



HG-ACB

Air Circuit Breakers

Essential for Today, Potential for Tomorrow

HD Hyundai Electric solely pursues the growth of our customers' business. From power generation to power distribution, we focus on developing and commercializing products and solutions aimed at increasing the efficiency of energy equipment as well as at proactively monitoring and controlling assets in an integrated manner to improve our customers' productivity and management efficiency. We are well aware that our efforts add to the driving force behind our customers' growth and contribute to the creation and maintenance of a more dynamic world. We focus on achieving innovation and strive to evolve continuously to shape a better tomorrow based on today's technological advancement



INTEGRICT

Energy Solution

Energy solution business refers to the business of designing, procuring and establishing a system that enables the efficient use of power energy through integrated management of the production, consumption, sales and operation.

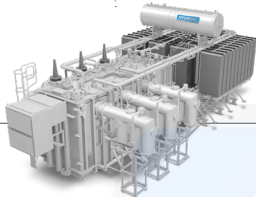
Asset Management Solution

Asset management solution is a business that maximizes the overall business efficiency by systematically managing the performance, risk, maintenance cost and others as well as by providing an asset management solution suitable to the customer's circumstance depending on the product lifecycle (PLC) of various products.

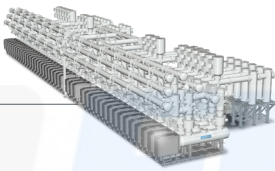
Generation(step-up)

Power Plants

- Supplied to more than 70 countries around the world for the past 45 over years since 1978
- Satisfies the various demands of customers through the acquisition of quality certifications from international accredited institute
- Participates in the world's key technical committee such as GIGRE and others, pioneering the establishment of technology standard related to power network



Power Transformer
· up to 800 kV, 1,500 MVA



Gas Insulated Switchgear
· up to 800 kV



Gas Insulated Switchgear
· up to 800 kV



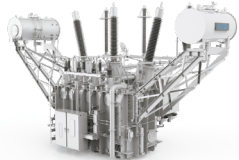
Power Transformer
· up to 800 kV, 1,500 MVA



Shunt Reactor
· up to 765 kV, 300 Mvar

- Can be installed in spaces smaller than the open type of substation by using SF₆ gas with outstanding insulation and arc extinguishing characteristics
- Manufacturing advanced products that are resistant to external environment and climate effects through the sealing at the charge part
- Extensive project experiences around the world
- Reduces installation period and cost due to simple installation and transportation, convenient maintenance
- Design considering the safety of the workers as priority

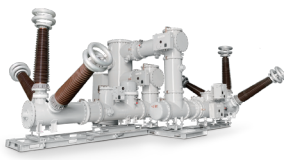
GREENTRIC



ECO Transformer
· up to 500 kV, 1,000 MVA

- Eco-friendly oil (Natural/Synthetic)
- Dynamic Pressure Resistant System(DPRS)
- Guarantees excellence in safety

GREENTRIC



SF₆ Free Gas Insulated Switchgear
· GIS for 170 kV 50 kA 60 Hz
· ECO GIS for 72.5 kV, 145 kV

- Korea's first solely developed technology
- Eco-friendly Novec mixture gas instead of SF₆ gas

Transmission

Primary Substation/Secondary Substation

Distribution



Cubicle GIS
· up to 40.5 kV
· IEC, ANSI, GOST, UL

- Produces high quality products using angle-less type
- Multi-functional digital protection relay (HIMAP) applied
- High reliability secured, provides various operation information such as protection, measurement and control
- Firm external box, size and compact, making it safe
- Maintains high quality through stringent quality control system and continuous research and development

Motor & Generator



Synchronous Generator
· Rated Output: < 50 MVA
· Rated Voltage: < 15 kV
· Ploes: > 2P

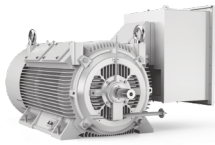
Marine

Marine Solution

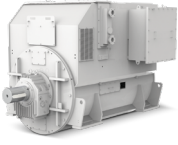
- Production of high quality marine devices satisfying the regulations and standards of key marine associations (LRS, ABS, DNV, GL, BV, NK etc.) and world's renowned institutes
- High quality safety secured through the latest equipment and stringent quality control system
- Realization of optimal high efficiency by converging SWGR, Generator, Motor, Telecom, Automation, Intelligent Motor Control Unit and others



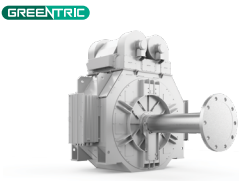
Marine Switchgear



Marine Motor



Generator



Shaft Generator



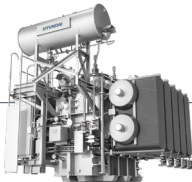
Metal Clad Switchgear

- up to 38 kV
- IEC, ANSI, UL



Low Voltage Switchgear & Motor Control Center

- H8PU : 480 V, 3,200 A, 65 kA
- H5600 : 480 V, 1,200 A, 65 kA
- HiMCC : 480 V, 5,000 A, 100 kA



Distribution Transformer

- up to 36 kV, 50 MVA



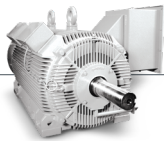
Cast Resin Transformer

- up to 36 kV, 20 MVA



Synchronous Motor

- Rated Output: < 40 MW
- Rated Voltage: < 15 kV
- Ploes: > 2P



MV&HV Induction Motor

- Rated Output: < 35 MW
- Rated Voltage: < 15 kV
- Poles: 2P-30P



VCB

- IEC, ANSI, UL
- up to 36/38 kV, 50 kA, 4,000 A



ACB

- AC : up to 150 kA, 6,300 A
- DC : up to 60 kA, 4,000 A



VC

- up to 12 kV, 400 A



Switch-Disconnecter

- DC : up to 100 kA/1 s, 4,000 A



HGMAP

- HGMAP Series



HGCAM

- HGCAM Series



MCCB

- AC : up to 150 kA, 1,600 A
- DC : up to 100 kA, 800 A



ELCB

- up to 85 kA, 800 A, 1,000 mA



MCCB / ELCB

- up to 10 kA, 100 A, 100 mA



MS / MC

- up to 800 A



Distribution Box

- Up to 36 ways
- Surface/Flush type



MCB

- up to 15 kA, 125 A



RCCB / RCBO

- up to 100 A, 500 mA



Isolator

- up to 125 A



Electronic Circuit Breaker

- up to 20 A



MMS

- up to 100 kA, 80 A



Installation Contactor

- up to 63 A



Fuse Links & Switches

- up to 1,250 A

- Can be applied to various places of demand due to various domestic and international certifications and marine certifications
- Full HG-Series line-up established
- High standard of breaking capacity and various product line offers production in any load environments
- Increased reliability with reinforced breaking performance of high-breaking MCCB
- Reinforced usage stability through internal reliability verification



SPD

- up to 200 kA
- AC, DC



HGDM



EOCR

- up to 60 A



LV Motor

- Rated Output: < 750 kW
- Rated Voltage: < 690 V
- Poles: 2P-12P

- Enhanced reliability and secured safety with production of products based on the world's best equipment and stringent quality system
- Realized high efficiency by selecting slot based on FEM
- Realized small and lightweight with optimal design based on FEM analysis method
- Satisfies the quality standards of international accredited institutes (IEC, IEEE, CSA, NEMA, API etc.)

HG

Air Circuit Breakers

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Model Selection Table

Air Circuit Breakers (HGN/HGS)

Model Name			HGN				HGS		
Item			A Frame	B Frame	C Frame	D Frame	A Frame	B Frame	
Rated Current [In max]	Based on 40 °C	A	06 : 630	06 : 630	32 : 3,200	40 : 4,000	06 : 630	20 : 2,000	
			08 : 800	08 : 800	40 : 4,000	50 : 5,000	08 : 800	25 : 2,500	
			10 : 1,000	10 : 1,000	50 : 5,000	63 : 6,300	10 : 1,000	32 : 3,200	
			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	65	85	85	100	50	70 ¹⁾ (KS : 65)	
		500/480/460 V	85	100	100	150	65	85	
		415/380/230/220V	85	100	100	150	65	85	
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	690/600/550V	143	187	187	220	105	154	
		500/480/460V	187	220	220	330	143	187	
		415/380/230/220V	187	220	220	330	143	187	
Rated Short-Time withstand Voltage [Icw] (Without Inst)									
1 Second		kA	65	85	85	100	50	70	
2 Seconds			42	75	75	85	35	65	
3 Seconds			35	65	65	75	28	50	
Rated Impulse withstand Voltage [Uimp]		kV	12				12		
Break time between tripping order and arc extinction		ms	35				35		
Closing Operational Time									
Motor Charging Time (sec) max.			10				10		
Closing Time (ms) max.			80				80		
Lifecycle (Cycles)									
Mechanical			20,000		15,000	10,000	10,000	20,000	15,000
Electrical			5,000		5,000	2,000	2,000	5,000	5,000
Weight									
3 Pole	Draw-Out Type	kg	63	87 (107) ²⁾	145	169	63	87	
	Fixed Type		34	44 (61) ²⁾	76	108	34	44	
4 Pole	Draw-Out Type		74	103 (140) ²⁾	173	214	74	103	
	Fixed Type		44	55 (80) ²⁾	81	137	44	55	
External dimensions (W×H×D)									
3 Pole	Draw-Out Type	mm	328×460×368.4	399×460×368.4	624×460×368.4	766×460×368.4	328×460×368.4	399×460×368.4	
	Fixed Type		337.4×404.4×295.8	408.4×404.4×295.8	633.4×404.4×295.8	775.4×404.4×295.8	337.4×404.4×295.8	408.4×404.4×295.8	
4 Pole	Draw-Out Type		413×460×368.4	514×460×368.4	794×460×368.4	996×460×368.4	413×460×368.4	514×460×368.4	
	Fixed Type		422.4×404.4×295.8	523.4×404.4×295.8	803.4×404.4×295.8	1,005×404.4×295.8	422.4×404.4×295.8	523.4×404.4×295.8	

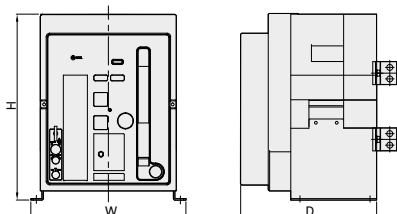
※ 1) 70 kA is DEKRA certified

2) 4,000 AF

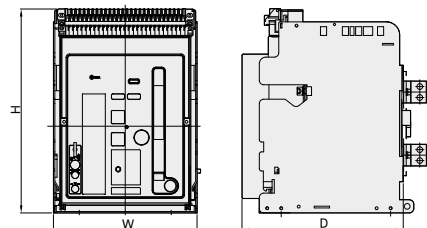
Life time is the limit lifespan and is not the guaranteed lifespan. In case of maintenance, it is charged. In the event of abnormalities in accessories during use, it can be replaced.

Quality Assurance : Based on IEC 60947-2's number of opening/closing within the warranty period.

Fixed Type



Draw-Out Type



Air Circuit Breakers (HGN1150V)

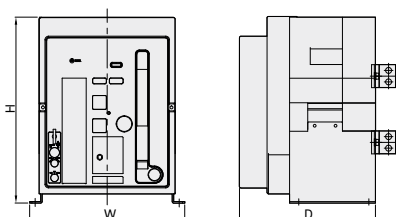
Model Name			HGN		
Item			P Frame	Q Frame	
Rated Current [In max]	Based on 40 °C	A	06:630	06:630	
			08:800	08:800	
			10:1,000	10:1,000	
			12:1,250	12:1,250	
			16:1,600	16:1,600	
			20:2,000	20:2,000	
				25:2,500	
				32:3,200	
			40:4,000		
Rated Operational Voltage [Ue]		V	1,150		
Rated Insulation Voltage [Ui]		V	1,250		
Frequency		Hz	50/60		
No. of Poles		P	3, 4		
Current Setting Range (···× In max)		A	0.4 ~ 1.0		
Rated Current of Neutral Pole (N) (··· %×In)		A	100%	100%	
Rated Breaking Capacity [Icu] [Sym]					
IEC 60947-2 Category “B”	AC	1,150/1,000/900V	kA	30	50
		800V		30	75
Rated Service Short-Circuit Breaking Capacity [Ics] (··· %×Icu)		kA	100%	100%	
Rated Closing Current [Icm] [Peak]					
IEC 60947-2 Category “B”	AC	1,150/1,000/900V	kA	66	110
		800V		66	165
Rated Short-Time withstand Voltage [Icw] (Without Inst)					
1 Second		kA	30	50	
Rated Impulse withstand Voltage [Uimp]		kV	12	12	
Break time between tripping order and arc extinction		ms	35	35	
Closing Operational Time					
Motor Charging Time (sec) max.			10	10	
Closing Time (ms) max.			80	80	
Lifecycle (Cycles)					
Mechanical			10,000	10,000	
Electrical			5,000	5,000	
Weight					
3 Pole	Draw-Out Type	kg	68	92 (112) ¹⁾	
	Fixed Type		36	46 (61) ¹⁾	
4 Pole	Draw-Out Type		79	108 (145) ¹⁾	
	Fixed Type		46	57 (80) ¹⁾	
External dimensions (W×H×D)					
3 Pole	Draw-Out Type	mm	328×483.3×368.4	399×483.3×368.4	
	Fixed Type		337.4×404.4×295.8	408.4×404.4×295.8	
4 Pole	Draw-Out Type		413×483.3×368.4	514×483.3×368.4	
	Fixed Type		422.4×404.4×295.8	523.4×404.4×295.8	

※ 1) 4,000AF

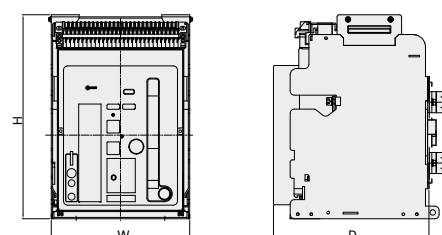
Life time is the limit lifespan and is not the guaranteed lifespan. In case of maintenance, it is charged. In the event of abnormalities in accessories during use, it can be replaced.

Quality Assurance : Based on IEC 60947-2's number of opening/closing within the warranty period.

Fixed Type



Draw-Out Type



Model Selection Table

Accessories - Protective Relay (OCR)

Function	General Feeder					Generator (Marine Type)		
Model Name	N Type	A Type		P Type	H Type	N Type	A Type	P Type
	GPR-LN	GPR-LA	GPR-LAG	GPR-LP	GPR-LH	GPR-SN	GPR-SA	GPR-SP
Frequency								
50 Hz	50	51	52	54	55	57	58	59
60 Hz	60	61	62	64	65	67	68	69
Control Power								
External Power	-	●	●	●	●	-	●	●
Self-Power	●	●	●	●	●	●	●	●
Protection Function								
LTD (Long Time)	●	●	●	●	●	●	●	●
STD (Short Time)	●	●	●	●	●	●	●	●
INST (Instantaneous)	●	●	●	●	●	●	●	●
Pre-Trip Alarm	-	●	●	●	●	-	●	●
Ground Fault Trip	●	●	-	●	●	-	-	-
ELT Function	-	-	● Outer CT Ground 2) (Ground fault at more than 30 A)	-	-	-	-	-
Thermal Function	●	●	●	●	●	●	●	●
Field Test	-	●	●	●	●	-	●	●
Fail Safe	●	●	●	●	●	●	●	●
Indication								
True RMS Detection Method	●	●	●	●	●	●	●	●
LED Indication per Trip Type	-	●	●	●	●	-	●	●
Fault LED	L 1)	PTA, L, S/I, G	PTA, L, S/I, leakage	PTA, L, S/I, G	PTA, L, S/I, G	L 1)	PTA, L, S/I	PTA, L, S/I
Real-Time LCD Indication of Load Rate per Phase	-	●	●	●	●	-	●	●
Measurement LCD	-	●	●	●	●	-	●	●
Output Contact								
Integrated Instantaneous Contact (1a)	-	-	-	-	-	-	-	-
Individual Continuous Contact (4a)	-	●	●	●	●	-	● 4)	● 4)
Operation								
MCR	-	○	○	○	○	-	○	○
Communication	NFC	Modbus-RTU	Modbus-RTU	Modbus-RTU	Modbus-RTU	NFC	Modbus-RTU	Modbus-RTU
Event/Fault Recording	●	●	●	●	●	●	●	●

※ ● : Standard, ○ : Option

1) Indicates reserve before operation during long time delay.

2) ZCT designated by the customer is used.

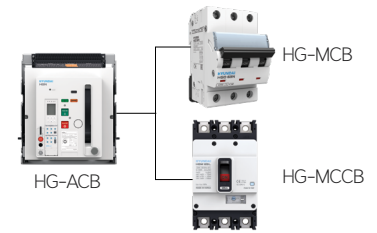
3) ZCT designated by our company is used.

4) As for marine type, individual continuous contact is 3a.

Air Circuit Breakers (HGN/HGS)

Selective Breaking Method of Protection Coordination

- Upstream : ACB HGN/HGS
- Downstream : MCB HGD, MCCB HGM/HGP



Upstream →																			
Downstream ↓	Item		ACB																
	Model Name			HGN/HGS A Frame						HGN/HGS B Frame				HGN C Frame		HGN D Frame			
		Rated Current (A)	Rated Breaking Current [Icu] (kAms)	630	800	1,000	1,250	1,600	2,000	2,000	2,500	3,200	4,000	4,000	5,000	4,000	5,000	6,300	
				85	85	85	85	85	85	100	100	100	100	100	100	100	150	150	
HGD63E B, C, D Curve	1	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	2	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	3	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	4	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	5	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	6	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	10	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	13	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	15	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	16	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	20	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	25	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	32	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	40	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	50	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	63	3	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
MCB HGD63S B, C, D Curve	1	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	2	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	3	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	4	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	5	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	6	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	10	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	13	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	15	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	16	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	20	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	25	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	32	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	40	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	50	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	63	4.5	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
HGD63N/M B, C, D Curve	1	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	2	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	3	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	4	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	5	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	6	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	10	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	13	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	15	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	16	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	20	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		
	25	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		

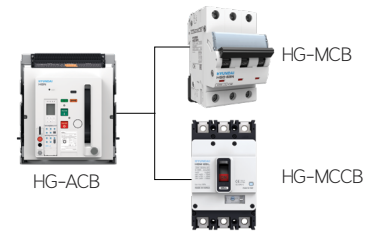
※ ☒ Selective breaking is possible in all sectors, ☐ Selective breaking is impossible in this sector.

Model Selection Table

Air Circuit Breakers (HGN/HGS)

Selective Breaking Method of Protection Coordination

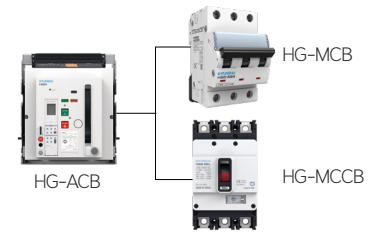
- Upstream : ACB HGN/HGS
- Downstream : MCB HGD, MCCB HGM/HGP



Upstream →																		
Downstream ↓	Item	ACB																
	Model Name			HGN/HGS A Frame						HGN/HGS B Frame				HGN C Frame		HGN D Frame		
		Rated Current (A)	Rated Breaking Current [I _{cu}] (kA _{ms})	630	800	1,000	1,250	1,600	2,000	2,000	2,500	3,200	4,000	4,000	5,000	4,000	5,000	6,300
				85	85	85	85	85	85	100	100	100	100	100	100	100	150	150
MCB	HGD63N/M B, C, D Curve	32	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		40	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		50	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		63	6	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	HGD63H B, C, D Curve	1	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		2	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		3	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		4	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		5	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		6	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		10	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		13	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		15	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		16	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		20	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		25	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		32	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		40	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		50	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		63	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	HGD125 B, C, D Curve	80	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		100	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		125	10	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
MCCB	HGM100	16	30	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		20	30	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		25	30	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		32	30	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		40	30	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		50	30	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		63	30	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		75	30	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		80	30	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		100	30	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	HGM125	16	55	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		20	55	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		25	55	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		32	55	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		40	55	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
		50	55	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T
	63	55	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
	75	55	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
	80	55	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
	100	55	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	
	125	55	T	T	T	T	T	T	T	T	T	T	T	T	T	T	T	

※ ☒ Selective breaking is possible in all sectors, ☐ Selective breaking is impossible in this sector.
MCCB Rated Breaking Current : Based on AC 440/460 V, HGM L-Type, HGP X-Type

- Upstream : ACB HGN/HGS
- Downstream : MCB HGD, MCCB HGM/HGP



Upstream →

Downstream ↓

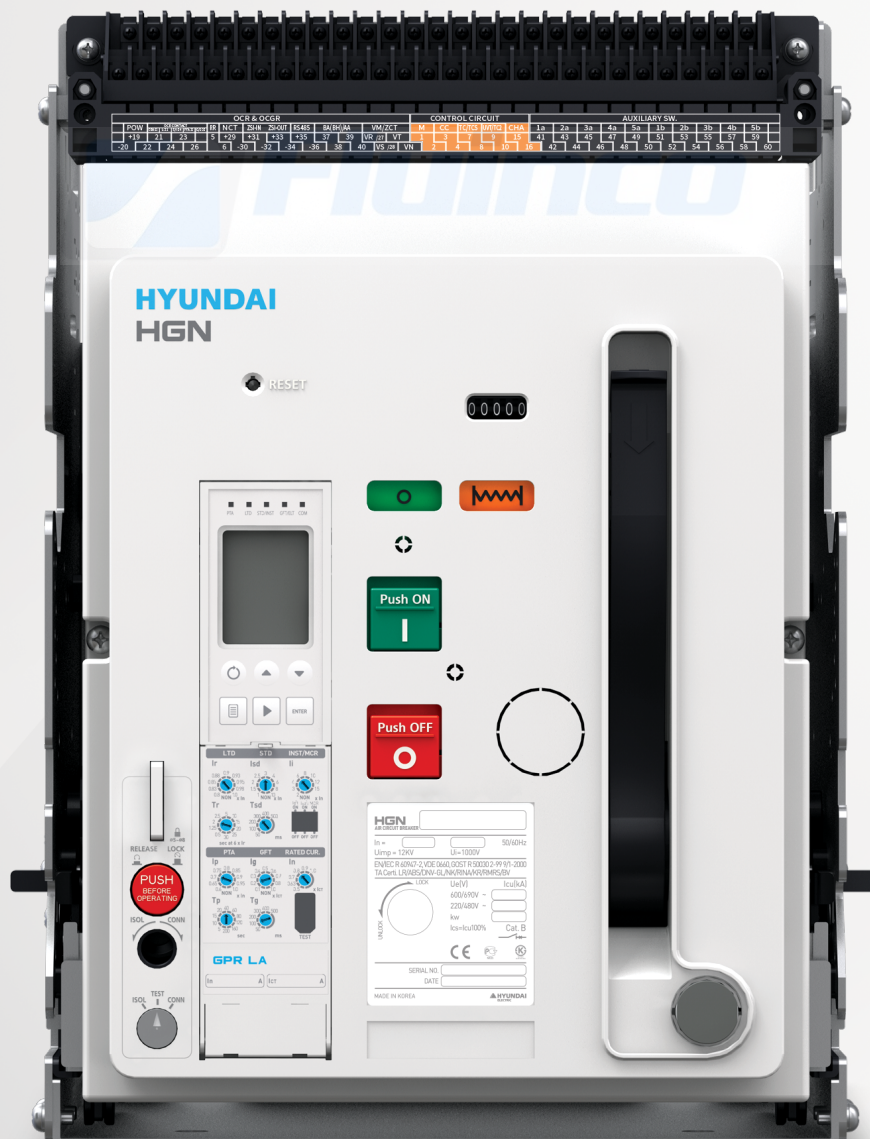
Item	ACB														
	Model Name	Rated Current (A)	Rated Breaking Current [Icu] (kArms)	HGN/HGS A Frame						HGN/HGS B Frame				HGN C Frame	
				630	800	1,000	1,250	1,600	2,000	2,000	2,500	3,200	4,000	4,000	5,000
				85	85	85	85	85	85	100	100	100	100	100	100
ACB	HGM160 E/S/H/L	100	55	T	T	T	T	T	T	T	T	T	T	T	T
		125	55	T	T	T	T	T	T	T	T	T	T	T	T
		150	55	T	T	T	T	T	T	T	T	T	T	T	T
		160	55	T	T	T	T	T	T	T	T	T	T	T	T
		175	55	T	T	T	T	T	T	T	T	T	T	T	T
		200	55	T	T	T	T	T	T	T	T	T	T	T	T
		225	55	T	T	T	T	T	T	T	T	T	T	T	T
		250	55	T	T	T	T	T	T	T	T	T	T	T	T
	HGM400 E/S/H/L	250	85	T	T	T	T	T	T	T	T	T	T	T	T
		300	85	T	T	T	T	T	T	T	T	T	T	T	T
		350	85	T	T	T	T	T	T	T	T	T	T	T	T
		400	85	T	T	T	T	T	T	T	T	T	T	T	T
	HGM630	500	85		T	T	T	T	T	T	T	T	T	T	T
		630	85		T	T	T	T	T	T	T	T	T	T	T
	HGM800	700	85			T	T	T	T	T	T	T	T	T	T
		800	85			T	T	T	T	T	T	T	T	T	T
MCCB	HGP125D	16	150	T	T	T	T	T	T	T	T	T	T	T	T
		20	150	T	T	T	T	T	T	T	T	T	T	T	T
		25	150	T	T	T	T	T	T	T	T	T	T	T	T
		32	150	T	T	T	T	T	T	T	T	T	T	T	T
		40	150	T	T	T	T	T	T	T	T	T	T	T	T
		50	150	T	T	T	T	T	T	T	T	T	T	T	T
		63	150	T	T	T	T	T	T	T	T	T	T	T	T
		80	150	T	T	T	T	T	T	T	T	T	T	T	T
		100	150	T	T	T	T	T	T	T	T	T	T	T	T
		125	150	T	T	T	T	T	T	T	T	T	T	T	T
	HGP250	100	150	T	T	T	T	T	T	T	T	T	T	T	T
		125	150	T	T	T	T	T	T	T	T	T	T	T	T
		150	150	T	T	T	T	T	T	T	T	T	T	T	T
		160	150	T	T	T	T	T	T	T	T	T	T	T	T
		175	150	T	T	T	T	T	T	T	T	T	T	T	T
		200	150	T	T	T	T	T	T	T	T	T	T	T	T
		225	150	T	T	T	T	T	T	T	T	T	T	T	T
		250	150	T	T	T	T	T	T	T	T	T	T	T	T
	HGP400	300	150	T	T	T	T	T	T	T	T	T	T	T	T
		350	150	T	T	T	T	T	T	T	T	T	T	T	T
		400	150	T	T	T	T	T	T	T	T	T	T	T	T
	HGP630	500	150		T	T	T	T	T	T	T	T	T	T	T
		630	150		T	T	T	T	T	T	T	T	T	T	T
	HGP800	700	150			T	T	T	T	T	T	T	T	T	T
		800	150			T	T	T	T	T	T	T	T	T	T

※ ☒ Selective breaking is possible in all sectors, ☐ Selective breaking is impossible in this sector.
MCCB Rated Breaking Current : Based on AC 440/460 V, HGM L-Type, HGP X-Type

HG Series

Air Circuit Breakers

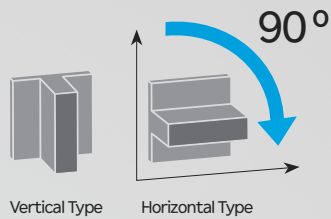
Maximized customer's range of selection and level of satisfaction with model dualization and compact size.



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, HGND Frame)

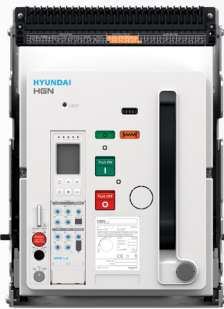
Type per Rating

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

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

Rated Impulse Withstand Voltage (Uimp) : 12kV

100 % N Phase Current Flow Capacity for all Types



A Frame [85 kA]

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



B Frame [100 kA]

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



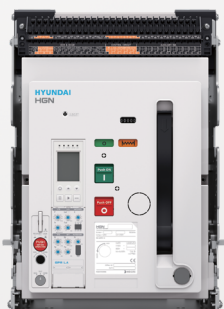
C Frame [100 kA]

3,200 ~ 5,000A (HGN)



D Frame [150 kA]

4,000 ~ 6,300A (HGN)



P Frame [30kA]

HGN 630 ~ 2,000 A



Q Frame [50kA]

HGN 630 ~ 4,000 A

Overview and Characteristics

Air Circuit Breaker (ACB)

Capable of Responding to Various Customer Applications

HG Series air circuit breaker is equipped with high breaking capacity and highly functional OCR, making various customer applications on industrial building, computer center, device industries and others possible. With all models designed with 100 % n phase current flow capacity, the equipment is safely protected against abnormal phenomenon such as harmonics and others.

Equipped with Various Accessories and Highly Functional Protection Trip Relay (OCR)

Over Current Relay (Trip Relay)

Apart from the basic protection functions, OCR has reinforced power monitoring functions such as temperature monitoring, fault recording and storage etc., enabling stable power supply.

N Type

- Overcurrent Protection (L/S/I/G)
- World's First NFC Function Applied
- Fault Recording (10) and Waveform (4 Cycles, Check Via Communication) can be Transmitted to Mobile Phone App

A Type

- Overcurrent Protection (L/S/I/G)
- Self Power
- Individual Continuous Power Contact
- Fault Recording (256) and Waveform (4 Cycles, Check Via Communication)
- Communication (MODBUS), External Grounding CT/Earth Leakage ZCT can be used

P Type

- Overcurrent Protection (L/S/I/G)
- External Power
- Individual Continuous Power Contact
- Fault Recording (256) and Waveform (4 Cycles, Check Via Communication)
- Over-Voltage/Under-Voltage, Power, Power Factor, Energy Display

H Type

- L/S/I/G Functions
- External Power
- Individual Continuous Power Contact
- Fault Recording (256) and Waveform (4 Cycles, Check Via Communication)
- L/S/I/G Minute Current Adjustment
- Voltage/Current Harmonics (1 st ~ 63 th) Analysis
- View 3 Phase Waveform

Bus Bar Terminal can be Changed to Horizontal/Vertical

Connection method can be changed flexibly according to the customer's panel structure

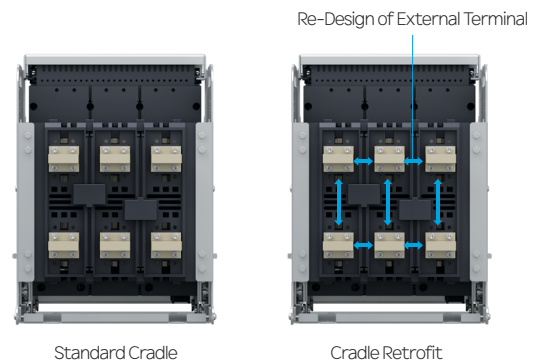
- HGS/HGN A, P frame 630 ~ 1,600 A
- HGS/HGN B, Q frame 630 ~ 3,200 A

Convenient Maintenance by Attaching Draw-In/Out Device to the Body

Customized Retrofit ACB

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

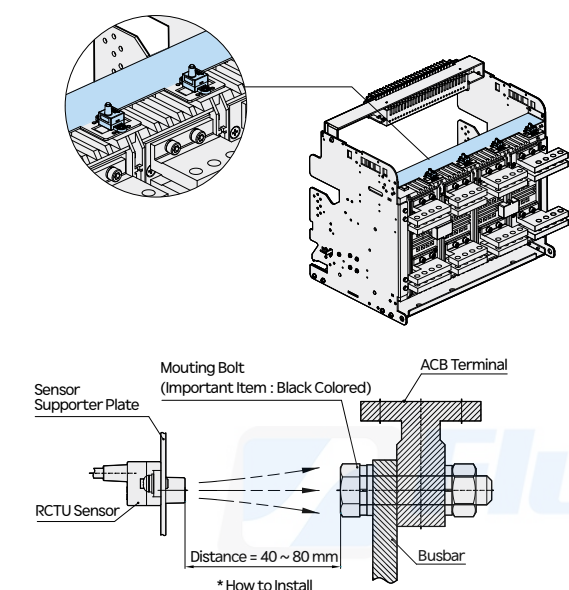
- Economic : No need for busbar and external box replacement, minimum construction period, uninterruptable replacement in case of body retrofit
- Stability : Lifespan can be extended through the latest relay performance and by providing breaking performance of high breaking product
- Compatibility : Stable usage through control terminal bar, bus bar structure and plug-in compatible devices
- Technical Support : Customer satisfaction through inspection of various accessories of old panels



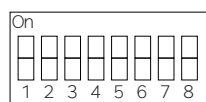
Equipped with Temperature Sensor

Reliable high temperature measurement is possible following the sensor measurement of the heat source (Range of measurement : -5 ~ 250 degrees)

Example of IR Sensor Application



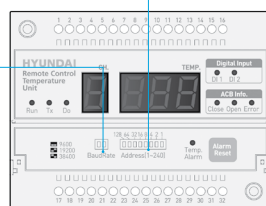
Address Setting : 1 ~ 240



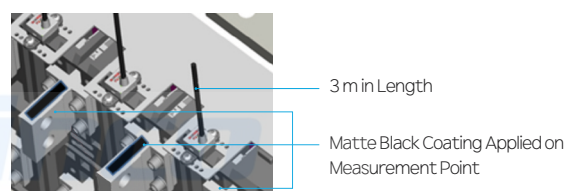
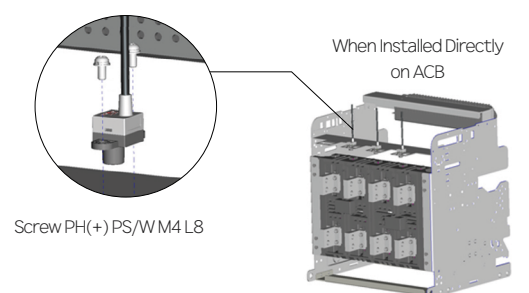
Baud Rate Setting



Set	Description
Off Off	9,600
Off On	19,200
On Off	38,400



Installation of IR Sensor



- IR temperature sensor has to be installed with sufficient insulation distance from the point to be measured
- The recommended distance between the measurement point and temperature sensor is 50 ~ 80 mm.
- The measurement point has to be a surface without reflection due to the characteristics of the IR sensor and matte black painting is recommended for the measurement point.

Caution

1. The measurement value of the IR sensor differs depending on the reflection rate of the metal surface. Surfaces coated with matte black or surface with varnish excluding metallic varnish must be measured.
2. The size of measurement point differs depending on the D : S Ratio for the surface to be measured and the IR distance. This sensor has a ratio of 8 : 1.

Applied Standards and Certifications

HG Series air circuit breaker has acquired testing/certifications from IEC 60947-1, 2 certified testing institute and can be installed and applied according to the usage environment and conditions permitted by the standards.

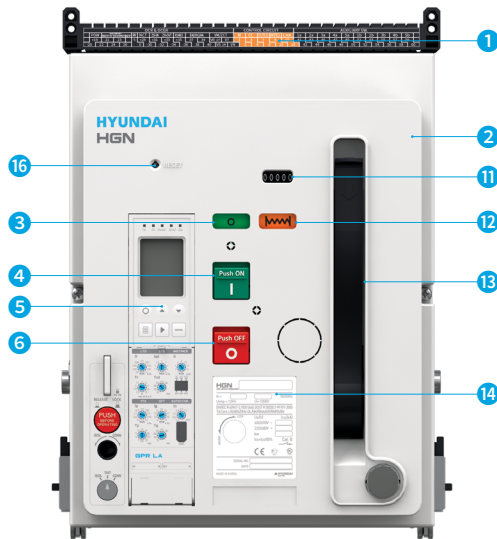


Acquired Standards and Certifications

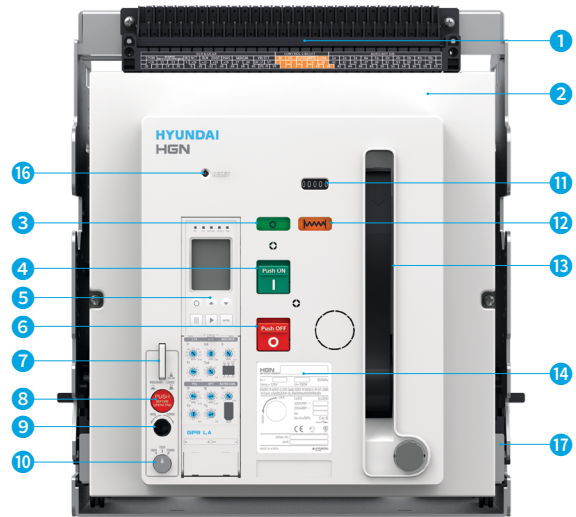
- KS Certification : KS C 4620
- CB Certification (DEKRA, KERI) : IEC 60947-1, 2
- CE Mark
- CCC Certification
- Vessel Certification : LR, ABS, KR, BV, GL, NK, RINA, DNV, RS
- 9 Major Vessel Certifications : KR, GL, LR, ABS, BV, NK, RINA, DNV, RS

External·Internal Structure

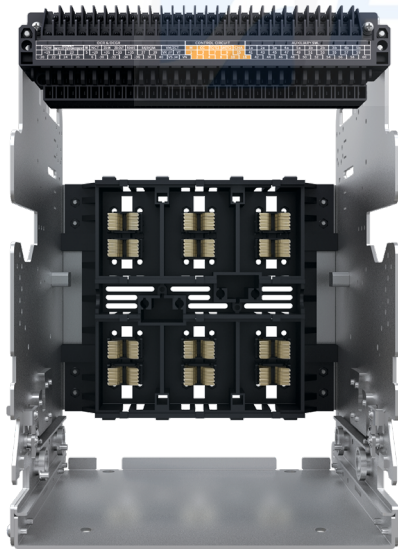
Air Circuit Breakers (HGN/HGS)



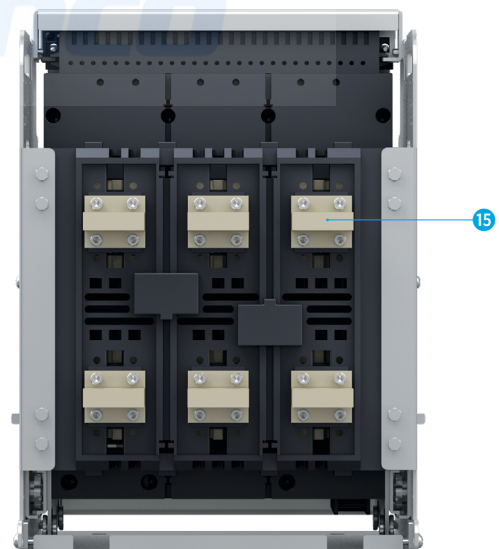
Draw-In/Out Type (ACB Body)



Draw-In/Out Type (Including Cradle)



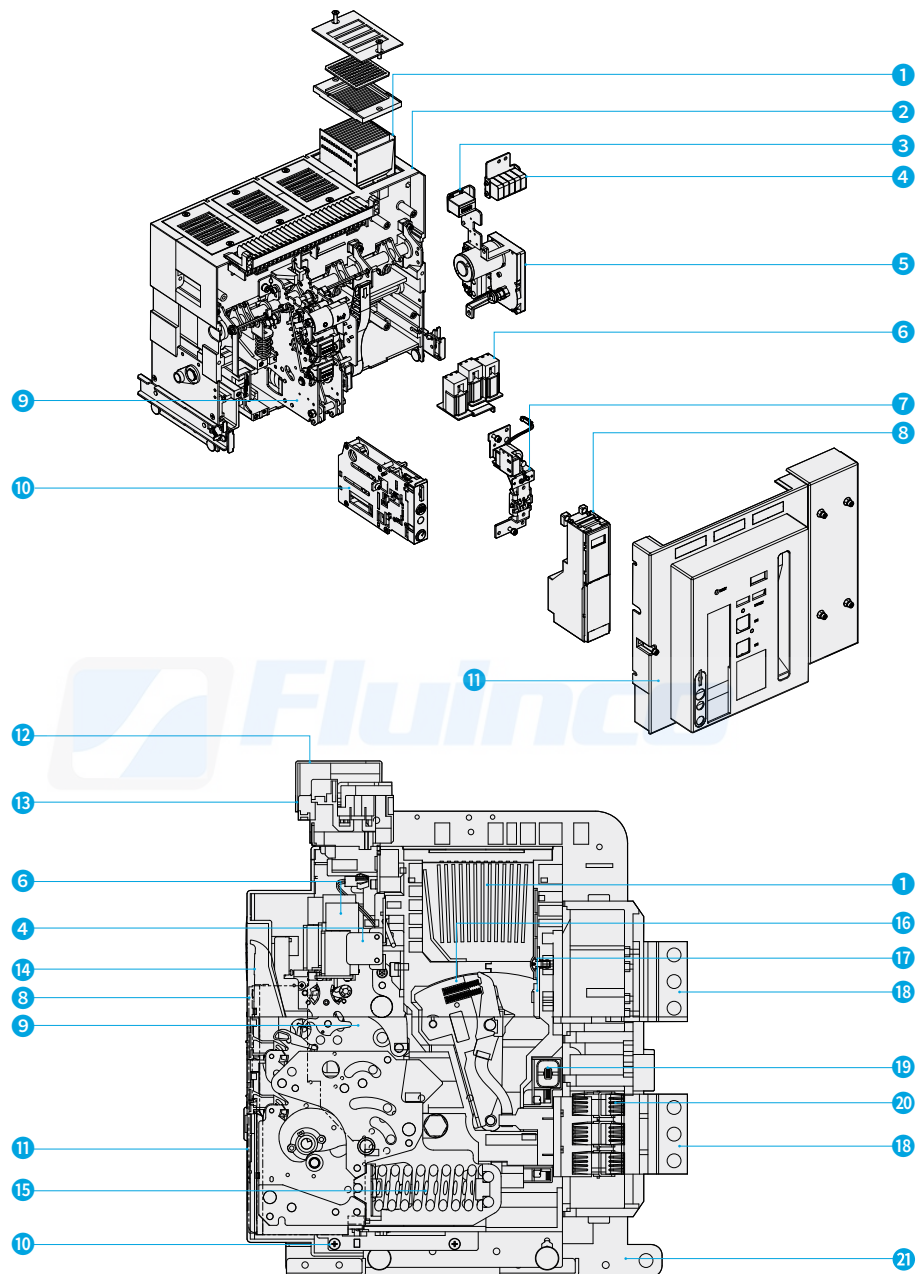
Cradle Front



Cradle Rear

Air Circuit Breakers (HGN/HGS)

- | | | |
|----------------------------|-------------------------------------|--------------------------------|
| ① Control Circuit Terminal | ⑦ Position Padlock | ⑬ Manual Charging Handle |
| ② Front-Cover | ⑧ Position Lock Release Button | ⑭ Rating Nameplate |
| ③ Close/Open Indicator | ⑨ Draw-In/Out Handle Insertion Hole | ⑮ Terminal Busbar |
| ④ Close Button | ⑩ Position Indicator | ⑯ OCR & Alarm S/W Reset Button |
| ⑤ Overcurrent Relay Device | ⑪ Counter | ⑰ Draw-In/Out Guide Rail |
| ⑥ Open Button | ⑫ Charged/Discharged Indicator | |



Air Circuit Breakers (HGN/HGS)

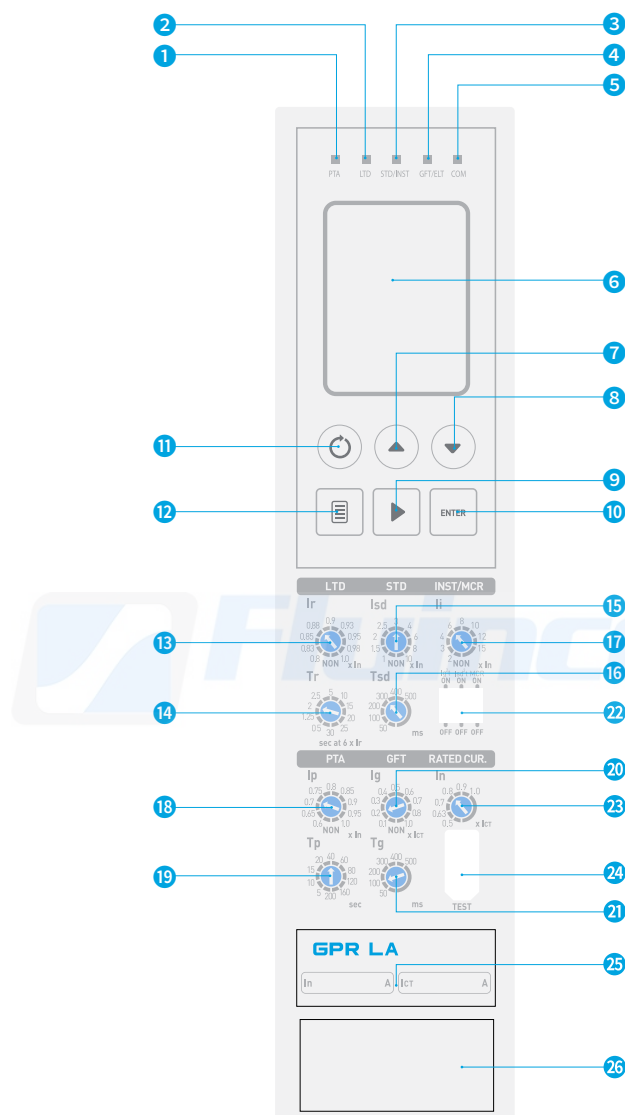
- | | | | |
|-------------------------|--------------------------------------|---------------------------|----------------------------|
| 1 DI Grid | 7 MHT Device | 13 Control Terminal | 19 Current Transformer(CT) |
| 2 CO Unit | 8 OCR | 14 Manual Charging Handle | 20 Terminal Clip |
| 3 Counter | 9 Mechanism | 15 Closing Spring | 21 Cradle |
| 4 AUX Switch | 10 DR Device | 16 Moving Contact | |
| 5 Motor | 11 Cover | 17 Fixed Contact | |
| 6 Closing/Trip/UVT Coil | 12 Control Terminal Protection Cover | 18 Terminal | |

※ HG Series air circuit breaker has been designed so that upon closing, the N phase is closed earlier than R, S, T phase and upon opening, the N phase is disconnected last in order to reduce burden of main contact and to prevent ripple effect of accident of N phase.

Accessories

Over Current Relay (OCR)

External



Protective Relay (OCR) Accessories

- | | | | |
|----------------------------|---------------------------------|-------------------------------------|---|
| 1 PTA Signal LED | 8 LTD Test Button | 15 STD Pick Up Setting | 22 GFT/STD (Inverse Time Setting),
MCR On/Off Setting Switch |
| 2 LTD Signal LED | 9 Movement Button | 16 STD Operational Time Setting | 23 In (Rated Current) Setting |
| 3 STD/INST Signal LED | 10 Enter Button | 17 INST Pick Up Setting | 24 Temporary Test Connection Jack |
| 4 GFT/ELT Signal LED | 11 Reset Button | 18 PTA Pick Up Setting | 25 Model Name |
| 5 Com. Signal LED | 12 Menu Button | 19 PTA Operational Time Setting | 26 Battery |
| 6 LCD/NFC Antenna (LN, SN) | 13 LTD Pick Up Setting | 20 GFT/ELT Pick Up Setting | |
| 7 STD/INST Test Button | 14 LTD Operational Time Setting | 21 GFT/ELT Operational Time Setting | |

※ Self-power functions normally in the case of 10 % for 3 phases and 30 % for a single phase. However, when 200A, 320A, 400A CT is used, it functions normally in case of 50 % for 3 phase and more than 100 % for single phase.

When using MCR function, mark B8 in the name of order type. Auxiliary contact point is 4a5b.

The lifespan of the battery is usually 10 years so in case it is time for replacement, contact our customer support division and services can be received at a cost.

High/low test function is automatically disabled when a load current is applied.

Enhancement of Over Current Relay (OCR) Functions

Over current relay (OCR) built in the HG Series air circuit breaker has reinforced power monitoring functions such as temperature monitoring, fault recording other than the basic protection function, ultimately enabling stable power supply.

Item	General Feeder					
Model Name	N Type	A Type		P Type	H Type	
	GPR-LN	GPR-LA	GPR-LAG (Outer CT Ground)	GPR-LP	GPR-LH	
Externals						
Frequency	50 Hz	50	51	52	54	55
	60 Hz	60	61	62	64	65
Main Functions	• L/S/I/G • Thermal • Self-Power • Fail Safe • Integrated Instantaneous Contact • 10 ea Fault Recording (Check Via Communication) • Last Fault's Waveform Recording (4 Cycles, Check Via Communication)	• L/S/I/G • Thermal • Self-Power • Fail Safe • Communication (Modbus) • External Power • ZSI • Remote Reset Function • Individual Continuous Contact : LTD, STD/INST, GFT, PTA • 256 ea Fault Recording • Last Fault's Waveform Recording (4 Cycles, Check Via Communication) • 200 ea Event Recording (Check Via Communication)	• L/S/I Uses Dedicated Outer CT Ground if Outer CT Ground (More than 30 A) > 5 A at Secondary) • Thermal • Self-Power • Fail Safe • Communication (Modbus) • External Power • ZSI • Remote Reset Function • Individual Continuous Contact : LTD, STD/INST, GFT, PTA • 256 ea Fault Recording • Last Fault's Waveform Recording (4 Cycles, Check Via Communication) • 200 ea Event Recording (Check Via Communication)	• L/S/I/G • Thermal • Self-Power • Fail Safe • Communication (Modbus) • External Power • ZSI • Remote Reset Function • Individual Continuous Contact : LTD, STD/INST, GFT, PTA • 256 ea Fault Recording • Last Fault's Waveform Recording (4 Cycles, Check Via Communication) • 200 ea Event Recording (Check Via Communication) • Over-Voltage/Under-Voltage • Imbalance Type (Voltage/Current) • Reverse Power • 3 Phase Voltage/Current RMS/Vector • Power (P, Q, S), Power Factor (3 Phase) • Energy (Normal/Reverse Direction) • Frequency, Demand • Minute Current Adjustment at Long Time, Short Time, Instantaneous, Ground Setting • Voltage/Current Harmonics (1 st ~ 63 th) • View 3 Phase Waveform • THD, TDD	• L/S/I/G • Thermal • IDMTL • Self-Power • Fail Safe • Communication (Modbus) • External Power • ZSI • Remote Reset Function • Individual Continuous Contact : LTD, STD/INST, GFT, PTA • 256 ea Fault Recording • Last Fault's Waveform Recording (4 Cycles, Check Via Communication) • 200 ea Event Recording • Over-Voltage/Under-Voltage • Imbalance Type (Voltage/Current) • Reverse Power • 3 Phase Voltage/Current RMS/Vector • Power (P, Q, S), Power Factor (3 Phase) • Energy (Normal/Reverse Direction) • Frequency, Demand • Minute Current Adjustment at Long Time, Short Time, Instantaneous, Ground Setting • Voltage/Current Harmonics (1 st ~ 63 th) • View 3 Phase Waveform • THD, TDD	

Accessories

Over Current Relay (OCR)

Enhancement of Over Current Relay (OCR) Functions

Over current relay (OCR) built in the HG Series air circuit breaker has reinforced power monitoring functions such as temperature monitoring, fault recording other than the basic protection function, ultimately enabling stable power supply.

Item		Generator (Marine Type)		
Model Name		N Type	A Type	P Type
		GPR-SN	GPR-SA	GPR-SP
Externals				
Main Functions	Frequency	50Hz 60Hz	58 68	59 69
		• L/S/I • Minute Current Adjustment • Thermal • Self-Power • Fail Safe • Integrated Instantaneous Contact • 10 ea Fault Recording (Check Via Communication) • Last Fault's Waveform Recording (4 Cycles, Check Via Communication)	• L/S/I • Minute Current Adjustment • Thermal • Self-Power • Fail Safe • Communication (Modbus) • External Power • ZSI • Remote Reset Function • Individual Continuous Contact : LTD, STD/INST, PTA • 256 ea Fault Recording • Last Fault's Waveform Recording (4 Cycles, Check Via Communication) • 200 ea Event Recording (Check Via Communication)	• L/S/I • Thermal • Self-Power • Fail Safe • Communication (Modbus) • External Power • ZSI • Remote Reset Function • Individual Continuous Contact : LTD, STD/INST, PTA • 256 ea Fault Recording • Last Fault's Waveform Recording (4 Cycles, Check Via Communication) • 200 ea Event Recording (Check Via Communication) • Over-Voltage/Under-Voltage • Imbalance Type (Voltage/Current) • Reverse Power/Over-Power • 3 Phase Voltage/Current RMS/Vector • Power (P, Q, S), Power Factor (3 Phase) • Energy (Normal/Reverse Direction) • Demand • Minute Current Adjustment at Long Time, Short time, Instantaneous, Ground Setting

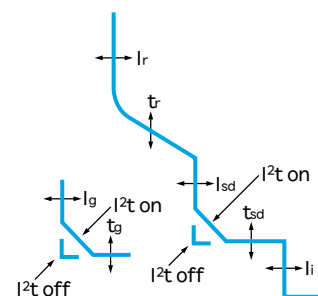
Appearance and Setting Value

GPR-LN (50, 60)



- Overload Protection
 - Long time delay
- Short Circuit Protection
 - Short time delay, instantaneous trip
 - I²t On/Off optional (for STD)
- Ground Fault Protection
 - I²t On/Off optional
- Neutral Wire Protection
 - 3P : No protection for neutral wire
 - 4P : 100 % × In
 - LTD, STD, INST protection
- Self-Power
- Equipped with NFC Functions
 - Incident information can be received to the mobile phone
 - Introduction of function and app installation method : Refer to Page 34

• Protection Features



Protection Functions

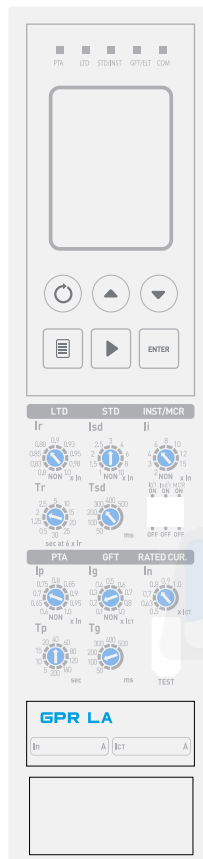
LTD Protection	Current Setting (A)	$I_n = I_{ct} \times \dots$	0.5	0.63	0.7	0.8	0.9	1				
		$I_r = I_n \times \dots$	0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1	Non
	Time Delay (sec)	$t_r @ (1.5 \times I_r)$	10.4	26.1	41.7	52	104	208	312	417	521	626
	Accuracy : $\pm 15\%$ or Below 100 ms	$t_r @ (6.0 \times I_r)$	0.5	1.25	2	2.5	5	10	15	20	25	30
STD Protection	Current Setting (A)	$I_{sd} = I_n \times \dots$	1	1.5	2	2.5	3	4	6	8	10	Non
	Time Delay (sec) @ $10 \times I_n$	t_{sd}	0.05	0.1	0.2	0.3	0.4	0.5				
	Accuracy : $\pm 15\%$	I ² t Off	0.05	0.1	0.2	0.3	0.4	0.5				
		I ² t On	0.05	0.1	0.2	0.3	0.4	0.5				
Instantaneous Protection	Current Setting (A)	$I_{li} = I_n \times \dots$	2	3	4	6	8	10	12	15	Non	
	Tripping Time		Below 50 ms									
	Grounding Pick-Up Setting (A)	$I_g = I_{ct} \times \dots$	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1	Non
	Accuracy : $\pm 15\%$ ($I_g > 0.4 I_n$) $\pm 20\%$ ($I_g \leq 0.4 I_n$)											
Grounding Protection	Time Delay (sec) @ $1 \times I_{ct}$	t_g	0.05	0.1	0.2	0.3	0.4	0.5				
	Accuracy : $\pm 20\%$	I ² t Off	0.05	0.1	0.2	0.3	0.4	0.5				
		I ² t On	0.05	0.1	0.2	0.3	0.4	0.5				
		I ² t off	20	80	160	260	360	460				
		Max. Trip Time (ms)	80	140	240	340	440	540				

Accessories

Over Current Relay (OCR)

Appearance and Setting Value

GPR-LA (51, 61)

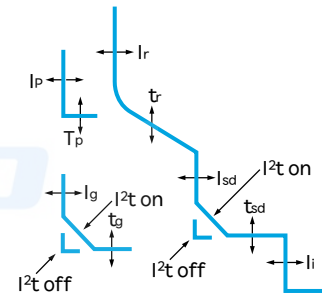


- Overload Protection
 - Long time delay
- Short Circuit Protection
 - Short time delay, instantaneous trip
 - I^2t On/Off optional (for STD)
- Ground Fault Protection
 - I^2t On/Off optional
- Neutral Wire Protection
 - 3 Pole : No protection
 - 4 Pole : Non, 50 %, 100 % ($\times I_r$, I_{sd} , I_i)
- Measurement and Display
 - 3 Phase current
- Realization of Protective Coordination by ZSI (Zone Selective Interlocking)
- Fault Recording
 - Records up to 256 fault information on fault type, fault phase, fault value, occurrence time of fault
- Event Recording
 - Records up to 200 events of devices, records changes in protection trip relay information
- Pre-Trip Alarm
 - Prevent unnecessary overload trip by setting according to rated current (I_n)
- Field Test
 - Simulation of long time, short time, instantaneous

- RS-485 Communication/Modbus-RTU
- 4a DO (Digital Output)
 - Contact specification

Rating	Nominal Switching Capacity (Resistive Load)	5 A 277 VAC
	Max. Switching Power (Resistive Load)	1,385 VA
	Max. Switching Voltage	277 VAC
	Max. Switching Current	5 A
	Max. Switching Capacity (Reference Value)	100 mA 5 VDC

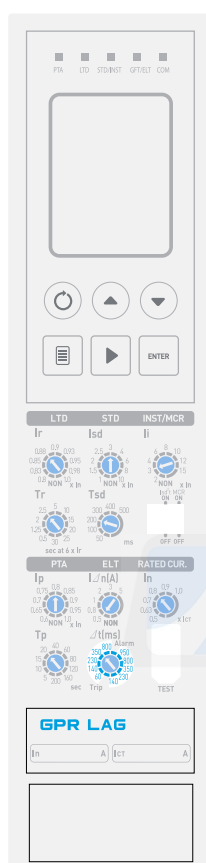
- Protection Features



Protection Functions

LTD Protection	Current Setting (A)	$I_n = I_{ct} \times \dots$ $I_r = I_n \times \dots$	0.5	0.63	0.7	0.8	0.9	1					
	Time Delay (sec)	$t_r @ (1.5 \times I_r)$ $t_r @ (6.0 \times I_r)$ $t_r @ (7.2 \times I_r)$	10.4	26.1	41.7	52	104	208	312	417	521	626	
	Accuracy : $\pm 15\%$ or Below 100 ms		0.5	1.25	2	2.5	5	10	15	20	25	30	
			0.35	0.86	1.38	1.73	3.45	6.9	10.4	13.8	17.3	20.7	
STD Protection	Current Setting (A)	$I_{sd} = I_n \times \dots$	1	1.5	2	2.5	3	4	6	8	10	Non	
	Time Delay (sec) @ $10 \times I_n$	t_{sd} I^2t Off I^2t On	0.05	0.1	0.2	0.3	0.4	0.5					
	Accuracy : $\pm 15\%$		0.05	0.1	0.2	0.3	0.4	0.5					
		$(I^2t$ Off) Min. Trip Time (ms)	20	80	160	260	360	460					
Instantaneous Protection	Current Setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Non		
	Tripping Time		Below 50 ms										
Grounding Protection	Grounding Pick-Up Setting (A)	$I_g = I_{ct} \times \dots$	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1	Non	
	Accuracy : $\pm 15\%$ ($I_g > 0.4 I_n$) $\pm 20\%$ ($I_g \leq 0.4 I_n$)												
	Time Delay (sec) @ $1 \times I_{ct}$	t_g I^2t Off I^2t On	0.05	0.1	0.2	0.3	0.4	0.5					
	Accuracy : $\pm 20\%$		0.05	0.1	0.2	0.3	0.4	0.5					
Pre-Alarm	전류설정 (A)	$I_p = I_n \times \dots$	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1	Non	
	Time Delay (sec)	t_p	5	10	15	20	40	60	80	120	160		
	Accuracy : $\pm 15\%$												

GPR-LAG (52, 62)



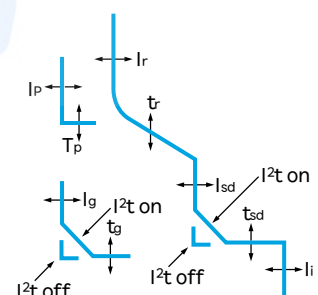
- **Overload Protection**
 - Long time delay
 - Thermal operation
- **Short Circuit Protection**
 - Short time delay, instantaneous trip
 - I^2t On/Off optional (for STD)
- **Earth Leakage Protection**
 - Uses ZCT for 5 A output at secondary (used within 3 %)
 - GPR setting is calculated based on 5 A at secondary
Ex) When using 100 : 5 A, in order for primary to function at 30 A, $30 \times 5 / 100 = 1.5$ A, GPR is set to 2 A
- **Neutral Wire Protection**
 - 3 Pole : No protection
 - 4 Pole : Non, 50 %, 100 % ($\times I_r$, I_{sd} , I_i)
- **Measurement and Display**
 - 3 Phase current
- **Realization of Protective Coordination by ZSI (Zone Selective Interlocking)**
- **Fault Recording**
 - Records up to 256 fault information on fault type, fault phase, fault value, occurrence time of fault
- **Event Recording**
 - Records up to 200 events of devices, records changes in protection trip relay information
- **Pre-Trip Alarm**

- Prevent unnecessary overload trip by setting according to rated current (I_n)

- **Field Test**
 - Simulation of long time, short time, instantaneous
- **RS-485 Communication/Modbus-RTU**
- **4a DO (Digital Output)**
 - Contact specification

Rating	Nominal Switching Capacity (Resistive Load)	5 A 277 VAC
	Max. Switching Power (Resistive Load)	1,385 VA
	Max. Switching Voltage	277 VAC
	Max. Switching Current	5 A
	Max. Switching Capacity (Reference Value)	100 mA 5 VDC

• Protection Features



Protection Functions

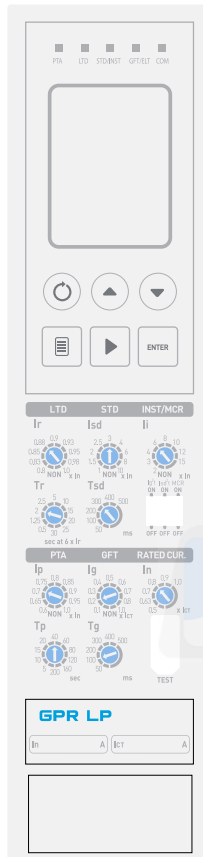
LTD Protection	Current Setting (A)	$I_n = I_{ct} \times \dots$	0.5	0.63	0.7	0.8	0.9	1				
		$I_r = I_n \times \dots$	0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1	Non
	Time Delay (sec) Accuracy : $\pm 15\%$ or Below 100 ms	$t_r @ (1.5 \times I_r)$	10.4	26.1	41.7	52	104	208	312	417	521	626
		$t_r @ (6.0 \times I_r)$	0.5	1.25	2	2.5	5	10	15	20	25	30
STD Protection	Current Setting (A)	$I_{sd} = I_n \times \dots$	1	1.5	2	2.5	3	4	6	8	10	Non
		I^2t Off	0.05	0.1	0.2	0.3	0.4	0.5				
	Time Delay (sec) @ $10 \times I_n$ Accuracy : $\pm 15\%$	I^2t On	0.05	0.1	0.2	0.3	0.4	0.5				
		(I^2t Off) Min. Trip Time (ms)	20	80	160	260	360	460				
Instantaneous Protection	Current Setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Non	
	Tripping Time		Below 50 ms									
Pre-Alarm	Current Setting (A)	$I_p = I_n \times \dots$	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1	Non
	Time Delay (sec) Accuracy : $\pm 15\%$	t_p	5	10	15	20	40	60	80	120	160	200
Leakage Protection	Current Setting (A)	$I_{\Delta n}$	0.5	0.8	1	2	3	5	Non			
	Time Delay (ms) Accuracy : $\pm 15\%$ or Above 40 ms	Δt Alarm Time (ms)	140	230	350	800	950					
		Trip Time (ms)	60	140	230	350	800					

Accessories

Over Current Relay (OCR)

Appearance and Setting Value

GPR-LP (54, 64) / GPR-LH (55, 65)

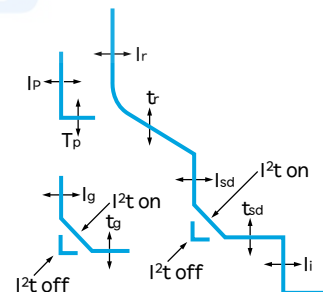


- **Overload Protection**
 - Long time delay
 - Thermal operation
- **Short Circuit Protection**
 - Short time delay, instantaneous trip
 - I²t On/Off optional (for STD)
- **Ground Fault Protection**
 - I²t On/Off optional
- **Neutral Wire Protection**
 - 3 Pole : No protection
 - 4 Pole : Non, 50 %, 100 % (×Ir, Isd, li)
- **Over-Voltage/Under-Voltage/Imbalance Protection**
- **Measurement and Display**
 - 3 Phase current/voltage/power/power factor/power quantity/phase/demand
- **Realization of Protective Coordination by ZSI (Zone Selective Interlocking)**
- **Fault Recording**
 - Records up to 256 fault information on fault type, fault phase, fault value, occurrence time of fault
- **Event Recording**
 - Records up to 256 events of devices, records changes in protection trip relay information
- **Pre-Trip Alarm**
 - Prevent unnecessary overload trip by setting according to rated current (In)
- **Field Test**
 - Simulation of long time, short time, instantaneous

- RS-485 Communication/Modbus-RTU
- Need to Connect Voltage Module for Voltage Measurement
- Additional Function in LH Type
- Voltage/Current Harmonics (1 st ~ 63 th)
 - 3 phase waveform
 - TDH, TDD
- 4a DO (Digital Output)
 - Contact specification

Rating	Nominal Switching Capacity (Resistive Load)	5 A 277 VAC
	Max. Switching Power (Resistive Load)	1,385 VA
	Max. Switching Voltage	277 VAC
	Max. Switching Current	5 A
	Max. Switching Capacity (Reference Value)	100 mA 5 VDC

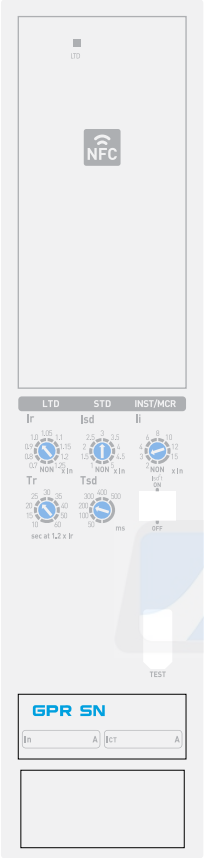
Protection Features



Protection Functions

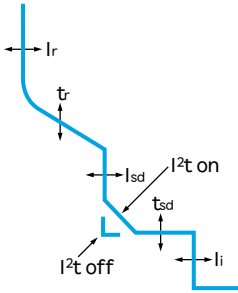
LTD Protection	Current Setting (A)	$I_n = I_{ct} \times \dots$ $I_r = I_n \times \dots$	0.5	0.63	0.7	0.8	0.9	1				
	Time Delay (sec)	$tr @ (1.5 \times I_r)$	10.4	26.1	41.7	52	104	208	312	417	521	626
	Accuracy : $\pm 15\%$ or Below 100 ms	$tr @ (6.0 \times I_r)$	0.5	1.25	2	2.5	5	10	15	20	25	30
		$tr @ (7.2 \times I_r)$	0.35	0.86	1.38	1.73	3.45	6.9	10.4	13.8	17.3	20.7
STD Protection	Current Setting (A)	$I_{sd} = I_n \times \dots$	1	1.5	2	2.5	3	4	6	8	10	Non
	Time Delay (sec) @ $10 \times I_n$	t_{sd} I ² t Off	0.05	0.1	0.2	0.3	0.4	0.5				
	Accuracy : $\pm 15\%$	I ² t On	0.05	0.1	0.2	0.3	0.4	0.5				
		(I ² t Off) Min. Trip Time (ms)	20	80	160	260	360	460				
Instantaneous Protection	Current Setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Non	
	Tripping Time		Below 50 ms									
Grounding Protection	Ground Pick-Up Setting (A) Accuracy : $\pm 15\%$ ($I_g > 0.4 I_n$) $\pm 20\%$ ($I_g \leq 0.4 I_n$)	$I_g = I_{ct} \times \dots$	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1	Non
	Time Delay (sec) @ $1 \times I_{ct}$	t_g I ² t Off	0.05	0.1	0.2	0.3	0.4	0.5				
	Accuracy : $\pm 20\%$	I ² t On	0.05	0.1	0.2	0.3	0.4	0.5				
		(I ² t off) Min. Trip Time (ms)	20	80	160	260	360	460				
Pre-Alarm	Current Setting (A)	$I_p = I_n \times \dots$	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1	Non
	Time Delay (sec) Accuracy : $\pm 15\%$	t_p	5	10	15	20	40	60	80	120	160	200

GPR-SN (57, 67)



- Overload Protection
 - Long time delay
- Short Circuit Protection
 - Short time delay, instantaneous trip
 - I²t On/Off optional (for STD)
- Self-Power
- Equipped with NFC Functions
 - Incident information can be received to the mobile phone
 - Introduction of function and app installation method : Refer to P age 34

• Protection Features



Protection Functions

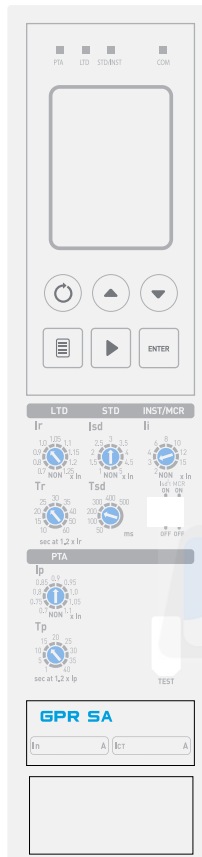
		(0.5 ~ 1.0) * 1 % Unit or 1 A Unit										
LTD Protection	Current Setting (A)	$I_n = I_{ct} \times \dots$	0.7	0.8	0.9	1	1.05	1.1	1.15	1.2	1.25	Non
	Time Delay (sec)	$I_r = I_n \times \dots$	20	30	40	50	60	70	80	100	120	
	Accuracy : ±15% 또는 100ms이하	$t_r @ (1.05 \times I_r)$	10	15	20	25	30	35	40	50	60	
		$t_r @ (1.2 \times I_r)$	0.99	1.49	1.99	2.48	2.98	3.48	3.97	4.97	5.96	
STD Protection	Current Setting (A)	$I_{sd} = I_n \times \dots$	1	1.5	2	2.5	3	3.5	4	4.5	5	Non
	Time Delay (sec) @ 10×I _n Accuracy : ±15%	I^2t Off	0.05	0.1	0.2	0.3	0.4	0.5				
		I^2t On	0.05	0.1	0.2	0.3	0.4	0.5				
		(I ² t Min. Trip Time (ms)	20	80	160	260	360	460				
		(I ² t Max. Trip Time (ms)	80	140	240	340	440	540				
Instantaneous Protection	Current Setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Non	
	Tripping Time		Below 50 ms									

Accessories

Over Current Relay (OCR)

Appearance and Setting Value

GPR-SA (58, 68)

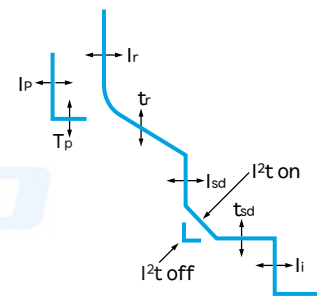


- **Overload Protection**
 - Long time delay
- **Short Circuit Protection**
 - Short time delay, instantaneous trip
 - I^2t On/Off optional (for STD)
- **In Setting with Minute Adjustment**
 - Adjusts in 1 A unit within the range of 0.5 ~ 1 lct
 - Adjusted using button in the LCD setting screen
- **Realization of Protective Coordination by ZSI (Zone Selective Interlocking)**
- **Fault Recording**
 - Records up to 256 fault information on fault type, fault phase, fault value, occurrence time of fault
- **Event Recording**
 - Records up to 200 events of devices, records changes in protection trip relay information
- **Pre-Trip Alarm**
 - Prevent unnecessary overload trip by setting according to rated current (I_n)
- **Field Test**
 - Simulation of long time, short time, instantaneous
- **RS-485 Communication/Modbus-RTU**

- **3a DO (Digital Output)**
 - Contact specification

Rating	Nominal Switching Capacity (Resistive Load)	5 A 277 VAC
	Max. Switching Power (Resistive Load)	1,385 VA
	Max. Switching Voltage	277 VAC
	Max. Switching Current	5 A
	Max. Switching Capacity (Reference Value)	100 mA 5 VDC

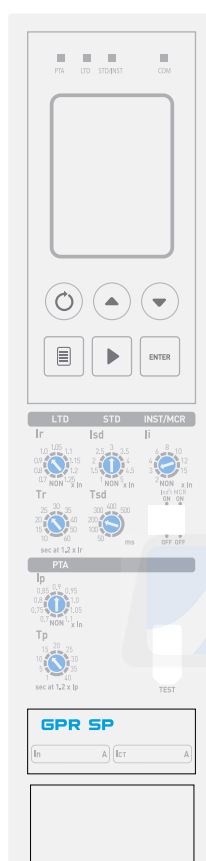
- **Protection Features**



Protection Functions

		(0.5 ~ 1.0) * 1 % Unit or 1 Unit										
LTD Protection	Current Setting (A)	$I_n = I_{ct} \times \dots$	0.7	0.8	0.9	1	1.05	1.1	1.15	1.2	1.25	Non
		$I_r = I_n \times \dots$	20	30	40	50	60	70	80	100	120	
	Time Delay (sec)	$tr @ (1.05 \times I_r)$	10	15	20	25	30	35	40	50	60	
	Accuracy : $\pm 15\%$ or Below 100 ms	$tr @ (1.2 \times I_r)$ $tr @ (3 \times I_r)$	0.99	1.49	1.99	2.48	2.98	3.48	3.97	4.97	5.96	
STD Protection	Current Setting (A)	$I_{sd} = I_n \times \dots$	1	1.5	2	2.5	3	3.5	4	4.5	5	Non
		I^2t Off	0.05	0.1	0.2	0.3	0.4	0.5				
		I^2t On	0.05	0.1	0.2	0.3	0.4	0.5				
	Time Delay (sec) @ $10 \times I_n$	Accuracy : $\pm 15\%$	20	80	160	260	360	460				
Instantaneous Protection	Current Setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Non	
	Tripping Time		Below 50 ms									
Pre-Alarm	Current Setting (A)	$I_p = I_n \times \dots$	0.7	0.75	0.8	0.85	0.9	0.95	1	1.05	1.1	Non
	Time Delay (sec)	$tp @ (I_p \times 1.2)$	1	5	10	15	20	25	30	35	40	

GPR-SP (59, 69)

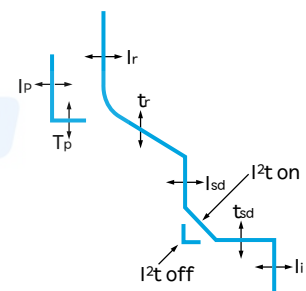


- **Overload Protection**
 - Long time delay
- **Short Circuit Protection**
 - Short time delay, instantaneous trip
 - I^2t On/Off optional (for STD)
- **Neutral Wire Protection**
 - 3 Pole : No protection
 - 4 Pole : Non, 50 %, 100 % ($\times I_r$, I_{sd} , I_i)
- **Over-Voltage/Under-Voltage/Imbalance Protection**
- **Measurement and Display**
 - 3 Phase current/voltage/power/power factor/power quantity/phase/demand
- **Realization of Protective Coordination by ZSI (Zone Selective Interlocking)**
- **Fault Recording**
 - Records up to 256 fault information on fault type, fault phase, fault value, occurrence time of fault
- **Event Recording**
 - Records up to 200 events of devices, records changes in protection trip relay information
- **Pre-Trip Alarm**
 - Prevent unnecessary overload trip by setting according to rated current (I_n)
- **Field Test**
 - Simulation of long time, short time, instantaneous

- RS-485 Communication/Modbus-RTU
- Need to Connect Voltage Module for Voltage Measurement
- 3a DO (Digital Output)
 - Contact specification

Rating	Nominal Switching Capacity (Resistive Load)	5 A 277 VAC
	Max. Switching Power (Resistive Load)	1,385 VA
	Max. Switching Voltage	277 VAC
	Max. Switching Current	5 A
	Max. Switching Capacity (Reference Value)	100 mA 5 VDC

Protection Features



Protection Functions

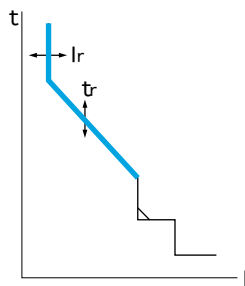
STD Protection	Current Setting (A)	$I_n = I_{ct} \times \dots$	0.5	0.63	0.7	0.8	0.9	1				
		$I_r = I_n \times \dots$	0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1	Non
	Time Delay (sec)	$t_r @ (1.05 \times I_r)$	10.4	26.1	41.7	52	104	208	312	417	521	626
	Accuracy : $\pm 15\%$ or Below 100 ms	$t_r @ (1.2 \times I_r)$	0.5	1.25	2	2.5	5	10	15	20	25	30
STD Protection	Current Setting (A)	$I_{sd} = I_n \times \dots$	1	1.5	2	2.5	3	4	6	8	10	Non
	Time Delay (sec) @ $10 \times I_n$	I^2t Off	0.05	0.1	0.2	0.3	0.4	0.5				
	Accuracy : $\pm 15\%$	I^2t On	0.05	0.1	0.2	0.3	0.4	0.5				
		(I^2t Off) Min. Trip Time (ms)	20	80	160	260	360	460				
Instantaneous Protection	Current Setting (A)	$I_i = I_n \times \dots$	2	3	4	6	8	10	12	15	Non	
	Tripping Time		Below 50 ms									
Pre-Alarm	Current Setting (A)	$I_p = I_n \times \dots$	0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1	Non
	Time Delay (sec) Accuracy : $\pm 15\%$	$t_p @ (I_p \times 1.2)$	5	10	15	20	40	60	80	120	160	

Accessories

Over Current Relay (OCR)

Operation Characteristics

Long Time Delay (LTD)



Standard Current Setting

• L Type

- The scale marks the magnification of $[I_n]$.
- 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 $1.0 \times [I_n]$.
- No protection in case the $[I_r]$ is set as [Non].
- The breaker does not trip below 105 % of $[I_r]$ and trips at 120 % of $[I_r]$ 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, $1.25 \times [I_n]$.
- The breaker trips at 100 % of $[I_r]$ setting value and above.

Time Delay Setting

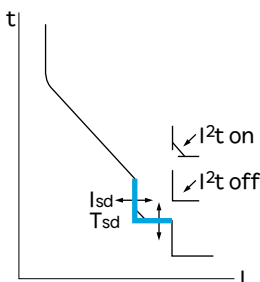
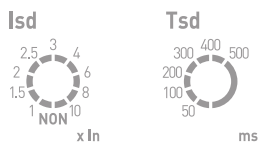
• L Type

- The scale is the second of operating time based on $600 \% \times [I_r]$ 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 $\pm 15 \%$ 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 $120 \% \times [I_r]$ with inverse time operation.

Short Time Delay (STD)



Standard Current Setting

• L Type

- The scale marks the magnification of $[I_n]$.
- The setting range of current is a 10-step method of Non, 1, 1.5, 2, 2.5, 3, 4, 6, 8, $10 \times [I_n]$.

• S Type

- The scale marks the magnification of $[I_n]$.
- The setting range of current is a 10-step method of Non, 1, 1.5, 2, 2.5, 3, 3.5, 4, 4.5, $5 \times [I_n]$.

Time delay setting

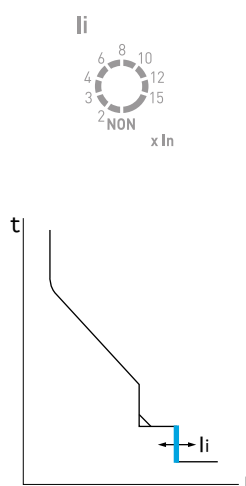
• L Type

- The marking indicates the relay operation based on the time of 110 % of $[I_{sd}]$ 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 $[I_{sd}]$ 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.

Instantaneous (INST)



Standard Current Setting

- The scale marks the magnification of $[I_n]$.
- The setting range of current is a 9-step method of Non, 2, 3, 4, 6, 8, 10, 12, $15 \times [I_n]$.
- No protection in case $[li]$ 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 1st current of OCR $[I_{ct}]$.
- 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, $1.0 \times [I_{ct}]$.

Time Delay Setting

• L Type

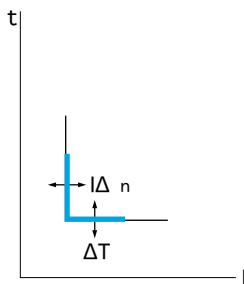
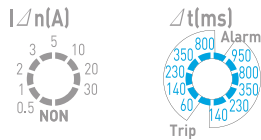
- The marking indicates the relay operation based on the time of 120 % of $[I_g]$ in msec with definite time operation.
- The setting range is a 6-step method of 50, 100, 200, 300, 400, 500 msec.
- It functions in case of 100 % I_{ct} of inverse time in case of $I_g^2 t$ on setting.

Accessories

Over Current Relay (OCR)

Operation Characteristics

Earth Leakage 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.

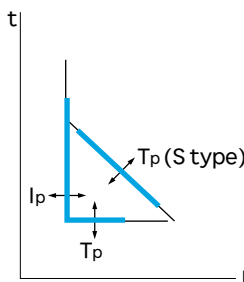
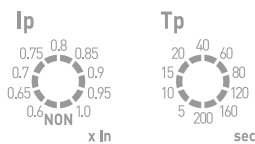
Time Delay Setting

• 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 Alarm (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.

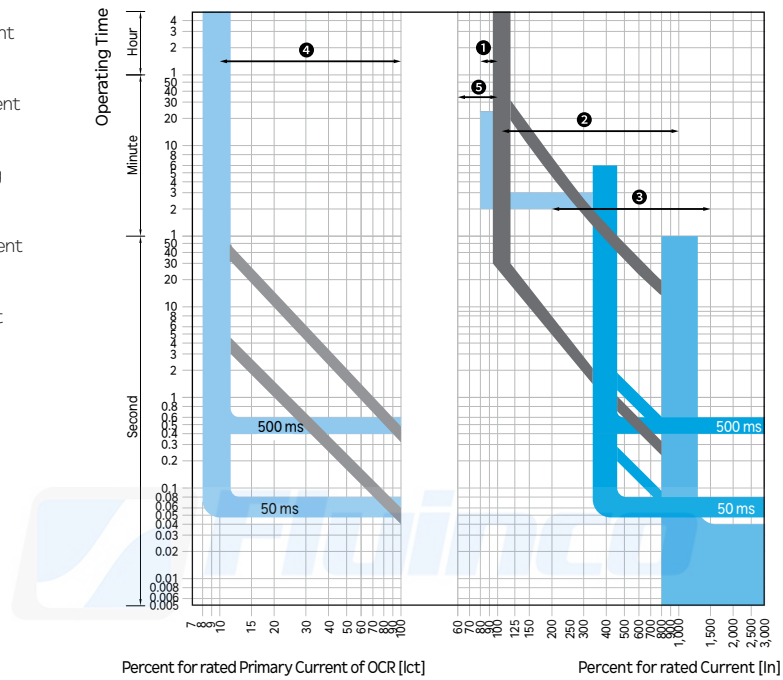
• S Type

- 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.

Characteristic Curve

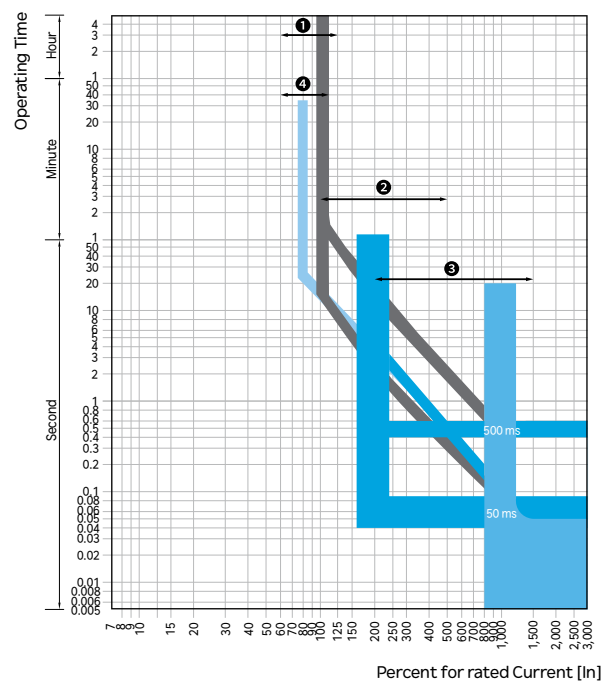
General Feeder

- 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

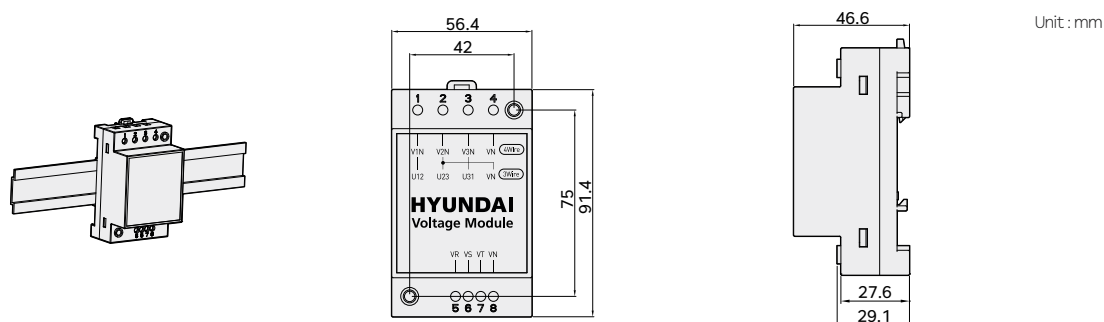


Accessories

Over Current Relay (OCR)

Measurable

Dimension



Voltage Module

GPR-LP/LH/SP Trip Relay has to be installed with a voltage module to measure the voltage.

Voltage Input Range : AC 69 ~ 690 V

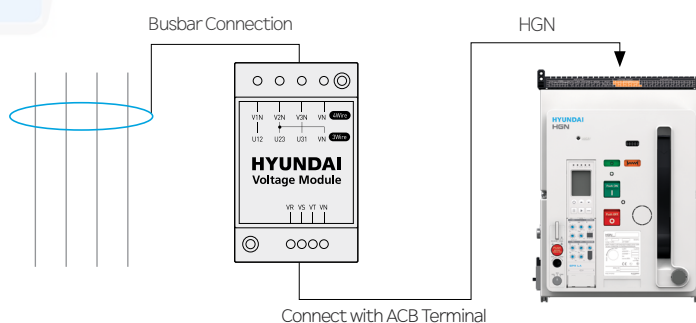
※ INSTALLATION PRECAUTION

- When installing on a panel, do not install in a place exposed to external shock or vibration.
- Do not install it on the ACB Cradle as it may be damaged by shock from opening and closing.

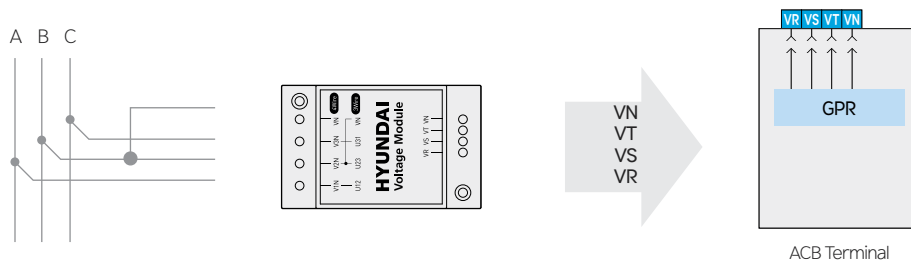
Voltage Connection

Voltage Input Range : 69 ~ 690 V

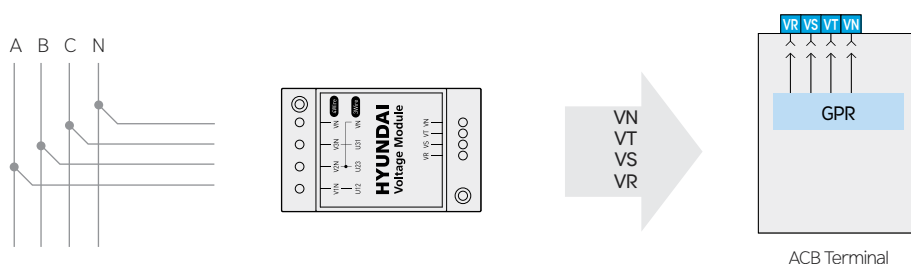
※ The length of connecting cable of the voltage module and ACB's VR, VS, VT shall be installed within 150 mm.



3P 3Wire



4P 4Wire / 3P 4Wire



Zone Selective Interlocking System

Zone selective interlocking function involves the breaker in the fault sector detecting malfunction for selective protection coordination. The circuit breaker in the fault sector sends a lock signal to the back-up protection circuit breaker by force to delay the operation and the circuit breaker in the fault sector operates instantaneously to enable selective protection coordination of the system.

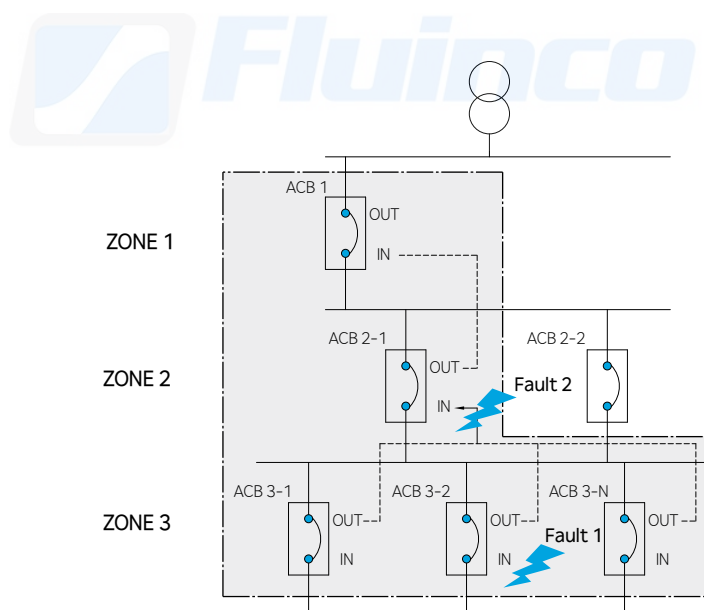
Examples

• First Fault Occurrence

In case fault 1 occurs in selective zone (Zone 3), ACB 3-2 relay functions immediately and ACB 3-2 relay triggers a ZSI signal in ACB 2-1 relay to maintain a delay so that the circuit breaker does not function, preventing the expansion of fault region.

• Fault 2 Occurrence

In case a fault occurs at the lower end of ACB 2-1, the circuit breaker in zone 3 region is unable to detect. Therefore, the relay of ACB 2-1 is unable to receive any signal from the lower end so, immediately, ACB 2-1 functions, triggering a ZSI signal to ACB 1 to prevent the expansion of fault range.



----- ZSI Connection

※ ZSI connection wire's maximum distance has to be constituted within 3 m.

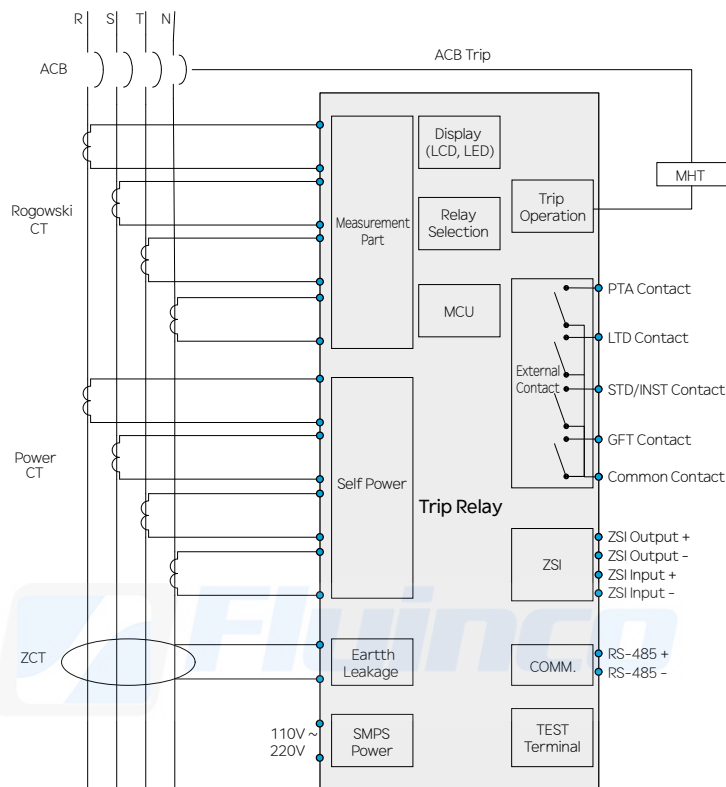
ZSI function cannot be operated during self-power.

Upon the release of the product, ZSI function is not activated and the 2 terminals (31, 32) at the control power input area are short so please cut the wire before connection when using ZSI.

Accessories

Over Current Relay (OCR)

System Diagram



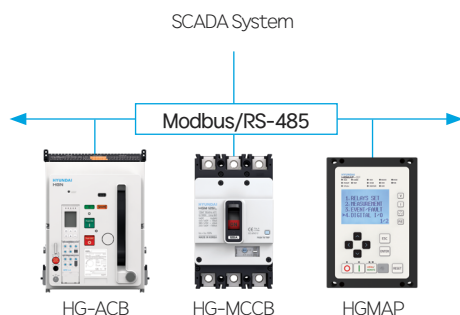
Communication Function

Modbus-RTU/RS-485

- Operation Mode : Differential
- Distance : Max. 1.2 km
- Cable : RS-485 Shielded Twist 2-Pair Cable
- Baud Rate : 9,600, 19,200, 38,400 bps
- Transmission Method : Half-Duplex
- Termination : 110Ω

NFC Communication (Near Field Communication) * for Android™

- Various information related to the breaker's faults (cause of fault, current waveform at fault etc.) can be received conveniently through smart phones by using NFC wireless communication technology's Android application.
- Execute the application and receive the fault information by placing the smart phone's NFC antenna at the contact position indicated in the OCR.
- You can search the HG CB Link in Google Play™ for the application or download it for free by connecting to the QR code on the right.
- Up to 10 past faults worth of information is saved.
(However, as for current's waveform information, only the recent fault is saved.)
- The information received can be sent to the e-mail through the application.

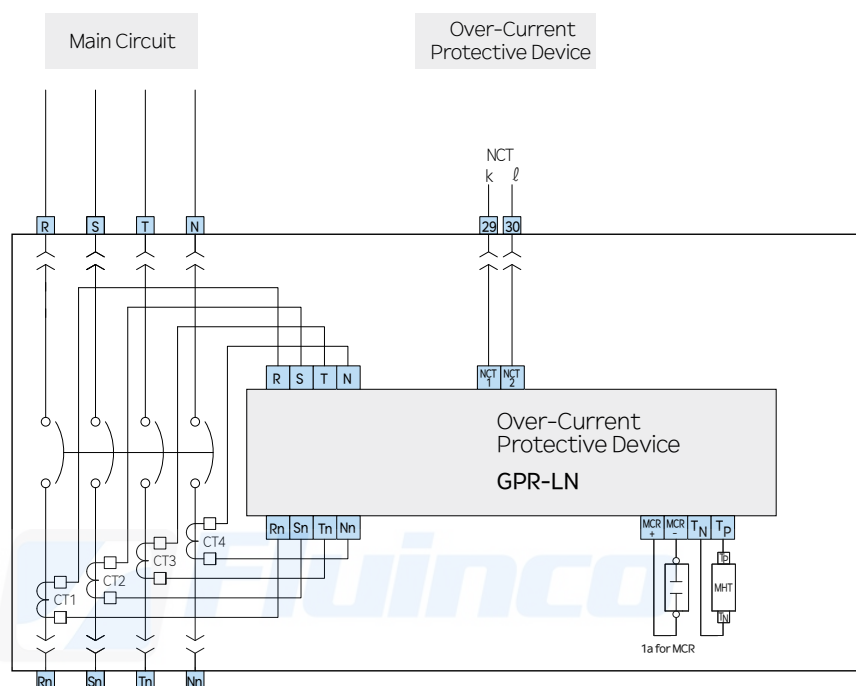


※ Android and Google Play are registered trademarks of Google Inc.

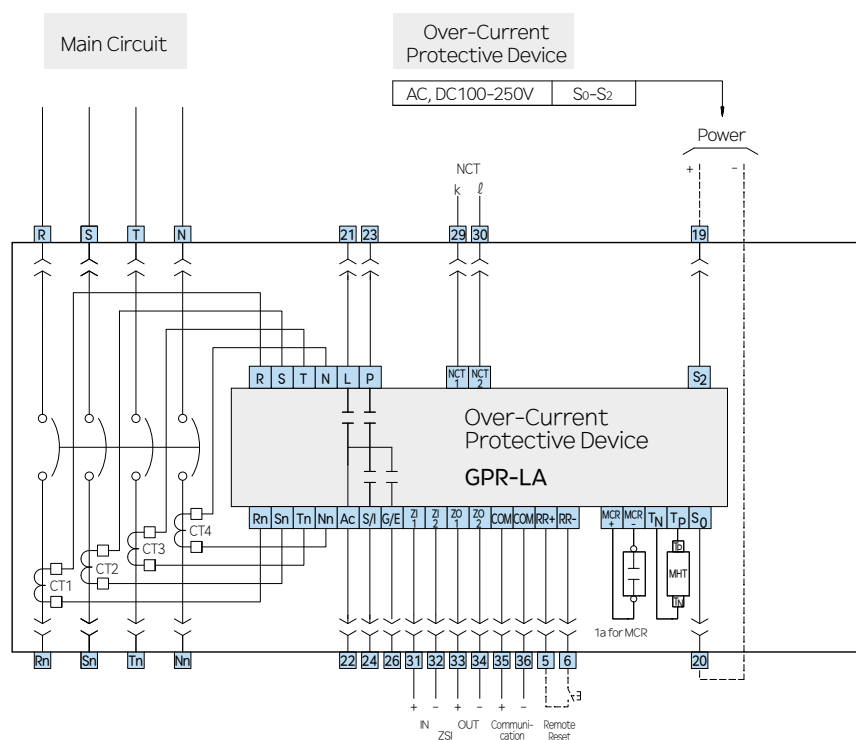


Circuit Diagrams

GPR-LN



GPR-LA

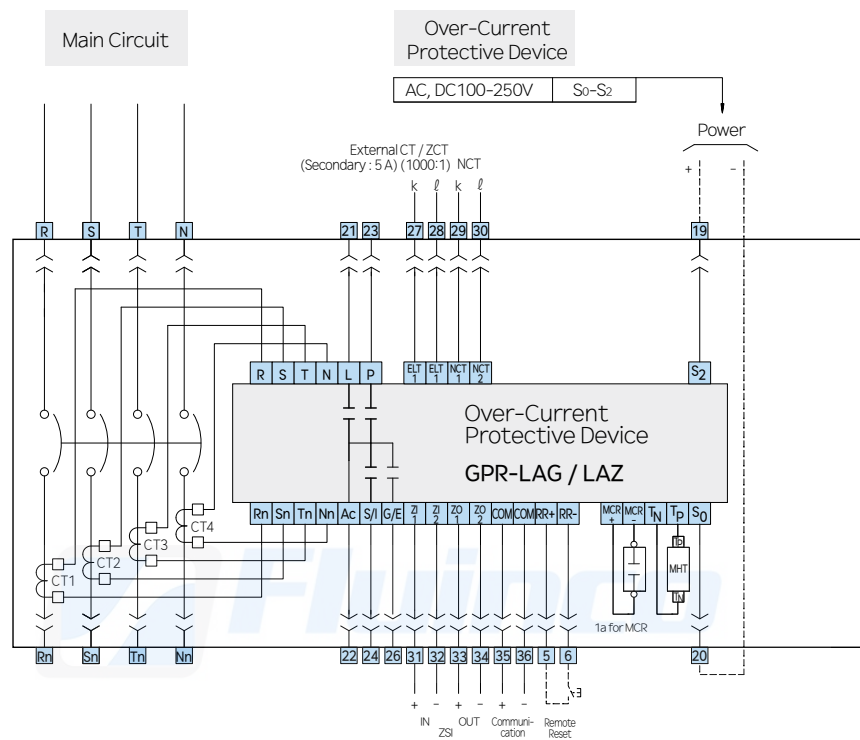


Accessories

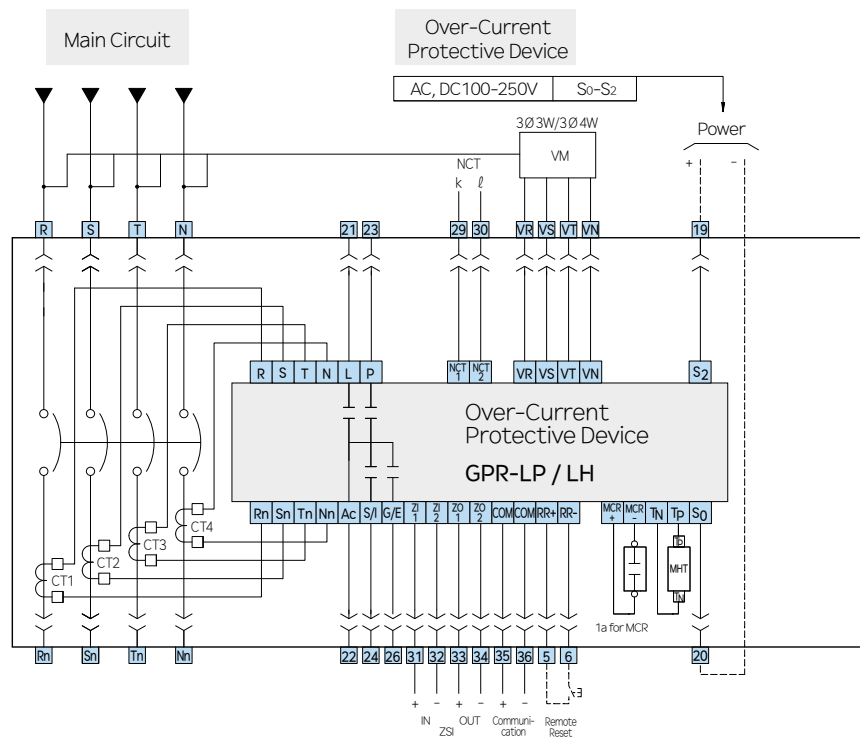
Over Current Relay (OCR)

Circuit Diagrams

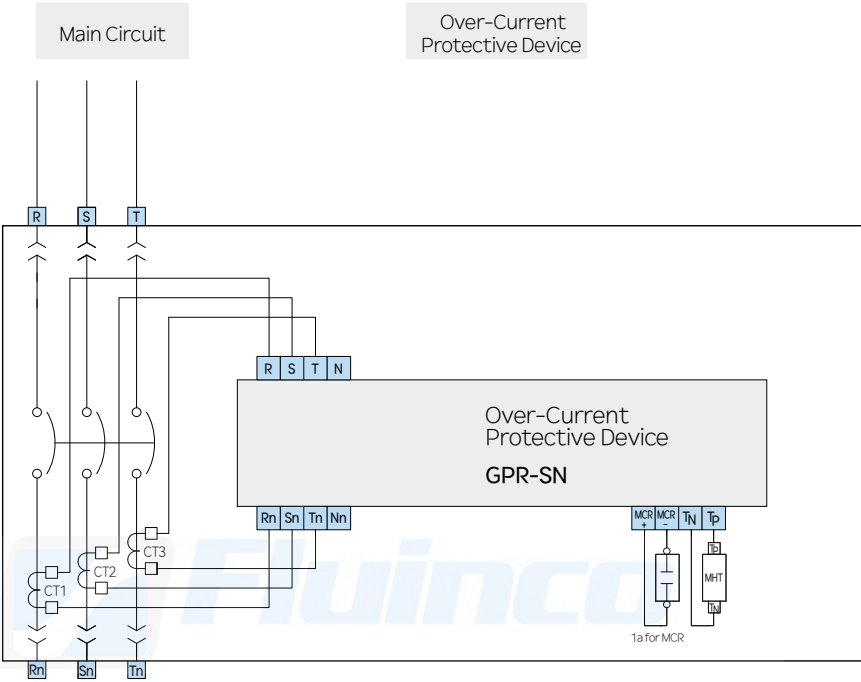
GPR-LAG/LAZ



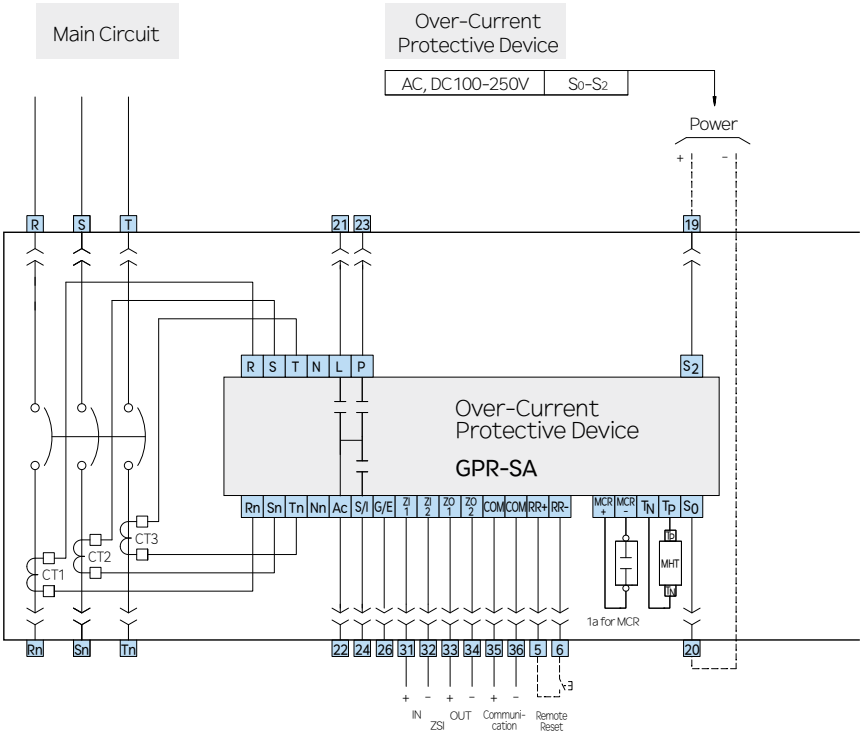
GPR-LP/LH



GPR-SN



GPR-SA



※ 52번 62 (GPR-LAG) 53-63 (GPR-LAZ)인 경우 CT연결선 27, 28은 5m이내로 구성하십시오.
Remote Reset (RR) 5번 6번 회로의 연결선은 5m이내로 구성하십시오.

Time Chart for LTD Inverse Time (General Feeder)

Item	xlr	Tr	LTD Time Setting (sec)									
			0.5	1.25	2	2.5	5	10	15	20	25	30
Overload Rate (%)	115		25.05	62.62	100.19	125.23	250.47	500.93	751.40	1,001.87	1,252.34	1,502.80
	120		21.04	52.61	84.17	105.22	210.43	420.87	631.30	841.74	1,052.17	1,262.61
	125		18.13	45.33	72.53	90.67	181.33	362.66	543.99	725.32	906.66	1,087.99
	130		15.90	39.75	63.60	79.50	158.99	317.99	476.98	635.97	794.96	953.96
	135		14.12	35.30	56.48	70.61	141.21	282.42	423.64	564.85	706.06	847.27
	140		12.67	31.67	50.67	63.34	126.69	253.37	380.06	506.74	633.43	760.11
	145		11.46	28.64	45.83	57.29	114.58	229.15	343.73	458.31	572.88	687.46
	150		10.43	26.08	41.73	52.16	104.33	208.65	312.98	417.30	521.63	625.95
	155		9.55	23.88	38.21	47.77	95.53	191.07	286.60	382.13	477.67	573.20
	160		8.79	21.98	35.17	43.96	87.91	175.83	263.74	351.65	439.57	527.48
	165		8.12	20.31	32.50	40.62	81.25	162.50	243.75	325.00	406.25	487.50
	170		7.54	18.84	30.15	37.69	75.38	150.75	226.13	301.50	376.88	452.25
	175		7.02	17.54	28.07	35.08	70.16	140.33	210.49	280.65	350.82	420.98
	180		6.55	16.38	26.20	32.76	65.51	131.02	196.53	262.04	327.55	393.06
	185		6.13	15.33	24.53	30.67	61.33	122.67	184.00	245.34	306.67	368.01
	190		5.76	14.39	23.03	28.78	57.57	115.14	172.71	230.28	287.85	345.42
	195		5.42	13.54	21.66	27.08	54.16	108.32	162.48	216.64	270.80	324.96
	200		5.11	12.77	20.42	25.53	51.06	102.12	153.18	204.24	255.30	306.36
	205		4.82	12.06	19.29	24.12	48.23	96.46	144.70	192.93	241.16	289.39
	210		4.56	11.41	18.26	22.82	45.64	91.29	136.93	182.57	228.22	273.86
	215		4.33	10.82	17.31	21.63	43.27	86.53	129.80	173.07	216.33	259.60
	220		4.11	10.27	16.43	20.54	41.08	82.16	123.23	164.31	205.39	246.47
	225		3.91	9.76	15.62	19.53	39.06	78.12	117.18	156.23	195.29	234.35
	230		3.72	9.30	14.88	18.59	37.19	74.38	111.57	148.76	185.95	223.14
	235		3.55	8.86	14.18	17.73	35.46	70.91	106.37	141.82	177.28	212.74
	240		3.38	8.46	13.54	16.92	33.85	67.69	101.54	135.38	169.23	203.07
	245		3.23	8.09	12.94	16.17	32.35	64.69	97.04	129.38	161.73	194.07
	250		3.09	7.74	12.38	15.47	30.95	61.89	92.84	123.78	154.73	185.67
	255		2.96	7.41	11.86	14.82	29.64	59.28	88.91	118.55	148.19	177.83
	260		2.84	7.10	11.37	14.21	28.41	56.83	85.24	113.65	142.07	170.48
	265		2.73	6.82	10.91	13.63	27.27	54.53	81.80	109.06	136.33	163.59
	270		2.62	6.55	10.47	13.09	26.19	52.37	78.56	104.75	130.94	157.12
	275		2.52	6.29	10.07	12.59	25.17	50.35	75.52	100.69	125.87	151.04
	280		2.42	6.05	9.69	12.11	24.22	48.44	72.66	96.87	121.09	145.31
	285		2.33	5.83	9.33	11.66	23.32	46.64	69.95	93.27	116.59	139.91
	290		2.25	5.62	8.99	11.23	22.47	44.94	67.41	89.87	112.34	134.81
	295		2.17	5.42	8.67	10.83	21.67	43.33	65.00	86.66	108.33	129.99
	300		2.09	5.23	8.36	10.45	20.91	41.81	62.72	83.62	104.53	125.43
	305		2.02	5.05	8.07	10.09	20.19	40.37	60.56	80.74	100.93	121.11
	310		1.95	4.88	7.80	9.75	19.50	39.00	58.51	78.01	97.51	117.01
	315		1.89	4.71	7.54	9.43	18.85	37.71	56.56	75.42	94.27	113.13
	320		1.82	4.56	7.30	9.12	18.24	36.48	54.72	72.95	91.19	109.43
	325		1.77	4.41	7.06	8.83	17.65	35.31	52.96	70.61	88.27	105.92
	330		1.71	4.27	6.84	8.55	17.10	34.19	51.29	68.38	85.48	102.57
	335		1.66	4.14	6.63	8.28	16.56	33.13	49.69	66.26	82.82	99.39
340		1.61	4.01	6.42	8.03	16.06	32.12	48.18	64.23	80.29	96.35	
345		1.56	3.89	6.23	7.79	15.58	31.15	46.73	62.30	77.88	93.45	
350		1.51	3.78	6.05	7.56	15.11	30.23	45.34	60.46	75.57	90.69	
355		1.47	3.67	5.87	7.34	14.67	29.35	44.02	58.70	73.37	88.04	
360		1.43	3.56	5.70	7.13	14.25	28.50	42.76	57.01	71.26	85.51	
365		1.38	3.46	5.54	6.92	13.85	27.70	41.55	55.40	69.24	83.09	
370		1.35	3.37	5.39	6.73	13.46	26.93	40.39	53.85	67.31	80.78	
375		1.31	3.27	5.24	6.55	13.09	26.19	39.28	52.37	65.46	78.56	

Accessories

Over Current Relay (OCR)

Time Chart for LTD Inverse Time (General Feeder)

Item	xlr	Tr	LTD Time Setting (sec)									
			0.5	1.25	2	2.5	5	10	15	20	25	30
Overload Rate (%)	380		1.27	3.18	5.10	6.37	12.74	25.48	38.21	50.95	63.69	76.43
	385		1.24	3.10	4.96	6.20	12.40	24.79	37.19	49.59	61.99	74.38
	390		1.21	3.02	4.83	6.04	12.07	24.14	36.21	48.28	60.35	72.42
	395		1.18	2.94	4.70	5.88	11.76	23.51	35.27	47.03	58.78	70.54
	400		1.15	2.86	4.58	5.73	11.45	22.91	34.36	45.82	57.27	68.73
	405		1.12	2.79	4.47	5.58	11.16	22.33	33.49	44.66	55.82	66.99
	410		1.09	2.72	4.35	5.44	10.89	21.77	32.66	43.54	54.43	65.31
	415		1.06	2.65	4.25	5.31	10.62	21.23	31.85	42.47	53.08	63.70
	420		1.04	2.59	4.14	5.18	10.36	20.72	31.07	41.43	51.79	62.15
	425		1.01	2.53	4.04	5.05	10.11	20.22	30.33	40.44	50.54	60.65
	430		0.99	2.47	3.95	4.93	9.87	19.74	29.61	39.47	49.34	59.21
	435		0.96	2.41	3.85	4.82	9.64	19.27	28.91	38.55	48.18	57.82
	440		0.94	2.35	3.77	4.71	9.41	18.83	28.24	37.65	47.07	56.48
	445		0.92	2.30	3.68	4.60	9.20	18.39	27.59	36.79	45.99	55.18
	450		0.90	2.25	3.60	4.49	8.99	17.98	26.97	35.95	44.94	53.93
	455		0.88	2.20	3.51	4.39	8.79	17.57	26.36	35.15	43.94	52.72
	460		0.86	2.15	3.44	4.30	8.59	17.19	25.78	34.37	42.96	51.56
	465		0.84	2.10	3.36	4.20	8.40	16.81	25.21	33.62	42.02	50.43
	470		0.82	2.06	3.29	4.11	8.22	16.44	24.67	32.89	41.11	49.33
	475		0.80	2.01	3.22	4.02	8.05	16.09	24.14	32.18	40.23	48.28
	480		0.79	1.97	3.15	3.94	7.88	15.75	23.63	31.50	39.38	47.25
	485		0.77	1.93	3.08	3.86	7.71	15.42	23.13	30.84	38.55	46.26
	490		0.76	1.89	3.02	3.78	7.55	15.10	22.65	30.20	37.75	45.30
	495		0.74	1.85	2.96	3.70	7.40	14.79	22.19	29.58	36.98	44.37
	500		0.72	1.81	2.90	3.62	7.25	14.49	21.74	28.98	36.23	43.47
	505		0.71	1.77	2.84	3.55	7.10	14.20	21.30	28.40	35.50	42.60
	510		0.70	1.74	2.78	3.48	6.96	13.92	20.88	27.83	34.79	41.75
	515		0.68	1.71	2.73	3.41	6.82	13.64	20.46	27.29	34.11	40.93
	520		0.67	1.67	2.68	3.34	6.69	13.38	20.07	26.75	33.44	40.13
	525		0.66	1.64	2.62	3.28	6.56	13.12	19.68	26.24	32.80	39.36
	530		0.64	1.61	2.57	3.22	6.43	12.87	19.30	25.74	32.17	38.60
	535		0.63	1.58	2.52	3.16	6.31	12.62	18.94	25.25	31.56	37.87
	540		0.62	1.55	2.48	3.10	6.19	12.39	18.58	24.77	30.97	37.16
	545		0.61	1.52	2.43	3.04	6.08	12.16	18.24	24.31	30.39	36.47
	550		0.60	1.49	2.39	2.98	5.97	11.93	17.90	23.87	29.83	35.80
	555		0.59	1.46	2.34	2.93	5.86	11.72	17.57	23.43	29.29	35.15
	560		0.58	1.44	2.30	2.88	5.75	11.50	17.26	23.01	28.76	34.51
	565		0.56	1.41	2.26	2.82	5.65	11.30	16.95	22.60	28.24	33.89
	570		0.55	1.39	2.22	2.77	5.55	11.10	16.65	22.19	27.74	33.29
	575		0.55	1.36	2.18	2.73	5.45	10.90	16.35	21.80	27.26	32.71
	580		0.54	1.34	2.14	2.68	5.36	10.71	16.07	21.42	26.78	32.14
	585		0.53	1.32	2.11	2.63	5.26	10.53	15.79	21.05	26.32	31.58
	590		0.52	1.29	2.07	2.59	5.17	10.35	15.52	20.69	25.87	31.04
	595		0.51	1.27	2.03	2.54	5.09	10.17	15.26	20.34	25.43	30.51
	600		0.50	1.25	2.00	2.50	5.00	10.00	15.00	20.00	25.00	30.00
	605		0.49	1.23	1.97	2.46	4.92	9.83	14.75	19.67	24.58	29.50
	610		0.48	1.21	1.93	2.42	4.84	9.67	14.51	19.34	24.18	29.01
	615		0.48	1.19	1.90	2.38	4.76	9.51	14.27	19.02	23.78	28.53
620		0.47	1.17	1.87	2.34	4.68	9.36	14.04	18.71	23.39	28.07	
625		0.46	1.15	1.84	2.30	4.60	9.21	13.81	18.41	23.01	27.62	
630		0.45	1.13	1.81	2.26	4.53	9.06	13.59	18.12	22.65	27.17	
635		0.45	1.11	1.78	2.23	4.46	8.91	13.37	17.83	22.29	26.74	
640		0.44	1.10	1.75	2.19	4.39	8.77	13.16	17.55	21.93	26.32	

Item	x Ir	Tr	LTD Time Setting (sec)								
			0.5	1.25	2	2.5	5	10	15	20	25
Overload Rate (%)	645	0.43	1.08	1.73	2.16	4.32	8.64	12.96	17.27	21.59	25.91
	650	0.43	1.06	1.70	2.13	4.25	8.50	12.75	17.01	21.26	25.51
	655	0.42	1.05	1.67	2.09	4.19	8.37	12.56	16.74	20.93	25.12
	660	0.41	1.03	1.65	2.06	4.12	8.24	12.37	16.49	20.61	24.73
	665	0.41	1.01	1.62	2.03	4.06	8.12	12.18	16.24	20.30	24.36
	670	0.40	1.00	1.60	2.00	4.00	8.00	12.00	15.99	19.99	23.99
	675	0.39	0.98	1.58	1.97	3.94	7.88	11.82	15.76	19.69	23.63
	680	0.39	0.97	1.55	1.94	3.88	7.76	11.64	15.52	19.40	23.28
	685	0.38	0.96	1.53	1.91	3.82	7.65	11.47	15.29	19.12	22.94
	690	0.38	0.94	1.51	1.88	3.77	7.54	11.30	15.07	18.84	22.61
	695	0.37	0.93	1.49	1.86	3.71	7.43	11.14	14.85	18.57	22.28
	700	0.37	0.91	1.46	1.83	3.66	7.32	10.98	14.64	18.30	21.96
	705	0.36	0.90	1.44	1.80	3.61	7.21	10.82	14.43	18.04	21.64
	710	0.36	0.89	1.42	1.78	3.56	7.11	10.67	14.23	17.78	21.34
	715	0.35	0.88	1.40	1.75	3.51	7.01	10.52	14.02	17.53	21.04
	720	0.35	0.86	1.38	1.73	3.46	6.91	10.37	13.83	17.29	20.74
	725	0.34	0.85	1.36	1.70	3.41	6.82	10.23	13.64	17.05	20.46
	730	0.34	0.84	1.34	1.68	3.36	6.72	10.09	13.45	16.81	20.17
	735	0.33	0.83	1.33	1.66	3.32	6.63	9.95	13.26	16.58	19.90
	740	0.33	0.82	1.31	1.64	3.27	6.54	9.81	13.08	16.36	19.63
	745	0.32	0.81	1.29	1.61	3.23	6.45	9.68	12.91	16.14	19.36
	750	0.32	0.80	1.27	1.59	3.18	6.37	9.55	12.73	15.92	19.10
	755	0.31	0.79	1.26	1.57	3.14	6.28	9.42	12.57	15.71	18.85
	760	0.31	0.77	1.24	1.55	3.10	6.20	9.30	12.40	15.50	18.60
	765	0.31	0.76	1.22	1.53	3.06	6.12	9.18	12.24	15.30	18.35
	770	0.30	0.75	1.21	1.51	3.02	6.04	9.06	12.08	15.10	18.11
	775	0.30	0.74	1.19	1.49	2.98	5.96	8.94	11.92	14.90	17.88
	780	0.29	0.74	1.18	1.47	2.94	5.88	8.82	11.77	14.71	17.65
	785	0.29	0.73	1.16	1.45	2.90	5.81	8.71	11.62	14.52	17.42
	790	0.29	0.72	1.15	1.43	2.87	5.73	8.60	11.47	14.33	17.20
	795	0.28	0.71	1.13	1.42	2.83	5.66	8.49	11.32	14.15	16.98
	800	0.28	0.70	1.12	1.40	2.80	5.59	8.39	11.18	13.98	16.77
	805	0.28	0.69	1.10	1.38	2.76	5.52	8.28	11.04	13.80	16.56
	810	0.27	0.68	1.09	1.36	2.73	5.45	8.18	10.90	13.63	16.36
	815	0.27	0.67	1.08	1.35	2.69	5.38	8.08	10.77	13.46	16.15
	820	0.27	0.66	1.06	1.33	2.66	5.32	7.98	10.64	13.30	15.96
	825	0.26	0.66	1.05	1.31	2.63	5.25	7.88	10.51	13.14	15.76
	830	0.26	0.65	1.04	1.30	2.60	5.19	7.79	10.38	12.98	15.57
	835	0.26	0.64	1.03	1.28	2.56	5.13	7.69	10.26	12.82	15.38
	840	0.25	0.63	1.01	1.27	2.53	5.07	7.60	10.13	12.67	15.20
	845	0.25	0.63	1.00	1.25	2.50	5.01	7.51	10.01	12.52	15.02
	850	0.25	0.62	0.99	1.24	2.47	4.95	7.42	9.89	12.37	14.84
	855	0.24	0.61	0.98	1.22	2.44	4.89	7.33	9.78	12.22	14.67
	860	0.24	0.60	0.97	1.21	2.42	4.83	7.25	9.66	12.08	14.50
	865	0.24	0.60	0.96	1.19	2.39	4.78	7.16	9.55	11.94	14.33
870	0.24	0.59	0.94	1.18	2.36	4.72	7.08	9.44	11.80	14.16	
875	0.23	0.58	0.93	1.17	2.33	4.67	7.00	9.33	11.67	14.00	
880	0.23	0.58	0.92	1.15	2.31	4.61	6.92	9.23	11.53	13.84	
885	0.23	0.57	0.91	1.14	2.28	4.56	6.84	9.12	11.40	13.68	
890	0.23	0.56	0.90	1.13	2.25	4.51	6.76	9.02	11.27	13.53	
895	0.22	0.56	0.89	1.11	2.23	4.46	6.69	8.92	11.15	13.38	
900	0.22	0.55	0.88	1.10	2.20	4.41	6.61	8.82	11.02	13.23	
905	0.22	0.55	0.87	1.09	2.18	4.36	6.54	8.72	10.90	13.08	

Accessories

Over Current Relay (OCR)

Time Chart for LTD Inverse Time (General Feeder)

Item	xIr	Tr	LTD Time Setting (sec)									
			0.5	1.25	2	2.5	5	10	15	20	25	30
Overload Rate (%)	910		0.22	0.54	0.86	1.08	2.16	4.31	6.47	8.63	10.78	12.94
	915		0.21	0.53	0.85	1.07	2.13	4.27	6.40	8.53	10.66	12.80
	920		0.21	0.53	0.84	1.05	2.11	4.22	6.33	8.44	10.55	12.66
	925		0.21	0.52	0.83	1.04	2.09	4.17	6.26	8.35	10.43	12.52
	930		0.21	0.52	0.83	1.03	2.06	4.13	6.19	8.26	10.32	12.38
	935		0.20	0.51	0.82	1.02	2.04	4.08	6.13	8.17	10.21	12.25
	940		0.20	0.51	0.81	1.01	2.02	4.04	6.06	8.08	10.10	12.12
	945		0.20	0.50	0.80	1.00	2.00	4.00	6.00	7.99	9.99	11.99
	950		0.20	0.49	0.79	0.99	1.98	3.96	5.93	7.91	9.89	11.87
	955		0.20	0.49	0.78	0.98	1.96	3.91	5.87	7.83	9.78	11.74
	960		0.19	0.48	0.77	0.97	1.94	3.87	5.81	7.75	9.68	11.62
	965		0.19	0.48	0.77	0.96	1.92	3.83	5.75	7.67	9.58	11.50
	970		0.19	0.47	0.76	0.95	1.90	3.79	5.69	7.59	9.48	11.38
	975		0.19	0.47	0.75	0.94	1.88	3.75	5.63	7.51	9.38	11.26
	980		0.19	0.46	0.74	0.93	1.86	3.72	5.57	7.43	9.29	11.15
	985		0.18	0.46	0.74	0.92	1.84	3.68	5.52	7.36	9.19	11.03
	990		0.18	0.46	0.73	0.91	1.82	3.64	5.46	7.28	9.10	10.92
	995		0.18	0.45	0.72	0.90	1.80	3.60	5.41	7.21	9.01	10.81
	1,000		0.18	0.45	0.71	0.89	1.78	3.57	5.35	7.14	8.92	10.70

Time Chart for LTD Inverse Time (Generator)

Item	xlr	Tr	LTD Time Setting (sec)								
			10	15	20	25	30	35	40	50	60
Overload Rate (%)	101		33.12	49.68	66.24	82.80	99.36	115.92	132.49	165.61	198.73
	105		20.04	30.05	40.07	50.09	60.11	70.12	80.14	100.18	120.21
	110		14.77	22.16	29.54	36.93	44.31	51.70	59.08	73.85	88.63
	115		11.90	17.85	23.80	29.76	35.71	41.66	47.61	59.51	71.41
	120		10.00	15.00	20.00	25.00	30.00	35.00	40.00	50.00	60.00
	125		8.62	12.93	17.23	21.54	25.85	30.16	34.47	43.08	51.70
	130		7.56	11.33	15.11	18.89	22.67	26.44	30.22	37.78	45.33
	135		6.71	10.07	13.42	16.78	20.13	23.49	26.84	33.55	40.26
	140		6.02	9.03	12.04	15.05	18.06	21.07	24.08	30.10	36.12
	145		5.44	8.17	10.89	13.61	16.33	19.06	21.78	27.22	32.67
	150		4.96	7.44	9.92	12.39	14.87	17.35	19.83	24.79	29.75
	155		4.54	6.81	9.08	11.35	13.62	15.89	18.16	22.70	27.24
	160		4.18	6.27	8.36	10.44	12.53	14.62	16.71	20.89	25.07
	165		3.86	5.79	7.72	9.65	11.58	13.51	15.44	19.31	23.17
	170		3.58	5.37	7.16	8.95	10.75	12.54	14.33	17.91	21.49
	175		3.33	5.00	6.67	8.34	10.00	11.67	13.34	16.67	20.01
	180		3.11	4.67	6.23	7.78	9.34	10.90	12.45	15.57	18.68
	185		2.91	4.37	5.83	7.29	8.74	10.20	11.66	14.57	17.49
	190		2.74	4.10	5.47	6.84	8.21	9.58	10.94	13.68	16.41
	195		2.57	3.86	5.15	6.43	7.72	9.01	10.29	12.87	15.44
	200		2.43	3.64	4.85	6.07	7.28	8.49	9.71	12.13	14.56
	205		2.29	3.44	4.58	5.73	6.88	8.02	9.17	11.46	13.75
	210		2.17	3.25	4.34	5.42	6.51	7.59	8.68	10.85	13.01
	215		2.06	3.08	4.11	5.14	6.17	7.20	8.22	10.28	12.34
	220		1.95	2.93	3.90	4.88	5.86	6.83	7.81	9.76	11.71
	225		1.86	2.78	3.71	4.64	5.57	6.50	7.42	9.28	11.14
	230		1.77	2.65	3.53	4.42	5.30	6.19	7.07	8.84	10.60
	235		1.68	2.53	3.37	4.21	5.05	5.90	6.74	8.42	10.11
	240		1.61	2.41	3.22	4.02	4.83	5.63	6.43	8.04	9.65
	245		1.54	2.31	3.07	3.84	4.61	5.38	6.15	7.69	9.22
	250		1.47	2.21	2.94	3.68	4.41	5.15	5.88	7.35	8.82
	255		1.41	2.11	2.82	3.52	4.23	4.93	5.63	7.04	8.45
	260		1.35	2.03	2.70	3.38	4.05	4.73	5.40	6.75	8.10
	265		1.30	1.94	2.59	3.24	3.89	4.53	5.18	6.48	7.77
	270		1.24	1.87	2.49	3.11	3.73	4.36	4.98	6.22	7.47
	275		1.20	1.79	2.39	2.99	3.59	4.19	4.78	5.98	7.18
	280		1.15	1.73	2.30	2.88	3.45	4.03	4.60	5.75	6.91
	285		1.11	1.66	2.22	2.77	3.32	3.88	4.43	5.54	6.65
	290		1.07	1.60	2.14	2.67	3.20	3.74	4.27	5.34	6.41
	295		1.03	1.54	2.06	2.57	3.09	3.60	4.12	5.15	6.18
	300		0.99	1.49	1.99	2.48	2.98	3.48	3.97	4.97	5.96
	305		0.96	1.44	1.92	2.40	2.88	3.36	3.84	4.80	5.76
	310		0.93	1.39	1.85	2.32	2.78	3.24	3.71	4.63	5.56
	315		0.90	1.34	1.79	2.24	2.69	3.14	3.58	4.48	5.38
	320		0.87	1.30	1.73	2.17	2.60	3.03	3.47	4.33	5.20
	325		0.84	1.26	1.68	2.10	2.52	2.94	3.36	4.19	5.03
	330		0.81	1.22	1.62	2.03	2.44	2.84	3.25	4.06	4.87
	335		0.79	1.18	1.57	1.97	2.36	2.76	3.15	3.94	4.72
340		0.76	1.14	1.53	1.91	2.29	2.67	3.05	3.82	4.58	
345		0.74	1.11	1.48	1.85	2.22	2.59	2.96	3.70	4.44	
350		0.72	1.08	1.44	1.80	2.15	2.51	2.87	3.59	4.31	
355		0.70	1.05	1.39	1.74	2.09	2.44	2.79	3.49	4.18	
360		0.68	1.02	1.35	1.69	2.03	2.37	2.71	3.39	4.06	

Accessories

Over Current Relay (OCR)

Time Chart for LTD Inverse Time (Generator)

Item	xlr	Tr	LTD Time Setting (sec)								
			10	15	20	25	30	35	40	50	60
Overload Rate (%)	365		0.66	0.99	1.32	1.65	1.97	2.30	2.63	3.29	3.95
	370		0.64	0.96	1.28	1.60	1.92	2.24	2.56	3.20	3.84
	375		0.62	0.93	1.24	1.56	1.87	2.18	2.49	3.11	3.73
	380		0.61	0.91	1.21	1.51	1.82	2.12	2.42	3.03	3.63
	385		0.59	0.88	1.18	1.47	1.77	2.06	2.36	2.95	3.53
	390		0.57	0.86	1.15	1.43	1.72	2.01	2.29	2.87	3.44
	395		0.56	0.84	1.12	1.40	1.68	1.96	2.23	2.79	3.35
	400		0.54	0.82	1.09	1.36	1.63	1.91	2.18	2.72	3.27
	405		0.53	0.80	1.06	1.33	1.59	1.86	2.12	2.65	3.18
	410		0.52	0.78	1.03	1.29	1.55	1.81	2.07	2.59	3.10
	415		0.50	0.76	1.01	1.26	1.51	1.77	2.02	2.52	3.03
	420		0.49	0.74	0.98	1.23	1.48	1.72	1.97	2.46	2.95
	425		0.48	0.72	0.96	1.20	1.44	1.68	1.92	2.40	2.88
	430		0.47	0.70	0.94	1.17	1.41	1.64	1.88	2.34	2.81
	435		0.46	0.69	0.92	1.14	1.37	1.60	1.83	2.29	2.75
	440		0.45	0.67	0.89	1.12	1.34	1.57	1.79	2.24	2.68
	445		0.44	0.66	0.87	1.09	1.31	1.53	1.75	2.19	2.62
	450		0.43	0.64	0.85	1.07	1.28	1.50	1.71	2.14	2.56
	455		0.42	0.63	0.84	1.04	1.25	1.46	1.67	2.09	2.51
	460		0.41	0.61	0.82	1.02	1.22	1.43	1.63	2.04	2.45
	465		0.40	0.60	0.80	1.00	1.20	1.40	1.60	2.00	2.40
	470		0.39	0.59	0.78	0.98	1.17	1.37	1.56	1.95	2.34
	475		0.38	0.57	0.76	0.96	1.15	1.34	1.53	1.91	2.29
	480		0.37	0.56	0.75	0.94	1.12	1.31	1.50	1.87	2.25
	485		0.37	0.55	0.73	0.92	1.10	1.28	1.47	1.83	2.20
	490		0.36	0.54	0.72	0.90	1.08	1.26	1.44	1.79	2.15
	495		0.35	0.53	0.70	0.88	1.05	1.23	1.41	1.76	2.11
	500		0.34	0.52	0.69	0.86	1.03	1.21	1.38	1.72	2.07
	505		0.34	0.51	0.67	0.84	1.01	1.18	1.35	1.69	2.02
	510		0.33	0.50	0.66	0.83	0.99	1.16	1.32	1.65	1.98
	515		0.32	0.49	0.65	0.81	0.97	1.13	1.30	1.62	1.94
	520		0.32	0.48	0.64	0.79	0.95	1.11	1.27	1.59	1.91
	525		0.31	0.47	0.62	0.78	0.94	1.09	1.25	1.56	1.87
	530		0.31	0.46	0.61	0.76	0.92	1.07	1.22	1.53	1.83
	535		0.30	0.45	0.60	0.75	0.90	1.05	1.20	1.50	1.80
	540		0.29	0.44	0.59	0.74	0.88	1.03	1.18	1.47	1.77
	545		0.29	0.43	0.58	0.72	0.87	1.01	1.16	1.44	1.73
	550		0.28	0.43	0.57	0.71	0.85	0.99	1.13	1.42	1.70
	555		0.28	0.42	0.56	0.70	0.84	0.97	1.11	1.39	1.67
	560		0.27	0.41	0.55	0.68	0.82	0.96	1.09	1.37	1.64
565		0.27	0.40	0.54	0.67	0.81	0.94	1.07	1.34	1.61	
570		0.26	0.40	0.53	0.66	0.79	0.92	1.05	1.32	1.58	
575		0.26	0.39	0.52	0.65	0.78	0.91	1.04	1.30	1.55	
580		0.25	0.38	0.51	0.64	0.76	0.89	1.02	1.27	1.53	
585		0.25	0.38	0.50	0.63	0.75	0.88	1.00	1.25	1.50	
590		0.25	0.37	0.49	0.61	0.74	0.86	0.98	1.23	1.48	
595		0.24	0.36	0.48	0.60	0.73	0.85	0.97	1.21	1.45	
600		0.24	0.36	0.48	0.59	0.71	0.83	0.95	1.19	1.43	
605		0.23	0.35	0.47	0.58	0.70	0.82	0.93	1.17	1.40	
610		0.23	0.34	0.46	0.57	0.69	0.80	0.92	1.15	1.38	
615		0.23	0.34	0.45	0.56	0.68	0.79	0.90	1.13	1.36	
620		0.22	0.33	0.44	0.56	0.67	0.78	0.89	1.11	1.33	
625		0.22	0.33	0.44	0.55	0.66	0.77	0.87	1.09	1.31	

Item	x Ir	Tr	LTD Time Setting (sec)								
			10	15	20	25	30	35	40	50	60
Overload Rate (%)	630		0.22	0.32	0.43	0.54	0.65	0.75	0.86	1.08	1.29
	635		0.21	0.32	0.42	0.53	0.64	0.74	0.85	1.06	1.27
	640		0.21	0.31	0.42	0.52	0.63	0.73	0.83	1.04	1.25
	645		0.21	0.31	0.41	0.51	0.62	0.72	0.82	1.03	1.23
	650		0.20	0.30	0.40	0.51	0.61	0.71	0.81	1.01	1.21
	655		0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.99	1.19
	660		0.20	0.29	0.39	0.49	0.59	0.69	0.78	0.98	1.18
	665		0.19	0.29	0.39	0.48	0.58	0.68	0.77	0.96	1.16
	670		0.19	0.29	0.38	0.48	0.57	0.67	0.76	0.95	1.14
	675		0.19	0.28	0.37	0.47	0.56	0.66	0.75	0.94	1.12
	680		0.18	0.28	0.37	0.46	0.55	0.65	0.74	0.92	1.11
	685		0.18	0.27	0.36	0.45	0.55	0.64	0.73	0.91	1.09
	690		0.18	0.27	0.36	0.45	0.54	0.63	0.72	0.90	1.07
	695		0.18	0.26	0.35	0.44	0.53	0.62	0.71	0.88	1.06
	700		0.17	0.26	0.35	0.43	0.52	0.61	0.70	0.87	1.04
	705		0.17	0.26	0.34	0.43	0.51	0.60	0.69	0.86	1.03
	710		0.17	0.25	0.34	0.42	0.51	0.59	0.68	0.84	1.01
	715		0.17	0.25	0.33	0.42	0.50	0.58	0.67	0.83	1.00
	720		0.16	0.25	0.33	0.41	0.49	0.58	0.66	0.82	0.99
	725		0.16	0.24	0.32	0.41	0.49	0.57	0.65	0.81	0.97
	730		0.16	0.24	0.32	0.40	0.48	0.56	0.64	0.80	0.96
	735		0.16	0.24	0.32	0.39	0.47	0.55	0.63	0.79	0.95
	740		0.16	0.23	0.31	0.39	0.47	0.54	0.62	0.78	0.93
	745		0.15	0.23	0.31	0.38	0.46	0.54	0.61	0.77	0.92
	750		0.15	0.23	0.30	0.38	0.45	0.53	0.61	0.76	0.91
	755		0.15	0.22	0.30	0.37	0.45	0.52	0.60	0.75	0.90
	760		0.15	0.22	0.29	0.37	0.44	0.52	0.59	0.74	0.88
	765		0.15	0.22	0.29	0.36	0.44	0.51	0.58	0.73	0.87
	770		0.14	0.22	0.29	0.36	0.43	0.50	0.57	0.72	0.86
	775		0.14	0.21	0.28	0.35	0.42	0.50	0.57	0.71	0.85
	780		0.14	0.21	0.28	0.35	0.42	0.49	0.56	0.70	0.84
	785		0.14	0.21	0.28	0.34	0.41	0.48	0.55	0.69	0.83
	790		0.14	0.20	0.27	0.34	0.41	0.48	0.54	0.68	0.82
	795		0.13	0.20	0.27	0.34	0.40	0.47	0.54	0.67	0.81
	800		0.13	0.20	0.27	0.33	0.40	0.46	0.53	0.66	0.80
	805		0.13	0.20	0.26	0.33	0.39	0.46	0.52	0.66	0.79
	810		0.13	0.19	0.26	0.32	0.39	0.45	0.52	0.65	0.78
	815		0.13	0.19	0.26	0.32	0.38	0.45	0.51	0.64	0.77
	820		0.13	0.19	0.25	0.32	0.38	0.44	0.51	0.63	0.76
	825		0.12	0.19	0.25	0.31	0.37	0.44	0.50	0.62	0.75
830		0.12	0.18	0.25	0.31	0.37	0.43	0.49	0.62	0.74	
835		0.12	0.18	0.24	0.30	0.37	0.43	0.49	0.61	0.73	
840		0.12	0.18	0.24	0.30	0.36	0.42	0.48	0.60	0.72	
845		0.12	0.18	0.24	0.30	0.36	0.42	0.48	0.59	0.71	
850		0.12	0.18	0.24	0.29	0.35	0.41	0.47	0.59	0.71	
855		0.12	0.17	0.23	0.29	0.35	0.41	0.46	0.58	0.70	
860		0.11	0.17	0.23	0.29	0.34	0.40	0.46	0.57	0.69	
865		0.11	0.17	0.23	0.28	0.34	0.40	0.45	0.57	0.68	
870		0.11	0.17	0.22	0.28	0.34	0.39	0.45	0.56	0.67	
875		0.11	0.17	0.22	0.28	0.33	0.39	0.44	0.55	0.67	
880		0.11	0.16	0.22	0.27	0.33	0.38	0.44	0.55	0.66	
885		0.11	0.16	0.22	0.27	0.33	0.38	0.43	0.54	0.65	
890		0.11	0.16	0.21	0.27	0.32	0.38	0.43	0.54	0.64	

Accessories

Over Current Relay (OCR)

Time Chart for LTD Inverse Time (Generator)

Item	xIr	Tr	LTD Time Setting (sec)								
			10	15	20	25	30	35	40	50	60
Overload Rate (%)	895		0.11	0.16	0.21	0.26	0.32	0.37	0.42	0.52	0.64
	900		0.10	0.16	0.21	0.26	0.31	0.37	0.42	0.52	0.63
	905		0.10	0.16	0.21	0.26	0.31	0.36	0.41	0.52	0.62
	910		0.10	0.15	0.20	0.26	0.31	0.36	0.41	0.51	0.61
	915		0.10	0.15	0.20	0.25	0.30	0.35	0.41	0.51	0.61
	920		0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.50	0.60
	925		0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.50	0.59
	930		0.10	0.15	0.20	0.25	0.29	0.34	0.39	0.49	0.59
	935		0.10	0.15	0.19	0.24	0.29	0.34	0.39	0.49	0.58
	940		0.10	0.14	0.19	0.24	0.29	0.34	0.38	0.48	0.58
	945		0.09	0.14	0.19	0.24	0.28	0.33	0.38	0.47	0.57
	950		0.09	0.14	0.19	0.23	0.28	0.33	0.38	0.47	0.56
	955		0.09	0.14	0.19	0.23	0.28	0.33	0.37	0.46	0.56
	960		0.09	0.14	0.18	0.23	0.28	0.32	0.37	0.46	0.55
	965		0.09	0.14	0.18	0.23	0.27	0.32	0.36	0.46	0.55
	970		0.09	0.14	0.18	0.23	0.27	0.32	0.36	0.45	0.54
	975		0.09	0.13	0.18	0.22	0.27	0.31	0.36	0.45	0.54
980		0.09	0.13	0.18	0.22	0.26	0.31	0.35	0.44	0.53	
985		0.09	0.13	0.17	0.22	0.26	0.31	0.35	0.44	0.52	

Time Chart for STD Inverse Time (General Feeder)

Item	Tsd x In	STD Time Setting (ms) Inland Type					
		50	100	200	300	400	500
	100	5,000	10,000	20,000	30,000	40,000	50,000
	110	4,132	8,264	16,529	24,793	33,058	41,322
	120	3,472	6,944	13,889	20,833	27,778	34,722
	130	2,959	5,917	11,834	17,751	23,669	29,586
	140	2,551	5,102	10,204	15,306	20,408	25,510
	150	2,222	4,444	8,889	13,333	17,778	22,222
	160	1,953	3,906	7,813	11,719	15,625	19,531
	170	1,730	3,460	6,920	10,381	13,841	17,301
	180	1,543	3,086	6,173	9,259	12,346	15,432
	190	1,385	2,770	5,540	8,310	11,080	13,850
	200	1,250	2,500	5,000	7,500	10,000	12,500
	210	1,134	2,268	4,535	6,803	9,070	11,338
	220	1,033	2,066	4,132	6,198	8,264	10,331
	230	945	1,890	3,781	5,671	7,561	9,452
	240	868	1,736	3,472	5,208	6,944	8,681
	250	800	1,600	3,200	4,800	6,400	8,000
	260	740	1,479	2,959	4,438	5,917	7,396
	270	686	1,372	2,743	4,115	5,487	6,859
	280	638	1,276	2,551	3,827	5,102	6,378
	290	595	1,189	2,378	3,567	4,756	5,945
	300	556	1,111	2,222	3,333	4,444	5,556
	310	520	1,041	2,081	3,122	4,162	5,203
	320	488	977	1,953	2,930	3,906	4,883
	330	459	918	1,837	2,755	3,673	4,591
	340	433	865	1,730	2,595	3,460	4,325
	350	408	816	1,633	2,449	3,265	4,082
	360	386	772	1,543	2,315	3,086	3,858
	370	365	730	1,461	2,191	2,922	3,652
	380	346	693	1,385	2,078	2,770	3,463
	390	329	657	1,315	1,972	2,630	3,287
	400	313	625	1,250	1,875	2,500	3,125
	410	297	595	1,190	1,785	2,380	2,974
	420	283	567	1,134	1,701	2,268	2,834
	430	270	541	1,082	1,622	2,163	2,704
	440	258	517	1,033	1,550	2,066	2,583
	450	247	494	988	1,481	1,975	2,469
	460	236	473	945	1,418	1,890	2,363
	470	226	453	905	1,358	1,811	2,263
	480	217	434	868	1,302	1,736	2,170
	490	208	416	833	1,249	1,666	2,082
	500	200	400	800	1,200	1,600	2,000
	510	192	384	769	1,153	1,538	1,922
	520	185	370	740	1,109	1,479	1,849
	530	178	356	712	1,068	1,424	1,780
	540	171	343	686	1,029	1,372	1,715
	550	165	331	661	992	1,322	1,653
	560	159	319	638	957	1,276	1,594
	570	154	308	616	923	1,231	1,539
	580	149	297	595	892	1,189	1,486
	590	144	287	575	862	1,149	1,436
	600	139	278	556	833	1,111	1,389
	610	134	269	537	806	1,075	1,344
	620	130	260	520	780	1,041	1,301

Overload
Rate
(%)

Item	Tsd x In	STD Time Setting (ms) Inland Type					
		50	100	200	300	400	500
	630	126	252	504	756	1,008	12,60
	640	122	244	488	732	977	1,221
	650	118	237	473	710	947	1,183
	660	115	230	459	689	918	1,148
	670	111	223	446	668	891	1,114
	680	108	216	433	649	865	1,081
	690	105	210	420	630	840	1,050
	700	102	204	408	612	816	1,020
	710	99	198	397	595	793	992
	720	96	193	386	579	772	965
	730	94	188	375	563	751	938
	740	91	183	365	548	730	913
	750	89	178	356	533	711	889
	760	87	173	346	519	693	866
	770	84	169	337	506	675	843
	780	82	164	329	493	657	822
	790	80	160	320	481	641	801
	800	78	156	313	469	625	781
	810	76	152	305	457	610	762
	820	74	149	297	446	595	744
	830	73	145	290	435	581	726
	840	71	142	283	425	567	709
	850	69	138	277	415	554	692
	860	68	135	270	406	541	676
	870	66	132	264	396	528	661
	880	65	129	258	387	517	646
	890	63	126	252	379	505	631
	900	62	123	247	370	494	617
	910	60	121	242	362	483	604
	920	59	118	236	354	473	591
	930	58	116	231	347	462	578
	940	57	113	226	340	453	566
	950	55	111	222	332	443	554
	960	54	109	217	326	434	543
	970	53	106	213	319	425	531
	980	52	104	208	312	416	521
	990	51	102	204	306	408	510
	1,000	50	100	200	300	400	500

Overload
Rate
(%)

Accessories

Over Current Relay (OCR)

Time Chart for STD Inverse Time (Generator)

Item	x In	Tsd	STD Time Setting (ms) Marine Type					
			50	100	200	300	400	500
Overload Rate (%)	100		1,250	2,500	5,000	7,500	1,0000	12,500
	110		1,033	2,066	4,132	6,198	8,264	10,331
	120		868	1,736	3,472	5,208	6,944	8,681
	130		740	1,479	2,959	4,438	5,917	7,396
	140		638	1,276	2,551	3,827	5,102	6,378
	150		556	1,111	2,222	3,333	4,444	5,556
	160		488	977	1,953	2,930	3,906	4,883
	170		433	865	1,730	2,595	3,460	4,325
	180		386	772	1,543	2,315	3,086	3,858
	190		346	693	1,385	2,078	2,770	3,463
	200		313	625	1,250	1,875	2,500	3,125
	210		283	567	1,134	1,701	2,268	2,834
	220		258	517	1,033	1,550	2,066	2,583
	230		236	473	945	1,418	1,890	2,363
	240		217	434	868	1,302	1,736	2,170
	250		200	400	800	1,200	1,600	2,000
	260		185	370	740	1,109	1,479	1,849
	270		171	343	686	1,029	1,372	1,715
	280		159	319	638	957	1,276	1,594
	290		149	297	595	892	1,189	1,486
	300		139	278	556	833	1,111	1,389
	310		130	260	520	780	1,041	1,301
	320		122	244	488	732	977	1,221
	330		115	230	459	689	918	1,148
	340		108	216	433	649	865	1,081
	350		102	204	408	612	816	1,020
	360		96	193	386	579	772	965
	370		91	183	365	548	730	913
	380		87	173	346	519	693	866
	390		82	164	329	493	657	822
	400		78	156	313	469	625	781
	410		74	149	297	446	595	744
	420		71	142	283	425	567	709
430		68	135	270	406	541	676	
440		65	129	258	387	517	646	
450		62	123	247	370	494	617	
460		59	118	236	354	473	591	
470		57	113	226	340	453	566	
480		54	109	217	326	434	543	
490		52	104	208	312	416	521	
500		50	100	200	300	400	500	

Time Chart for GFT Inverse Time (General Feeder)

Item	T _g x lct	GFT Time Setting (ms)					
		50	100	200	300	400	500
	10	5,000	10,000	20,000	30,000	40,000	50,000
	11	4,132	8,264	16,529	24,793	33,058	41,322
	12	3,472	6,944	13,889	20,833	27,778	34,722
	13	2,959	5,917	11,834	17,751	23,669	29,586
	14	2,551	5,102	10,204	15,306	20,408	25,510
	15	2,222	4,444	8,889	13,333	17,778	22,222
	16	1,953	3,906	7,813	11,719	15,625	19,531
	17	1,730	3,460	6,920	10,381	13,841	17,301
	18	1,543	3,086	6,173	9,259	12,346	15,432
	19	1,385	2,770	5,540	8,310	11,080	13,850
	20	1,250	2,500	5,000	7,500	10,000	12,500
	21	1,134	2,268	4,535	6,803	9,070	11,338
	22	1,033	2,066	4,132	6,198	8,264	10,331
	23	945	1,890	3,781	5,671	7,561	9,452
	24	868	1,736	3,472	5,208	6,944	8,681
	25	800	1,600	3,200	4,800	6,400	8,000
	26	740	1,479	2,959	4,438	5,917	7,396
	27	686	1,372	2,743	4,115	5,487	6,859
	28	638	1,276	2,551	3,827	5,102	6,378
	29	595	1,189	2,378	3,567	4,756	5,945
	30	556	1,111	2,222	3,333	4,444	5,556
	31	520	1,041	2,081	3,122	4,162	5,203
	32	488	977	1,953	2,930	3,906	4,883
	33	459	918	1,837	2,755	3,673	4,591
	34	433	865	1,730	2,595	3,460	4,325
Detection Setting Current (%)	35	408	816	1,633	2,449	3,265	4,082
	36	386	772	1,543	2,315	3,086	3,858
	37	365	730	1,461	2,191	2,922	3,652
	38	346	693	1,385	2,078	2,770	3,463
	39	329	657	1,315	1,972	2,630	3,287
	40	313	625	1,250	1,875	2,500	3,125
	41	297	595	1,190	1,785	2,380	2,974
	42	283	567	1,134	1,701	2,268	2,834
	43	270	541	1,082	1,622	2,163	2,704
	44	258	517	1,033	1,550	2,066	2,583
	45	247	494	988	1,481	1,975	2,469
	46	236	473	945	1,418	1,890	2,363
	47	226	453	905	1,358	1,811	2,263
	48	217	434	868	1,302	1,736	2,170
	49	208	416	833	1,249	1,666	2,082
	50	200	400	800	1,200	1,600	2,000
	51	192	384	769	1,153	1,538	1,922
	52	185	370	740	1,109	1,479	1,849
	53	178	356	712	1,068	1,424	1,780
	54	171	343	686	1,029	1,372	1,715
	55	165	331	661	992	1,322	1,653
	56	159	319	638	957	1,276	1,594
	57	154	308	616	923	1,231	1,539
	58	149	297	595	892	1,189	1,486
	59	144	287	575	862	1,149	1,436
	60	139	278	556	833	1,111	1,389
	61	134	269	537	806	1,075	1,344
	62	130	260	520	780	1,041	1,301

Item	T _g x lct	GFT Time Setting (ms)					
		50	100	200	300	400	500
	63	126	252	504	756	1,008	1,260
	64	122	244	488	732	977	1,221
	65	118	237	473	710	947	1,183
	66	115	230	459	689	918	1,148
	67	111	223	446	668	891	1,114
	68	108	216	433	649	865	1,081
	69	105	210	420	630	840	1,050
	70	102	204	408	612	816	1,020
	71	99	198	397	595	793	992
	72	96	193	386	579	772	965
	73	94	188	375	563	751	938
	74	91	183	365	548	730	913
	75	89	178	356	533	711	889
	76	87	173	346	519	693	866
	77	84	169	337	506	675	843
	78	82	164	329	493	657	822
	79	80	160	320	481	641	801
	80	78	156	313	469	625	781
Detection Setting Current (%)	81	76	152	305	457	610	762
	82	74	149	297	446	595	744
	83	73	145	290	435	581	726
	84	71	142	283	425	567	709
	85	69	138	277	415	554	692
	86	68	135	270	406	541	676
	87	66	132	264	396	528	661
	88	65	129	258	387	517	646
	89	63	126	252	379	505	631
	90	62	123	247	370	494	617
	91	60	121	242	362	483	604
	92	59	118	236	354	473	591
	93	58	116	231	347	462	578
	94	57	113	226	340	453	566
	95	55	111	222	332	443	554
	96	54	109	217	326	434	543
	97	53	106	213	319	425	531
	98	52	104	208	312	416	521
	99	51	102	204	306	408	510
	100	50	100	200	300	400	500

Accessories

Over Current Relay (OCR)

Time Chart for PTA Inverse Time (Generator)

Item	xIp	Tp	PTA Time Setting (sec)								
			1	5	10	15	20	25	30	35	40
Detection Setting Current (%)	49		6.00	29.99	59.98	89.96	119.95	149.94	179.93	209.91	239.90
	50		5.76	28.80	57.60	86.40	115.20	144.00	172.80	201.60	230.40
	51		5.54	27.68	55.36	83.04	110.73	138.41	166.09	193.77	221.45
	52		5.33	26.63	53.25	79.88	106.51	133.14	159.76	186.39	213.02
	53		5.13	25.63	51.26	76.90	102.53	128.16	153.79	179.42	205.06
	54		4.94	24.69	49.38	74.07	98.77	123.46	148.15	172.84	197.53
	55		4.76	23.80	47.60	71.40	95.21	119.01	142.81	166.61	190.41
	56		4.59	22.96	45.92	68.88	91.84	114.80	137.76	160.71	183.67
	57		4.43	22.16	44.32	66.48	88.64	110.80	132.96	155.12	177.29
	58		4.28	21.40	42.81	64.21	85.61	107.02	128.42	149.82	171.22
	59		4.14	20.68	41.37	62.05	82.73	103.42	124.10	144.79	165.47
	60		4.00	20.00	40.00	60.00	80.00	100.00	120.00	140.00	160.00
	61		3.87	19.35	38.70	58.05	77.40	96.75	116.10	135.45	154.80
	62		3.75	18.73	37.46	56.19	74.92	93.65	112.38	131.11	149.84
	63		3.63	18.14	36.28	54.42	72.56	90.70	108.84	126.98	145.12
	64		3.52	17.58	35.16	52.73	70.31	87.89	105.47	123.05	140.63
	65		3.41	17.04	34.08	51.12	68.17	85.21	102.25	119.29	136.33
	66		3.31	16.53	33.06	49.59	66.12	82.64	99.17	115.70	132.23
	67		3.21	16.04	32.08	48.12	64.16	80.20	96.24	112.27	128.31
	68		3.11	15.57	31.14	46.71	62.28	77.85	93.43	109.00	124.57
	69		3.02	15.12	30.25	45.37	60.49	75.61	90.74	105.86	120.98
	70		2.94	14.69	29.39	44.08	58.78	73.47	88.16	102.86	117.55
	71		2.86	14.28	28.57	42.85	57.13	71.41	85.70	99.98	114.26
	72		2.78	13.89	27.78	41.67	55.56	69.44	83.33	97.22	111.11
	73		2.70	13.51	27.02	40.53	54.04	67.55	81.07	94.58	108.09
	74		2.63	13.15	26.30	39.44	52.59	65.74	78.89	92.04	105.19
	75		2.56	12.80	25.60	38.40	51.20	64.00	76.80	89.60	102.40
	76		2.49	12.47	24.93	37.40	49.86	62.33	74.79	87.26	99.72
	77		2.43	12.14	24.29	36.43	48.57	60.72	72.86	85.01	97.15
	78		2.37	11.83	23.67	35.50	47.34	59.17	71.01	82.84	94.67
	79		2.31	11.54	23.07	34.61	46.15	57.68	69.22	80.76	92.29
	80		2.25	11.25	22.50	33.75	45.00	56.25	67.50	78.75	90.00
	81		2.19	10.97	21.95	32.92	43.90	54.87	65.84	76.82	87.79
	82		2.14	10.71	21.42	32.12	42.83	53.54	64.25	74.96	85.66
	83		2.09	10.45	20.90	31.35	41.81	52.26	62.71	73.16	83.61
	84		2.04	10.20	20.41	30.61	40.82	51.02	61.22	71.43	81.63
	85		1.99	9.97	19.93	29.90	39.86	49.83	59.79	69.76	79.72
	86		1.95	9.73	19.47	29.20	38.94	48.67	58.41	68.14	77.88
	87		1.90	9.51	19.02	28.54	38.05	47.56	57.07	66.59	76.10
	88		1.86	9.30	18.60	27.89	37.19	46.49	55.79	65.08	74.38
	89		1.82	9.09	18.18	27.27	36.36	45.45	54.54	63.63	72.72
	90		1.78	8.89	17.78	26.67	35.56	44.44	53.33	62.22	71.11
	91		1.74	8.69	17.39	26.08	34.78	43.47	52.17	60.86	69.56
	92		1.70	8.51	17.01	25.52	34.03	42.53	51.04	59.55	68.05
	93		1.66	8.32	16.65	24.97	33.30	41.62	49.95	58.27	66.60
	94		1.63	8.15	16.30	24.45	32.59	40.74	48.89	57.04	65.19
	95		1.60	7.98	15.96	23.93	31.91	39.89	47.87	55.84	63.82
	96		1.56	7.81	15.63	23.44	31.25	39.06	46.88	54.69	62.50
	97		1.53	7.65	15.30	22.96	30.61	38.26	45.91	53.57	61.22
	98		1.50	7.50	14.99	22.49	29.99	37.48	44.98	52.48	59.98
	99		1.47	7.35	14.69	22.04	29.38	36.73	44.08	51.42	58.77
	100		1.44	7.20	14.40	21.60	28.80	36.00	43.20	50.40	57.60
	101		1.41	7.06	14.12	21.17	28.23	35.29	42.35	49.41	56.47

Item	xlp	Tp	PTA Time Setting (sec)								
			1	5	10	15	20	25	30	35	40
Detection Setting Current (%)	102		1.38	6.92	13.84	20.76	27.68	34.60	41.52	48.44	55.36
	103		1.36	6.79	13.57	20.36	27.15	33.93	40.72	47.51	54.29
	104		1.33	6.66	13.31	19.97	26.63	33.28	39.94	46.60	53.25
	105		1.31	6.53	13.06	19.59	26.12	32.65	39.18	45.71	52.24
	106		1.28	6.41	12.82	19.22	25.63	32.04	38.45	44.86	51.26
	107		1.26	6.29	12.58	18.87	25.16	31.44	37.73	44.02	50.31
	108		1.23	6.17	12.35	18.52	24.69	30.86	37.04	43.21	49.38
	109		1.21	6.06	12.12	18.18	24.24	30.30	36.36	42.42	48.48
	110		1.19	5.95	11.90	17.85	23.80	29.75	35.70	41.65	47.60
	111		1.17	5.84	11.69	17.53	23.37	29.22	35.06	40.91	46.75
	112		1.15	5.74	11.48	17.22	22.96	28.70	34.44	40.18	45.92
	113		1.13	5.64	11.28	16.92	22.55	28.19	33.83	39.47	45.11
	114		1.11	5.54	11.08	16.62	22.16	27.70	33.24	38.78	44.32
	115		1.09	5.44	10.89	16.33	21.78	27.22	32.67	38.11	43.55
	116		1.07	5.35	10.70	16.05	21.40	26.75	32.10	37.46	42.81
	117		1.05	5.26	10.52	15.78	21.04	26.30	31.56	36.82	42.08
	118		1.03	5.17	10.34	15.51	20.68	25.85	31.03	36.20	41.37
	119		1.02	5.08	10.17	15.25	20.34	25.42	30.51	35.59	40.68
	120		1.00	5.00	10.00	15.00	20.00	25.00	30.00	35.00	40.00
	121		0.98	4.92	9.84	14.75	19.67	24.59	29.51	34.42	39.34
	122		0.97	4.84	9.67	14.51	19.35	24.19	29.02	33.86	38.70
	123		0.95	4.76	9.52	14.28	19.04	23.80	28.55	33.31	38.07
	124		0.94	4.68	9.37	14.05	18.73	23.41	28.10	32.78	37.46
	125		0.92	4.61	9.22	13.82	18.43	23.04	27.65	32.26	36.86
	126		0.91	4.54	9.07	13.61	18.14	22.68	27.21	31.75	36.28
	127		0.89	4.46	8.93	13.39	17.86	22.32	26.78	31.25	35.71
	128		0.88	4.39	8.79	13.18	17.58	21.97	26.37	30.76	35.16
	129		0.87	4.33	8.65	12.98	17.31	21.63	25.96	30.29	34.61
	130		0.85	4.26	8.52	12.78	17.04	21.30	25.56	29.82	34.08
	131		0.84	4.20	8.39	12.59	16.78	20.98	25.17	29.37	33.56
	132		0.83	4.13	8.26	12.40	16.53	20.66	24.79	28.93	33.06
	133		0.81	4.07	8.14	12.21	16.28	20.35	24.42	28.49	32.56
	134		0.80	4.01	8.02	12.03	16.04	20.05	24.06	28.07	32.08
	135		0.79	3.95	7.90	11.85	15.80	19.75	23.70	27.65	31.60
	136		0.78	3.89	7.79	11.68	15.57	19.46	23.36	27.25	31.14
	137		0.77	3.84	7.67	11.51	15.34	19.18	23.02	26.85	30.69
	138		0.76	3.78	7.56	11.34	15.12	18.90	22.68	26.47	30.25
	139		0.75	3.73	7.45	11.18	14.91	18.63	22.36	26.09	29.81
	140		0.73	3.67	7.35	11.02	14.69	18.37	22.04	25.71	29.39
	141		0.72	3.62	7.24	10.86	14.49	18.11	21.73	25.35	28.97
	142		0.71	3.57	7.14	10.71	14.28	17.85	21.42	25.00	28.57
	143		0.70	3.52	7.04	10.56	14.08	17.60	21.13	24.65	28.17
	144		0.69	3.47	6.94	10.42	13.89	17.36	20.83	24.31	27.78
	145		0.68	3.42	6.85	10.27	13.70	17.12	20.55	23.97	27.40
	146		0.68	3.38	6.76	10.13	13.51	16.89	20.27	23.64	27.02
	147		0.67	3.33	6.66	10.00	13.33	16.66	19.99	23.32	26.66
	148		0.66	3.29	6.57	9.86	13.15	16.44	19.72	23.01	26.30
	149		0.65	3.24	6.49	9.73	12.97	16.22	19.46	22.70	25.94
	150		0.64	3.20	6.40	9.60	12.80	16.00	19.20	22.40	25.60
	151		0.63	3.16	6.32	9.47	12.63	15.79	18.95	22.10	25.26
	152		0.62	3.12	6.23	9.35	12.47	15.58	18.70	21.81	24.93
	153		0.62	3.08	6.15	9.23	12.30	15.38	18.45	21.53	24.61
	154		0.61	3.04	6.07	9.11	12.14	15.18	18.22	21.25	24.29

Accessories

Over Current Relay (OCR)

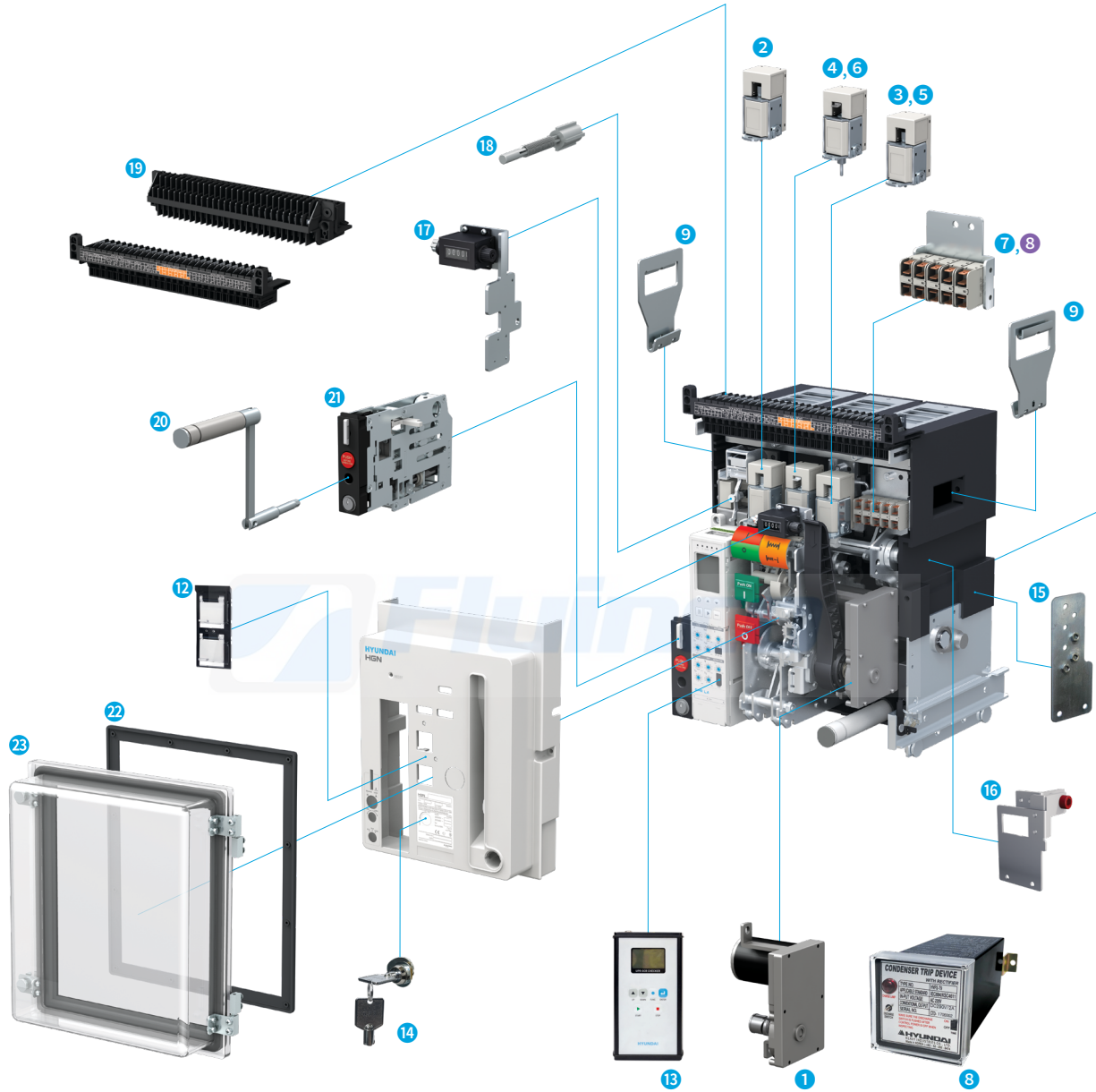
Time Chart for PTA Inverse Time (Generator)

Item	xIp	Tp	PTA Time Setting (sec)							
			1	5	10	15	20	25	30	35
Detection Setting Current (%)	155	0.60	3.00	5.99	8.99	11.99	14.98	17.98	20.98	23.98
	156	0.59	2.96	5.92	8.88	11.83	14.79	17.75	20.71	23.67
	157	0.58	2.92	5.84	8.76	11.68	14.61	17.53	20.45	23.37
	158	0.58	2.88	5.77	8.65	11.54	14.42	17.30	20.19	23.07
	159	0.57	2.85	5.70	8.54	11.39	14.24	17.09	19.94	22.78
	160	0.56	2.81	5.63	8.44	11.25	14.06	16.88	19.69	22.50
	161	0.56	2.78	5.56	8.33	11.11	13.89	16.67	19.44	22.22
	162	0.55	2.74	5.49	8.23	10.97	13.72	16.46	19.20	21.95
	163	0.54	2.71	5.42	8.13	10.84	13.55	16.26	18.97	21.68
	164	0.54	2.68	5.35	8.03	10.71	13.38	16.06	18.74	21.42
	165	0.53	2.64	5.29	7.93	10.58	13.22	15.87	18.51	21.16
	166	0.52	2.61	5.23	7.84	10.45	13.06	15.68	18.29	20.90
	167	0.52	2.58	5.16	7.74	10.33	12.91	15.49	18.07	20.65
	168	0.51	2.55	5.10	7.65	10.20	12.76	15.31	17.86	20.41
	169	0.50	2.52	5.04	7.56	10.08	12.60	15.13	17.65	20.17
	170	0.50	2.49	4.98	7.47	9.97	12.46	14.95	17.44	19.93
	171	0.49	2.46	4.92	7.39	9.85	12.31	14.77	17.24	19.70
	172	0.49	2.43	4.87	7.30	9.73	12.17	14.60	17.04	19.47
	173	0.48	2.41	4.81	7.22	9.62	12.03	14.43	16.84	19.25
	174	0.48	2.38	4.76	7.13	9.51	11.89	14.27	16.65	19.02
	175	0.47	2.35	4.70	7.05	9.40	11.76	14.11	16.46	18.81
	176	0.46	2.32	4.65	6.97	9.30	11.62	13.95	16.27	18.60
	177	0.46	2.30	4.60	6.89	9.19	11.49	13.79	16.09	18.39
	178	0.45	2.27	4.54	6.82	9.09	11.36	13.63	15.91	18.18
	179	0.45	2.25	4.49	6.74	8.99	11.24	13.48	15.73	17.98
	180	0.44	2.22	4.44	6.67	8.89	11.11	13.33	15.56	17.78
	181	0.44	2.20	4.40	6.59	8.79	10.99	13.19	15.38	17.58
	182	0.43	2.17	4.35	6.52	8.69	10.87	13.04	15.22	17.39
	183	0.43	2.15	4.30	6.45	8.60	10.75	12.90	15.05	17.20
	184	0.43	2.13	4.25	6.38	8.51	10.63	12.76	14.89	17.01
	185	0.42	2.10	4.21	6.31	8.41	10.52	12.62	14.73	16.83
	186	0.42	2.08	4.16	6.24	8.32	10.41	12.49	14.57	16.65
	187	0.41	2.06	4.12	6.18	8.24	10.29	12.35	14.41	16.47
	188	0.41	2.04	4.07	6.11	8.15	10.19	12.22	14.26	16.30
	189	0.40	2.02	4.03	6.05	8.06	10.08	12.09	14.11	16.12
	190	0.40	1.99	3.99	5.98	7.98	9.97	11.97	13.96	15.96
	191	0.39	1.97	3.95	5.92	7.89	9.87	11.84	13.82	15.79
	192	0.39	1.95	3.91	5.86	7.81	9.77	11.72	13.67	15.63
	193	0.39	1.93	3.87	5.80	7.73	9.66	11.60	13.53	15.46
	194	0.38	1.91	3.83	5.74	7.65	9.57	11.48	13.39	15.30
	195	0.38	1.89	3.79	5.68	7.57	9.47	11.36	13.25	15.15
	196	0.37	1.87	3.75	5.62	7.50	9.37	11.25	13.12	14.99
	197	0.37	1.86	3.71	5.57	7.42	9.28	11.13	12.99	14.84
	198	0.37	1.84	3.67	5.51	7.35	9.18	11.02	12.86	14.69
	198	0.36	1.82	3.64	5.45	7.27	9.09	10.91	12.73	14.55
	198	0.36	1.80	3.60	5.40	7.20	9.00	10.80	12.60	14.40
	200	0.36	1.80	3.60	5.40	7.20	9.00	10.80	12.60	14.40



Accessories

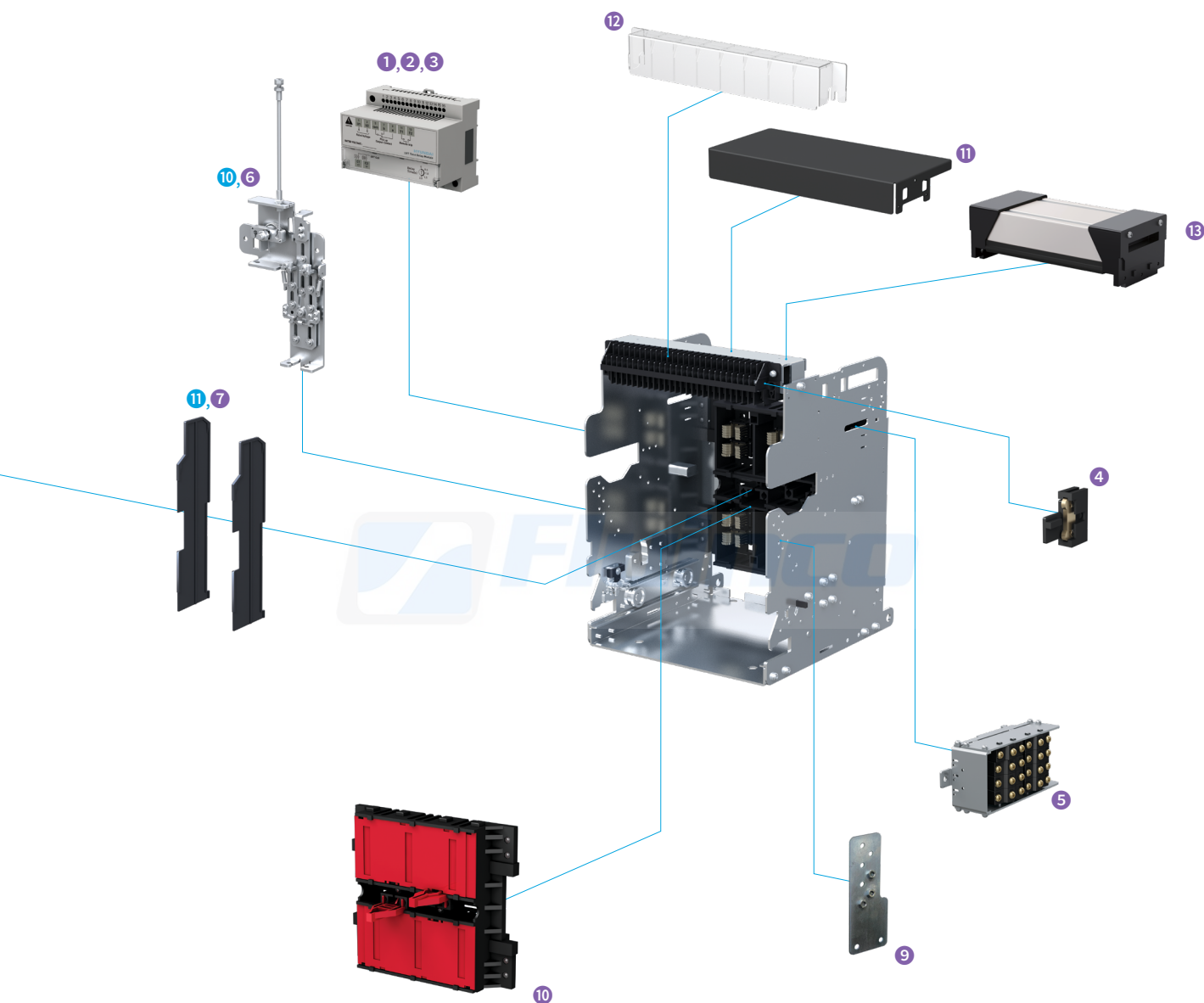
Main Unit



Accessories for Circuit Breaker

- | | | |
|-------------------------------|-----------------------------|---------------------------------|
| 1 Spring Charge Geared Motor | 9 Lifting Lug | 17 Counter |
| 2 Closing Coil | 10 Mechanical Interlock | 18 OCR & Alarm S/W Reset Button |
| 3 Trip Coil | 11 Phase Insulation Barrier | 19 Test Jumper |
| 4 Secondary Trip Coil | 12 On/Off Button Lock | 20 Draw-In/Out Handle |
| 5 Trip Coil Supervision | 13 OCR Portable Checker | 21 Position Pad Lock |
| 6 UVT Coil | 14 Key Lock | 22 Door Flange |
| 7 AUX Switch | 15 Miss-Insertion Preventer | 23 Dust Cover |
| 8 Condenser Trip Device (CTD) | 16 Fixing Block | |

Cradle



Accessories for Cradle

- ① UVT Time Delay Controller
- ② Remote Closing Prevention Module
- ③ Temperature Monitoring Device Module
- ④ Short "b" Contact
- ⑤ Position Switch

- ⑥ Mechanical Interlock
- ⑦ Phase Insulation Barrier
- ⑧ Mechanical Operated Cell Switch
- ⑨ Miss-Insertion Preventer

- ⑩ Safety Shutter
- ⑪ Arc Shield
- ⑫ Control Block Protection Cover
- ⑬ Arc Shied

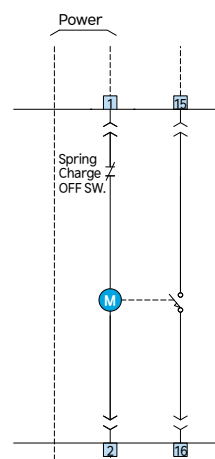
* Standard supply for HGN1150V model

Accessories

Spring Charging Geared Motor

- Manual charging method and geared motor charging method using external power source for charging the spring in the circuit breaker.
- As for the geared motor charging method, if power is applied to the control power terminal number (1), (2), spring charge is possible at 85 ~ 110 % power of the operating voltage range.
- Add M1 ~ M9 in the order form.
- It can be purchased separately.

Connection Diagram



Ordering Method

Name of Accessory	Order Name Placed upon Outgoing	Detailed Specification
Spring Charging Geared Motor	M1	AC/DC 110 V
	M2	AC/DC 220 V
	M7	DC 24 V
	M8	DC 48 V
	M9	DC 125 V

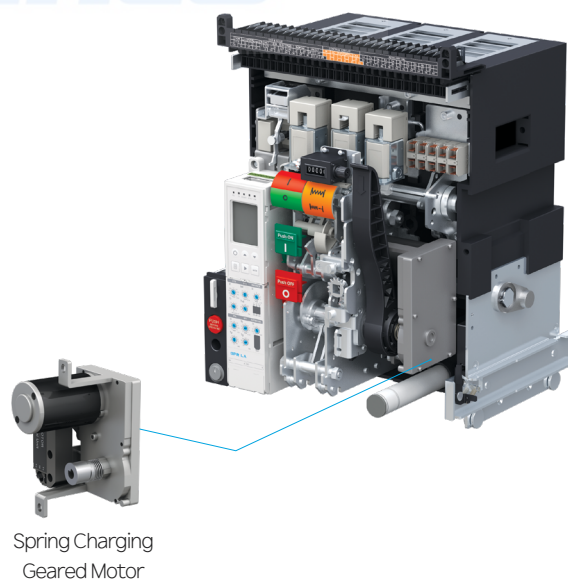
Ratings

Item	DC 110	DC 220
Rated Current (A)	1.2	0.5
Starting Pick-Up (A)	5 ~ 6 times the rated current	
Final Rated rpm	16 ± 3	
Charging Time (sec)	Within 5 seconds ¹⁾	
Rated Torque (kgf)	300 kgf×cm	
Rated Watt (W)	100	100
Dielectric Strength (V/min)	2,000	
Insulation Resistance (MΩ)	100	
Workable Temperature (°C)	-15 ~ 60	

※ ¹⁾ Charging time is within 10 sec of rated, in case of DC 24/48 V.

Wire Ratings

Rated Voltage	DC 24, 48		DC 110, 220	
	AWG (mm ²)	Insulation Level (V)	AWG (mm ²)	Insulation Level (V)
Specification	18	600	18	600



Spring Charging Geared Motor

Spring Charging Switch or Ready to Close Switch

- Spring charging switch delivers (15, 16) the charged status when mechanism spring charge is complete.
- Read to close switch delivers (15, 16) only when the circuit breaker is open and simultaneously only when the mechanism spring charge is complete.
- Order name of spring charging switch : B6, Order name of ready to close switch : BT
- Two accessories cannot be ordered simultaneously.

Closing Coil (CC)

- A control device which closes a circuit breaker remotely from outside.
- The circuit breaker is closed by applying power of at least more than 150 ms within the range of 85 ~ 110 % of the rated control voltage to the control power terminal number (3) and (4).
- Add C1 ~ C9 in the order form when ordering the main unit.
- It can be purchased separately.
- Use a separate switch externally to apply power to the closing coil.

Ordering Method

Name of Accessory	Order Name Placed upon Outgoing	Detailed Specification
Closing Coil	C1	AC/DC 110 V
	C2	AC/DC 220 V
	C3	AC 380 V
	C4	AC 440 V
	C7	DC 24 V
	C8	DC 48 V
	C9	DC 125 V

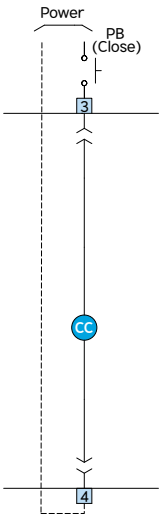
Ratings

Item	DC (V)	AC (V)
	24~48	-
Rated Voltage (Vn)	100 ~ 130	100 ~ 130
	200 ~ 250	200 ~ 250
Operating Limits (Vn)	0.85 ~ 1.1	
Power Consumption (VA)	Inrush (300), Steady-State (10)	
Trip Time (ms)	80	
Pick up current	24 ~ 48V : 3.0A(±10%)	-
	100 ~ 130V : 2.0A(±10%)	100 ~ 130V : 2.0A(±10%)
	200 ~ 250V : 1.4A(±10%)	200 ~ 250V : 1.4A(±10%)
Holding current	24 ~ 48V : 330mA(±10%)	-
	100 ~ 130V : 150mA(±10%)	100 ~ 130V : 150mA(±10%)
	200 ~ 250V : 120mA(±10%)	200 ~ 250V : 120mA(±10%)



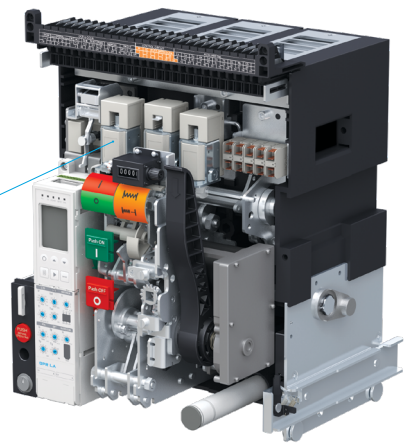
Closing Coil

Connection Diagram



Wire Ratings

Rated Voltage	DC 24		AC/DC 110, 220	
	AWG (mm ²)	Insulation Level (V)	AWG (mm ²)	Insulation Level (V)
Specification	20	600	20	600



Accessories

Trip Coil (TC)

- A control device which trips a circuit breaker remotely.
- The circuit breaker is tripped by applying power of at least more than 150 ms within the range of 70 ~ 110 % of the rated control voltage to the control power terminal number (7) and (8).
- Add S1 ~ S9 in the order form when ordering the main unit.
- It can be purchased separately.
- Use a separate switch externally to apply power to the closing coil.

Ordering Method

Name of Accessory	Order Name Placed upon Outgoing	Detailed Specification
Trip Coil	S1	AC/DC 110 V
	S2	AC/DC 220 V
	S3	AC 380 V
	S4	AC 440 V
	S7	DC 24 V
	S8	DC 48 V
	S9	DC 125 V

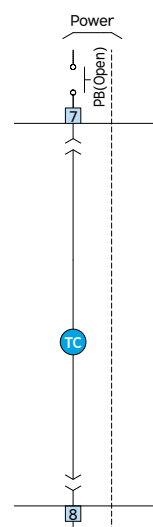
Ratings

Item	DC (V)	AC (V)
Rated Voltage (Vn)	24~48	-
	100 ~ 130	100 ~ 130
	200 ~ 250	200 ~ 250
Operating Limits (Vn)	0.7 ~ 1.1	
Power Consumption (VA)	Inrush (300), Steady-State (10)	
Trip Time (ms)	40	
Pick up current	24 ~ 48V : 2.0A(±10%)	-
	100 ~ 130V : 2.0A(±10%)	100 ~ 130V : 2.0A(±10%)
	200 ~ 250V : 1.4A(±10%)	200 ~ 250V : 1.4A(±10%)
Holding current	24 ~ 48V : 330mA(±10%)	-
	100 ~ 130V : 120mA(±10%)	100 ~ 130V : 120mA(±10%)
	200 ~ 250V : 100mA(±10%)	200 ~ 250V : 100mA(±10%)



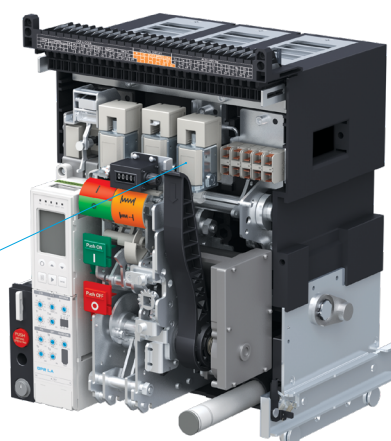
Trip Coil

Connection Diagram



Wire Ratings

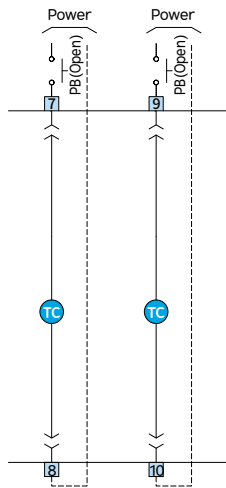
Rated Voltage	DC 24		AC/DC 110, 220	
	AWG (mm ²)	Insulation Level (V)	AWG (mm ²)	Insulation Level (V)
Specification	20	600	20	600



Secondary Trip Coil

- It is a control device which trips a circuit breaker remotely from outside and dual remote trip is possible with an additional installation of trip coil.
- The circuit breaker is tripped by applying power of at least more than 150 ms within the range of 70 ~ 110 % of the rated control voltage by applying power to the control power terminal number (9) and (10).
- When dual trip coil is used, it cannot be used together with UVT coil.
- Add S1 ~ S9 in the order form when ordering the main unit and under the option, add S1 ~ S9 once again.
- It can be purchased separately.
- Use a separate switch externally to apply power to the dual trip coil.

Connection Diagram



Ordering Method

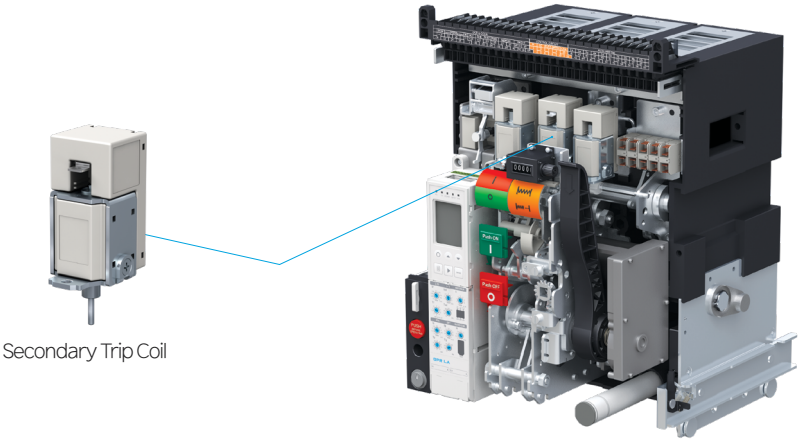
Name of Accessory	Order Name Placed upon Outgoing	Detailed Specification
Secondary Trip Coil	S1	AC/DC 110 V
	S2	AC/DC 220 V
	S3	AC 380 V
	S4	AC 440 V
	S7	DC 24 V
	S8	DC 48 V
	S9	DC 125 V

Wire Ratings

Rated Voltage	DC 24		AC/DC 110, 220	
	AWG (mm ²)	Insulation Level (V)	AWG (mm ²)	Insulation Level (V)
Specification	20	600	20	600

Ratings

Item	DC (V)	AC (V)
Rated Voltage (Vn)	24~48	-
	100 ~ 130	100 ~ 130
	200 ~ 250	200 ~ 250
Operating Limits (Vn)	0.7 ~ 1.1	
Power Consumption (VA)	Inrush (300), Steady-State (10)	
Trip Time (ms)	40	
Pick up current	24 ~ 48V : 2.0A(±10%)	-
	100 ~ 130V : 2.0A(±10%)	100 ~ 130V : 2.0A(±10%)
	200 ~ 250V : 1.4A(±10%)	200 ~ 250V : 1.4A(±10%)
Holding current	24 ~ 48V : 330mA(±10%)	-
	100 ~ 130V : 120mA(±10%)	100 ~ 130V : 120mA(±10%)
	200 ~ 250V : 100mA(±10%)	200 ~ 250V : 100mA(±10%)

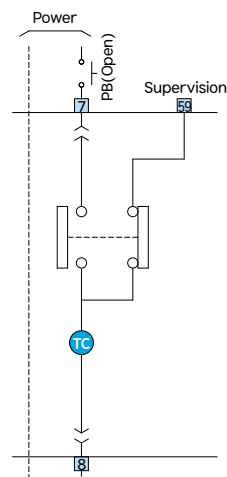


Accessories

Trip Coil Supervision

- A control device which trips a circuit breaker remotely from outside.
- The circuit breaker is tripped by applying power of at least more than 150 ms within the range of 70 ~ 110 % of the rated control voltage by applying power to the control power terminal number (7) and (8).
- When using trip coil supervision, auxiliary contact is 4a3b and when 1a1b is added, it becomes 5a4b. (AUX S/W 43/44, 53/54 cannot be used.)
- In order to monitor the permanent normal status when TCS is closed and tripped, the circuit sequence cannot be created by using the additional 1a1b (Order code AA). (Possibility of contact damage) However, if it is compulsory, select 1a contact within 4a3b for use.
- The trip coil's monitoring output contact No. 59.
- Coil supervision checks not only the circuit's mechanical contact but also the condition of the coil.
- Add T1 ~ T9 in the order form when ordering the main unit.
- It can be purchased separately.

Connection Diagram



Ordering Method

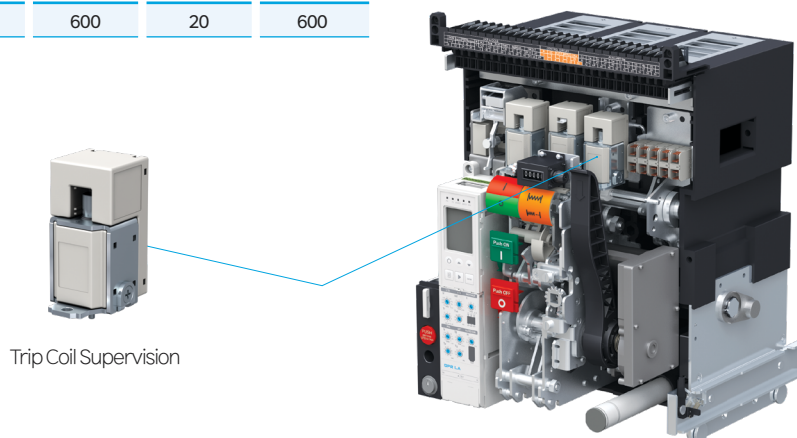
Name of Accessory	Order Name Placed upon Outgoing	Detailed Specification
Trip Coil Supervision	T1	AC/DC 110 V
	T2	AC/DC 220 V
	T3	AC 380 V
	T4	AC 440 V
	T7	DC 24 V
	T8	DC 48 V
	T9	DC 125 V

Ratings

Item	DC (V)	AC (V)
Rated Voltage (Vn)	24	-
	100 ~ 130	100 ~ 130
	200 ~ 250	200 ~ 250
Operating Limits (Vn)	0.7 ~ 1.1	
Power Consumption (VA)	Inrush (300), Steady-State (10)	
Trip Time (ms)	40	

Wire Ratings

Rated Voltage	DC 24		AC/DC 110, 220	
	AWG (mm ²)	Insulation Level (V)	AWG (mm ²)	Insulation Level (V)
Specification	20	600	20	600

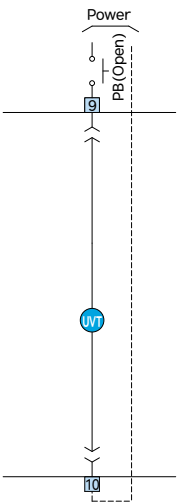


Trip Coil Supervision

UVT Coil

- Under-voltage trip device is a device that automatically trips the circuit breaker if the load voltage drops to below the standard or to prevent accidents at the load part during a black out.
- Under-voltage trip device is classified into instantaneous and time delay type for use. As for instantaneous type, directly connect to control power terminal number (9), (10) for use and as for time delay type, the Time Delay Controller can be used.
- When instantaneous type of UVT is used, dual trip coil cannot be used.
- When instantaneous type of UVT is used, add U1 ~ U9 in the order form when ordering the main unit.
- It can be purchased separately.

Connection Diagram



Ordering Method

Name of Accessory	Order Name Placed upon Outgoing	Detailed Specification
UVT Coil	U1	AC/DC 110 V
	U2	AC/DC 220 V
	U3	AC 380 V
	U4	AC 440 V
	U7	DC 24 V
	U8	DC 48 V
	U9	DC 125 V

Ratings

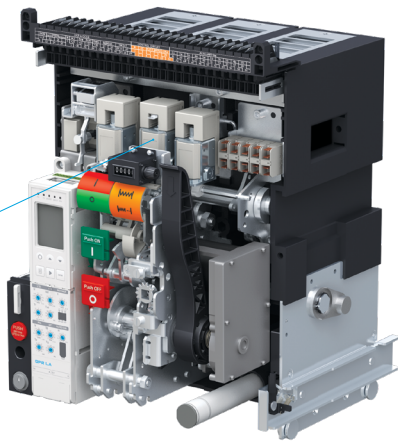
Item	DC (V)	AC (V)
	24	-
Rated Voltage (Vn)	110 (100 ~ 130)	110 (100 ~ 130)
	220 (200 ~ 250)	220 (200 ~ 250)
	-	380
	-	440
Pickup	Above 0.85 Vn	
Drop	Below 0.35 Vn	
Power Consumption (VA)	Inrush (300), Steady-State (10)	
Trip Time (ms)	50	

Wire Ratings

Rated Voltage	DC 24		AC/DC 110, 220		AC 380, 440	
	AWG (mm ²)	Insulation Level (V)	AWG (mm ²)	Insulation Level (V)	AWG (mm ²)	Insulation Level (V)
Specification	20	600	20	600	20	600



UVT Coil

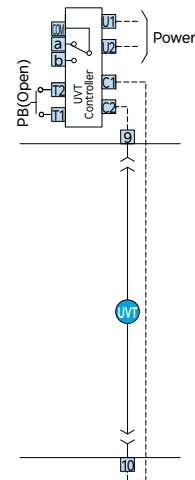


Accessories

UVT Time Delay Controller

- Under-voltage trip device is a device that automatically trips the circuit breaker if the load voltage drops to below operating voltage or to prevent accidents at the load part during a black out.
- This device is capable of delaying (0.5, 1.0, 1.5, 3 sec).
- UVT Time Delay Controller can be mounted at the left side of the cradle and the external rail and it can also be mounted at the position desired by the customer.
- Add V1 ~ V9 in the order form when ordering the main unit. Time Delay Controller will be included in the package.
- When purchasing the UVT time delay controller only, place the order for the separate product, HGNS UT1 ~ UT9.
- DC 24 V and DC 48 V are only available in instantaneous type.
- In the event the UVT Time Delay Controller and RCTU are purchased simultaneously, the front mounting can be installed in the front for 1 option designated by the customer. The remaining 1 shall be installed by designating a position in the DIN RAIL inside the panel.

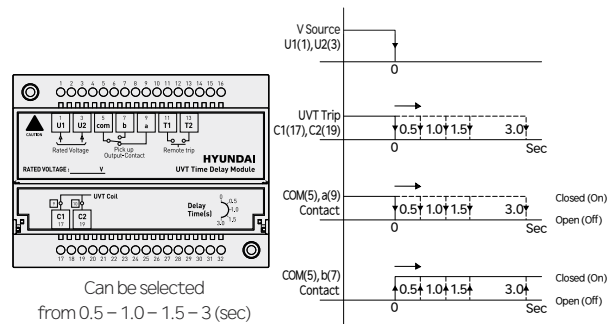
Connection Diagram



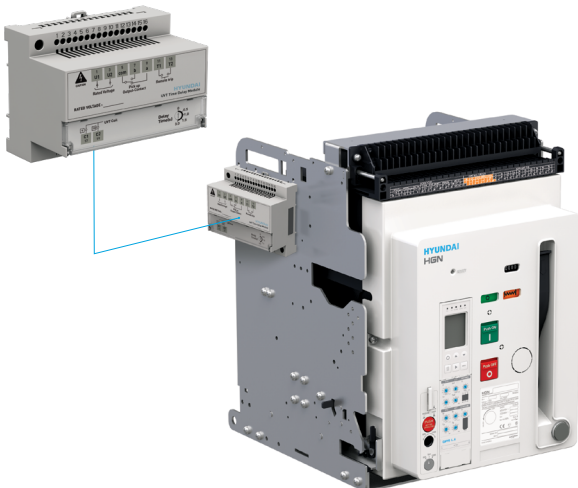
Ordering Method

Name of Accessory	Order Name Placed upon Outgoing	Order Name for Separate Sales (HGNS-)	Detailed Specification
UVT Time Delay Controller	-	HGNS UT1	AC/DC 110 V
	-	HGNS UT2	AC/DC 220 V
	-	HGNS UT3	AC 380 V
	-	HGNS UT4	AC 440 V
	-	HGNS UT9	DC 125 V
UVT Time Delay Controller + UVT Coil	V1	HGNS V1	AC/DC 110 V
	V2	HGNS V2	AC/DC 220 V
	V3	HGNS V3	AC 380 V
	V4	HGNS V4	AC 440 V
	V9	HGNS V9	DC 125 V

Wiring and Operating Time

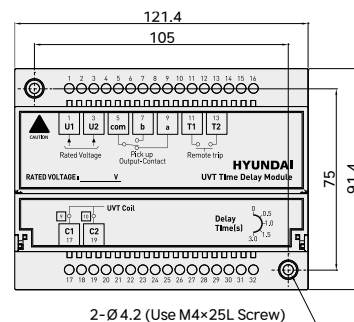


UVT Time Delay Controller



Dimension

Unit : mm



※ 5, 7, 9 switch status is the status when UVT is functioning.

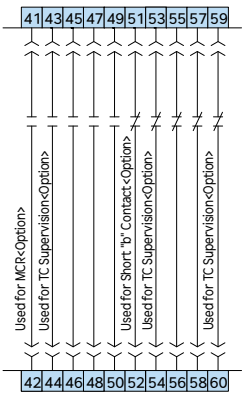
AUX Switch

- It is an output contact to remotely monitor the On/Off state of the ACB.
- As for HGS Type, 3a3b is provided and as for HGN Type, 5a5b is provided as standard without separate indication in the order form.
- AUX switch can be expanded up to 6a6b maximum.
 - How to order HGS 5a5b : Add A5 in the order form.
 - How to order HGS/HGN 6a6b : Add AA in the order form.
- When using the monitoring contact for trip coil, 3a3b can be used for the AUX switch and when using the MCR function of OCR, it can be used as 4a3b.
- When short "b" is added, it will be attached to 'b' contacts 51, 52 for outgoing and upon additional mounting, the short "b" sealed and released can be mounted additionally depending on the number of b contacts.
- 5a5b can be purchased separately. Place an order separately as HGNS A5.

AUX Switch Ratings

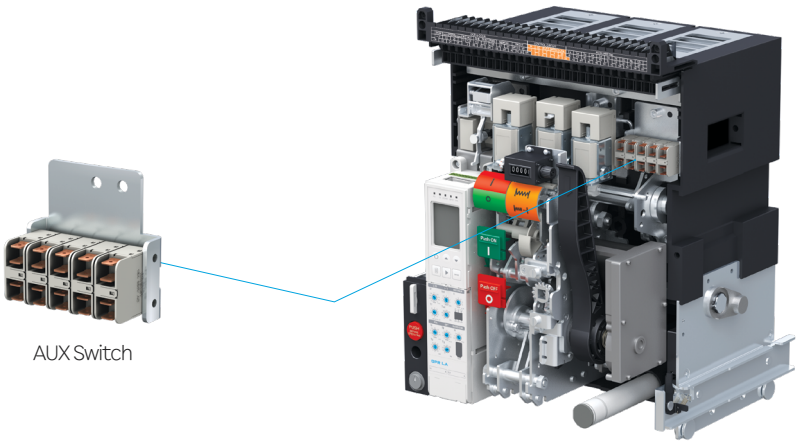
Applicable Load	Resistance	Lamp	Inductor	Motor
AC 125 V	5 A	0.7 A	4 A	1.3 A
AC 250 V	5 A	0.5 A	4 A	0.8 A
DC 125V	≤ 2 A	-	≤ 1.0 A	-
DC 250V	≤ 1 A	-	≤ 0.5 A	-

Connection



Wire Specification

Wire Specification	AWG	Insulation Level (V)
Specification	20	300



Accessories

Counter

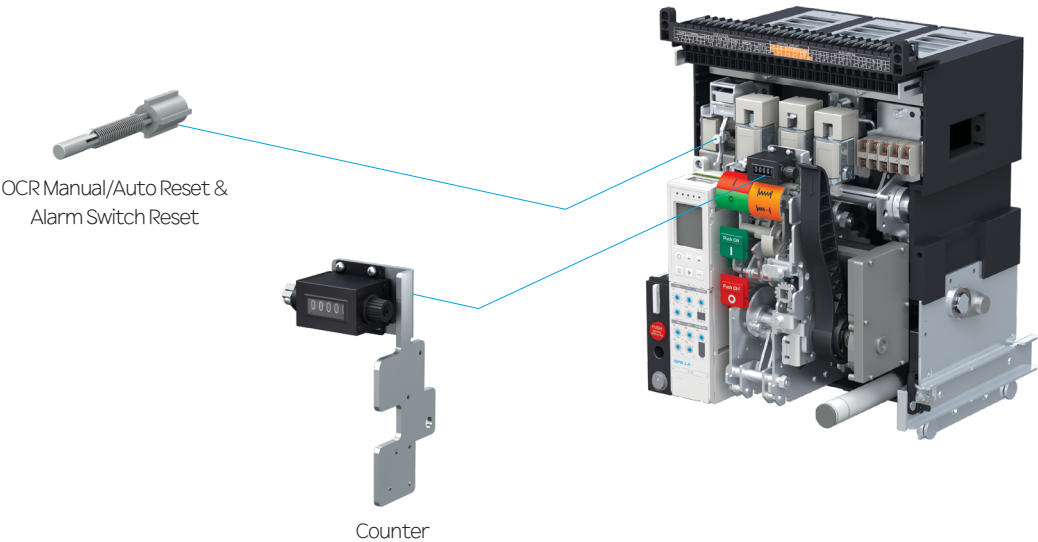
- It is a device that displays the number of operations, indicating On/Off operation of the circuit breaker in 1 cycle.
- It is a primary component so separate order is unnecessary.

OCR Manual/Auto Reset & Alarm Switch Reset

- It is a device that interlocks the closing of the circuit breaker until the electric line is restored after the user has completely removed the fault factor when a circuit breaker tripped by OCR due to overload or fault current in the electric line. (BR)
- BR : When the circuit breaker functions due to OCR, it interlocks to prevent closing of circuit breaker and is reset manually.
- BA : When the circuit breaker functions due to OCR, the circuit breaker's status is indicated as output contact 1a1b other than the interlock feature and this output contact is reset manually.
- BH : When the circuit breaker functions due to OCR, the circuit breaker's status is indicated as output contact high capacity switch other than the interlock feature and this output contact is reset manually.
- As a product mounted in the main unit, add BR/BA/BH in the order form when ordering the main unit.

Ordering Method

Name of Accessory	Order Name Placed upon Outgoing	Detailed Specification
OCR Manual Reset	BR	Interlock Manual Reset
OCR Manual Reset + Alarm S/W Reset	BA	Interlock Manual Reset + Alarm S/W Reset
OCR Manual Reset + High Capacity Alarm S/W Reset (1C)	BH	Interlock Manual Reset + Alarm S/W Reset (High Capacity DC 3 A)



OCR Manual/Auto Reset &
Alarm Switch Reset

Counter

Position Switch

- This switch, mounted at the side of the cradle, displays the position of ACB during draw-out.
- The position of Inserted/Isolated/Test/Connected can be displayed.
- Only one switch is applicable and it can only be mounted at the right side of the cradle.
- It can be purchased separately.

AUX Switch Ratings

Applicable Load	Resistance	Lamp	Inductor	Motor
AC 125 V	10 A	1.5 A	6 A	2 A
DC 30 V	6 A	3 A	6 A	3 A
DC 125 V	0.6 A	0.1 A	0.6 A	0.1 A
DC 250 V	0.3 A	0.05 A	0.3 A	0.05 A



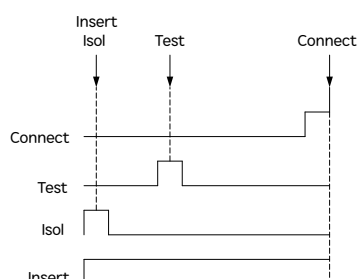
Ordering Method

Order Name		Specification of Switch Output					Mounting Position
		Composition	Insert	Isol	Test	Connect	
AQ	HGNS AQ	Test 1C/Connect 1C	×	×	● (1C)	● (1C)	Right Side of Cradle
AR	HGNS AR	Connect 2C	×	×	×	● (2C)	
AS	HGNS AS	Test 2C	×	×	● (2C)	×	
AT	HGNS AT	Isol 1C/Insert 1C	● (1C)	● (1C)	×	×	
AU	HGNS AU	Insert 2C	● (2C)	×	×	×	
AV	HGNS AV	Isol 2C	×	● (2C)	×	×	
PQ	HGNS PQ	Isol 1C/Insert 1C/Test 1C/Connect 1C	● (1C)	● (1C)	● (1C)	● (1C)	
PS	HGNS PS	Isol 1C/Test 1C/Connect 2C	×	● (1C)	● (1C)	● (2C)	
P4	HGNS P4	Test 2C/Connect 2C	×	×	● (2C)	● (2C)	
PT	HGNS PT	Test 4C	×	×	● (4C)	×	
PR	HGNS PR	Insert 1C/Isol 1C/Test 3C/Connect 3C	● (1C)	● (1C)	● (3C)	● (3C)	
P8	HGNS P8	Insert 2C/Isol 2C/Test 2C/Connect 2C	● (2C)	● (2C)	● (2C)	● (2C)	
PU	HGNS PU	Test 4C/Connect 4C	×	×	● (4C)	● (4C)	

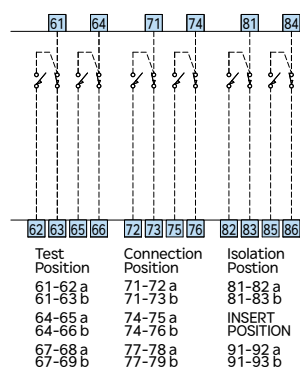
※ For position switches, because they are common parts with the U-Series product, the position switch may be marked "UANS".

Operating Sequence of

Position Switch Operation Circuit



Connection Diagram



Dimension



Accessories

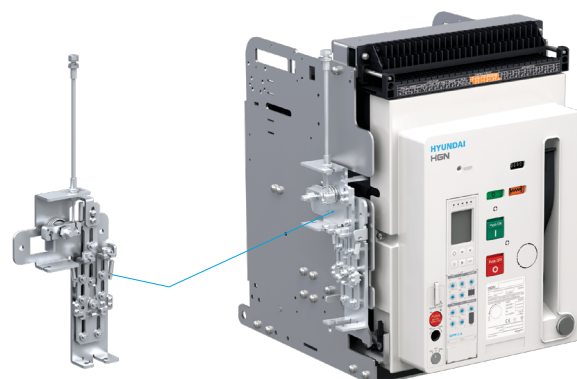
Lifting Lug

- It is a component that is used for transporting the circuit breaker.
- It can be hung to the handle at the side of the cradle, side of the arc shield and the main unit and the product can be moved by a crane or a person.
- When handling all the products, use the crane and in case of transporting independently using only the crane in case of products below 3,200 A, the products must be transported in accordance with the safety regulations.
- As a product sold separately, place an order for HGNS AL.



Mechanical Interlock

- MI is a device that mechanically interlocks the closing and tripping of each circuit breaker by connecting 2 or 3 circuit breakers.
- The MI is operated by a combination of the MI unit and the components of the interlock that is installed inside the main unit.
- The MI unit is a separate product and it is a device that is mounted additionally after the ACB has to be installed in the panel.
- When placing the order for the main unit, add B0 in the order from and only the component inside the interlock is mounted inside the main unit for release and as for the external mounting kit, place an additional order as a separate product.
- MI wire should be connected under 2 m between ACBs.
- In order to install, a square hole of 100×200 (mm) is required.



Mechanical Interlock

Ordering Method

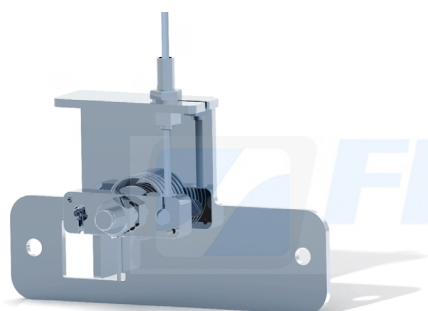
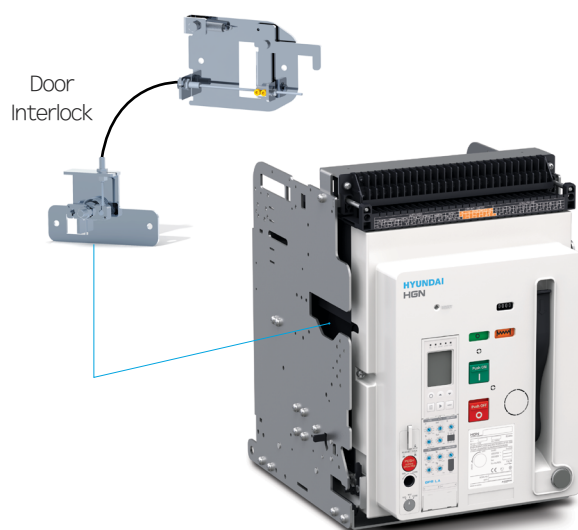
Name of Accessory	Order Name for Separate Sales (HGNS-)	Accessory Spec.
Mechanical Interlock	HGNS DWB1	A & B & C & D & P & Q Frame Draw-Out (Fixed) Type 2 Way MI (External Mounting Kit Only)
	HGNS DWB2	A & B & C & D & P & Q Frame Draw-Out (Fixed) Type 3 Way MI (External Mounting Kit Only)
	HGNS FWB1	A & B & C & D & P & Q Frame Fixed Type 2 Way MI (External Mounting Kit Only)
	HGNS FWB2	A & B & C & D & P & Q Frame Fixed Type 3 Way MI (External Mounting Kit Only)
	HGNS B0DA	A, P Frame Interlock Part (B0)
	HGNS B0DB	B, Q Frame Interlock Part (B0)
	HGNS B0DC3	C Frame 3P Interlock Part (B0)
	HGNS B0DC4	C Frame 4P Interlock Part (B0)
	HGNS B0DD3	D Frame 3P Interlock Part (B0)
	HGNS B0DD4	D Frame 4P Interlock Part (B0)
	HGNS B0FA	A, P Frame Interlock Part (B0) + Fixed Type of Installation Bracket
	HGNS B0FB	B, Q Frame Interlock Part (B0) + Fixed Type of Installation Bracket
	HGNS B0FC3	C Frame 3P Interlock Part (B0) + Fixed Type of Installation Bracket
	HGNS B0FC4	C Frame 4P Interlock Part (B0) + Fixed Type of Installation Bracket
	HGNS B0FD3	D Frame 3P Interlock Part (B0) + Fixed Type of Installation Bracket
	HGNS B0FD4	D Frame 4P Interlock Part (B0) + Fixed Type of Installation Bracket
	HGNS DWB1A	A, P Frame Draw-Out Type 2 Way MI + Interlock Part (B0)
	HGNS DWB2A	A, P Frame Draw-Out Type 3 Way MI + Interlock Part (B0)
	HGNS DWB1B	B, Q Frame Draw-Out Type 2 Way MI + Interlock Part (B0)
	HGNS DWB2B	B, Q Frame Draw-Out Type 3 Way MI + Interlock Part (B0)
	HGNS DWB1C3	C Frame 3P Draw-Out 2 Way MI + Interlock Part (B0)
	HGNS DWB1C4	C Frame 4P Draw-Out 2 Way MI + Interlock Part (B0)

Name of Accessory	Order Name for Separate Sales (HGNS-)	Accessory Spec.
Mechanical Interlock	HGNS DWB2C3	C Frame 3P Draw-Out 3 Way MI + Interlock Part (B0)
	HGNS DWB2C4	C Frame 4P Draw-Out 3 Way MI + Interlock Part (B0)
	HGNS DWB1D3	D Frame 3P Draw-Out 2 Way MI + Interlock Part (B0)
	HGNS DWB1D4	D Frame 4P Draw-Out 2 Way MI + Interlock Part (B0)
	HGNS DWB2D3	D Frame 3P Draw-Out 3 Way MI + Interlock Part (B0)
	HGNS DWB2D4	D Frame 4P Draw-Out 3 Way MI + Interlock Part (B0)
	HGNS FWB1A	A, P Frame Fixed Type 2 Way MI + Interlock Part (B0)
	HGNS FWB2A	A, P Frame Fixed Type 3 Way MI + Interlock Part (B0)
	HGNS FWB1B	B, Q Frame Fixed Type 2 Way MI + Interlock Part (B0)
	HGNS FWB2B	B, Q Frame Fixed Type 3 Way MI + Interlock Part (B0)
	HGNS FWB1C3	C Frame 3P Fixed Type 2 Way MI + Interlock Part (B0)
	HGNS FWB1C4	C Frame 4P Fixed Type 2 Way MI + Interlock Part (B0)
	HGNS FWB2C3	C Frame 3P Fixed Type 3 Way MI + Interlock Part (B0)
	HGNS FWB2C4	C Frame 4P Fixed Type 3 Way MI + Interlock Part (B0)
	HGNS FWB1D3	D Frame 3P Fixed Type 2 Way MI + Interlock Part (B0)
	HGNS FWB1D4	D Frame 4P Fixed Type 2 Way MI + Interlock Part (B0)
	HGNS FWB2D3	D Frame 3P Fixed Type 3 Way MI + Interlock Part (B0)
	HGNS FWB2D4	D Frame 4P Fixed Type 3 Way MI + Interlock Part (B0)

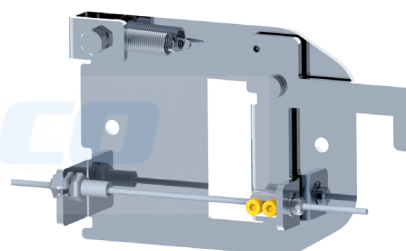
Accessories

Door Interlock [DI]

- The device that prevents the switchboard door from opening when the ACB is in the "ON" state at the "Connection" position.
- The DI operates through a combination of the DI Unit and interlock components inside the main body.
- When ordering the main unit with D0, only the interlock internal components will be attached. The external attachment kit must be ordered separately.
- For installation and maintenance, please refer to the installation manual.



Installation on the left side
of the ACB cradle



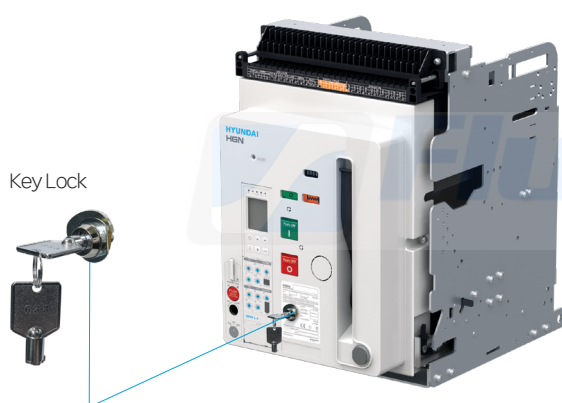
Installation on the right side
of the switchboard.

Ordering Method

Name of Accessory	Order Name for Separate Sales (HGNS-)	Detailed Specification
Door Interlock	HGNS DDI	Draw-out type Door Interlock external attachment Kit only.
	HGNS FDI	Fixed type Door Interlock external attachment Kit only.
	HGNS DDIAC	Draw-out type external attachment Kit + A, C, P Frame internal interlock components(D0)
	HGNS DDIBD	Draw-out type external attachment Kit + B, D, Q Frame internal interlock components(D0)
	HGNS FDIAC	Fixed type external attachment Kit + A, C, P Frame internal interlock components(D0)
	HGNS FDIBD	Fixed type external attachment Kit + B, D, Q Frame internal interlock components(D0)

Key Lock

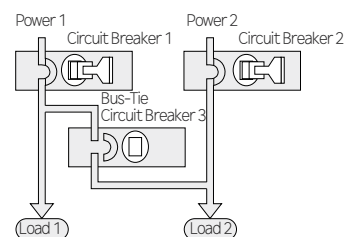
- It is a device that maintains the interlock condition to prevent electric/manual closing when the circuit breaker is open.
- When the key has been used to unlock, the electric/manual On/Off operation is possible. When the key has been removed from the circuit breaker, it becomes interlocked. When the key has been used to lock, the Off button has to be pressed to turn the key to the lock position.
- As a product mounted on the main unit, add AB in the order form when placing an order for the main unit.



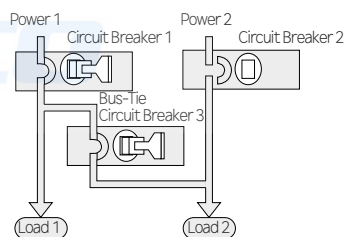
Key Lock & Key Interlock

- 3 circuit breakers mounted with the key lock device for preventing On can be used to make up the system. Only 2 circuit breakers can be allowed to close using 2 keys and the remaining 1 unit can be interlocked to provide stable load.

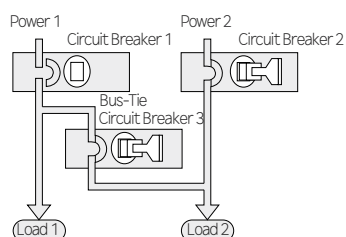
Circuit Breaker 3 cannot be closed



Circuit Breaker 2 cannot be closed



Circuit Breaker 1 cannot be closed



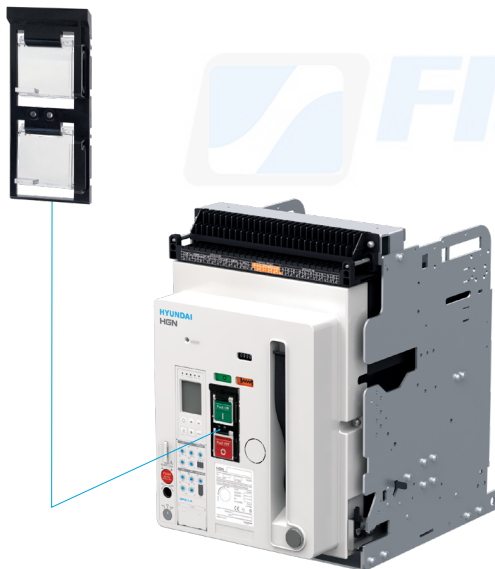
※ Example : Parallel feed at 2 power is prevented in case bus-tie circuit breaker is used

Accessories

On/Off Button Lock

- It is a safety device that prevents manual On/Off operation caused by the user's mistaken. The buttons are covered with a plastic cover to prevent arbitrary operation of manual close/trip button and padlock is used.
- As a product mounted on the main unit, add AM in the order form when placing an order for the main unit.
- Padlock is not provided by our company. (Ø5 ~ Ø8)

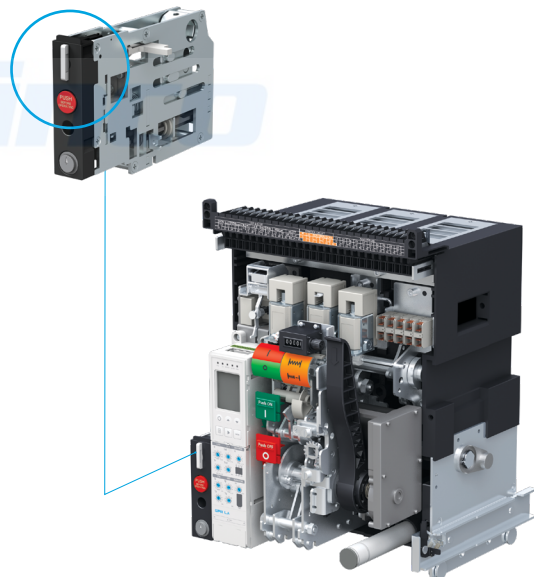
On/Off Button Lock



DR Device Unit & Position Pad Lock

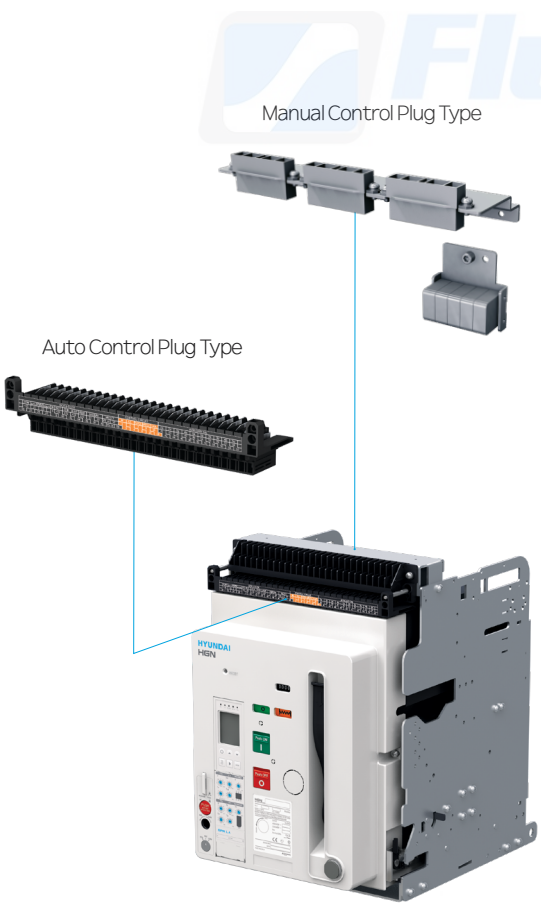
- As for the draw-out type of circuit breaker, DR device is mounted on the main unit.
- DR device is comprised of a groove for inserting draw-out handle, draw-out push button, position indicator and a padlock device.
- As for the padlock device, it is provided as a standard safety device that prevents arbitrary draw-out by using a padlock in the connection/test/isolated position but the padlock is not provided by our company. (Ø5 ~ Ø8)
- It can be purchased separately.

DR Device Unit &
Position Pad Lock



Auto Connection Type & Manual Control Plug Type

- As for the method of connecting the control power, auto connection type in which the control power is automatically connected/isolated when the main unit is drawn out and manual connection type in which the user directly inserts the connector with the control power connected to the main unit are available.
- Fixed type is provided with manual control plug type as standard so that type of connection terminal of the main power can be designated without separate indication.
- When completely removing the manual connection type of product from the cradle, the main unit has to be separated after removing the connector.
- As a product mounted on the cradle, select A for automatic connection type and J for manual connection type.



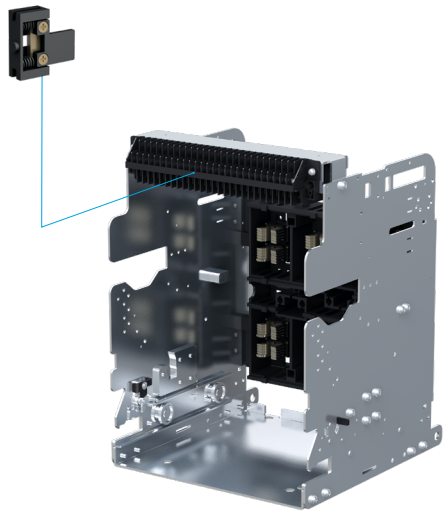
Short "b" Contact

- When the circuit breaker is moved from the Connected position to the Test position, the auxiliary contact AUX "b" is disconnected to maintain the external control circuit in normal, ultimately maintaining an accurate sequence operation. As for the number of shorting "b" contact, it corresponds to the number of AUX "b" (5b).
- Upon outgoing, only 1b (51, 52) is mounted and as for the remaining 4b, it is sealed together with the manual pack so it can be mounted as much as needed for use.
- As a product mounted on the main unit, add AK in the order form when placing an order for the main unit.

Indication of Contact Status
(When AUX "b" and Short "b" are Connected)

ACB Position	ACB Operating	ACB Close (AUX "b" Off)	ACB Open (AUX "b" On)
	ACB Operating	ACB Close (AUX "b" Off)	ACB Open (AUX "b" On)
Connected Position (Short "b" Off)			
Test Position (Short "b" On)			

Short "b" Contact



Accessories

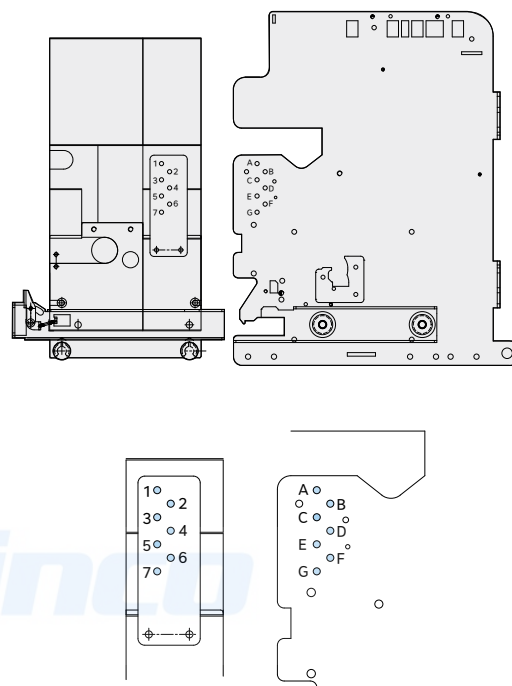
Miss-Insertion Preventor

- Although the external size is equivalent, in case the rating does not conform when the main unit of the circuit breaker (ACB) is inserted in the cradle in the composition of another circuit breaker, this device prevents it from being inserted.
- It is comprised based on the CT rated current.
- Each component is mounted on the main unit and cradle respectively. Add AW in the main unit and cradle's order form respectively when placing the order.

Ordering Method

CT Rating	Cradle	ACB
O = OCR Non Mounting	ADEG	236
O = 200A	ADEF	237
V = 320A	ABEF	347
E = 400A	ABDG	356
T = 630A	ABDF	357
H = 800A	ABDE	367
J = 1,000A	ABCG	456
K = 1,250A	ABCF	457
L = 1,600A	ABCE	467
M = 2,000A	ABCD	567
N = 2,500A	BCDE	167
P = 3,200A	BCDF	157
Q = 4,000A	BCDG	156
S = 5,000A	BCEF	147
X = 6,300A	ABEG	346

Part's Mounting Position per Rated Current

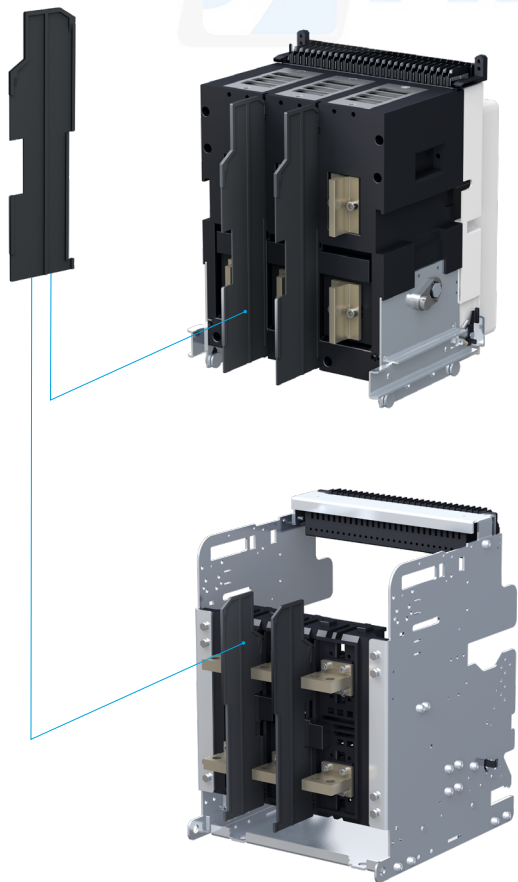


Miss-Insertion Preventor

Phase Insulation Barrier

- Phase insulation barrier is a part installed between phases that prevents short circuit between phases in advance by closing the arc which may occur between phases.
- 2 ea are mounted for 3P Type and 3 ea are mounted for 4P Type and as they are sold individually, select the required quantity when placing the order.
- As a product sold separately, place an order in HGNS P BAR.

Phase Insulation Barrier



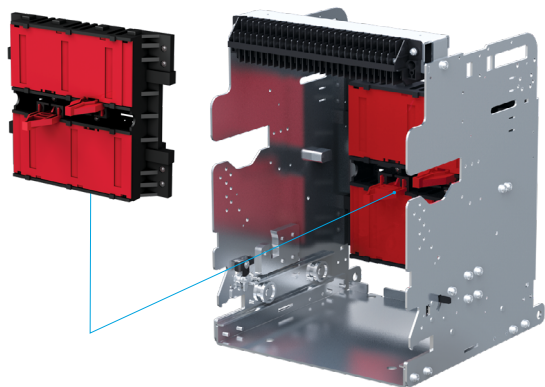
Safety Shutter & Shutter Lock

- It is a safety device that prevents the contact between the conductor part and the front part when the main unit of the circuit breaker mounted on the cradle is drawn out.
- The structure automatically opens and closes when the circuit breaker is drawn out and it comes with a shutter lock device that prevents it from opening when the shutter is closed in the event the main unit is drawn out. The padlock is not provided by our company. (Ø5 ~ Ø8)
- As for the shutter, the power side and load side operates separately, each equipped with an operation device and they can be locked individually.
- As a product mounted on the cradle, add AE in the order form when placing the order for the cradle.

Ordering Method

Name of Accessory	Order Name Placed upon Outgoing	Order Name for Separate Sales (HGNS-)	Detailed Specification
Safety Shutter	AE	HGNS AEA3	A, P Frame, 630 ~ 2,000 A, 3P
		HGNS AEA4	A, P Frame, 630 ~ 2,000 A, 4P
		HGNS AEB3	B, Q Frame, 2,000 ~ 4,000 A, 3P
		HGNS AEB4	B, Q Frame, 2,000 ~ 4,000 A, 4P
		HGNS AEC3	C Frame, 3,200 ~ 5,000 A, 3P
		HGNS AEC4	C Frame, 3,200 ~ 5,000 A, 4P
		HGNS AED3	D Frame, 4,000 ~ 6,300 A, 3P
		HGNS AED4	D Frame, 4,000 ~ 6,300 A, 4P

Safety Shutter & Shutter Lock



Accessories

Fixing Block

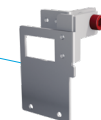
- It is a safety device for reinforcement in order to prevent abnormal operation caused by vibration.
- It is capable of simultaneously fixing the main unit and the cradle and reinforcing the cradles and panel supporters.
- Each component is mounted on the main unit and the cradle. Add AF in the respective order form of the main unit and cradle when placing the order.

Control Terminal Protection Cover

- It is a safety cover that is placed on the connection terminal to prevent contact with external foreign substances or physical contact after the control power has been connected to the automatic connection type of terminal.
- It cannot be applied to fixed type ACB and draw-out type ACB with manual connection terminal.
- As a product mounted on the cradle, add BC when placing an order for the draw-out type with automatic connection type.



Control Terminal Protection Cover

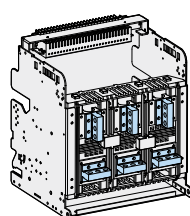


Fixing Block

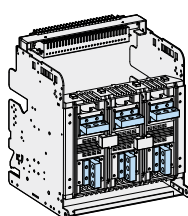
Terminal Bus Bar (Draw-Out Type)

- HG-Series ACB is compatible with various type of terminal bus bar such as vertical, horizontal, front and others depending on the type of bus bar of the customer's equipment and the terminal can be changed to A, P frame (630 ~ 1,600 A) and B, Q frame (630 ~ 3,200 A).
- The front type of terminal bus bar is released separately from the main unit and cradle so it needs to be installed at site. In addition, the front type of terminal bus bar requires separate order so refer to the following table when placing the order.
- As for the front type of terminal bus bar that is provided separately for the B, Q frame 2,000/2,500 A, 3,200 A terminal is provided.
- Front type of terminal bus bar is sold separately.

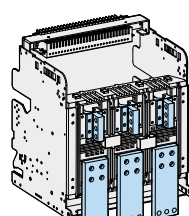
Mixed Type



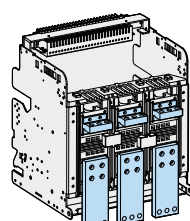
(Upper) Vertical Type
+
(Lower) Horizontal Type



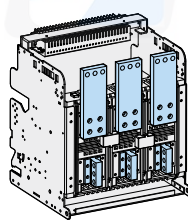
(Upper) Horizontal Type
+
(Lower) Vertical Type



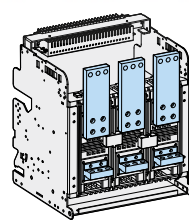
(Upper) Vertical Type
+
(Lower) Front Type



(Upper) Horizontal Type
+
(Lower) Front Type

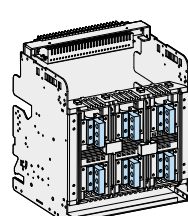


(Upper) Front Type
+
(Lower) Vertical Type

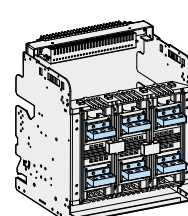


(Upper) Front Type
+
(Lower) Horizontal Type

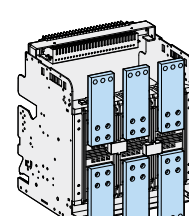
Standard Type



Vertical Type



Horizontal Type



Front Type

Ordering Method

Name of Accessory	Order Name for Separate Sales (HGNS-)	Detailed Specification
Connection Terminal (Draw-Out Type)	HGNS HVA3	Up-Down Horizontal Type/Up-Down Vertical Type 6 ea (A, P Frame, 630 ~ 1,600 A, 3P)
	HGNS HVA4	Up-Down Horizontal Type/Up-Down Vertical Type 8 ea (A, P Frame, 630 ~ 1,600 A, 4P)
	HGNS HVB3	Up-Down Horizontal Type/Up-Down Vertical Type 6 ea (B, Q Frame, 2,000 ~ 3,200 A, 3P)
	HGNS HVB4	Up-Down Horizontal Type/Up-Down Vertical Type 8 ea (B, Q Frame, 2,000 ~ 3,200 A, 4P)
	HGNS FRA3	Up-Down Front Type 6 ea (A, P Frame, 630 ~ 1,600 A, 3P)
	HGNS FRA4	Up-Down Front Type 8 ea (A, P Frame, 630 ~ 1,600 A, 4P)
	HGNS FRB3	Up-Down Front Type 6 ea (B, Q Frame, 2,000 ~ 3,200 A, 3P)
	HGNS FRB4	Up-Down Front Type 8 ea (B, Q Frame, 2,000 ~ 3,200 A, 4P)
	HGNS FHVA3	Up-Down Front Type 3 ea + Horizontal Type/Vertical Type 3 ea (A, P Frame, 630 ~ 1,600 A, 3P)
	HGNS FHVA4	Up-Down Front Type 4 ea + Horizontal Type/Vertical Type 4 ea (A, P Frame, 630 ~ 1,600 A, 4P)
	HGNS FHVB3	Up-Down Front Type 3 ea + Horizontal Type/Vertical Type 3 ea (B, Q Frame, 2,000 ~ 3,200 A, 3P)
	HGNS FHVB4	Up-Down Front Type 4 ea + Horizontal Type/Vertical Type 4 ea (B, Q Frame, 2,000 ~ 3,200 A, 4P)

※ The customer-selected type can be purchased separately after the customer modifies the horizontal, vertical, and flat type.

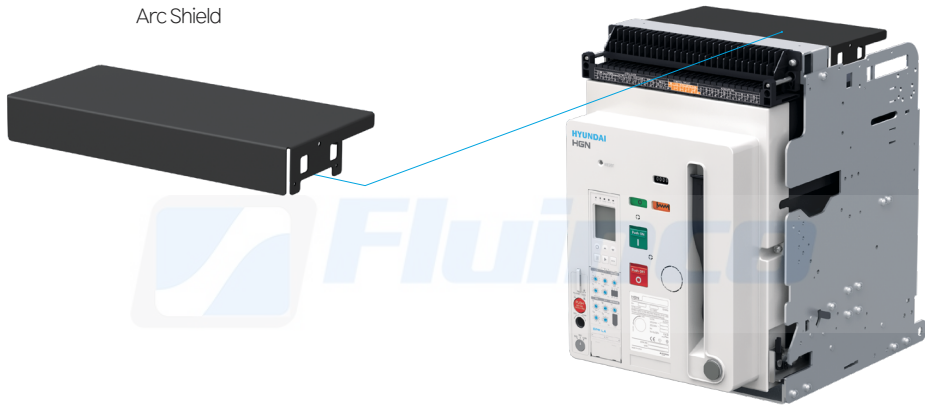
Accessories

Arc Shield

- Arc which occurs while breaking the circuit breaker is extinguished through the arc chamber within the main unit or as the residual arc is discharged to the external upper part, the basic distance required for insulation has to be maintained.
- When mounting the arc shield, the insulation distance can be minimized to "0" due to the residual arc discharged to the upper part.
- When mounting the arc shield, it can be piled in 4 stories.
- As a product mounted on the cradle, add AX in the order form when placing the order for the cradle.

Ordering Method

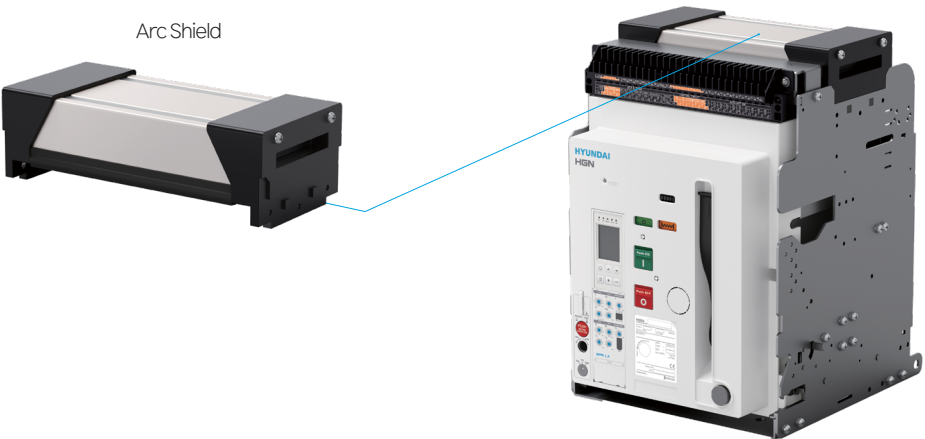
Name of Accessory	Order Name Placed upon Outgoing	Order Name for Separate Sales (HGNS-)	Detailed Specification
Arc Shield	AX	HGNS AXA3	A Frame, 630 ~ 2,000 A, 3P
		HGNS AXA4	A Frame, 630 ~ 2,000 A, 4P
		HGNS AXB3	B Frame, 2,000 ~ 4,000 A, 3P
		HGNS AXB4	B Frame, 2,000 ~ 4,000 A, 4P
		HGNS AXC3	C Frame, 4,000 ~ 5,000 A, 3P
		HGNS AXC4	C Frame, 4,000 ~ 5,000 A, 4P
		HGNS AXD3	D Frame, 4,000 ~ 6,300 A, 3P
		HGNS AXD4	D Frame, 4,000 ~ 6,300 A, 4P



HGN1150V Arc Shield

Applicable Model
2000AF 3P
2000AF 4P
4000AF 3P
4000AF 4P

* P, Q Frame Standard Supply



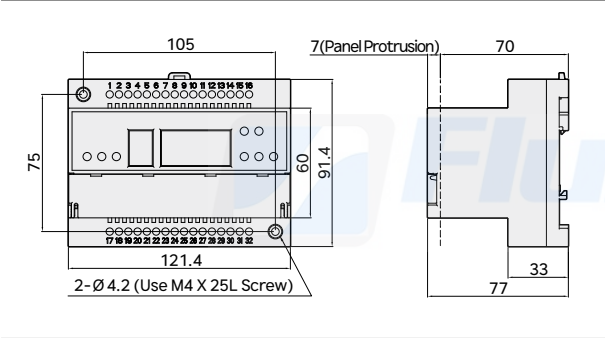
RCTU

- This product is a module that closes and prevents the ACB remotely by using communication.
- This product uses Modbus/RS-485 communication.
- Close/Open control of ACB assures its reliability through SBO (Select Before Operation) function.
- It can be used together with the temperature monitoring device module.

Contact Specification

For ACB Control	Applicable Range
Contact Ratings	10 A 240 VAC, 30 VDC
Max Switching Power	10 A 240 VAC, 30 VDC

Dimension



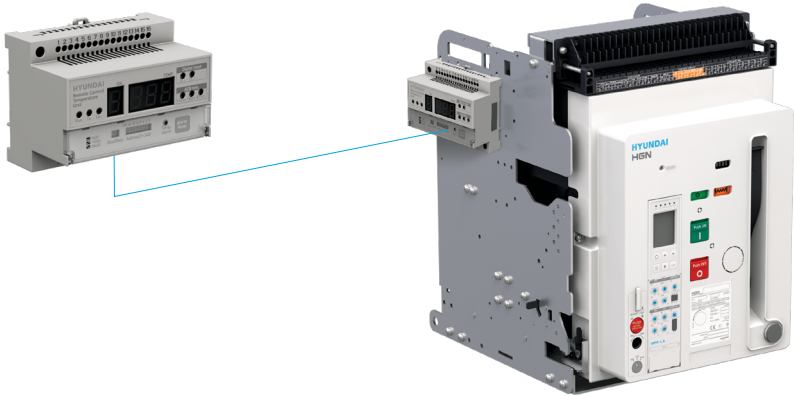
Temperature Monitoring Device Module

- This product detects the bus bar temperature of the ACB through the temperature sensor installed on the temporary location of ACB and displays it.
- Up to 3 temperature sensor can be installed and it can trigger the designated temperature alarm through a separate temperature contact.
- It supports Modbus/RS-485 communication and the each channel's temperature value and the maximum temperature value out of the channel are transmitted through communication.
- The alarm for operating temperature value can be set through communication.
- The temperature value of each channel can be checked through the Segment LED mounted at the front and once it reaches the temperature alarm set by the user, the temperature value of the relevant channel is displayed.
- As a product sold separately, it can be installed in the ACB and the internal panel. It can also be used together with the remote breaking module.
- This product is an optional product of remote breaking module and it is only sold as a combination type with the remote breaking module.

Contact Specification

Temperature Alarm	Applicable Range
Contact Ratings	10 A 120 VAC/5 A 240 VAC, 5 A 30 VDC
Max Switching Power	1,200 VA, 150 W

Remote Control Trip Unit (RCTU) /
Temperature Monitoring Device Module



Accessories

Temperature Sensor Unit

- Detailed specification of Remote Control Temperature Unit (RCTU)
 - RCTU is equipped with a contact that enables remote insertion/disconnection of ACB using communication. Through the 4 temperature channels, the temperature of ACB is measured.
 - RCTU supports RS-485/Modbus-RTU communication.
 - Insertion/disconnection control of ACB assures its reliability through SBO (Select Before Operation) function.
 - If the temperature rises over the value set by the user through communication, it can be checked through the alarm contacting point (Additional connection required).
 - The temperature of ACB can be checked through the Segment LED at the front.
 - RCTU can be installed in the ACB's cradle or panel.
 - RCU module is equipped with the same function other than the temperature monitoring function in the RCTU module.

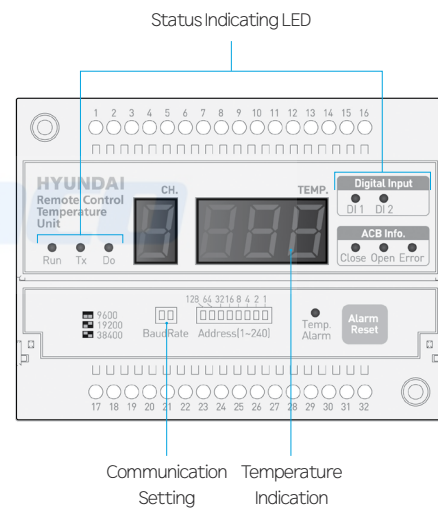
Status Indicating LED		Details
RCTU Status	Run LED	RCTU Operation Status LED
	Com LED	Communication LED
	Temp. Alarm LED	Temperature Alarm LED
	Alarm DO LED	Temperature Alarm Output Contact LED
Universal Digital Input	DI1	Dry Contact (5 V)
	DI2	Dry Contact (5 V)
Temperature Alarm	CB Close	ACB Close Status LED
	CB Open	ACB Open Status LED
	CB Error	ACB Close/Open Terminal Non Contacted and Control Error Status

Terminal Block

No.	Definition	No.	Definition
1	DI1 +	17	NTC IR Sensor
2	DI1 -	18	NTC IR Sensor
3	DI2 +	19	IR Sensor 3 AOR (Black)
4	DI2 -	20	IR Sensor 3 GND (Green)
5	DI Close +	21	IR Sensor 3 AOT (Yellow)
6	DI Close -	22	IR Sensor 3 Power (Red)
7	DI Open +	23	IR Sensor 2 AOR (Black)
8	DI Open -	25	IR Sensor 2 GND (Green)
9	DO Temp. Alarm	25	IR Sensor 2 AOT (Yellow)
10	DO Temp. Alarm	26	IR Sensor 2 Power (Red)
11	DO Close	27	IR Sensor 1 AOR (Black)
12	DO Close	28	IR Sensor 1 GND (Green)
13	DO Open	29	IR Sensor 1 AOT (Yellow)
14	DO Open	30	IR Sensor 1 Power (Red)
15	AC Power	31	RS485 (-)
16	AC Power	32	RS485 (+)

Contact Specification

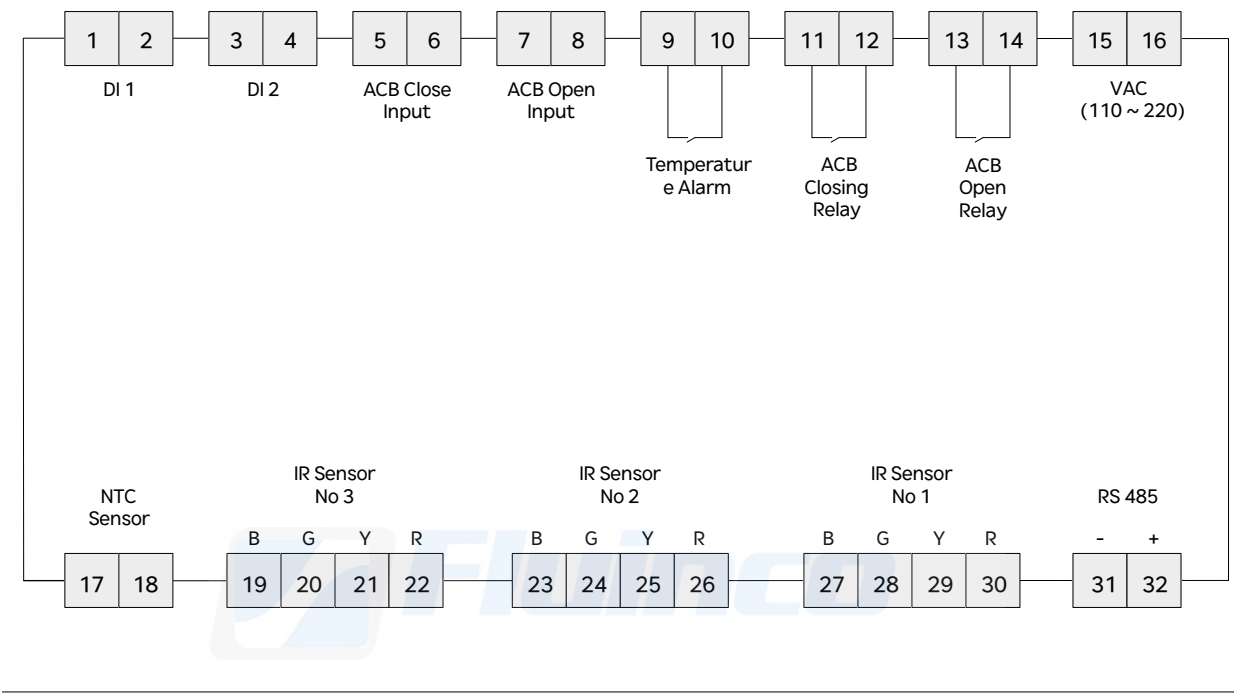
Item	Applicable Range	
ACB Control	Contact Ratings	10 A 240 VAC, 30 VDC
	Max Switching Power	2,400 VA, 300 W
Temperature Alarm	Contact Ratings	10 A 120 VAC/5 A 240 VAC 5 A 30 VDC
	Max Switching Power	1,200 VA, 150 W



Caution

- IR sensor differs in value by the reflectivity of metal surface. Measuring point should be varnished or painted with matt black paint depending on material.
- Measuring point and IR distance differ measuring spot size by D : S ratio. This sensor has 8 : 1 scale.
- IR sensor should be indicated at the point where there is no gloss surface.
- IR sensor distance : The ratio of measurement locations is 8 : 1. The diameter measured by the IR sensor is 1 cm when it is 8 cm away from the measurement position.

Block Diagram



Accessories

Temperature Sensor

- The temperature sensor is mounted on the designated position as standard but another location can be designated by the user.
- It is sold separately.

Ordering Method

Name of Accessory	Order Name for Separate Sales (HGNS-)	Detailed Specification
Temp Sensor	HGNS TSN	Temperature Sensor
	HGNS RCU	Remote Control Trip Module
	HGNS RCTU	Remote Control Trip Module + Temperature Monitoring Device Module
	HGNS RCTUN	Remote Control Trip Module + Temperature Monitoring Device Module + Temperature Sensor

Physical Medium

- Shielded Twister Pair cable used

Caution

1. The use of Shielded Twisted Pair cable is recommended.
2. The maximum length for connection can be 1 km but the communication length may become shorter depending on the installation environment and the number of device connected to the communication line.
3. The communication length may differ depending on the communication speed.

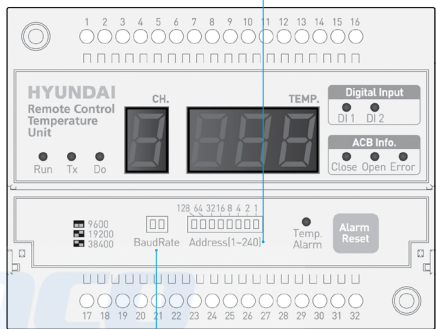
Communication Specification

- RS-485 (Modbus-RTU)
- Baud Rate : 9,600, 19,200, 38,400 bps (Default : 9,600)
- Data Bits : 8 bits
- Parity : None
- Stop Bits : 1 bits

Address Setting : 1 ~ 240

On

☐	☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7	8

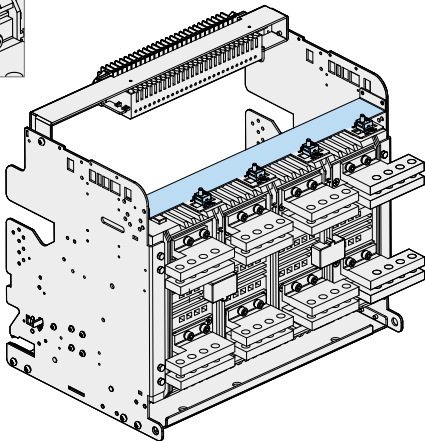
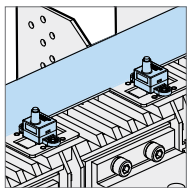


Baud Rate Setting

On

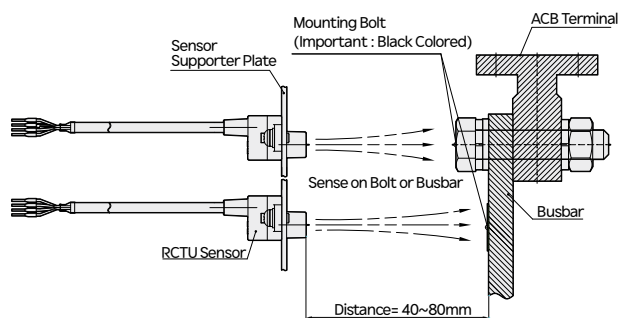
☐	☐
1	2

Set		Description
Off	Off	9,600
Off	On	19,200
On	Off	38,400

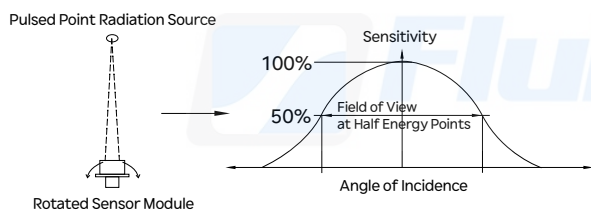
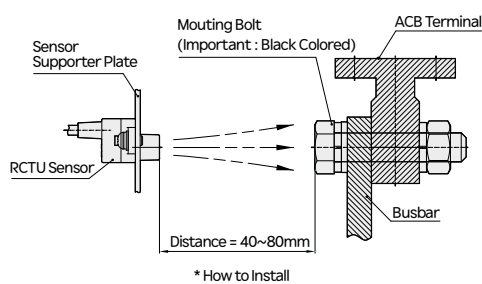


IR (Infrared Sensor) Specification (Option)

IR Sensor



Example of IR Sensor Application



Parameter	Limits			Unit	Conditions
	Min	Typ	Max		
Cable Length		3		m	
Optical Axis	- 3.5	0	+ 3.5	Degree	Sensor View Direction
Field of View		6	11	Degree	50 % Energy Points
D:S Ratio		8:1			Distance (mm) to Spot Size

IR Sensor Measurement

- IR temperature sensor has to be installed with sufficient insulation distance from the measuring point.
- The recommended distance between the measuring point and the temperature sensor is 50 ~ 80 mm.
- The measuring point must be a surface without reflection due to the characteristics of the IR sensor and black matte painting is recommended at the measuring point.

Caution

1. As for the IR sensor, the measurement value differs depending on the reflection rate of the metal surface. Measuring point with surfaced painted with matte black or varnish other than metallic varnishing must be measured.
2. As for the surface to be measured and the IR distance, the size of measurement area differs depending on the D : S Ratio. This sensor has a ratio of 8 : 1.

Accessories

Temperature Sensor

Connection Diagram

ACB Information Pin

a Contact	b Contact	Test	Connection
45, 47, 49	55, 57	61	71
46, 48, 50	56, 58	62	72

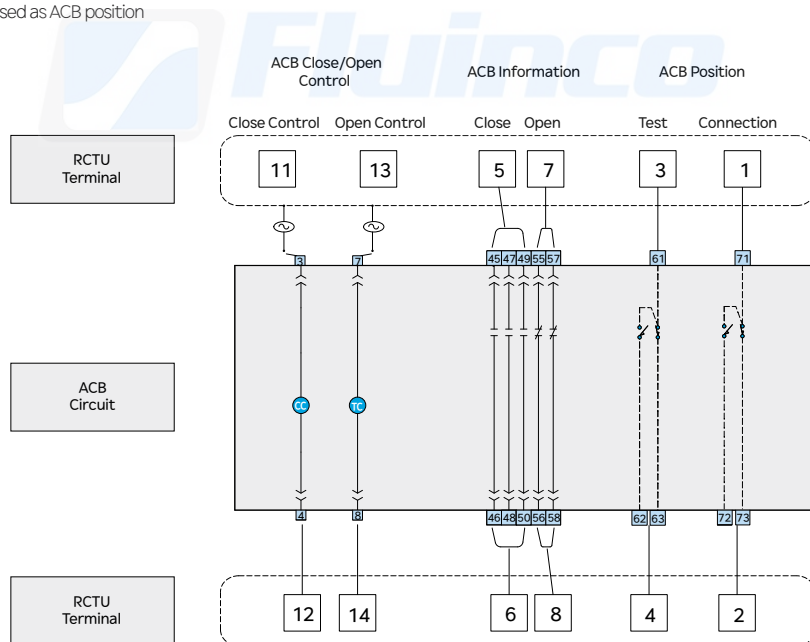
ACB Open/Close Control Pin

CC	TC
3	7
4	8

HGN



Example : When DI input is used as ACB position



INTC Thermistor Specification (Option)

- The electrical resistance value changes depending on the ambient temperature and by measuring the change in value, the temperature is displayed.
- The length of the cable is 1,000 mm and it measures the value of ambient temperature where in the RCTU has been installed.
- The range that can be measured is -50 ~ 250 °C.

Parameter	Content	Conditions
Length of Cable	1,000 mm	
Resistance Value	10 kΩ ± 1 %	Ambient Temperature of 25 °C

OCR Portable Checker

- OCR Portable Checker (Hereinafter referred to as the Checker) executes the relay test operation of the OCR (Hereinafter referred to as the OCR) (Long time/short time delay/ instantaneous/ground fault).
- It is possible to set the current size and phases using button for the OCR test.
- The relay test factors can be set through the front LCD and the operating time can be checked.
- It is equipped with a battery so it can be used without a separate external power.
- As for the cable connector of the checker, connect when the control power of OCR is off when inserting the OCR.
- As a product sold separately, place an order for HGNS OCC.
- HGNS OCC is a product with a calibration certificate issued by a specializing institute.



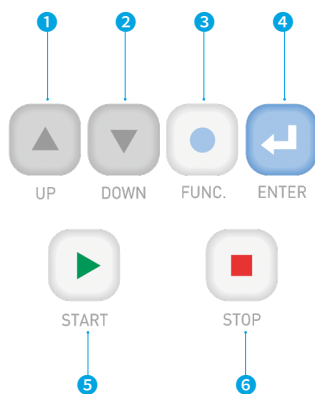
Ratings

Item	Detailed Specification
External Power (Adaptor)	Input : AC/DC 100 ~ 220 V, 50/60 Hz Output : DC 24 V, 2.5 A
Battery	Alkaline 9 V : 3 ea
Trip Time Measurement	0 ~ 999.999 sec
Test Output	0.3 lct ~ 17 lct
Output Precision	± 20 % (1 lct ~ 17 lct)
Size (mm)	193.40 (H) × 110.60 (W) × 44.60 (D)

Ordering Method

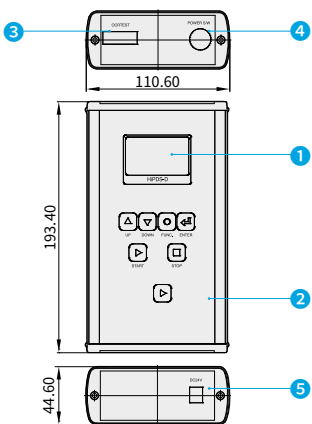
Name of Accessory	Order Name for Separate Sales	accessory Spec.
OCR Checker	HGNS OC	PORTABLE OCR CHECKER

Key Pad



No.	Button	Application
1	UP	Move Menu and Increase Setting Value
2	DOWN	Move Menu and Decrease Setting Value
3	FUNC	Move to the Previous Menu and Return to the Setup Screen
4	ENTER	Save the Setting and Move the Number of Digits of Setting Current
5	START	Generate Waveform
6	STOP	Stop Waveform

Externals



No.	Content	Function
1	LCD	Indicates Menu, Setting Current, Trip Time
2	Key Pad	Move Menu and Setting
3	Signal Output Terminal	OCR Connection Terminal
4	Power Switch	Power On/Off
5	Adapter Terminal	Control Terminal of Checker

Accessories

OCR Checker

Multi-functional OCR checker is test equipment that can inspect the OCR operation in unloaded status and the OCR status can be inspected through communication.

- Control Power : AC/DC 85 ~ 270 V (50/60 Hz)
- Specification
 - Dimension : 411 (L) × 321 (W) × 165 (H)
 - Weight : 8 kg
- Key Functions
 - Inspection of LTD, STD, INST, GFT operation and operating time
 - Inspection of PTA operation (Pre Trip Alarm)
 - Touch LCD

Rating	Specification
Control Power	AC/DC 85 ~ 270 V (50/60 Hz)
Output	Output Channel : 4 (R, S, T, N) Test Output : 0.4 ~ 17 lct Precision : ± 3 %
Input	Communication : RS 485 Touch-Screen of HMI
Size	411×321×165 mm, 8 kg

Ordering Method

Name of Accessory	Order Name for Separate Sales	accessory Spec.
OCR Checker	HGNS HROC	HIGHER OCR CHECKER



NCT (Neutral CT)

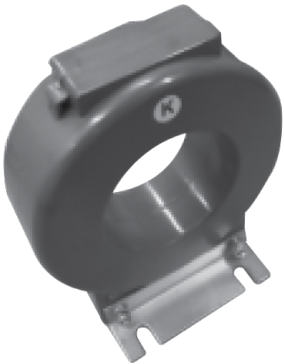
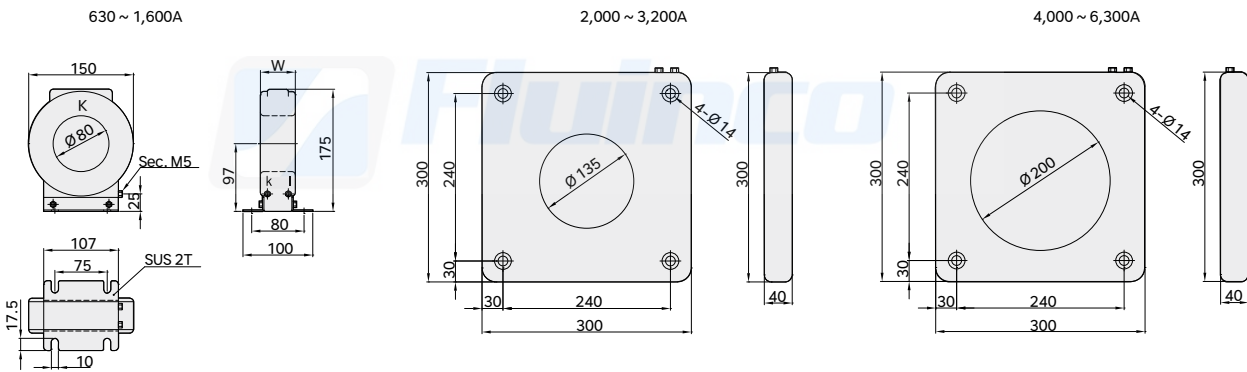
- It is a separate mounting type of current transform installed in the N phase in case of protecting the earth fault by using 3-pole air circuit breaker with earth fault protection features in a 3 phase 4 line circuit. It clarifies the GFT operation caused by earth fault by detecting currents flowing in the N phase.
- The phase is important for inserting the relay so connect properly to the designated terminal.
- As a product sold separately, place the order using the following form name per rated current.
- Switch the OCR's switch from 3P to 4P after connecting the NCT power (k), 30 (ℓ) to the 3-pole circuit breaker.

Ordering Method

Name of Accessory	Order Name for Separate Sales (HGNS-)	Detailed Specification
Neutral CT	HGNS NCT_T	NCT T = 630 A/Inner Diameter 80
	HGNS NCT_H	NCT H = 800 A/Inner Diameter 80
	HGNS NCT_J	NCT J = 1,000 A/Inner Diameter 80
	HGNS NCT_K	NCT K = 1,250 A/Inner Diameter 80
	HGNS NCT_L	NCT L = 1,600 A/Inner Diameter 80
	HGNS NCT_M	NCT M = 2,000 A/Inner Diameter 135
	HGNS NCT_N	NCT N = 2,500 A/Inner Diameter 135
	HGNS NCT_P	NCT P = 3,200 A/Inner Diameter 135
	HGNS NCT_Q	NCT Q = 4,000 A/Inner Diameter 200
	HGNS NCT_X	NCT X = 6,300 A/Inner Diameter 200

Externals

Unit : mm



Accessories

CTD-Condenser Trip Device

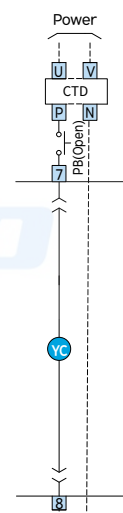
- In case of using AC/DC power for trip control of the circuit breaker, it is a device that can electrically trip the circuit breaker once by using the power charged in the CTD when the supply of control voltage has been stopped due to black-out and others.
- It is a product sold separately.



Ordering Method

Name of Accessory	Order Name for Separate Sales (HGNS-)	Detailed Specification
CTD	HGNS CTD1	AC 110 V
	HGNS CTD2	AC 220 V

Connection Diagram

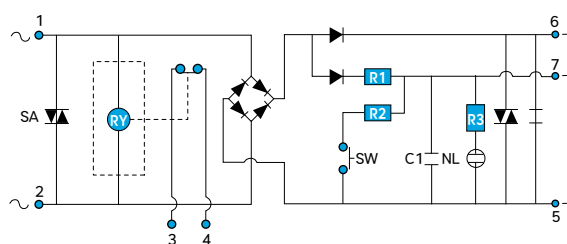
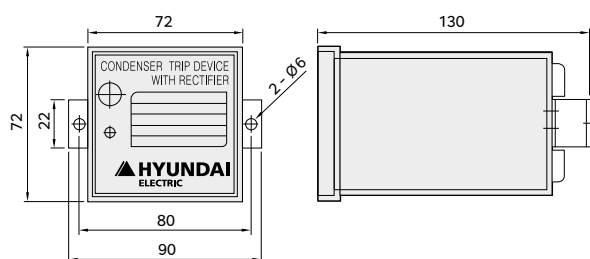


Ratings

Item	Details	
Rated Input Voltage	AC 110 V	AC 220 V
Normal Charging Voltage	DC 145 V	DC 290 V
Normal Current Capacity	DC 2 A	
Rated Frequency	50/60 Hz	
Delay Circuit Time	Within 1.5 sec	
Applicable Standard	IEC 60694/KSC 4611	

Operating Sequence of CTD External Operation Circuit

Unit : mm



- AC Input Power NO. 1, 2
- CTD Trip Power NO. 7 (+), 5 (-)
- DC Normal Power NO. 6 (+), 5 (-)
- Delay Contact NO. 3, 4

Test Jumper

- It is a device that enables the main unit to be operated independently by separating the automatic connection type of main unit from the cradle.
- As a product sold separately, place an order for HGNS AJ when ordering.



Draw-In/Out Handle

- The draw-in/out handle for drawing the draw-in type of circuit breaker is provided basically.
- In case the standard handle is uncomfortable when drawing the circuit breaker in and out, Long Type Handle and Universal Joint Handle which are sold separately can be used.
- As a product sold separately, place an order of HGNS LHANDLE or HGNS UHANDLE.



Type

Long Type Handle	Universal Joint Handle	T-Type Handle

Ordering Method

Name of Accessory	Order Name Placed upon Outgoing	Order Name for Separate Sales (HGNS-)	Detailed Specification
Draw-In/Out Handle	-	HGNS HANDLE	Standard Handle (Provided as Standard)
		HGNS LHANDLE	Long Type of Draw-In/Out Handle (For ACB)
		HGNS UHANDLE	Universal Joint Type of Draw-In/Out Handle
		HGNS THANDLE	T-Type, Long Type Handle

Accessories

Door Flange

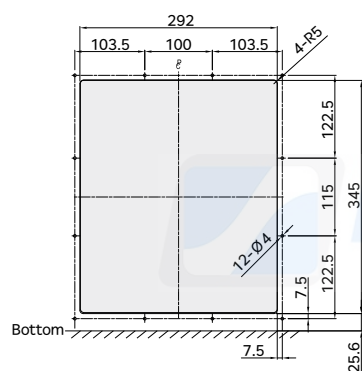
- It is an auxiliary device mounted on the cutting part of the panel door at the front protrusion mounting type of ACB.
- The door flange of our company is IP30.
- As for the cutting dimension of the panel, refer to the external drawing.
- As for the panel cutting dimension, it is equivalent for both the draw-out and fixed type and it is the same even if the dust cover is installed.
- As a product sold separately, place an order for HGNS AG.

Dust Cover

- It is a device installed to protect against dust and moisture mounted on the cutting part of the panel door at the front protrusion mounting type of ACB.
- The dust cover of our company is IP52.
- The cover can be locked in the test and connected position.
- The cutting dimension of the panel must be referred to.
- As a product sold separately, place an order for HGNS DC.

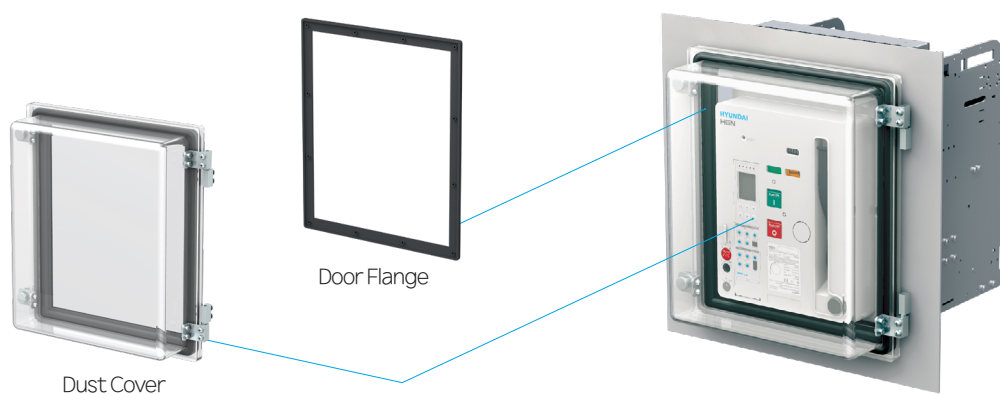
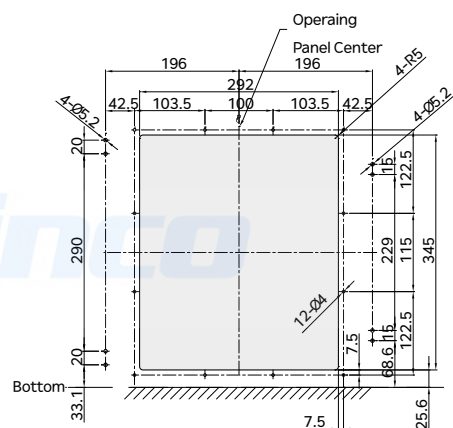
Panel Door Cutting Dimension

Unit : mm



Panel Door Cutting Dimension

Unit : mm



ATS & Controller

Features

• Stable Transfer System

By applying Hyundai air circuit breaker equipped with the highest rated breaking capacity in Korea, it has outstanding protective features with regards to electric power system, making it optimal for places in which stable power supply is compulsory (Communication base station, computer center, hospital, plant equipment and other important facilities).

• Unmanned Working System

Unmanned power transfer is possible by applying automatic power control device in the ACB equipped with mechanical interlock device.

• Various Modes

Various modes is possible as it is equipped with 4 selection models for user convenience.

• Multi Protection Device

The multi protection device installed in ACB has self-monitoring, simple set up and various protecting functions. Unlike the existing ATS, short circuit and overload protection are possible for stable use.

• Compact Size, Lightweight

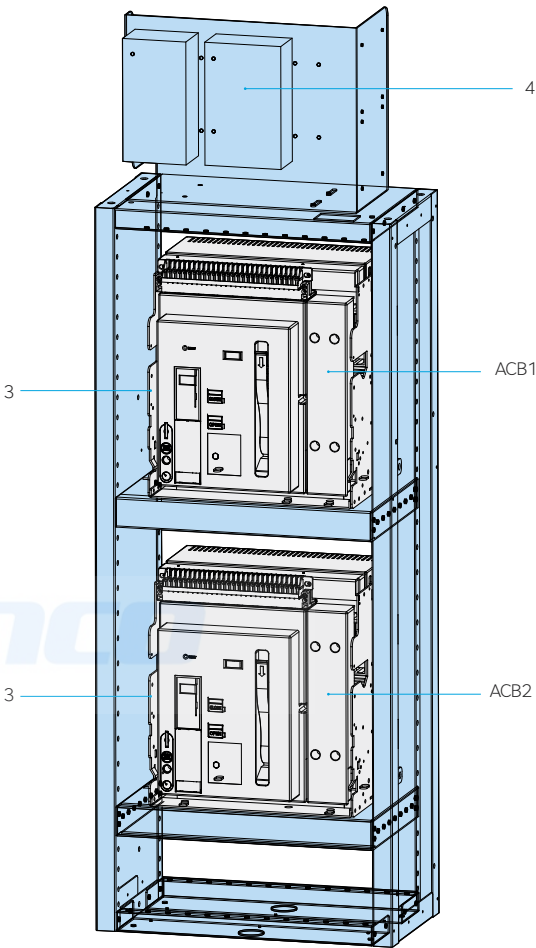
ACB is more compact and lightweight so it can easily be installed in the ATS switchgear and occupies less space.

• ATS Configuration and Interlock

- ACB1 : "Normal" power (Power company side)
- ACB2 : "Stand-by" power (Power generator side)
- 3 : Mechanical interlock device unit
- 4 : ATS unit

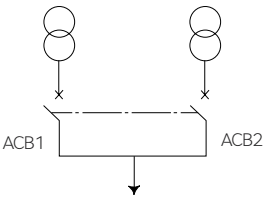
Each ACB should meet the following specifications.

- Geared charge type of mechanism (Control power of AC 220 V)
- TC (Control power of AC 220 V)
- CC (Control power of AC 220 V)
- Trip device for overload or short protection (2a contact)



Transfer System's Interlock Conditions

ACB1	ACB2
Open	Open
Close	Open
Open	Close



※ As a product sold separately, place an order for HGNS ATS when placing an order.
However, M1 has to be ordered separately and B0, BA must be added when placing an order for the product.

Accessories

ATS & Controller

Characteristics per Mode

There are 4 selection modes.

• Stop/Manu Mode

This mode offers On/Off functions using ACB Manual from the power company side and generator side.

• Auto Mode

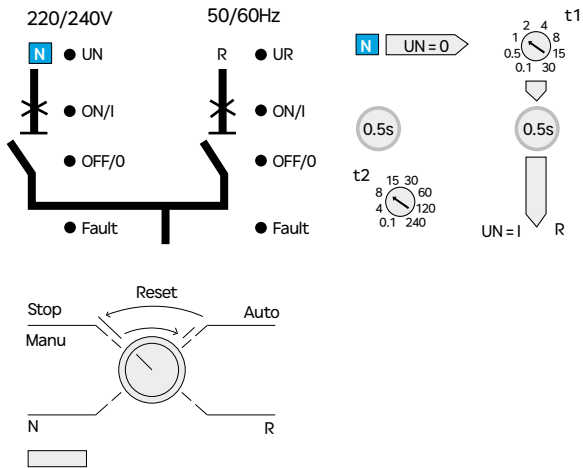
This mode is for automatically controlling the ACB depending on the sequence of system operation flow chart in the controller.

• N Mode (Forced Operation of Power Company Power)

This mode turns off the ACB at the generator side and turns on the ACB at the power company side by force.

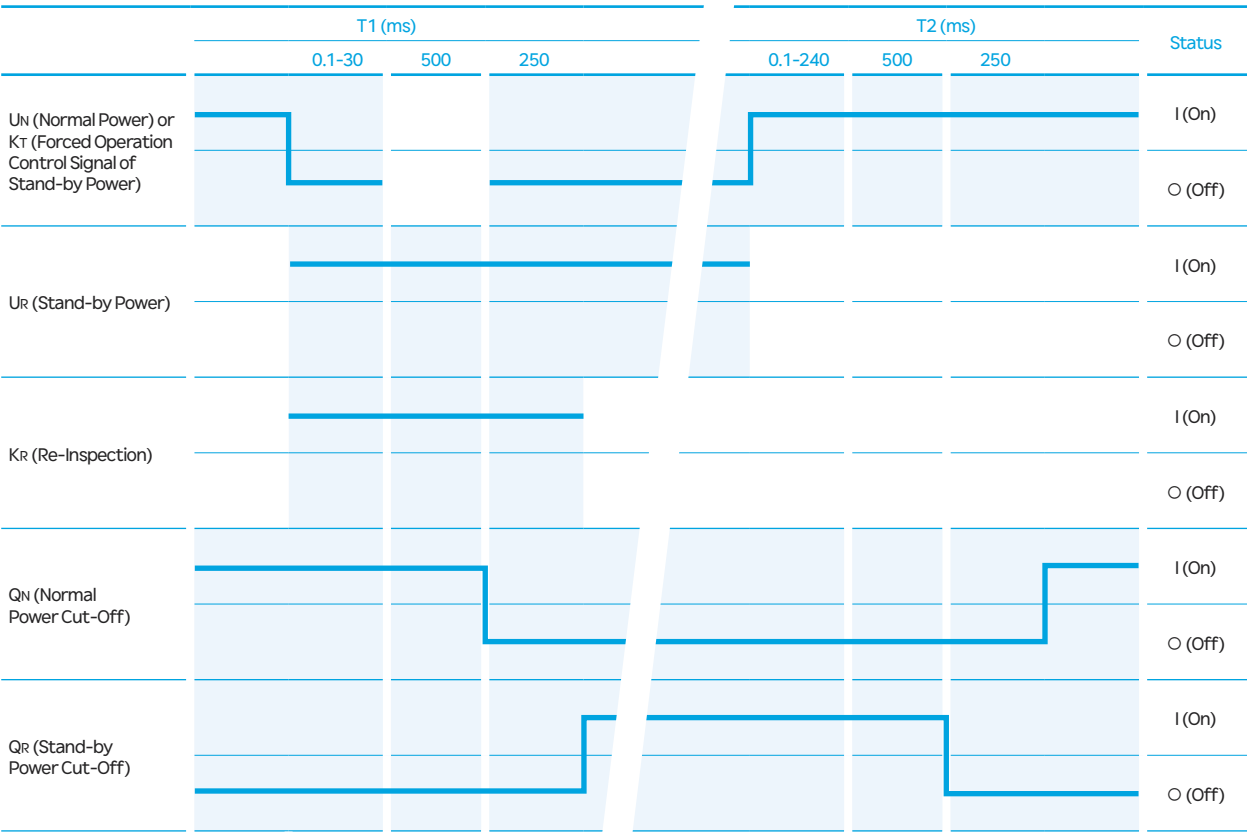
• R Mode (Forced Operation of Generator Power)

This mode turns off the ACB at the power company side and turns on the ACB at the generator side by force.



Time Delay Adjustment	Indication of the Controller's Status
t1 : 0.1 ~ 30 sec	On, Off, Fault Indication
t2 : 0.1 ~ 240 sec	(Power Company Side, Generator Side)

Operation Characteristics

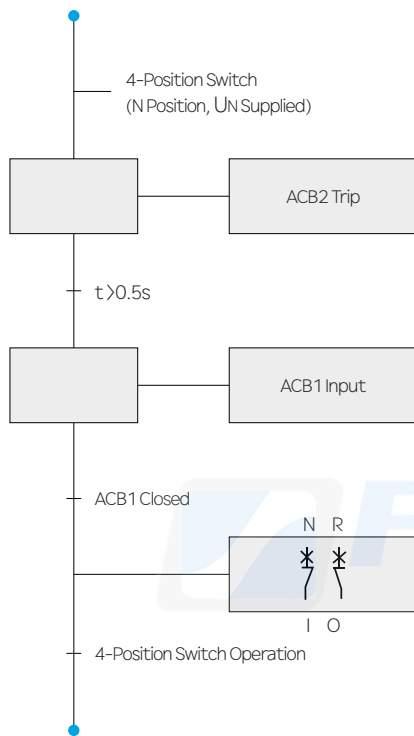


Accessories

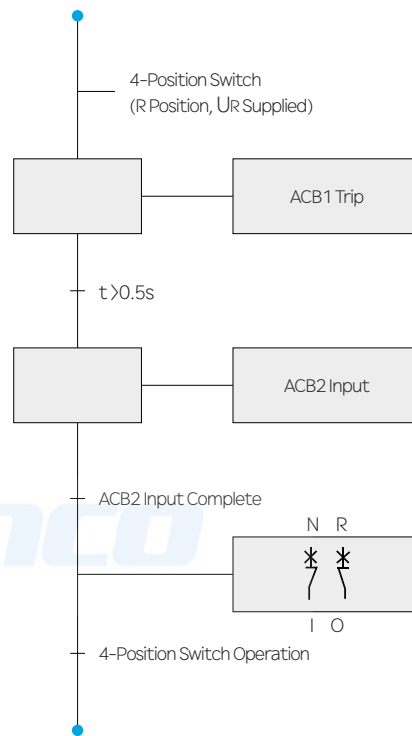
ATS & Controller

System Operation

N Mode ("Normal Mode" Forced ON)

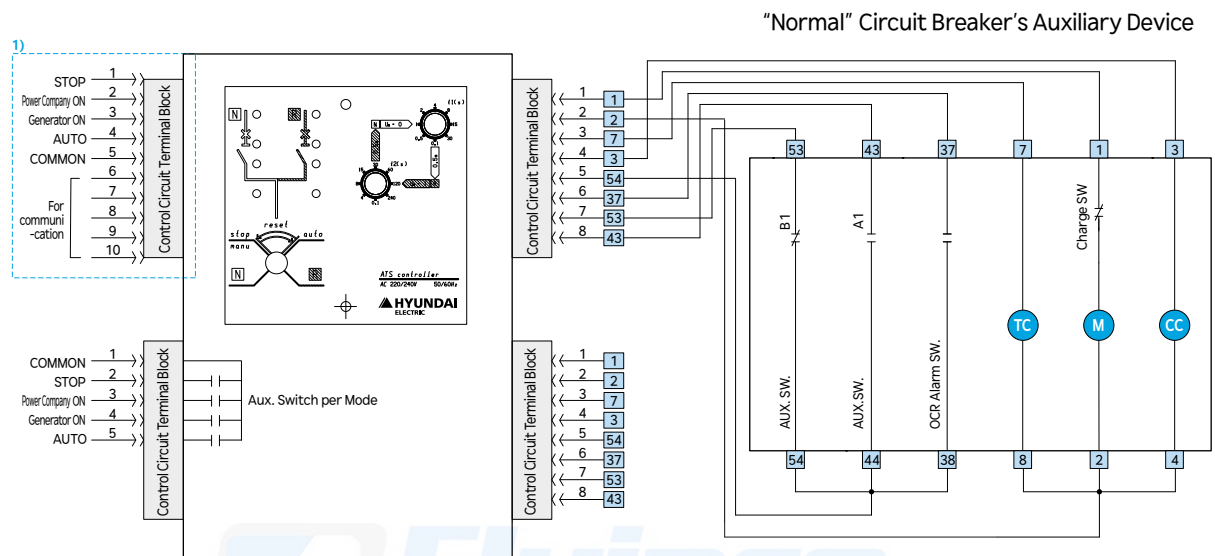


R Mode ("Stand-by" Power Forced ON)

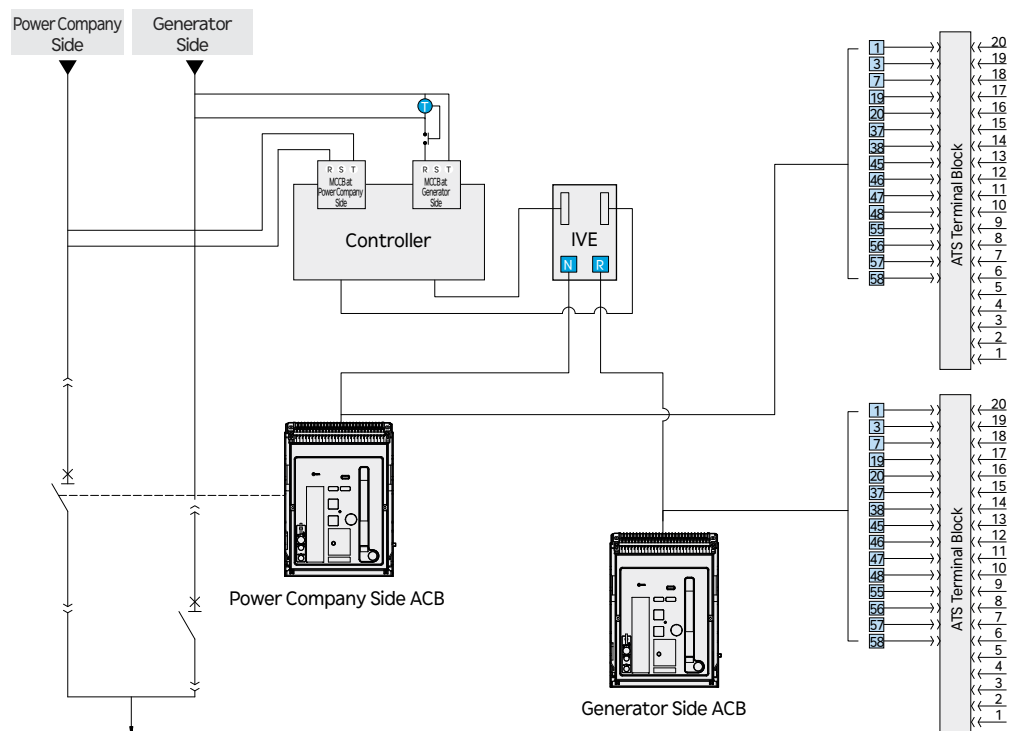


Circuit Diagram of the System [HGS/HGN Type]

Auto Switch System's Auxiliary Device Circuit Diagram



Auto Power Switch System's Auxiliary Device Circuit Diagram applied with 2 ACBs

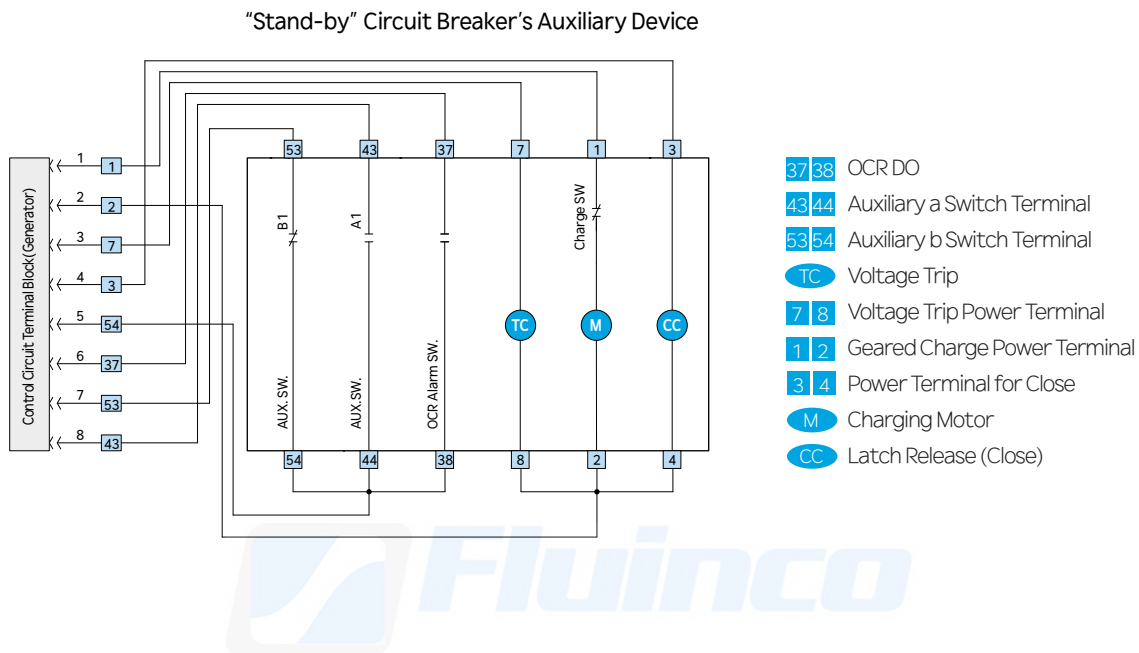


Accessories

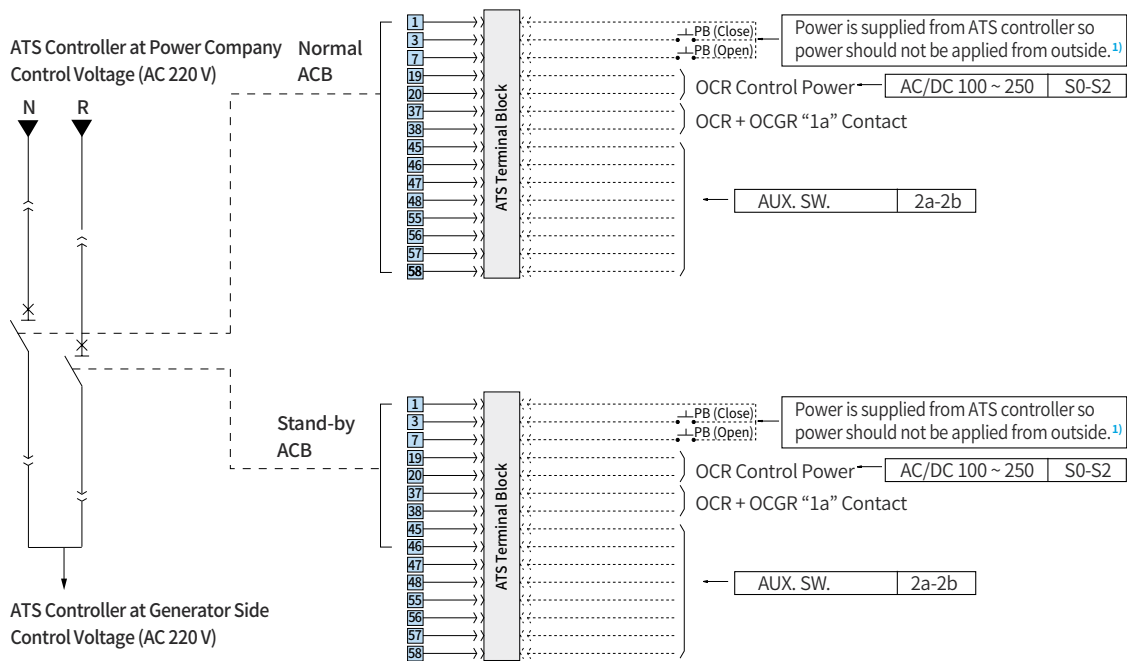
ATS & Controller

Circuit Diagram of the System [HGS/HGN Type]

Auto Switch System's Auxiliary Device Circuit Diagram



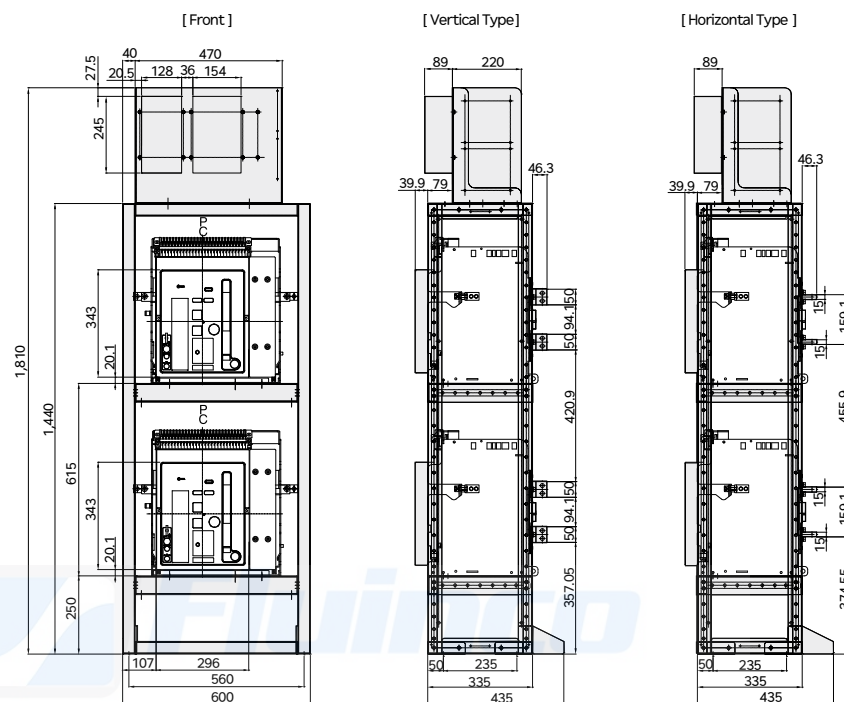
ATS Panel Remote Circuit Diagram



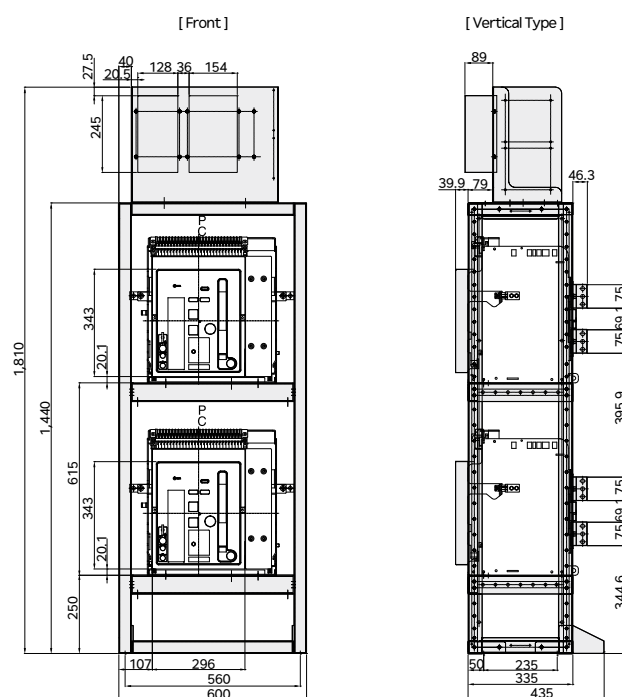
※ 1) Upon remote operation, as for the Open/Close power, the power is supplied from the ATS control device so do not input a separate control power supply. (Terminal number "1", "7", "16")

Dimensions [ATS HGN A Frame]

HGN06 ~ 16 A



HGN20 A

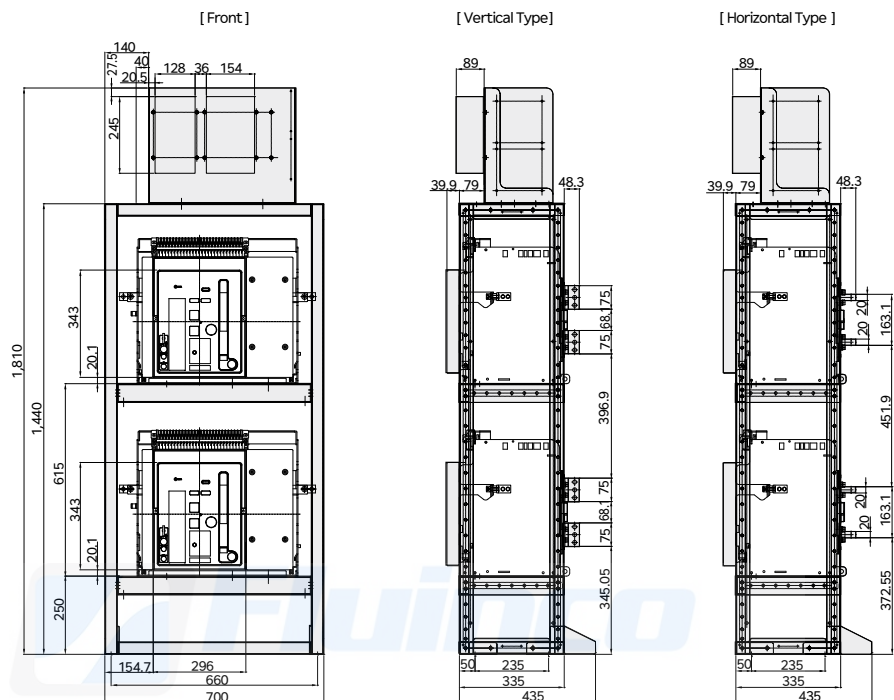


Accessories

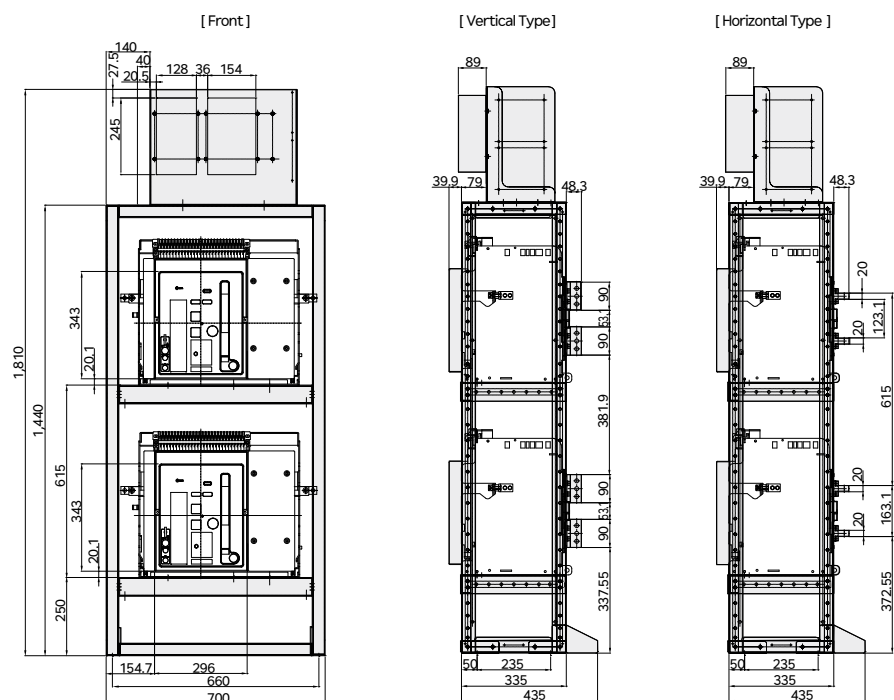
ATS & Controller

Dimensions [ATS HGNB Frame]

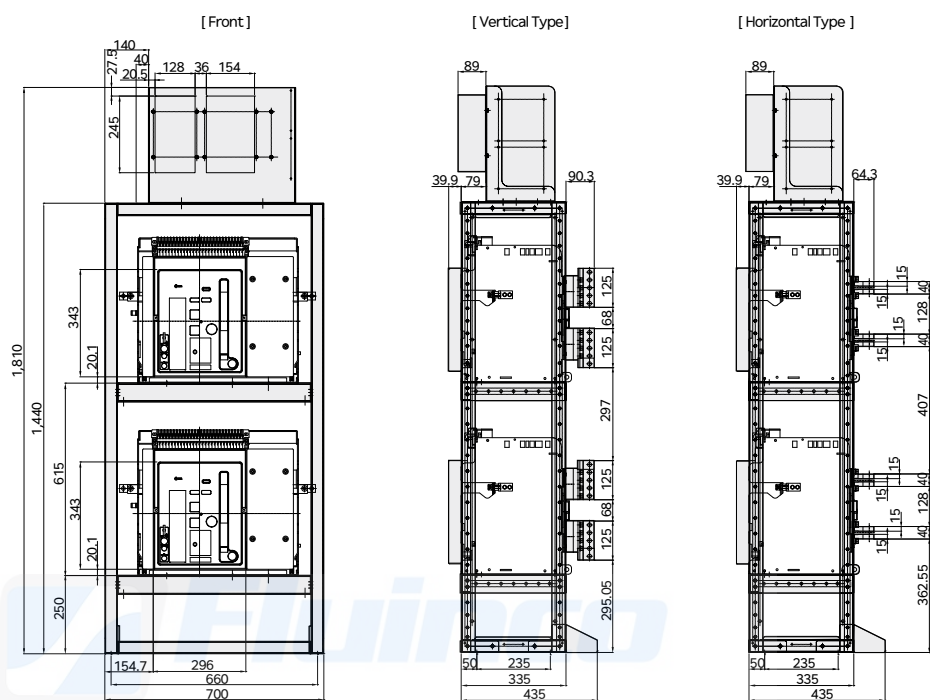
HGN20 ~ 25 B



HGN32 B



HGN40 B



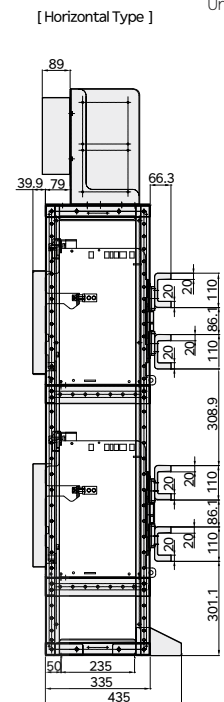
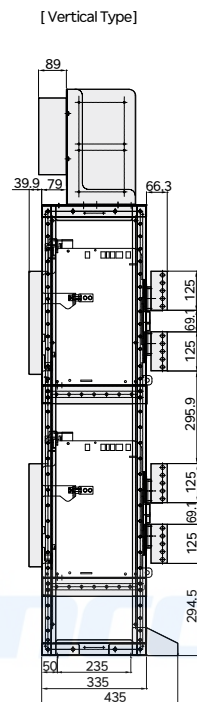
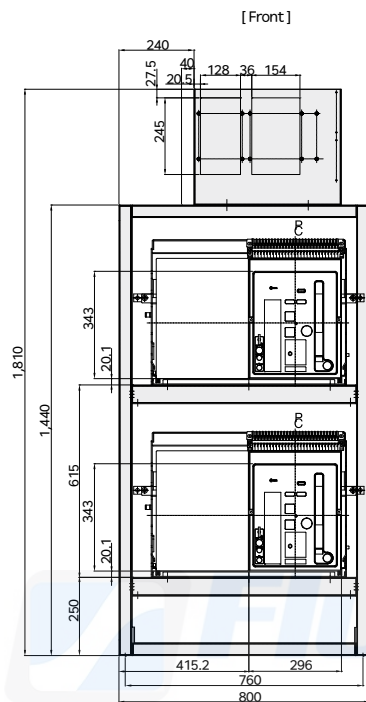
※ The drawing dimension of this page may be subject to change without prior notice.

Accessories

ATS & Controller

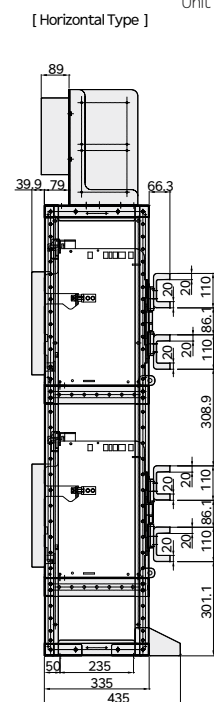
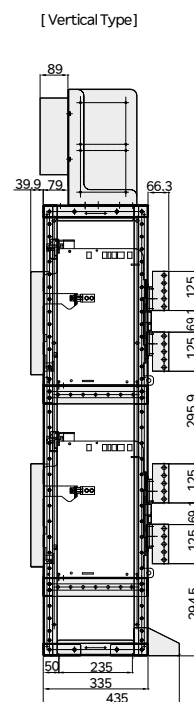
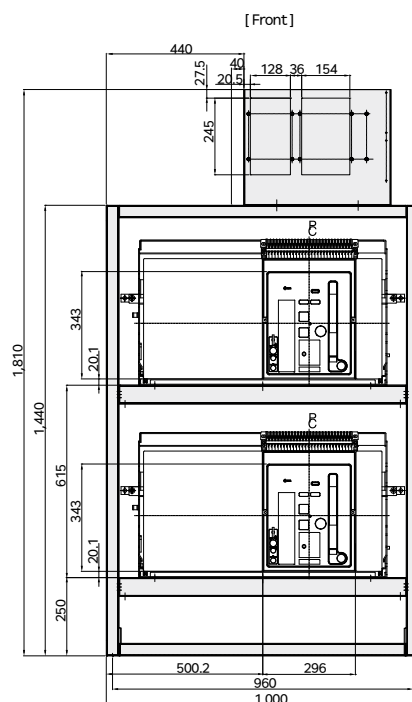
Dimensions [ATS HGNC Frame]

HGN40 ~ 50 C,
3P



Unit : mm

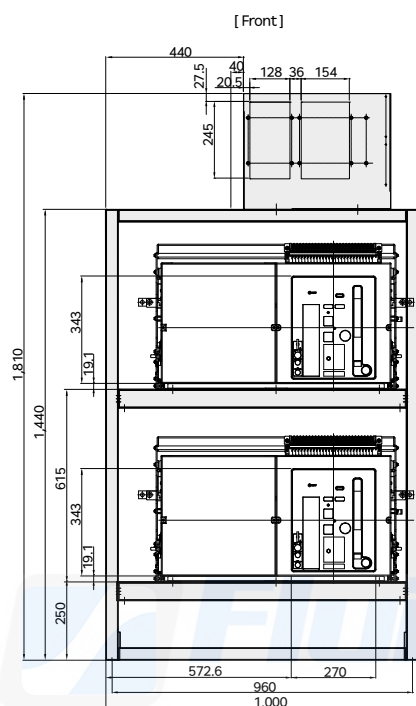
HGN40 ~ 50 C,
4P



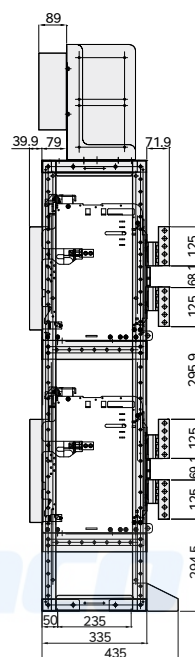
Unit : mm

Dimensions [ATS HGN D Frame]

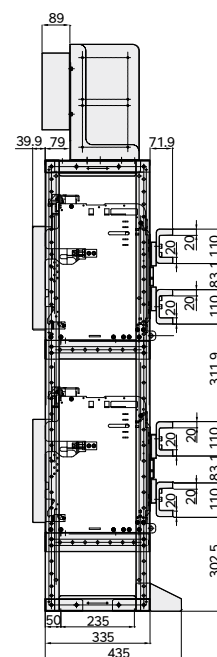
HGN40 D, 3P



[Vertical Type]

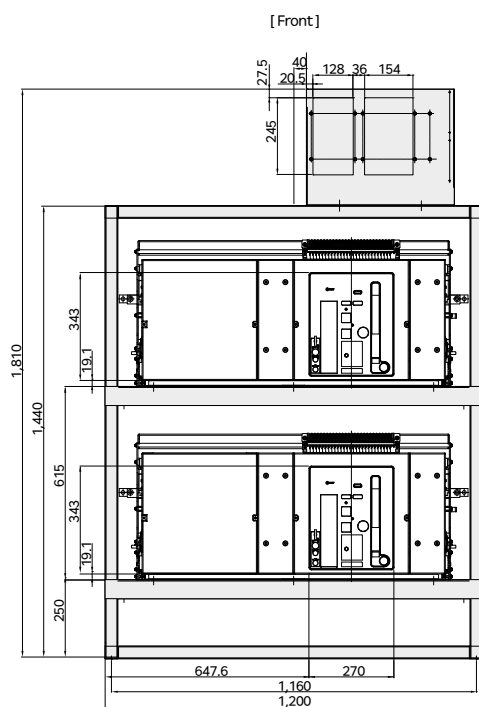


[Horizontal Type]

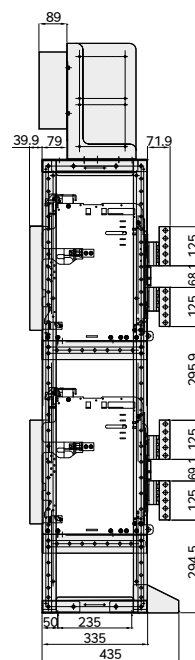


Unit : mm

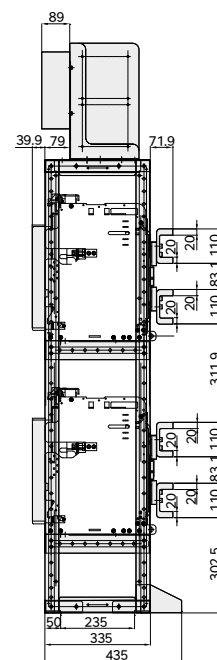
HGN40 D, 4P



[Vertical Type]



[Horizontal Type]



Unit : mm

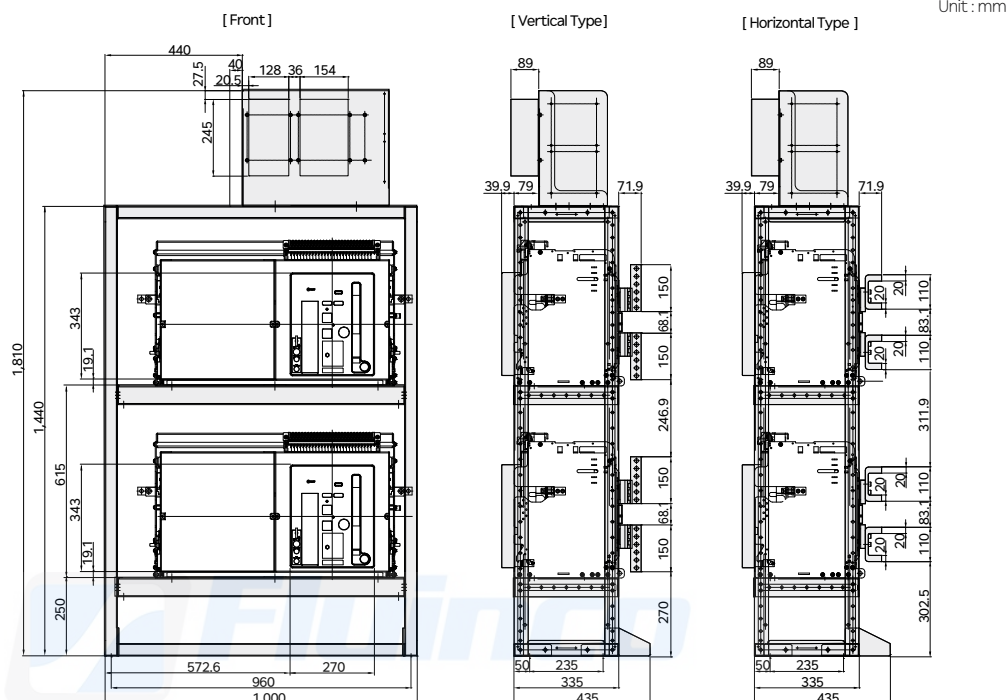
※ The drawing dimension of this page may be subject to change without prior notice.

Accessories

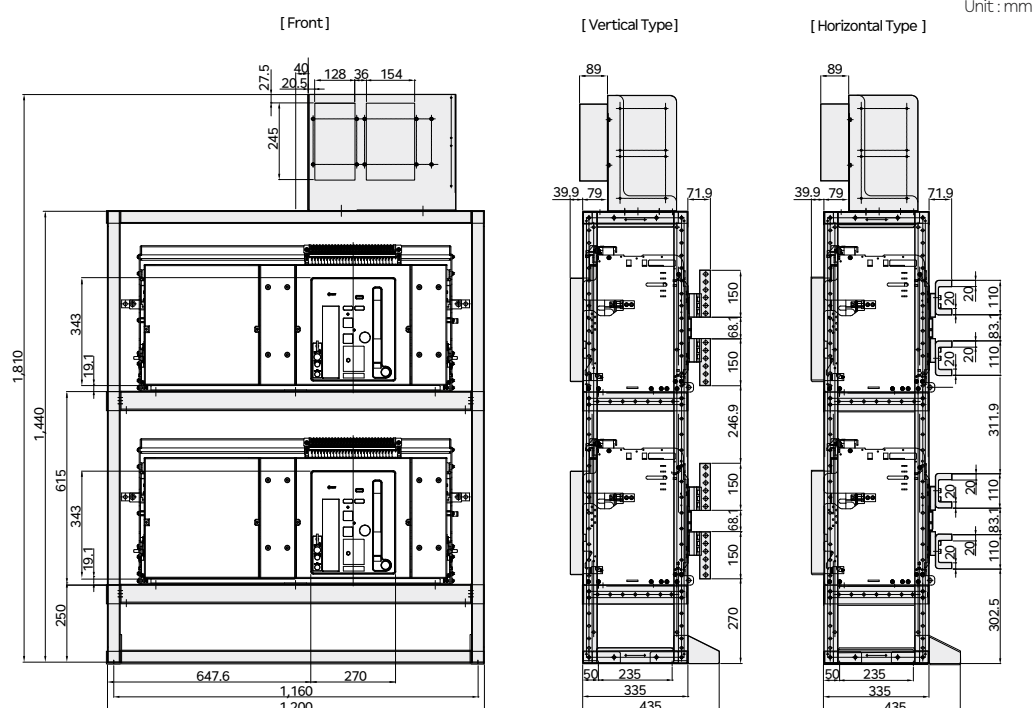
ATS & Controller

Dimensions [ATS HGND Frame]

HGN50 ~ 63 D,
3P



HGN50 ~ 63 D,
4P





Technical Data

Standard Operating Conditions

Load Rate (I/In)

- ACB cannot be used in outdoor panel in principle. In case of inevitable installation, the ambient temperature must be below 40 °C and the load rate must be below 50 % of the rated current. In case it is not complied with, it may cause heating and burning in the ACB.
- As for the total harmonic distortion (THD) rate, it must be managed below 5 % in the distribution system phase. In case it is not complied with, it may cause heating in the product.

Load Rate	Hours of Use	Effect	Installation
$I/In \leq 80\%$	24/24 Hours	-	Normal Condition (Recommended)
$80 < I/In \leq 90\%$	24/24 Hours	-	Periodic Inspection
$I/In = 100\%$	24/24 Hours	Change in Plastic Insulation Material Color	Additional Exhaust

Altitude

- Below 2,000 m

Item	Altitude		
	2,000 m (6,600 ft)	2,600 m (8,500 ft)	3,900 m (13,000 ft)
Isolation Voltage (V)	1,000 (1,250)	950 (1,200)	800 (1,050)
Operating Voltage (V)	690 (1,150)	655.5 (1,115.5)	552 (1,012)
Allowed Current (V)	In	0.99×In	0.96×In

※ () indicates P, Q frame application

Protection Degree Provided by Enclosures (IP Code)

- Standard : IP30 (When the ACB front cover part of the switchboard door is cut out)
- With Dust Cover : IP52

Classification of Protection Degree Provided by Enclosures (IP code) IEC 60529

Indication : IP

- Second Characteristic Numeral : Level of preventing liquid from permeating into the external box (0 ~ 8)
- First Characteristic Numeral : Level of preventing particulate materials from permeating into the external box (0 ~ 6)

※ In the event indicating the characteristic number is not required, mark the said area with 'X'.

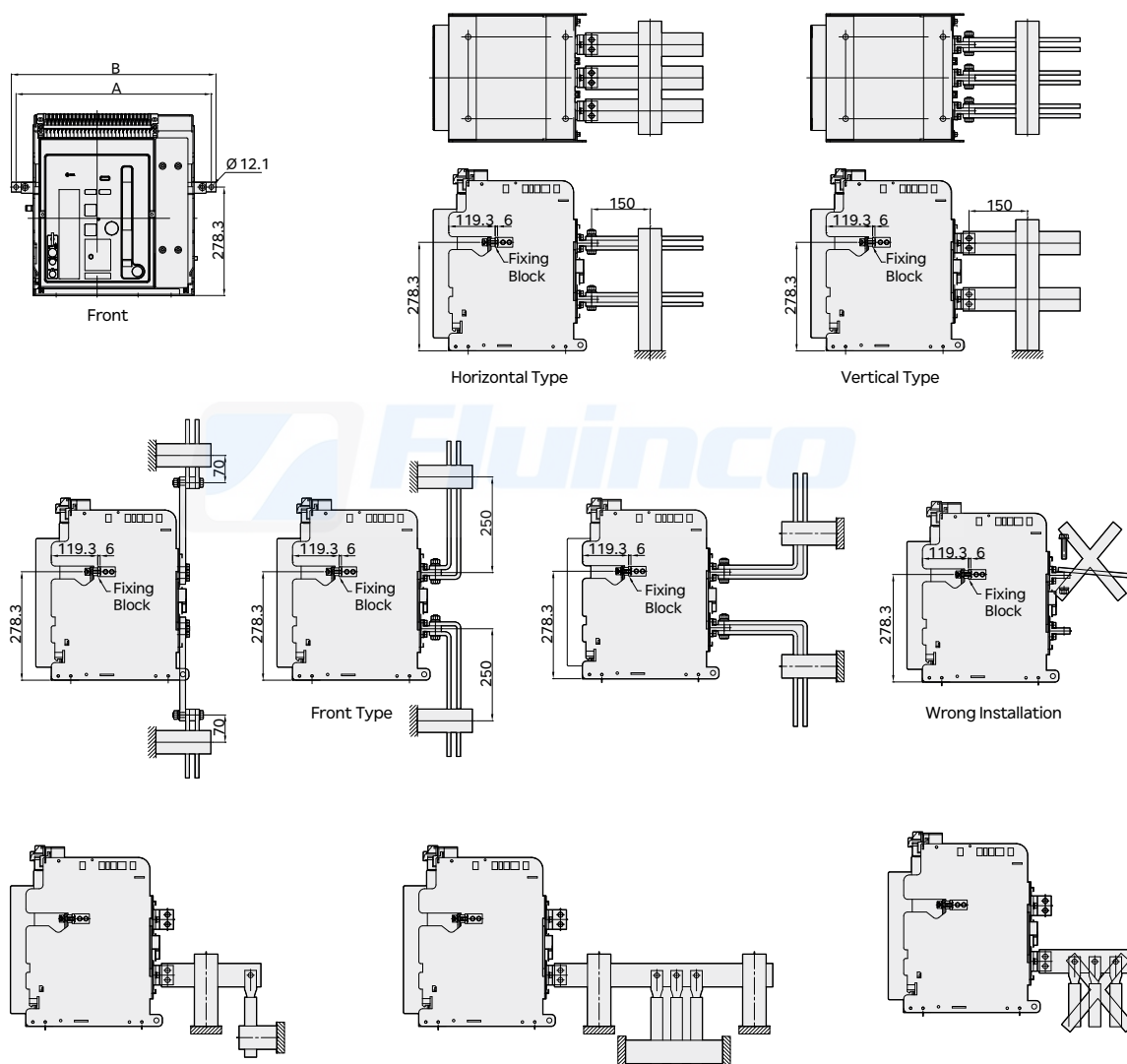
Classification Table Following the Degree

Numeral	Protection Degree	
	First Characteristic Numeral (Particulate)	Second Characteristic Numeral (Liquid)
0	No protection (Open)	No protection (Open)
1	Protected against external objects with a diameter of 50 mm and above	Protected against vertical fall
2	Protected against external objects with a diameter of 12.5 mm and above	Protected against falling with a gradient of 15 °
3	Protected against external objects with a diameter of 2.5 mm and above	Protected against falling with a gradient of 60 °
4	Protected against external objects with a diameter of 1.0 mm and above	Protected against spraying water from up, down, left, right (Splash proof)
5	Protected against deposition risk of dust and others	Protected against spraying water from up, down, left, right (Hose proof)
6	Complete protection without deposition of dust and others	Protected against heavy rainfall and tsunami (Deckwater proof)
7	-	Protected against submersion under certain pressure and certain time (Immersible)
8	-	Protected against complete submersion (Submersible)

Product Installation Condition

- In order to prevent burning of products caused by electrical fault and to enhance structural safety of the panel when installing the product in areas with concerns of vibration, mount the fixing block and install the terminal supporting position like the figure.
- In particular, when executing short-time/short-circuit panel testing, it must be installed for structural safety.
- For the support dimension of the product, refer to the drawing.
- In the event of switchboard (Panel) development test (Short-time, short-circuit), the bus bar inside the panel must be supported firmly according to the following conditions.

Unit : mm



Model Name	A	B
HGN 06 ~ 20A 3P, HGS 06 ~ 16A 3P, HGN 06 ~ 20P 3P	416	440
HGN 06 ~ 20A 4P, HGS 06 ~ 16A 4P, HGN 06 ~ 20P 4P	501	525
HGN 20 ~ 40B 3P, HGS 20 ~ 32A 3P, HGN 20 ~ 40Q 3P	487	511
HGN 20 ~ 40B 4P, HGS 20 ~ 32A 4P, HGN 20 ~ 40Q 4P	602	626
HGN 40 ~ 50C 3P	712	736
HGN 40 ~ 50C 4P	906	982
HGN 40 ~ 63D 3P	854	878
HGN 40 ~ 63D 4P	1,084	1,108

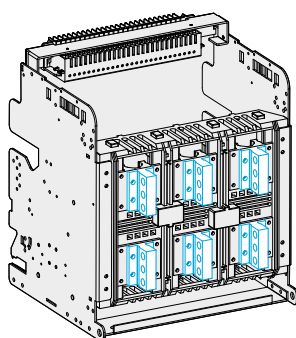
Technical Data

Connection Method

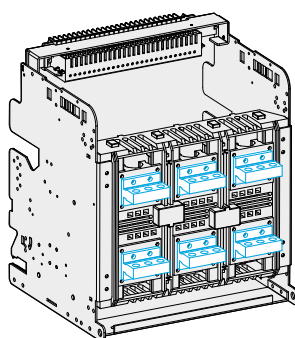
User convenience has been reinforced by allowing each terminal to be rotated 90 degrees directly on site depending on the busbar type of low voltage switchgear.

Standard Type

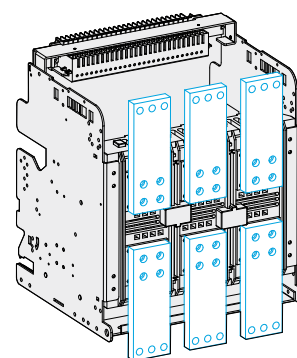
Vertical Type



Horizontal Type

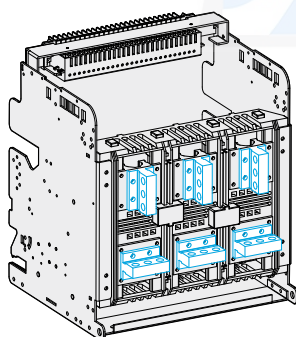


Front Type

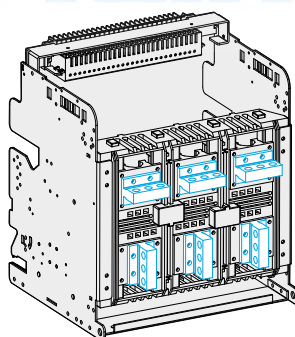


Combined Type

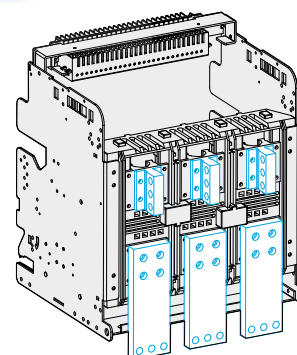
(Upper) Vertical Type +
(Lower) Horizontal Type



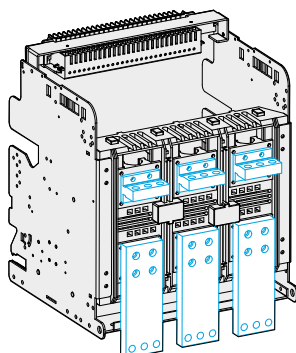
(Upper) Horizontal Type +
(Lower) Vertical Type



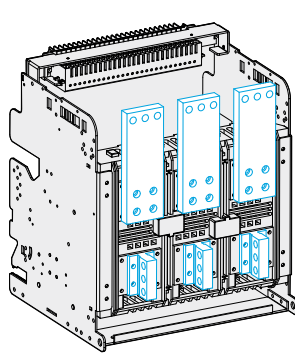
(Upper) Vertical Type +
(Lower) Front Type



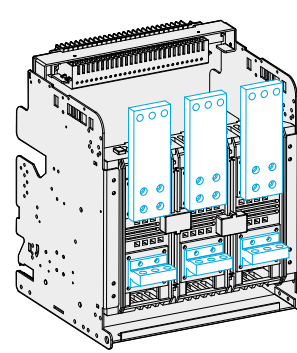
(Upper) Horizontal Type +
(Lower) Front Type



(Upper) Front Type +
(Lower) Vertical Type



(Upper) Front Type +
(Lower) Horizontal Type



※ Terminal change is only possible for HGS/HGN A, P frame 630 ~ 1,600 A, B, Q frame 2,000 ~ 3,200 A.
Front type is a terminal form that is suitable for switchgear with spatial restrictions.
Horizontal/vertical change above 4,000 A requires separate parts so please contact our company.
In case of B, Q frame, 3,200 A terminal is provided as for the front type provided separately for 2,000/2,500 A.
Front type terminal has to be purchased separately.

Convenient Connection Method

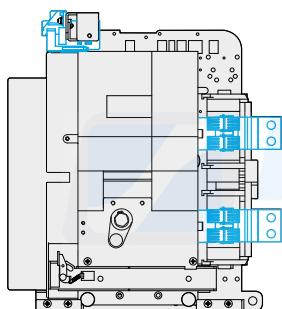
As for HG Series air circuit breaker, 4 types of mounting (Connected, test, isolated, removed) are possible and offer easy maintenance.



Sliding Body Type (In Case of Draw-In/Out Type)

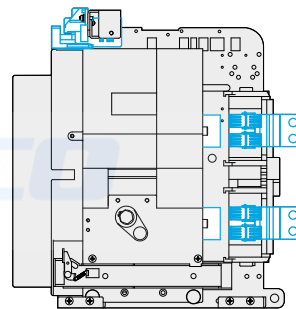
Connected Position

As a commonly used status, the main circuit and control circuit are both connected.



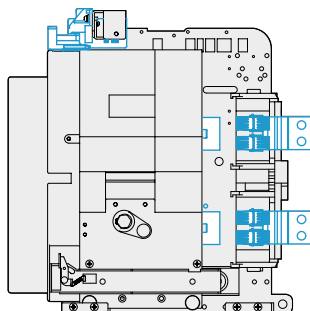
Test Position

As a status in which the main circuit is isolated and the control circuit is connected, the circuit breaker can be turned On/Off with the switchgear door closed.



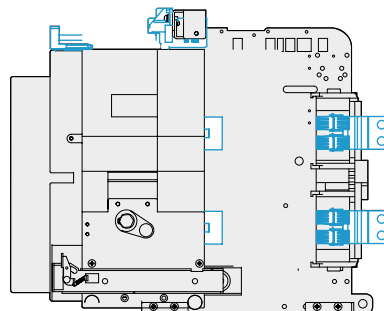
Isolated Position

With the main circuit and control circuit both isolated, the air circuit cannot be turned On/Off.



Removed Position

The air circuit has completely been removed from the cradle.



Technical Data

Internal Resistance and Power Consumption

Model Name	Rated Current (A)	Fixed Type		Draw-Out Type	
		Internal Resistance ($\mu\Omega$)	Power Consumption (W/3Phase)	Internal Resistance ($\mu\Omega$)	Power Consumption (W/3Phase)
A Frame HGS/HGN 06 ~ 16	630	20	24	40	48
	800	20	38	40	77
	1,000	20	60	40	120
P Frame HGN 06 ~ 16	1,250	20	94	40	188
	1,600	20	154	40	307
A Frame HGN 20	630	15	18	30	36
	800	15	29	30	58
	1,000	15	45	30	90
P Frame HGN 20	1,250	15	70	30	141
	1,600	15	115	30	230
	2,000	13	156	27	324

Model Name	Rated Current (A)	Fixed Type		Draw-Out Type	
		Internal Resistance ($\mu\Omega$)	Power Consumption (W/3Phase)	Internal Resistance ($\mu\Omega$)	Power Consumption (W/3Phase)
B Frame HGS/HGN 20 ~ 32	2,000	10	120	20	240
	2,500	10	188	20	375
	3,200	10	307	20	614
B Frame HGN 40	2,000	10	120	20	240
	2,500	10	188	20	375
	3,200	10	307	20	614
C Frame HGN 40 ~ 50	4,000	8	384	11	528
	5,000	8	600	11	825
	6,300	5	595	7	833

※ The abovementioned power consumption is the total power consumption of the circuit breaker based on 50/60 Hz, 3/4 pole.

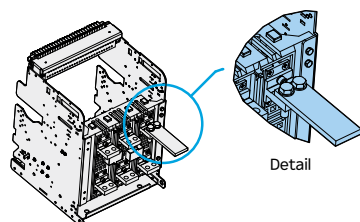
The inner resistance value is the resistance value per pole. Power Factor = 1.0

※ The internal resistance mentioned above is the factory default value. It may slightly increase depending on the operating environment (load conditions, short circuits, load switching, and other ambient conditions) and the duration of use.

Regular inspections and maintenance are recommended.

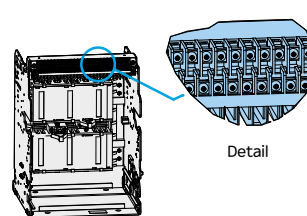
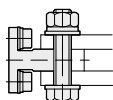
※ Contact resistance may increase after 1-2 years. Wiping the contact surface with an alcohol-dampened towel can reduce contact resistance.

Tightening Torque



Detail

Main Circuit
Tightening Torque
M10 : 270 ± 32kgf-cm
M12 : 480 ± 57kgf-cm



Detail

Control Circuit
Tightening Torque
M3.5 : 8.8 ± 1.1kgf-cm

Insulation Voltage

When designing the switchboard, maintain the insulation distance in accordance with the table below.

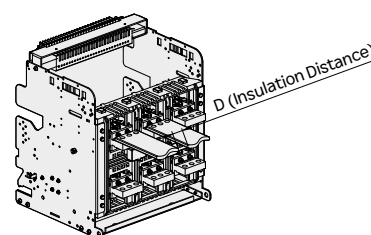
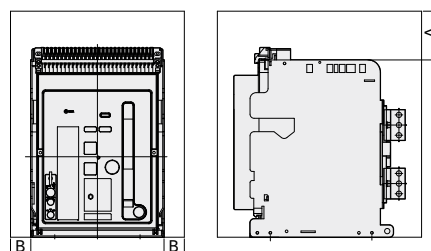
Insulation Distance from ARC

Unit : mm

Item	A	B
Fixed Type	150	50
Draw-Out Type without Arc Shield	150	50
Draw-Out Type with Arc Shield	0	50

Minimum Insulation Distance at Charging Side

Insulating Voltage	Minimum Insulation Distance(mm)
Below 600 V	8
Above 600 V, below 1,250 V	14



Calibration of Rating Current

Calibration of Rating Current Following Ambient Temperature and Motion Specification

Model Name	Rating Current	ACB Terminal	Applicable Motion Standard										
				Horizontal Type					Vertical Type				
				40 °C	45 °C	50 °C	55 °C	60 °C	40 °C	45 °C	50 °C	55 °C	60 °C
A Frame HGN/HGS 06 ~ 16	200 A	15 t×50×1 ea	5 t×50×1 ea	200 A	200 A	200 A	200 A	200 A	200 A	200 A	200 A	200 A	200 A
	400 A			400 A	400 A	400 A	400 A	400 A	400 A	400 A	400 A	400 A	400 A
	630 A			630 A	630 A	630 A	630 A	630 A	630 A	630 A	630 A	630 A	630 A
	800 A			800 A	800 A	800 A	800 A	800 A	800 A	800 A	800 A	800 A	800 A
	1,000 A			1,000 A	1,000 A	1,000 A	1,000 A	1,000 A	1,000 A	1,000 A	1,000 A	1,000 A	1,000 A
P Frame HGN 06 ~ 16	1,250 A	15 t×50×1 ea	8 t×50×2 ea 6 t×75×2 ea	-	-	-	-	-	1,250 A	1,250 A	1,250 A	1,250 A	1,250 A
	1,600 A			-	-	-	-	-	1,600 A	1,600 A	1,580 A	1,550 A	1,500 A
	2,000 A			-	-	-	-	-	2,000 A	2,000 A	1,940 A	1,860 A	1,780 A
	630 A			630 A	630 A	630 A	630 A	630 A	630 A	630 A	630 A	630 A	630 A
	800 A			800 A	800 A	800 A	800 A	800 A	800 A	800 A	800 A	800 A	800 A
B Frame HGS/HGN 06 ~ 25	1,000 A	20 t×75×1 ea	8 t×50×2 ea 6 t×75×2 ea	1,000 A	1,000 A	1,000 A	1,000 A	1,000 A	1,000 A	1,000 A	1,000 A	1,000 A	1,000 A
	1,250 A			1,250 A	1,250 A	1,250 A	1,250 A	1,250 A	1,250 A	1,250 A	1,250 A	1,250 A	1,250 A
	1,600 A			1,600 A	1,600 A	1,600 A	1,600 A	1,600 A	1,600 A	1,600 A	1,600 A	1,600 A	1,600 A
	2,000 A			2,000 A	2,000 A	2,000 A	2,000 A	2,000 A	2,000 A	2,000 A	2,000 A	2,000 A	2,000 A
	2,500 A			2,500 A	2,500 A	2,500 A	2,400 A	2,300 A	2,500 A	2,500 A	2,500 A	2,500 A	2,500 A
B Frame HGN32 Q Frame HGN32	3,200 A	20 t×90×1 ea	10 t×100×3 ea 10 t×75×4 ea	-	-	-	-	-	3,200 A	3,200 A	3,120 A	3,050 A	2,950 A
	4,000 A Horizontal			4,000 A	4,000 A	3,900 A	3,800 A	3,640 A	-	-	-	-	-
B Frame HGN40 Q Frame HGN40	4,000 A Vertical	15 t×125×2 ea	10 t×100×4 ea 10 t×125×3 ea	-	-	-	-	-	4,000 A	4,000 A	3,950 A	3,800 A	3,680 A
	3,200 A			3,200 A	3,200 A	3,100 A	3,000 A	2,900 A	3,200 A	3,200 A	3,100 A	3,000 A	2,900 A
C Frame HGN32 ~ 50	4,000 A	20 t×125×2 ea	10 t×100×4 ea	4,000 A	4,000 A	3,920 A	3,860 A	3,800 A	4,000 A	4,000 A	3,960 A	3,900 A	3,880 A
	5,000 A			5,000 A	5,000 A	4,900 A	4,800 A	4,700 A	5,000 A	5,000 A	4,950 A	4,900 A	4,850 A
	4,000 A			4,000 A	4,000 A	4,000 A	4,000 A	4,000 A	4,000 A	4,000 A	4,000 A	4,000 A	4,000 A
D Frame HGN40 ~ 63	5,000 A	20 t×125×2 ea	10 t×125×4 ea	5,000 A	5,000 A	4,900 A	4,820 A	4,750 A	5,000 A	5,000 A	4,950 A	4,870 A	4,850 A
	6,300 A			6,300 A	6,300 A	6,170 A	6,040 A	5,900 A	6,300 A	6,300 A	6,220 A	6,160 A	6,100 A

※ The ambient temperature is based on the external temperature of the circuit breaker and the motion that can be applicable to the circuit breaker is applied.
The motion is based on copper material with no separate painting.
The maximum allowable temperature of the motion is below 100 °C.

※ The above table represents the correction values for individual applications.
※ When installing inside a panel, please apply the Derating Table.

Calibration of Rating Current Following Altitude

ACB is designed to be used at altitudes below 2,000 m.

When used at above 2,000 m, change the ratings depending on the surrounding environment condition for use.

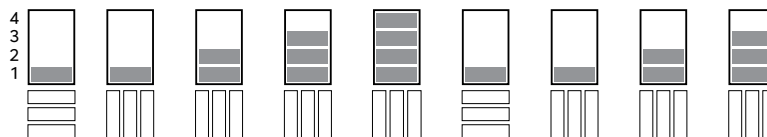
Item	Altitude	2,000m	3,000m	4,000m	5,000m
Withstand Voltage (V)		3,500	3,150	2,500	2,100
Average Insulating Voltage (V)		1,000 (1,250)	900 (1,125)	700 (1,000)	600 (875)
Max. Operation Voltage (V)		690 (1,150)	590 (1,035)	520 (920)	460 (805)
Current Calibration Coefficient		1×In	0.99×In	0.96×In	0.94×In

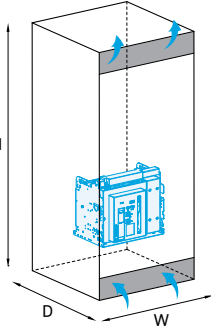
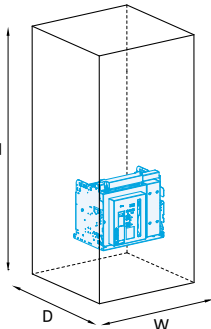
※ () indicates P, Q frame application

Technical Data

Derating Table (HGN)

Switchboard Composition
Connection Type



Model Name		HGN 06 ~ 08					HGN 10				
Rated Current ²⁾		~ 800A					1,000A				
Busbar Dimensions (mm)		6t×50×2ea					8t×50×2ea				
Ventilation distribution board (IP31) ³⁾  Area of intake ventilation : 350cm² Area of exhaust ventilation : 350cm²		Ta ¹⁾ = 30 ~ 40°C	4				800↓				
			3				800↓	800↓			1,000
			2			800↓	800↓	800↓			1,000
			1	800↓	800↓	800↓	800↓	800↓	1,000	1,000	1,000
		Ta = 40 ~ 50°C	4				800↓				
			3				800↓	800↓			1,000
			2			800↓	800↓	800↓			1,000
			1	800↓	800↓	800↓	800↓	800↓	1,000	1,000	1,000
		Ta = 50 ~ 60°C	4				800↓				
			3				800↓	800↓			1,000
			2			800↓	800↓	800↓			1,000
			1	800↓	800↓	800↓	800↓	800↓	1,000	1,000	1,000
Enclosed distribution board (IP41/54) ⁵⁾ 		Ta ¹⁾ = 30 ~ 40°C	4				800↓				
			3				800↓	800↓			1,000
			2			800↓	800↓	800↓			1,000
			1	800↓	800↓	800↓	800↓	800↓	1,000	1,000	1,000
		Ta = 40 ~ 50°C	4				800↓				
			3				800↓	800↓			1,000
			2			800↓	800↓	800↓			1,000
			1	800↓	800↓	800↓	800↓	800↓	1,000	1,000	1,000
		Ta = 50 ~ 60°C	4				800↓				
			3				800↓	800↓			1,000
			2			800↓	800↓	800↓			1,000
			1	800↓	800↓	800↓	800↓	800↓	1,000	1,000	1000
Panel dimensions (mm) : W×H×D		800×2,300×900									
Area of outlet vents (IP31)		350cm ²									
Area of inlet vents (IP31)		350cm ²									

※ 1) Ambient temperature Ta refers to the temperature outside the panel (per IEC 60947-1).

2) The rated current should meet the performance satisfying the temperature requirements of IEC 60947-1 and 2 when installed inside the panel, using additional current derating and recommended conductor sizes.

3) Ventilation structure should be designed to allow temperature reduction for products installed inside the panel.

4) The above Derating Table represents the maximum current for the selected circuit breaker under panel conditions.

5) To reduce the temperature inside the sealed panel, forced ventilation devices must be added.

6) For ACB product ratings, the specifications of the panel busbars, vertical/horizontal arrangement, air circulation, presence of vents, fans, and IEC temperature rise test conditions create variables in the operating environment. Therefore, the ratings of circuit breakers and panels may differ. Thus, when selecting the circuit breaker rating, consider the actual safe load of the panel (up to 30%) to ensure the safety of the panel's actual load.

Ex) Actual load 2,850A × 1.3 = 3,705A → Select 4,000AF.

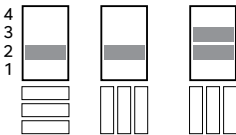
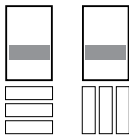
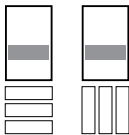
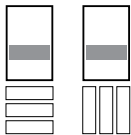
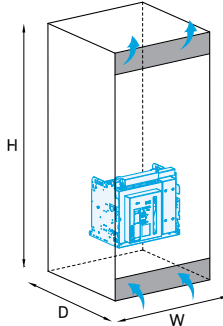
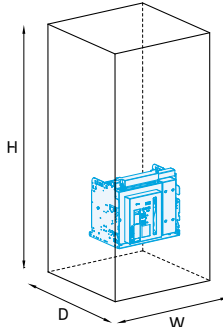
Under the conditions of the Derating table above, the load factor should be less than 70% of the rated current. If the designated busbar size is smaller, it can cause temperature rise due to reduced busbar cross-section. To protect the load, the current load factor must be reduced to a safe range.

Switchboard Composition
Connection Type

Model Name	HGN 12A				HGN 16A			HGN 20A	
Rated Current ²⁾	1,250A				1,600A			2,000A	
Busbar Dimensions (mm)	8t×75×2ea				8t×75×3ea			10t×100×2ea	
Ventilation distribution board (IP31) ³⁾ Area of intake ventilation : 350cm ² Area of exhaust ventilation : 350cm ²	4								
	3			1,250					2,000
	2		1,250	1,250			1,600	2,000	2,000
	1	1,250	1,250	1,250	1,250	1,600	1,600		
	4								
	3			1,250					1,900
	2		1,250	1,250			1,600	2,000	2,000
	1	1,250	1,250	1,250	1,250	1,600	1,600		
	4								
	3			1,250					1,800
	2		1,250	1,250			1,470	1,900	1,900
	1	1,250	1,250	1,250	1,250	1,520	1,600		
Enclosed distribution board (IP41/54) ⁵⁾ Area of intake ventilation : 350cm ² Area of exhaust ventilation : 350cm ²	4								
	3			1,250					1,750
	2		1,250	1,250			1,600	1,850	1,850
	1	1,250	1,250	1,250	1,250	1,600	1,600		
	4								
	3			1,250					1,650
	2		1,250	1,250			1,500	1,750	1,750
	1	1,250	1,250	1,250	1,250	1,500	1,600		
	4								
	3			1,250					1,550
	2		1,250	1,250			1,400	1,650	1,650
	1	1,250	1,250	1,250	1,250	1,400	1,520	1,520	
Panel dimensions (mm) : W×H×D	800×2,300×900								
Area of outlet vents (IP31)	350cm ²								
Area of inlet vents (IP31)	350cm ²								

Technical Data

Derating Table (HGN)

Switchboard Composition Connection Type											
Model Name		HGN 06 ~ 20B		HGN 25B		HGN 32B		HGN 40B			
Rated Current ²⁾		2,000A		2,500A		3,200A		4,000A			
Busbar Dimensions (mm)		10t×100×2ea		10t×100×3ea		10t×125×3ea		10t×125×4ea			
 Area of intake ventilation : 350cm² Area of exhaust ventilation : 350cm²	Ta ¹⁾ = 30 ~ 40°C	4									
		3			2,000↓						
		2	2,000↓	2,000↓	2,000↓	2,375	2,500	3,040	3,200	3,320	3,700
		1									
	Ta = 40 ~ 50°C	4									
		3			2,000↓						
		2	2,000↓	2,000↓	2,000↓	2,250	2,380	2,880	3,100	3,160	3,500
		1									
	Ta = 50 ~ 60°C	4									
		3			2,000↓						
		2	2,000↓	2,000↓	2,000↓	2,100	2,250	2,690	2,900	2,960	3,280
		1									
	Ta ¹⁾ = 30 ~ 40°C	4									
		3			2,000↓						
		2	2,000↓	2,000↓	2,000↓	2,125	2,275	2,650	2,850	3,040	3,320
		1									
	Ta = 40 ~ 50°C	4									
		3			1,900↓						
		2	1,900↓	1,960↓	1,960↓	2,000	2,150	2,550	2,700	2,880	3,120
		1									
	Ta = 50 ~ 60°C	4									
		3			1,780↓						
		2	1,800↓	1,920↓	1,920↓	1,900	2,020	2,370	2,530	2,720	2,960
		1									
Panel dimensions (mm) : W×H×D		800×2,300×900									
Area of outlet vents (IP31)		350cm ²									
Area of inlet vents (IP31)		350cm ²									

※ 1) Ambient temperature Ta refers to the temperature outside the panel (per IEC 60947-1).

2) The rated current should meet the performance satisfying the temperature requirements of IEC 60947-1 and 2 when installed inside the panel, using additional current derating and recommended conductor sizes.

3) Ventilation structure should be designed to allow temperature reduction for products installed inside the panel.

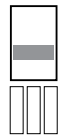
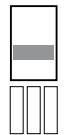
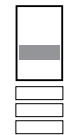
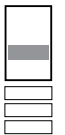
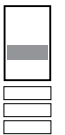
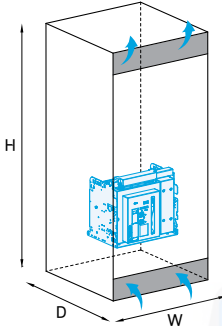
4) The above Derating Table represents the maximum current for the selected circuit breaker under panel conditions.

5) To reduce the temperature inside the sealed panel, forced ventilation devices must be added.

6) For ACB product ratings, the specifications of the panel busbars, vertical/horizontal arrangement, air circulation, presence of vents, fans, and IEC temperature rise test conditions create variables in the operating environment. Therefore, the ratings of circuit breakers and panels may differ. Thus, when selecting the circuit breaker rating, consider the actual safe load of the panel (up to 30%) to ensure the safety of the panel's actual load.

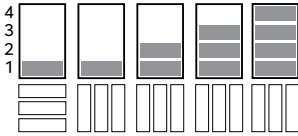
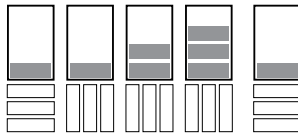
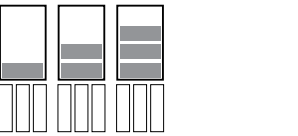
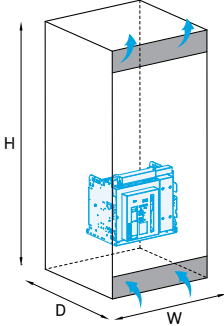
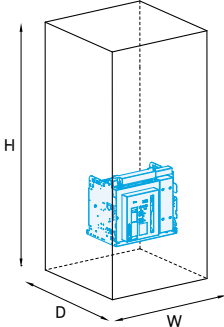
Ex) Actual load 2,850A × 1.3 = 3,705A → Select 4,000AF.

Under the conditions of the Derating table above, the load factor should be less than 70% of the rated current. If the designated busbar size is smaller, it can cause temperature rise due to reduced busbar cross-section. To protect the load, the current load factor must be reduced to a safe range.

Switchboard Composition Connection Type																					
Model Name		HGN 40C		HGN 50C		HGN 40D		HGN 50D		HGN 63D											
Rated Current ²⁾		4,000A		5,000A		4,000A		5,000A		6,300A											
Busbar Dimensions (mm)		10t×125×4ea		10t×140×5ea		10t×125×4ea		10t×140×5ea		10t×160×5ea											
Ventilation distribution board (IP31) ³⁾																					
		Ta ¹⁾ = 30 ~ 40°C																			
		4																			
		3																			
		2		3,900		4,000		4,550		4,850		4,000		4,000		4,700		5,000		5,550	
		1																			
		4																			
		3																			
		2		3,850		3,900		4,350		4,650		4,000		4,000		4,450		4,850		5,380	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			
		2		3,800		3,850		4,100		4,400		4,000		4,000		4,200		4,600		5,080	
		1																			
		4																			
		3																			

Technical Data

Derating Table (HGS)

Switchboard Composition Connection Type																
Model Name		HGS 06 ~ 08A					HGS 10A					HGS 12A				
Rated Current ²⁾		~800A					1,000A					1,250A				
Busbar Dimensions (mm)		6t×50×2ea					8t×50×2ea					8t×75×2ea				
Ventilation distribution board (IP31) ³⁾  Area of intake ventilation : 350cm ² Area of exhaust ventilation : 350cm ²	Ta ¹⁾ = 30 ~ 40°C	4				800↓										
		3				800↓	800↓				1,000				1,250	
		2			800↓	800↓	800↓			1,000	1,000			1,250	1,250	
		1	800↓	800↓	800↓	800↓	800↓	1,000	1,000	1,000	1,000	1,250	1,250	1,250	1,250	
	Ta = 40 ~ 50°C	4				800↓										
		3				800↓	800↓				1,000				1,250	
		2			800↓	800↓	800↓			1,000	1,000			1,250	1,250	
		1	800↓	800↓	800↓	800↓	800↓	1,000	1,000	1,000	1,000	1,250	1,250	1,250	1,250	
	Ta = 50 ~ 60°C	4				800↓										
		3				800↓	800↓				1,000				1,050	
		2			800↓	800↓	800↓			1,000	1,000			1,200	1,150	
		1	800↓	800↓	800↓	800↓	800↓	1,000	1,000	1,000	1,000	1,250	1,250	1,250	1,250	
Enclosed distribution board (IP41/54) ⁵⁾ 	Ta ¹⁾ = 30 ~ 40°C	4				800↓										
		3				800↓	800↓				1,000				1,050	
		2			800↓	800↓	800↓			1,000	1,000			1,200	1,150	
		1	800↓	800↓	800↓	800↓	800↓	1,000	1,000	1,000	1,000	1,250	1,250	1,250	1,250	
	Ta = 40 ~ 50°C	4				800↓										
		3				800↓	800↓				900				1,000	
		2			800↓	800↓	800↓			975	950			1,100	1,050	
		1	800↓	800↓	800↓	800↓	800↓	1,000	1,000	1,000	1,000	1,250	1,250	1,150	1,150	
	Ta = 50 ~ 60°C	4				800↓										
		3				800↓	800↓				850				975	
		2			800↓	800↓	800↓			950	900			1,050	1,000	
		1	800↓	800↓	800↓	800↓	800↓	1,000	1,000	975	950	1,250	1,250	1,150	1,050	
Panel dimensions (mm) : W×H×D		800×2,300×900														
Area of outlet vents (IP31)		350cm ²														
Area of inlet vents (IP31)		350cm ²														

※ 1) Ambient temperature Ta refers to the temperature outside the panel (per IEC 60947-1).

2) The rated current should meet the performance satisfying the temperature requirements of IEC 60947-1 and 2 when installed inside the panel, using additional current derating and recommended conductor sizes.

3) Ventilation structure should be designed to allow temperature reduction for products installed inside the panel.

4) The above Derating Table represents the maximum current for the selected circuit breaker under panel conditions.

5) To reduce the temperature inside the sealed panel, forced ventilation devices must be added.

6) For ACB product ratings, the specifications of the panel busbars, vertical/horizontal arrangement, air circulation, presence of vents, fans, and IEC temperature rise test conditions create variables in the operating environment. Therefore, the ratings of circuit breakers and panels may differ. Thus, when selecting the circuit breaker rating, consider the actual safe load of the panel (up to 30%) to ensure the safety of the panel's actual load.

Ex) Actual load 2,850A × 1.3 = 3,705A → Select 4,000AF.

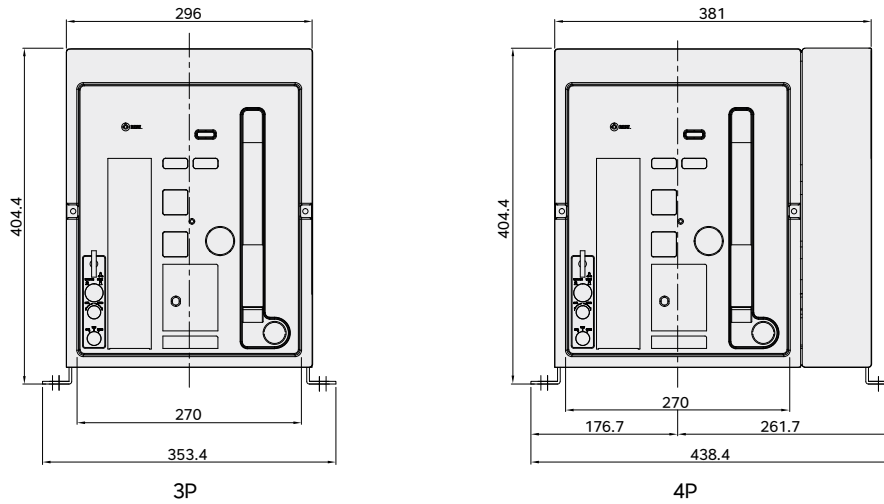
Under the conditions of the Derating table above, the load factor should be less than 70% of the rated current. If the designated busbar size is smaller, it can cause temperature rise due to reduced busbar cross-section. To protect the load, the current load factor must be reduced to a safe range.

Dimensions

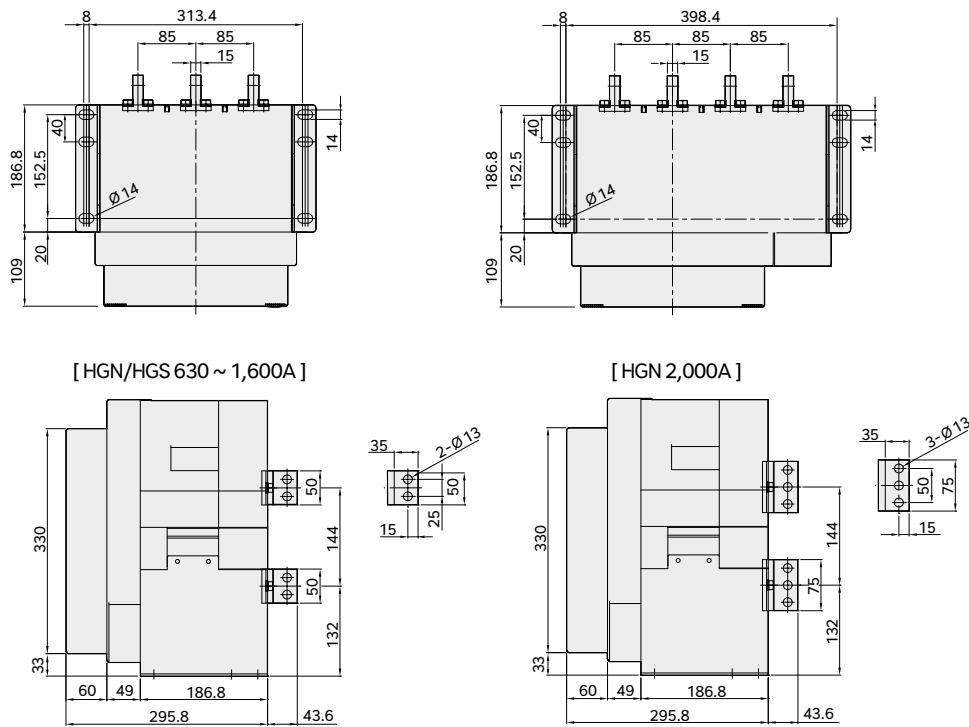
HGS/HGN Fixed Type 630 ~ 2,000 A (HGS06 ~ 16/HGN06 ~ 20 A Frame)

Unit: mm

Front



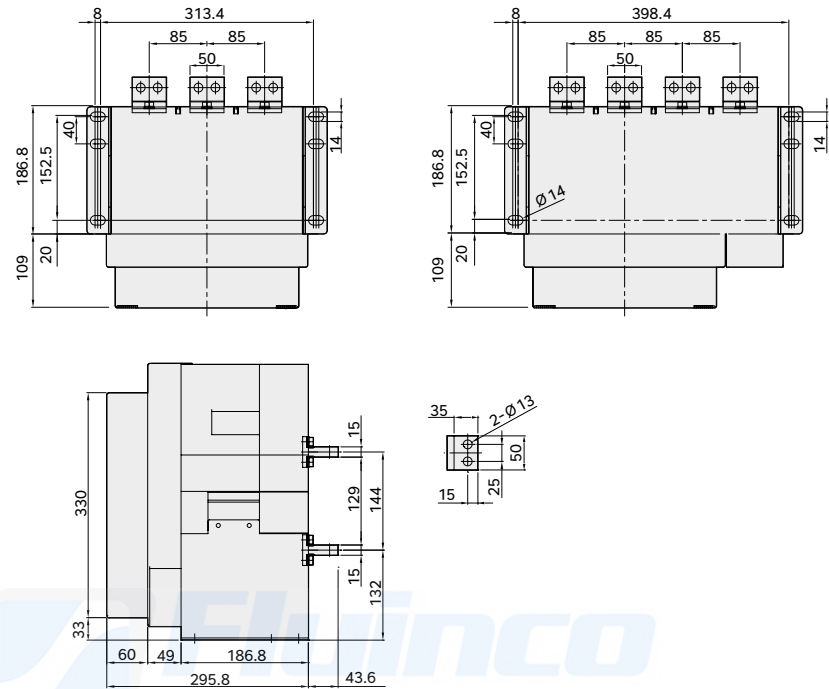
Vertical Type



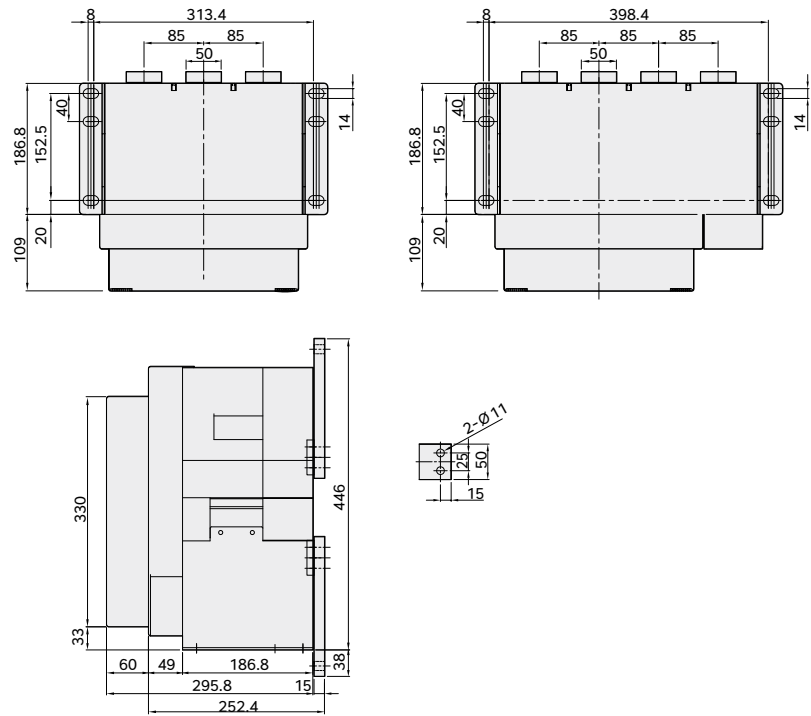
※ The drawing dimension of this page may be subject to change without prior notice.
As for the HGN fixed type A type 2,000 A, only the vertical terminal can be applicable.

Unit : mm

Horizontal Type (630 ~ 1,600A)



Flat Type (630 ~ 1,600A)



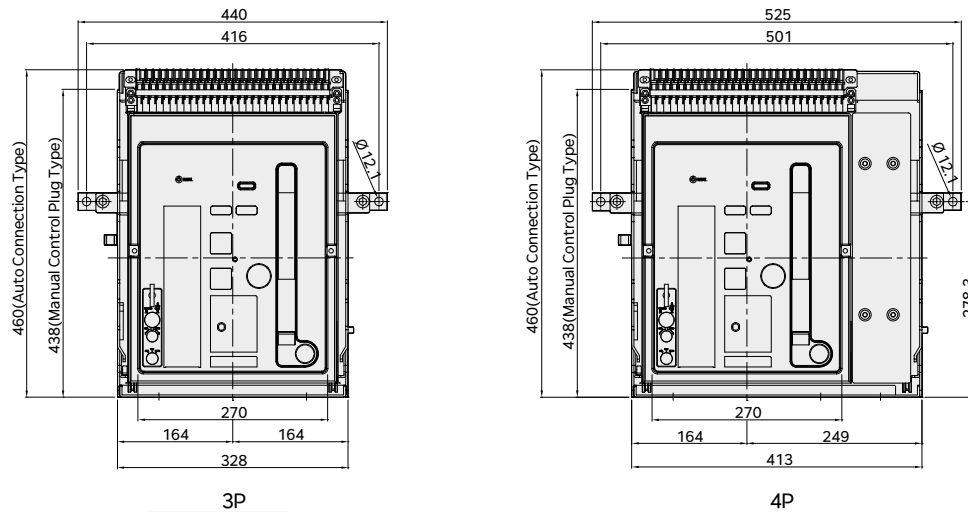
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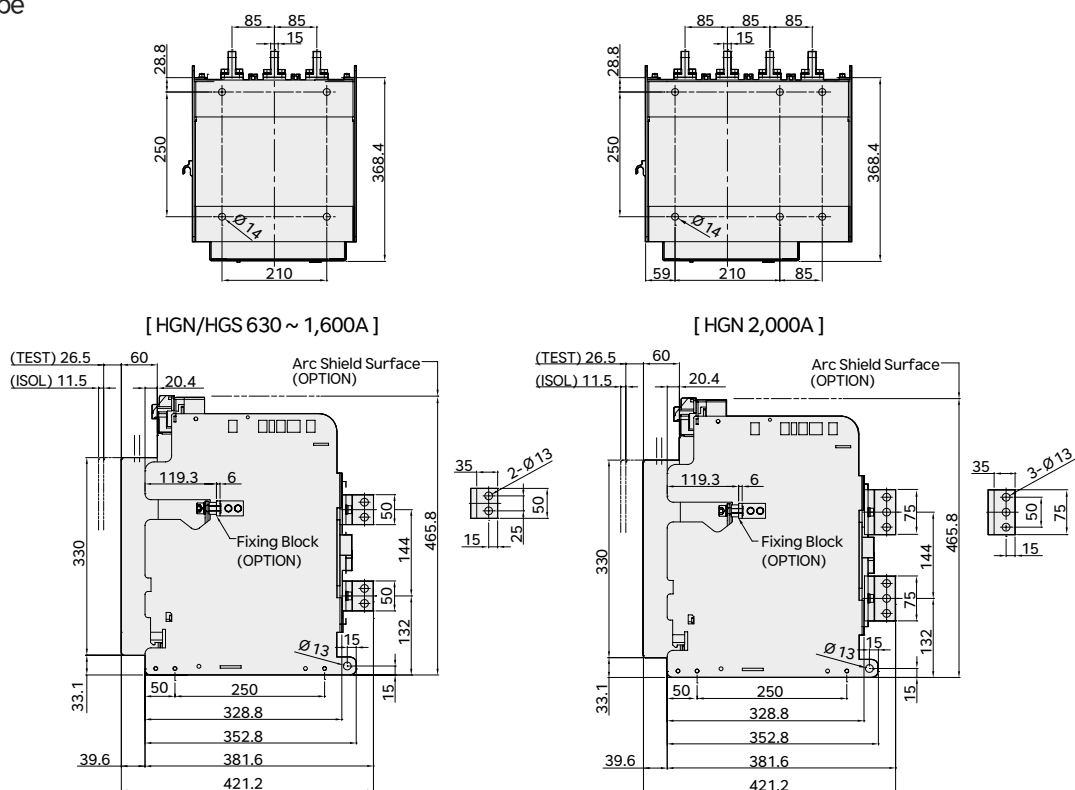
HGS/HGN Draw-Out Type 630 ~ 2,000 A (HGS06 ~ 16/HGN06 ~ 20 A Frame)

Unit: mm

Front



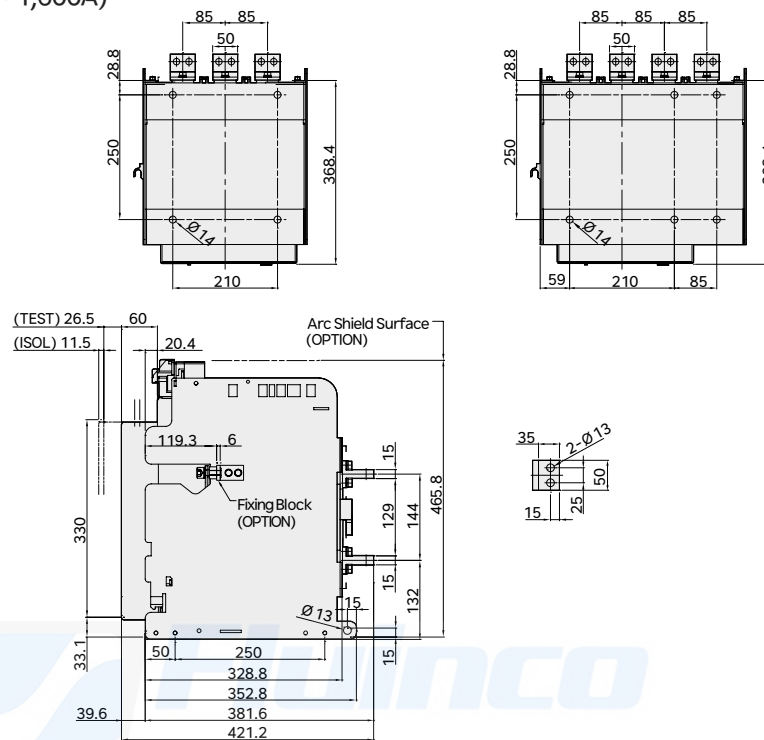
Vertical Type



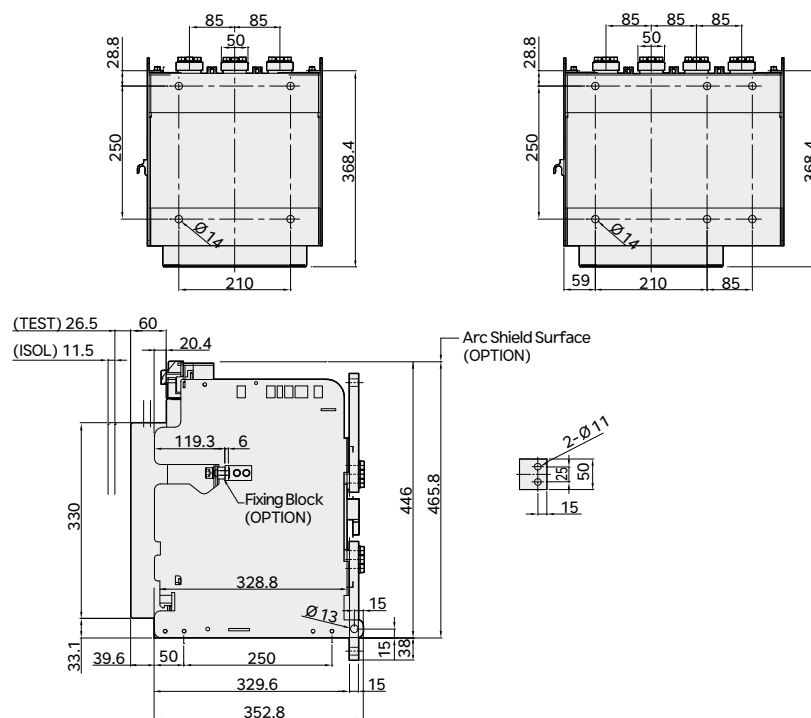
※ The drawing dimension of this page may be subject to change without prior notice.
As for the HGN draw-out type A type 2,000 A, only the vertical terminal can be applicable.

Unit : mm

Horizontal Type (630 ~ 1,600A)



Flat Type (630 ~ 1,600A)



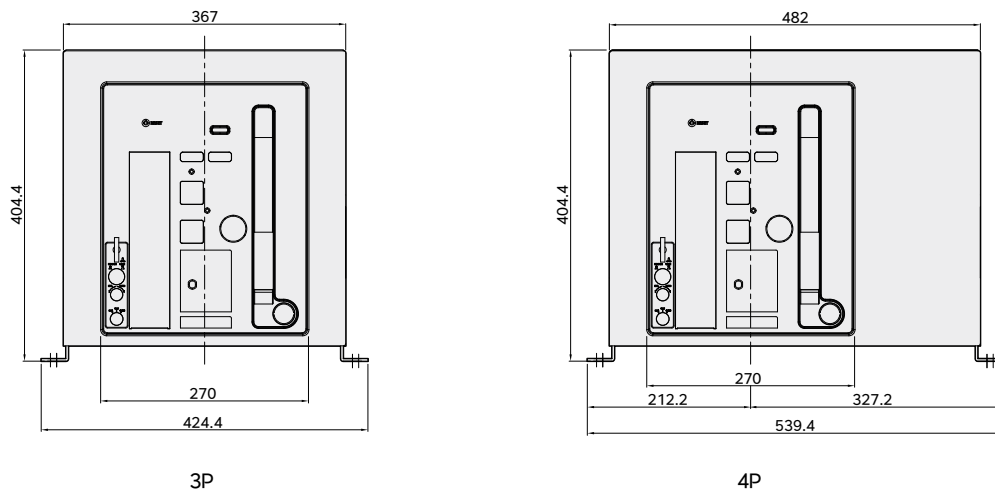
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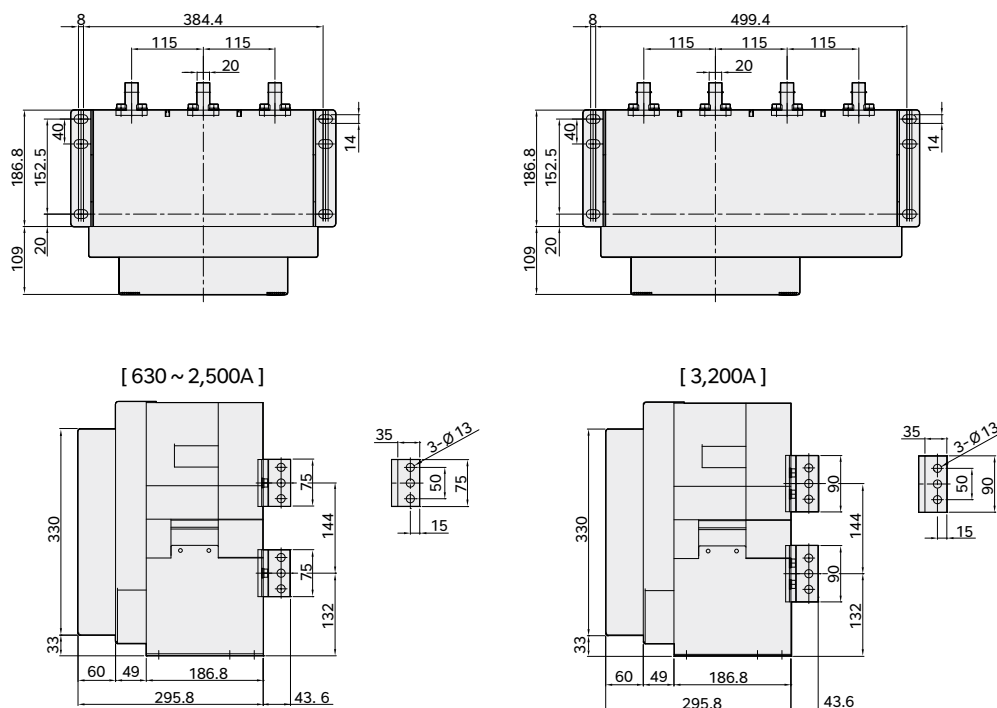
HGS/HGN Fixed Type 2,000 (630) ~ 3,200 A (HGS/HGN20 (06) ~ 32 B Frame)

Unit : mm

Front

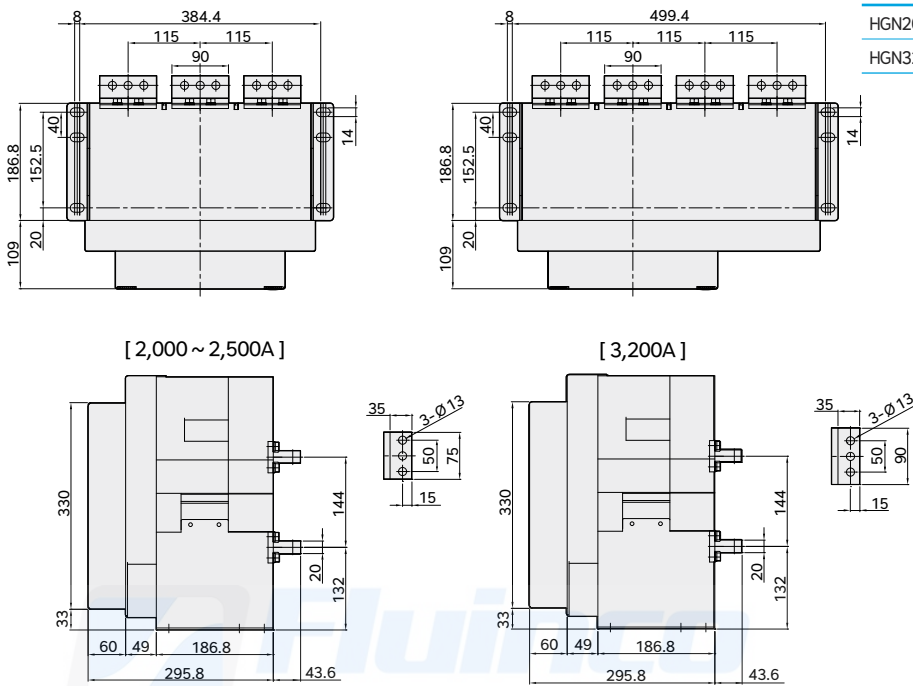


Vertical Type



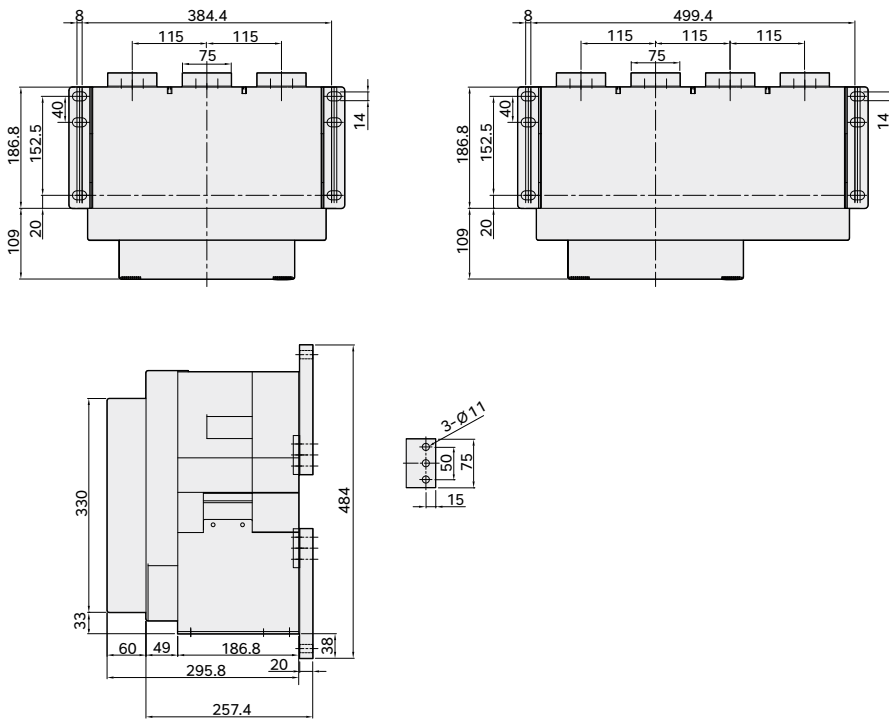
Unit : mm

Horizontal Type



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

Flat Type



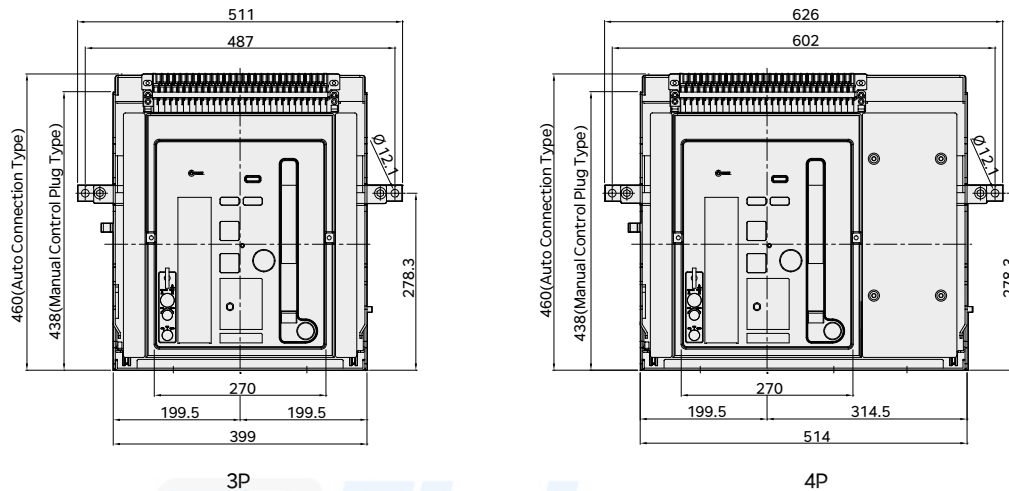
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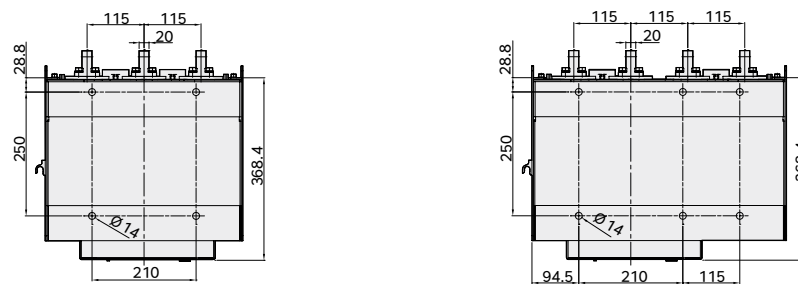
HGS/HGN Draw-Out Type 2,000 (630) ~ 3,200 A (HGS/HGN20 (06) ~ 32 B Frame)

Unit : mm

Front

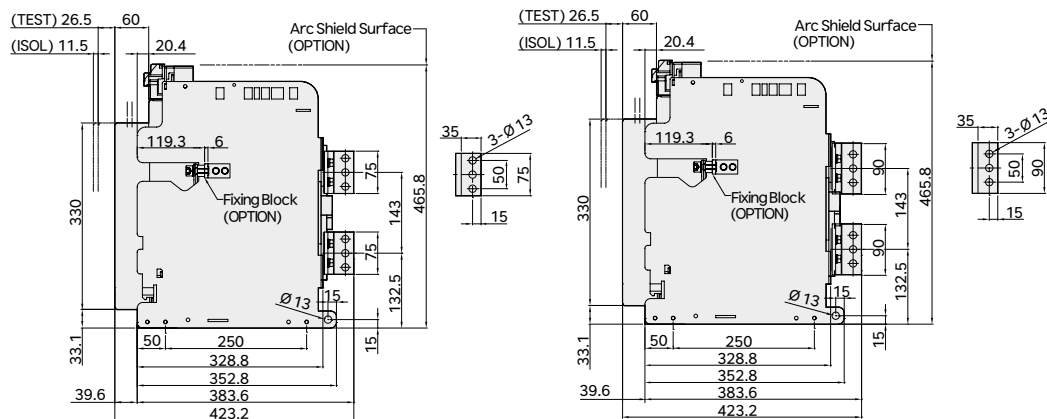


Vertical Type



[630 ~ 2,500A]

[3,200A]



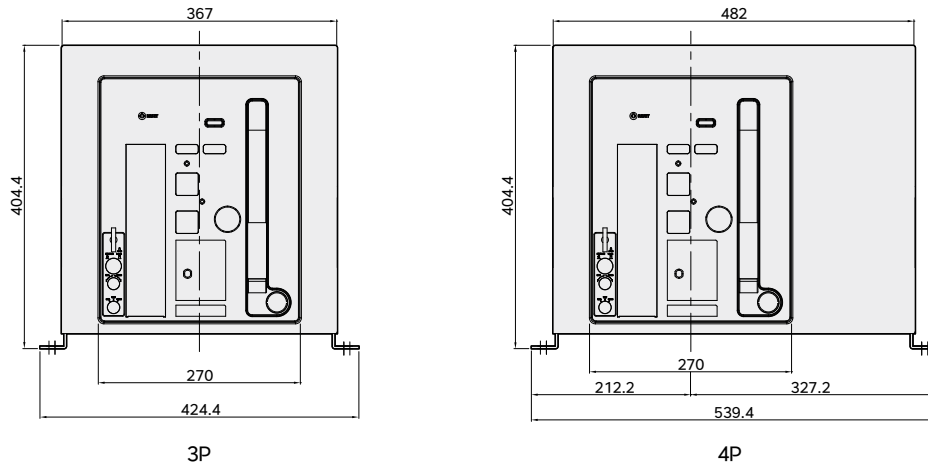
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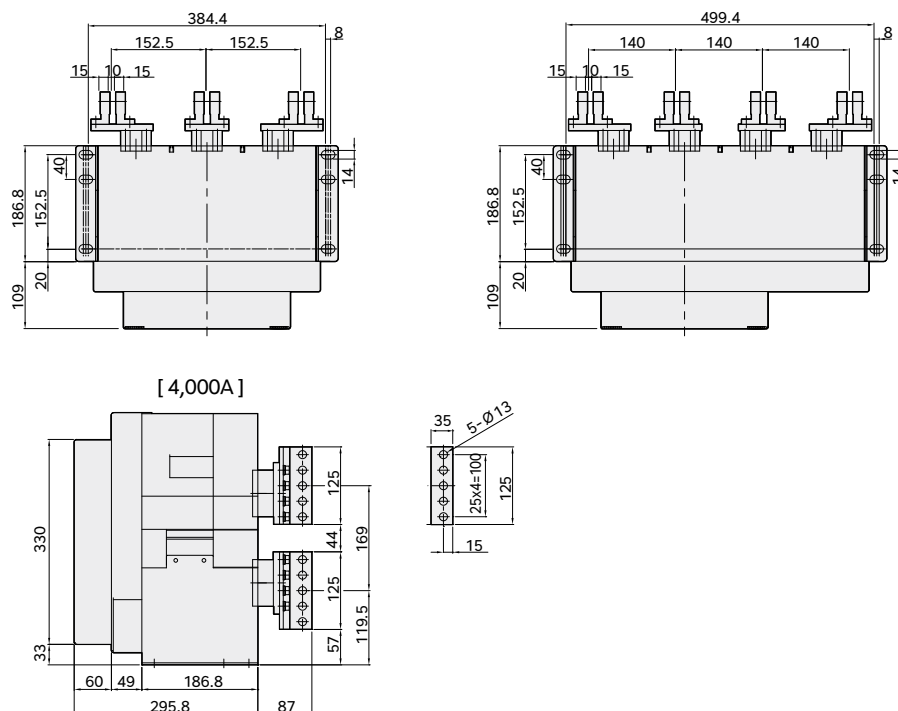
HGN Fixed Type 4,000 A (HGN40 B Frame)

Unit : mm

Front



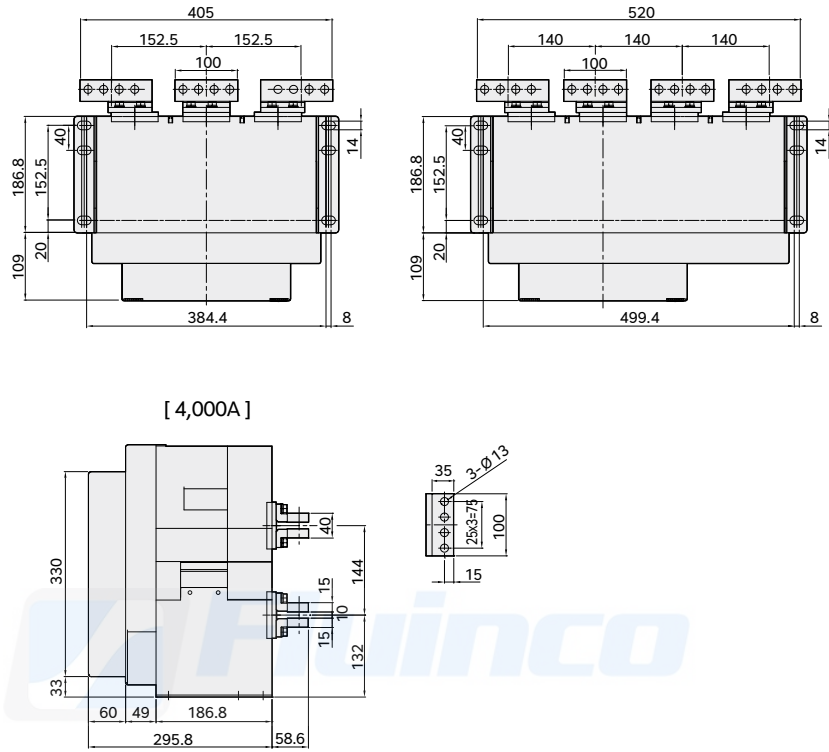
Vertical Type



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

Unit : mm

Horizontal Type

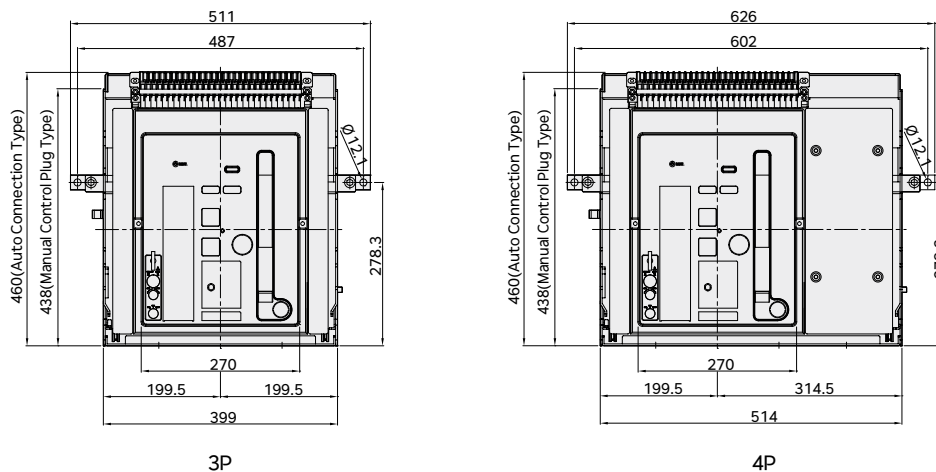


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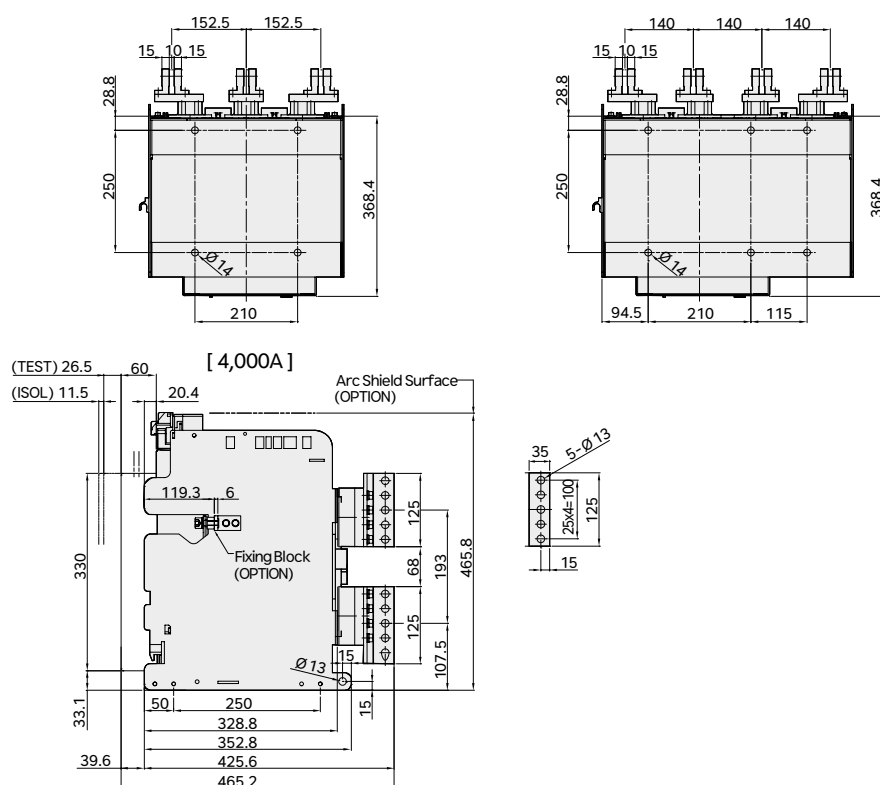
HGN Draw-Out Type 4,000 A (HGN40 B Frame)

Unit : mm

Front



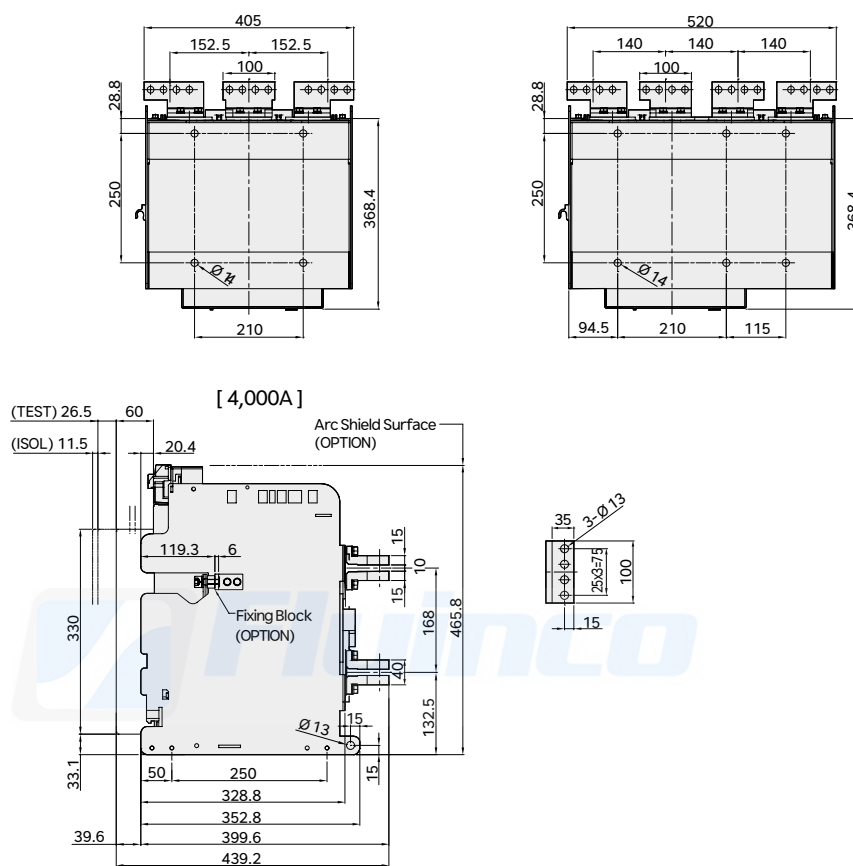
Vertical Type



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

Unit : mm

Horizontal Type



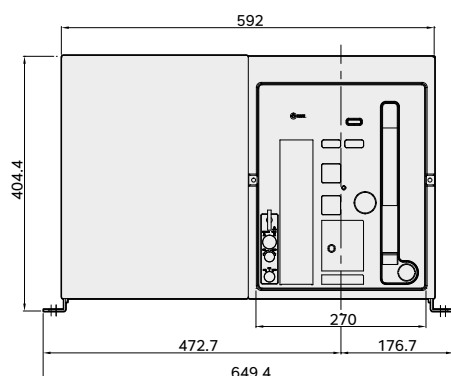
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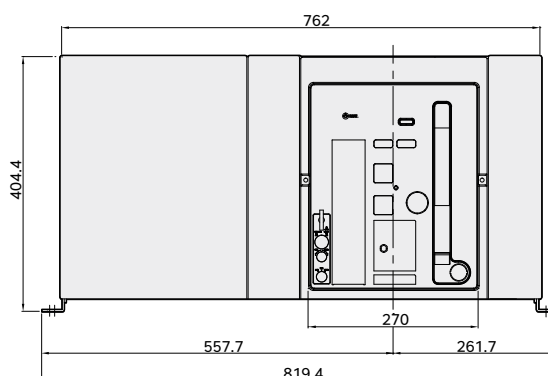
HGN Fixed Type 3,200 ~ 5,000 A (HGN32 ~ 50 C Frame)

Unit : mm

Front



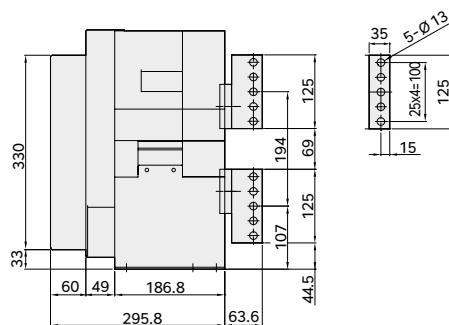
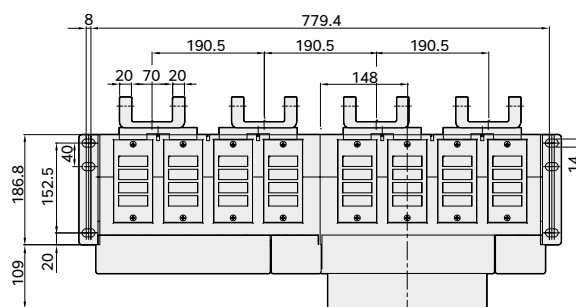
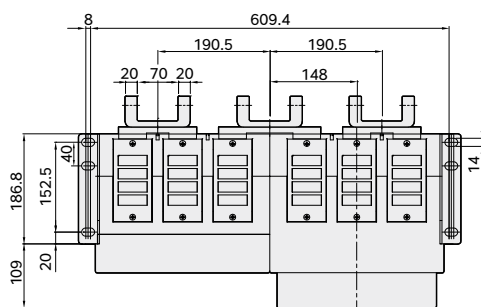
3P



4P



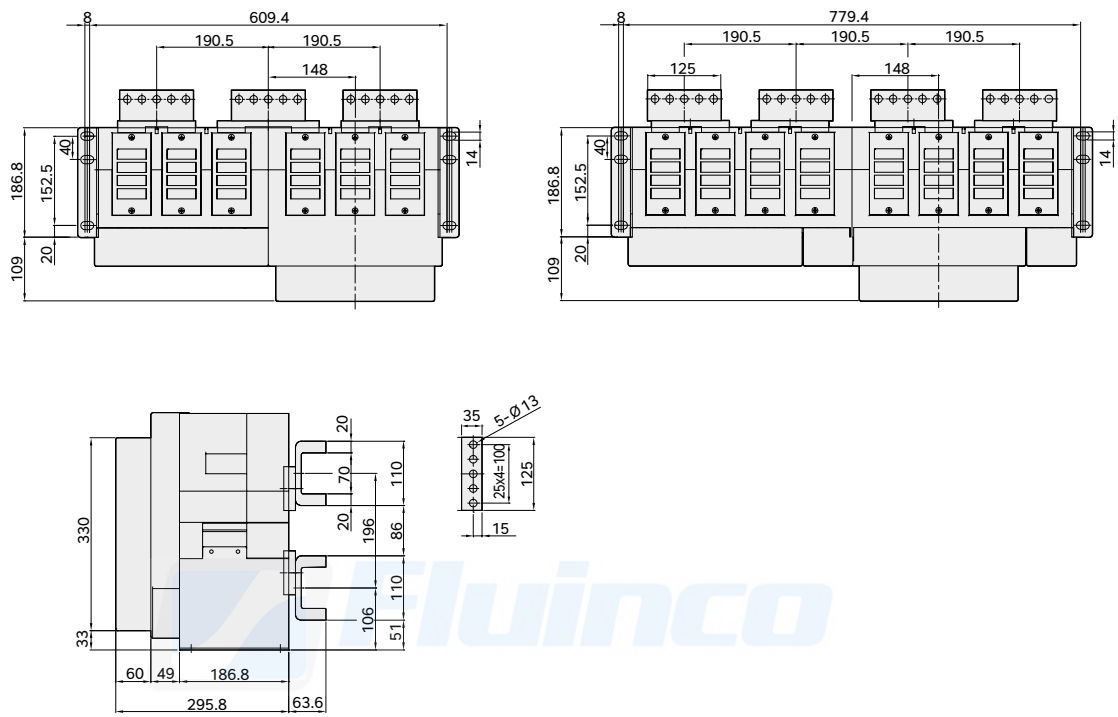
Vertical Type



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

Unit : mm

Horizontal Type



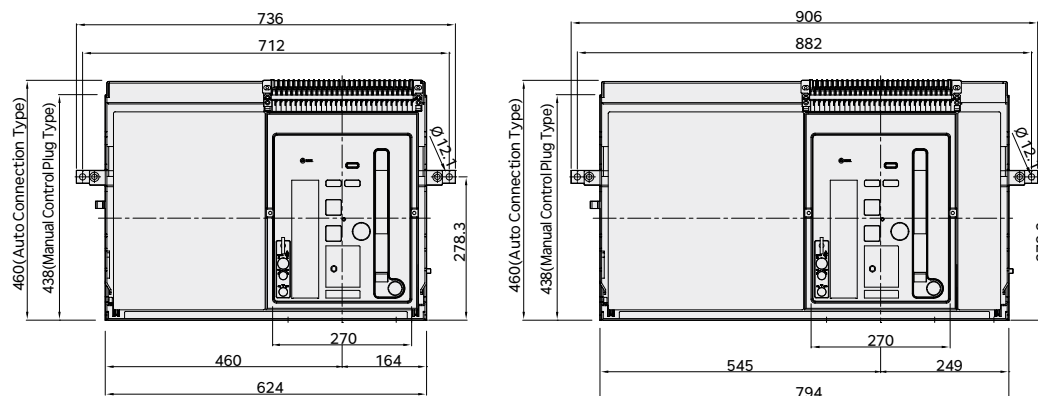
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Dimensions

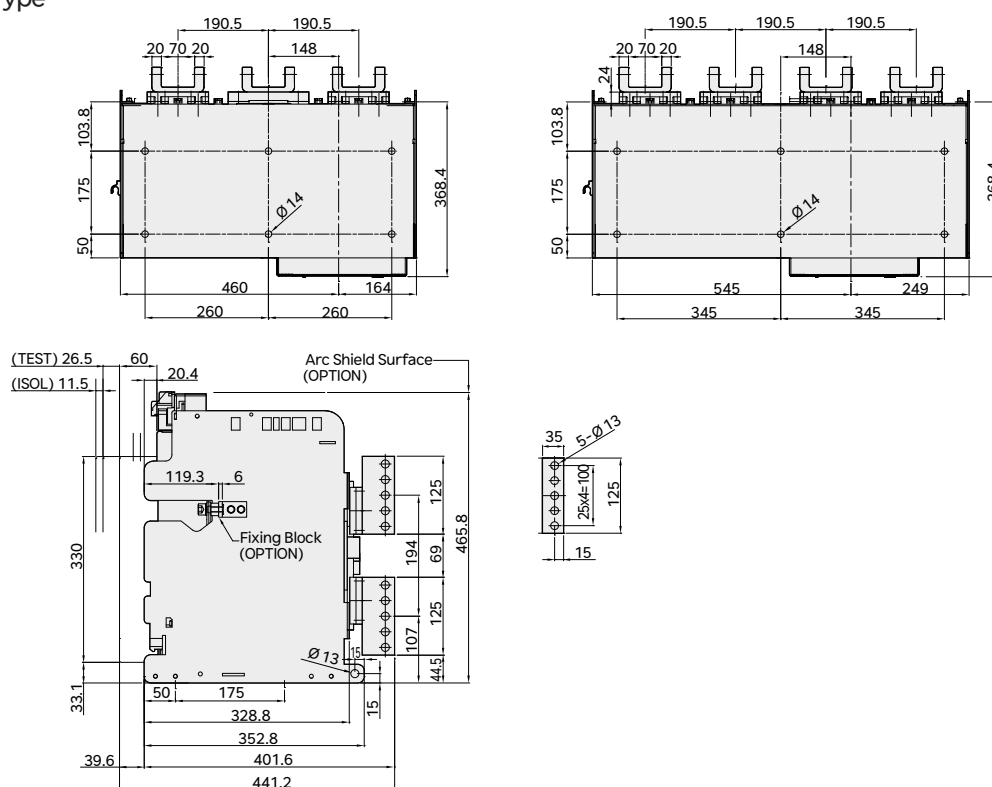
HGN Draw-Out Type 3,200 ~ 5,000A (HGN30 ~ 50 C Frame)

Unit : mm

Front



Vertical Type



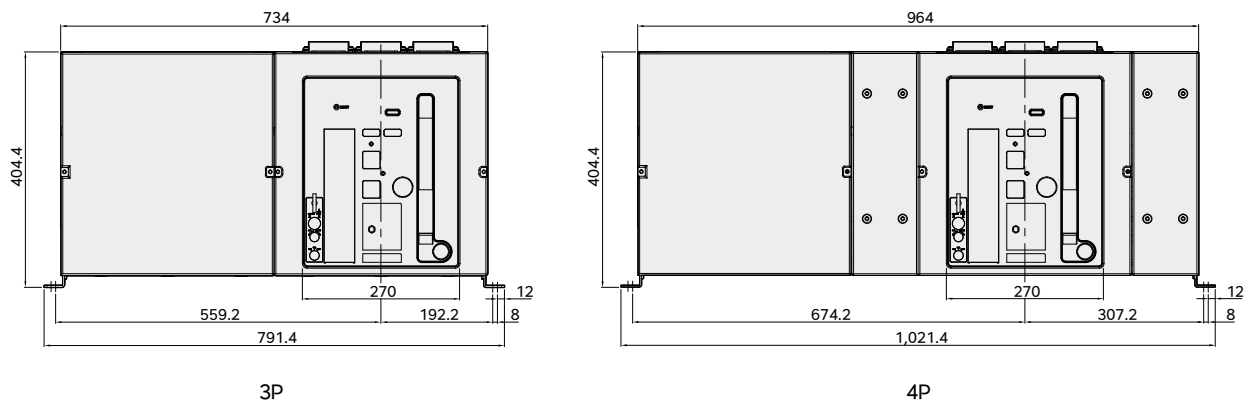
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Dimensions

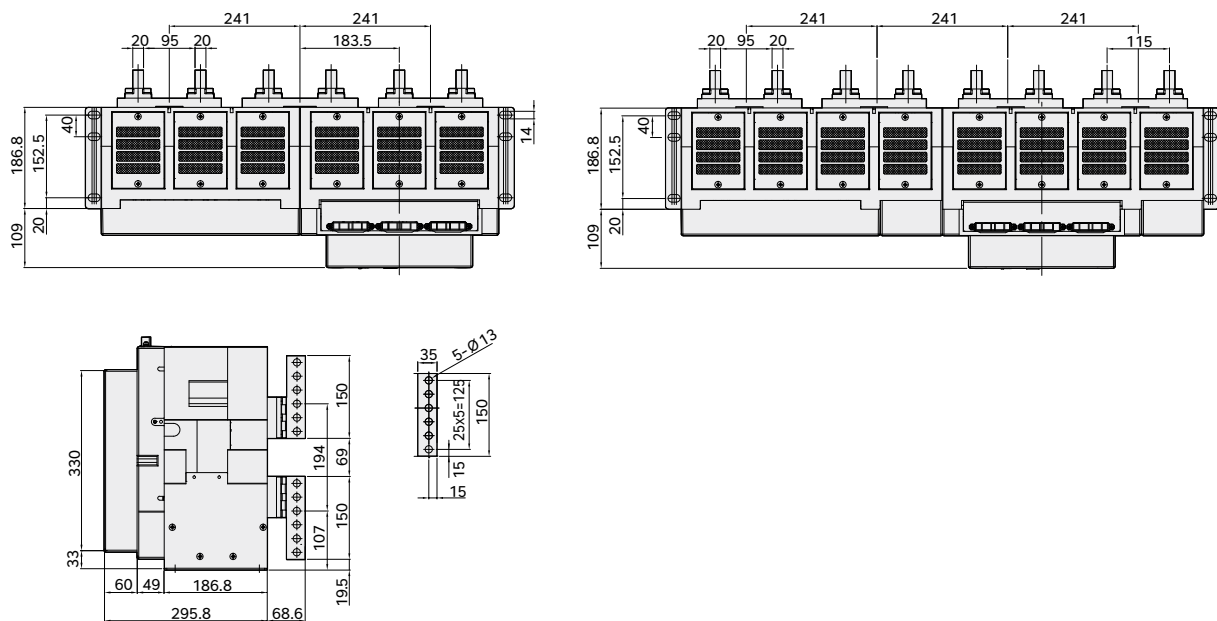
HGN Fixed Type 4,000 ~ 6,300 A (HGN40 ~ 63 D Frame)

Unit: mm

Front



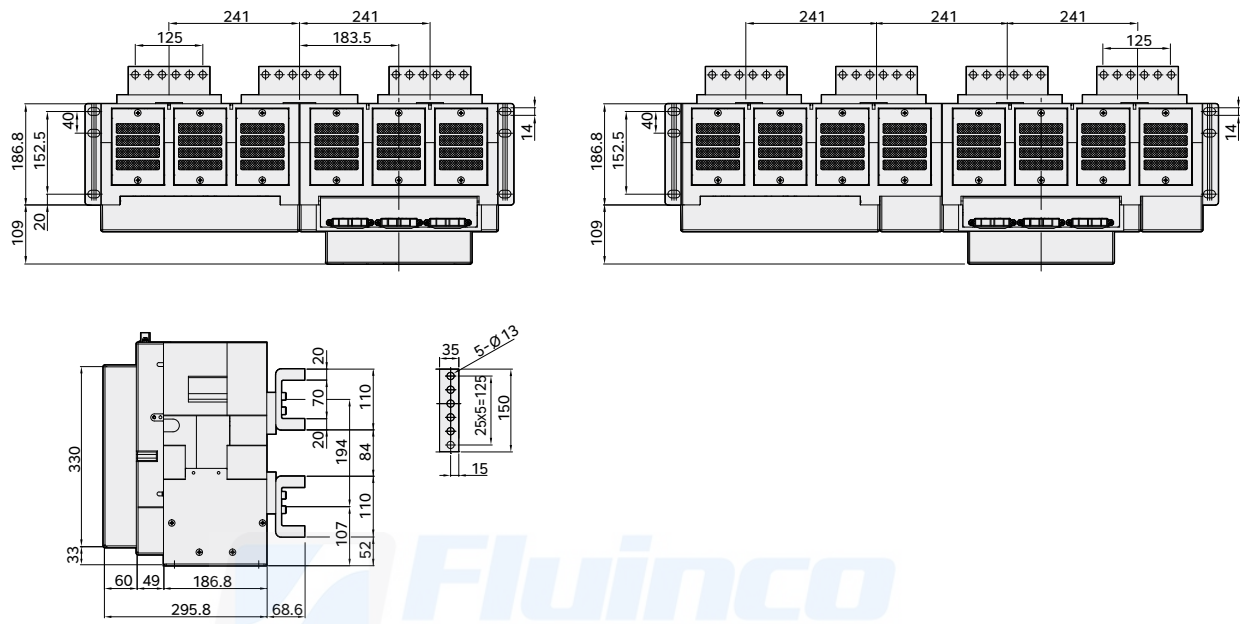
Vertical Type



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

Unit : mm

Horizontal Type



HGN/HGS

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

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

Unit : mm

460 (Auto Connection Type)

438 (Manual Control Plug Type)

878.2

854.2

278.3

566.6

766.2

270

199.6

460 (Auto Connection Type)

438 (Manual Control Plug Type)

1,108.2

1,084.2

278.3

681.6

996.2

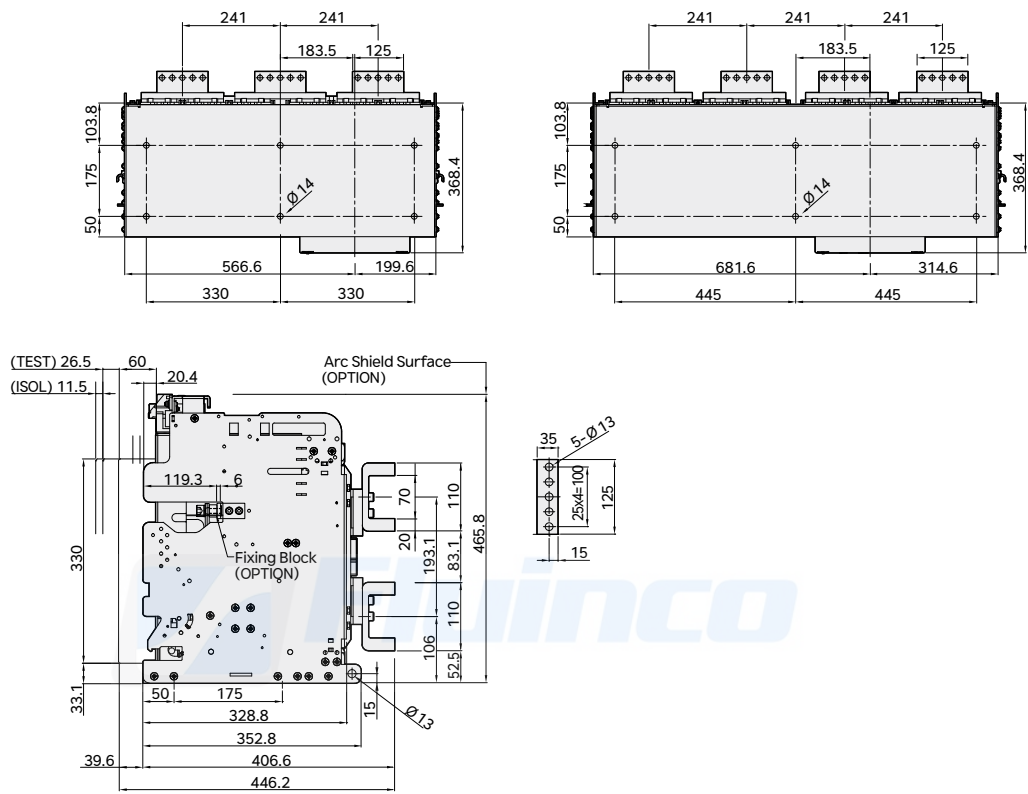
270

314.6

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

Unit : mm

Horizontal Type



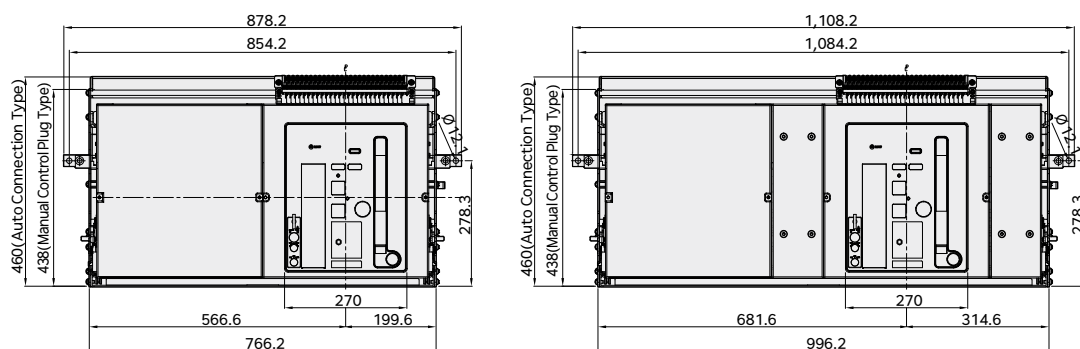
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Dimensions

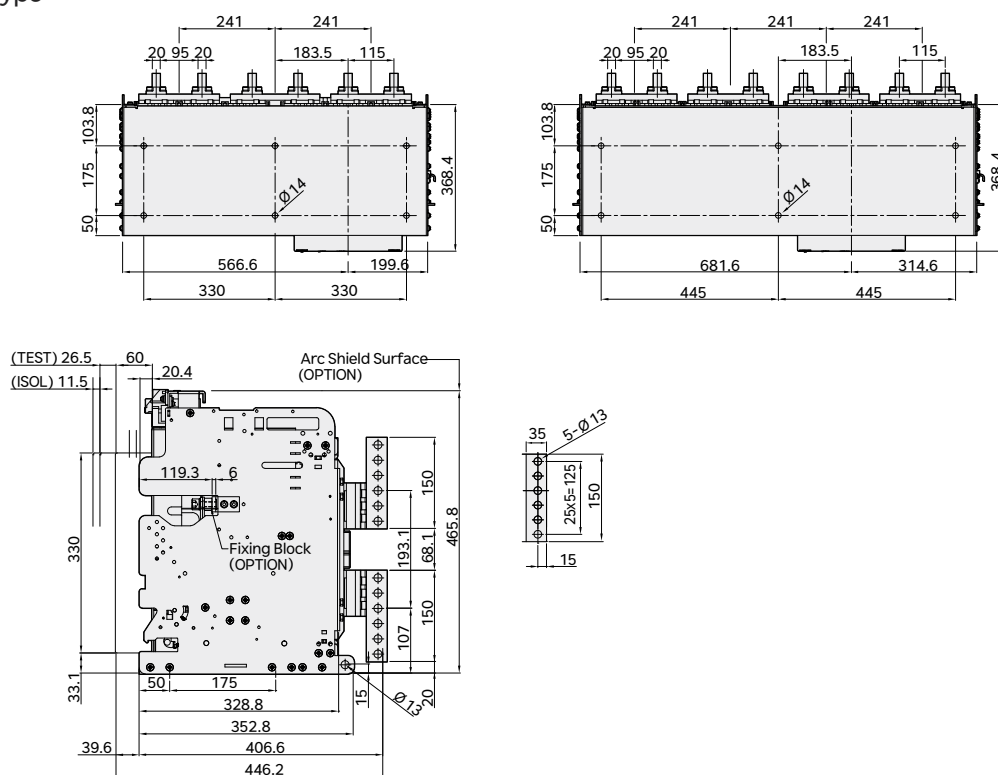
HGN Draw-Out Type 5,000 ~ 6,300 A (HGN50 ~ 63 D Frame)

Unit: mm

Front



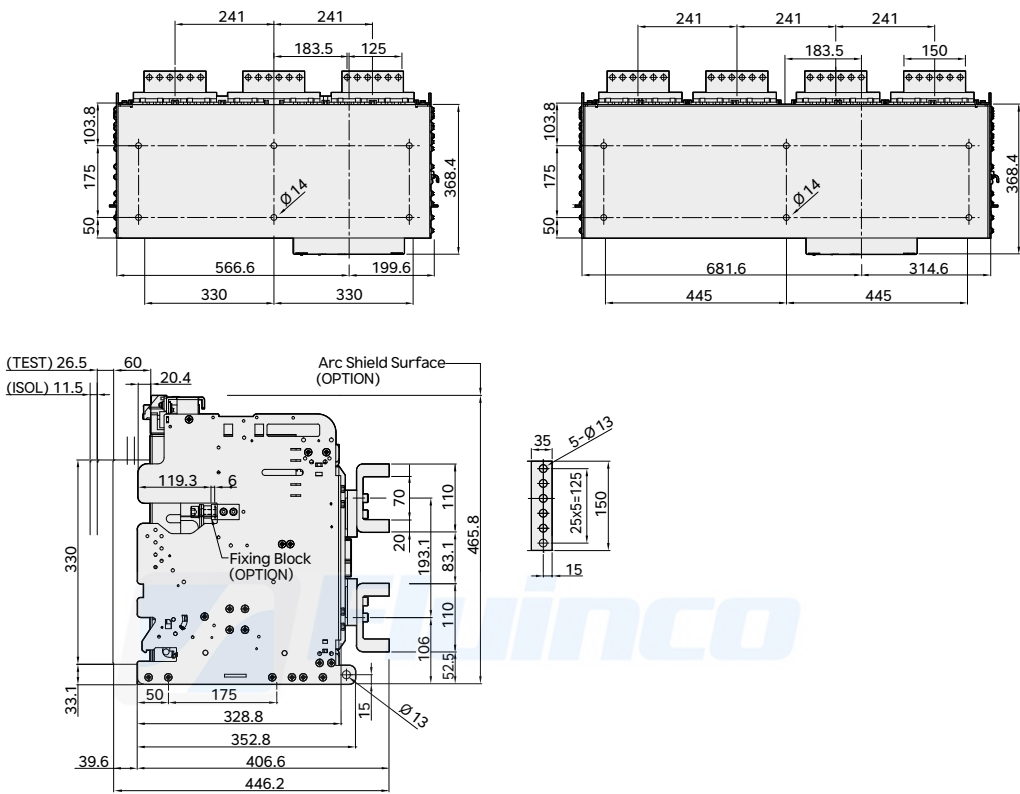
Vertical Type



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

Unit : mm

Horizontal Type



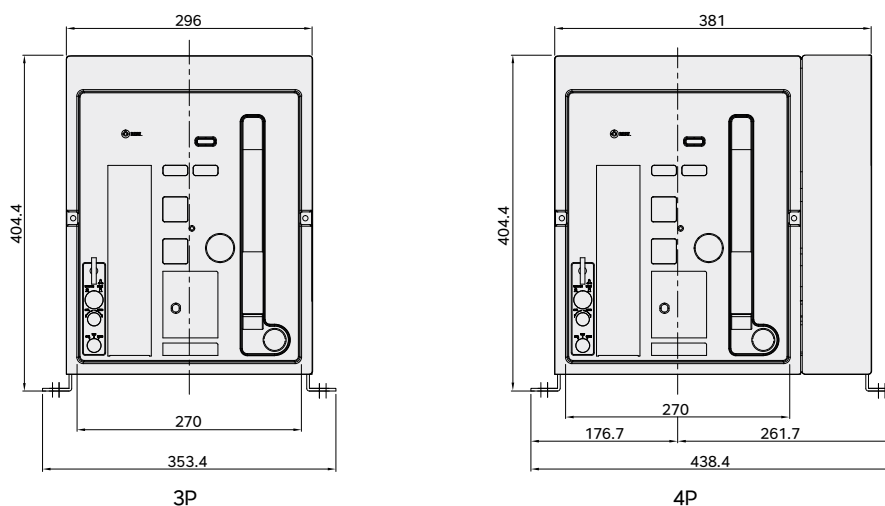
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Dimensions

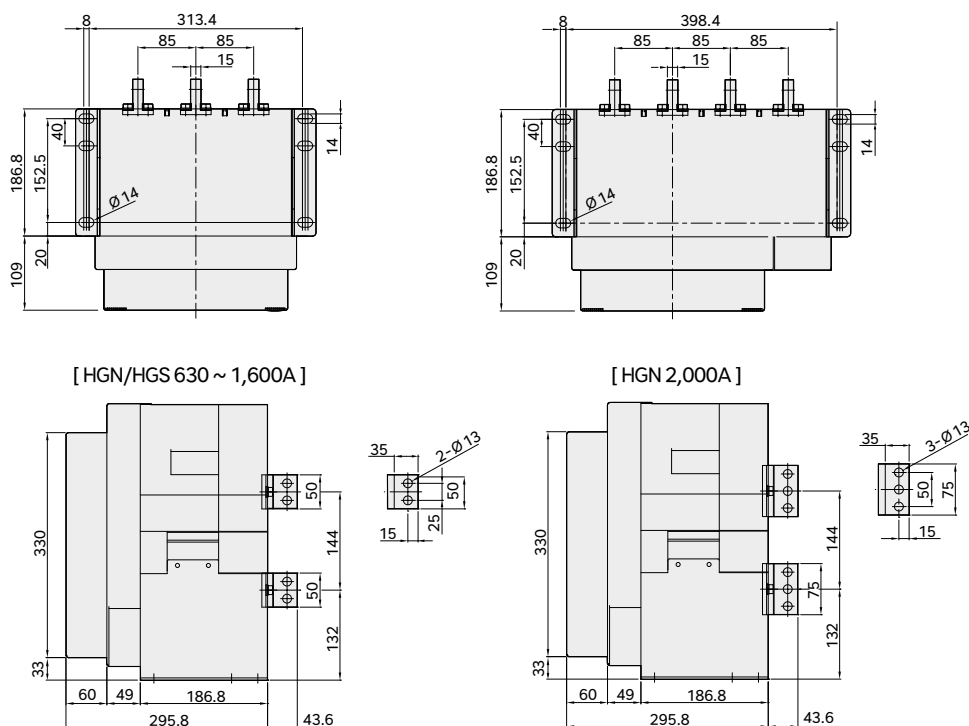
HGN Fixed Type 630~2,000A (HGN06~20 P Frame)

Unit : mm

Front



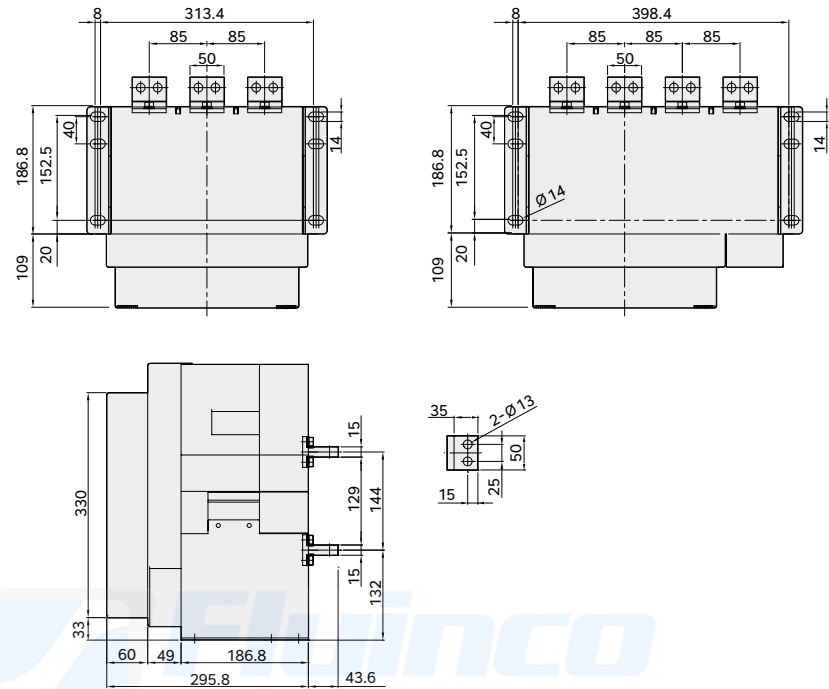
Vertical Type



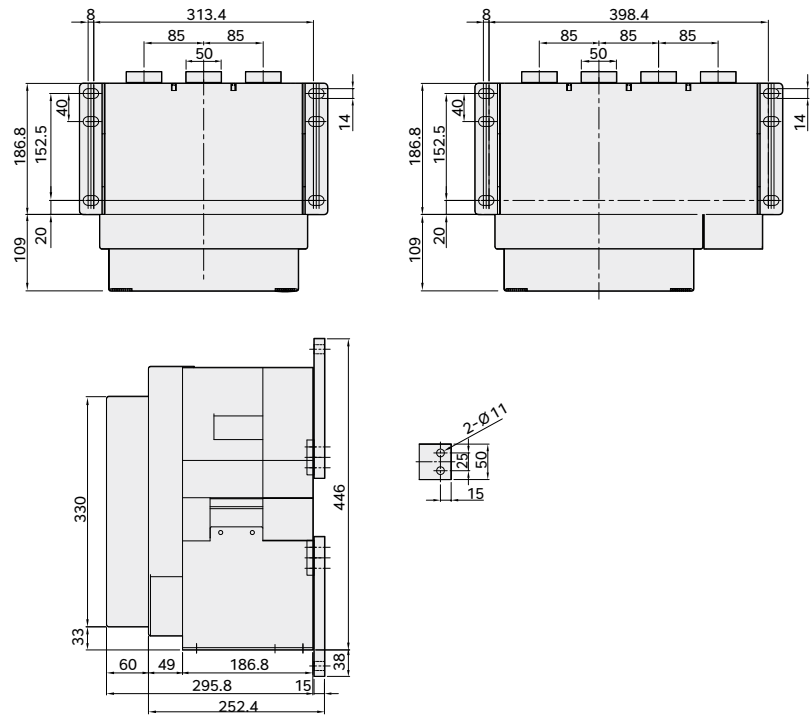
※ The drawing dimension of this page may be subject to change without prior notice.
As for the HGN fixed type P type 2,000 A, only the vertical terminal can be applicable.

Unit : mm

Horizontal Type (630 ~ 1,600A)



Flat Type (630 ~ 1,600A)



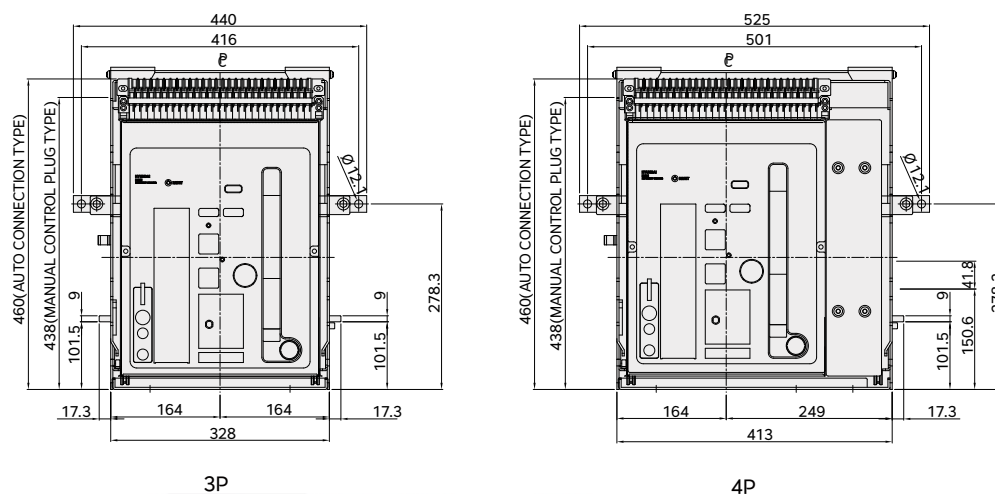
※ The drawing dimension of this page may be subject to change without prior notice.

Dimensions

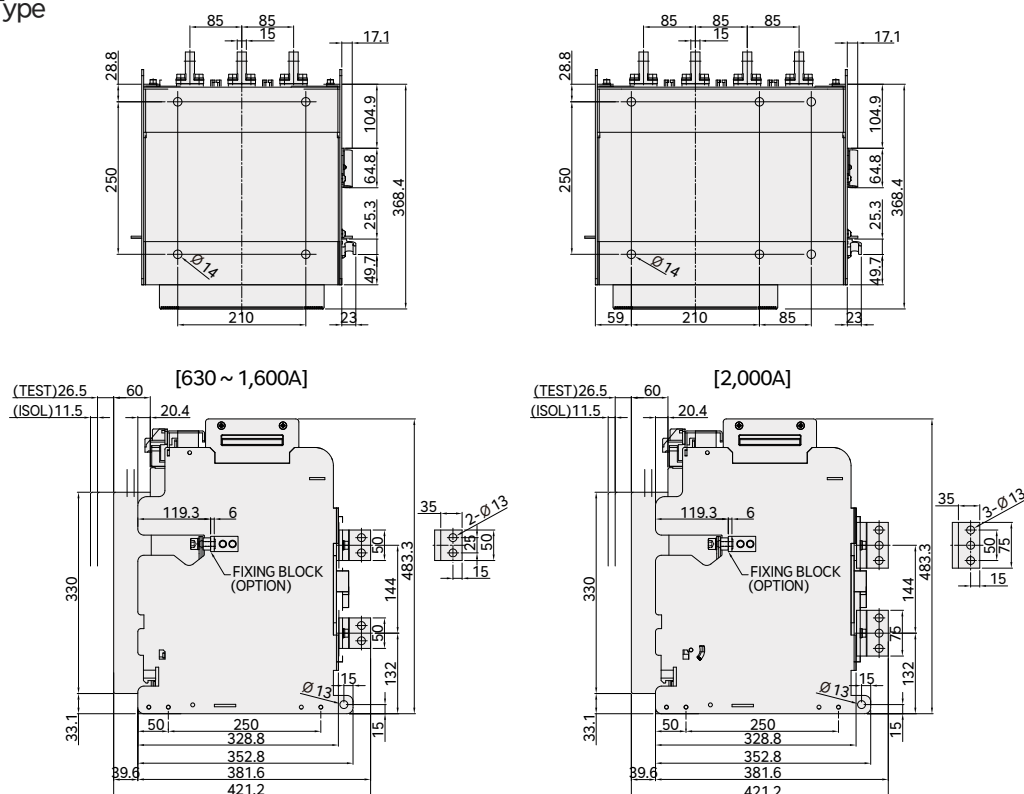
HGN Draw-Out Type 630~2,000A (HGN06~20 P Frame)

Unit : mm

Front



Vertical Type



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

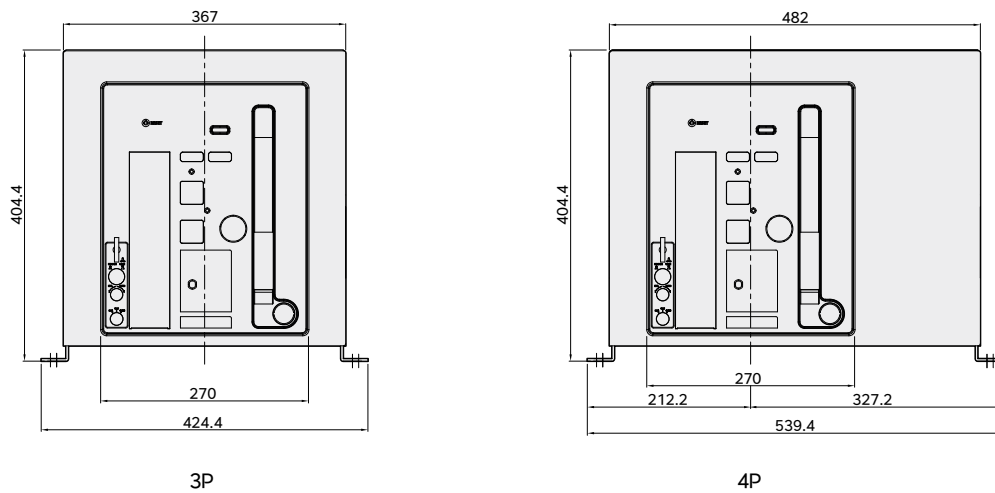
As for the HGN draw-out type P type 2,000 A, only the vertical terminal can be applicable.

Dimensions

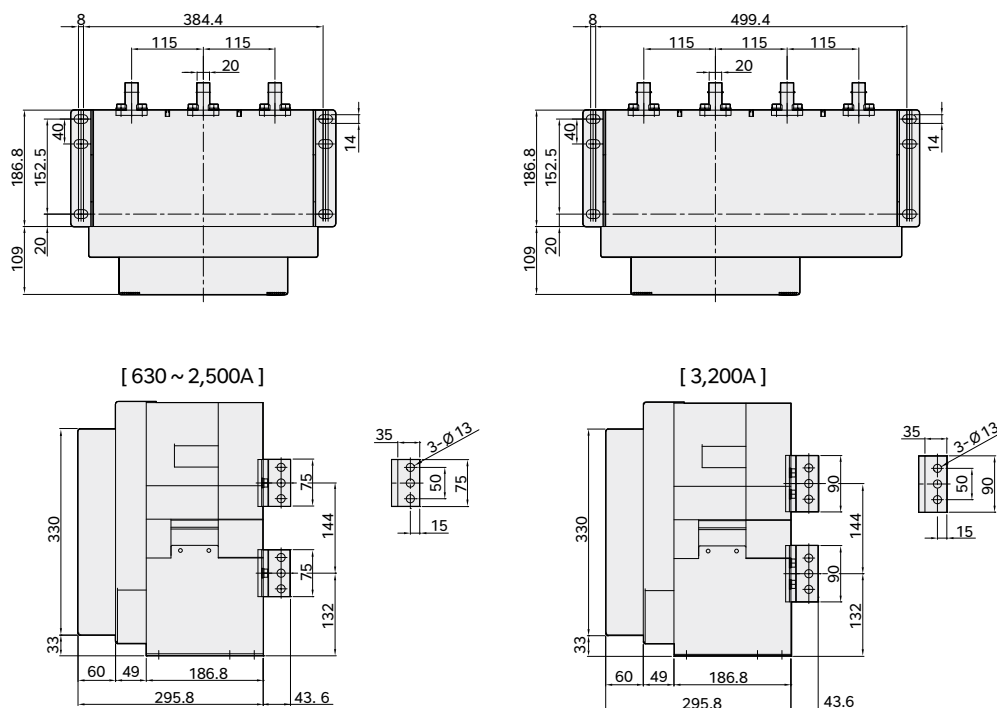
HGN Fixed Type 630~3,200A (HGN06~32 Q Frame)

Unit : mm

Front



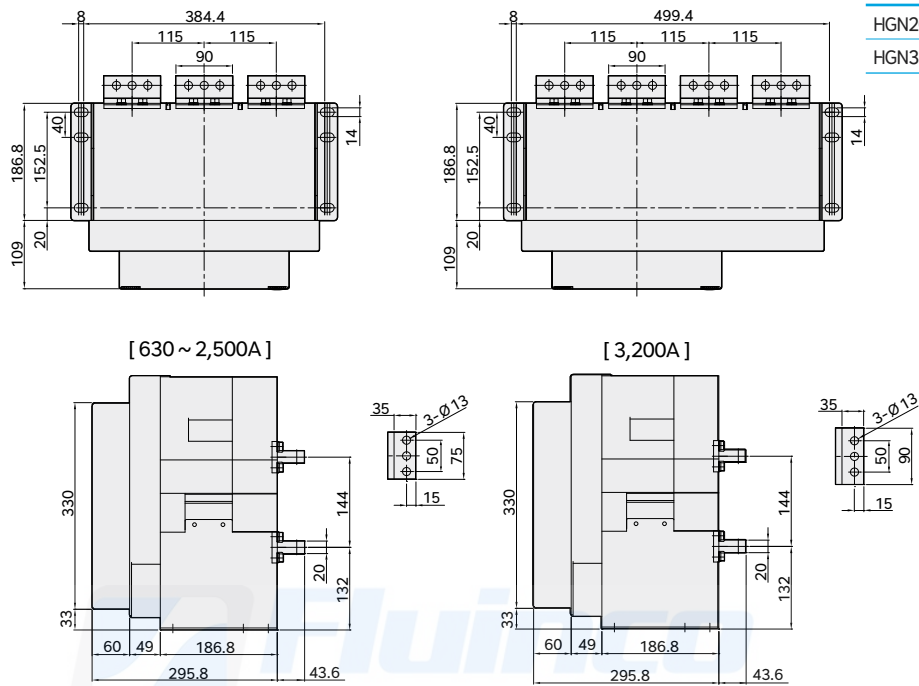
Vertical Type



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

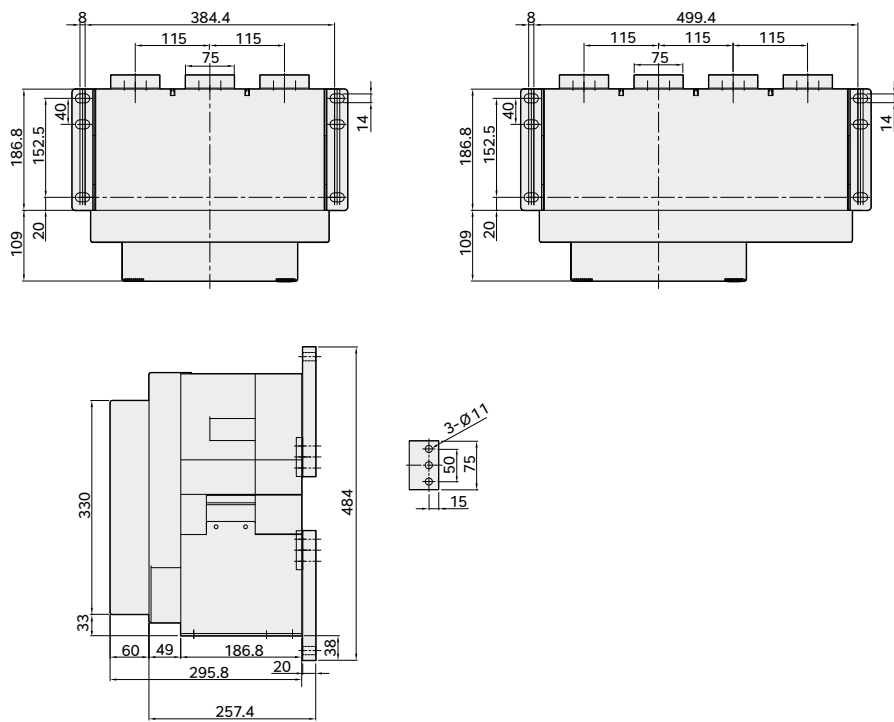
Unit : mm

Horizontal Type



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

Flat Type



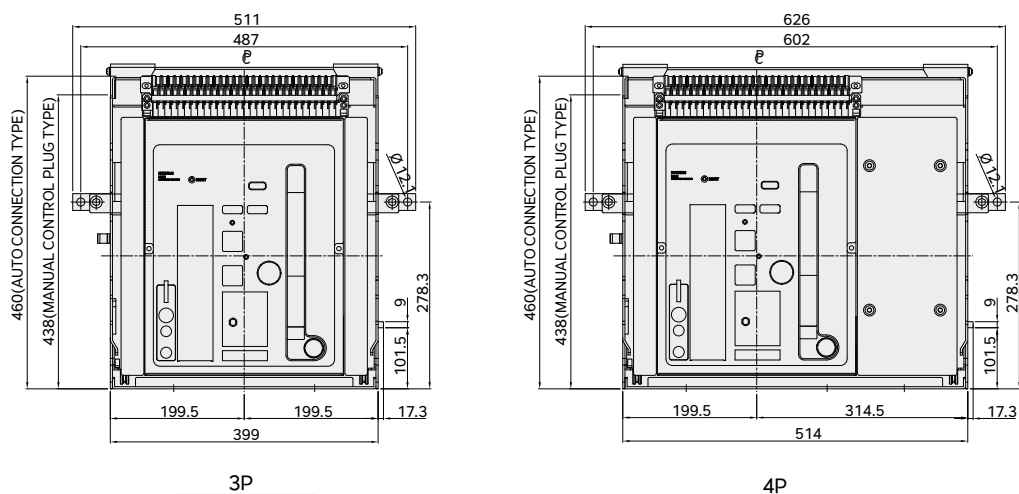
※ The drawing dimension of this page may be subject to change without prior notice.

Dimensions

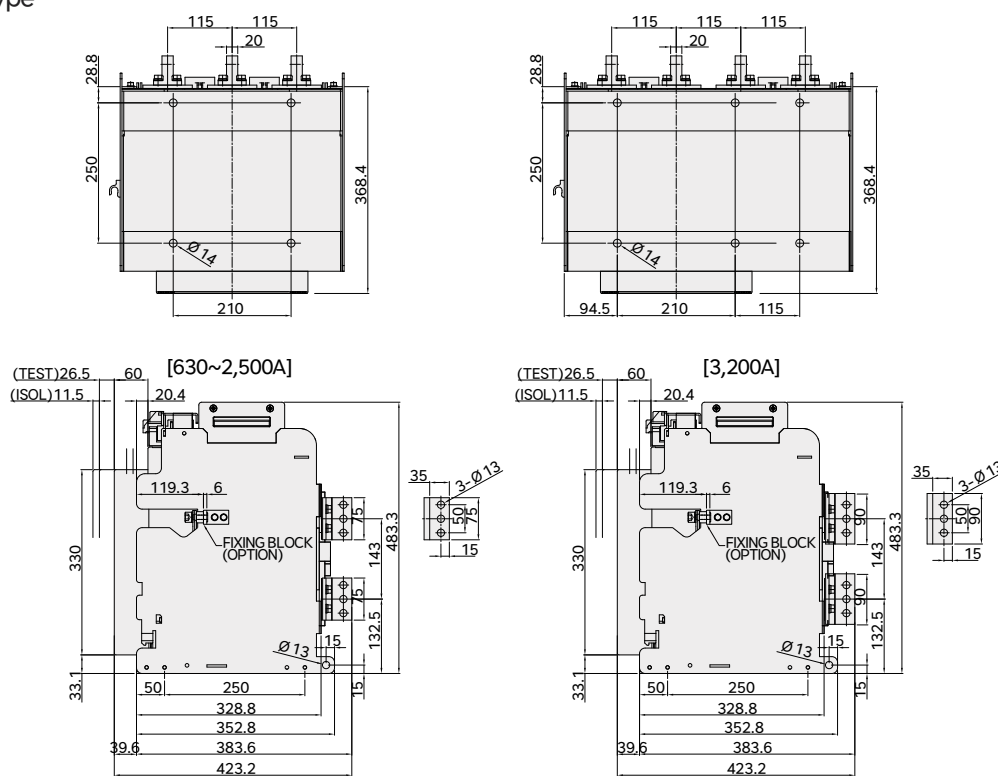
HGN Draw-Out Type 630~3,200A (HGN06~32 Q Frame)

Unit: mm

Front



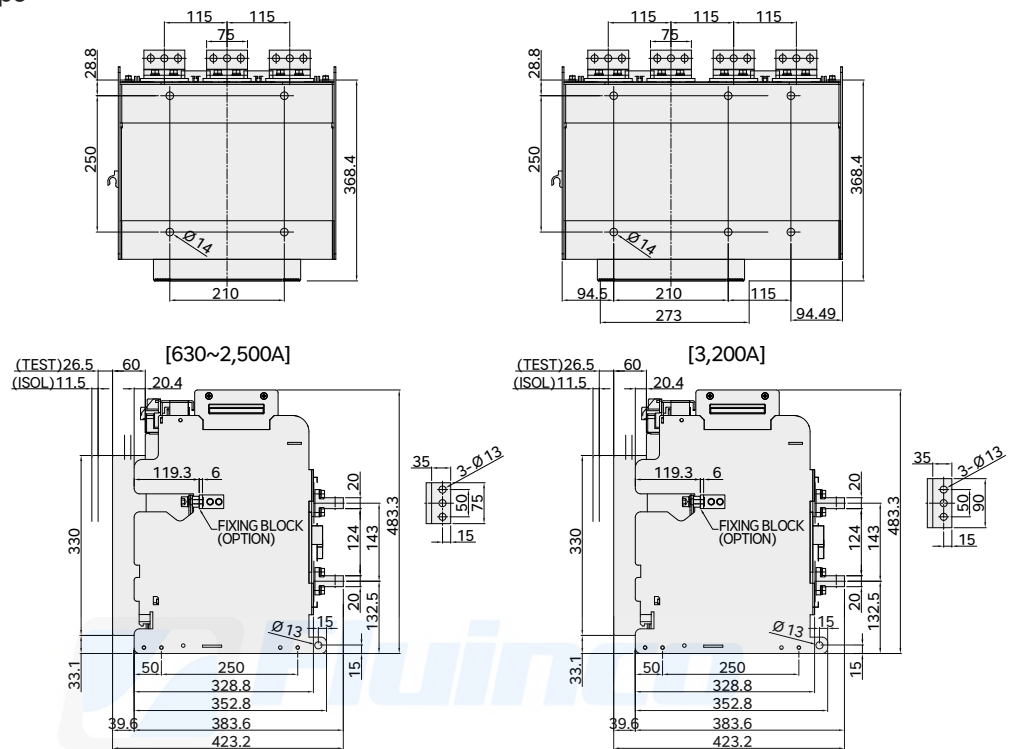
Vertical Type



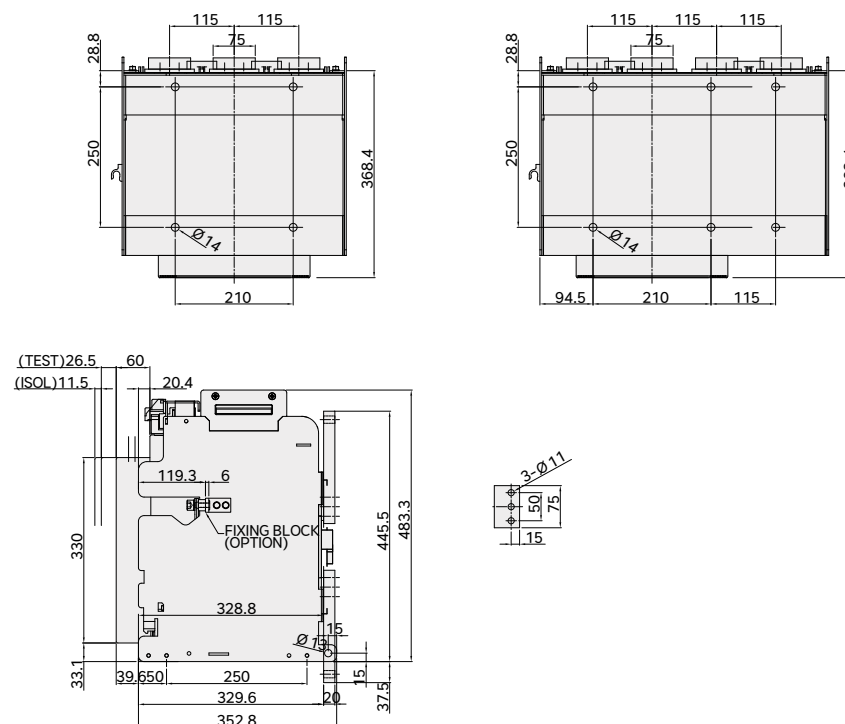
※ The drawing dimension of this page may be subject to change without prior notice.

Unit : mm

Horizontal Type



Flat Type



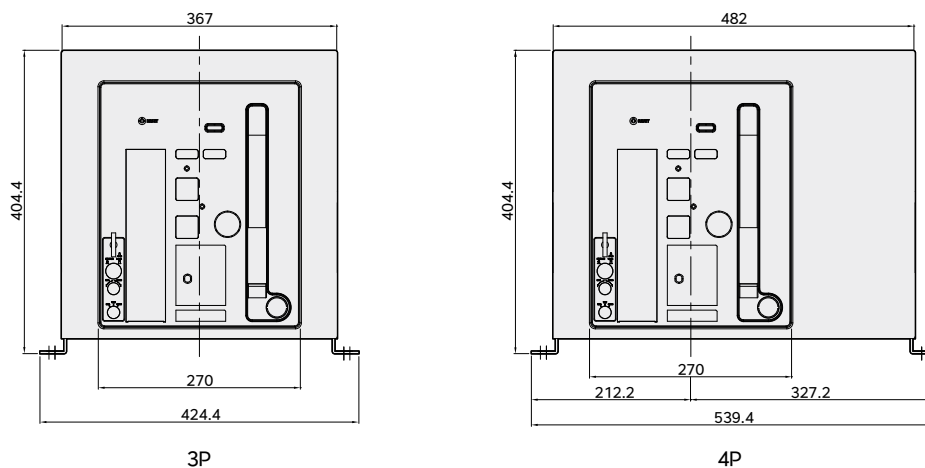
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Dimensions

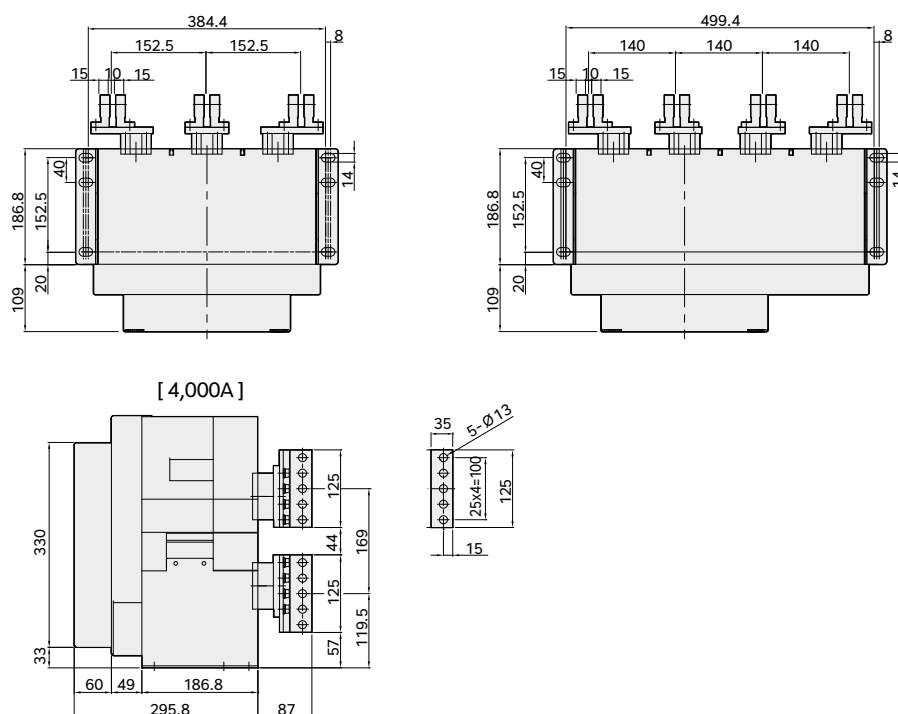
HGN Fixed Type 4,000A (HGN40 Q Frame)

Unit : mm

Front



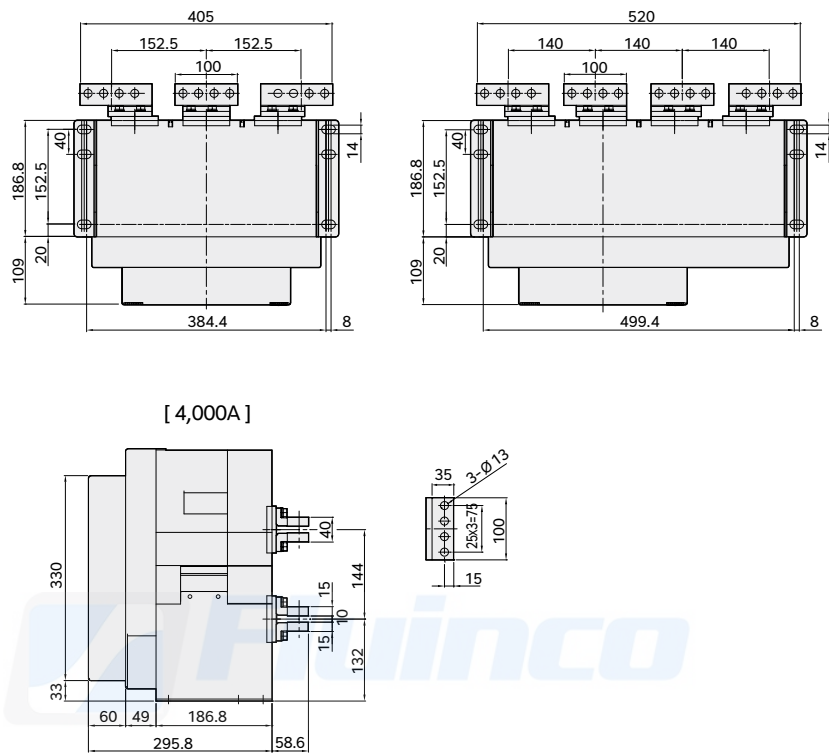
Vertical Type



※ 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.

Unit : mm

460(AUTO CONNECTION TYPE)
438(MANUAL CONTROL PLUG TYPE)

511
487
φ
12.1
101.5
9
278.3
199.5
199.5
399
17.3

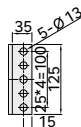
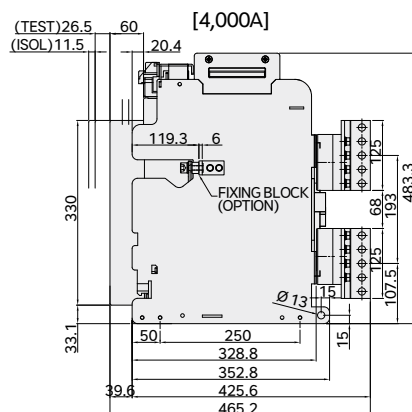
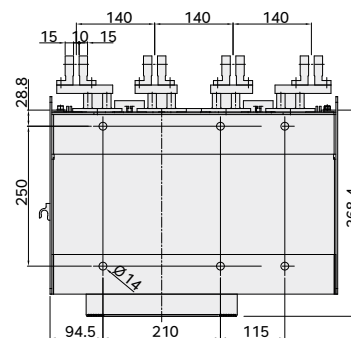
460(AUTO CONNECTION TYPE)
438(MANUAL CONTROL PLUG TYPE)

626
602
 ϕ

101.5
9
278.3

199.5
314.5
514
17.3

1:2

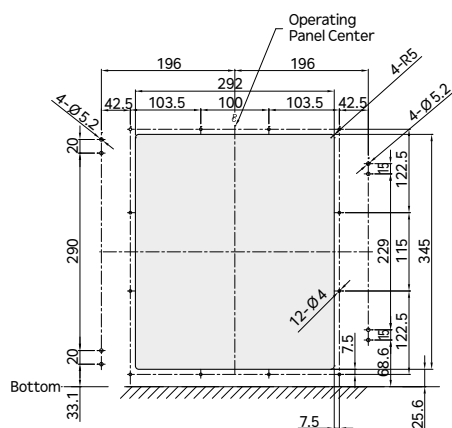


Dimensions

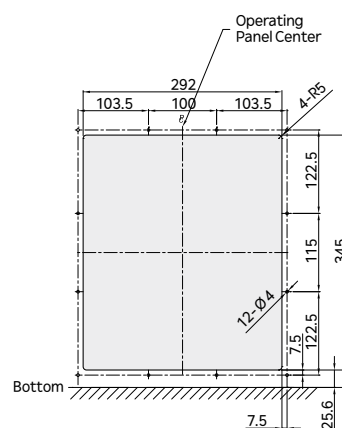
Panel Cutting Dimension of HGS/HGN Fixed Type

Unit: mm

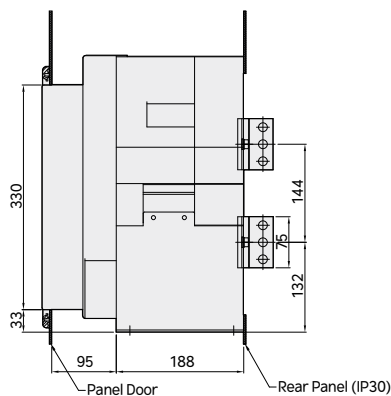
Panel Door Cut-Out (For Dust Cover)



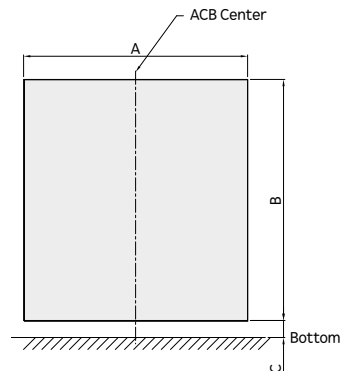
Panel Door Cut-Out (For Door Flange)



Side View



Rear Panel Cutting Size (For IP30)



Detailed Dimensions of Real Panel Cutting

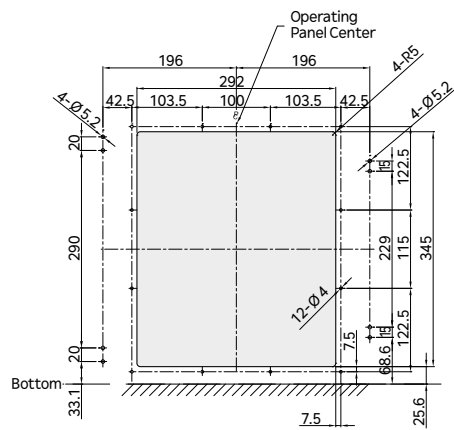
Model Name	A	B	C
HGN 06A3 ~ 20A3, HGS 06A3 ~ 16A3, HGN 06P3 ~ 20P3	283	355	25
HGN 06A4 ~ 20A4, HGS 06A4 ~ 16A4, HGN 06P4 ~ 20P4	368	355	25
HGN 06B3 ~ 40B3, HGS 20B3 ~ 32B3, HGN 06Q3 ~ 40Q3	354	355	25
HGN 06B4 ~ 40B4, HGS 20B4 ~ 32B4, HGN 06Q4 ~ 40Q4	469	355	25
HGN 32C3 ~ 50C3	579	355	25
HGN 32C4 ~ 50C4	749	355	25

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

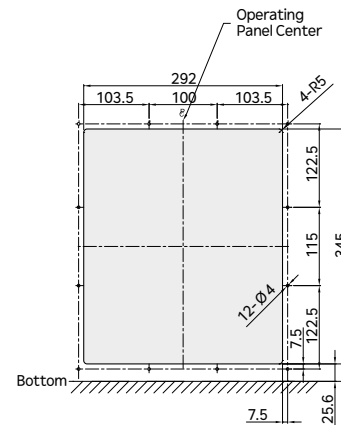
Panel Cutting Dimension of HGS/HGN Draw-Out Type

Unit : mm

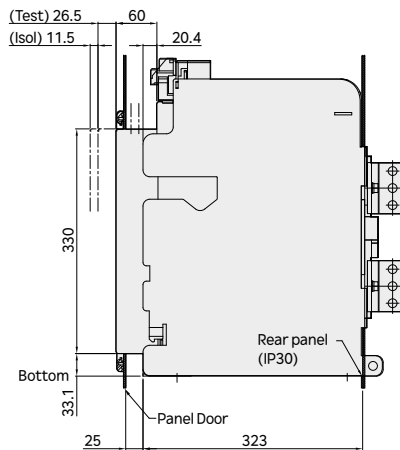
Panel Door Cut-Out (For Dust Cover)



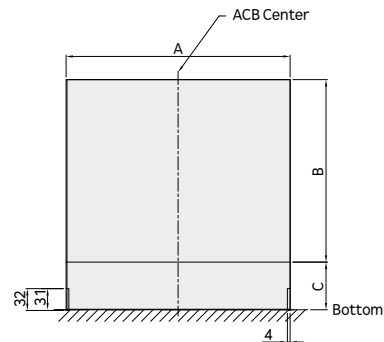
Panel Door Cut-Out (For Door Flange)



Side View



Rear Panel Cutting Size (For IP30)

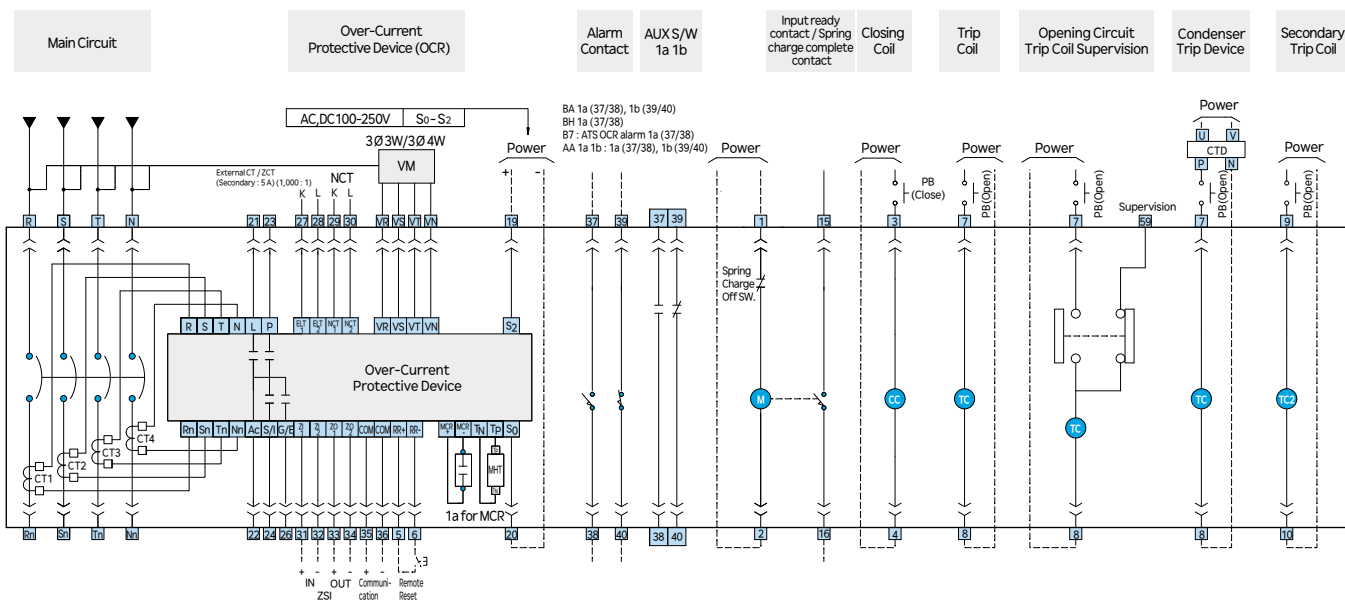


Detailed Dimensions of Real Panel Cutting

Model Name	A	B	C
HGN 06A3 ~ 20A3, HGS 06A3 ~ 16A3, HGN 06P3 ~ 20P3	329	268	70
HGN 06A4 ~ 20A4, HGS 06A4 ~ 16A4, HGN 06P4 ~ 20P4	414	268	70
HGN 06B3 ~ 40B3, HGS 20B3 ~ 32B3, HGN 06Q3 ~ 40Q3	400	298	55
HGN 06B4 ~ 40B4, HGS 20B4 ~ 32B4, HGN 06Q4 ~ 40Q4	515	298	55
HGN 32C3 ~ 50C3	625	338	35
HGN 32C4 ~ 50C4	795	338	35

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

Circuit Diagrams



Terminal symbol

CT	Transformer
L	Normally open contact
PT	Standby alarm
G	Fault contact
S/I	Instantaneous / Time-delay contact
Ac	Common contact
NCT	Neutral Current Transformer (NCT) input
ZI	Zone Selective Interlock Input
ZO	Zone Selective Interlock Output
MCR +	MCR input terminal
Tp / Tn	MCR output terminal
M	Charging motor
CC	Closing coil
TC	Trip coil
UVT	Under-voltage trip coil
MHT	Magnetic Hold Trigger
SO/S2	OCR power supply

Terminal symbol

1 2	Charging motor power supply
3 4	Closing coil power supply
5 6	Remote Reset
7 8	Trip coil power supply
9 10	UVT Coil power supply
15 16	Spring charge switch
19 20	OCR control power supply
22 21	LTD contact
22 23	Standby/temperature alarm contact
22 24	Instantaneous/time-delay contact
22 26	Fault/leakage contact
27 28	ELT (CT/ZCT) input terminal
29 30	NCT (Neutral Current Transformer) input terminal
31~34	ZSI (Zone Selective Interlock)
35 36	Communication (RS485)
41~60	Auxiliary contact
61~93	Position switch

• RR : Remote Reset • VM : Voltage Module • VR ~ VN : Voltage phase input
• R ~ N : Current input • Rn ~ Nn : Current input

— Manufacturer's wiring ---- Customer's wiring << Automatic connection (Draw-Out Type)

*Please refer to pages 31 to 34 for the circuit diagram according to the type of protective relay (OCR).

Order Code

HGN Type

HGN		12		A		3		J		M2	
Model Name		Rated Frame		Frame Category & Neutral Pole		No. of Poles		Mounting Method		Charging Motor Power	
HGN	Air Circuit Breakers	6	630 A	A	630 ~ 2,000 AF 3/4P Standard RST (N)	3	3 Pole	Independent Release of Draw-Out Type (Control Power) of Main Unit		M0	Manual Type
		8	800 A			4	4 Pole			M1	AC/DC 110 V
10		1,000 A	W	630 ~ 2,000 AF 4P Reverse Phase NRST			A	Auto Connection	M2	AC/DC 220 V	
12		1,250 A					J	Manual Connection	M7	DC 24 V	
16		1,600 A							M8	DC 48 V	
20		2,000 A ¹⁾					M9	DC 125 V			
							Fixed Type (Terminal Form)				
6		630 A	B	630 ~ 4,000 AF 3/4P Standard RST (N)			H	Horizontal Type			
8		800 A					V	Vertical Type			
10		1,000 A					T	Upper Side : Horizontal/ Lower Side : Vertical			
12		1,250 A					L	Upper Side : Vertical/ Lower Side : Horizontal			
16		1,600 A	X	630 ~ 4,000 AF 4P Reverse Phase NRST			P ²⁾ Front Type and Mounting Type Selected by Customer				
20		2,000 A									
25		2,500 A									
32		3,200 A									
40		4,000 A	C	3,200 ~ 5,000 AF 3/4P Standard RST (N)							
32		3,200 A					B	Auto Connection + Horizontal Type			
40		4,000 A					C	Auto Connection + Vertical Type			
50		5,000 A	Y	3,200 ~ 5,000 AF 4P Reverse Phase NRST			D	Auto Connection + Upper Side : Horizontal / Lower Side : Vertical			
40		4,000 A	D	4,000 ~ 6,300 AF 3/4P Standard RST (N)			E	Auto Connection + Upper Side : Vertical / Lower Side : Horizontal			
50		5,000 A					G ²⁾	Auto Connection + Front Type/Mounting Type Selected by Customer			
63		6,300 A	Z	4,000 ~ 6,300 AF 4P Reverse Phase NRST			K	Manual Connection + Horizontal Type			
						M	Manual Connection + Vertical Type				
						N	Manual Connection + Upper : Horizontal/ Lower : Vertical				
						Q	Manual Connection + Upper Side : Vertical/ Lower Side : Horizontal				
						R ²⁾	Manual Connection + Front Type/Mounting Type Selected by Customer				

※ 1) A frame, 2,000 A is only available for vertical terminal bus bar arrangement.

2) P, G, R type of fixed terminal bus bar arrangement should be ordered per terminal and mounted personally.
(Refer to the additional components). Applicable frames are A06 ~ 16, B06 ~ 32.

3) CT for Over-Current

- A/W Frame : 200 ~ 2,000 A

- B/X Frame : 400 ~ 4,000 A

- C/Y Frame : 3,200 ~ 5,000 A

- D/Z Frame : 4,000 ~ 6,300 A

4) When applying OCR high-end type P, H type, place an order for voltage module (HGNS VM) additionally for mounting.

C2		S2		61		K		AB			
Closing Coil		Trip Coil		Over-Current Trip		CT ³⁾		Parts for Main Unit		Parts Mounted on Cradle (Only Applicable when Placing an Order for Combination Type)	
C0	N/A	S0	N/A	General Feeder		O	OCR N/A	INST (UVT Coil)		Time Delay Type (UVT Coil + UVT Controller)	
C1	AC/DC 110 V	S1	AC/DC 110 V	00	N/A	O	200 A	U1	AC/DC 110 V	V1	AC/DC 110 V
C2	AC/DC 220 V	S2	AC/DC 220 V	50 Hz		V	320 A	U2	AC/DC 220 V	V2	AC/DC 220 V
C3	AC 380 V	S3	AC 380 V	50	GPR-LN	E	400 A	U3	AC 380 V	V3	AC 380 V
C4	AC 440 V	S4	AC 440 V	51	GPR-LA	T	630 A	U4	AC 440 V	V4	AC 440 V
C7	DC 24 V	S7	DC 24 V	52	GPR-LAG	H	800 A	U7	DC 24 V	V9	DC 125 V
C8	DC 48 V	S8	DC 48 V	54	GPR-LP ⁴⁾	J	1,000 A	U8	DC 48 V		
C9	DC 125 V	S9	DC 125 V	55	GPR-LH ⁴⁾	K	1,250 A	U9	DC 125 V	Position S/W	
		Trip Supervision Coil		60 Hz		L	1,600 A			AQ	Test 1C, Connected 1C
		T1	AC/DC 110 V	60	GPR-LN	M	2,000 A	Secondary Trip Coil		AR	Connected 2C
		T2	AC/DC 220 V	61	GPR-LA	N	2,500 A	S1	AC/DC 110 V	AS	Test 2C
		T3	AC 380 V	62	GPR-LAG	P	3,200 A	S2	AC/DC 220 V	AT	Isolated 1C, Inserted 1C
		T4	AC 440 V	64	GPR-LP ⁴⁾	Q	4,000 A	S3	AC 380 V	AU	Inserted 2C
		T7	DC 24 V	65	GPR-LH ⁴⁾	S	5,000 A	S4	AC 440 V	AV	Isolated 2C
		T8	DC 48 V	Generator		X	6,300 A	S7	DC 24 V	P4	Test 2C, Connected 2C
		T9	DC 125 V	50 Hz				S8	DC 48 V	PT	Test 4C
				57	GPR-SN			S9	DC 125 V	PS	Isolated 1C, Test 1C, Connected 2C
				58	GPR-SA					PQ	Inserted 1C, Isolated 1C, Test 1C, Connected 1C
				59	GPR-SP ⁴⁾			AM	On/Off Button Lock Device		
				60Hz				AA	Auxiliary Switch (Additional 1a 1b)	P8	Inserted 2C, Isolated 2C, Test 2C, Connected 2C
				67	GPR-SN			AB	Key Lock Device (Prevent ON)	PR	Inserted 1C, Isolated 1C, Test 3C, Connected 3C
				68	GPR-SA			B8	OCR MCR		
				69	GPR-SP ⁴⁾			BR	OCR Manual Reset Function	BC	Auto Connection Control Terminal's Safety Cover
								BA	OCR Manual Reset & Alarm S/W 1a1b	MC	External Auxiliary Contact (MOC) 10a10b
								BH	CR Manual Reset + High Capacity Alarm S/W 1a	AK	Short "b" Contact
								B0	Mechanical Interlock Device	AE	Safety Shutter
								B6	Spring Charge Switch	AX	Arc Shield
								AG	Door Flange	AF	Fixing Block
								BT	Closing Preparation Contact (B6 and CT cannot be Combined)	AW	Miss Insertion Preventer
								MR	Marine Switchgear	TM	Temperature Sensor Bracket
								D0	Door Interlock	ATS Production	
										BAB7	Emergency Power Transfer
										MR	Marine Switchgear

- U□ is only applicable when instantaneous type and only the UVT coil is installed. When using time delay type, place a separate order for the time delay type of controller (HGNS ~) and install externally.
- V□ is only applicable when time delay type is applied and the UVT coil is installed in the main unit while the time delay type of controller is installed at the side of the cradle. In case of dimension issues, place an order for HGNS V□ for separate installation.
- When S□ Secondary trip is applied, UVT coil cannot be applied at the same time.
- When using T□ trip coil monitoring contact, it becomes 4a4b and when using MCR function of B8 OCR, it can be used as 4a5b. When both functions are applied, 3a4b can be possible.
- In the order code for the main unit only (A/J/Fixed type), combination with cradle accessories is not possible and the cradle accessory arrangement is only possible when purchased with cradle arrangement. For the independent release of the main unit, place a separate order (HGNS ~) (refer to additional components).
- Position switch cannot be overlapped for use and can only be attached only at the right side of cradle. In case a combination other than the combination indicate is required, make an inquiry separately.
- Mechanical interlock device (B0), external auxiliary contact (MC), fixing block (AF) and Door Interlock (D0) cannot be used together.
- BC : The control terminal's safety cover is only available for the auto connection.
- AK : Short "b" is only available for auto connection and is attached to 51, 52. It can be attached as much as the number of "B" contact so upon additional mounting, place a separate order (HGNS ~).
- AG : Originally, it is attached separately but upon release, the front cover is inserted when shipped.
- AA and BA (BH) cannot be attached at the same time.

- U□ is only applicable when instantaneous type and only the UVT coil is installed. When using time delay type, place a separate order for the time delay type of controller (HGNS ~) and install externally.
- V□ is only applicable when time delay type is applied and the UVT coil is installed in the main unit while the time delay type of controller is installed at the side of the cradle. In case of dimension issues, place an order for HGNS V□ for separate installation.
- When S□ Secondary trip is applied, UVT coil cannot be applied at the same time.
- When using T□ trip coil monitoring contact, it becomes 4a4b and when using MCR function of B8 OCR, it can be used as 4a5b. When both functions are applied, 3a4b can be possible.
- In the order code for the main unit only (A/J/Fixed type), combination with cradle accessories is not possible and the cradle accessory arrangement is only possible when purchased with cradle arrangement. For the independent release of the main unit, place a separate order (HGNS ~) (refer to additional components).
- Position switch cannot be overlapped for use and can only be attached only at the right side of cradle. In case a combination other than the combination indicate is required, make an inquiry separately.
- Mechanical interlock device (B0), external auxiliary contact (MC), fixing block (AF) and Door Interlock (D0) cannot be used together.
- BC : The control terminal's safety cover is only available for the auto connection.
- AK : Short "b" is only available for auto connection and is attached to 51, 52. It can be attached as much as the number of "B" contact so upon additional mounting, place a separate order (HGNS ~).
- AG : Originally, it is attached separately but upon release, the front cover is inserted when shipped.
- AA and BA (BH) cannot be attached at the same time.
- UVT and Secondary Trip Coil cannot be attached at the same time.

Order Code

HGN (When Placing an Order for the Cradle)

DHN		12	A	3	A	H	AE														
Model Name		Rated Frame		Frame Category & Neutral Pole		No. of Poles		Control Terminal Connection		Terminal Bus Bar Arrangement		Accessories									
DHN	Air Circuit Breakers Cradle	16	DHN06 ~ 16A (W)	A	630 ~ 1,600 A 3/4P Standard RSTN Reverse Phase NRST	3	3 Pole	A	Auto Connection	H	Horizontal Type	AE	Safety Shutter								
		20	DHN20A (W) ¹⁾			4	4 Pole			V	Vertical Type										
		25	DHN06 ~ 25B (X)			B		J	Manual Connection	T	Upper Side : Horizontal/ Lower Side : Vertical										
		32	DHN32B (X)							L	Upper Side : Vertical/ Lower Side : Horizontal										
		40	DHN40B (X)								Front Type and Mounting Type Selected by Customer										
		50	DHN32 ~ 50C (Y)	C	3,200 ~ 5,000 A 3/4P Standard RSTN Reverse Phase NRST	D				p ²⁾											
		40	DHN40D (Z)																		
		63	DHN50 ~ 63D (Z)																		
				D	4,000 ~ 6,300 A 3/4P Standard RSTN Reverse Phase NRST																

※ Marking upon Shipping of Cradle

- DHN06/08/10/12/16A (W) > DHN06 ~ 16A (W)
- DHN20A (W) > DHN20A (W)
- DHN06/08/10/12/16/20/25B (X) > DHN06 ~ 25B (X)
- DHN32B (X) > DHN32B (X)
- DHN40B (X) > DHN40B (X)
- DHN32/40/50C (Y) > DHN32 ~ 50C (Y)
- DHN40/50D (Z) > DHN40 ~ 50D (Z)

※ ¹⁾ A frame, 2,000 A is only available for vertical terminal bus bar arrangement.

²⁾ P type of fixed terminal bus bar arrangement should be ordered per terminal and mounted personally. (Refer to the additional components).

Applicable frames are A06 ~ 16, B06 ~ 32.



Order Code

HGS Type

HGS		12		A		3		J		M2	
Model Name		Rated Frame		Frame Category & Neutral Pole		No. of Poles		Mounting Method		Charging Motor Power	
HGS	Air Circuit Breakers	6	630 A	A	630 ~ 1,600 AF 3/4P Standard RST (N)	3	3 Pole	Independent Release of Draw-Out Type (Control Power) of Main Unit			
		8	800 A			4	4 Pole				
		10	1,000 A			W	630 ~ 1,600 AF 4P Reverse Phase NRST	Fixed Type (Terminal Form)			
		12	1,250 A								
		16	1,600 A								
		20	2,000 A	B	2,000 ~ 3,200 AF 3/4P Standard RST (N)	H	Horizontal Type				
		25	2,500 A			V	Vertical Type				
		32	3,200 A			X	2,000 ~ 3,200 AF 4P Reverse Phase NRST	T	Upper Side : Horizontal/ Lower Side : Vertical		
								L	Upper Side : Vertical/ Lower Side : Horizontal		
								P ¹⁾	Front Type and Mounting Type Selected by Customer		
						Draw-Out Type (Combined with Cradle)					
						B	Auto Connection + Horizontal Type				
						C	Auto Connection + Vertical Type				
						D	Auto Connection + Upper Side : Horizontal/ Lower Side : Vertical				
						E	Auto Connection + Upper Side : Vertical/ Lower Side : Horizontal				
						G ¹⁾	Auto Connection + Front Type/Mounting Type Selected by Customer				
						K	Manual Connection + Horizontal Type				
						M	Manual Connection + Vertical Type				
						N	Manual Connection + Upper Side : Horizontal/ Lower Side : Vertical				
						Q	Manual Connection + Upper Side : Vertical/ Lower Side : Horizontal				
						R ¹⁾	Manual Connection + Front Type/Mounting Type Selected by Customer				

※ 1) P, G, R type of fixed terminal bus bar arrangement should be ordered per terminal and mounted personally. (Refer to the additional components).

2) O, V can only be applicable to frame A.

- B frame can be applied above 400 A of CT.

3) When applying LP type of OCR, place an order for the voltage module (HGNS VM) additional for mounting.

C2		S2		61		K		AB	
Closing Coil		Trip Coil		Over-Current Trip		CT ²⁾		Parts for Main Unit	
C0	N/A	S0	N/A	General Feeder		0	OCR N/A	INST (UVT Coil)	
C1	AC/DC 110 V	S1	AC/DC 110 V	00	N/A	O	200 A	U1	AC/DC 110 V
C2	AC/DC 220 V	S2	AC/DC 220 V	50 Hz		V	320 A	U2	AC/DC 220 V
C3	AC 380 V	S3	AC 380 V	50	GPR-LN	E	400 A	U3	AC 380 V
C4	AC 440 V	S4	AC 440 V	51	GPR-LA	T	630 A	U4	AC 440 V
C7	DC 24 V	S7	DC 24 V	52	GPR-LAG	H	800 A	U7	DC 24 V
C8	DC 48 V	S8	DC 48 V	54	GPR-LP ³⁾	J	1,000 A	U8	DC 48 V
C9	DC 125 V	S9	DC 125 V	60 Hz		K	1,250 A	U9	DC 125 V
				60	GPR-LN	L	1,600 A	Secondary Trip Coil	
				61	GPR-LA	M	2,000 A	S1	AC/DC 110 V
				62	GPR-LAG	N	2,500 A	S2	AC/DC 220 V
				64	GPR-LP ³⁾	P	3,200 A	S3	AC 380 V
								S4	AC 440 V
								S7	DC 24 V
								S8	DC 48 V
								S9	DC 125 V
								AM	On/Off Button Lock Device
								AA	Auxiliary Switch (Additional 1a 1b)
								A5	Auxiliary Switch (Additional 5a 5b)
								AB	Key Lock Device (Prevent ON)
								B8	OCR MCR
								BR	OCR Manual Reset Function
								BA	OCR Manual Reset & Alarm S/W 1a1b
								BH	CR Manual Reset + High Capacity Alarm S/W 1a
								BT	Closing Preparation Contact (B6 and BT cannot be Applied Simultaneously (Overlapping Mounting))
								B6	Spring Charge Switch
								AG	Door Flange
								A5	Auxiliary Switch (5 ~ 5b)
								AQ	Test 1C, Connected 1C
								AR	Connected 2C
								AS	Test 2C
								AT	Isolated 1C, Inserted 1C
								AU	Inserted 2C
								AV	Isolated 2C
								P4	Test 2C, Connected 2C
								PT	Test 4C
								PS	Isolated 1C, Test 1C, Connected 2C
								PQ	Inserted 1C, Isolated 1C, Test 1C, Connected 1C
								P8	Inserted 2C, Isolated 2C, Test 2C, Connected 2C
								PR	Inserted 1C, Isolated 1C, Test 3C, Connected 3C
								BC	Auto Connection Control Terminal's Safety Cover
								AE	Safety Shutter
								AX	Arc Shield
								AF	Fixing Block



- □ is only applicable when instantaneous type and only the UVT coil is installed. When using time delay type, place a separate order for the time delay type of controller (HGNS ~) and install externally.

- □ is only applicable when time delay type is applied and the UVT coil is installed in the main unit while the time delay type of controller is installed at the side of the cradle. In case of dimension issues, place an order for HGNS □ for separate installation.

- When □ Secondary trip is applied, UVT coil cannot be applied at the same time.

- When using □ trip coil monitoring contact, it becomes 4a4b and when using MCR function of B8 OCR, it can be used as 4a5b. When both functions are applied, 3a4b can be possible.

- In the order code for the main unit only (A/J/Fixed type), combination with cradle accessories is not possible and the cradle accessory arrangement is only possible when purchased with cradle arrangement. For the independent release of the main unit, place a separate order (HGNS ~) (refer to additional components).

- Position switch cannot be overlapped for use and can only be attached only at the right side of cradle. In case a combination other than the combination indicate is required, make an inquiry separately.

- Mechanical interlock device (B0), external auxiliary contact (MC) and fixing block (AF) cannot be used together.

- BC : The control terminal's safety cover is only available for the auto connection.

- AK : Short "b" is only available for auto connection and is attached to 51, 52. It can be attached

- U□ is only applicable when instantaneous type and only the UVT coil is installed. When using time delay type, place a separate order for the time delay type of controller (HGNS ~) and install externally.
- V□ is only applicable when time delay type is applied and the UVT coil is installed in the main unit while the time delay type of controller is installed at the side of the cradle. In case of dimension issues, place an order for HGNS V□ for separate installation.
- When S□ Secondary trip is applied, UVT coil cannot be applied at the same time.
- When using T□ trip coil monitoring contact, it becomes 4a4b and when using MCR function of B8 OCR, it can be used as 4a5b. When both functions are applied, 3a4b can be possible.
- In the order code for the main unit only (A/J/Fixed type), combination with cradle accessories is not possible and the cradle accessory arrangement is only possible when purchased with cradle arrangement. For the independent release of the main unit, place a separate order (HGNS ~) (refer to additional components).
- Position switch cannot be overlapped for use and can only be attached only at the right side of cradle. In case a combination other than the combination indicate is required, make an inquiry separately.
- Mechanical interlock device (B0), external auxiliary contact (MC) and fixing block (AF) cannot be used together.
- BC : The control terminal's safety cover is only available for the auto connection.
- AK : Short "b" is only available for auto connection and is attached to 51, 52. It can be attached as much as the number of "B" contact so upon additional mounting, place a separate order (HGNS ~).
- AG : Originally, it is attached separately but upon release, the front cover is inserted when shipped.
- AA and BA (BH) cannot be attached at the same time.
- UVT and Secondary Trip Coil cannot be attached at the same time.

Order Code

HGN (When Placing an Order for the Cradle)

DHS		12		A		3		A		H		AE	
Model Name		Rated Frame		Frame Category & Neutral Pole		No. of Poles		Control Terminal Connection		Terminal Bus Bar Arrangement		Accessories	
DHS	Air Circuit Breakers Cradle	10	DHS06 ~ 10A (W)	A	630 ~ 1,600 A 3/4P Standard RSTN Reverse Phase NRST	3	3 Pole	A	Auto Connection	H	Horizontal Type	AE	Safety Shutter
		16	DHS12 ~ 16A (W)			4	4 Pole			V	Vertical Type		
		20	DHS20B (X)	B	2,000 ~ 3,200 A 3/4P Standard RSTN Reverse Phase NRST			J	Manual Connection	T	Upper Side : Horizontal/ Lower Side : Vertical		
		25	DHS25B (X)							L	Upper Side : Vertical/ Lower Side : Horizontal		
		32	DHS32B (X)							P ¹⁾	Front Type and Mounting Type Selected by Customer		

※ Marking upon Shipping of Cradle

- DHS06/08/10A (W) > DHS06 ~ 16A (W)
- DHS12/16A (W) > DHS12 ~ 16A (W)
- DHS20B (X) > DHS20B (X)
- DHS25B (X) > DHS25B (X)
- DHS32B (X) > DHS32B (X)

※ AE : Safety shutter lock is supplied with safety shutter.



※ 1) P type of fixed terminal bus bar arrangement should be ordered per terminal and mounted personally. (Refer to the additional components).
Applicable frames are A06 ~ 16, B06 ~ 32.



Order Code

HGN 1150V

HGN		12		A		3		J		M2	
Model Name		Rated Frame		Frame Category & Neutral Pole		No. of Poles		Mounting Method		Charging Motor Power	
HGN	Air Circuit Breakers	6	630A	P	630 ~ 2,000 AF 3/4P Standard RST (N)	3	3 Pole	Independent Release of Draw-Out Type (Control Power) of Main Unit		M0	Manual Type
		8	800A			4	4 Pole			M1	AC/DC 110V
10	1,000A	S	630 ~ 2,000 AF 4P Reverse Phase NRST					A	Auto Connection	M2	AC/DC 220V
12	1,250A							J	Manual Connection	M7	DC 24V
16	1,600A			Fixed Type (Terminal Form)				M8	DC 48V		
20	2,000A ¹⁾							M9	DC 125V		
		6	630A	Q	630 ~ 4,000 AF 3/4P Standard RST (N)	H	Horizontal Type	Draw-Out Type (Combined with Cradle)			
8	800A	V	Vertical Type								
10	1,000A	T	Upper Side : Horizontal/ Lower Side : Vertical								
12	1,250A	L	Upper Side : Vertical/ Lower Side : Horizontal								
16	1,600A	P ²⁾	Front Type and Mounting Type Selected by Customer								
20	2,000A										
25	2,500A	U	630 ~ 4,000 AF 4P Reverse Phase NRST	B	Auto Connection + Horizontal Type						
32	3,200A			C	Auto Connection + Vertical Type						
40	4,000A			D	Auto Connection + Upper Side : Horizontal / Lower Side : Vertical						
				E	Auto Connection + Upper Side : Vertical / Lower Side : Horizontal						
				G ²⁾	Auto Connection + Front Type/Mounting Type Selected by Customer						
				K	Manual Connection + Horizontal Type						
				M	Manual Connection + Vertical Type						
				N	Manual Connection + Upper : Horizontal/ Lower : Vertical						
		Q	Manual Connection + Upper Side : Vertical/ Lower Side : Horizontal								
		R ²⁾	Manual Connection + Front Type/Mounting Type Selected by Customer								

※ 1) P frame, 2,000 A is only available for vertical terminal bus bar arrangement.

2) P, G, R type of fixed terminal bus bar arrangement should be ordered per terminal and mounted personally.
(Refer to the additional components). Applicable frames are A06 ~ 16, B06 ~ 32.

3) CT for Over-Current
- P/S Frame : 200 ~ 2,000 A
- Q/U Frame : 400 ~ 4,000 A

4) When applying OCR high-end type P, H type, place an order for voltage module (HGNS VM) additionally for mounting.

C2		S2		61		K		AB			
Closing Coil		Trip Coil		Over-Current Trip		CT ³⁾		Parts for Main Unit		Parts Mounted on Cradle (Only Applicable when Placing an Order for Combination Type)	
C0	N/A	S0	N/A	General Feeder		O	OCR N/A	INST (UVT Coil)		Time Delay Type (UVT Coil + UVT Controller)	
C1	AC/DC 110 V	S1	AC/DC 110 V	00	N/A	O	200 A	U1	AC/DC 110 V	V1	AC/DC 110 V
C2	AC/DC 220 V	S2	AC/DC 220 V	50 Hz		V	320 A	U2	AC/DC 220 V	V2	AC/DC 220 V
C3	AC 380 V	S3	AC 380 V	50	GPR-LN	E	400 A	U3	AC 380 V	V3	AC 380 V
C4	AC 440 V	S4	AC 440 V	51	GPR-LA	T	630 A	U4	AC 440 V	V4	AC 440 V
C7	DC 24 V	S7	DC 24 V	52	GPR-LAG	H	800 A	U7	DC 24 V	V9	DC 125 V
C8	DC 48 V	S8	DC 48 V	54	GPR-LP ⁴⁾	J	1,000 A	U8	DC 48 V		
C9	DC 125 V	S9	DC 125 V	55	GPR-LH ⁴⁾	K	1,250 A	U9	DC 125 V	Position S/W	
		Trip Supervision Coil		60 Hz		L	1,600 A			AQ	Test 1C, Connected 1C
		T1	AC/DC 110 V	60	GPR-LN	M	2,000 A	Secondary Trip Coil		AR	Connected 2C
		T2	AC/DC 220 V	61	GPR-LA	N	2,500 A	S1	AC/DC 110 V	AS	Test 2C
		T3	AC 380 V	62	GPR-LAG	P	3,200 A	S2	AC/DC 220 V	AT	Isolated 1C, Inserted 1C
		T4	AC 440 V	64	GPR-LP ⁴⁾	Q	4,000 A	S3	AC 380 V	AU	Inserted 2C
		T7	DC 24 V	65	GPR-LH ⁴⁾	S	5,000 A	S4	AC 440 V	AV	Isolated 2C
		T8	DC 48 V	Generator		X	6,300 A	S7	DC 24 V	P4	Test 2C, Connected 2C
		T9	DC 125 V	50 Hz				S8	DC 48 V	PT	Test 4C
				57	GPR-SN			S9	DC 125 V	PS	Isolated 1C, Test 1C, Connected 2C
				58	GPR-SA			AM		PQ	Inserted 1C, Isolated 1C, Test 1C, Connected 1C
				59	GPR-SP ⁴⁾			AA		P8	Inserted 2C, Isolated 2C, Test 2C, Connected 2C
				60Hz				AB		PR	Inserted 1C, Isolated 1C, Test 3C, Connected 3C
				67	GPR-SN			B8	OCR MCR		
				68	GPR-SA			BR	OCR Manual Reset Function	BC	Auto Connection Control Terminal's Safety Cover
				69	GPR-SP ⁴⁾			BA	OCR Manual Reset & Alarm S/W 1a1b	MC	External Auxiliary Contact (MOC) 10a10b
								BH	CR Manual Reset + High Capacity Alarm S/W 1a	AK	Short "b" Contact
								B0	Mechanical Interlock Device	AE	Safety Shutter
								B6	Spring Charge Switch	AX	Arc Shield
								AG	Door Flange	AF	Fixing Block
								BT	Closing Preparation Contact (B6 and CT cannot be Combined)	AW	Miss Insertion Preventer
								MR	Marine Switchgear	TM	Temperature Sensor Bracket
								D0	Door Interlock	ATS Production	
										BAB7	Emergency Power Transfer
										MR	Marine Switchgear

- □ is only applicable when instantaneous type and only the UVT coil is installed. When using time delay type, place a separate order for the time delay type of controller (HGNS ~) and install externally.
- □ is only applicable when time delay type is applied and the UVT coil is installed in the main unit while the time delay type of controller is installed at the side of the cradle. In case of dimension issues, place an order for HGNS □ for separate installation.
- When □ Secondary trip is applied, UVT coil cannot be applied at the same time.
- When using □ trip coil monitoring contact, it becomes 4a4b and when using MCR function of B8 OCR, it can be used as 4a5b. When both functions are applied, 3a4b can be possible.
- In the order code for the main unit only (A/J/Fixed type), combination with cradle accessories is not possible and the cradle accessory arrangement is only possible when purchased with cradle arrangement. For the independent release of the main unit, place a separate order (HGNS ~) (refer to additional components).
- Position switch cannot be overlapped for use and can only be attached only at the right side of cradle. In case a combination other than the combination indicate is required, make an inquiry separately.
- Mechanical interlock device (B0), external auxiliary contact (MC), fixing block (AF) and Door Interlock (D0) cannot be used together.
- BC : The control terminal's safety cover is only available for the auto connection.
- AK : Short "b" is only available for auto connection and is attached to 51, 52. It can be attached as much as the number of "B" contact so upon additional mounting, place a separate order (HGNS ~).
- AG : Originally, it is attached separately but upon release, the front cover is inserted when shipped.
- AA and BA (BH) cannot be attached at the same time.

- U□ is only applicable when instantaneous type and only the UVT coil is installed. When using time delay type, place a separate order for the time delay type of controller (HGNS ~) and install externally.
- V□ is only applicable when time delay type is applied and the UVT coil is installed in the main unit while the time delay type of controller is installed at the side of the cradle. In case of dimension issues, place an order for HGNS V□ for separate installation.
- When S□ Secondary trip is applied, UVT coil cannot be applied at the same time.
- When using T□ trip coil monitoring contact, it becomes 4a4b and when using MCR function of B8 OCR, it can be used as 4a5b. When both functions are applied, 3a4b can be possible.
- In the order code for the main unit only (A/J/Fixed type), combination with cradle accessories is not possible and the cradle accessory arrangement is only possible when purchased with cradle arrangement. For the independent release of the main unit, place a separate order (HGNS ~) (refer to additional components).
- Position switch cannot be overlapped for use and can only be attached only at the right side of cradle. In case a combination other than the combination indicate is required, make an inquiry separately.
- Mechanical interlock device (B0), external auxiliary contact (MC), fixing block (AF) and Door Interlock (D0) cannot be used together.
- BC : The control terminal's safety cover is only available for the auto connection.
- AK : Short "b" is only available for auto connection and is attached to 51, 52. It can be attached as much as the number of "B" contact so upon additional mounting, place a separate order (HGNS ~).
- AG : Originally, it is attached separately but upon release, the front cover is inserted when shipped.
- AA and BA (BH) cannot be attached at the same time.
- UVT and Secondary Trip Coil cannot be attached at the same time.

Order Code

HGN 1150V (When Placing an Order for the Cradle)

DHS		12		A		3		A		H		AE	
Model Name		Rated Frame		Frame Category & Neutral Pole		No. of Poles		Control Terminal Connection		Terminal Bus Bar Arrangement		Accessories	
DHS	Air Circuit Breakers Cradle	16	DHN06 ~ 16P (S)	p	630 ~ 1,600 A 3/4P Standard RSTN Reverse Phase NRST	3	3 Pole	A	Auto Connection	H	Horizontal Type	AE	Safety Shutter
		20	DHN20P (S) ¹⁾			4	4 Pole			V	Vertical Type		
		25	DHN06 ~ 25Q (U)	q	630 ~ 4,000 A 3/4P Standard RSTN Reverse Phase NRST			J	Manual Connection	T	Upper Side : Horizontal/ Lower Side : Vertical		
		32	DHN32Q (U)							L	Upper Side : Vertical/ Lower Side : Horizontal		
		40	DHN40Q (U)							p ¹⁾	Front Type and Mounting Type Selected by Customer		

※ Marking upon Shipping of Cradle

- DHS06/08/10A (W) > DHS06 ~ 16A (W)
- DHS12/16A (W) > DHS12 ~ 16A (W)
- DHS20B (X) > DHS20B (X)
- DHS25B (X) > DHS25B (X)
- DHS32B (X) > DHS32B (X)

※ AE : Safety shutter lock is supplied with safety shutter.



※ 1) P frame 2,000A is only implementable for vertical terminals.

2) Fixed connection terminals P type are customer-installed after separate ordering. (Refer to separate shipping item)

Applicable frames are only applicable for P06 ~ 16, Q06 ~ 32.

3) Arc shield is provided as a complimentary for P, Q frames.



Order Code

Accessories

Name of Accessory	Order Form		Detailed Specification	Release Form	Page
	Mounted	Sold Separately			
Terminal Bus Bar ¹⁾ (Draw-Out Type)	-	HGNS HVA3	Up-Down Horizontal/Up-Down Vertical (A, P Frame, 06 ~ 16A 3P)	Sold Separately	-
	-	HGNS HVA4	Up-Down Horizontal/Up-Down Vertical (A, P Frame, 06 ~ 16A 4P)		
	-	HGNS HVB3	Up-Down Horizontal/Up-Down Vertical (B, Q Frame, 06 ~ 32B 3P)		
	-	HGNS HVB4	Up-Down Horizontal/Up-Down Vertical (B, Q Frame, 06 ~ 32B 4P)		
	-	HGNS FRA3	Up-Down Front 6 ea (A, P Frame, 06 ~ 16A 3P)		
	-	HGNS FRA4	Up-Down Front 8 ea (A, P Frame, 06 ~ 16A 4P)		
	-	HGNS FRB3	Up-Down Front 6 ea (B, Q Frame, 06 ~ 32B 3P)		
	-	HGNS FRB4	Up-Down Front 8 ea (B, Q Frame, 06 ~ 32B 4P)		
	-	HGNS FHVA3	Up-Down Front 3 ea + Horizontal/Vertical 3 ea 06 ~ 16A 3P		
	-	HGNS FHVA4	Up-Down Front 4 ea + Horizontal/Vertical 4 ea 06 ~ 16A 4P		
	-	HGNS FHVB3	Up-Down Front 3 ea + Horizontal/Vertical 3 ea 06 ~ 32B 3P		
	-	HGNS FHVB4	Up-Down Front 4 ea + Horizontal/Vertical 4 ea 06 ~ 32B 4P		
Terminal Bus Bar ²⁾ (Fixed Type)	-	HGNS FRA3F	Up-Down Front 6 ea (A Frame, 06 ~ 16A 3P) + Additional Spacer 6	Sold Separately	-
	-	HGNS FRA4F	Up-Down Front 8 ea (A Frame, 06 ~ 16A 4P) + Additional Spacer 8		
	-	HGNS FRB3F	Up-Down Front 6 ea (B Frame, 06 ~ 32B 3P) + Additional Spacer 6		
	-	HGNS FRB4F	Up-Down Front 8 ea (B Frame, 06 ~ 32B 4P) + Additional Spacer 8		
	-	HGNS FHVA3F	Up-Down Front 3 ea + Horizontal/Vertical 3 ea 06 ~ 16A 3P + Additional Spacer 3		
	-	HGNS FHVA4F	Up-Down Front 4 ea + Horizontal/Vertical 4 ea 06 ~ 16A 4P + Additional Spacer 4		
	-	HGNS FHVB3F	Up-Down Front 3 ea + Horizontal/Vertical 3 ea 06 ~ 32B 3P + Additional Spacer 3		
	-	HGNS FHVB4F	Up-Down Front 4 ea + Horizontal/Vertical 4 ea 06 ~ 32B 4P + Additional Spacer 4		
Auxiliary Switch ³⁾	MC	HGNS MOC	External Auxiliary Contact 10a10b (Mechanical Operating Cell Switch)	Mounted upon Release and Sold Separately	-
Automatic Connection Control Terminal Protection Cover	BC	HGNS BC	Automatic Connection Control Terminal Cover (Cannot be Mounted on Fixed Type, Manual Connection Type)	Mounted upon Release and Sold Separately	-
Manual Connector	J	HGNS MCJ	Manual Control Plug	Sold Separately	-
Manual Connector Lead Wire	J	HGNS MWIRE	Manual Connector Lead Wire	Mounted upon Release and Sold Separately	-
Condenser Trip Device	-	HGNS CTD1	AC 110 V	Sold Separately	-
	-	HGNS CTD2	AC 220 V		
UVT Time Delay Module ⁴⁾	-	HGNS UT1	AC/DC 110 V & DC 125 V	Sold Separately	-
	-	HGNS UT2	AC/DC 220 V		
	-	HGNS UT3	AC 380 V		
	-	HGNS UT4	AC 440 V		
	-	HGNS UT9	AC/DC 110 V & DC 125 V		
	-	HGNS UT9	AC/DC 110 V & DC 125 V		
UVT Time Delay Module + UVT Coil	V1	HGNS V1	AC/DC 110 V	Mounted upon Release and Sold Separately	-
	V2	HGNS V2	AC/DC 220 V		
	V3	HGNS V3	AC 380 V		
	V4	HGNS V4	AC 440 V		
	V9	HGNS V9	DC 125 V		
OCR Acce	-	HGNS OC	OCR Portable Checker	Sold Separately	-
	-	HGNS HROC	Higher OCR Checker		
	-	HGNS VM	Voltage Module		

※ 1) Only the terminal bus bar (Draw-out type) A, P frame 630 ~ 1,600A/B, Q frame 2,000 ~ 3,200 A-draw-out type can be ordered.

2) Only the terminal bus bar (Fixed type) A, P frame 630 ~ 1,600A/B, Q frame 2,000 ~ 3,200 A-fixed type can be ordered.

3) Contact us when placing an order for set order required for installation.

4) UVT time delay type of controller is mounted outside the main unit or the cradle.

Name of Accessory	Order Form		Detailed Specification	Release Form	Page
	Mounted	Sold Separately			
Key Lock	AB	HGNS AB	Key Lock	Mounted upon Release and Sold Separately	-
Safety Shutter	AE	HGNS AEA3	06A3 ~ 20A3, 06P3 ~ 20P3	Mounted upon Release and Sold Separately	-
		HGNS AEA4	06A4 ~ 20A4, 06P4 ~ 20P4		
		HGNS AEB3	20B3 ~ 40B3, 20Q3 ~ 40Q3		
		HGNS AEB4	20B4 ~ 40B4, 20Q4 ~ 40Q4		
		HGNS AEC3	32C3 ~ 50C3		
		HGNS AEC4	32C4 ~ 50C4		
		HGNS AED3	40D3 ~ 63D3		
		HGNS AED4	40D4 ~ 63D4		
Fixing Block	AF	HGNS AF	For Main Unit + Cradle	Mounted upon Release and Sold Separately	-
		HGNS AFB	For Main Unit + Cradle	Sold Separately	-
		HGNS AFC	For Cradle		
Position Switch ⁵⁾	AQ	HGNS AQ	Test 1C, Connected 1C	Mounted upon Release and Sold Separately	-
	AR	HGNS AR	Connected 2C		
	AS	HGNS AS	Test 2C		
	AT	HGNS AT	Isolated 1C, Inserted 1C		
	AU	HGNS AU	Inserted 2C		
	AV	HGNS AV	Isolated 2C		
	P4	HGNS P4	Test 2C, Connected 2C		
	PS	HGNS PS	Isolated 1C, Test 1C, Connected 2C		
	PT	HGNS PT	Test 4C		
	PQ	HGNS PQ	Inserted 1C, Isolated 1C, Test 1C, Connected 1C		
	P8	HGNS P8	Inserted 2C, Isolated 2C, Test 2C, Connected 2C		
	PR	HGNS PR	Inserted 1C, Isolated 1C, Test 3C, Connected 3C		
	PU	HGNS PU	Test 4C, Connected 4C		
Miss Insertion Preventor	AW	HGNS AW	Add Order Form in the Main Unit + Cradle, Main Unit/Cradle Respectively	Mounted upon Release and Sold Separately	-
Arc Shield	AX	HGNS AXA3	06A3 ~ 20A3	Mounted upon Release and Sold Separately	-
		HGNS AXA4	06A4 ~ 20A4		
		HGNS AXB3	20B3 ~ 40B3		
		HGNS AXB4	20B4 ~ 40B4		
		HGNS AXC3	32C3 ~ 50C3		
		HGNS AXC4	32C4 ~ 50C4		
		HGNS AXD3	40D3 ~ 63D3		
		HGNS AXD4	40D4 ~ 63D4		
Mech Interlock ⁶⁾	-	HGNS DWB1	Drawout (Fixed)/Wire Type 2 Way MI	Sold Separately	-
	-	HGNS DWB2	Drawout (Fixed)/Wire Type 3 Way MI		
	-	HGNS FWB1	Fixed/Wire Type 2 Way MI		
	-	HGNS FWB2	Fixed/Wire Type 3 Way MI		
	-	HGNS DWB1A	A, P Frame, Draw-Out Type, Wire Type 2 Way MI + Interlock Parts (B0)		
	-	HGNS DWB2A	A, P Frame, Draw-Out Type, Wire Type 3 Way MI + Interlock Parts (B0)		
	-	HGNS DWB1B	B, Q Frame, Draw-Out Type, Wire Type 2 Way MI + Interlock Parts (B0)		
	-	HGNS DWB2B	B, Q Frame, Draw-Out Type, Wire Type 3 Way MI + Interlock Parts (B0)		

※ ⁵⁾ Position switch cannot be used together and can only be mounted at the right side of the cradle.

For position switches, because they are common parts with the U-Series product, the position switch may be marked "UANS".

⁶⁾ Mechanical interlock is a wire type. The MI unit is mounted outside the main unit or on the cradle and the interlock part is mounted inside the main unit.

Order Code

Accessories

Name of Accessory	Order Form		Specification	Release Form	Page
	Mounted	Sold Separately			
Mech Interlock ⁶⁾	-	HGNS DWB1C3	C Frame 3P, Draw-Out Type, Wire Type 2way MI + Interlock Parts (B0)	Sold Separately	-
	-	HGNS DWB1C4	C Frame 4P, Draw-Out Type, Wire Type 2way MI + Interlock Parts (B0)		
	-	HGNS DWB2C3	C Frame 3P, Draw-Out Type, Wire Type 3way MI + Interlock Parts (B0)		
	-	HGNS DWB2C4	C Frame 4P, Draw-Out Type, Wire Type 3way MI + Interlock Parts (B0)		
	-	HGNS DWB1D3	DFrame 3P, Draw-Out Type, Wire Type 2way MI + Interlock Parts (B0)		
	-	HGNS DWB1D4	DFrame 4P, Draw-Out Type, Wire Type 2way MI + Interlock Parts (B0)		
	-	HGNS DWB2D3	DFrame 3P, Draw-Out Type, Wire Type 3way MI + Interlock Parts (B0)		
	-	HGNS DWB2D4	DFrame 4P, Draw-Out Type, Wire Type 3way MI + Interlock Parts (B0)		
	-	HGNS FWB1A	A, P Frame, Fixed Type, Wire Type 2way MI + Interlock Parts (B0)		
	-	HGNS FWB2A	A, P Frame, Fixed Type, Wire Type 3way MI + Interlock Parts (B0)		
	-	HGNS FWB1B	B, Q Frame, Fixed Type, Wire Type 2way MI + Interlock Parts (B0)		
	-	HGNS FWB2B	B, Q Frame, Fixed Type, Wire Type 3way MI + Interlock Parts (B0)		
	-	HGNS FWB1C3	C Frame 3P, Fixed Type, Wire Type 2way MI + Interlock Parts (B0)		
	-	HGNS FWB1C4	C Frame 4P, Fixed Type, Wire Type 2way MI + Interlock Parts (B0)		
	-	HGNS FWB2C3	C Frame 3P, Fixed Type, Wire Type 3way MI + Interlock Parts (B0)		
	-	HGNS FWB2C4	C Frame 4P, Fixed Type, Wire Type 3way MI + Interlock Parts (B0)		
	-	HGNS FWB1D3	DFrame 3P, Fixed Type, Wire Type 2way MI + Interlock Parts (B0)		
	-	HGNS FWB1D4	DFrame 4P, Fixed Type, Wire Type 2way MI + Interlock Parts (B0)		
	-	HGNS FWB2D3	DFrame 3P, Fixed Type, Wire Type 3way MI + Interlock Parts (B0)		
	-	HGNS FWB2D4	DFrame 4P, Fixed Type, Wire Type 3way MI + Interlock Parts (B0)		
	BO	HGNS B0DA	A, P Frame Interlock Parts (B0)	Mounted upon Release and Sold Separately	-
		HGNS B0DB	B, Q Frame Interlock Parts (B0)		
		HGNS B0DC3	C Frame 3P Interlock Parts (B0)		
		HGNS B0DC4	C Frame 4P Interlock Parts (B0)		
		HGNS B0DD3	DFrame 3P Interlock Parts (B0)		
		HGNS B0DD4	DFrame 4P Interlock Parts (B0)		
		HGNS B0FA	A, P Frame Interlock Parts (B0) + Fixed Bracket		
		HGNS B0FB	B, Q Frame Interlock Parts (B0) + Fixed Bracket		
		HGNS B0FC3	C Frame 3P Interlock Parts (B0) + Fixed Bracket		
		HGNS B0FC4	C Frame 4P Interlock Parts (B0) + Fixed Bracket		
Temperature Sensor Bracket	-	HGNS TMSUPA3	A, P Frame 3P, Temperature Sensor Bracket	Mounted upon Release and Sold Separately	-
	-	HGNS TMSUPA4	A, P Frame 4P, Temperature Sensor Bracket		
	-	HGNS TMSUPB3	B, Q Frame 3P, Temperature Sensor Bracket		
	-	HGNS TMSUPB4	B, Q Frame 4P, Temperature Sensor Bracket		
	-	HGNS TMSUPC3	C Frame 3P, Temperature Sensor Bracket		
	-	HGNS TMSUPC4	C Frame 4P, Temperature Sensor Bracket		
	-	HGNS TMSUPD3	D Frame 3P, Temperature Sensor Bracket		
	-	HGNS TMSUPD4	D Frame 4P, Temperature Sensor Bracket		
Neutral CT	-	HGNS NCT_T	T = 630A/Inner Diameter 80	Sold Separately	-
	-	HGNS NCT_H	NCT H = 800A/Inner Diameter 80		
	-	HGNS NCT_J	NCT J = 1,000A/Inner Diameter 80		
	-	HGNS NCT_K	NCT K = 1,250A/Inner Diameter 80		
	-	HGNS NCT_L	NCT L = 1,600A/Inner Diameter 80		
	-	HGNS NCT_M	NCT M = 2,000A/Inner Diameter 135		
	-	HGNS NCT_N	NCT N = 2,500A/Inner Diameter 135		
	-	HGNS NCT_P	NCT P = 3,200A/Inner Diameter 135		
	-	HGNS NCT_Q	NCT Q = 4,000A/Inner Diameter 200		
	-	HGNS NCT_S	NCT S = 5,000A/Inner Diameter 200		
	-	HGNS NCT_X	NCT x = 6,300A/Inner Diameter 200		

※6) Mechanical interlock is a wire type. The MI unit is mounted outside the main unit or on the cradle and the interlock part is mounted inside the main unit.

Name of Accessory	Order Form		Detailed Specification	Release Form	Page
	Mounted	Sold Separately			
Door Flange	AG	HGNS AG	IP30	Mounted upon Release and Sold Separately	-
Dust Cover	-	HGNS DC	IP52	Sold Separately	-
Test Jumper	-	HGNS AJ	For Automatic Connection Type of Test	Sold Separately	-
Short "B" Contact	AK	HGNS AK	Short Circuit "B" Contact	Mounted upon Release and Sold Separately	-
Lifting LUG	-	HGNS AL	2 ea = 1 set, C Frame 5,000 A is Provided as Standard	Sold Separately	-
On/Off Button Lock	AM	HGNS AM	On/Off Button Cover Lock	Sold Separately	-
Insulation Barrier	-	HGNS PBAR	Insulation Barrier	Sold Separately	-
Draw In-Out Handle	-	HGNS LHANDLE	Long Head Type Draw In-Out Handle	Sold Separately	-
	-	HGNS UHANDLE	Universal Join Head Draw In-Out Handle		
	-	HGNS THANDLE	T Grip Long Type Draw In-Out Handle		
	-	HGNS HANDLE	Standard Draw In-Out Handle		
Door Interlock	-	HGNS DDI	Draw-out type Door Interlock external attachment Kit Only	Sold Separately	-
	-	HGNS FDI	Fixed type Door Interlock external attachment Kit Only	Sold Separately	-
	-	HGNS DDIAC	Draw-out type Door Interlock external attachment Kit + A, C, P Frame internal interlock components (D0)	Sold Separately	-
	-	HGNS DDIBD	Draw-out type Door Interlock external attachment Kit + B, D, Q Frame internal interlock components (D0)	Sold Separately	-
	-	HGNS FDIAC	Fixed type Door Interlock external attachment Kit + A, C, P Frame internal interlock components (D0)	Sold Separately	-
	-	HGNS FDIBD	Fixed type Door Interlock external attachment Kit + B, D, Q Frame internal interlock components (D0)	Sold Separately	-

Handling and maintenance inspection

Standard Operation Conditions

| Ambient Temperature | $-5 \sim +40^{\circ}\text{C}$

(Daily average temperature of below 35°C)

| Altitude | Below 2,000 m above sea level

| Relative Humidity | Below 85 % (Below daily average of 85 %)

The surrounding environment may affect the insulation performance and durability of the circuit break so the operation conditions must be checked clearly before application.



In case of operating in high ambient temperature exceeding 40°C , use according to the derating calibrated depending on the ambient temperature indicated in the catalogue.



In case of operating in places with high humidity and frequent rain, the insulation or electrical performance may drop.



In case of storing and using in places with a lot of dust and humidity, the use of a dust cover or dehumidifier is recommended. Excessive impact and vibration may cause damage in the operation mechanism.



When storing circuit breaker without electric circuit : $-25^{\circ}\text{C} \sim 85^{\circ}\text{C}$

When storing circuit breaker with electric circuit : $-15^{\circ}\text{C} \sim 70^{\circ}\text{C}$

After storing in low temperature, store for more than 8 hours in room temperature then store in an open location for the type with charging motor.



In case there is a lot of corrosive gas, it must be stored in an enclosed protective structure to minimize damage.



In case of highland with high altitude, the insulation performance drops so please apply the highest rating product after checking the insulation performance calibration coefficient.

Special Operating Conditions

The HG-Series air circuit breaker has been designed/manufactured to operate in a standard operating environment designated by the IEC standard and in case of operating the circuit breaker in the following special environment, contact our company.

- In case the altitude above sea level and the ambient temperature exceeds the standard operating environment
- In case of a region with a lot of sea wind or salinity
- In case of a region with snow and freezing
- In case of a region of frequent shock and vibration
- In case the relative humidity exceeds the standard operating environment
- In case of a region with a lot of humidity and frequent rainfall
- In case of a region with a lot of dust, vapor, corrosive and combustible gas, wet steam
- In other special environment that exceeds the standard environment

※ Special operating environment and condition may cause damage in the product (Increase in resistance at main circuit, rust, change in coating).

Maintenance inspection

Regular Inspection

Inspection Form	Inspection Item		Inspection Period
	Main Review Item	Details and Countermeasures	
General Regular Inspection	Foreign Substance	Visual examination must be executed and there must be no foreign substance inside. Blow away the foreign substance using compressed air.	Every 6 months
	Gap	Execute visual examination and there must be no cracks or gaps.	Replace, repair
	Operation	Circuit breaker must be closed manually to inspect the operation area during normal status.	Once a year
	Greasing	Apply an adequate amount of grease on each pin, axle and bearing. Excessive greasing may cause dust and stain from building up. Electrical grease : HITALWBE 28G Lubricant grease : Kamro Chemical/CHEMAX HHI 5000#1.	Every 6 months
	Spring Type	The status of the spring must be checked to inspect the damaged area.	Replace, repair
	Screw/Bolt Type	Tighten loose areas using screw or bolt.	Every 6 months
	Stain on the Fastening Bolt Area	There must be no dust or stain at the fastening area. Wipe the area well using clean cloth dipped in alcohol.	All the time
Mechanical Durability Warranty Lifespan Inspection (Based on IEC60947 standard)	Below 2,500 AF	Total operation frequency : 3,000 times	Paid inspection is required (Precision inspection)
		Open/closing frequency : 500 times	
		Open/closing frequency : 25 times	
		Immediately upon breaking	
	Above 3,200 AF	Open/close frequency : 2,000 times	Inspection period : At least 6 months after exceeding the opening/closing frequency Precision inspection once a year is recommended
		Open/close cycle : 500 times	
		Open/close cycle : 25 times	
		Immediately upon breaking	
Arc Chamber (Grid)	Contact with Foreign Substance	In case foreign substance has melted onto the grid's side plate, replace the ionized pieces inside the arc chamber and others.	Replace, contact our company
Arc Contact	Contact Tip Surface	Remove foreign substance, dust and oil.	Visual inspection, no problem Replace, contact our company
		Melting stains on the contact tip surface is caused by open/closing arc.	
		In case the extent of melting caused by arc reduces to 1/3, replace the entire operation and fixing moving contact unit.	
		However, in case there is foreign substance on the contact, precision diagnosis is required to determine if replacement is necessary through our company's paid service.	
Main Contact	Damage of Main Contact	In case the main contact has been worn off and is rough, the surface must be managed neatly.	At all times
		However, in case there is foreign substance on the contact, precision diagnosis is required to determine if replacement is necessary through our company's paid service.	

⚠ Caution

1. In the event the contact or part is replaced, turn the circuit breaker off and replace after drawing out the disconnected position to isolated.
2. Execute the inspection work after checking whether the remaining heat in the conduction part has been dissipated. It may cause burns.
3. When rubbing the contact tip, ensure that the sludge does not enter the circuit breaker's mechanical device. After rubbing, wipe the contact tip neatly.
4. Please refer to the instruction manual for detailed information when disassembling and assembling.

Approvals & Certificates Status

Approvals & Certificates

ACB

● : Acquired
 ◎ : In Progress (Expected)

Type of Certification	Approvals				
Type of Standard	KS	IEC	IEC	ANSI	ANSI
Mark					
Testing Institute	KS	CE	DEKRA	KEPIC	KERI
Certification Country	Korea	Europe	Netherlands	Korea	Korea
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		●	●		
HGN16 E Frame				●	
HGN20 F Frame				●	
HGN32 F Frame				●	
HGN40 G Frame				●	
HGN16 L Frame				●	
HGN25 M Frame				●	
HGN32 N Frame				●	
HGS06 A Frame	●	●	●		
HGS08 A Frame	●	●	●		
HGS10 A Frame	●	●	●		
HGS12 A Frame	●	●	●		
HGS16 A Frame	●	●	●		
HGS20 B Frame	●	●	●		
HGS25 B Frame	●	●	●		
HGS32 B Frame	●	●	●		

Approvals & Marine Certificates

ACB

● : Acquired
 ◎ : In Progress (Expected)

Type of Certification	Vessel								
Type of Standard	Korea	U.K	U.S.A	France	Japan	Germany	Germany	Italy	Russia
Mark									
Testing Institute	KR	LR	ABS	BV	NK	GL	DNV	RINA	RMRS
Certification Country	Korea	U.K.	USA	France	Japan	Germany	Germany	Italy	Russia
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	●	●	●	●	●	●	●	●	●
HGS06 A Frame									
HGS08 A Frame									
HGS10 A Frame									
HGS12 A Frame									
HGS16 A Frame									
HGS20 B Frame									
HGS25 B Frame									
HGS32 B Frame									



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