

HGL-ACB

UL Air Circuit Breakers

(Low-Voltage AC Power Circuit Breakers)

HD HYUNDAI ELECTRIC

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

Solution

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

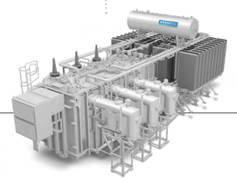
Asset management solution is a business that maximizes the overall business efficiency by systematically managing the performance, risk, maintenance cost and others as well as by providing an asset management solution suitable to the customer's circumstance depending on the product lifecycle (PLC) of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

Utility

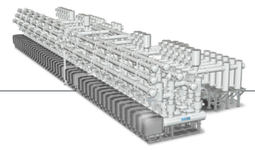
Generation(step-up)

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



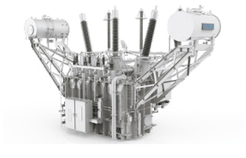
Power Transformer
· up to 800 kV, 1,500 MVA



Gas Insulated Switchgear
· up to 800 kV

- Can be installed in spaces smaller than the open type of substation by using SF_6 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



SF_6 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 SF_6 gas

Transmission

Primary Substation/Secondary Substation



Gas Insulated Switchgear
· up to 800 kV



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



Shunt Reactor
· up to 765 kV, 300 Mvar

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

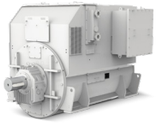
- Production of high quality marine devices satisfying the regulations and standards of key marine associations (LRS, ABS, DNV, GL, BV, NK etc.) and world's renowned institutes
- High quality safety secured through the latest equipment and stringent quality control system
- Realization of optimal high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



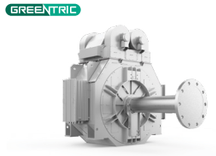
Marine Switchgear



Marine Motor



Generator



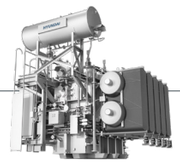
Shaft Generator



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
· AC : up to 130 kA, 6,000 A
(UL1066, ANSI C37.13/16/17/50, CSA C22.2 no. 31)



VC
· up to 12 kV, 400 A



Switch-Disconnector
· DC : up to 100 kA/1.0 s, 4,000 A
· DC : up to 150 kA/0.6 s, 4,000 A
(UL 489, UL489B)



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

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



Installation Contactor
· up to 63 A



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.)

HGL

Low-Voltage AC Power Circuit Breakers

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UL ACB

Model Selection Table

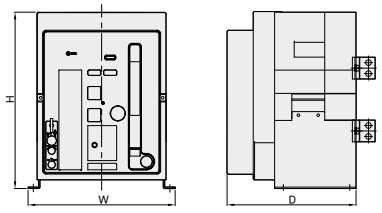
Low-Voltage AC Power Circuit Breakers (HGL)

Model Name — HGL

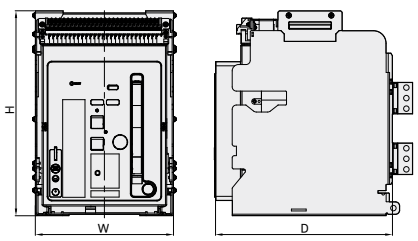
Item				A Frame		B, Q Frame					C Frame	D Frame
AF				08	16	08	16	20	25	32	40	60
Rated Current [In max]	Based on 40°C		A	400	800	400	800	1,000	1,250	1,600	2,000	3,000
				600	1,000	600	1,000	1,200	1,600	2,000	2,500	3,200
				630	1,200	630	1,200	1,250	2,000	2,500	3,000	3,600
				800	1,250	800	1,250	1,600	2,500	3,000	3,200	4,000
					1,600		1,600	2,000		3,200	3,600	5,000
											4,000	6,000
Rated Operational Voltage [Ue]			V	635 (Q Frame: 730)								
Frequeency			Hz	50/60								
No. of Poles			P	3, 4								
Current Setting Range (x In max)			A	0.5~1.0								
Raged Current of Neutral Pole (N) ("" % x In)			A	100%								
Rated short circuit current (Duty : O-15s-CO) with instananeous	AC	730 V	kA	-		65					-	-
		635 V		65		85					85	100
		508 V		85		100					100	130
		254 V		85		100					100	130
Rated short circuit current (Duty : O-15s-CO) without instananeous	AC	730 V	kA	-		65					-	-
		635 V		65		85					85	100
		508 V		65		85					85	100
		254 V		65		85					85	100
Rated short time current	AC		kA	65		85 (Q Frame: 65)					85	100
Break time between tripping order and arc extinction			ms	35		35					35	35
Operation Temperature				-4 °F ~ +140 °F (-20 °C ~ +60 °C)								
Certified Standards				UL 1066								
Closing Operational Time												
Motor Charging Time (sec) max.				10		10					10	10
Closing Time (ms) max.				80		80					80	80
Lifecycle (Cycles)												
Mechanical				12,500		12,500				7,500	7,500	7,500
Electrical				2,800		2,800				1,000	1,000	1,000
Weight												
3 Pole	Draw-Out Type		lb (kg)	185(84)		254(115)				408(185)	489(222)	829(376)
	Fixed Type			101(46)		134(61)				286(130)	435(198)	624(283)
4 Pole	Draw-Out Type			213(97)		325(147)				517(235)	621(282)	1050(476)
	Fixed Type			122(55)		170(77)				369(167)	528(240)	779(354)
External dimensions (W×H×D)												
3 Pole	Draw-Out Type		in (mm)	12.91x19.17x16.54 (328x487x420.2)		15.71x19.17x16.54 (399x487x420.2)					24.57x19.96x16.54 (624x507x420.2)	30.16x19.96x16.54 (766x507x420.2)
	Fixed Type			13.91x15.92x11.65 (353.4x404.4x295.8)		16.71x15.92x11.65 (424.4x404.4x295.8)					25.57x15.98x11.65 (649.4x406x295.8)	31.16x15.92x11.65 (791.4x404.4x295.8)
4 Pole	Draw-Out Type			16.26x19.17x16.54 (413x487x420.2)		20.24x19.17x16.54 (514x487x420.2)					31.26x19.96x16.54 (794x507x420.2)	32.21x19.96x16.54 (996x507x420.2)
	Fixed Type			17.26x15.92x11.65 (438.4x404.4x295.8)		21.24x15.92x11.65 (539.4x404.4x295.8)					32.26x15.98x11.65 (819.4x406x295.8)	40.21x15.92x11.65 (1,021.4x404.4x295.8)

※ 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 UL1066's number of opening/closing within the warranty period.

Fixed Type



Draw-Out Type



Accessories - Protective Relay (OCR)

Function	General Feeder			
Model Name	N Type	A Type		P Type
	GPR-LN	GPR-LA	GPR-LAG	GPR-LP
Frequency				
50 Hz	50	51	52	54
60 Hz	60	61	62	64
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	●	●	●	●
ERMS	-	●	●	●
Indication				
True RMS Detection Method	●	●	●	●
LED Indication per Trip Type	-	●	●	●
Fault LED	L [1], Rating Plug	PTA, L, S/I, G, Rating Plug	PTA, L, S/I, leakage, Rating Plug	PTA, L, S/I, G, Rating Plug
Real-Time LCD Indication of Load Rate per Phase	-	●	●	●
Measurement LCD	-	●	●	●
Output Contact				
Integrated Instantaneous Contact (1a)	-	-	-	-
Individual Continuous Contact (4a)	-	●	●	●
Operation				
MCR	-	○	○	○
Communication	NFC	Modbus-RTU	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.

HGL Series

Low-Voltage AC Power Circuit Breakers

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



Characteristics

Maximum Breaking Capacity

130 kA (At 508 V, HGL D Frame)

Rated Impulse Withstand Voltage (Uimp) : 12 kV

100 % N Phase Current Flow Capacity for all Types

Certifications

c UL us
LISTED
File E543210



A Frame [85 kA]
400 ~ 1,600 A



B, Q Frame [100 kA]
400 ~ 3,200 A



C Frame [100 kA]
2,000 ~ 4,000 A



D Frame [130 kA]
3,000 ~ 6,000 A

Overview and Characteristics

Low-Voltage AC Power Circuit Breaker

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)
- Self Power
- 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 & External 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
- Energy Reduction Maintenance Setting (ERMS)

P Type
- Overcurrent Protection (L/S/I/G)
- Self Power & 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
- Energy Reduction Maintenance Setting (ERMS)

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

Applied Standards and Certifications

HGL Series air circuit breaker has acquired testing/certifications from UL certified testing institute and can be installed and applied according to the usage environment and conditions permitted by the standards.

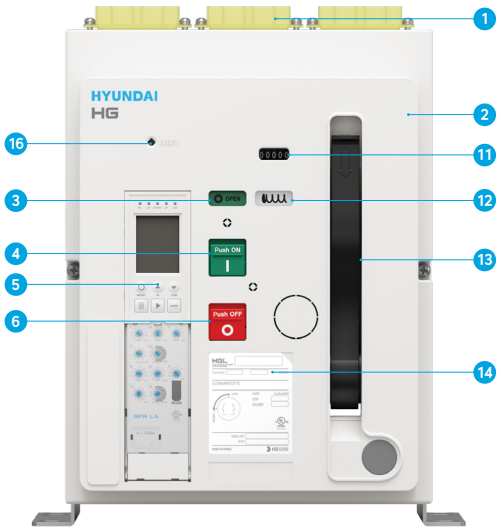
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File E543210

Acquired Standards and Certifications

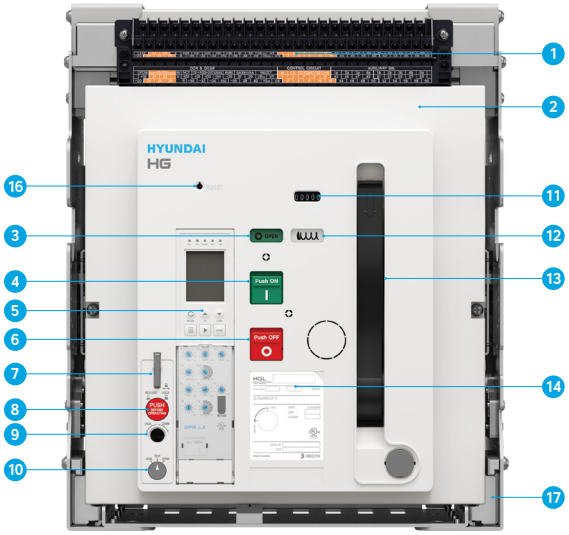
• UL Certification : UL1066, ANSI C37.13

External·Internal Structure

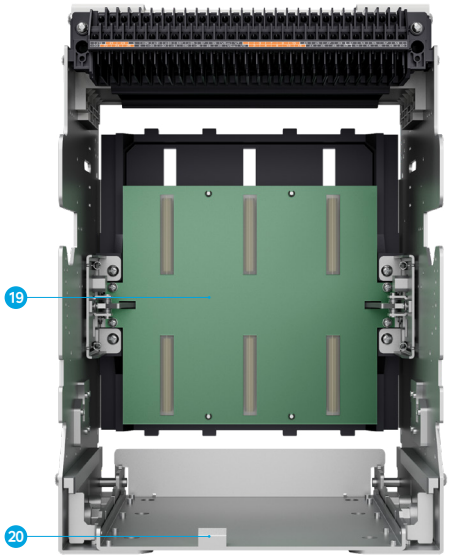
Air Circuit Breakers (HGL)



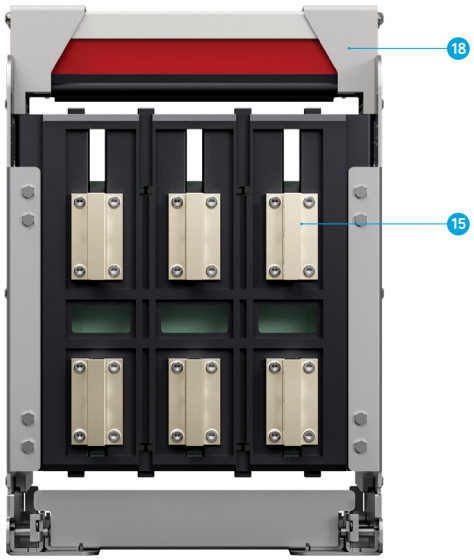
Draw-In/Out Type (ACB Body)



Draw-In/Out Type (Including Cradle)



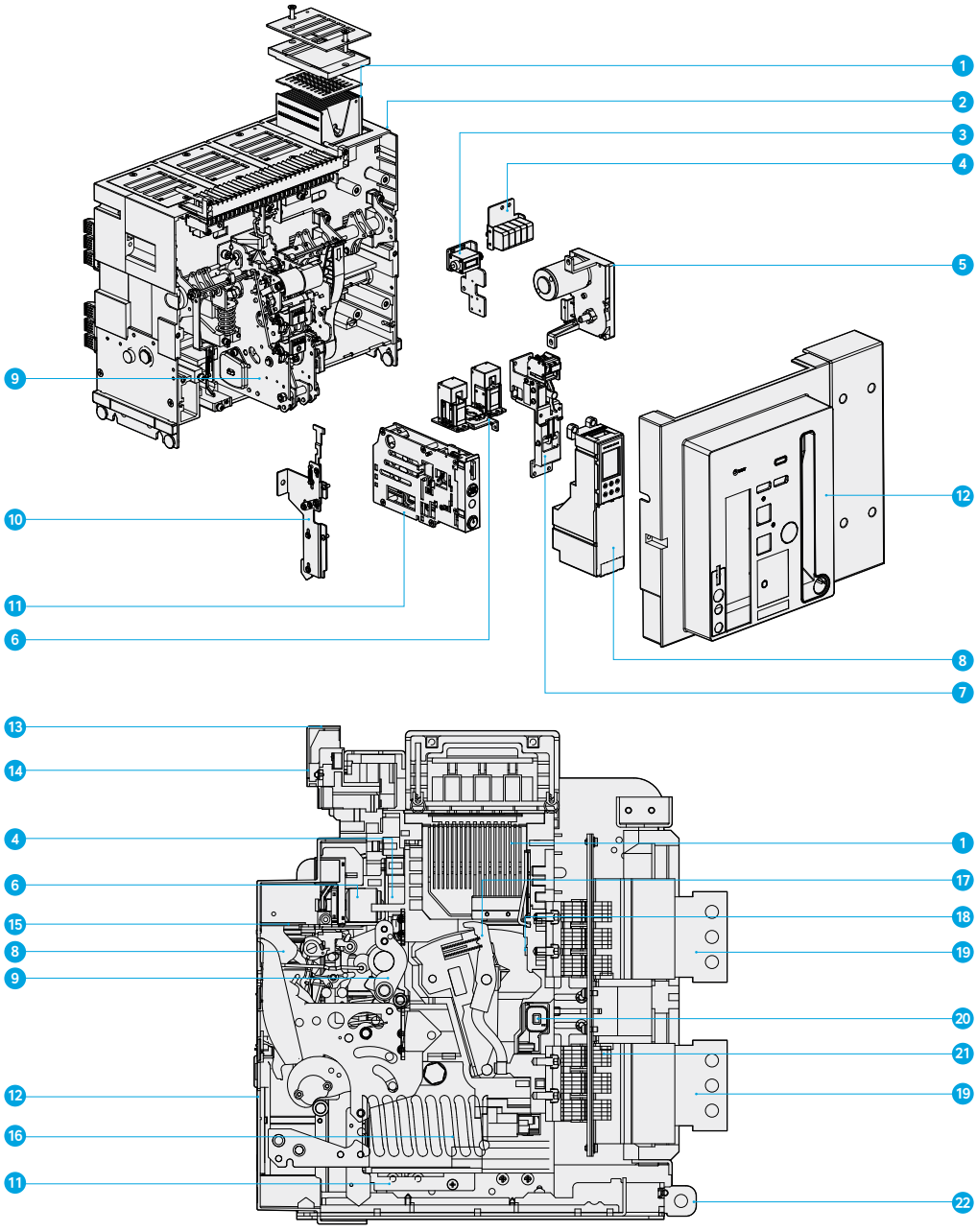
Cradle Front



Cradle Rear

Air Circuit Breakers (HGL)

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



Air Circuit Breakers (HGL)

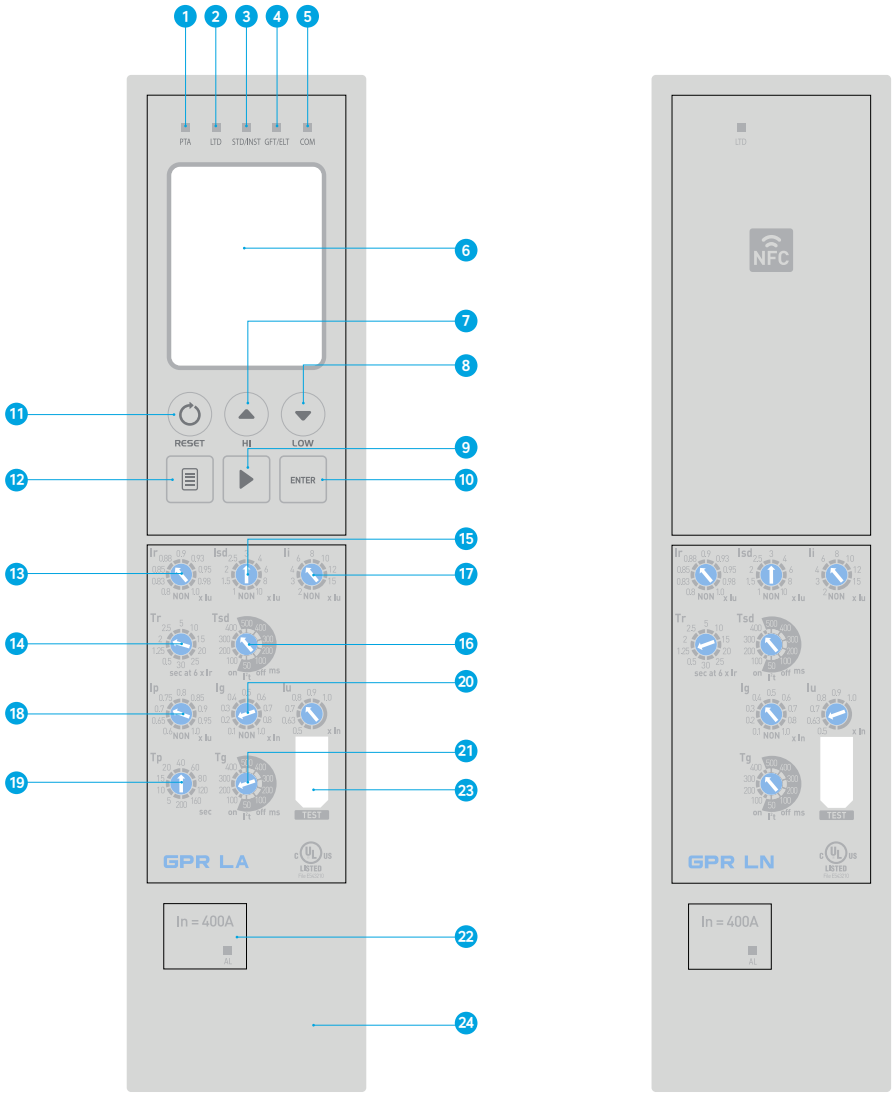
1. DI Grid
2. CO Unit
3. Counter
4. AUX Switch
5. Motor
6. Closing/Trip/UVT Coil
7. MHT Device
8. OCR
9. Mechanism
10. Auto Discharge
11. DR Device
12. Cover
13. Control Terminal Protection Cover
14. Control Terminal
15. Manual Charging Handle
16. Closing Spring
17. Moving Contact
18. Fixed Contact
19.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

※ 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	⑦ STD/INST test button	⑬ LTD pick up setting switch	⑲ PTA time setting switch
② LTD signal LED	⑧ LTD test switch	⑭ LTD time setting switch	⑳ GFT/ELT pick up setting switch
③ STD/INST signal LED	⑨ Movement button	⑮ STD pick up setting switch	㉑ GFT/ELT time setting switch
④ GFT/ELT signal LED	⑩ ENTER button	⑯ STD time setting switch	㉒ Rating plug
⑤ Com. signal LED	⑪ RESET button	⑰ INST pick up setting switch	㉓ Temporary test
⑥ LCD	⑫ LIST button	⑱ PTA pick up setting switch	㉔ Battery

※ Self-power functions normally in the case of 10 % for 3 phases and 30 % for a single phase. However, in the case of B, Q Frame with a 400A rating plug, normal operation is ensured at 50 % load for three-phase and above 100 % load for single-phase.

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.

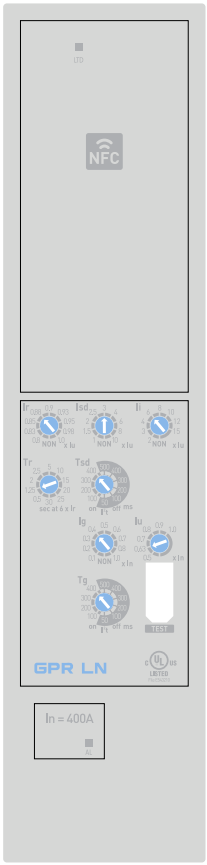
Item	General Feeder			
Model Name	N Type	A Type		P Type
	GPR-LN	GPR-LA	GPR-LAG	GPR-LP
Externals				
Frequency 50 Hz	50	51	52	54
Frequency 60 Hz	60	61	62	64
Main Functions	• L/S/I/G • Thermal • Self-Power • Fail Safe • Fault Recording 10ea (Check Via NFC) • Last Fault's Waveform • Recording (4 Cycles, Check Via NFC)	• 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) • ERMS	• 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, ELT, PTA) • 256 ea Fault Recording • Last Fault's Waveform • Recording (4 Cycles, Check Via Communication) • 200 ea Event Recording (Check Via Communication) • ERMS	• L/S/I/G • Thermal • Self-Power • Fail Safe • Communication (Modb us) • 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) • OVR / UVR • Unbalance Type (Voltage/Current) • Reverse Power • Voltage/Current • Power (P, Q, S), Power Factor • Energy • Demand • ERMS

Accessories

Over Current Relay (OCR)

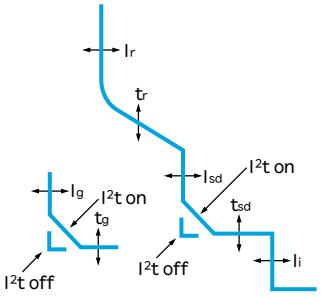
Appearance and Setting Value

GPR-LN (50, 60)



- 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
  - 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

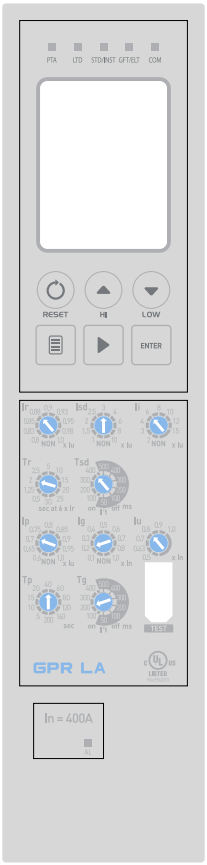


Protection Functions

Long time	Pick up between 1.05 ~ 1.20 Ir	Iu = In x		0.5	0.63	0.7	0.8	0.9	1.0				
		Ir = Iu x		0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1	non
	Time delay (sec) Tolerance Pick Largest value between ±15 % (Ir < 6 In),±20 % (Ir ≥ 6 In), or ±40 ms	tr @ (1.5×Ir)		10.4	26.1	41.7	52	104	208	312	417	521	626
		tr @ (6.0×Ir)		0.5	1.25	2	2.5	5	10	15	20	25	30
		tr @ (7.2×Ir)		0.35	0.86	1.38	1.73	3.45	6.9	10.4	13.8	17.3	20.7
Short time	Threshold accruracy : ±10 %	Isd = Iu x		1	1.5	2	2.5	3	4	6	8	10	non
	Time delay (sec) @ 10×Iu Accuracy : ±15% or ±40 ms I^2t on : ±20 % or 40 ms	tsd	I^2t off	0.05	0.1	0.2	0.3	0.4	0.5				
			I^2t on		0.1	0.2	0.3	0.4					
		I^2t off	min. trip time	0.02	0.8	0.16	0.26	0.36	0.46				
			max. trip time	0.08	0.14	0.24	0.34	0.44	0.54				
Instantaneous	Threshold (A) Accuracy : ±10 %	Ii = Iu x		2	3	4	6	8	10	12	15	non	
	Trip time			under 50 ms									
Ground fault	Threshold (A) Accuracy : ±15 %(Ig > 0.4 In) ±20 %(Ig ≤ 0.4 In)	Ig = In x		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1	non
	Time delay (sec) @ 1×In Accuracy : ±20 % or 40 ms	tg	I^2t off	0.05	0.1	0.2	0.3	0.4	0.5				
			I^2t on		0.1	0.2	0.3	0.4					
		I^2t off	min. trip time	0.02	0.8	0.16	0.26	0.36	0.46				
			max. trip time	0.08	0.14	0.24	0.34	0.44	0.54				

※ Ig cannot adjust over 1200A

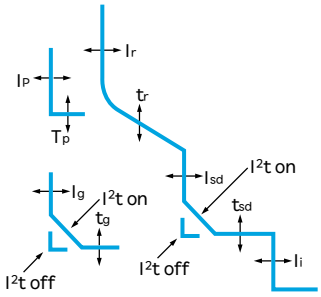
GPR-LA (51, 61)



- 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 % (×Ir, Isd, Ii)
- 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 (In)
- Field Test
  - Simulation of long time, short time, instantaneous
- ERMS (Energy Reduction Maintenance Setting)
  - To secure safety for electric technician or site operator
- 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

Long time	Pick up between 1.05 ~ 1.20 Ir	Iu = In x		0.5	0.63	0.7	0.8	0.9	1.0				
		Ir = Iu x		0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1	non
	Time delay (sec) Tolerance Pick Largest value between ±15 % (Ir < 6 In), ±20 % (Ir ≥ 6 In), or ±40 ms	tr @ (1.5×Ir)		10.4	26.1	41.7	52	104	208	312	417	521	626
		tr @ (6.0×Ir)		0.5	1.25	2	2.5	5	10	15	20	25	30
		tr @ (7.2×Ir)		0.35	0.86	1.38	1.73	3.45	6.9	10.4	13.8	17.3	20.7
Short time	Threshold accruracy: ±10 %	Isd = Iu x		1	1.5	2	2.5	3	4	6	8	10	non
	Time delay (sec) @ 10×Iu Accuracy : ±15 % or ±40 ms I^2t on : ±20 % or 40 ms	tsd	I^2t off	0.05	0.1	0.2	0.3	0.4	0.5				
			I^2t on		0.1	0.2	0.3	0.4					
		I^2t off	min. trip time	0.02	0.8	0.16	0.26	0.36	0.46				
			max. trip time	0.08	0.14	0.24	0.34	0.44	0.54				
Instantaneous	Threshold (A) Accuracy : ±10 %	Ii = Iu x		2	3	4	6	8	10	12	15	non	
	Trip time			under 50 ms									
Ground fault	Threshold (A) Accuracy : ±15 %(Ig > 0.4 In), ±20 %(Ig ≤ 0.4 In)	Ig = In x		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1	non
	Time delay (sec) @ 1×In Accuracy : ±20 % or 40 ms	tg	I^2t off	0.05	0.1	0.2	0.3	0.4	0.5				
			I^2t on		0.1	0.2	0.3	0.4					
		I^2t off	min. trip time	0.02	0.8	0.16	0.26	0.36	0.46				
			max. trip time	0.08	0.14	0.24	0.34	0.44	0.54				
Pre-Alarm	Threshold	Ip = Iu x		0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1	non
	Time delay (sec) Accuracy : ±20 %	tp		5	10	15	20	40	60	80	120	160	

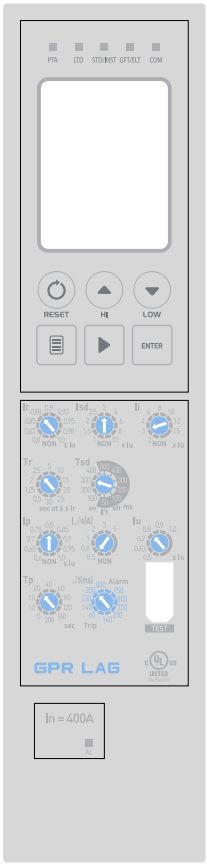
※ Ig cannot adjust over 1200A

Accessories

Over Current Relay (OCR)

Appearance and Setting Value

GPR-LAG (52, 62)

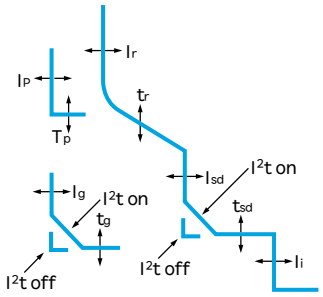


- Overload Protection
  - Long time delay
  - Thermal operation
- Short Circuit Protection
  - Short time delay, instantaneous trip
  - I^2t On/Off optional (for STD)
- Earth Leakage Protection
  - Uses ZCT for 5 A output at secondary (used within 3 %)
  - GPR setting is calculated based on 5 A at secondary

  Ex) When using 100 : 5 A, in order for primary to function at 30 A, 30×5/100 = 1.5 A, GPR is set to 2 A
- Neutral Wire Protection
  - 3 Pole : No protection
  - 4 Pole : Non, 50 %, 100 % (×Ir, Isd, Ii)
- 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 (In)
- ERMS (Energy Reduction Maintenance Setting)
  - To secure safety for electric technician or site operator
- 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

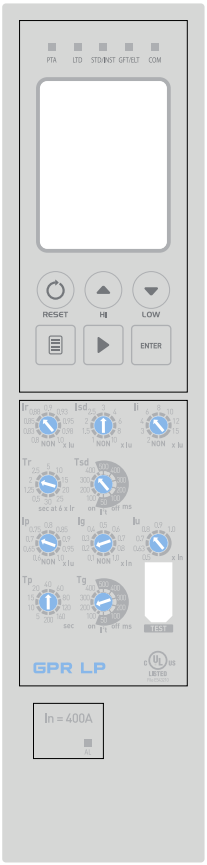
- Protection Features



Protection Functions

Long time	Pick up between 1.05 ~ 1.20 Ir	Iu = In x		0.5	0.63	0.7	0.8	0.9	1.0				
		Ir = Iu x		0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1	non
	Time delay (sec) Tolerance Pick Largest value between ±15 % (Ir < 6 In),±20 % (Ir ≥ 6 In), or ±40 ms	tr @ (1.5×Ir)		10.4	26.1	41.7	52	104	208	312	417	521	626
		tr @ (6.0×Ir)		0.5	1.25	2	2.5	5	10	15	20	25	30
		tr @ (7.2×Ir)		0.35	0.86	1.38	1.73	3.45	6.9	10.4	13.8	17.3	20.7
Short time	Threshold accruracy: ±10 %	Isd = Iu x		1	1.5	2	2.5	3	4	6	8	10	non
	Time delay (sec) @ 10×Iu Accuracy : ±15 % or ±40 ms I^2t on : ±20 % or 40 ms	tsd	I^2t off	0.05	0.1	0.2	0.3	0.4	0.5				
			I^2t on		0.1	0.2	0.3	0.4					
		I^2t off	min. trip time	0.02	0.8	0.16	0.26	0.36	0.46				
			max. trip time	0.08	0.14	0.24	0.34	0.44	0.54				
Instantaneous	Threshold (A) Accuracy : ±10 %	Ii = Iu x		2	3	4	6	8	10	12	15	non	
	Trip time			under 50 ms									
Pre-Alarm	Threshold	Ip = Iu x		0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1	non
	Time delay (sec) Accuracy : ±20 %	tp		5	10	15	20	40	60	80	120	160	
Earth leakage	Threshold	IΔn		0.5	0.8	1	2	3	5	non			
	Time delay (sec) Accuracy : ± 15 % or 40 ms	Δt	Alarm Time	0.14	0.23	0.35	0.80	0.95					
			Trip Time	0.06	0.14	0.23	0.35	0.8					

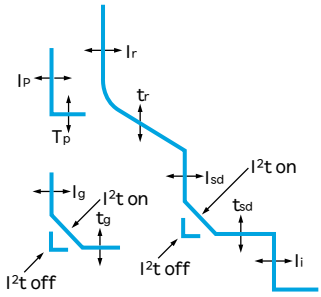
GPR-LP (54, 64)



- Overload Protection
  - Long time delay
  - Thermal operation
- 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 % (×Ir, Isd, Ii)
- 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
- ERMS (Energy Reduction Maintenance Setting)
  - To secure safety for electric technician or site operator
- RS-485 Communication/Modbus-RTU
- Need to Connect Voltage Module for Voltage Measurement

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

Long time	Pick up between 1.05 ~ 1.20 Ir	Iu = In x		0.5	0.63	0.7	0.8	0.9	1.0				
		Ir = Iu x		0.8	0.83	0.85	0.88	0.9	0.93	0.95	0.98	1	non
	Time delay (sec) Tolerance Pick Largest value between ±15 % (Ir < 6 In), ±20 % (Ir ≥ 6 In), or ±100 ms	tr @ (1.5×Ir)		10.4	26.1	41.7	52	104	208	312	417	521	626
		tr @ (6.0×Ir)		0.5	1.25	2	2.5	5	10	15	20	25	30
		tr @ (7.2×Ir)		0.35	0.86	1.38	1.73	3.45	6.9	10.4	13.8	17.3	20.7
Short time	Threshold accuracy : ±10 %	Isd = Iu x		1	1.5	2	2.5	3	4	6	8	10	non
	Time delay (sec) @ 10×Iu Accuracy : ±15 % or ±40 ms I^2t on : ±20 % or 40 ms	tsd	I^2t off	0.05	0.1	0.2	0.3	0.4	0.5				
			I^2t on		0.1	0.2	0.3	0.4					
		I^2t off	min. trip time	0.02	0.8	0.16	0.26	0.36	0.46				
			max. trip time	0.08	0.14	0.24	0.34	0.44	0.54				
Instantaneous	Threshold (A) Accuracy : ±10 %	Ii = Iu x		2	3	4	6	8	10	12	15	non	
	Trip time			under 50 ms									
Ground fault	Threshold (A) Accuracy : ±15 %(Ig > 0.4 In), ±20 %(Ig ≤ 0.4 In)	Ig = In x		0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	1	non
	Time delay (sec) @ 1×In Accuracy : ±20 % or 40 ms	tg	I^2t off	0.05	0.1	0.2	0.3	0.4	0.5				
			I^2t on		0.1	0.2	0.3	0.4					
		I^2t off	min. trip time	0.02	0.8	0.16	0.26	0.36	0.46				
			max. trip time	0.08	0.14	0.24	0.34	0.44	0.54				
Pre-Alarm	Threshold	Ip = Iu x		0.6	0.65	0.7	0.75	0.8	0.85	0.9	0.95	1	non
	Time delay (sec) Accuracy: ±20%	tp		5	10	15	20	40	60	80	120	160	

※Ig cannot adjust over 1200A

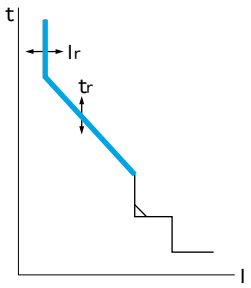
Accessories

Over Current Relay (OCR)

Operation Characteristics

Long Time Delay (LTD)





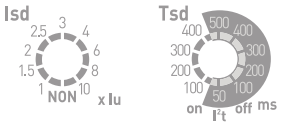
Standard Current Setting

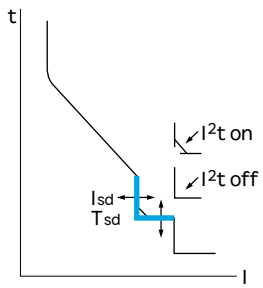
- L Type
  - The scale marks the magnification of [Iu].
  - The setting range of current is a 10-step
  - Iu : 0.5, 0.6, 0.7, 0.8, 0.9, 1.0 x In
  - Ir : 0.8, 0.83, 0.85,0.88, 0.9, 0.93, 0.95, 0.98, 1.0, non×[Iu].
    No protection in case the is set as [non]
  - The breaker does not trip below 105 % of [Ir] and trips at 120 % of [Ir] and above

Time Delay Setting

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

Short Time Delay (STD)





Standard Current Setting

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

Time delay setting

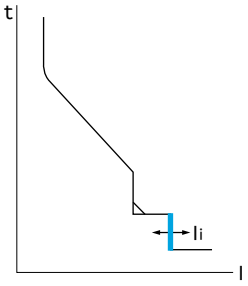
- L Type
  - The marking indicates the relay operation based on the time of 110 % of [Isd] in msec with definite time operation.
  - The setting range is:
  - Definite time(I^2t off): 50, 100, 200, 300, 400, 500 msec.
  - Inverse time (I^2t on): 100, 200, 300, 400 msec.
  - 1,000 % of inverse time curve is applied in case of I^2t on setting.
  - When ZSI function is set, the protection operates instantaneously when there is no ZSI input signal by downstream devices. The ZSI function should be disabled at the last downstream device.

Instantaneous (INST)



Standard Current Setting

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

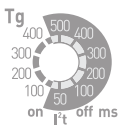


Time Delay Setting

- Total breaking time is below 50 ms.

Ground Fault Trip (GFT)

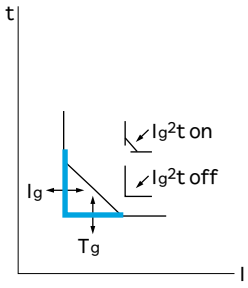




Standard Current Setting

• L Type

- The numbers indicate scale for the 1 st currnet of OCR [In].
- The setting range of current is
- Non,0.1,0.2,0.3,0.4,0.5,0.6, 0.7, 0.8,1.0×[In].
- Ig cannot adjust over 1200A



Time Delay Setting

• L Type

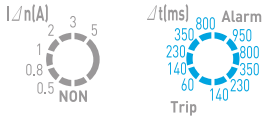
- The marking indicates the relay operation based on the time of 120 % of [Ig] in msec with definite time operation.
- The setting range is
- Definite time (I2t off) : 50, 100, 200, 300, 400, 500 msec.
- Inverse time (I2t on) : 100, 200, 300, 400 msec.
- It functions in case of 100 % Ict of inverse time in case of Ig^2t on setting.
- When ZSI function is set, the protection operates instantaneously when there is no ZSI input signal by downstream devices. The ZSI function should be disabled at the last downstream device.

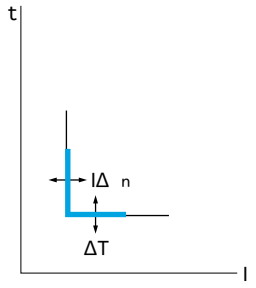
Accessories

Over Current Relay (OCR)

Operation Characteristics

Earth Leakege Trip (ELT)





Standard Current Setting

• GPR LAG

- The setting range of current is a 7-step method of Non, 0.5, 0.8, 1, 2, 3, 5, non (A)
- This function can be used only with private external CT (secondary output 5 A) selected by customers.
- Use cautions
- The setting range should be from 0.5 to 5A based on its secondary current. (Secondary output rating 5 A)
  if the customer uses the 100:5 A ZCT and trip relay is set to 0.5 A, the trip relay is going to operate exceeding 10 A earth leakage current. (0.5 A x 20 = 10 A)

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.
- Setting values within the alarm range won't rip the breaker. it will only activate 23-22 alarm contact.

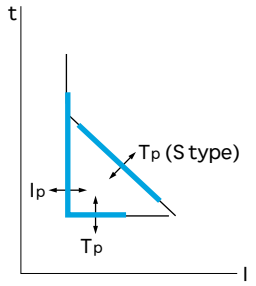
Pre-Trip Alram (PTA)



Standard Current Setting

• L Type

- The scale marks the magnification of [In] with inverse time operation.
- The setting range of current is a 10-step method of Non, 0.6, 0.65, 0.7, 0.75, 0.8, 0.85, 0.9, 0.95, 1.0 of [Iu].



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.

Characteristic Curve

General Feeder

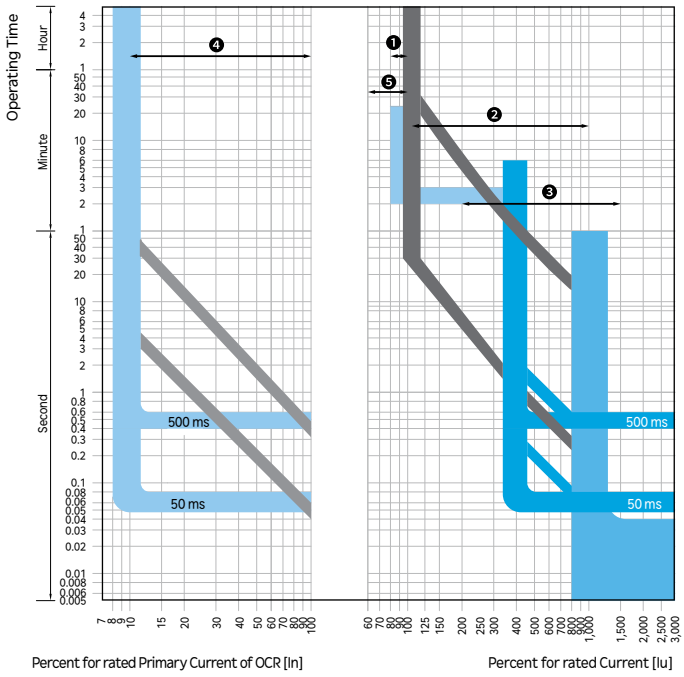
❶ Long Time Delay Current Setting Range

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



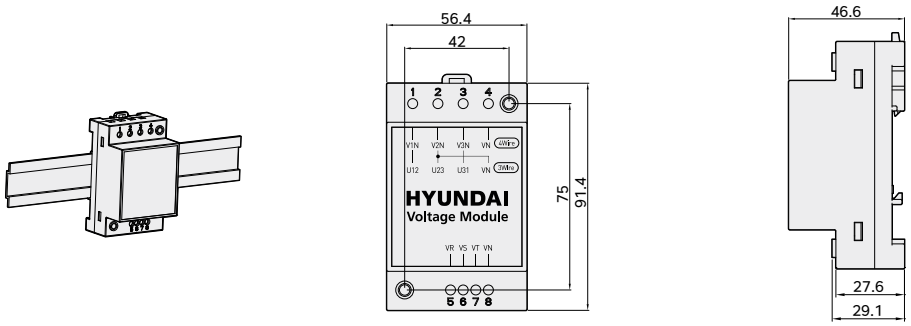
Accessories

Over Current Relay (OCR)

Measurable

Dimension

Unit : mm



Voltage Module

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

Voltage Input Range : AC 69 ~ 600 V

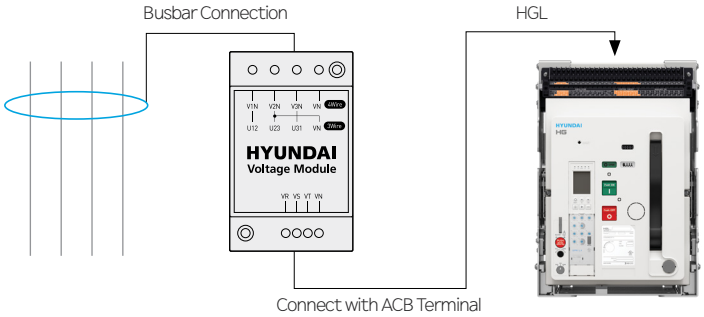
※ INSTALLATION PRECAUTION

- 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.

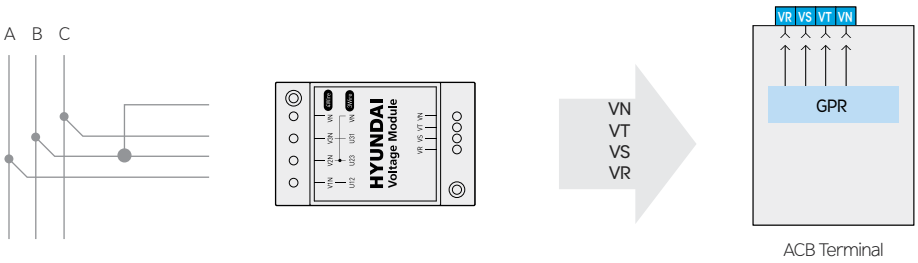
Voltage Connection

Voltage Input Range : 69 ~ 600 V

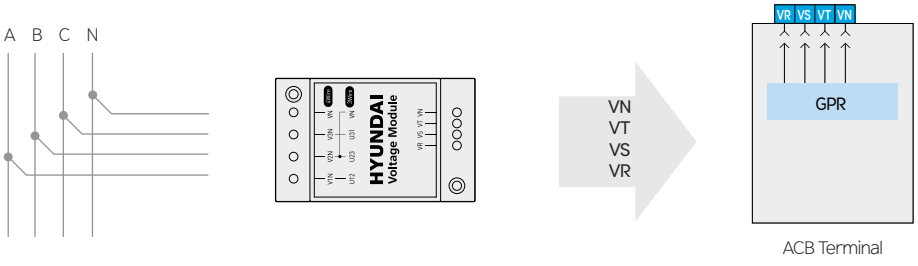
※ The length of connecting cable of the voltage module and ACB's VR, VS, VT shall be installed within 150 mm.



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.

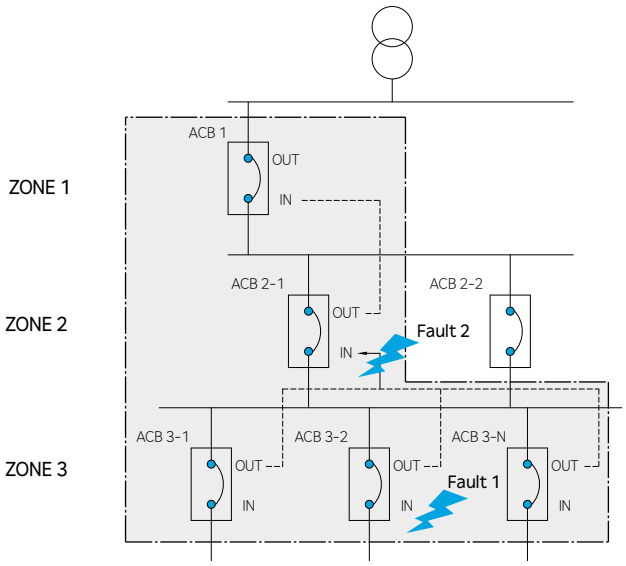
Examples

- First Fault Occurrence

  In case fault 1 occurs in selective zone (Zone 3), ACB 3-2 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)

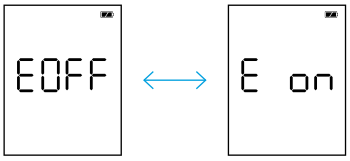
ERMS (Energy Reduction Maintenance setting)

The ERMS is a function to reduce the arc energy to ensure workers' safety. It is used to reduce the SIG protection settings in order to trip faster when an internal arc fault occurs. It is acknowledged as one of the recognized solutions to improve the protection of works against internal arc-fault caused by faulty electrical equipment, abnormal environmental conditions, lack of maintenance, ingress of mice. The ERMS function, when engaged, allows the A/P type trip unit to operate faster.

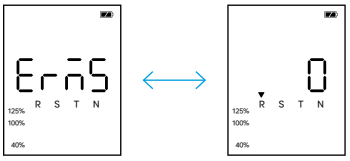
When ERMS is engaged. The corresponding information is made available as follow :

- On the trip unit face with the PTA alarm LED and number 22-23 contact operation on ACB terminal.
- On the trip unit display with 'ERMS' character.
- Through the customer communications network (Modbus-RTU)

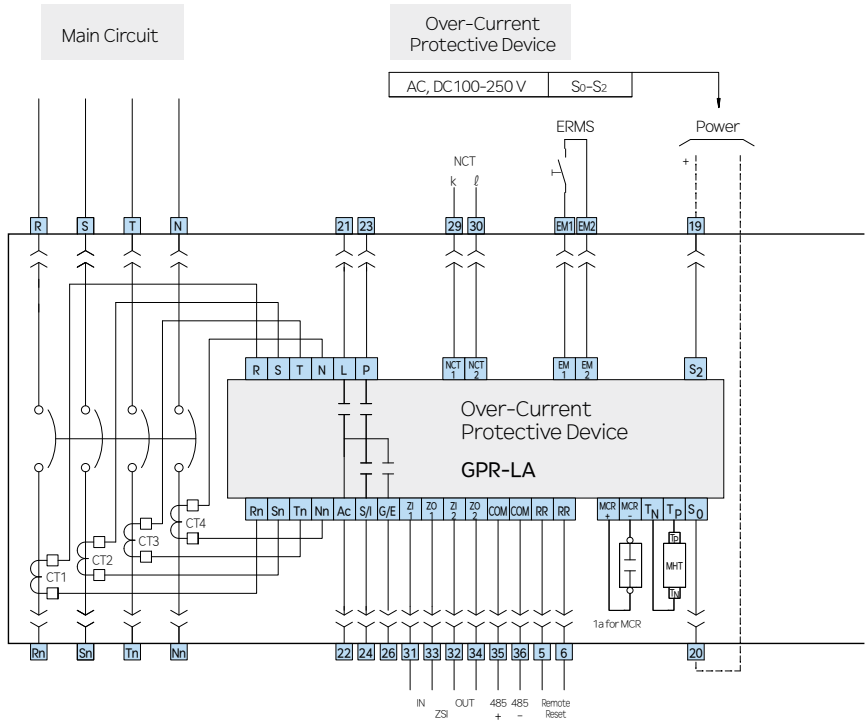
1. To use the ERMS function, jump between two ends of ERMS terminal.
2. Digital input :
   - Input (EM1-EM2) : Select ERMS.
   ※ All DI should be connected to dry contact.
3. Digital output :
   - Output (22-23) : alarm ERMS activated
4. It enables ERMS on the trip unit LCD or via user network like Modbus-RTU. The trip unit minimizes S, I, and G protection setting.



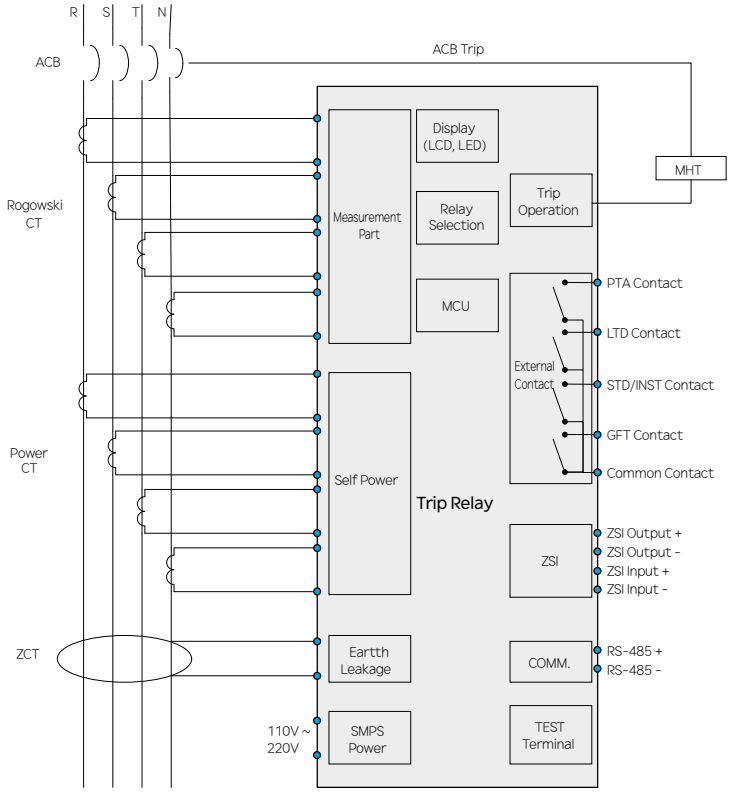
ERMS function enable / disable..



When ERMS is enable, display ERMS status.



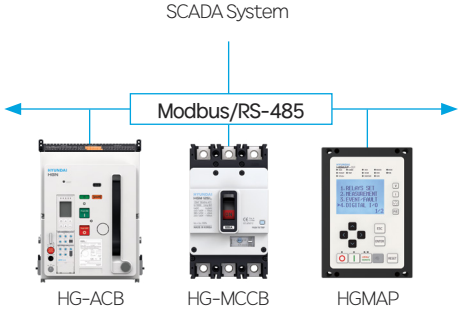
System Diagram



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 : 110 Ω



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.

NFC

Accessories

Over Current Relay (OCR)

Rating plug

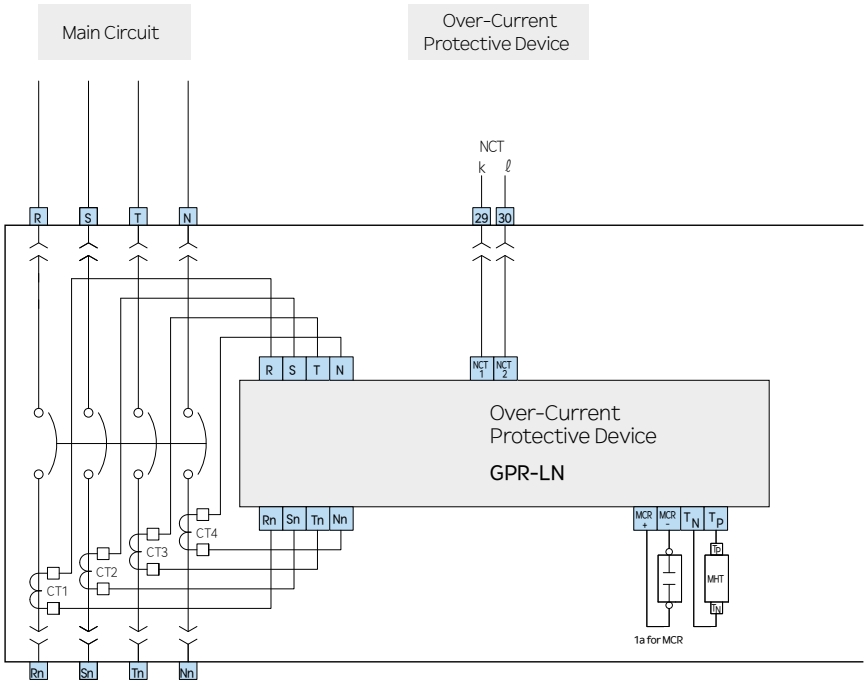
A Rating plug is value between 50 and 100% of the ACB.

The minimum value of self power is based on the CT rating not the rating plug.

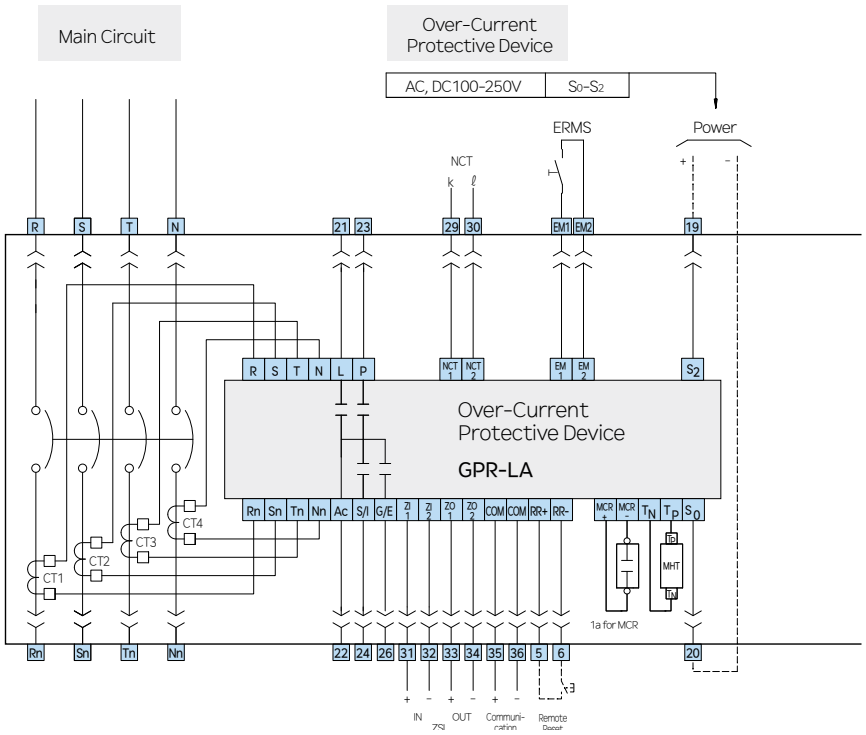
Rating plug	AF						
Rating	800AF	1600AF	2000AF	2500AF	3200AF	4000AF	6000AF
400 A	■						
600 A	■						
630 A	■						
800 A	■	■					
1000 A		■	■				
1200 A		■	■				
1250 A		■	■	■			
1600 A		■	■	■	■		
2000 A			■	■	■	■	
2500 A				■	■	■	
3000 A					■	■	■
3200 A					■	■	■
3600 A						■	■
4000 A						■	■
5000 A							■
6000 A							■

Circuit Diagrams

GPR-LN



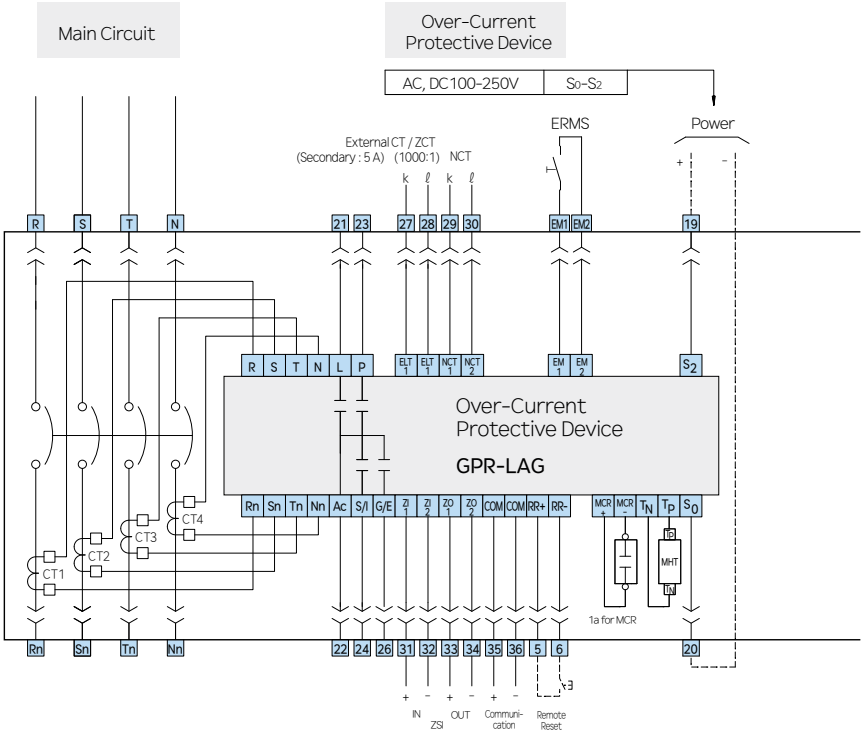
GPR-LA



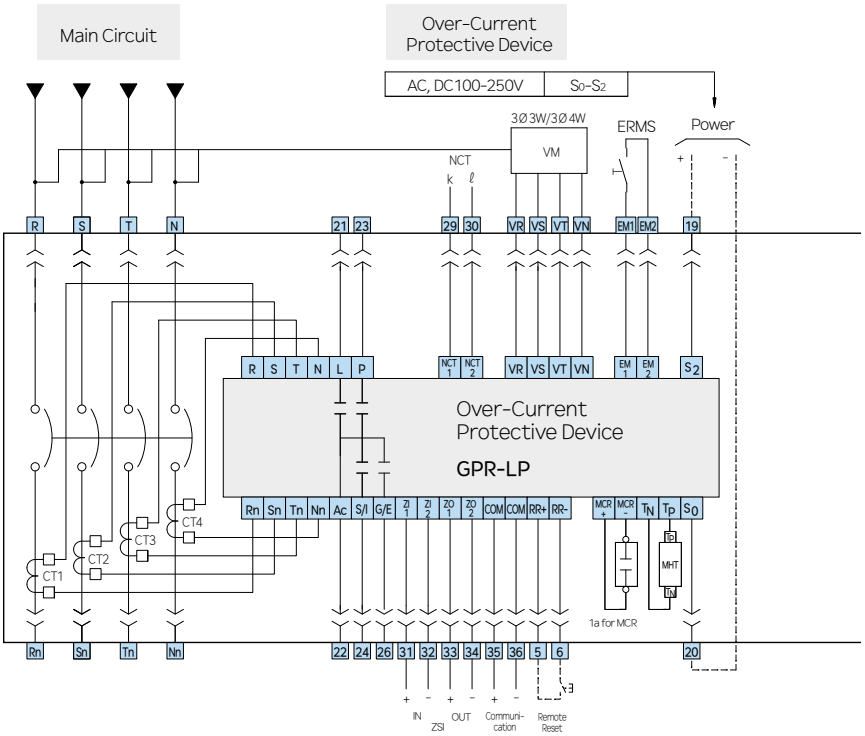
Accessories

Circuit Diagrams

GPR-LAG



GPR-LP



Time Chart for LTD Inverse Time (General Feeder)

Item	Tr / x Ir	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	Tr / x Ir	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	Tr / x Ir	LTD Time Setting (sec)									
		0.5	1.25	2	2.5	5	10	15	20	25	30
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	Tr / x Ir	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 STD Inverse Time (General Feeder)

Item	Tsd / x Iu	STD Time Setting (ms) Inland Type			
		100	200	300	400
Overload Rate (%)	100	10,000	20,000	30,000	40,000
	110	8,264	16,529	24,793	33,058
	120	6,944	13,889	20,833	27,778
	130	5,917	11,834	17,751	23,669
	140	5,102	10,204	15,306	20,408
	150	4,444	8,889	13,333	17,778
	160	3,906	7,813	11,719	15,625
	170	3,460	6,920	10,381	13,841
	180	3,086	6,173	9,259	12,346
	190	2,770	5,540	8,310	11,080
	200	2,500	5,000	7,500	10,000
	210	2,268	4,535	6,803	9,070
	220	2,066	4,132	6,198	8,264
	230	1,890	3,781	5,671	7,561
	240	1,736	3,472	5,208	6,944
	250	1,600	3,200	4,800	6,400
	260	1,479	2,959	4,438	5,917
	270	1,372	2,743	4,115	5,487
	280	1,276	2,551	3,827	5,102
	290	1,189	2,378	3,567	4,756
	300	1,111	2,222	3,333	4,444
	310	1,041	2,081	3,122	4,162
	320	977	1,953	2,930	3,906
	330	918	1,837	2,755	3,673
	340	865	1,730	2,595	3,460
	350	816	1,633	2,449	3,265
	360	772	1,543	2,315	3,086
	370	730	1,461	2,191	2,922
	380	693	1,385	2,078	2,770
	390	657	1,315	1,972	2,630
	400	625	1,250	1,875	2,500
	410	595	1,190	1,785	2,380
	420	567	1,134	1,701	2,268
	430	541	1,082	1,622	21,63
	440	517	1,033	1,550	2,066
	450	494	988	1,481	1,975
	460	473	945	1,418	1,890
	470	453	905	13,58	1,811
	480	434	868	1,302	1,736
	490	416	833	1,249	1,666
	500	400	800	1,200	1,600
	510	384	769	1,153	1,538
	520	370	740	1,109	1,479
	530	356	712	1,068	1,424
	540	343	686	1,029	1,372
	550	331	661	992	1,322
	560	319	638	957	1,276
	570	308	616	923	1,231
	580	297	595	892	1,189
	590	287	575	862	1149
	600	278	556	833	11,11
	610	269	537	806	1,075
	620	260	520	780	1,041

Item	Tsd / x Iu	STD Time Setting (ms) Inland Type			
		100	200	300	400
Overload Rate (%)	630	252	504	756	1,008
	640	244	488	732	977
	650	237	473	710	947
	660	230	459	689	918
	670	223	446	668	891
	680	216	433	649	865
	690	210	420	630	840
	700	204	408	612	816
	710	198	397	595	793
	720	193	386	579	772
	730	188	375	563	751
	740	183	365	548	730
	750	178	356	533	711
	760	173	346	519	693
	770	169	337	506	675
	780	164	329	493	657
	790	160	320	481	641
	800	156	313	469	625
	810	152	305	457	610
	820	149	297	446	595
	830	145	290	435	581
	840	142	283	425	567
	850	138	277	415	554
	860	135	270	406	541
	870	132	264	396	528
	880	129	258	387	517
	890	126	252	379	505
	900	123	247	370	494
	910	121	242	362	483
	920	118	236	354	473
	930	116	231	347	462
	940	113	226	340	453
	950	111	222	332	443
	960	109	217	326	434
	970	106	213	319	425
	980	104	208	312	416
	990	102	204	306	408
	1,000	100	200	300	400

Accessories

Over Current Relay (OCR)

Time Chart for GFT Inverse Time (General Feeder)

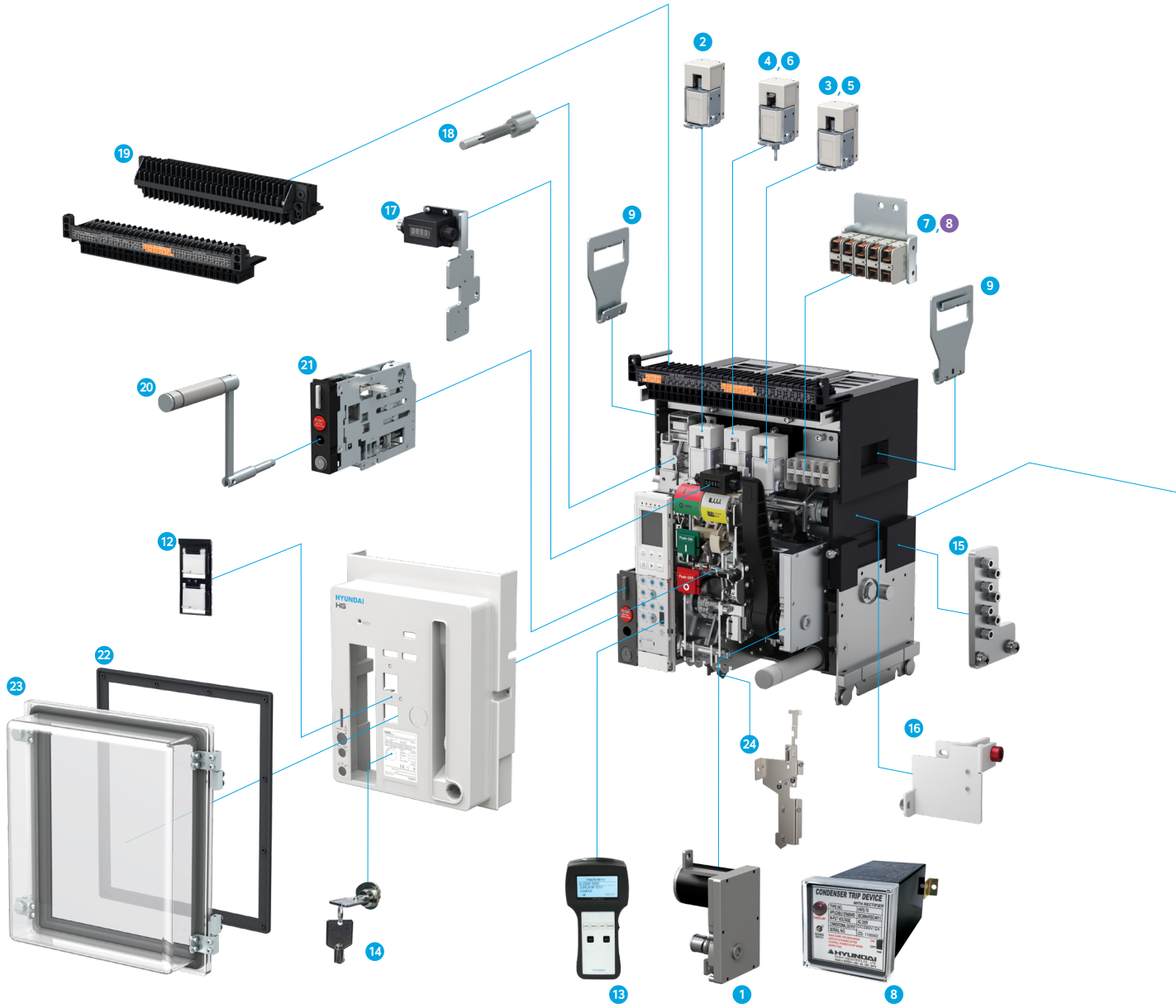
Item	Tg / x In	GFT Time Setting (ms)			
		100	200	300	400
Detection Setting Current (%)	10	10,000	20,000	30,000	40,000
	11	8,264	16,529	24,793	33,058
	12	6,944	13,889	20,833	27,778
	13	5,917	11,834	17,751	23,669
	14	5,102	10,204	15,306	20,408
	15	4,444	8,889	13,333	17,778
	16	3,906	7,813	11,719	15,625
	17	3,460	6,920	10,381	13,841
	18	3,086	6,173	9,259	12,346
	19	2,770	5,540	8,310	11,080
	20	2,500	5,000	7,500	10,000
	21	2,268	4,535	6,803	9,070
	22	2,066	4,132	6,198	8,264
	23	1,890	3,781	5,671	7,561
	24	1,736	3,472	5,208	6,944
	25	1,600	3,200	4,800	6,400
	26	1,479	2,959	4,438	5,917
	27	1,372	2,743	4,115	5,487
	28	1,276	2,551	3,827	5,102
	29	1,189	2,378	3,567	4,756
	30	1,111	2,222	3,333	4,444
	31	1,041	2,081	3,122	4,162
	32	977	1,953	2,930	3,906
	33	918	1,837	2,755	3,673
	34	865	1,730	2,595	3,460
	35	816	1,633	2,449	3,265
	36	772	1,543	2,315	3,086
	37	730	1,461	2,191	2,922
	38	693	1,385	2,078	2,770
	39	657	1,315	1,972	2,630
	40	625	1,250	1,875	2,500
	41	595	1,190	1,785	2,380
	42	567	1,134	1,701	2,268
	43	541	1,082	1,622	2,163
	44	517	1,033	1,550	2,066
	45	494	988	1,481	1,975
	46	473	945	1,418	1,890
	47	453	905	1,358	1,811
	48	434	868	1,302	1,736
	49	416	833	1,249	1,666
	50	400	800	1,200	1,600
	51	384	769	1,153	1,538
	52	370	740	1,109	1,479
	53	356	712	1,068	1,424
	54	343	686	1,029	1,372
	55	331	661	992	1,322
	56	319	638	957	1,276
	57	308	616	923	1,231
	58	297	595	892	1,189
	59	287	575	862	1,149
	60	278	556	833	1,111
	61	269	537	806	1,075
	62	260	520	780	1,041

Item	Tg / x In	GFT Time Setting (ms)			
		100	200	300	400
Detection Setting Current (%)	63	252	504	756	1,008
	64	244	488	732	977
	65	237	473	710	947
	66	230	459	689	918
	67	223	446	668	891
	68	216	433	649	865
	69	210	420	630	840
	70	204	408	612	816
	71	198	397	595	793
	72	193	386	579	772
	73	188	375	563	751
	74	183	365	548	730
	75	178	356	533	711
	76	173	346	519	693
	77	169	337	506	675
	78	164	329	493	657
	79	160	320	481	641
	80	156	313	469	625
	81	152	305	457	610
	82	149	297	446	595
	83	145	290	435	581
	84	142	283	425	567
	85	138	277	415	554
	86	135	270	406	541
	87	132	264	396	528
	88	129	258	387	517
	89	126	252	379	505
	90	123	247	370	494
	91	121	242	362	483
	92	118	236	354	473
	93	116	231	347	462
	94	113	226	340	453
	95	111	222	332	443
	96	109	217	326	434
	97	106	213	319	425
	98	104	208	312	416
	99	102	204	306	408
	100	100	200	300	400

※ Ig cannot adjust over 1200A

Accessories

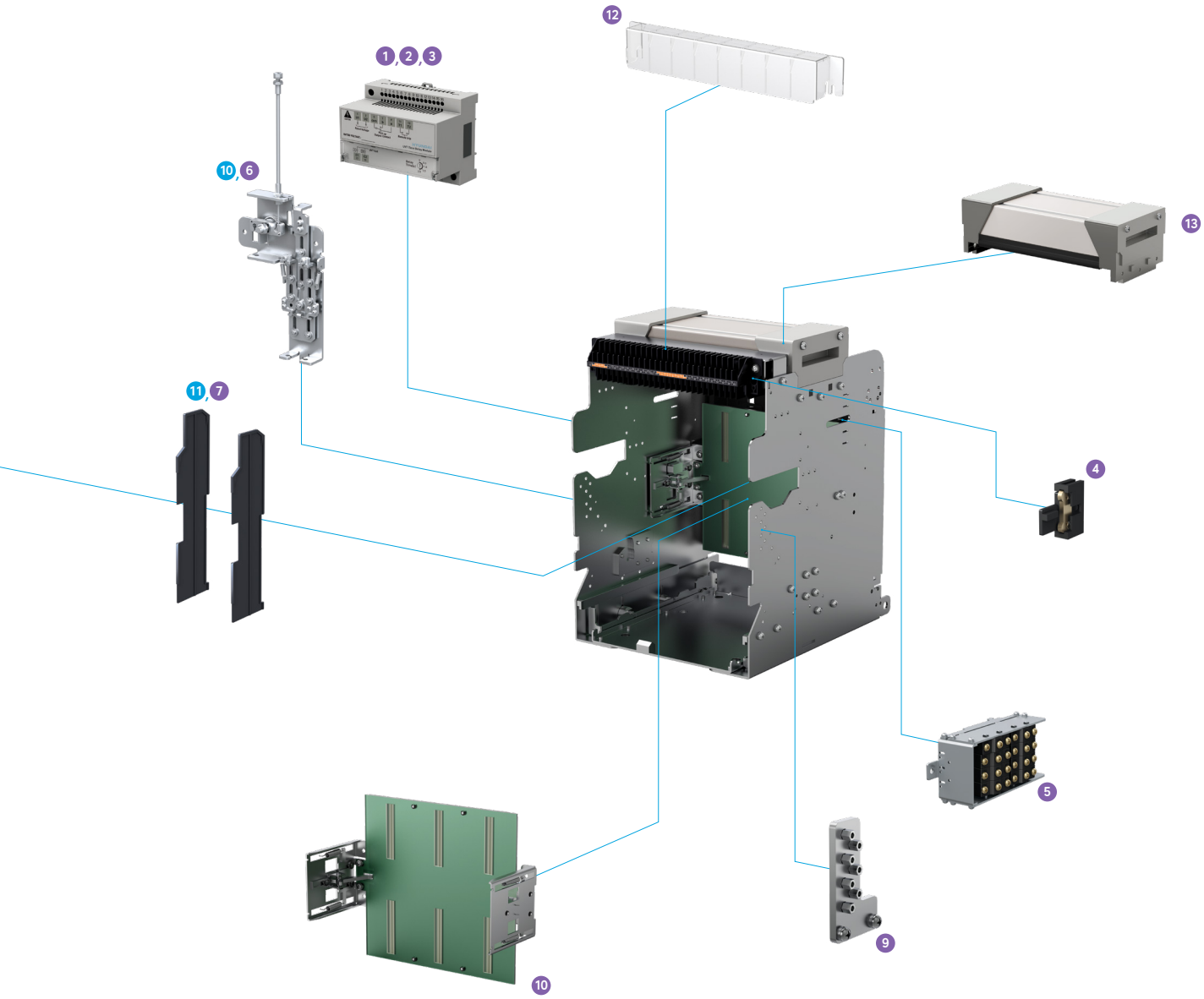
Main Unit



Accessories for Circuit Breaker

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

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

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.

Ordering Method

Name of Accessory	Order Name Placed upon Outgoing	Detailed Specification
Spring Charging Geared Motor	M1	AC/DC 100 ~ 125 V
	M2	AC/DC 200 ~ 250 V
	M7	DC 24 V
	M8	DC 48 V

Ratings

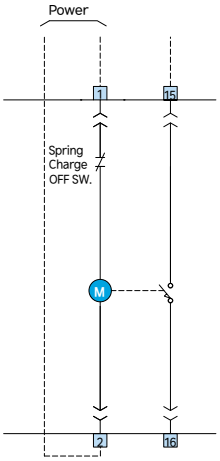
Item	DC 110	DC 220
Rated Current (A)	1.2	0.5
Starting Pick-Up (A)	5 ~ 6 times the rated current	
Final Rated rpm	16 ± 3	
Charging Time (sec)	Within 5 seconds [1)]	
Rated Torque (kgf)	300 kgf×cm	
Rated Watt (W)	100	100
Dielectric Strength (V/min)	2,000	
Insulation Resistance (MΩ)	100	
Workable Temperature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

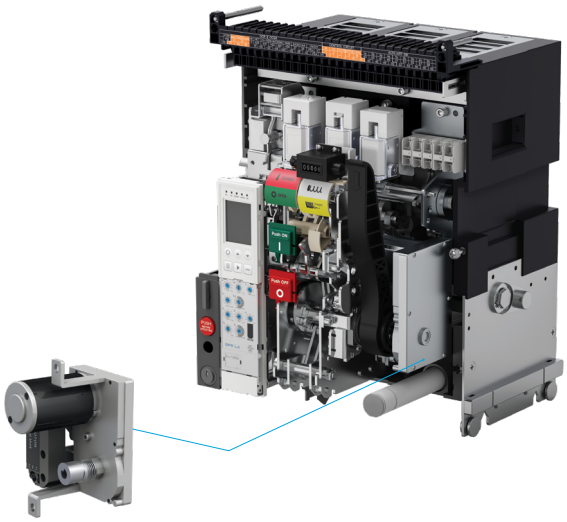
※ 1) Charging time is within 10 sec of rated, in case of DC 24/48 V.

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

Connection Diagram





Spring Charging Geared Motor

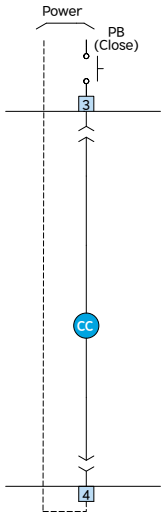
Spring Charging Switch or Ready to Close Switch

- 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.

Connection Diagram



Ordering Method

Name of Accessory	Order Name Placed upon Outgoing	Detailed Specification
Closing Coil	C1	AC/DC 100 ~ 125 V
	C2	AC/DC 200 ~ 250 V
	C3	AC 380 V
	C4	AC 440 V
	C7	DC 24 V
	C8	DC 48 V

Ratings

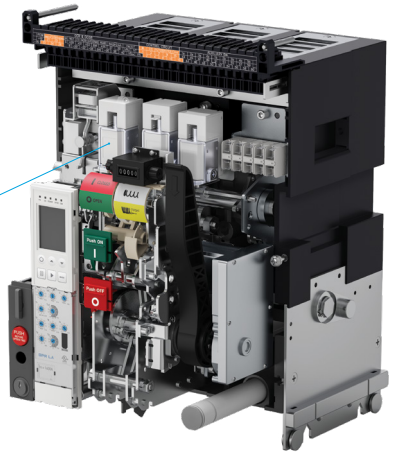
Item	DC (V)	AC (V)
Rated Voltage (Vn)	24~48	-
	100 ~ 130	100 ~ 130
	200 ~ 250	200 ~ 250
Operating Limits (Vn)	0.85 ~ 1.1	
Power Consumption (VA)	Inrush (300), Steady-State (10)	
Trip Time (ms)	80	
Pick up current	24 ~ 48 V : 3.0 A(±10 %)	-
	100 ~ 130 V : 2.0 A(±10 %)	100 ~ 130 V : 2.0 A(±10 %)
	200 ~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

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



Closing Coil

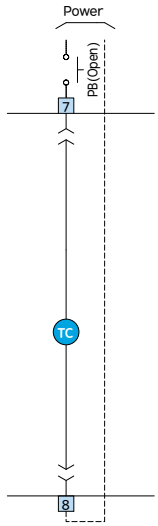


Accessories

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.

Connection Diagram



Ordering Method

Name of Accessory	Order Name Placed upon Outgoing	Detailed Specification
Trip Coil	S1	AC/DC 100 ~ 125 V
	S2	AC/DC 200 ~ 250 V
	S3	AC 380 V
	S4	AC 440 V
	S7	DC 24 V
	S8	DC 48 V

Ratings

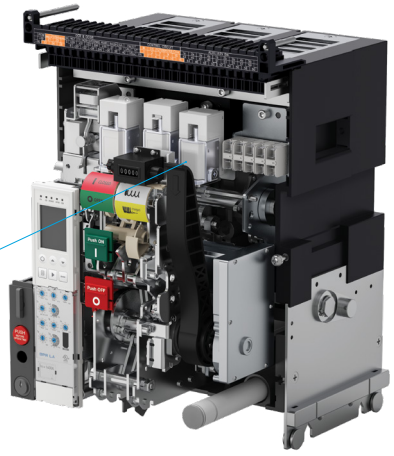
Item	DC (V)	AC (V)
Rated Voltage (Vn)	24~48	-
	100 ~ 130	100 ~ 130
	200 ~ 250	200 ~ 250
Operating Limits (Vn)	0.7 ~ 1.1	
Power Consumption (VA)	Inrush (300), Steady-State (10)	
Trip Time (ms)	40	
Pick up current	24 ~ 48 V : 2.0 A(±10 %)	-
	100 ~ 130 V : 2.0 A(±10 %)	100 ~ 130 V : 2.0 A(±10 %)
	200 ~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

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



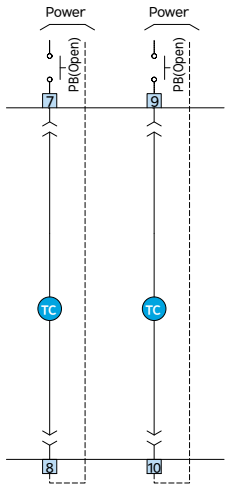
Trip Coil



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 100 ~125 V
	S2	AC/DC 200 ~ 250 V
	S3	AC 380 V
	S4	AC 440 V
	S7	DC 24 V
	S8	DC 48 V

Ratings

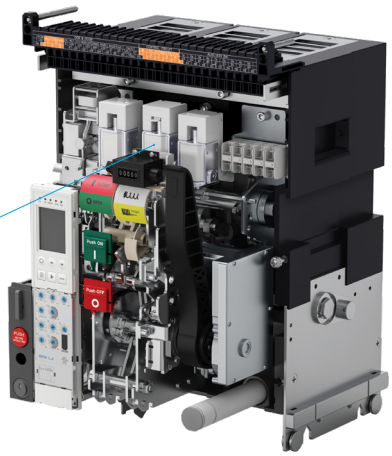
Item	DC (V)	AC (V)
Rated Voltage (Vn)	24~48	-
	100 ~ 130	100 ~ 130
	200 ~ 250	200 ~ 250
Operating Limits (Vn)	0.7 ~ 1.1	
Power Consumption (VA)	Inrush (300), Steady-State (10)	
Trip Time (ms)	40	
Pick up current	24 ~ 48V : 2.0A(±10%)	-
	100 ~ 130V : 2.0A(±10%)	100 ~ 130V : 2.0A(±10%)
	200 ~ 250V : 1.4A(±10%)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

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

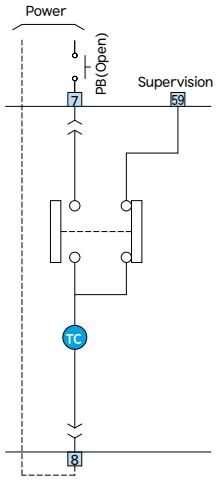


Accessories

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 100 ~ 125 V
	T2	AC/DC 200 ~ 250 V
	T3	AC 380 V
	T4	AC 440 V
	T7	DC 24 V
	T8	DC 48 V

Ratings

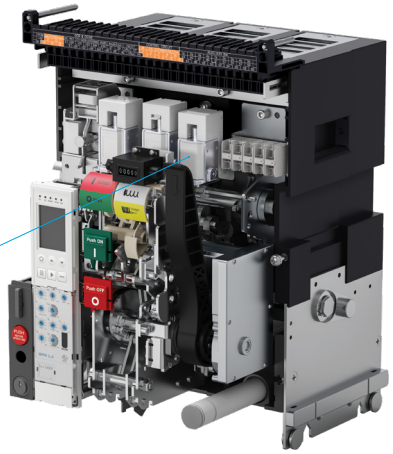
Item	DC (V)	AC (V)
Rated Voltage (Vn)	24	-
	100 ~ 130	100 ~ 130
	200 ~ 250	200 ~ 250
Operating Limits (Vn)	0.7 ~ 1.1	
Power Consumption (VA)	Inrush (300), Steady-State (10)	
Trip Time (ms)	40	

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



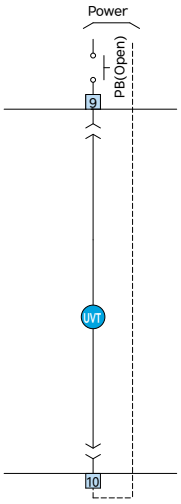
Trip Coil Supervision



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 100 ~ 125 V
	U2	AC/DC 200 ~ 250 V
	U3	AC 380 V
	U4	AC 440 V
	U7	DC 24 V
	U8	DC 48 V

Ratings

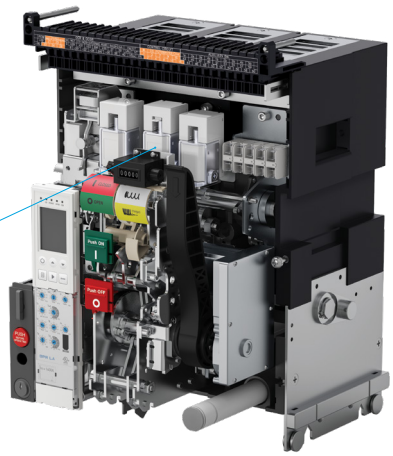
Item	DC (V)	AC (V)
Rated Voltage (Vn)	24	-
	110 (100 ~ 130)	110 (100 ~ 130)
	220 (200 ~ 250)	220 (200 ~ 250)
	-	380
	-	440
Pickup	Above 0.85 Vn	
Drop	Below 0.35 Vn	
Power Consumption (VA)	Inrush (300), Steady-State (10)	
Trip Time (ms)	50	

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

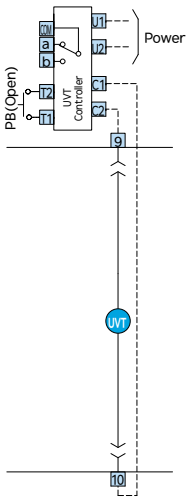


Accessories

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.

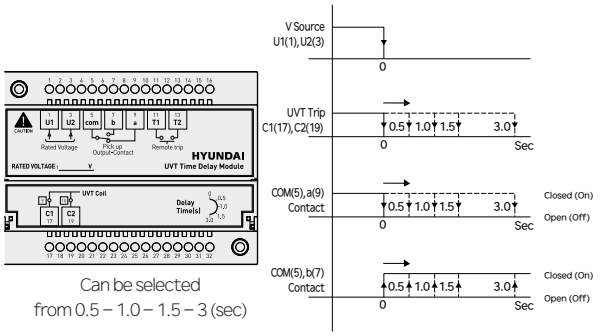
Connection Diagram



Ordering Method

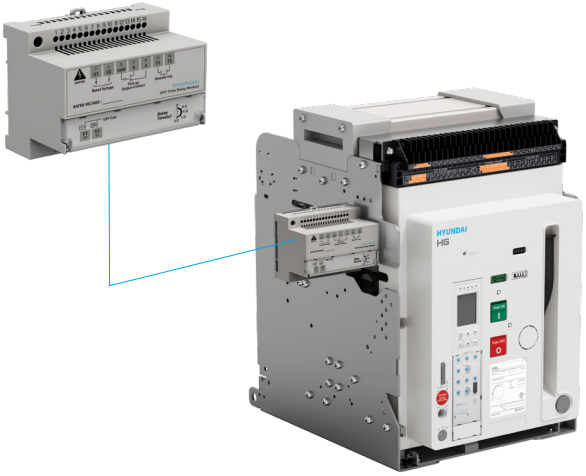
Name of Accessory	Order Name Placed upon Outgoing	Order Name for Separate Sales (HGNS-)	Detailed Specification
UVT Time Delay Controller	-	HGNS UT1	AC/DC 100 ~ 125 V
	-	HGNS UT2	AC/DC 200 ~ 250 V
	-	HGNS UT3	AC 380 V
	-	HGNS UT4	AC 440 V
UVT Time Delay Controller + UVT Coil	V1	HGNS V1	AC/DC 100 ~ 125 V
	V2	HGNS V2	AC/DC 200 ~ 250 V
	V3	HGNS V3	AC 380 V
	V4	HGNS V4	AC 440 V

Wiring and Operating Time



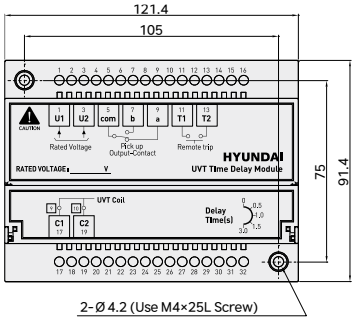
Can be selected from 0.5 – 1.0 – 1.5 – 3 (sec)

UVT Time Delay Controller



Dimension

Unit : mm

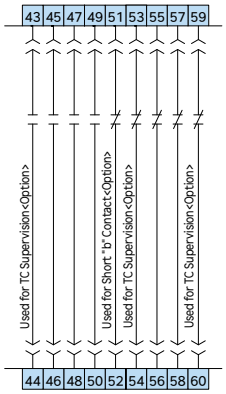


※ 5, 7, 9 switch status is the status when UVT is functioning.

AUX Switch

- It is an output contact to remotely monitor the On/Off state of the ACB.
- As for HGL Type, 4a5b is provided as standard without separate indication in the order form.
- AUX switch can be expanded up to 5a6b maximum.
  - How to order HGL 5a6b : Add AA in the order form.
- When using the monitoring contact for trip coil, 3a3b can be used for the AUX switch.
- 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.

Connection

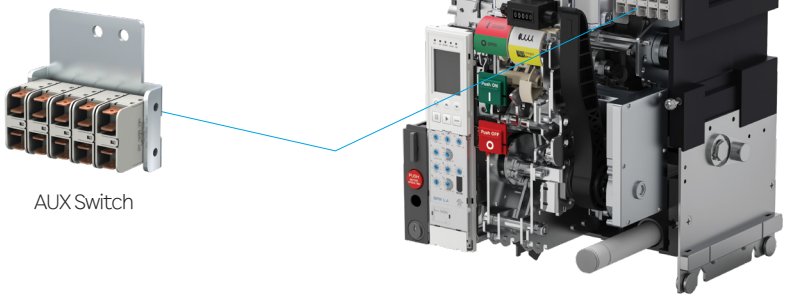


AUX Switch Ratings

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	-

Wire Specification

Wire Specification	AWG	Insulation Level (V)
Specification	20	300



AUX Switch

Accessories

Counter

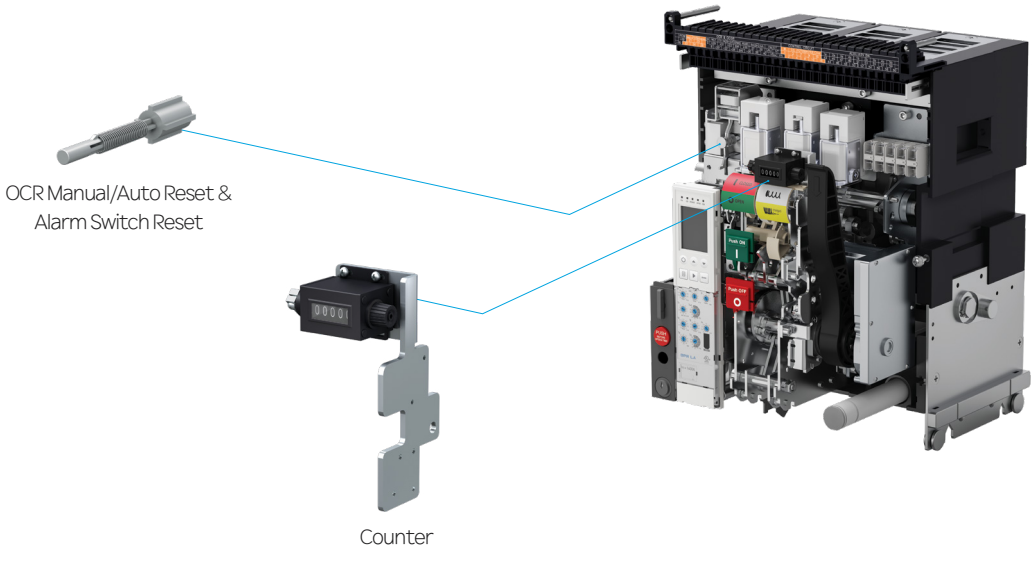
- It is a device that displays the number of operations, indicating On/Off operation of the circuit breaker in 1 cycle.
- It is a primary component so separate order is unnecessary.

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.
- Not UL Certified.

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)



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.

Position Switch



AUX Switch Ratings

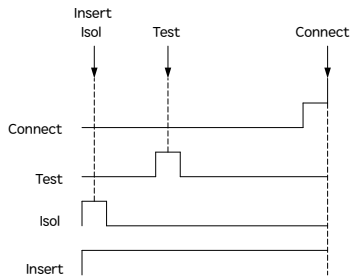
Applicable Load	Resistance	Lamp	Inductor	Motor
AC 125 V	10 A	1.5 A	6 A	2 A
DC 30 V	6 A	3 A	6 A	3 A
DC 125 V	0.6 A	0.1 A	0.6 A	0.1 A
DC 250 V	0.3 A	0.05 A	0.3 A	0.05 A

Ordering Method

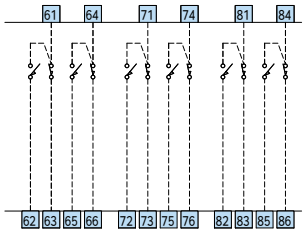
Order Name		Specification of Switch Output					Mounting Position
		Composition	Insert	Isol	Test	Connect	
AQ	HGNS AQ	Test 1C/Connect 1C	×	×	● (1C)	● (1C)	Right Side of Cradle
AR	HGNS AR	Connect 2C	×	×	×	● (2C)	
AS	HGNS AS	Test 2C	×	×	● (2C)	×	
AT	HGNS AT	Isol 1C/Insert 1C	● (1C)	● (1C)	×	×	
AU	HGNS AU	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



Test Position	Connection Position	Isolation Postion
61-62 a 61-63 b	71-72 a 71-73 b	81-82 a 81-83 b
64-65 a 64-66 b	74-75 a 74-76 b	INSERT POSITION
67-68 a 67-69 b	77-78 a 77-79 b	91-92 a 91-93 b

Dimension

Unit : inch (mm)

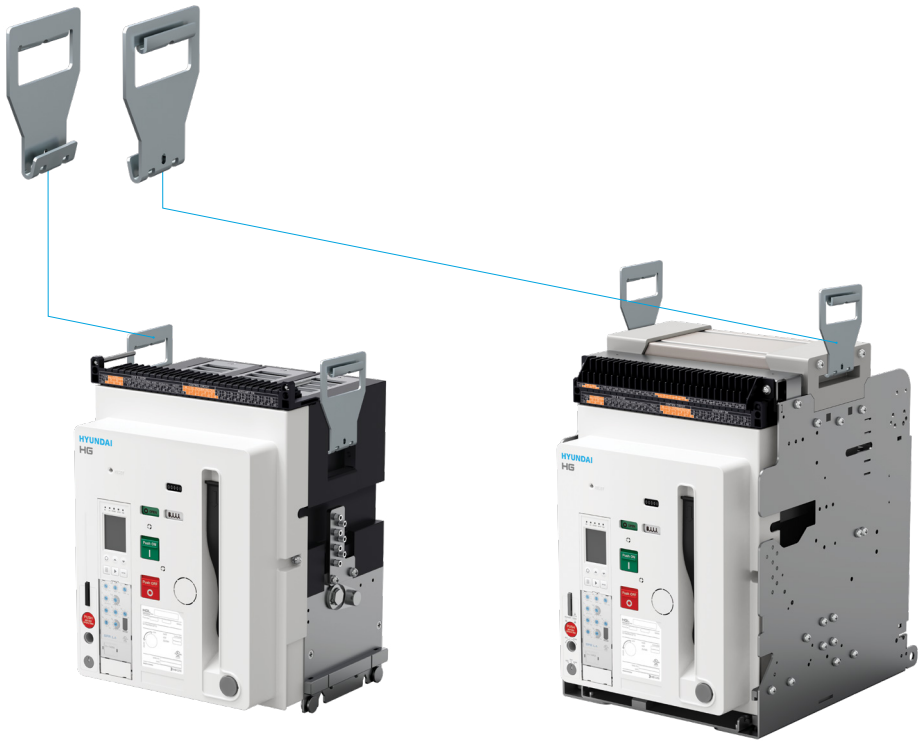


Accessories

Lifting Lug

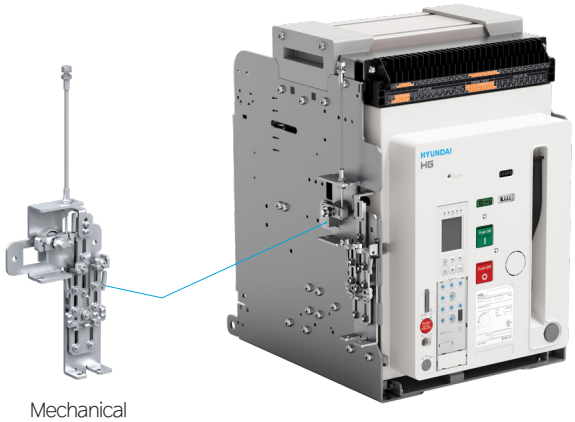
- It is a component that is used for transporting the circuit breaker.
- It can be hung to the handle at the side of the cradle, side of the arc shield and the main unit and the product can be moved by a crane or a person.
- When handling all the products, use the crane and in case of transporting independently using only the crane in case of products below 2,500 A, the products must be transported in accordance with the safety regulations.
- As a product sold separately, place an order for HGNS AL.

Lifting Lug



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

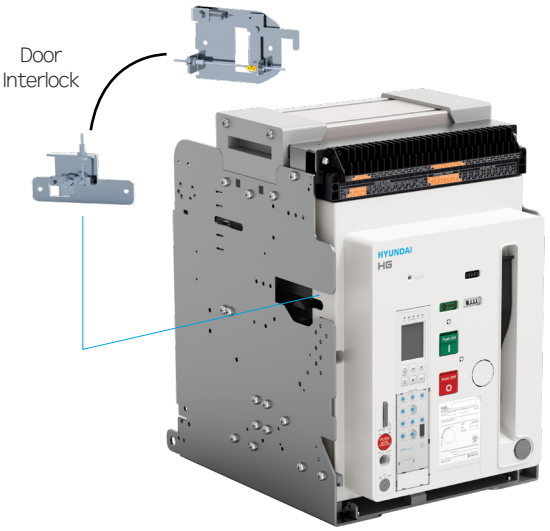
Name of Accessory	Order Name for Separate Sales (HGNS-)	Accessory Spec.
Mechanical Interlock	HGNS DWB1	A & B & Q & C & D Frame Draw-Out (Fixed) Type 2 Way MI (External Mounting Kit Only)
	HGNS DWB2	A & B & Q & C & D Frame Draw-Out (Fixed) Type 3 Way MI (External Mounting Kit Only)
	HGNS FWB1	A & B & Q & C & D Frame Fixed Type 2 Way MI (External Mounting Kit Only)
	HGNS FWB2	A & B & Q & C & D Frame Type 3 Way MI (External Mounting Kit Only)
	HGNS B0DA	A 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 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 Frame Draw-Out Type 2 Way MI + Interlock Part (B0)
	HGNS DWB2A	A 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)

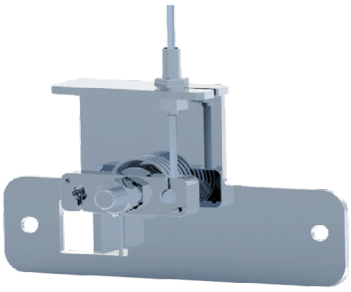
Name of Accessory	Order Name for Separate Sales (HGNS-)	Accessory Spec.
Mechanical Interlock	HGNS DWB2C3	C Frame 3P Draw-Out 3 Way MI + Interlock Part (B0)
	HGNS DWB2C4	C Frame 4P Draw-Out 3 Way MI + Interlock Part (B0)
	HGNS DWB1D3	D Frame 3P Draw-Out 2 Way MI + Interlock Part (B0)
	HGNS DWB1D4	D Frame 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 Frame Fixed Type 2 Way MI + Interlock Part (B0)
	HGNS FWB2A	A 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

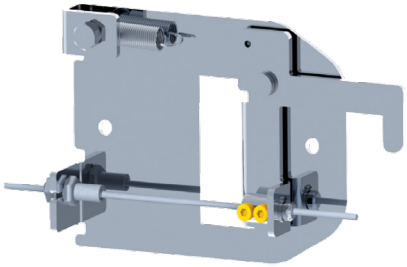
Door Interlock [DI]

- 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 DO, 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.
- Not UL Certified.





Installation on the left side of the ACB cradle



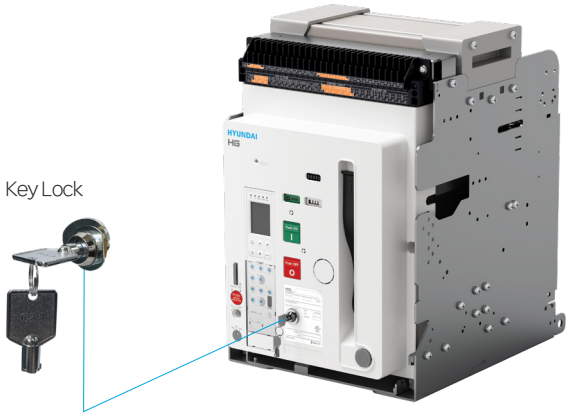
Installation on the right side of the switchboard.

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 Frame internal interlock components(DO)
	HGNS DDIBD	Draw-out type external attachment Kit + B, Q, D Frame internal interlock components(DO)
	HGNS FDIAC	Fixed type external attachment Kit + A, C Frame internal interlock components(DO)
	HGNS FDIBD	Fixed type external attachment Kit + B, Q, D Frame internal interlock components(DO)

Key Lock

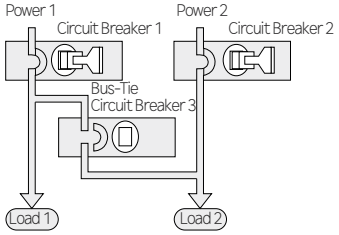
- It is a device that maintains the interlock condition to prevent electric/manual closing when the circuit breaker is open.
- When the key has been used to unlock, the electric/manual On/Off operation is possible. When the key has been removed from the circuit breaker, it becomes interlocked. When the 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.



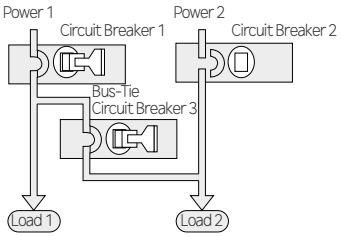
Key Lock & Key Interlock

- 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.

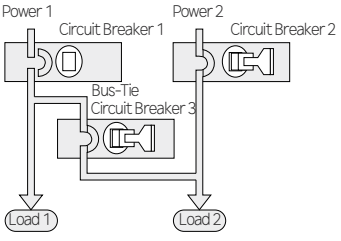
Circuit Breaker 3 cannot be closed



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)

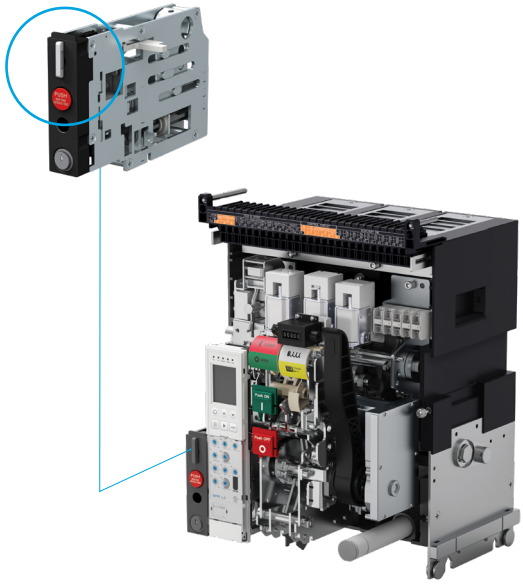
DR Device Unit & Position Pad Lock

- 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.

On/Off Button Lock



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.

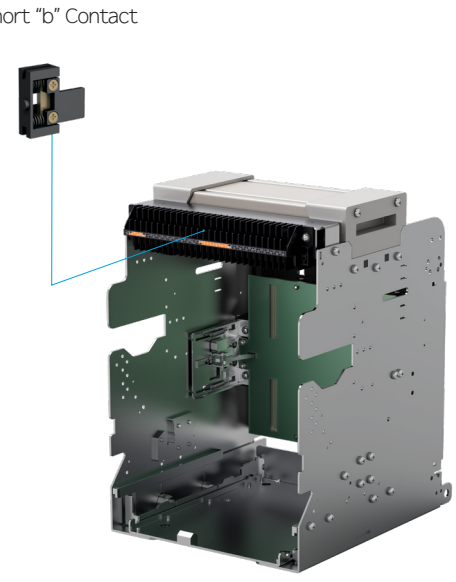


Short "b" Contact

- 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 Operating / ACB Position	ACB Close (AUX "b" Off)	ACB Open (AUX "b" On)
Connected Position (Short "b" Off)	OFF AUX "b" Short "b"	ON AUX "b" Short "b"
Test Position (Short "b" On)	OFF AUX "b" Short "b"	ON AUX "b" Short "b"



Accessories

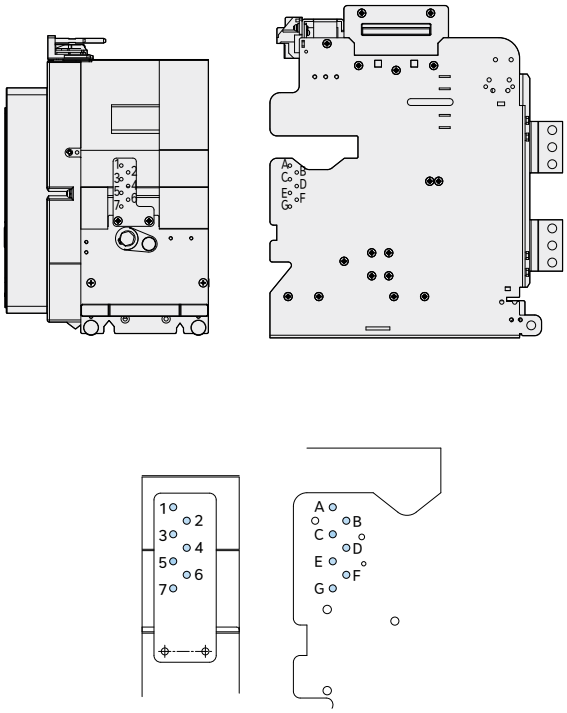
Miss-Insertion Preventor

- 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 Rating Plug (In).
- 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

Rating Plug (In)	Cradle	ACB
0 = OCR Non Mounting	ADEG	236
E = 400A	ABDG	356
B = 600A	ACDG	256
T = 630A	ABDF	357
H = 800A	ABDE	367
J = 1,000A	ABCG	456
W = 1,200A	ACFG	245
K = 1,250A	ABCF	457
L = 1,600A	ABCE	467
M = 2,000A	ABCD	567
N = 2,500A	BCDE	167
R = 3,000A	ACDE	267
P = 3,200A	BCDF	157
C = 3,600A	BCEG	146
Q = 4,000A	BCDG	156
S = 5,000A	BCEF	147
Z = 6,000A	BDEF	137

Part's Mounting Position per Rated Current





Miss-Insertion Preventer

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.

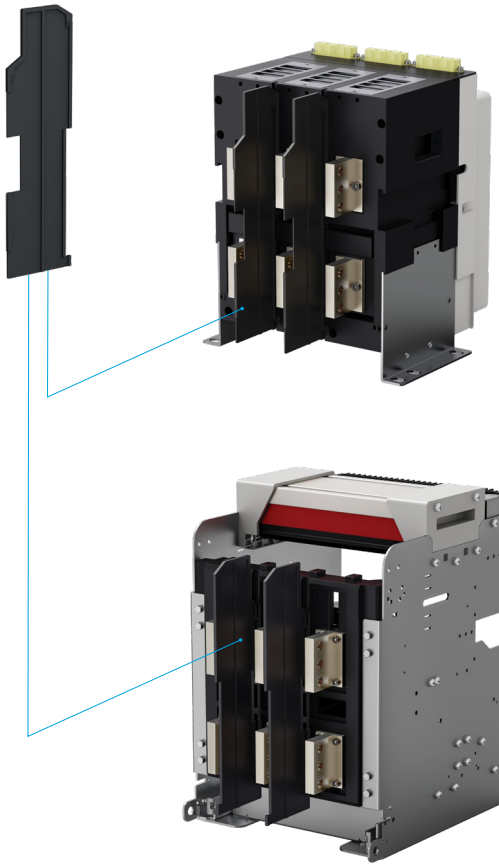
Safety Shutter & Shutter Lock

- 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.

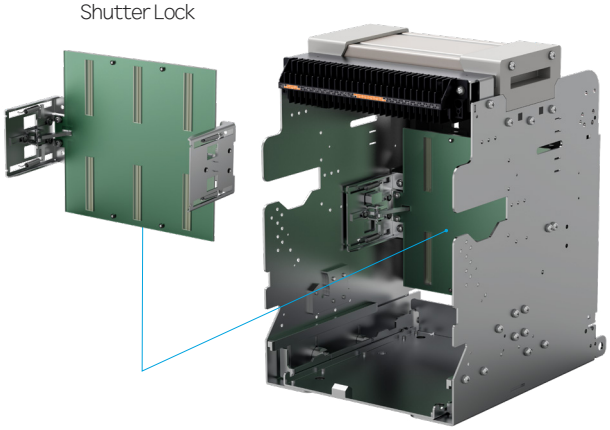
Ordering Method

Name of Accessory	Order Name Placed upon Outgoing	Order Name for Separate Sales (HGLS-)	Detailed Specification
Safety Shutter	AE	HGNS AEA3	A Frame, 400 ~ 1,600 A, 3P
		HGNS AEA4	A Frame, 400 ~ 1,600 A, 4P
		HGNS AEB3	B, Q Frame, 400 ~ 3,200 A, 3P
		HGNS AEB4	B, Q Frame, 400 ~ 3,200 A, 4P
		HGNS AEC3	C Frame, 2000 ~ 4,000 A, 3P
		HGNS AEC4	C Frame, 2000 ~ 4,000 A, 4P
		HGNS AED3	D Frame, 3,000 ~ 6,000 A, 3P
		HGNS AED4	D Frame, 3,000 ~ 6,000 A, 4P

Phase Insulation Barrier



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.

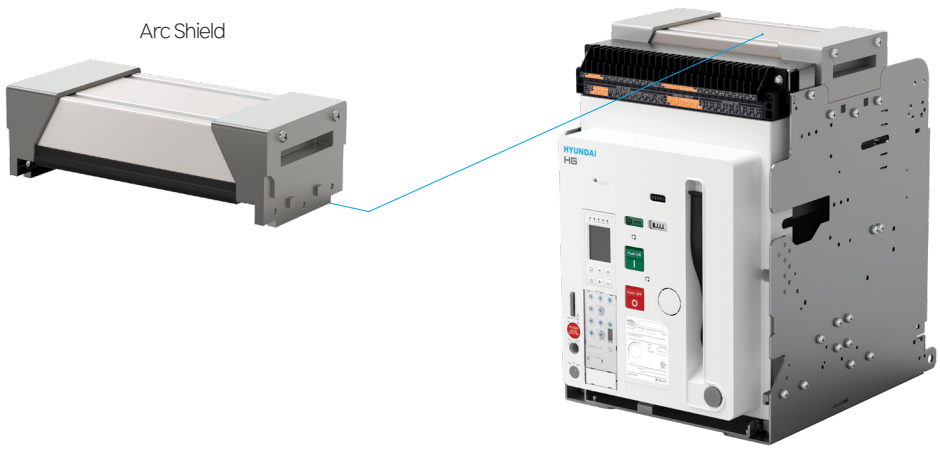


Arc Shield

- 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 (HGLS-)	Detailed Specification
Arc Shield	AX	HGLS AXA3	A Frame, 400 ~ 1,600 A, 3P
		HGLS AXA4	A Frame, 400 ~ 1,600 A, 4P
		HGLS AXB3	B, Q Frame, 400 ~ 3,200 A, 3P
		HGLS AXB4	B, Q Frame, 400 ~ 3,200 A, 4P
		HGLS AXC3	C Frame, 2,000 ~ 4,000 A, 3P
		HGLS AXC4	C Frame, 2,000 ~ 4,000 A, 4P
		HGLS AXD3	D Frame, 3,000 ~ 6,000 A, 3P
		HGLS AXD4	D Frame, 3,000 ~ 6,000 A, 4P



Accessories

UET (Unified ETU Tester)

- The Unified ETU Tester (UET) performs relay test operations of 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 UET, connect when the control power of OCR is off when inserting the OCR.
- UET is not used as a measuring equipment, but is simply a device that displays values from the operation results of ACB OCR.
- The equipment output is digitally controlled by CPU and does not require calibration.
- Not UL Certified.

※ For more information, please refer to the manual on our website.



Ratings

Item		Details
Operating Voltage (ADAPTOR provided)	Input	AC 100 - 240 V, 50/60 Hz, 0.5 A
	Output	DC 24 V, 1 A
Battery		Lithium polymer battery 3.7 V, 1,800 mAh
Operating Temperature		0 - 50 ℃
Storage Temperature		0 - 60 ℃
Trip Time Measuring Range	Resolution	1 ms
	Range	0 - 999.999 sec
Fault Simulation Signal		Digital Signal
Power Consumption		120 W

※ Please be sure to use the adaptor we provide. We are not responsible for any problems caused by using an adaptor other than the adaptor we provide with the product.

Ordering Method

Name of Accessory	Order Name for Separate Sales	Accessory Spec.
OCR Checker	HGNS UET AC	PORTABLE OCR CHECKER

CTD-Condenser Trip Device

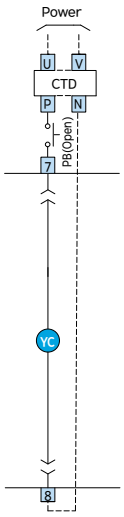
- In case of using AC/DC power for trip control of the circuit breaker, it is a device that can electrically trip the circuit breaker once by using the power charged in the CTD when the supply of control voltage has been stopped due to black-out and others.
- It is a product sold separately.
- Not UL Certified.



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

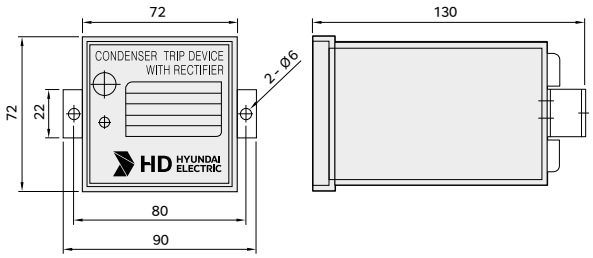


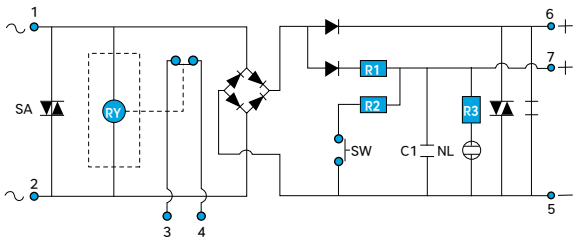
Ratings

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

Accessories

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.



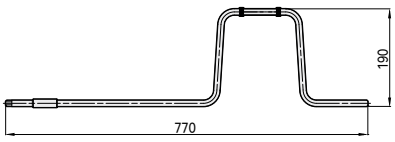
Draw-In/Out Handle

- 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.
- Not UL Certified.

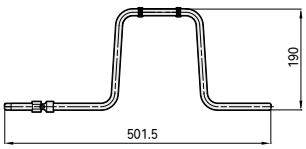


Type

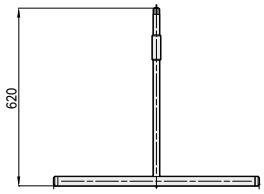
Long Type Handle



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

Door Flange

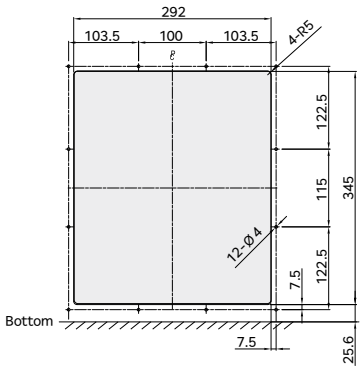
- It is an auxiliary device mounted on the cutting part of the panel door at the front protrusion mounting type of ACB.
- The door flange of our company is IP30.
- As for the cutting dimension of the panel, refer to the external drawing.
- As for the panel cutting dimension, it is equivalent for both 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.

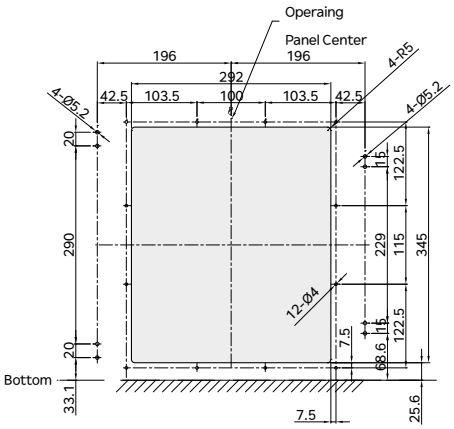
Panel Door Cutting Dimension

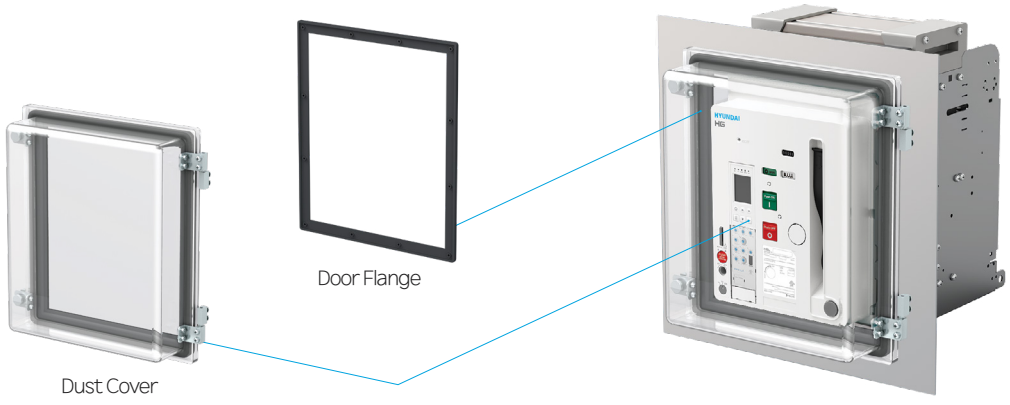
Unit : mm



Panel Door Cutting Dimension

Unit : mm





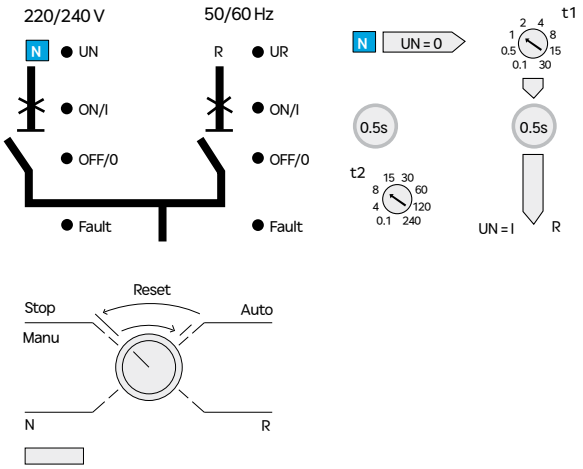
Accessories

ATS & Controller

Characteristics per Mode

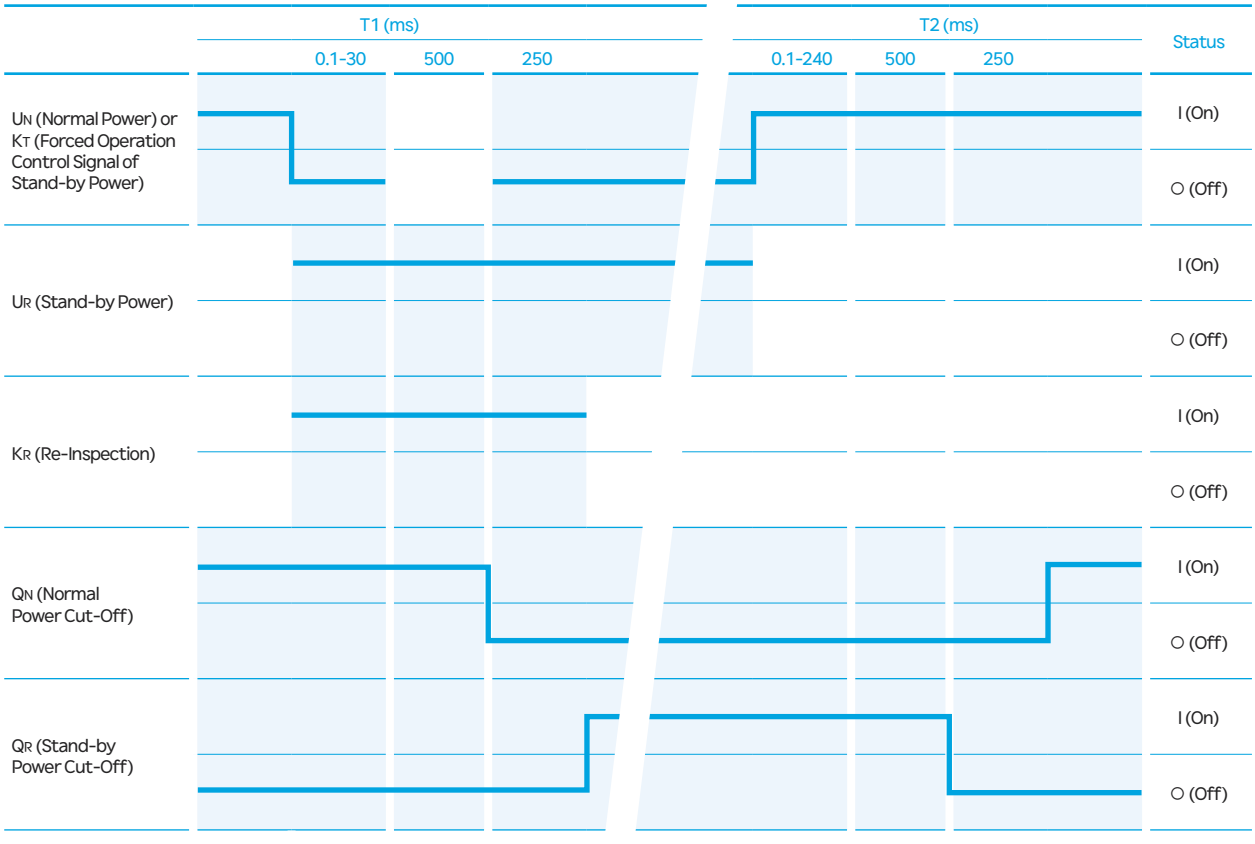
There are 4 selection modes.

- 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.
- Not UL Certified.



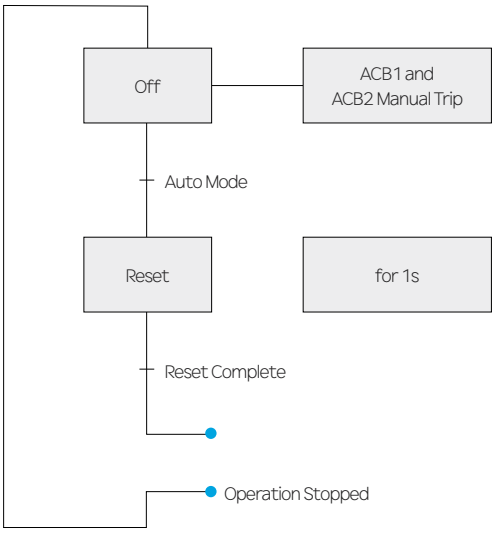
Time Delay Adjustment	Indication of the Controller's Status
t1 : 0.1 ~ 30 sec	On, Off, Fault Indication
t2 : 0.1 ~ 240 sec	(Power Company Side, Generator Side)

Operation Characteristics

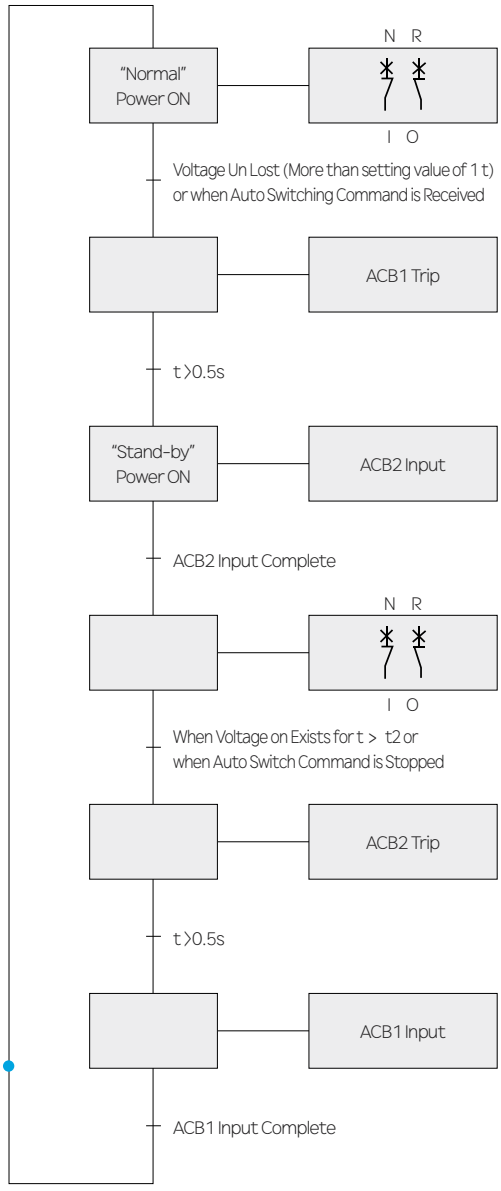


System Operation

Stop Mode



Auto Mode



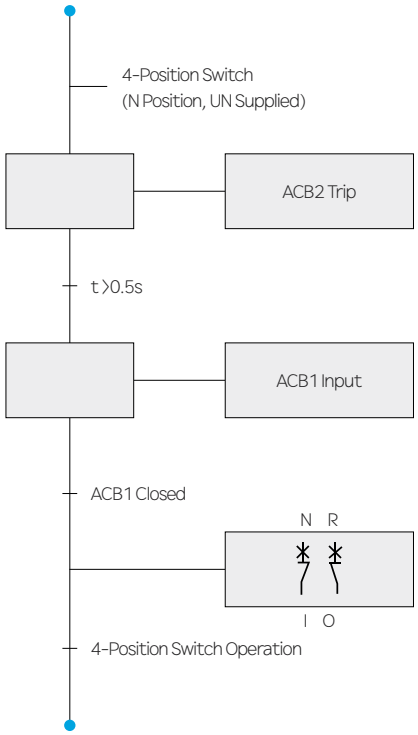
- ACB1 : HGN (S) ACB1 "Normal" Power (Power Company Side)
- ACB2 : HGN (S) ACB2 "Stand-by" Power (Generator Side)
- UN : "Normal" Power Voltage
- UR : "Stand-by" Power Voltage

Accessories

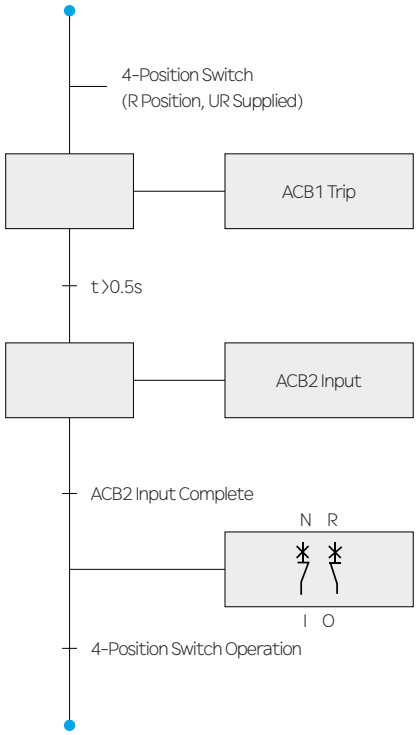
ATS & Controller

System Operation

N Mode ("Normal Mode" Forced ON)

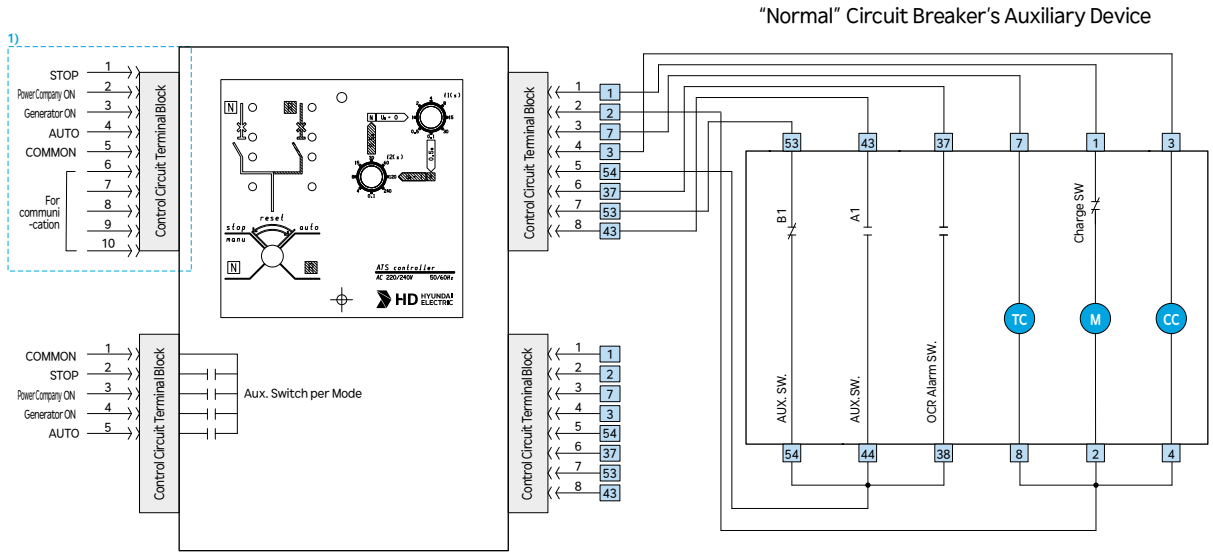


R Mode ("Stand-by" Power Forced ON)



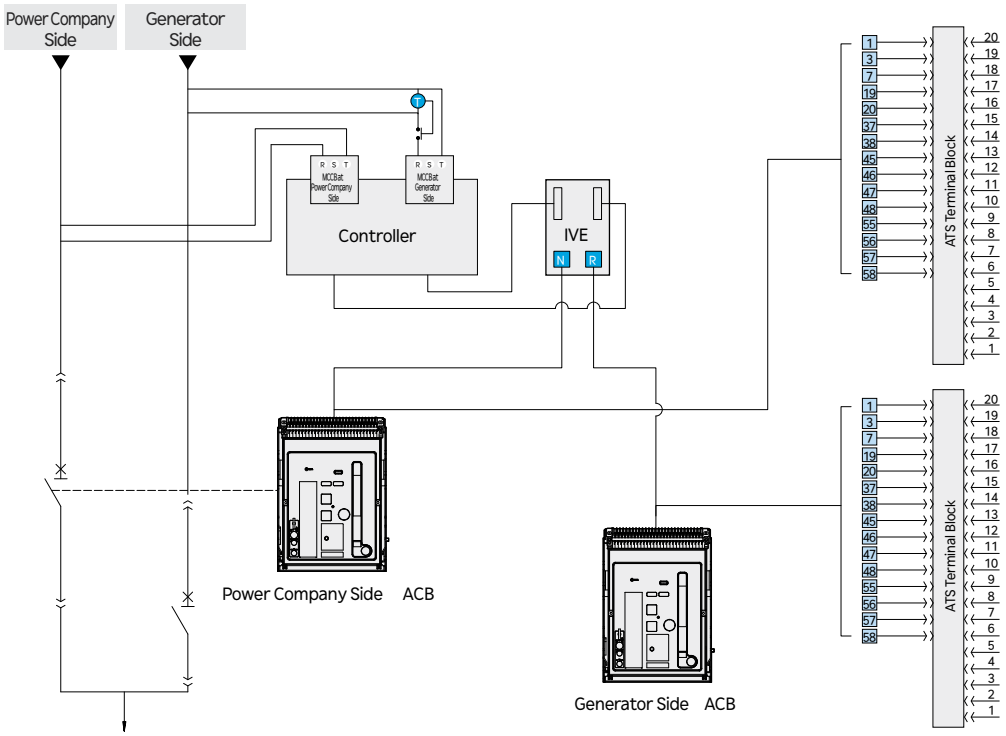
Circuit Diagram of the System [HGL Type]

Auto Switch System's Auxiliary Device Circuit Diagram



※ **1)** The standard model is a SW mounting type on controller. (Control terminal type is not a standard model)

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

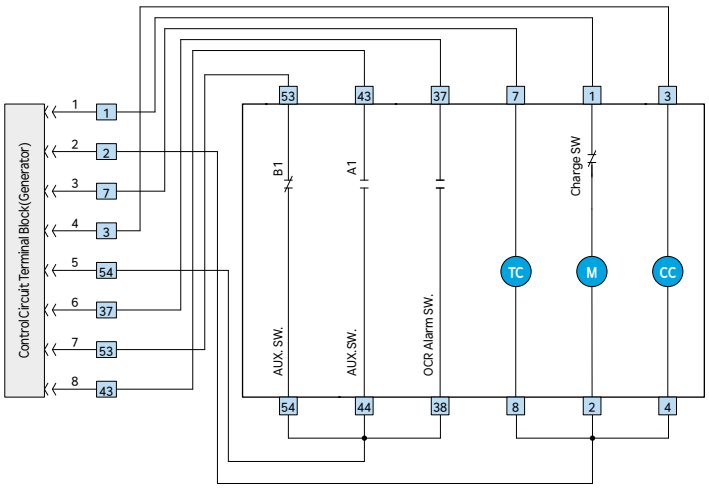


Accessories

ATS & Controller

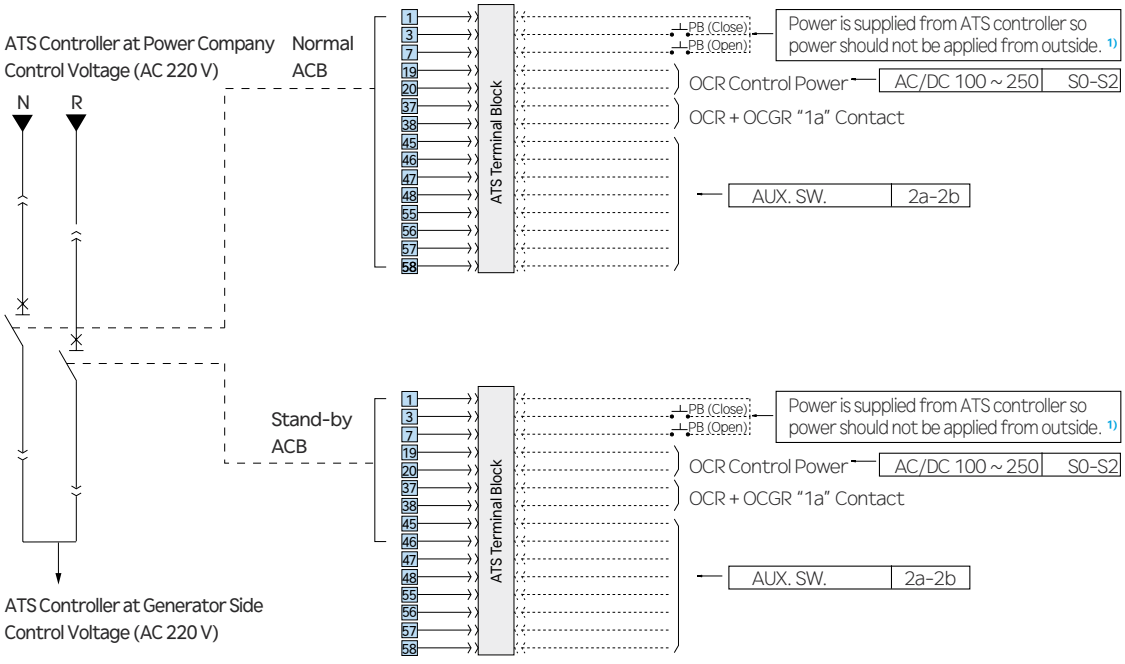
Circuit Diagram of the System [HGL Type]

"Stand-by" Circuit Breaker's Auxiliary Device



37 38 OCR DO
43 44 Auxiliary a Switch Terminal
53 54 Auxiliary b Switch Terminal
TC Voltage Trip
7 8 Voltage Trip Power Terminal
1 2 Geared Charge Power Terminal
3 4 Power Terminal for Close
M Charging Motor
CC Latch Release (Close)

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")

Technical Data

Convenient Connection Method

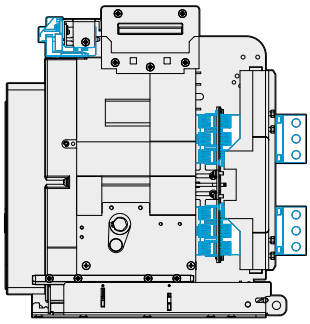
As for HG Series air circuit breaker, 4 types of mounting (Connected, test, isolated, removed) are possible and offer easy maintenance.



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

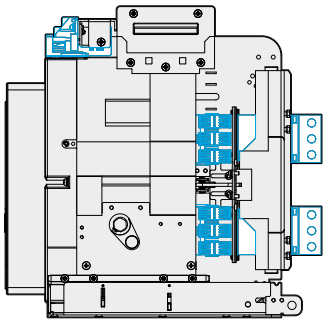
Connected Position

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



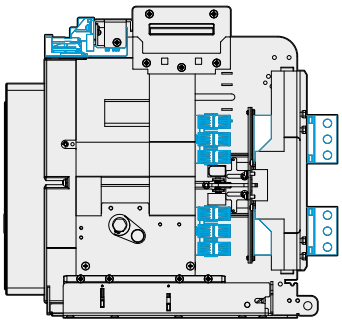
Test Position

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.



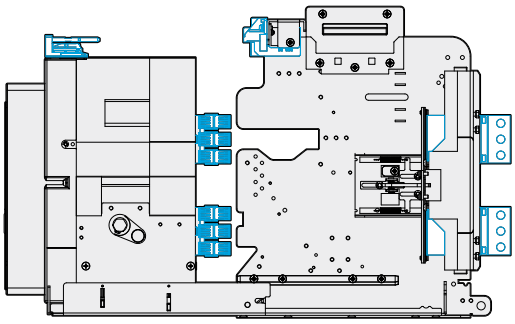
Isolated Position

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

Convenient Connection Method

Internal Resistance and Power Consumtion

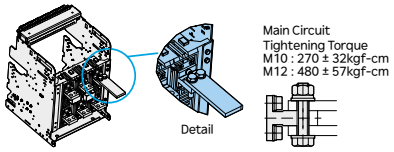
Model Name	Rated Current (A)	Draw-Out Type		Fixed Type	
		Internal RESISTANCE (μΩ)	Power Consumption (W/3Phase)	Internal RESISTANCE (μΩ)	Power Consumption (W/3Phase)
A FRAME HGL08~16	400	13	6	12	6
	600	13	14	12	13
	800	13	25	12	23
	1,000	13	39	12	36
	1,200	13	56	12	52
	1,250	13	61	12	56
	1,600	13	100	12	92
B, Q Frame HGL08~25	400	12	6	11	5
	600	12	13	11	12
	800	12	23	11	21
	1,000	12	36	11	33
	1,200	12	52	11	48
	1,250	12	56	11	52
	1,600	12	92	11	84
	2,000	12	114	11	132
	2,500	12	225	11	206

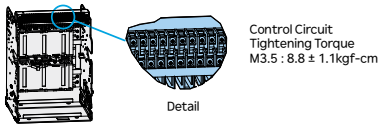
Model Name	Rated Current (A)	Draw-Out Type		Fixed Type	
		Internal RESISTANCE (μΩ)	Power Consumption (W/3Phase)	Internal RESISTANCE (μΩ)	Power Consumption (W/3Phase)
B, Q FRAME HGL32	1,600	12	92	12	92
	2,000	12	144	12	144
	2,500	12	225	12	225
	3,000	12	324	12	324
	3,200	12	369	12	369
C FRAME HGL40	2,000	20	240	18	216
	2,500	20	375	18	338
	3,000	20	540	18	486
	3,200	20	614	18	553
	3,600	20	778	18	700
	4,000	20	960	18	864
D FRAME HGL60	3,000	13	351	12	324
	3,200	13	399	12	369
	3,600	13	505	12	467
	4,000	13	624	12	576
	5,000	13	975	12	900
	6,000	13	1404	12	1296

※ 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 ncrease 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





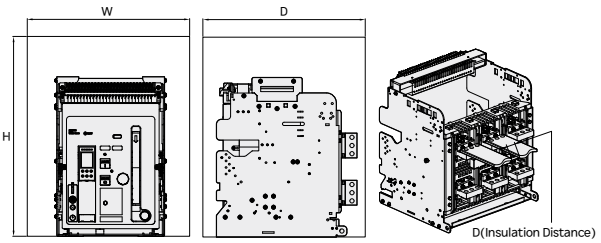
Insulation Voltage

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

Insulation Distance from ARC

Enclosure Dimension			H	W	D
A Frame	3P	In	19.69	21.18	15.00
		mm	500	538	381
	4P	In	19.69	24.53	15.00
		mm	500	623	381
B, Q Frame	3P	In	19.69	24.02	15.00
		mm	500	610	381
	4P	In	19.69	28.50	15.00
		mm	500	725	381
C Frame	3P	In	20.47	32.83	15.00
		mm	520	834	381
	4P	In	20.47	39.53	15.00
		mm	520	1,004	381
D Frame	3P	In	20.47	38.43	15.00
		mm	520	976	381
	4P	In	20.47	47.48	15.00
		mm	520	1,206	381

※ 1) Enclosure dimension is followed by UL/ANSI standard.



Enclosure ventilation		Top mm²	Bottom mm²
A Frame	3P	12,000	12,000
	4P	15,000	15,000
B&Q Frame	3P	35,000	35,000
	4P	45,000	45,000
C Frame	3P	50,000	50,000
	4P	50,000	50,000
D Frame	3P	50,000	50,000
	4P	50,000	50,000

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



Product Model	Rating Current	Applicable Busbar Size (mm)	Vertical Type						
			40 °C	45 °C	50 °C	55 °C	60 °C	65 °C	70 °C
A Frame HGL08 ~ 16	800 A	6.4 T×76.2×1 ea (Inch : 1/4×3×1 ea)	800 A	800 A	800 A	800 A	800 A	800 A	800 A
		5 T×100×1 ea							
		6 T×80×1 ea							
		5 T×50×2 ea							
	1,600 A	6.4 T×76.2×2 ea (Inch : 1/4×3×2 ea)	1,600 A	1,600 A	1,600 A	1,544 A	1,464 A	1,381 A	1,291 A
		10 T×100×1 ea							
		6 T×80×2 ea							
		10 T×50×2 ea							
B, Q Frame HGL08 ~ 25	800 A	6.4 T×76.2×1 ea (Inch : 1/4×3×1 ea)	800 A	800 A	800 A	800 A	800 A	800 A	800 A
		5 T×100×1 ea							
		6 T×80×1 ea							
	1,600 A	6.4 T×76.2×2 ea (Inch : 1/4×3×2 ea)	1,600 A	1,600 A	1,600 A	1,600 A	1,600 A	1,600 A	1,600 A
		10 T×100×1 ea							
		6 T×80×2 ea							
	2,000 A	6.4 T×101.6×2 ea (Inch : 1/4×4×2 ea)	2,000 A	2,000 A	2,000 A	1,930 A	1,831 A	1,726 A	1,614 A
		5 T×125×2 ea							
		10 T×1,000×2 ea							
		8 T×80×2 ea							
	2,500 A	6.4 T×127×3 ea (Inch : 1/4×5×2 ea)	2,500 A	2,500 A	2,484 A	2,368 A	2,247 A	2,118 A	1,981 A
		8 T×100×2 ea							
		5 T×100×3 ea							
		10 T×80×2 ea							
B, Q Frame HGL32	3,200 A	6.4 T×127×3 ea (Inch : 1/4×5×2 ea)	3,200 A	3,200 A	3,091 A	2,947 A	2,796 A	2,636 A	2,466 A
		10 T×125×2 ea							
		8 T×100×3 ea							
		10 T×80×3 ea							
C Frame HGL40	4,000 A	6.4 T×127×4 ea (Inch : 1/4×5×4 ea)	4,000 A	4,000 A	4,000 A	3,929 A	3,728 A	3,514 A	3,287 A
		10 T×150×2ea							
		10 T×125×3 ea							
D Frame HGL60	6,000 A	6.4 T×152×6 ea (Inch : 1/4×6×6 ea)	6,000 A	6,000 A	5,795 A	5,525 A	5,242 A	4,942 A	4,623 A
		6.4 T×203×6 ea (Inch : 1/4×6×6 ea)							
		10 T×100×6 ea							
		10 T×150×4 ea							

※ Ambient temperature is greater than 60 °C, consult us. ※ Total temperature limit is 105 °C according to UL/ANSI standard.
※ The current carrying capacity may differ depending on installation and environmental conditions.

Calibration of Rating Current Following Altitude

ACB is designed to be used at altitudes below 2,000m.
When used at above 2,000m, change the ratings depending on the surrounding environment condition for use.

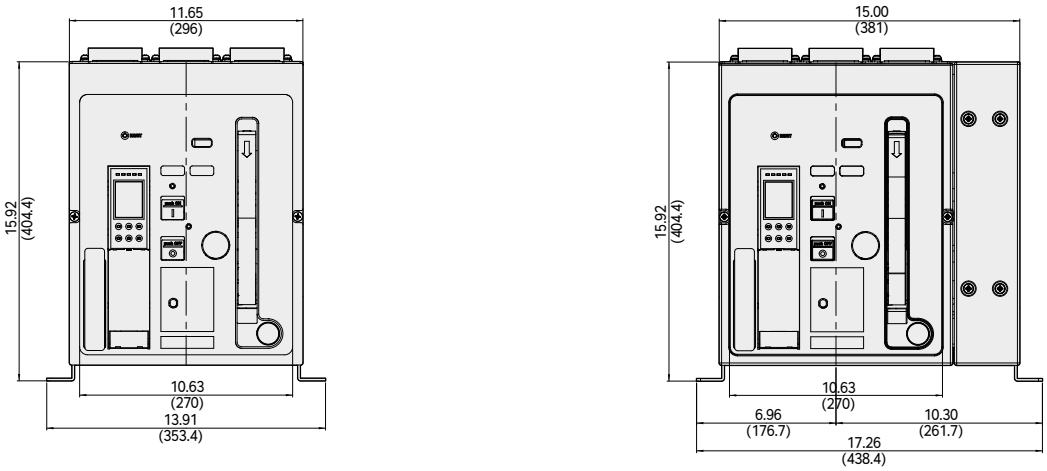
Item \ Altitude	2,000m (6,560 ft)	3,000m (9,842 ft)	4,000m (13,123 ft)	5,000m (16,404 ft)
Max. Operation Voltage (V)	635	571	508	438
Current Calibration Coefficient	In	0.99xIn	0.96xIn	0.94xIn

Dimensions

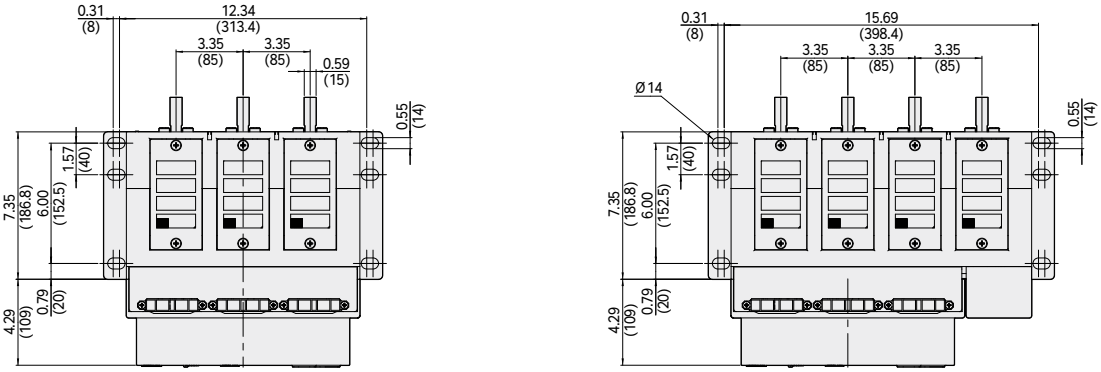
HGL Fixed Type 400 ~ 1,600 A (HGL08 ~ 16 A Frame)

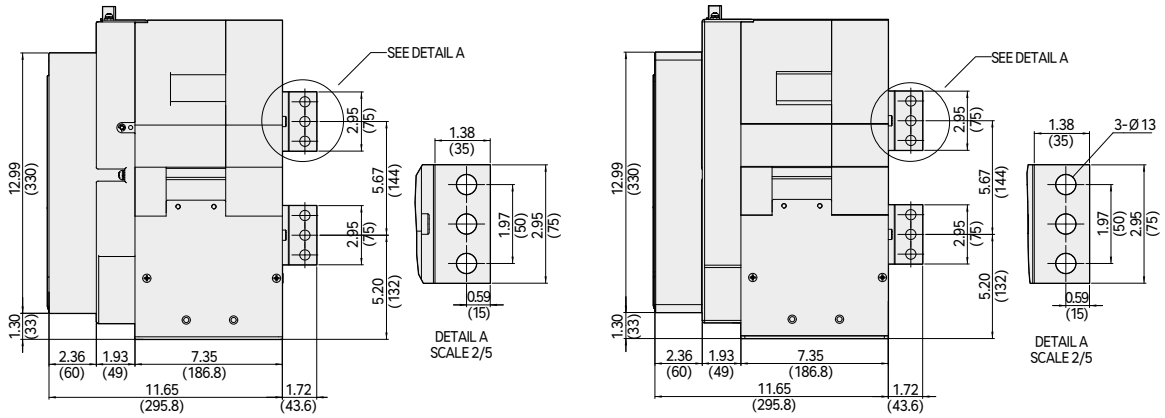
Unit : inch(mm)

Front



Vertical Type



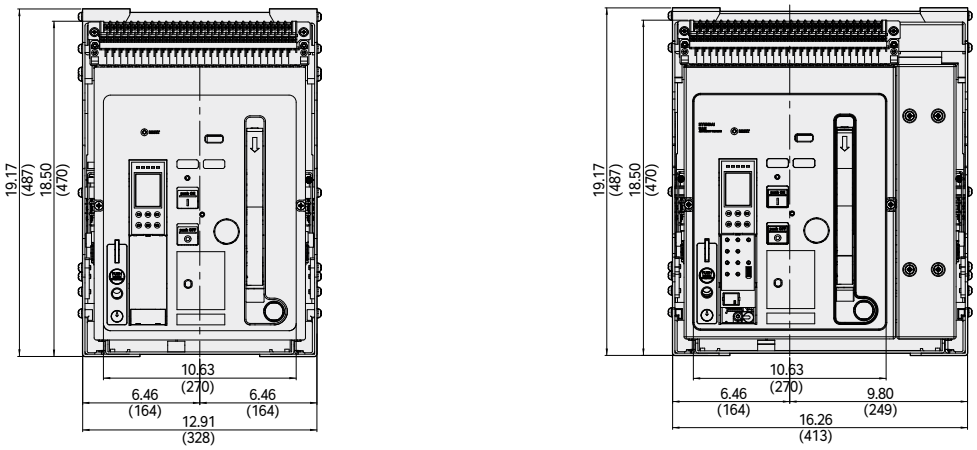


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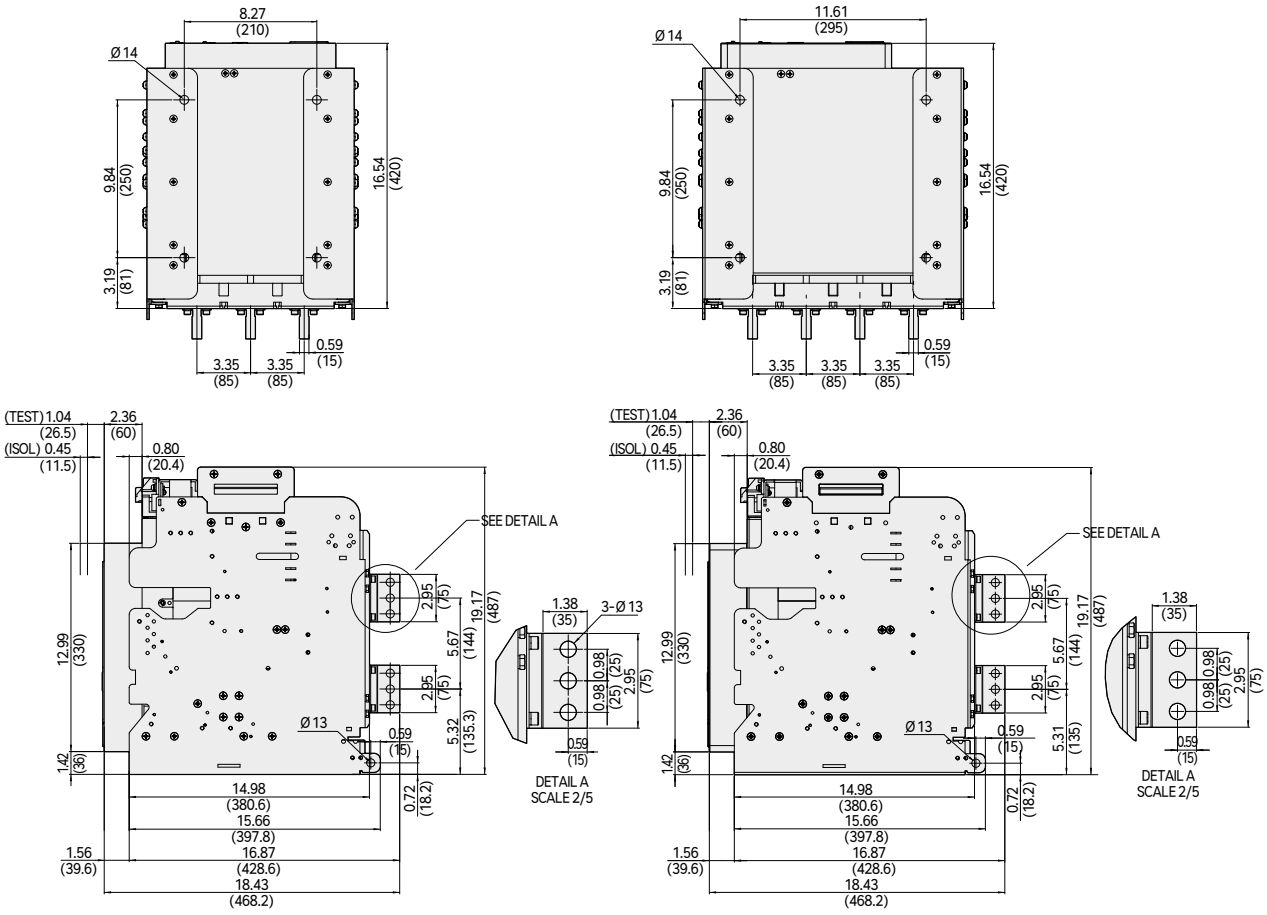
HGL Draw-Out Type 400 ~ 1,600 A (HGL08 ~ 16 A Frame)

Unit : inch(mm)

Front



Vertical Type



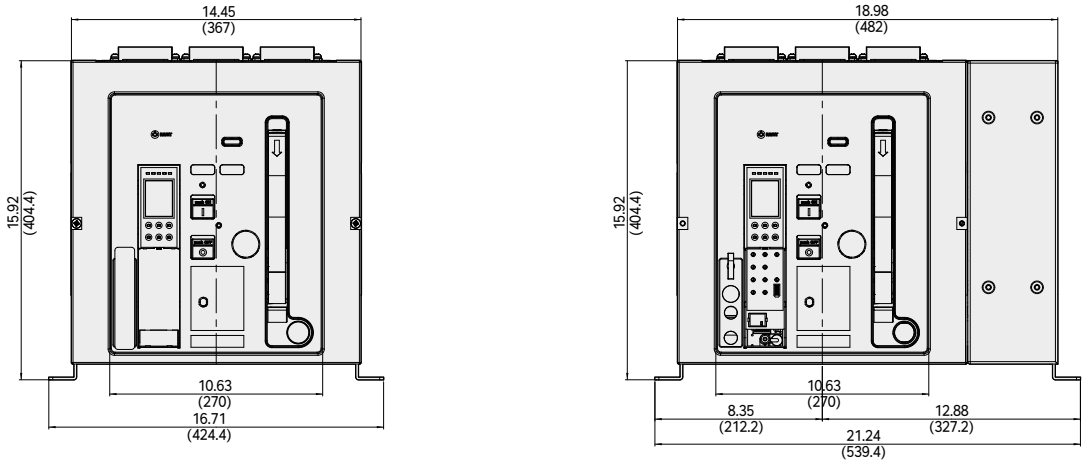
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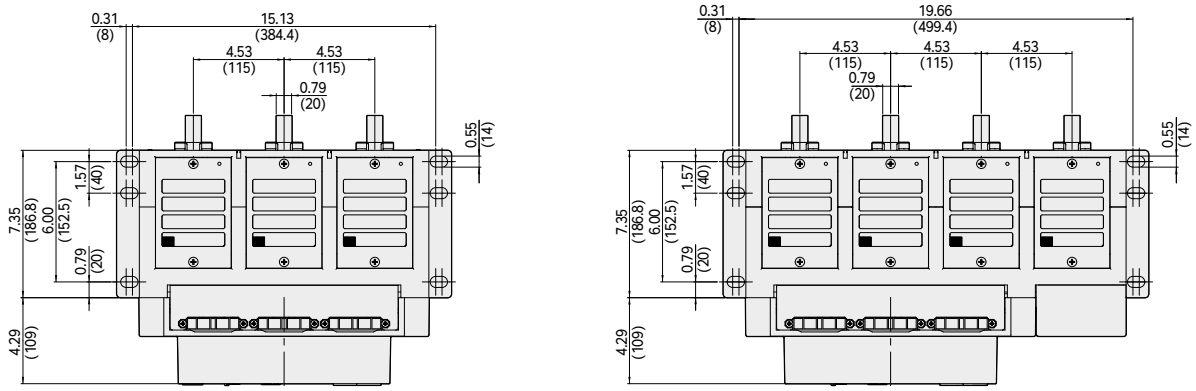
HGL Fixed Type 400 ~ 2,500 A (HGL08 ~ 25 B, Q Frame)

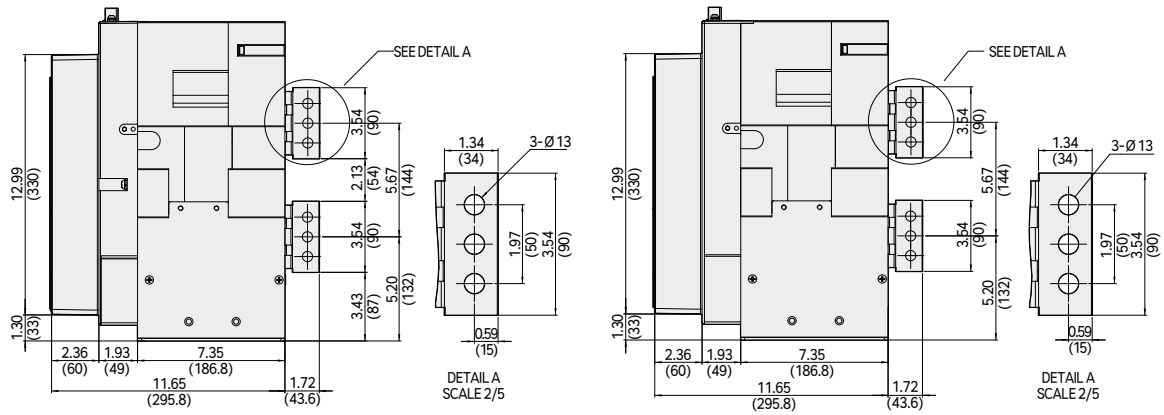
Unit : inch(mm)

Front



Vertical Type



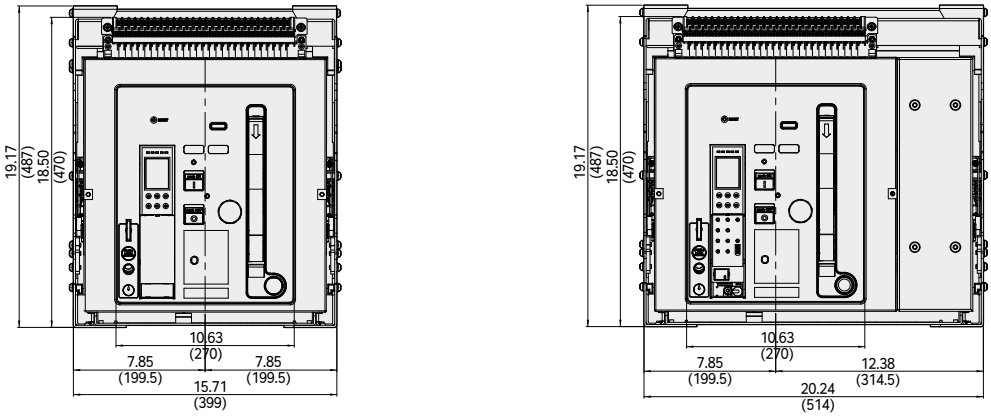


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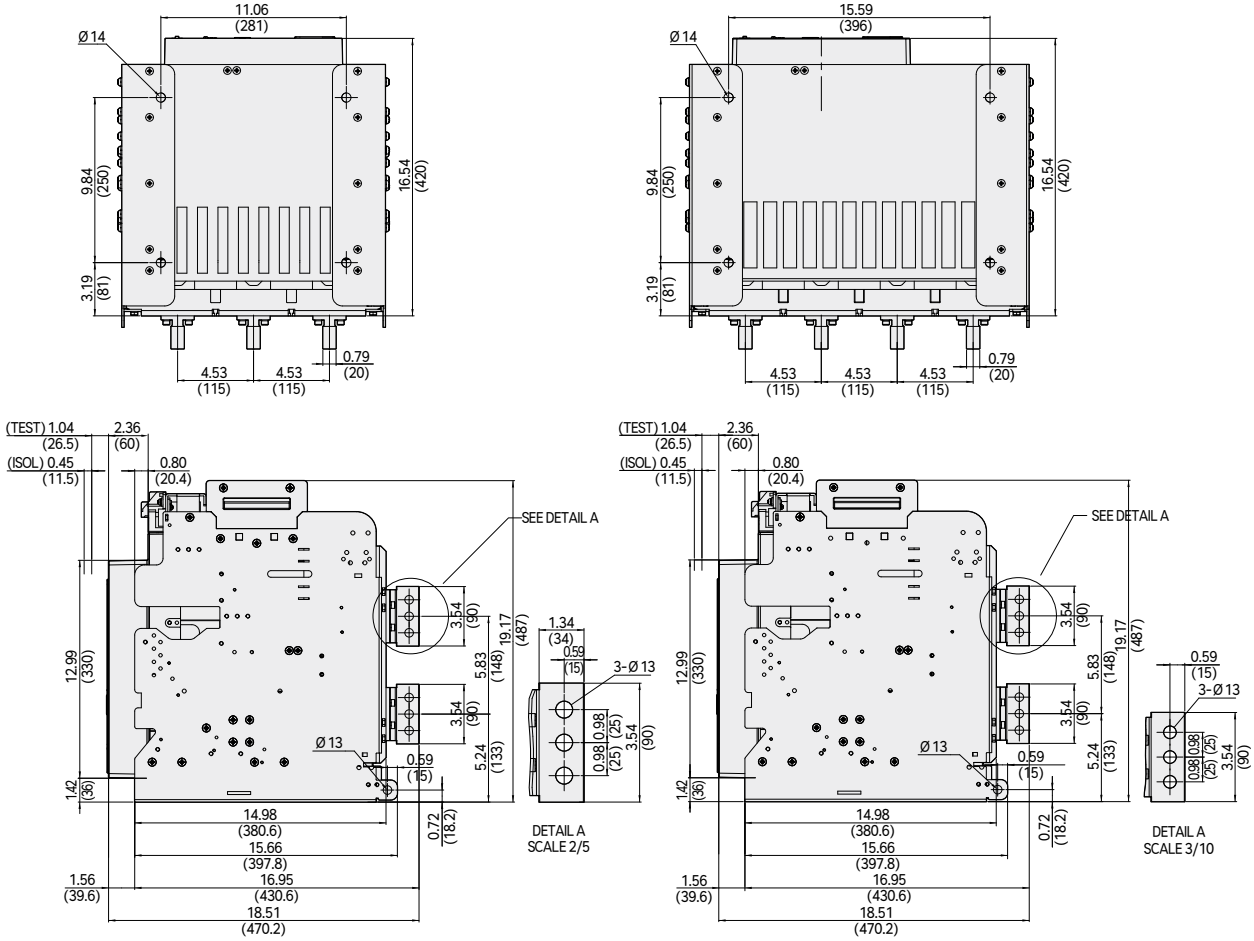
HGL Draw-Out Type 400 ~ 2,500 A (HGL08 ~ 25 B, Q Frame)

Unit : inch(mm)

Front



Vertical Type



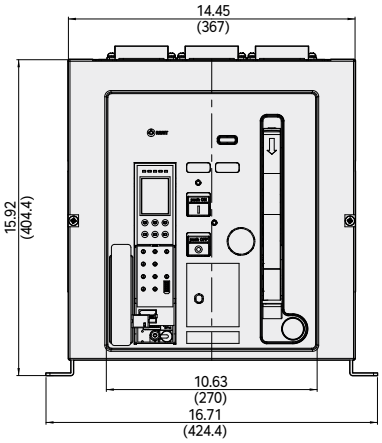
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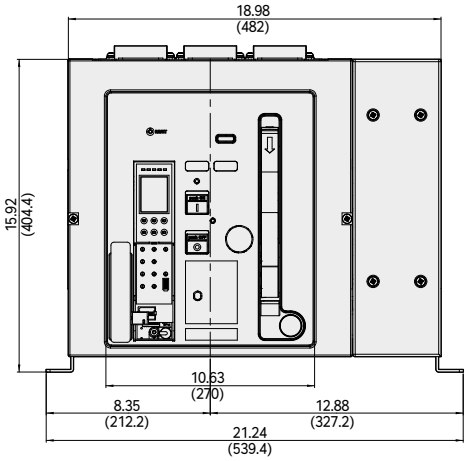
Dimensions

HGL Fixed Type 1,600 ~ 3,200 A (HGN32 B, Q Frame)

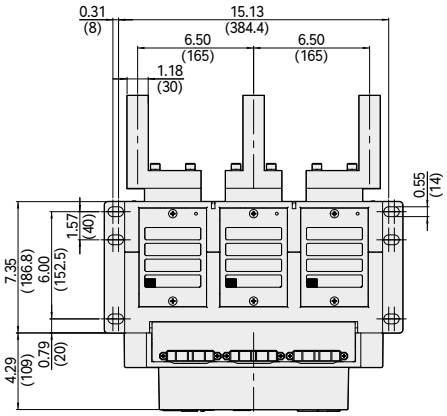
Unit : inch(mm)

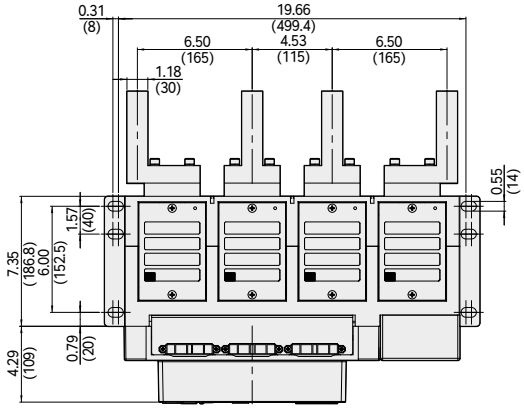
Front

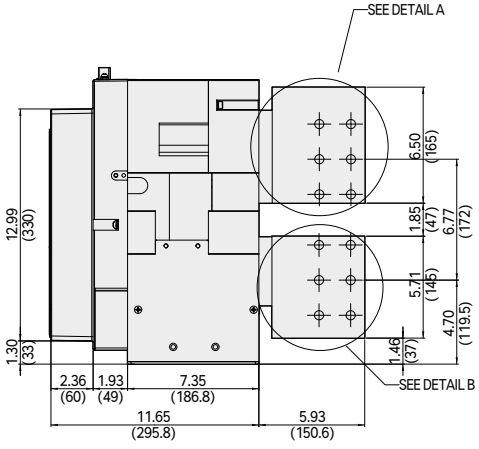


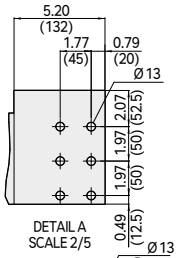


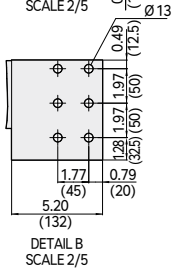
Vertical Type









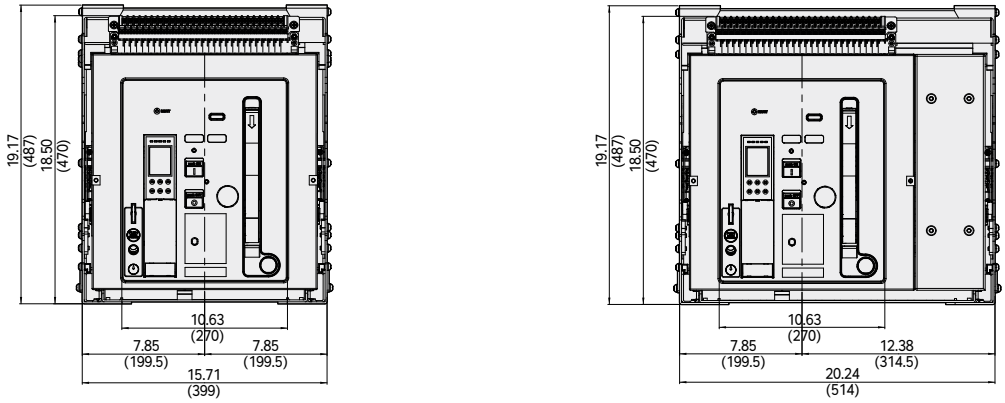


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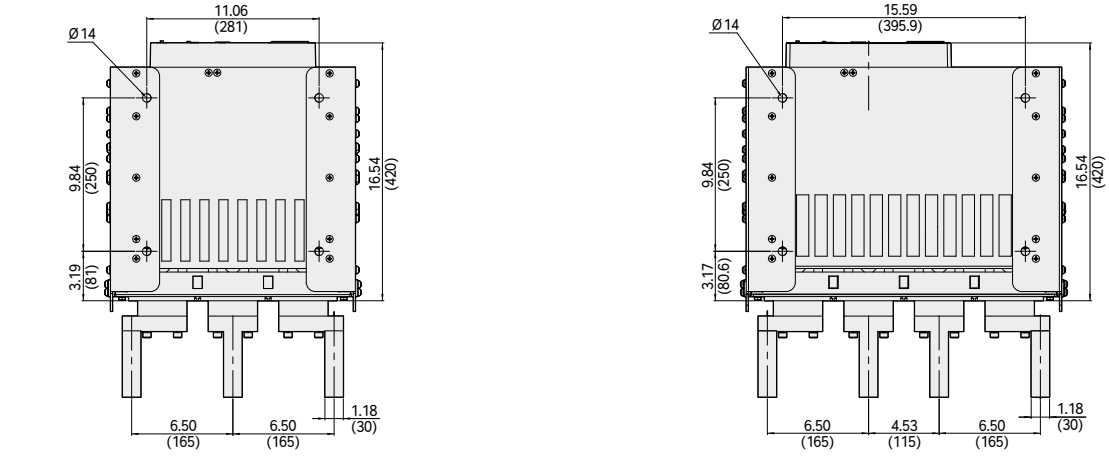
HGL Draw-Out Type 1,600 ~ 3,200 A (HGL32 B, Q Frame)

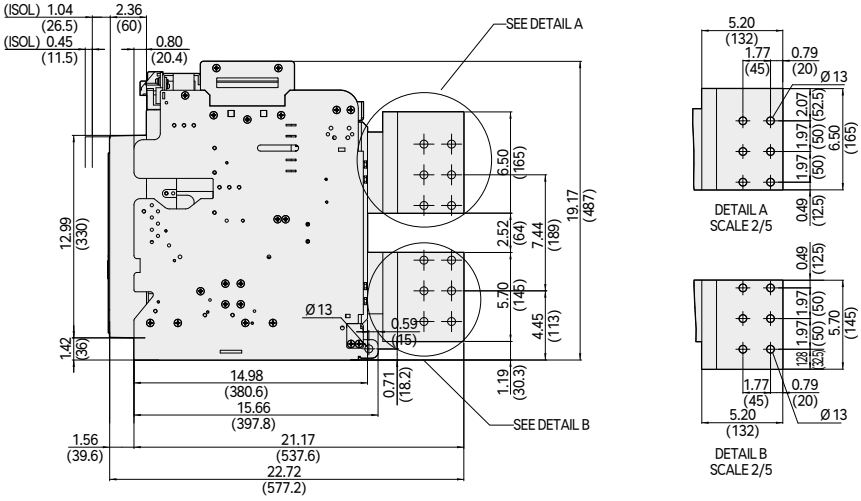
Unit : inch(mm)

Front



Vertical Type





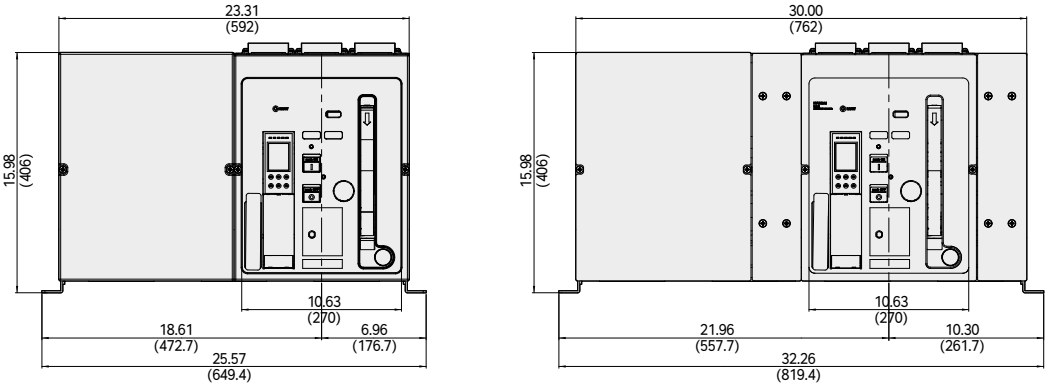
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Dimensions

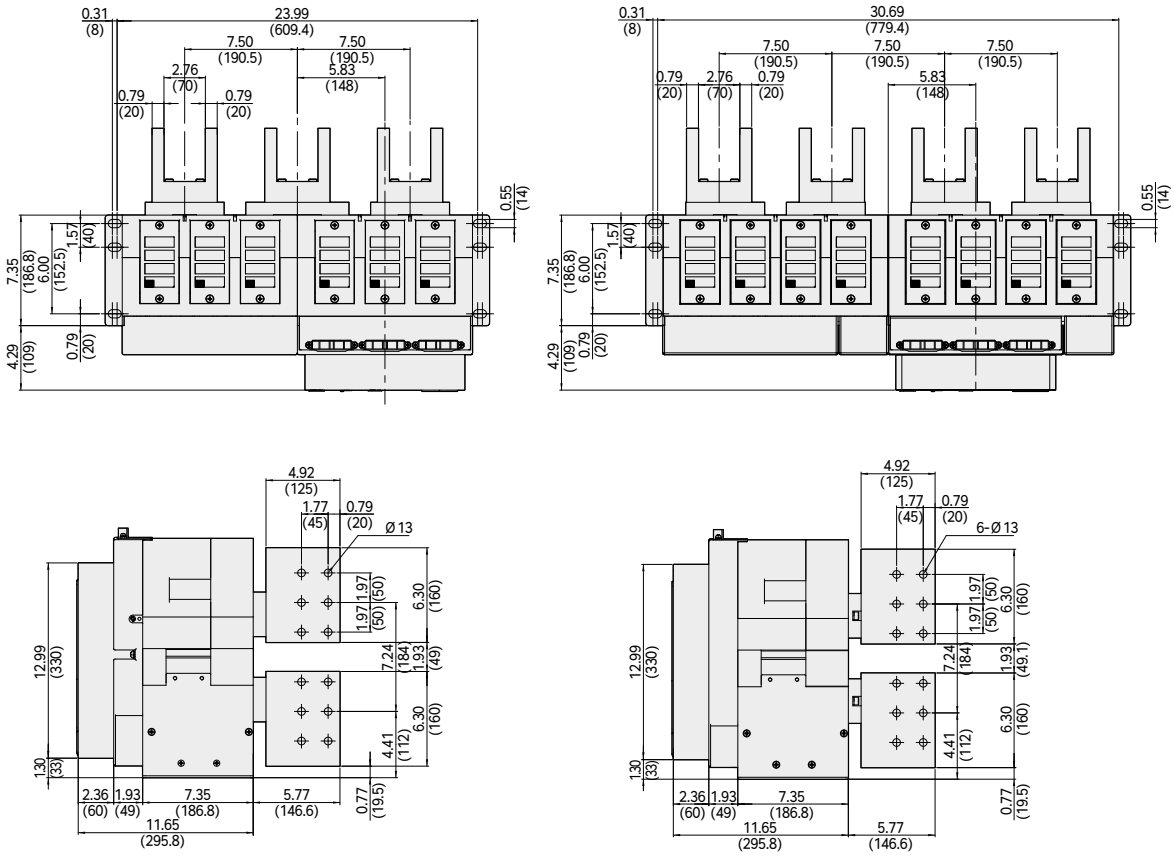
HGL Fixed Type 2,000 ~ 4,000 A (HGL40 C Frame)

Unit : inch(mm)

Front



Vertical Type

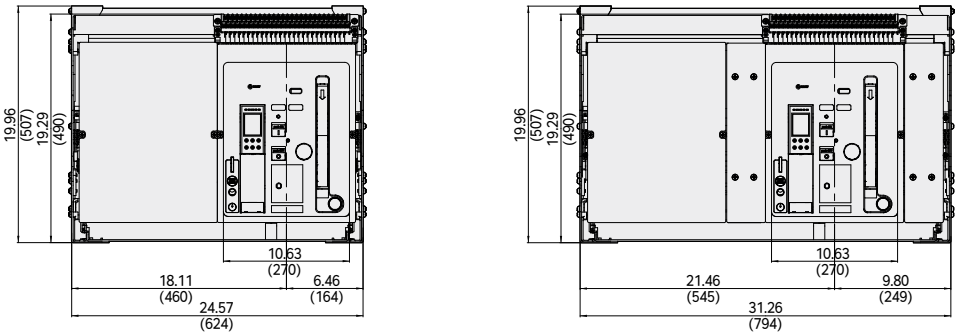


※ The drawing dimension of this page may be subject to change without prior notice.

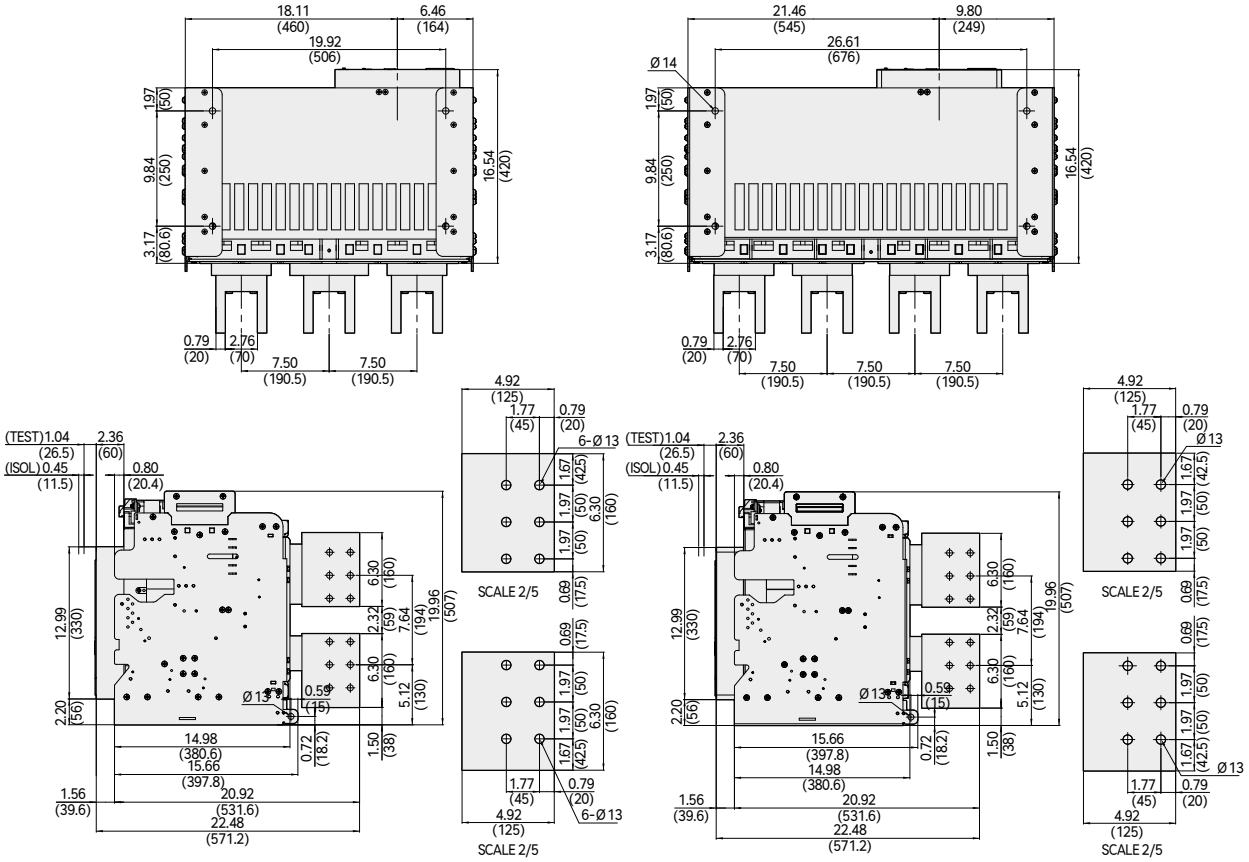
HGL Draw-Out Type 2,000 ~ 4,000 A (HGL40 C Frame)

Unit : inch(mm)

Front



Vertical Type



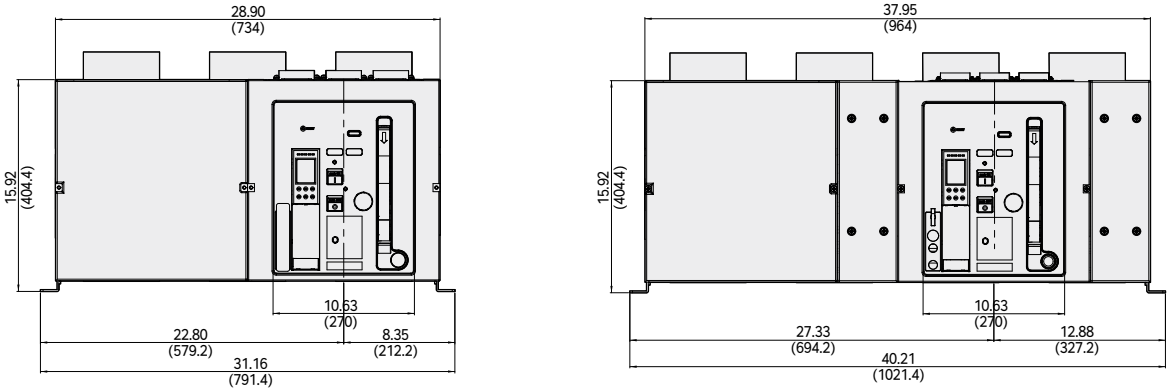
※ The drawing dimension of this page may be subject to change without prior notice.

Dimensions

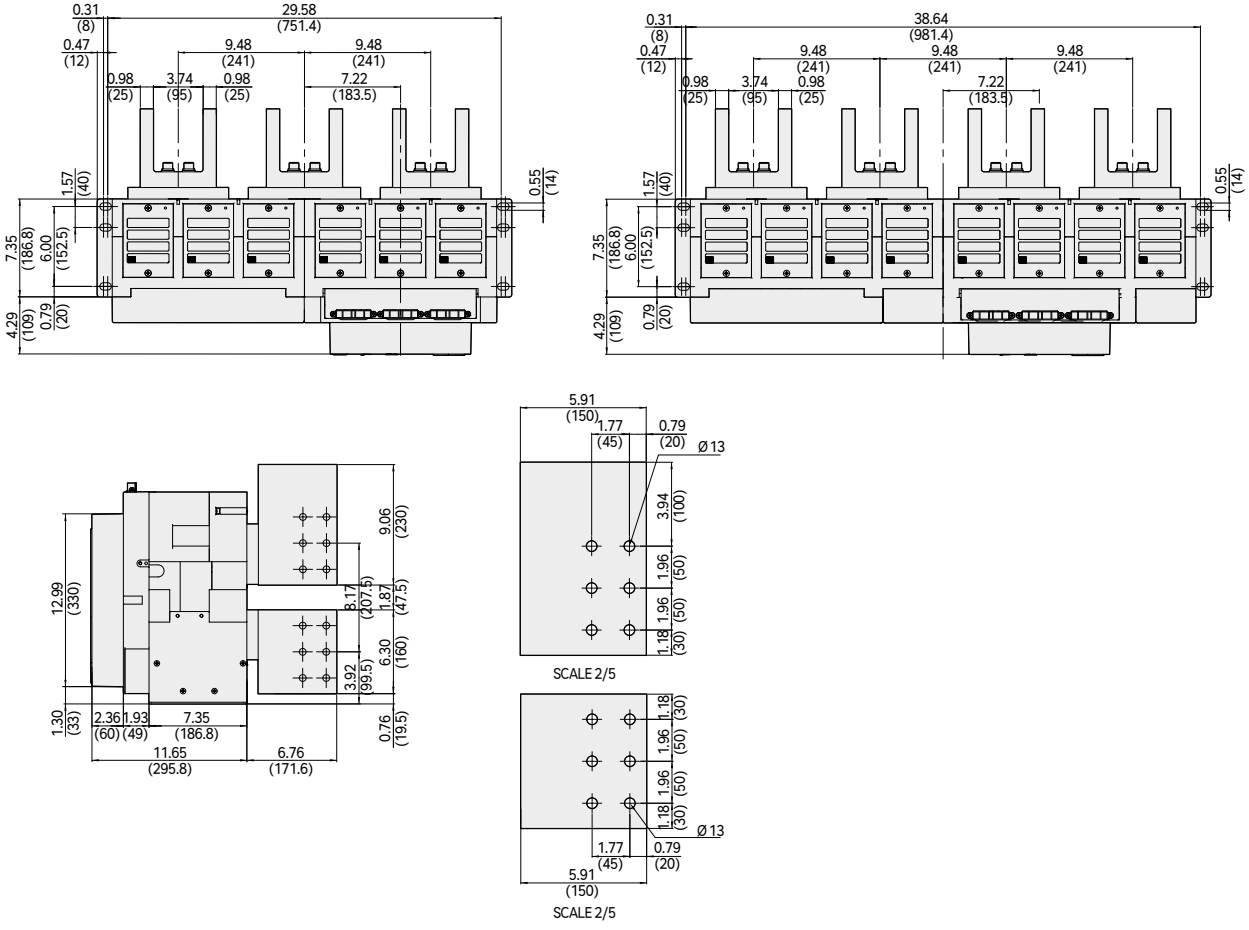
HGL Fixed Type 3,000 ~ 6,000 A (HGL60 D Frame)

Unit : inch(mm)

Front



Vertical Type

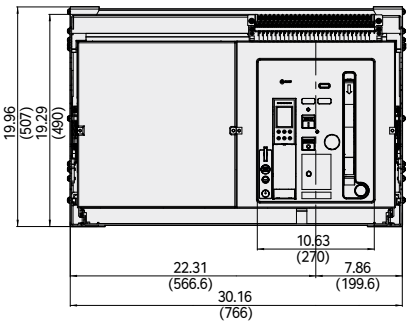


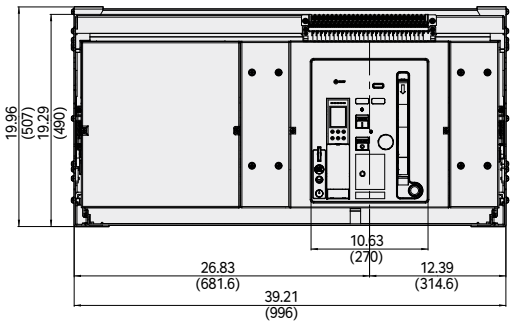
※ The drawing dimension of this page may be subject to change without prior notice.

HGL Draw-Out Type 3,000 ~ 6,000 A (HGL60 D Frame)

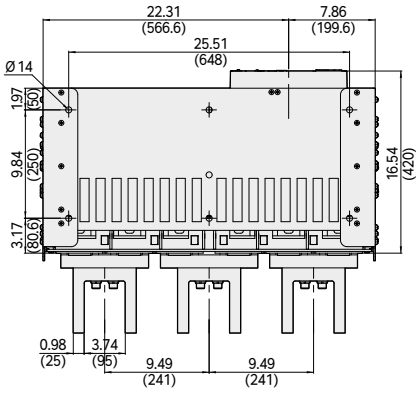
Unit : inch(mm)

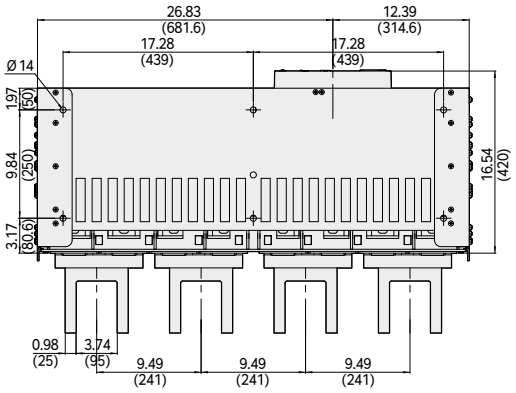
Front

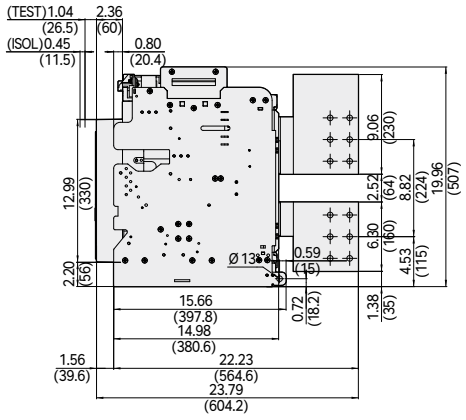


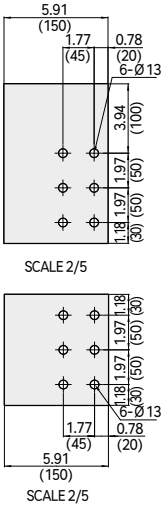


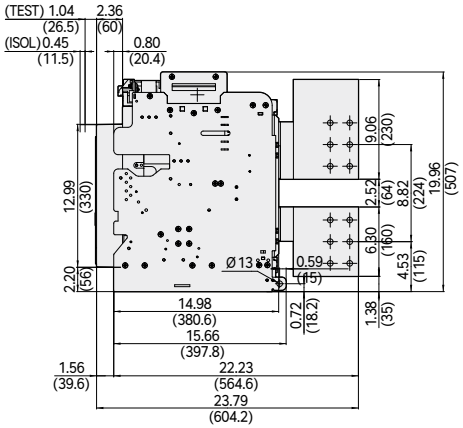
Vertical Type











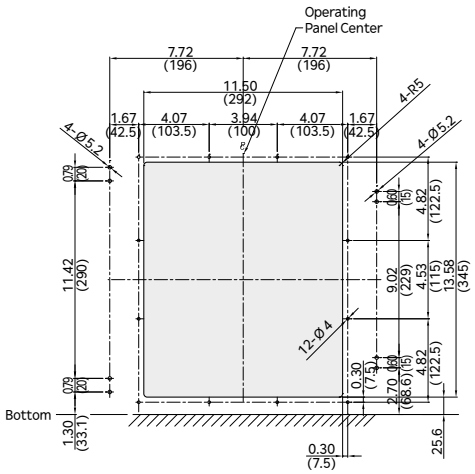
※ The drawing dimension of this page may be subject to change without prior notice.

Dimensions

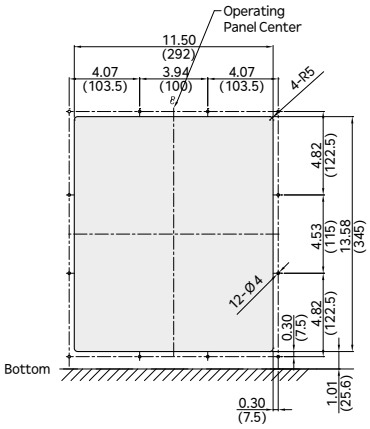
Panel Cutting Dimension of HGL Fixed Type

Unit : inch(mm)

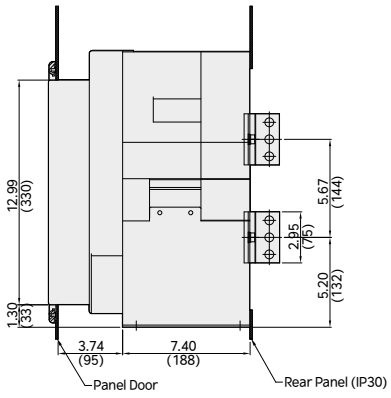
Panel Door Cut-Out (For Dust Cover)



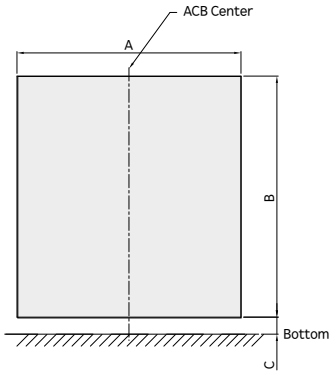
Panel Door Cut-Out (For Door Flange)



Side View



Rear Panel Cutting Size (For IP30)



Detailed Dimensions of Real Panel Cutting

Unit : inch(mm)

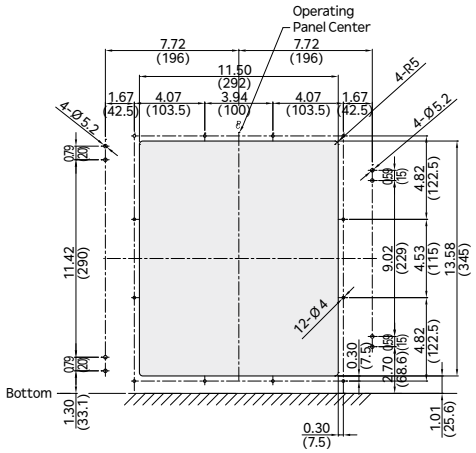
Model Name	A	B	C
HGL 08A3 ~ 16A3	11.14(283)	13.98(355)	0.98(25)
HGL 08A4 ~ 16A4	14.49(368)	13.98(355)	0.98(25)
HGL 08B3 ~ 32B3	13.94(354)	13.98(355)	0.98(25)
HGL 08B4 ~ 32B4	18.46(469)	13.98(355)	0.98(25)
HGL 40C3	22.80(579)	13.98(355)	0.98(25)
HGL 40C4	29.49(749)	13.98(355)	0.98(25)

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

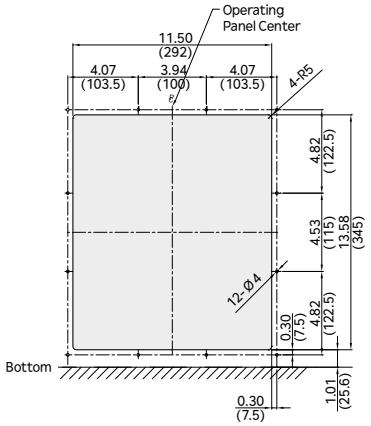
Panel Cutting Dimension of HGL Draw-Out Type

Unit : inch(mm)

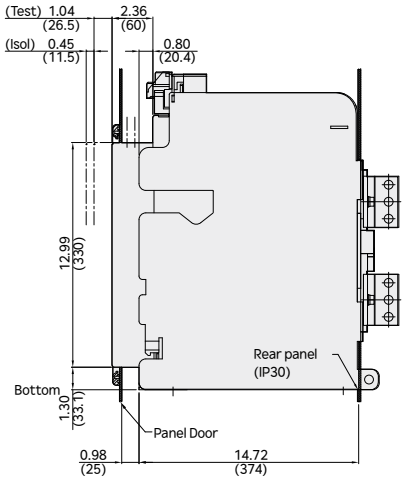
Panel Door Cut-Out (For Dust Cover)



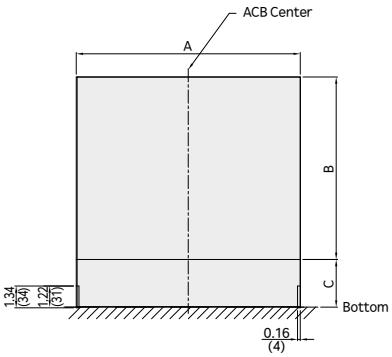
Panel Door Cut-Out (For Door Flange)



Side View



Rear Panel Cutting Size (For IP30)



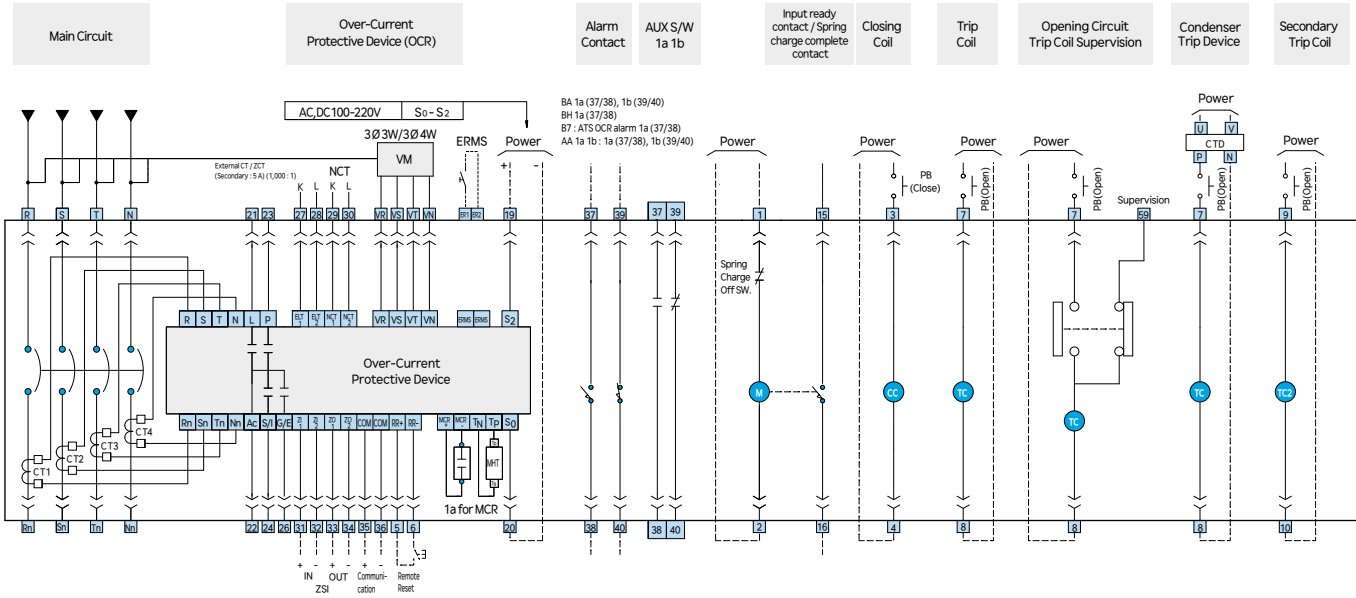
Detailed Dimensions of Real Panel Cutting

Unit : inch(mm)

Model Name	A	B	C
HGL 08A3 ~ 16A3	12.95(329)	12.40(315)	2.87(73)
HGL 08A3 ~ 16A3	16.30(414)	12.40(315)	2.87(73)
HGL 08B3 ~ 25B3	15.75(400)	13.03(331)	2.28(58)
HGL 08B4 ~ 25B4	20.28(515)	13.03(331)	2.28(58)
HGL 32B3	15.75(400)	14.84(377)	1.14(29)
HGL 32B4	20.28(515)	14.84(377)	1.14(29)
HGL 40C3	24.61(625)	16.06(408)	1.42(36)
HGL 40C4	31.30(795)	16.06(408)	1.42(36)

※ 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
EM1 / EM2	ERMS

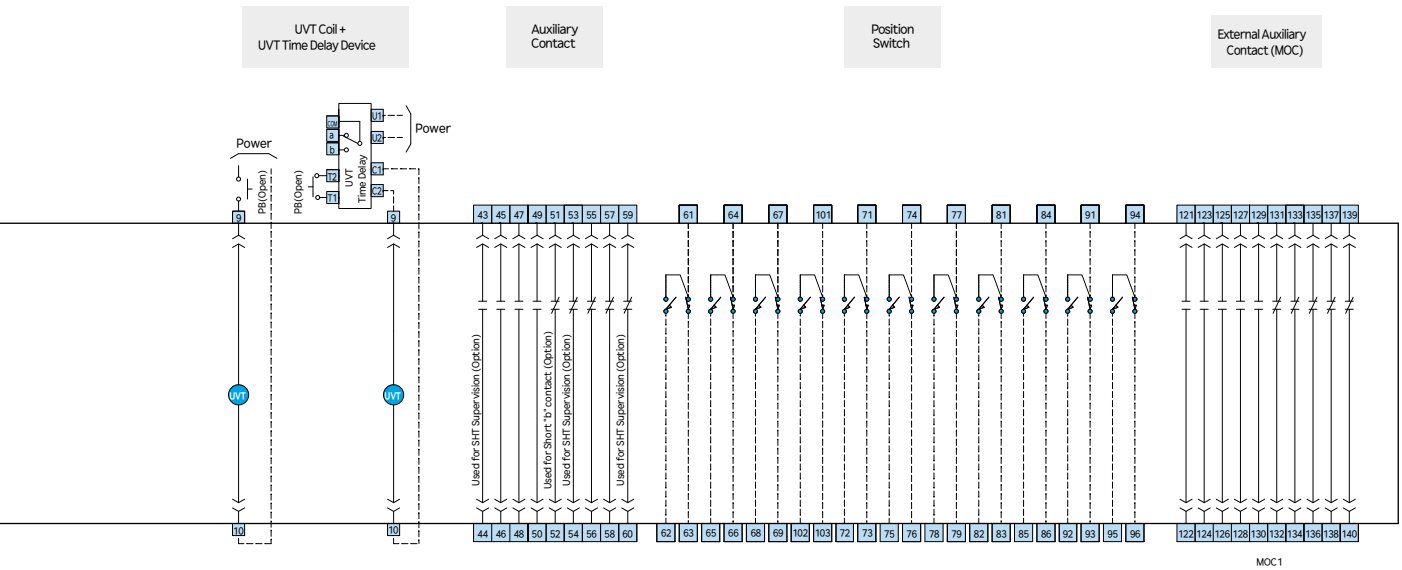
Terminal symbol

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)
43 ~ 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).

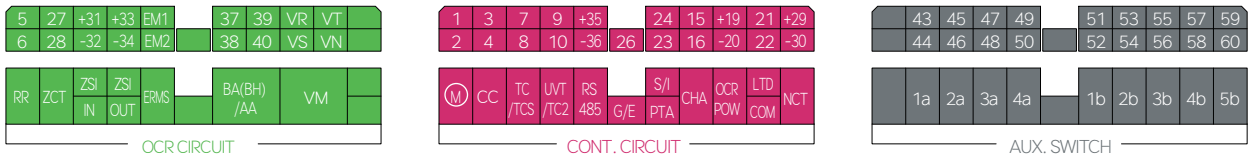


Test Position	Connection Position	Isolation Position	Insert Position
61-62 ON 61-63 OFF 64-65 ON 64-66 OFF 67-68 ON 67-69 OFF 101-102 ON 101-103 OFF	71-72 ON 71-73 OFF 74-75 ON 74-76 OFF 77-78 ON 77-79 OFF	81-82 ON 81-83 OFF 84-85 ON 84-86 OFF	84-85 ON 84-86 OFF 91-92 ON 91-93 OFF 94-95 ON 94-96 OFF

Control Jack Lay-out (Auto Connection Type)

OCR & OCGR														CONTROL CIRCUIT					AUXILIARY SW.									
	POW	OCR CONTACT				RR	NCT	ZSI-IN	ZSI-OUT	ERMS	RS485	BA(BH)/AA	VM/ZCT	M	CC	TV/TCS	UVT/TC2	CHA	1a	2a	3a	4a	1b	2b	3b	4b	5b	
	+19	21	23			5	+29	+31	+33	EM1	+35	37	39	VR/27	VT	1	3	7	9	15	43	45	47	49	51	53	55	57	59	
-20	22	24	26		6	-30	-32	-34	EM2	-36	38	40	VS/28	VN	2	4	8	10	16	44	46	48	50	52	54	56	58	60	

Control Jack Lay-out (Manual Connection Type)



Order Code

HGL Type

HGL	12	A	3	J	M2
Model Name	Rated Frame	Frame Category & Neutral Pole	No. of Poles	Mounting Method	Charging Motor Power

HGL	Low Voltage AC Power Circuit Breaker

12	Rated Frame
08	800 A
16	1,600 A
08	800 A
16	1,600 A
20	2,000 A
25	2,500 A
32	3,200 A
40	4,000 A
60	6,000 A

A	Frame Category & Neutral Pole
A	400 ~ 1,600 A 3/4P Standard RST(N)
B/Q	400 ~ 3,200 A 3/4P Standard RST(N)
C	2,000 ~ 4,000 A 3/4P Standard RST(N)
D	3,000 ~ 6,000 A 3/4P Standard RST(N)

3	No. of Poles
3	3 Pole
4	4 Pole

J	Mounting Method
Independent Release of Draw-Out Type (Control Power) of Main Unit	
A	Auto Connection
Fixed Type (Terminal Form)	
V	Vertical Type
Draw-Out Type (Combined with Cradle)	
C	Auto Connection + Vertical Type

M2	Charging Motor Power
M0	Manual Type
M1	AC/DC 100 ~ 125 V
M2	AC/DC 200 ~ 250 V
M7	DC 24 V
M8	DC 48 V

※ 1) Rating Plug for Over-Current
- A Frame : 400 ~ 1,600 A
- B Frame : 400 ~ 3,200 A
- Q Frame : 400 ~ 3,200 A
- C Frame : 2,000 ~ 4,000 A
- D Frame : 3,000 ~ 6,000 A

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

C2 – Closing Coil

C0	N/A
C1	AC/DC 100~125 V
C2	AC/DC 200~250 V
C3	AC 380 V
C4	AC 440 V
C7	DC 24 V
C8	DC 48 V

S2 – Trip Coil

S0	N/A
S1	AC/DC 100~125 V
S2	AC/DC 200~250 V
S3	AC 380 V
S4	AC 440 V
S7	DC 24 V
S8	DC 48 V

Trip Supervision Coil

T1	AC/DC 100~125 V
T2	AC/DC 200~250 V
T3	AC 380 V
T4	AC 440 V
T7	DC 24 V
T8	DC 48 V

61 – Over-Current Trip

	General Feeder
00	N/A
	50 Hz
50	GPR-LN
51	GPR-LA
52	GPR-LAG
54	GPR-LP [2]
	60 Hz
60	GPR-LN
61	GPR-LA
62	GPR-LAG
64	GPR-LP [2]

K – Rating Plug

0	OCR N/A
E	400
B	600
T	630
H	800
J	1000
W	1200
K	1250
L	1600
M	2000
N	2500
R	3000
P	3200
C	3600
Q	4000
S	5000
Z	6000

AB

Parts for Main Unit

	INST (UVT Coil)
U1	AC/DC 100~125 V
U2	AC/DC 200~250 V
U3	AC 380 V
U4	AC 440 V
U7	DC 24 V
U8	DC 48 V

Secondary Trip Coil

S1	AC/DC 100~125 V
S2	AC/DC 200~250 V
S3	AC 380 V
S4	AC 440 V
S7	DC 24 V
S8	DC 48 V

AM	On/Off Button Lock Device
AA	Auxiliary Switch (Additional 1a 1b)
AB	Key Lock Device (Prevent ON)
BR	OCR Manual Reset Function
BA	OCR Manual Reset & Alarm S/W 1a1b
BH	OCR Manual Reset + High Capacity Alarm S/W 1a
B0	Mechanical Interlock Device
B6	Spring Charge Switch
AG	Door Flange
BT	Closing Preparation Contact (B6 and CT cannot be Combined)
D0	Door Interlock

Parts Mounted on Cradle (Only Applicable when Placing an Order for Combination Type)

	Time Delay Type (UVT Coil + UVT Controller)
V1	AC/DC 100~125 V
V2	AC/DC 200~250 V
V3	AC 380 V
V4	AC 440 V

Position S/W

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
MC	External Auxiliary Contact (MOC) 5a5b
AK	Short "b" Contact
AF	Fixing Block
AW	Miss Insertion Preventer

ATS Production

BAB7	Emergency Power Transfer

- 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 the monitoring contact for trip coil, 3a3b can be used for the AUX switch.
- In the order code for the main unit only (A/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

HGL (When Placing an Order for the Cradle)

DHL	12	A	3	A	H
Model Name	Rated Frame	Frame Category & Neutral Pole	No. of Poles	Control Terminal Connection	Terminal Bus Bar Arrangement

Model Name	
DHL	Low Voltage AC Power Circuit Breaker Cradle

Rated Frame	
16	DHL08 ~ 16A (W)
25	DHL08 ~ 25B (X)
32	DHL32B (X)
40	DHL40C (Y)
60	DHL60D (Z)

Frame Category & Neutral Pole	
A	400 ~ 1,600A 3/4P Standard RSTN
B	400 ~ 3,200A 3/4P Standard RSTN
C	2,000 ~ 4,000A 3/4P Standard RSTN
D	3,000 ~ 6,000A 3/4P Standard RSTN

No. of Poles	
3	3 Pole
4	4 Pole

Control Terminal Connection	
A	Auto Connection

Terminal Bus Bar Arrangement	
V	Vertical Type

※ Marking upon Shipping of Cradle
- DHL08/16A (W) > DHL08 ~ 16A (W)
- DHL08/16/20/25B (X) > DHL08 ~ 25B (X)
- DHL32B (X) > DHL32B (X)
- DHL40C (Y) > DHL40C (Y)
- DHL60D (Z) > DHL60D (Z)

※ Q Frame models should be ordered as B Frame.

Accessories

Name of Accessory	Order Form		Detailed Specification	Release Form	Page
	Mounted	Sold Separately			
Auxiliary Switch [1]	MC	HGNS MOC	External Auxiliary Contact 10a10b (Mechanical Opearting 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 [2]	-	HGNS UT1	AC/DC 110 V	Sold Separately	-
	-	HGNS UT2	AC/DC 220 V		
	-	HGNS UT3	AC 380 V		
	-	HGNS UT4	AC 440 V		
	-	HGNS UT9	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 UET AC	OCR Portable Checker	Sold Separately	-
	-	HGNS VM	Voltage Module		
Key Lock	AB	HGNS AB	Key Lock	Mounted upon Release and Sold Separately	-
Safety Shutter	AE	HGLS AEA3	08A3 ~ 16A3	Mounted upon Release and Sold Separately	-
		HGLS AEA4	08A4 ~ 16A4		
		HGLS AEB3	08B3 ~ 32B3, 08Q3 ~ 32Q3		
		HGLS AEB4	08B4 ~ 32B4, 08Q4 ~ 32Q4		
		HGLS AEC3	40C3		
		HGLS AEC4	40C4		
		HGLS AED3	60D3		
		HGLS AED4	60D4		
Fixing Block	AF	HGLS AF	For Main Unit + Cradle	Mounted upon Release and Sold Separately	-
		HGLS AFB	For Main Unit + Cradle	Sold Separately	-
		HGLS AFC	For Cradle		
Position Switch [3]	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		

※ 1) Contact us when placing an order for set order required for installation.
2) UVT time delay type of controller is mounted outside the main unit or the cradle.
3) 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".

Order Code

Accessories

Name of Accessory	Order Form		Detailed Specification	Release Form	Page
	Mounted	Sold Separately			
Miss Insertion Preventor	AW	HGLS AW	Add Order Form in the Main Unit + Cradle, Main Unit/Cradle Respectively	Mounted upon Release and Sold Separately	-
Arc Shield	AX	HGLS AXA3	08A3 ~ 16A3	Mounted upon Release and Sold Separately	-
		HGLS AXA4	08A4 ~ 16A4		
		HGLS AXB3	08B3 ~ 32B3, 08Q3 ~ 32Q3		
		HGLS AXB4	08B4 ~ 32B4, 08Q4 ~ 32Q4		
		HGLS AXC3	40C3		
		HGLS AXC4	40C4		
		HGLS AXD3	60D3		
		HGLS AXD4	60D4		
Mech Interlock [4)]	-	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 Frame, Draw-Out Type, Wire Type 2 Way MI + Interlock Parts (B0)		
	-	HGNS DWB2A	A 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)		
	-	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	D Frame 3P, Draw-Out Type, Wire Type 2way MI + Interlock Parts (B0)		
	-	HGNS DWB1D4	D Frame 4P, Draw-Out Type, Wire Type 2way MI + Interlock Parts (B0)		
	-	HGNS DWB2D3	D Frame 3P, Draw-Out Type, Wire Type 3way MI + Interlock Parts (B0)		
	-	HGNS DWB2D4	D Frame 4P, Draw-Out Type, Wire Type 3way MI + Interlock Parts (B0)		
	-	HGNS FWB1A	A Frame, Fixed Type, Wire Type 2way MI + Interlock Parts (B0)		
	-	HGNS FWB2A	A 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	D Frame 3P, Fixed Type, Wire Type 2way MI + Interlock Parts (B0)		
	-	HGNS FWB1D4	D Frame 4P, Fixed Type, Wire Type 2way MI + Interlock Parts (B0)		
	-	HGNS FWB2D3	D Frame 3P, Fixed Type, Wire Type 3way MI + Interlock Parts (B0)		
	-	HGNS FWB2D4	D Frame 4P, Fixed Type, Wire Type 3way MI + Interlock Parts (B0)		
	BO	HGNS B0DA	A 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	D Frame 3P Interlock Parts (B0)		
		HGNS B0DD4	D Frame 4P Interlock Parts (B0)		
		HGNS B0FA	A 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		
		HGNS B0FD3	D Frame 3P Interlock Parts (B0) + Fixed Bracket		
		HGNS B0FD4	D Frame 4P Interlock Parts (B0) + Fixed Bracket		

※ 4) 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		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	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	-

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HD HYUNDAI ELECTRIC

Korea			
Head Office	477, Bundang Suseo-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea	Tel: +82-2-479-9180	Fax: +82-2-500-4958
Factory	20, Guksasandan 1-ro, Oksan-myeon, Heungdeok-gu, Cheongju-si, Chungcheongbuk-do, Republic of Korea		
Reliability Center	17-10, Mabuk-ro 240beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea	Tel: +82-31-289-5000	Fax: +82-31-289-5040
Overseas Subsidiaries			
Atlanta	2405 Satellite Blvd, Duluth GA 30096, U.S.A.	Tel: +1-678-789-1885	
Alabama	215 Folmar Parkway, Montgomery, AL 36105, U.S.A	Tel: +1-334-481-2000	Fax: +1-334-386-8994
Arabia	Office No. 529, 5th floor Akaria-3 Building, Olaya Street, PO Box 9187, Riyadh 11413, Kingdom of Saudi Arabia	Tel: +966-11-419-0168	Fax: +966-11-419-0220
Yangzhong	No.9, Xiandai Road, Xinba Scientific and Technologic Zone, Yangzhong, Jiangsu, P.R.C. Zip:212212, China	Tel: +86-511-8842-0510	Fax: +86-511-8842-0388
Branch Offices			
London	50-68 High Street, Weybridge, KT13 8BL, United Kingdom	Tel: +44-7979-125051	
Frankfurt	Eschborner Landstrasse 55, 60489 Frankfurt am Main, Germany	Tel: +49-69-7490-3934	
Moscow	World Trade Center, Ent.6, #412, Krasnopresnenskaya Nab.12, Moscow, 123610, Russia	Tel: +7-495-258-1381	
Riyadh	Office No. 530A, 5th Floor Akaria-2 Bldg., Olaya St., Short Address RHOB6847, Riyadh 12244, Kingdom of Saudi Arabia	Tel: +966-11-210-1107	Fax: +966-11-210-1107
Dubai	Unit 205, Emaar Square Building NO.4 Sheikh Zayed Road, Pobox 252458, Dubai, U.A.E	Tel: +971-50-321-8154	Fax: +971-4-425-7996
Bangkok	19th Floor, Unit 1908, Sathorn Square Office Tower, 98 North Sathorn Road, Silom, Bangrak, Bangkok 10500, Thailand	Tel: +66-02-115-7920	Fax: +66-2-115-7898
Ho Chi Minh	Room 1405, 14th Floor Centec Tower, 72-74 Nguyen Thi Minh Khai Street Vo Thi Sau Ward, District 3, Ho Chi Minh City, Vietnam	Tel: +84-28-3535-0465	
Osaka	1-Room 5th Floor Nagahori Plaza Bldg. 2-4-8 Minami Senba, chuo-ku, Osaka 542-0081, Japan	Tel: +81-6-6261-5766~7	Fax: +81-6-6261-5818
R&D Centers			
Switzerland	Hardturmstrasse 135, CH-8005, Zurich, Switzerland	Tel: +41-76-241-6707	
Hungary	H-1145 Bacskai utca 29/a, Budapest, Hungary	Tel: +36-1-273-3733	
China	Room 10102, Building 10, 498 Guoshoujing Road, Pudong, Shanghai, China(201203)	Tel: +86-21-5013-3393 #139	
Customer Service	service@hd.com		

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Korea			
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Reliability Center	17-10, Mabuk-ro 240beon-gil, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea	Tel: +82-31-289-5000	Fax: +82-31-289-5040
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London	50-68 High Street, Weybridge, KT13 8BL, United Kingdom	Tel: +44-7979-125051	
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