HAVELLS

Havells Global Series - New Range

Contactors & Overload Relays

HGs
Global Series

CONTACTORS & OVERLOAD RELAYS

Contents

HGS - New Range

Contactors & Overload Relays

Motor Control Solutions with higher Safety, Reliability & Performance

Range:

- Contactor ratings from 9 A to 800 A, AC-3
- Conactor rating 16 A to 60 A, AC-1
- Relay ratings 0.12 A to 800 A
- Capacitor duty contactor ratings 3 kVAr to 66 kVAr
- Complete range of accessories

Salient Features / Customer benefits:

- High electrical and mechanical life
- High Endurance / Switching Frequency
- Low Power Dissipation / Coil Consumption
- Class-H Insulation for Coils
- Dust free cover
- Terminal Barrier & Shrouds
- Nut Retaining Washer
- Inbuilt Aux. Contacts
- Removable Arc Chutes > 115 A Ratings
- Ref. Standard IS/IEC 60947-4-1


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Contactor HGS 9 - 800 AF

Thermal Overload Relays HGST 9 - 800 AF

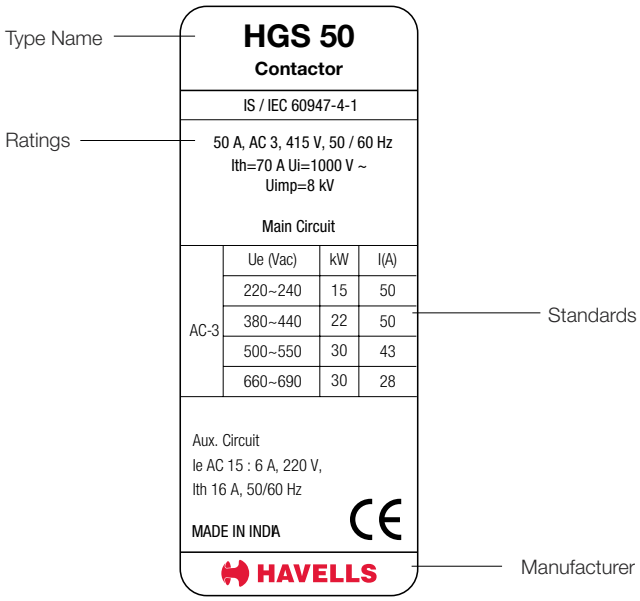
Contactor (HGS)				
Overload Relay (HGST)				
	18 AF	**40 AF**	**65 AF**	**100 AF**
HGS **Rated Current** **Rated Insulation Voltage**	9 A, 12 A, 18 A 800 V	25 A, 32 A, 40 A 800 V	50 A, 65 A 1,000 V	75 A, 85 A, 100 A 1,000 V
HGST **Setting Current**	0.12 - 18 A	7 - 40 A	7 - 65 A	17 - 100 A

150 AF	265 AF	500 AF	800 AF
115 A, 130 A, 150 A 1,000 V	185 A, 225 A, 265 A 1,000 V	300 A, 400 A, 500 A 1,000 V	630 A, 800 A 1,000 V
48 - 150 A	48 - 265 A	90 - 500 A	378 - 800 A

External Structure and Contents of Name plate

Contactors

1. Control Power Terminal
2. Main Terminal
3. Auxiliary Terminal
4. Type Name
5. Manufacturer Name
6. Safety Cover
7. Din-Rail Mounting Part
8. Upper Frame
9. Upper Cover
10. Name Plate
11. Screw Mounting Hole
12. Mounting Hole for Auxiliary Devices on Sides



Thermal Overload Relay

Protection Cover

- Operating side is covered with transparent cover in order to avoid any unauthorised changes in setting and any operation arbitrarily.
- Settings can be changed by lifting up the protection cover.

Test Button

- When motor needs emergency stop during operation, it is possible to stop the motor by cutting off its contact from the magnetic contact with test button.
- In order to test the operation of thermal overload relay contacts, immediate testing is possible by pulling up test button which changes NO/NC contact.

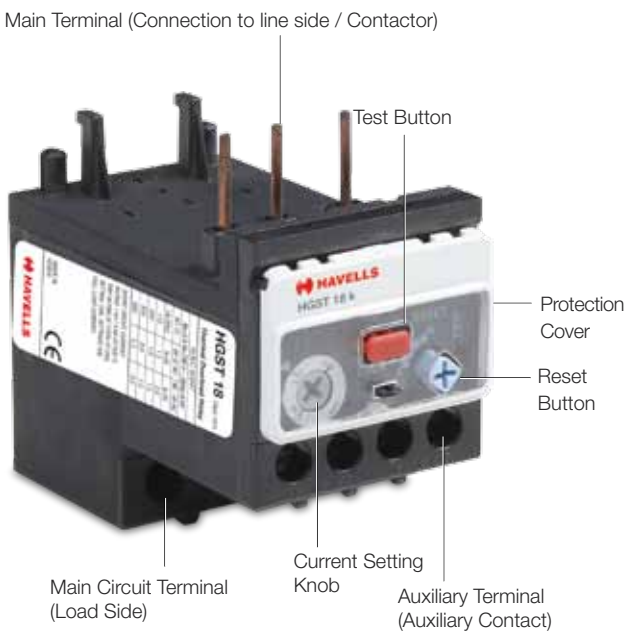
Current Setting Knob

It is possible to set the rated current as 3 steps by using a +/- screwdriver.

Reset Button

A (Auto) Mode: Auto reset

H (Manual) Mode: Manual reset



Main Circuit Terminal

Screw type terminal is standard model

Safety Structures of TOR

- Attachment of protection cover
  - Prevents test function during operation and misoperation by user.
- Separation of reset button and test button
  - Prevents malfunction during operation.

Contactor (HGS)

9 - 100 AF

Enhanced Safety

Front Protection Cover

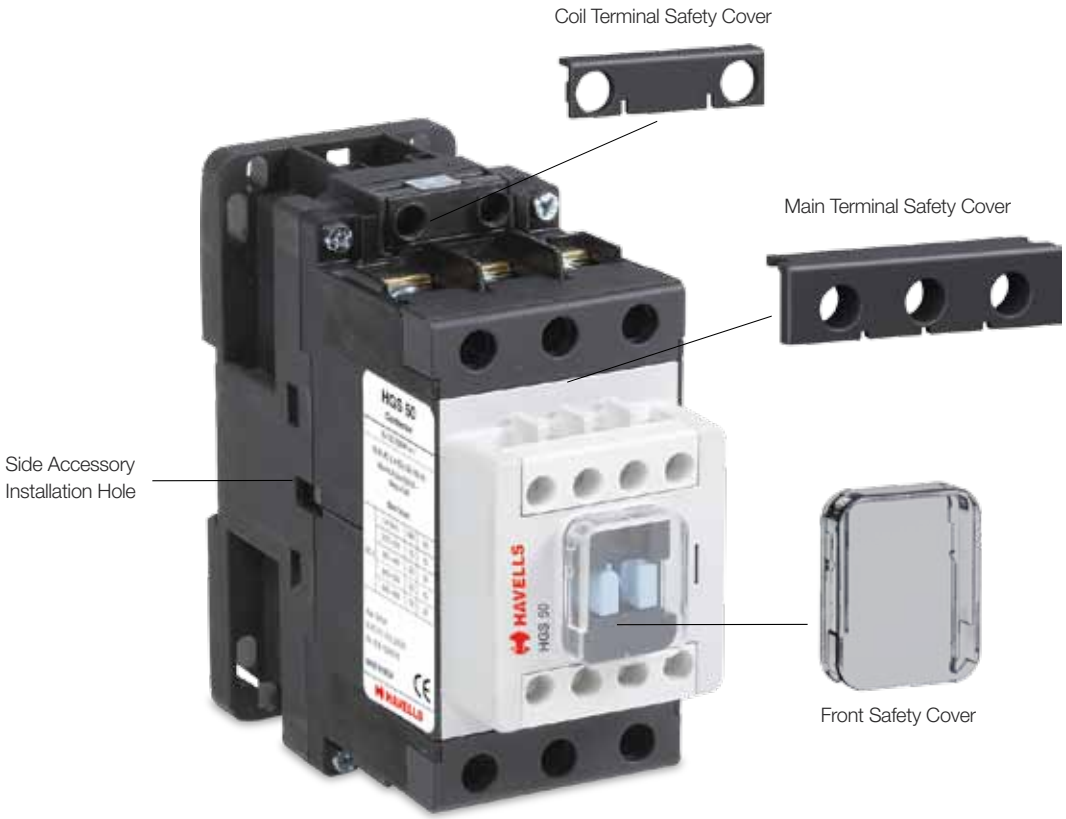
- Minimizes foreign input
- Prevents unexpected operation due to user's error

Sealed Structure of Mounting Hole for Auxiliary Devices

- Contact bridge seals the structure when contactor is switched ON / OFF

Removable Terminal Cover

- Applicable for main contact, auxiliary contact, coil contact
- IP20



Improved Customer's Convenience

Upper Arrayed Auxiliary Contacts

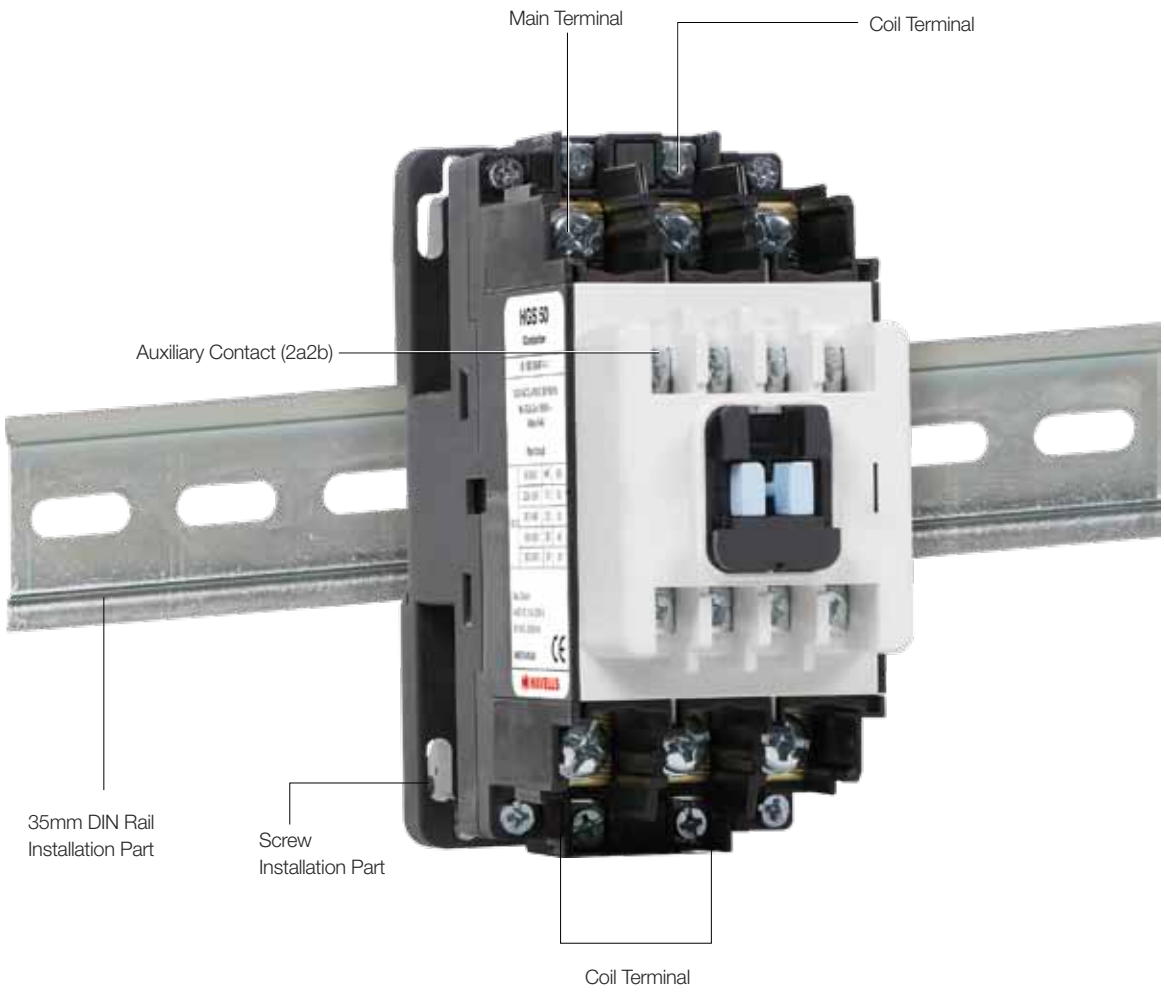
- Easy wiring control cable for HGS 50 AF - 100 AF (default, 2a2b).
- Easy wiring control cable for HGS 9 AF - 40 AF (default, 1a / 1b).

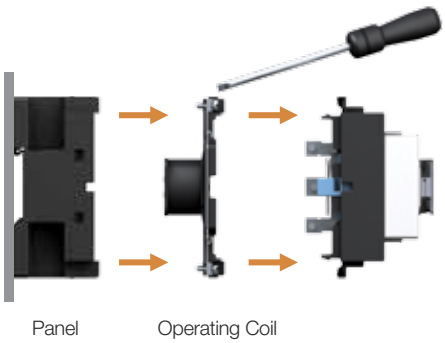
Easy Coil Replacement Structure

- Easy maintenance and replacement of coil inside the panel

Various Attachment Methods inside panel

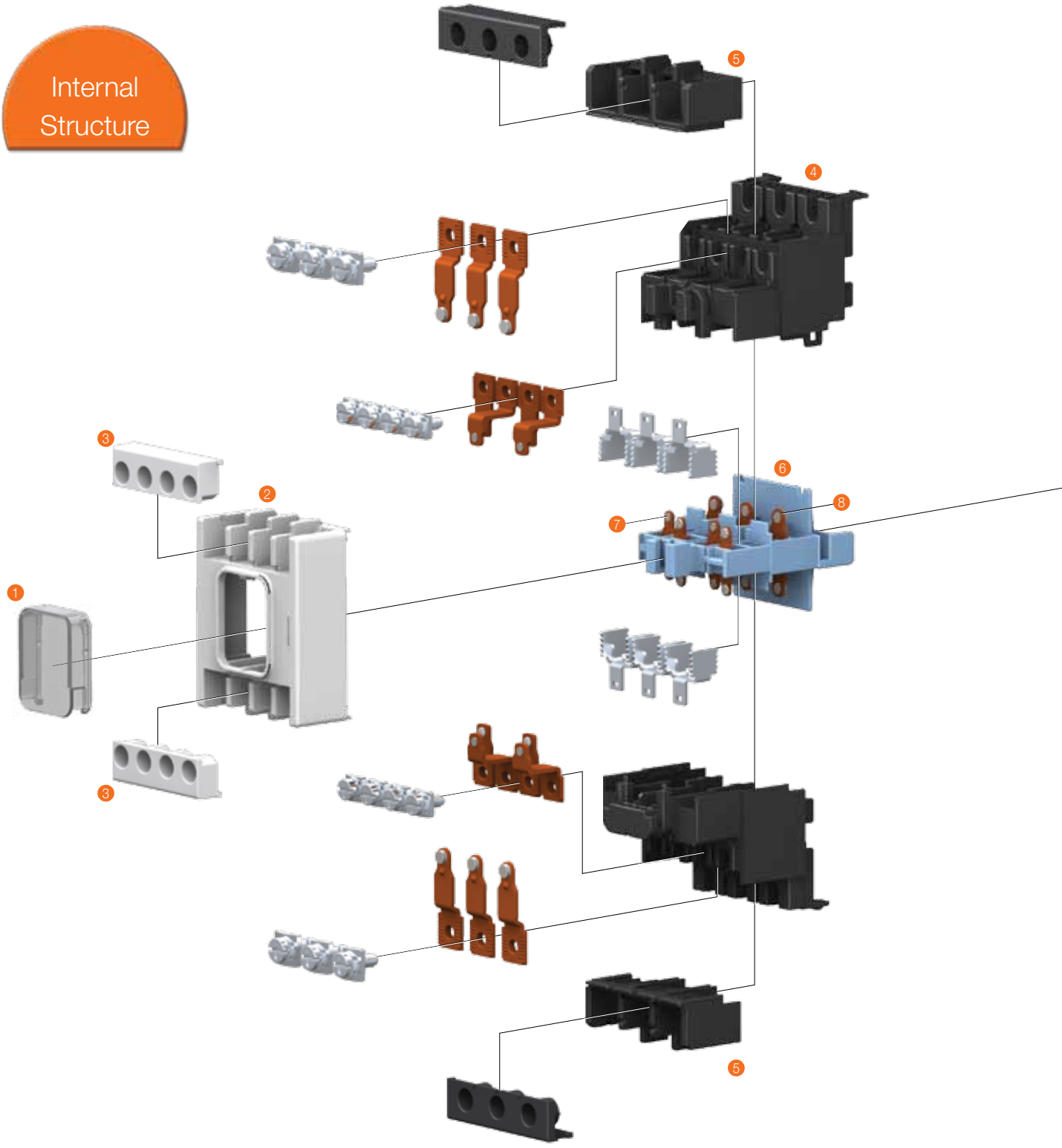
- DIN rail and screw type

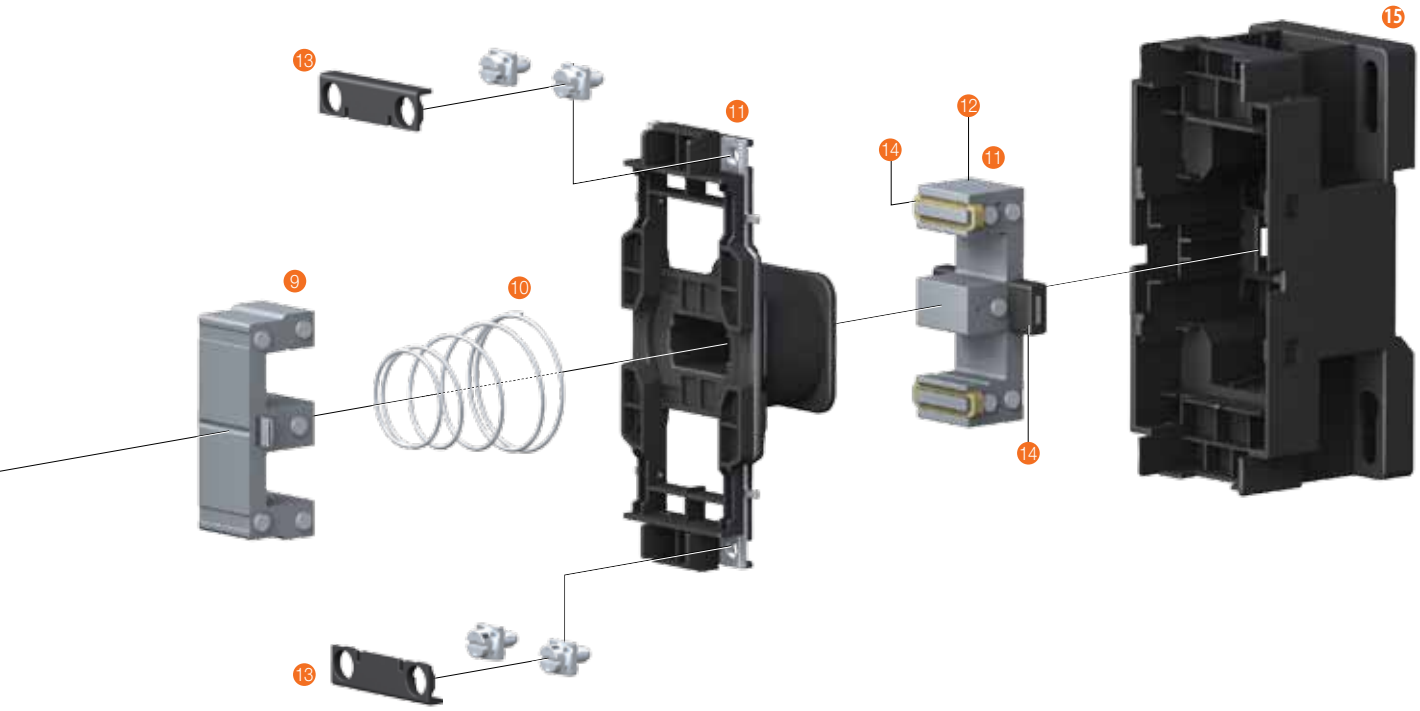




Contactor (HGS)

Internal Structure





1. Safety Cover: Prevents pushing contact bridge arbitrarily.
2. Top Cover: Assembles arc chamber. Auxiliary contact part is stored inside.
3. Auxiliary Terminal Protection Cover: Protects users from electrical parts
4. Arc Chamber: Cuts off arc during on/off
5. Screw Terminal: Device to connect terminals
6. Contact Bridge: Assembled with a moving contact and a moving core to operate on/off. Assembly mounting hole is stored inside.
7. Auxiliary Contact: Operational point of auxiliary contact terminal
8. Moving Contact: Operational point of main contact terminal
9. Moving Core: Contactor is closed when coil is energized and moving core slides into fixed core.
10. Return Spring: When coil is de-energized, it separates moving core from fixed core.
11. Coil Assembly: Energized part to make fixed core an electromagnet
12. Fixed Core: The part where it becomes an electromagnet when coil is energized.
13. Coil Protection Cover: Protects the user from energized coil
14. Rubber Damper: Reduces on/off operation impact on magnetic contact.
15. Frame: The bottom part of contact that stores coil and fixed core

Contactor (HGS)

115 - 800 AF

Easy Coil Replacement

- Easy maintenance and replacement without removal from panel
- Applying plastic case to fix coil unit
- Minimizes movement of coil unit

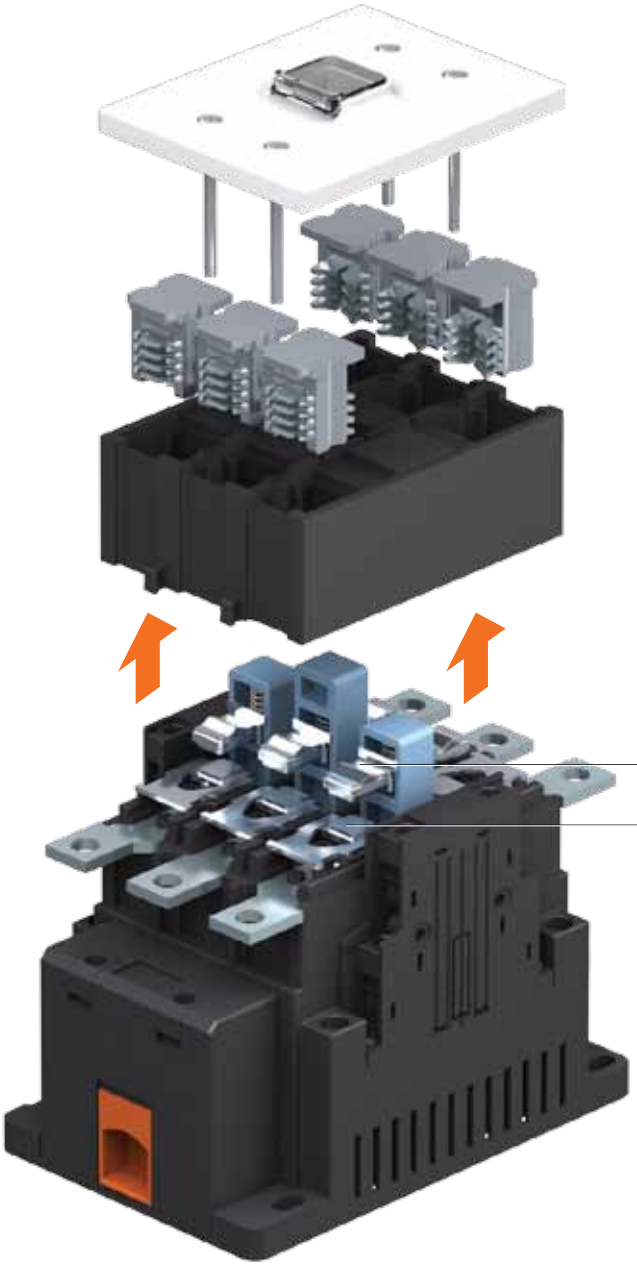
Design for Noise Reduction

- DC energizing method using electronic circuit

Wide Range of Coil Control Voltage

Nominal Voltage	Rated Voltage (AC/DC)
24 V	AC: 24 - 26 V, DC: 24 V
48 V	AC: 44 - 52 V, DC: 48 V
220 V	AC: 100 - 240 V, DC: 110 - 220 V
440 V	AC: 380 - 450 V

*Rated voltage depending on the types
(Table is only for HGS115 - 265)



Easy Maintenance and Replacement for Main Contacts

- As top cover is disassembled, main contacts are revealed to have easy maintenance and testing from outside.

Model Selection Table

Contactors: 9 - 100 AF

Model				SI Unit	HGS9	HGS12	HGS18	HGS25	HGS32	HGS40
IEC 60947-4-1	Rated Insulation Voltage Ui			V	800	800	800	800	800	800
	Rated Operational Voltage Ue			V	690	690	690	690	690	690
	Rated Impulse Withstand Voltage Uimp			kV	6	6	6	6	6	6
	Rated Thermal Current [Ith] (AC1)			A	25	25	40	45	55	60
	AC3	200 V - 240 V		kW/A	2.5/9	3.5/12	4.5/18	5.5/25	7.5/32	11/40
		380 V - 440 V			4/9	5.5/12	7.5/18	11/25	15/32	18.5/40
		500 V - 550 V			4/7	7.5/12	8.5/13	15/22	18.5/28	22/32
		660 V - 690 V			4/6	7.5/9	7.5/9	15/17	18.5/20	22/23
		1,000 V			-	-	-	-	-	-
		Lifetime	Electrical	10,000 Times	250	250	250	250	200	200
			Mechanical		1,500	1,500	1,500	1,500	1,500	1,500
	AC4	200 V - 240 V		kW/A	1.5/8	2.2/11	3.7/16	3.7/18	4.5/22	5.5/25
		380 V - 440 V			2.2/6	4/9	4/11	5.5/13	7.5/17	11/24
		Electrical Lifetime		10,000 Times	3	3	3	3	3	3
Mounting Method					Screw & DIN-Rail			Screw & DIN-Rail		
Contacts		Main	AC		1NO / 1NC			1NO / 1NC		
		Auxiliary	AC		2NO2NC			2NO2NC		
Dimensions		AC	W x H x D	mm	45 x 75 x 85.95			54 x 84 x 90.35		

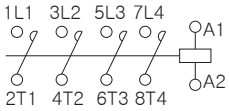
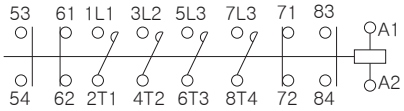
Model				SI Unit	HGS50	HGS65	HGS75	HGS85	HGS100
IEC 60947-4-1	Rated Insulation Voltage Ui			V	1,000	1,000	1,000	1,000	1,000
	Rated Operational Voltage Ue			V	690	690	690	690	690
	Rated Impulse Withstand Voltage Uimp			kV	8	8	8	8	8
	Rated Thermal Current [Ith] (AC1)			A	70	85	115	125	145
	AC3	200 V - 240 V		kW/A	15/50	18.5/65	22/75	25/85	30/100
		380 V - 440 V			22/50	30/65	37/75	45/85	55/100
		500 V - 550 V			30/43	33/60	37/64	50/75	55/85
		660 V - 690 V			30/28	33/35	37/42	45/45	50/65
		1,000 V			-	-	-	-	-
		Lifetime	Electrical	10,000 Times	200	200	200	200	200
			Mechanical		1,500	1,500	1,000	1,000	1,000
	AC4	200 V - 240 V		kW/A	7.5/35	11/50	13/55	15/65	17/72
		380 V - 440 V			15/32	22/47	25/52	30/62	33/68
		Electrical Lifetime		10,000 Times	3	3	3	3	3
Mounting Method					Screw & DIN-Rail		Screw & DIN-Rail		
Contacts		Main	AC		1NO1NC or 2NO2NC		1NO1NC or 2NO2NC		
		Auxiliary	AC		2NO2NC		2NO2NC		
Dimensions		AC	W x H x D	mm	55 x 123.6 x 129		70 x 146 x 153		

Contactors : 18 - 40 AF (4 Pole)

AC1 Series 4 pole contactor

Model		SI Unit	HGS94	HGS124	HGS184	HGS254	HGS324	HGS404
IEC 60947-4-1	Rated Insulation Voltage Ui	V	800	800	800	800	800	800
	Rated Operational Voltage Ue	V	690	690	690	690	690	690
	Rated Impulse Withstand Voltage Uimp	KV	6	6	6	6	6	6
	Rated Thermal Current [Ith] (AC1)	A	25	25	40	45	55	60
	Mechanical Life "10,000 Times"	Nos	1500	1500	1500	1500	1500	1500
Mounting Method		Screw & Rail Mounting						
Weight		kg	0.45			0.65		
Dimension (W X H X D)		mm	45 x 75 x 85.95			54 x 84 x 90.35		

Contact Arrangement

Main	Main	4a	
Main + Auxillary (2a 2b)	Main	4a	
	Auxillary	2a 2b	

Thermal Overload Relays: 18 - 100 AF

Model (Basic)			HGST18	HGST40	HGST65	HGST100
3 Phase, 3 Elements (Loss Phase Protection)			HGST18K	HGST40K	HGST65K	HGST100K
Nominal Current		A	0.12 - 18	7 - 40	7 - 65	17 - 100
Setting Current (Min. - Max.)		A	0.12 - 0.18 0.18 - 0.26 0.25 - 0.35 0.34 - 0.5 0.5 - 0.7 0.6 - 0.9 0.8 - 1.2 1.1 - 1.6 1.5 - 2.1 2 - 3 2.8 - 4.2 3 - 5 4 - 6 5.6 - 8 6 - 9 8 - 12 12 - 18	7 - 10 8 - 12 12 - 18 15 - 22 17 - 25 22 - 32 28 - 40	7 - 10 8 - 12 12 - 18 15 - 22 17 - 25 22 - 32 28 - 40 34 - 50 45 - 65	17 - 25 22 - 32 28 - 40 34 - 50 45 - 65 52 - 75 59 - 85 70 - 100
Auxiliary Contacts			1NO1NC	1NO1NC	1NO1NC	1NO1NC
Reset			Manual & Automatic	Manual & Automatic	Manual & Automatic	Manual & Automatic
Dimensions	W x H x D	mm	45 x 77.2 x 82.7	45 x 78.7 x 95.5	55 x 89.3 x 110.7	70 x 105 x 128.1

Model Selection Table

Contactors: 115 - 800 AF

Model				SI Unit	HGS115	HGS130	HGS150	HGS185	HGS225	HGS265
IEC 60947-4-1	Rated Insulation Voltage Ui			V	1,000	1,000	1,000	1,000	1,000	1,000
	Rated Operational Voltage Ue			V	1,000	1,000	1,000	1,000	1,000	1,000
	Rated Impulse Withstand Voltage Uimp			kV	8	8	8	8	8	8
	Rated Thermal Current [Ith] (AC1)			A	160	180	210	275	315	350
	AC3	200 V - 240 V		kW/A	37/115	40/130	45/150	55/185	75/225	80/265
		380 V - 440 V			60/115	65/130	75/150	90/185	132/225	147/265
		500 V - 550 V			59/100	70/120	90/140	110/180	132/200	150/225
		660 V - 690 V			55/65	75/82	90/120	110/120	132/150	160/173
		1,000 V			65/50	75/54	90/66	110/78	132/96	160/113
		Lifetime	Electrical	10,000 Times	100	100	100	100	100	100
			Mechanical		500	500	500	500	500	500
	AC4	200 V - 240 V		kW/A	19/80	22/93	30/125	37/150	45/185	50/200
		380 V - 440 V			37/75	45/90	55/110	75/150	90/185	102/200
		Electrical Lifetime		10,000 Times	3	3	3	3	3	3
Mounting Method					Screw			Screw		
Contacts	Main				2NO2NC			2NO2NC		
	Auxiliary				2NO2NC			2NO2NC		
Dimensions	W x H x D			mm	103 x 155 x 145.1			138 x 204 x 174.2		

Model				SI Unit	HGS300	HGS400	HGS500	HGS630	HGS800
IEC 60947-4-1	Rated Insulation Voltage Ui			V	1,000	1,000	1,000	1,000	1,000
	Rated Operational Voltage Ue			V	1,000	1,000	1,000	1,000	1,000
	Rated Impulse Withstand Voltage Uimp			kV	8	8	8	8	8
	Rated Thermal Current [Ith] (AC1)			A	400	500	550	750	900
	AC3	200 V - 240 V		kW/A	90/300	125/400	140/500	190/630	220/800
		380 V - 440 V			160/300	220/400	250/500	330/630	440/800
		500 V - 550 V			200/273	250/300	300/426	330/500	500/720
		660 V - 690 V			200/220	250/300	335/360	400/412	500/630
		1,000 V			200/141	250/178	275/192	300/213	400/284
		Lifetime	Electrical	10,000 Times	100	100	50	50	50
			Mechanical		500	500	500	500	500
	AC4	200 V - 240 V		kW/A	55/220	75/300	90/350	110/400	160/630
		380 V - 440 V			110/220	150/300	175/350	200/400	300/630
		Electrical Lifetime		10,000 Times	3	3	3	3	3
Mounting Method					Screw			Screw	
Contacts	Main				2NO2NC			2NO2NC	
	Auxiliary				2NO2NC			2NO2NC	
Dimensions	W x H x D			mm	163 x 243 x 203			276 x 314 x 255.3	

Thermal Overload Relays: 150 - 800 AF

Model (Basic)			HGST150	HGST265	HGST500	HGST800
3 Phase, 3 Elements (Loss Phase Protection)			HGST150K	HGST265K	HGST500K	HGST800K
Nominal Current		A	48 - 150	48 - 265	90 - 500	378 - 800
Setting Current (Min. - Max.)		A	48 - 80 69 - 115 78 - 130 90 - 150	48 - 80 69 - 115 78 - 130 90 - 150 111 - 185 135 - 225 159 - 265	90 - 150 111 - 185 135 - 225 159 - 265 180 - 300 240 - 400 300 - 500	378 - 630 480 - 800
Auxiliary Contacts			1NO1NC	1NO1NC	1NO1NC	1NO1NC
Reset			Manual & Automatic	Manual & Automatic	Manual & Automatic	Manual & Automatic
Dimensions	W x H x D	mm	180 x 159 x 179.3	180 x 185 x 179.3	180 x 205.2 x 179.3	245 x 197 x 209.9

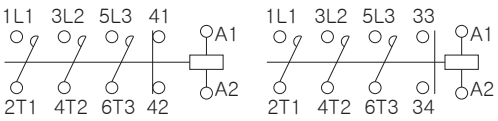
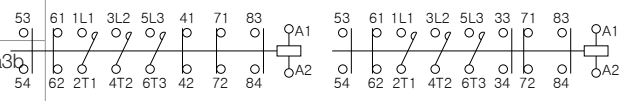
Rating and Selection

Contactor: HGS 9 - 18 A

Rating

Model				SI Unit	HGS9	HGS12	HGS18
IEC 60947-4-1	Rated Insulation Voltage Ui			V	800	800	800
	Rated Operational Voltage Ue			V	690	690	690
	Rated Impulse Withstand Voltage Uimp			kV	6	6	6
	Rated Thermal Current [Ith] (AC1)			A	25	25	40
	AC3	200 V - 240 V		kW/A	2.5/9	3.5/12	4.5/18
		380 V - 440 V			4/9	5.5/12	7.5/18
		500 V - 550 V			4/7	7.5/12	8.5/13
		660 V - 690 V			4/6	7.5/9	7.5/9
		1,000 V			-	-	-
		Lifetime	Electrical	10,000 Times	250	250	250
			Mechanical		1,500	1,500	1,500
	AC4	200 V - 240 V		kW/A	1.5/8	2.2/11	3.7/16
		380 V - 440 V			2.2/6	4/9	4/11
		Electrical Lifetime		10,000 Times	3	3	3
	AC1,2,3 Operating Frequency (per hour)	100 % load		Times	1,000	1,000	1,000
		50 % load (DC)			2,000	2,000	2,000
		20 % load (DC)			3,600	3,600	3,600
	AC4 Operating Frequency (per hour)	100 % load		Times	300	300	300
		50 % load			600	600	600
	Making Capacity	220 V		A	110	130	180
		440 V			90	120	180
	Breaking Capacity	220 V		A	88	104	144
		440 V			72	96	144
Mounting Method					Screw & DIN-Rail		
Contacts		Main	AC		1NO / 1NC		
			AC/DC		-		
		Auxiliary	AC		2NO2NC		
			AC/DC		-		
Dimensions		AC	W x H x D	mm	45 x 75 x 85.95		
		AC/DC			-		
Weight		AC		kg	0.4		
		AC/DC			-		

Contact Arrangement

Main	Main	3a	
	Auxiliary	1a / 1b	
Main + Auxiliary (2a2b)	Main	3a	
	Auxiliary	3a3b	

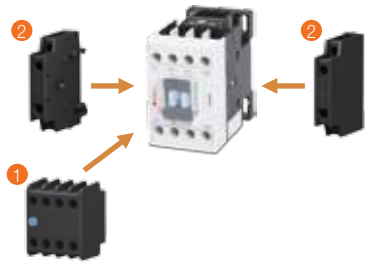
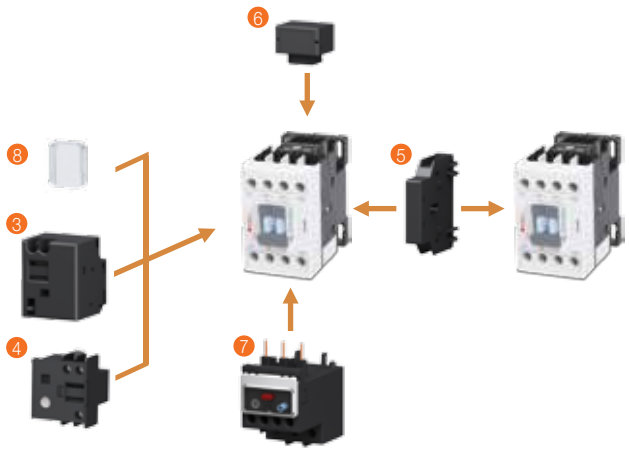
- Auxiliary Contacts Usage: Please refer to 48 - 49 page

1) Possible auxiliary contacts combination -> A Contact: maximum 6a, B Contact: maximum 4b

2) When using 4a4b by side auxillary block, front auxillary block is not applicable.

3) When using main 1a / 1b, front auxillary block is applicable.

Accessories

Auxiliary Contacts	Other Accessories
	
1 Auxiliary Contact Block (Front Mounting) HGS TB - 48 page 2 Auxiliary Contact Block (Side Mounting) HGS SB 40 - 48 page	3 Mechanical Latching Block HGS LB 100 - 51 page 4 Timer HGS ET - 53 page 5 Mechanical Interlock Block HGS IU 40 - 50 page 6 Surge Absorber HGS RC/CD 40 - 52 page 7 Thermal Overload Relay HGST 18 - 38 page 8 Front Safety Cover

Order Information

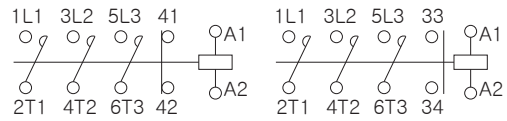
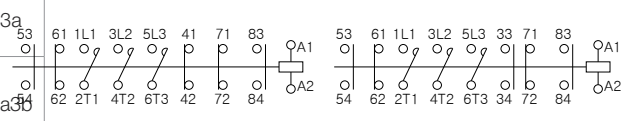
- Standard Order (w/protection cover, w/o accessories) / Inbuilt Auxiliary Contacts: 1NO/1NC

Rating	Operating Voltage @AC 50 Hz	3 Pole		4Pole	
		1 No	1 NC	2NO+2NC	4NO
HGS 9	24 V	IHPHA009110B	IHPHA009101B	IHPHA0016122B	IHPHC0016100B
	110 V	IHPHA009110H	IHPHA009101H	IHPHA0016122H	IHPHC0016100H
	220 V	IHPHA009110M	IHPHA009101M	IHPHA0016122M	IHPHC0016100M
	240 V	IHPHA009110N	IHPHA009101N	IHPHA0016122N	IHPHC0016100N
	415 V	IHPHA009110T	IHPHA009101T	IHPHA0016122T	IHPHC0016100T
	260 V - 440 V	IHPHA009110W	IHPHA009101W	IHPHA0016122W	IHPHA0016122W
HGS 12	24 V	IHPHA012110B	IHPHA012101B		
	110 V	IHPHA012110H	IHPHA012101H		
	220 V	IHPHA012110M	IHPHA012101M		
	240 V	IHPHA012110N	IHPHA012101N		
	415 V	IHPHA012110T	IHPHA012101T		
	260 V - 440 V	IHPHA012110W	IHPHA012101W		
HGS 18	24 V	IHPHA018110B	IHPHA018101B		
	110 V	IHPHA018110H	IHPHA018101H		
	220 V	IHPHA018110M	IHPHA018101M		
	240 V	IHPHA018110N	IHPHA018101N		
	415 V	IHPHA018110T	IHPHA018101T		
	260 V - 440 V	IHPHA018110W	IHPHA018101W		

Rating and Selection

Contactor: HGS 25 - 40 A

Rating

Model				SI Unit	HGS25	HGS32	HGS40
IEC 60947-4-1	Rated Insulation Voltage Ui			V	800	800	800
	Rated Operational Voltage Ue			V	690	690	690
	Rated Impulse Withstand Voltage Uimp			kV	6	6	6
	Rated Thermal Current [Ith] (AC1)			A	45	55	60
	AC3	200 V - 240 V		kW/A	5.5/25	7.5/32	11/40
		380 V - 440 V			11/25	15/32	18.5/40
		500 V - 550 V			15/22	18.5/28	22/32
		660 V - 690 V			15/17	18.5/20	22/23
		1,000 V			-	-	-
		Lifetime	Electrical	10,000 Times	250	200	200
			Mechanical		1,500	1,500	1,500
	AC4	200 V - 240 V		kW/A	3.7/18	4.5/22	5.5/25
		380 V - 440 V			5.5/13	7.5/17	11/24
		Electrical Lifetime		10,000 Times	3	3	3
	AC1,2,3 Operating Frequency (per hour)	100 % load		Times	1,000	1,000	1,000
		50 % load (DC)			2,000	2,000	2,000
		20 % load (DC)			3,600	3,600	3,600
	AC4 Operating Frequency (per hour)	100 % load		Times	300	300	250
		50 % load			600	600	500
	Making Capacity	220 V		A	250	320	400
		440 V			250	320	400
	Breaking Capacity	220 V		A	200	256	320
		440 V			200	256	320
Mounting Method					Screw & DIN-Rail		
Contacts		Main	AC		1NO / 1NC		
			AC/DC		-		
		Auxiliary	AC		2NO2NC		
			AC/DC		-		
Dimensions		AC	W x H x D	mm	54 x 84 x 90.35		
		AC/DC			-		
Weight		AC		kg	0.5		
		AC/DC			-		
Contact Arrangement							
Main		Main		3a			
		Auxiliary		1a / 1b			
Main + Auxiliary (2a2b)		Main		3a			
		Auxiliary		3a3b			

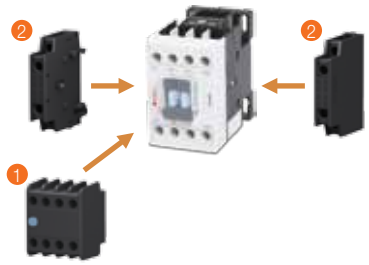
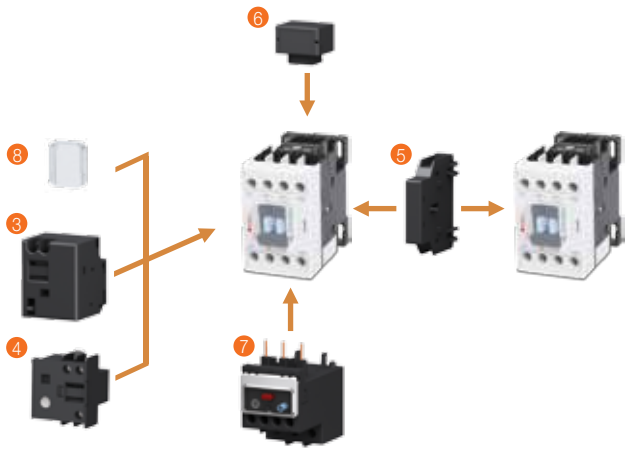
- Auxiliary Contacts Usage: Please refer to 48 - 49 page

1) Possible auxiliary contacts combination -> A Contact: maximum 6a, B Contact: maximum 4b

2) When using 4a4b by side auxillary block, front auxillary block is not applicable.

3) When using main 1a / 1b, front auxillary block is applicable.

Accessories

Auxiliary Contacts	Other Accessories
	
1 Auxiliary Contact Block (Front Mounting) HGS TB - 48 page 2 Auxiliary Contact Block (Side Mounting) HGS SB 40 - 48 page	3 Mechanical Latching Block HGS LB 100 - 51 page 4 Timer HGS ET - 53 page 5 Mechanical Interlock Block HGS IU 40 - 50 page 6 Surge Absorber HGS RC/CD 40 - 52 page 7 Thermal Overload Relay HGST 40 - 38 page 8 Front Safety Cover

Order Information

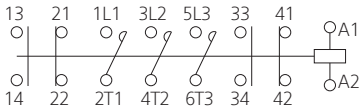
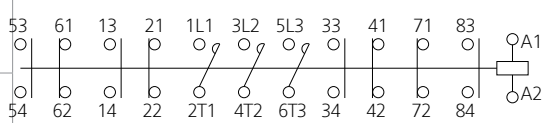
- Standard Order (w/protection cover, w/o accessories) / Inbuilt Auxiliary Contacts: 1NO/1NC

Rating	Operating Voltage @AC 50 Hz	3 Pole		4Pole	
		1 No	1 NC	2NO+2NC	4NO
HGS 25	24 V	IHPHA025110B	IHPHA025101B	IHPHC025122B	IHPHC025100B
	110 V	IHPHA025110H	IHPHA025101H	IHPHC025122H	IHPHC025100H
	220 V	IHPHA025110M	IHPHA025101M	IHPHC025122M	IHPHC025100M
	240 V	IHPHA025110N	IHPHA025101N	IHPHC025122N	IHPHC025100N
	415 V	IHPHA025110T	IHPHA025101T	IHPHC025122T	IHPHC025100T
	260 V - 440 V	IHPHA025110W	IHPHA025101W	IHPHC025122W	IHPHC025100W
HGS 32	24 V	IHPHA032110B	IHPHA032101B	IHPHC032122B	IHPHC032100B
	110 V	IHPHA032110H	IHPHA032101H	IHPHC032122H	IHPHC032100H
	220 V	IHPHA032110M	IHPHA032101M	IHPHC032122M	IHPHC032100M
	240 V	IHPHA032110N	IHPHA032101N	IHPHC032122N	IHPHC032100N
	415 V	IHPHA032110T	IHPHA032101T	IHPHC032122T	IHPHC032100T
	260 V - 440 V	IHPHA032110W	IHPHA032101W	IHPHC032122W	IHPHC032100W
HGS 40	24 V	IHPHA040110B	IHPHA040101B	IHPHC040122B	IHPHC040100B
	110 V	IHPHA040110H	IHPHA040101H	IHPHC040122H	IHPHC040100H
	220 V	IHPHA040110M	IHPHA040101M	IHPHC040122M	IHPHC040100M
	240 V	IHPHA040110N	IHPHA040101N	IHPHC040122N	IHPHC040100N
	415 V	IHPHA040110T	IHPHA040101T	IHPHC040122T	IHPHC040100T
	260 V - 440 V	IHPHA040110W	IHPHA040101W	IHPHC040122W	IHPHC040100W

Rating and Selection

Contactor: HGS 50 - 65 A

Rating

Model				SI Unit	HGS50	HGS65
IEC 60947-4-1	Rated Insulation Voltage Ui			V	1,000	1,000
	Rated Operational Voltage Ue			V	690	690
	Rated Impulse Withstand Voltage Uimp			kV	8	8
	Rated Thermal Current [Ith] (AC1)			A	70	85
	AC3	200 V - 240 V		kW/A	15/50	18.5/65
		380 V - 440 V			22/50	30/65
		500 V - 550 V			30/43	33/60
		660 V - 690 V			30/28	33/35
		1,000 V			-	-
		Lifetime	Electrical	10,000 Times	200	200
			Mechanical		1,500	1,500
	AC4	200 - 240 V		kW/A	7.5/35	11/50
		380 - 440 V			15/32	22/47
		Electrical Lifetime		10,000 Times	3	3
	AC1,2,3 Operating Frequency (per hour)	100 % load		Times	750	750
		50 % load (DC)			1,500 (900)	1,500 (900)
		20 % load (DC)			3,000 (1,200)	3,000 (1,200)
	AC4 Operating Frequency (per hour)	100 % load		Times	250	250
		50 % load			500	500
	Making Capacity	220 V		A	500	650
		440 V			500	650
	Breaking Capacity	220 V		A	400	520
		440 V			400	520
Mounting Method					Screw & DIN-Rail	
Contacts		Main	AC		2NO2NC	
			AC/DC		-	
		Auxiliary	AC		2NO2NC	
			AC/DC		-	
Dimensions		AC	W x H x D	mm	55 x 127.6 x 129.1	
		AC/DC			-	
Weight		AC		kg	0.8	
		AC/DC			-	
Contact Arrangement						
Main		Main		3a		
		Auxiliary		2a2b		
Main + Auxiliary (2a2b)		Main		3a		
		Auxiliary		4a4b		

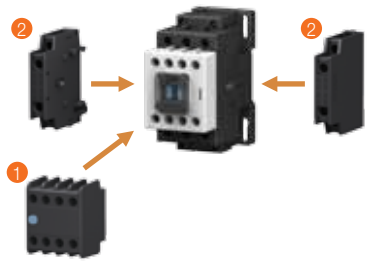
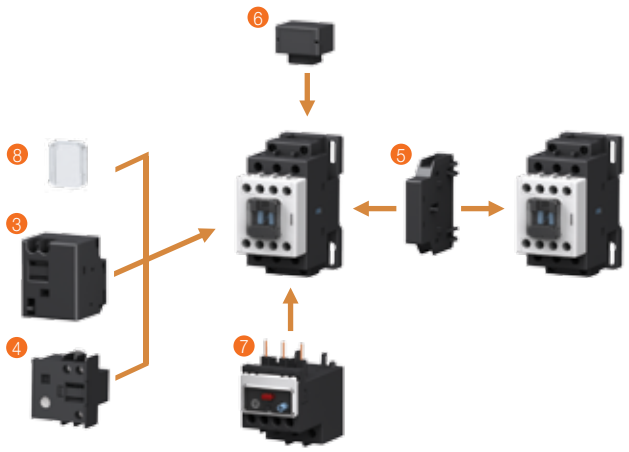
- Auxiliary Contacts Usage: Please refer to 48 - 49 page

1) Possible auxiliary contacts combination -> A Contact: maximum 6a, B Contact: maximum 4b

2) When using 4a4b by side auxillary block, front auxillary block is not applicable.

3) When using main 2a2b, front auxillary block is applicable.

Accessories

Auxiliary Contacts	Other Accessories
	

1. Auxiliary Contact Block (Front Mounting)
   HGS TB - 48 page
2. Auxiliary Contact Block (Side Mounting)
   HGS SB 100 - 48 page
3. Mechanical Latching Block
   HGS LB 100 - 51 page
4. Timer HGS ET - 53 page
5. Mechanical Interlock Block
   HGS IU 100 - 50 page
6. Surge Absorber
   HGS RC/CD100 - 52 page
7. Thermal Overload Relay
   HGST 65 - 38 page
8. Front Safety Cover

Order Information

·Standard Order (w/protection cover, w/o accessories) / Inbuilt Auxiliary Contacts: 2NO2NC

Rating	Operating Voltage @AC 50 Hz	3Pole
HGS 50	24 V	IHPHA050300B
	110 V	IHPHA050300H
	220 V	IHPHA050300M
	240 V	IHPHA050300N
	415 V	IHPHA050300T
	260 V - 440 V	IHPHA050300W
HGS 65	24 V	IHPHA065300B
	110 V	IHPHA065300H
	220 V	IHPHA065300M
	240 V	IHPHA065300N
	415 V	IHPHA065300T
	260 V - 440 V	IHPHA065300W

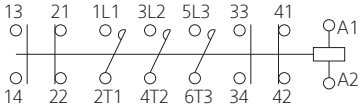
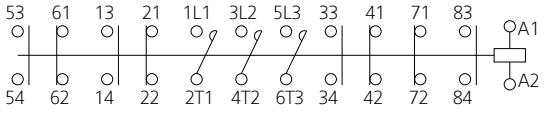
Rating and Selection

Contactor: HGS 75 - 100 A

Rating

Model				SI Unit	HGS75	HGS85	HGS100
IEC 60947-4-1	Rated Insulation Voltage Ui			V	1,000	1,000	1,000
	Rated Operational Voltage Ue			V	690	690	690
	Rated Impulse Withstand Voltage Uimp			kV	8	8	8
	Rated Thermal Current [Ith] (AC1)			A	115	125	145
	AC3	200 V - 240 V		kW/A	22/75	25/85	30/100
		380 V - 440 V			37/75	45/85	55/100
		500 V - 550 V			37/64	50/75	55/85
		660 V - 690 V			37/42	45/45	50/65
		1,000 V			-	-	-
		Lifetime	Electrical	10,000 Times	200	200	200
			Mechanical		1,000	1,000	1,000
	AC4	200 V - 240 V		kW/A	13/55	15/65	17/72
		380 V - 440 V			25/52	30/62	33/68
		Electrical Lifetime		10,000 Times	3	3	3
	AC1,2,3 Operating Frequency (per hour)	100 % load		Times	450	450	450
		50 % load (DC)			900	900	900
		20 % load (DC)			1,800	1,800	1,800
	AC4 Operating Frequency (per hour)	100 % load		Times	200	200	200
		50 % load			400	400	400
	Making Capacity	220 V		A	750	850	1,000
		440 V			750	850	1,000
	Breaking Capacity	220 V		A	600	680	800
		440 V			600	680	800
Mounting Method					Screw & DIN-Rail		
Contacts		Main	AC		1NO1NC or 2NO2NC		
			AC/DC		-		
		Auxiliary	AC		2NO2NC		
			AC/DC		-		
Dimensions		AC	W x H x D	mm	70 x 146 x 153		
		AC/DC			-		
Weight		AC		kg	1.3		
		AC/DC			-		

Contact Arrangement

Main	Main	3a	
	Auxiliary	2a2b	
Main + Auxiliary (2a2b)	Main	3a	
	Auxiliary	4a4b	

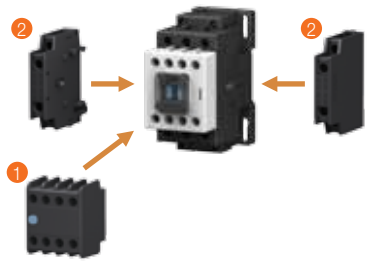
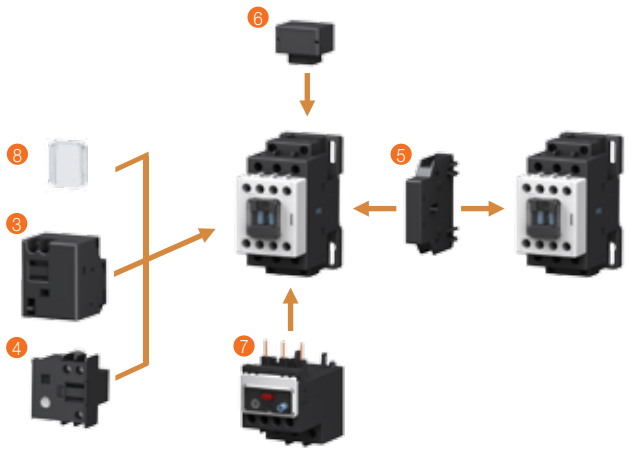
- Auxiliary Contacts Usage: Please refer to 48 - 49 page

1) Possible auxiliary contacts combination -> A Contact: maximum 6a, B Contact: maximum 4b

2) When using 4a4b by side auxillary block, front auxillary block is not applicable.

3) When using main 2a2b, front auxillary block is applicable.

Accessories

Auxiliary Contacts	Other Accessories
	

1. Auxiliary Contact Block (Front Mounting)
   HGS TB - 48 page
2. Auxiliary Contact Block (Side Mounting)
   HGS SB 100 - 48 page
3. Mechanical Latching Block
   HGS LB 100 - 51 page
4. Timer HGS ET - 53 page
5. Mechanical Interlock Block
   HGS IU 100 - 50 page
6. Surge Absorber
   HGS RC/CD100 - 52 page
7. Thermal Overload Relay
   HGST 100 - 38 page
8. Front Safety Cover

Order Information

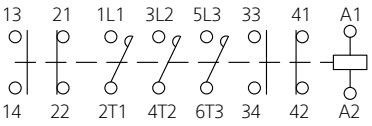
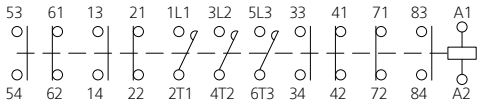
- Standard Order (w/protection cover, w/o accessories) / Inbuilt Auxiliary Contacts: 2NO2NC

Rating	Operating Voltage @AC 50 Hz	3Pole
HGS 75	24 V	IHPHA075400B
	110 V	IHPHA075400H
	220 V	IHPHA075400M
	240 V	IHPHA075400N
	415 V	IHPHA075400T
	260 V - 440 V	IHPHA075400W
HGS 85	24 V	IHPHA085400B
	110 V	IHPHA085400H
	220 V	IHPHA085400M
	240 V	IHPHA085400N
	415 V	IHPHA085400T
	260 V - 440 V	IHPHA085400W
HGS 100	24 V	IHPHA100400B
	110 V	IHPHA100400H
	220 V	IHPHA100400M
	240 V	IHPHA100400N
	415 V	IHPHA100400T
	260 V - 440 V	IHPHA100400W

Rating and Selection

Contactor: HGS 115 - 150 A

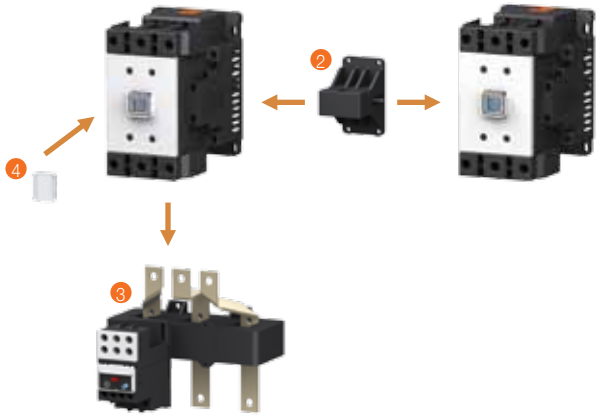
Rating

Model				SI Unit	HGS115	HGS130	HGS150
IEC 60947-4-1	Rated Insulation Voltage Ui			V	1,000	1,000	1,000
	Rated Operational Voltage Ue			V	1,000	1,000	1,000
	Rated Impulse Withstand Voltage Uimp			kV	8	8	8
	Rated Thermal Current [Ith] (AC1)			A	160	180	210
	AC3	200 V - 240 V		kW/A	37/115	40/130	45/150
		380 V - 440 V			60/115	65/130	75/150
		500 V - 550 V			59/100	70/120	90/140
		660 V - 690 V			55/65	75/82	90/120
		1,000 V			65/50	75/54	90/66
		Lifetime	Electrical	10,000 Times	100	100	100
			Mechanical		500	500	500
	AC4	200 V - 240 V		kW/A	19/80	22/93	30/125
		380 V - 440 V			37/75	45/90	55/110
		Electrical Lifetime		10,000 Times	3	3	3
	AC1,2,3 Operating Frequency (per hour)	100 % load		Times	450	450	450
		50 % load (DC)			900	900	900
		20 % load (DC)			1,800	1,800	1,800
	AC4 Operating Frequency (per hour)	100 % load		Times	200	200	200
		50 % load			400	400	400
	Making Capacity	220 V		A	1,150	1,300	1,500
		440 V			1,150	1,300	1,500
	Breaking Capacity	220 V		A	920	1,040	1,200
		440 V			920	1,040	1,200
Mounting Method					Screw		
Contacts		Main	AC/DC		2NO2NC		
		Auxiliary [1]	AC/DC		2NO2NC		
Dimensions		AC/DC	W x H x D	mm	103 x 155 x 145.1		
Weight		AC/DC		kg	2.7		
Contact Arrangement							
Main		Main		3a			
		Auxiliary		2a2b			
Main + Auxiliary (2a2b)		Main		3a			
		Auxiliary		4a4b			

- Auxiliary Contacts Usage: Please refer to page 48 - 49.

1) Maximum number of side auxilliary contacts

Accessories

Auxiliary Contacts	Other Accessories
	
1 Auxiliary Contact Block (Side mounting) HGS SB 800 - 48 page	2 Mechanical Interlock Block HGS IU 265 - 50 page 3 Thermal Overload Relay HGST 150 - 40 page 4 Front Safety Cover

Order Information

- Standard Order (w/protection cover, w/o accessories) / inbuilt Auxiliary Contacts: 2NO2NC

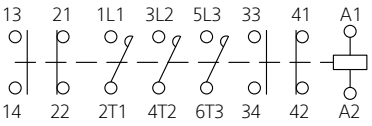
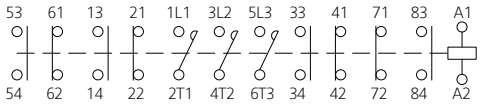
Rating	Coil Voltage	3Pole
HGS 115	AC : 24 V ~ 26 V ; DC : 24 V	IHPHA115500B
	AC : 220 V ~ 240 V	IHPHA115500M
	AC : 100 V ~ 240 V ; DC : 100 V ~ 220 V	IHPHA115500N
	AC : 380 V ~ 450 V	IHPHA115500T
HGS 130	AC : 24 V ~ 26 V ; DC : 24 V	IHPHA130500B
	AC : 220 V ~ 240 V	IHPHA130500M
	AC : 100 V ~ 240 V ; DC : 100 V ~ 220 V	IHPHA130500N
	AC : 380 V ~ 450 V	IHPHA130500T
HGS 150	AC : 24 V ~ 26 V ; DC : 24 V	IHPHA150500B
	AC : 220 V ~ 240 V	IHPHA150500M
	AC : 100 V ~ 240 V ; DC : 100 V ~ 220 V	IHPHA150500N
	AC : 380 V ~ 450 V	IHPHA150500T

*All AC coils available in 50 Hz

Rating and Selection

Contactor: HGS 185 - 265 A

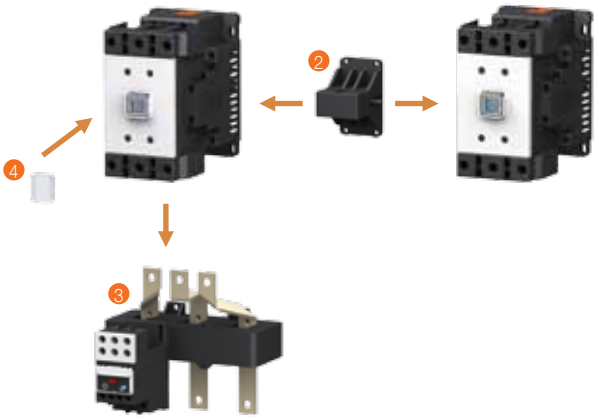
Rating

Model				SI Unit	HGS185	HGS225	HGS265
IEC 60947-4-1	Rated Insulation Voltage Ui			V	1,000	1,000	1,000
	Rated Operational Voltage Ue			V	1,000	1,000	1,000
	Rated Impulse Withstand Voltage Uimp			kV	8	8	8
	Rated Thermal Current [Ith] (AC1)			A	275	315	350
	AC3	200 V - 240 V		kW/A	55/185	75/225	80/265
		380 V - 440 V			90/185	132/225	147/265
		500 V - 550 V			110/180	132/200	150/225
		660 V - 690 V			110/120	132/150	160/173
		1,000 V			110/78	132/96	160/113
		Lifetime	Electrical	10,000 Times	100	100	100
			Mechanical		500	500	500
	AC4	200 V - 240 V		kW/A	37/150	45/185	50/200
		380 V - 440 V			75/150	90/185	102/200
		Electrical Lifetime		10,000 Times	3	3	3
	AC1,2,3 Operating Frequency (per hour)	100 % load		Times	300	300	300
		50 % load (DC)			600	600	600
		20 % load (DC)			1,200	1,200	1,200
	AC4 Operating Frequency (per hour)	100 % load		Times	200	200	200
		50 % load			400	400	400
	Making Capacity	220 V		A	1,850	2,250	2,650
		440 V			1,850	2,250	2,650
	Breaking Capacity	220 V		A	1,480	1,800	2,120
		440 V			1,480	1,800	2,120
Mounting Method					Screw		
Contacts		Main	AC/DC		2NO2NC		
		Auxiliary [1]	AC/DC		2NO2NC		
Dimensions		AC/DC	W x H x D	mm	138 x 204 x 174.2		
Weight		AC/DC		kg	4.8		
Contact Arrangement							
Main		Main		3a			
		Auxiliary		2a2b			
Main + Auxiliary (2a2b)		Main		3a			
		Auxiliary		4a4b			

- Auxiliary Contacts Usage: Please refer to page 48 - 49.

1) Maximum number of side auxilliary contacts.

Accessories

Auxiliary Contacts	Other Accessories
	
1 Auxiliary Contact Block (Side Mounting) HGS SB 800 - 48 page	2 Mechanical Interlock Block HGS IU 265 - 50 page 3 Thermal Overload Relay HGST 265 - 40 page 4 Front Safety Cover

Order Information

- Standard Order (w/protection cover, w/o accessories) / inbuilt Auxiliary Contacts: 2NO2NC

Rating	Coil Voltage	3Pole
HGS 185	AC : 24 V ~ 26 V ; DC : 24 V	IHPHA185600B
	AC : 100 V ~ 240 V ; DC : 100 V ~ 220 V	IHPHA185600N
	AC : 380 V ~ 450 V	IHPHA185600T
HGS 225	AC : 24 V ~ 26 V ; DC : 24 V	IHPHA225600B
	AC : 100 V ~ 240 V ; DC : 100 V ~ 220 V	IHPHA225600N
	AC : 380 V ~ 450 V	IHPHA225600T
HGS 265	AC : 24 V ~ 26 V ; DC : 24 V	IHPHA265600B
	AC : 100 V ~ 240 V ; DC : 100 V ~ 220 V	IHPHA265600N
	AC : 380 V ~ 450 V	IHPHA265600T

*All AC coils available in 50 Hz

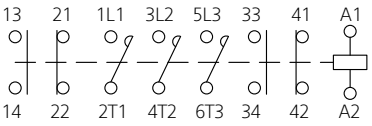
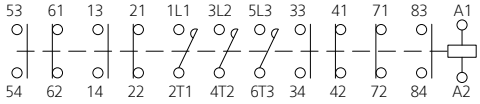
Rating and Selection

Contactor: HGS 300 - 500 A

Rating

Model				SI Unit	HGS300	HGS400	HGS500
IEC 60947-4-1	Rated Insulation Voltage Ui			V	1,000	1,000	1,000
	Rated Operational Voltage Ue			V	1,000	1,000	1,000
	Rated Impulse Withstand Voltage Uimp			kV	8	8	8
	Rated Thermal Current [Ith] (AC1)			A	400	500	550
	AC3	200 V - 240 V		kW/A	90/300	125/400	140/500
		380 V - 440 V			160/300	220/400	250/500
		500 V - 550 V			200/273	250/300	300/426
		660 V - 690 V			200/220	250/300	335/360
		1,000 V			200/141	250/178	275/192
		Lifetime	Electrical	10,000 Times	100	100	50
			Mechanical		500	500	500
	AC4	200 V - 240 V		kW/A	55/220	75/300	90/350
		380 V - 440 V			110/220	150/300	175/350
		Electrical Lifetime		10,000 Times	3	3	3
	AC1,2,3 Operating Frequency (per hour)	100 % load		Times	300	300	300
		50 % load (DC)			600	600	600
		20 % load (DC)			1,200	1,200	1,200
	AC4 Operating Frequency (per hour)	100 % load		Times	150	150	150
		50 % load			300	300	300
	Making Capacity	220 V		A	3,000	4,000	5,000
		440 V			3,000	4,000	5,000
	Breaking Capacity	220 V		A	2,400	3,200	4,000
		440 V			2,400	3,200	4,000
Mounting Method					Screw		
Contacts		Main	AC/DC		2NO2NC		
		Auxiliary [1]	AC/DC		2NO2NC		
Dimensions		AC/DC	W x H x D	mm	163 x 243 x 203		
Weight		AC/DC		kg	9.2		

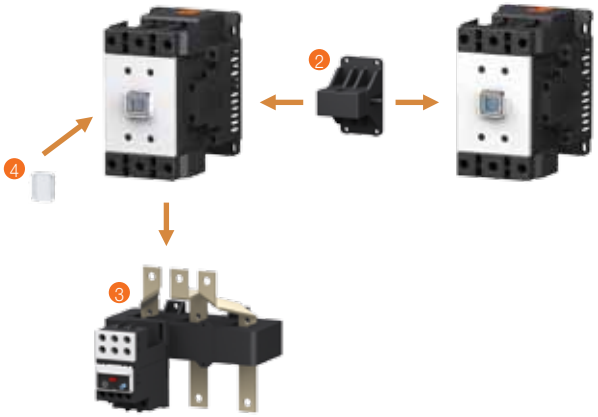
Contact Arrangement

Main	Main	3a	
	Auxiliary	2a2b	
Main + Auxiliary (2a2b)	Main	3a	
	Auxiliary	4a4b	

- Auxiliary Contacts Usage: Please refer to page 48 - 49.

1) Maximum number of side auxilliary contacts.

Accessories

Auxiliary Contacts	Other Accessories
	
1 Auxiliary Contact Block (Side Mounting) HGS SB 800 - 48 page	2 Mechanical Interlock Block HGS IU 800 - 50 page 3 Thermal Overload Relay HGST 500 - 40 page 4 Front Safety Cover

Order Information

- Standard Order (w/protection cover, w/o accessories) / inbuilt Auxiliary Contacts: 2NO2NC

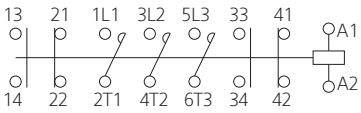
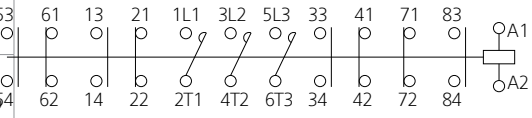
Rating	Coil Voltage	3Pole
HGS 300	AC : 100 V ~ 240 V ; DC : 100 V ~ 220 V	IHPHA300700N
	AC : 380 V ~ 450 V	IHPHA300700T
HGS 400	AC : 100 V ~ 240 V ; DC : 100 V ~ 220 V	IHPHA400700N
	AC : 380 V ~ 450 V	IHPHA400700T
HGS 500	AC : 100 V ~ 240 V ; DC : 100 V ~ 220 V	IHPHA500700N
	AC : 380 V ~ 450 V	IHPHA500700T

*All AC coils available in 50 Hz

Rating and Selection

Contactor: HGS 630 - 800 A

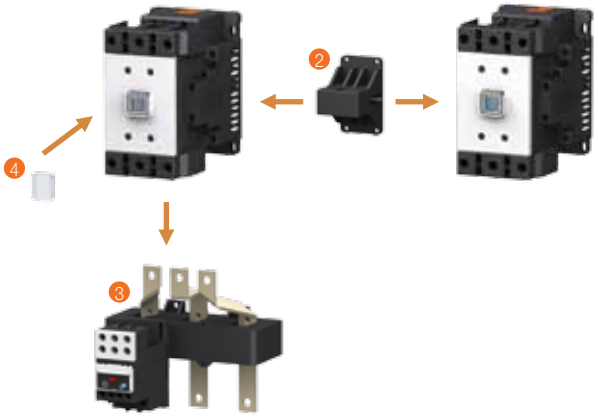
Rating

Model				SI Unit	HGS630	HGS800
IEC 60947-4-1	Rated Insulation Voltage Ui			V	1,000	1,000
	Rated Operational Voltage Ue			V	1,000	1,000
	Rated Impulse Withstand Voltage Uimp			kV	8	8
	Rated Thermal Current [Ith] (AC1)			A	750	900
	AC3	200 V - 240 V		kW/A	190/630	220/800
		380 V - 440 V			330/630	440/800
		500 V - 550 V			330/500	500/720
		660 V - 690 V			400/412	500/630
		1,000 V			300/213	400/284
		Lifetime	Electrical	10,000 Times	50	50
			Mechanical		500	500
	AC4	200 V - 240 V		kW/A	110/400	160/630
		380 V - 440 V			200/400	300/630
		Electrical Lifetime		10,000 Times	3	3
	AC1,2,3 Operating Frequency (per hour)	100 % load		Times	300	300
		50 % load (DC)			600	600
		20 % load (DC)			1,200	1,200
	AC4 Operating Frequency (per hour)	100 % load		Times	150	150
		50 % load			300	300
	Making Capacity	220 V		A	6,300	8,000
		440 V			6,300	8,000
	Breaking Capacity	220 V		A	5,040	6,400
		440 V			5,040	6,400
Mounting Method					Screw	
Contacts		Main	AC/DC		2NO2NC	
		Auxiliary [1]	AC/DC		2NO2NC	
Dimensions		AC/DC	W x H x D	mm	276 x 314 x 255.3	
Weight		AC/DC		kg	25	
Contact Arrangement						
Main	Main			3a		
	Auxiliary			2a2b		
Main + Auxiliary (2a2b)	Main			3a		
	Auxiliary			4a4b		

- Auxiliary Contacts Usage: Please refer to page 48 - 49.

1) Maximum number of side auxilliary contacts.

Accessories

Auxiliary Contacts	Other Accessories
	
1 Auxiliary Contact Block (Side Mounting) HGS SB 800 - 48 page	2 Mechanical Interlock Block HGS IU 800 - 50 page 3 Thermal Overload Relay HGST 800 - 40 page 4 Front Safety Cover

Order Information

- Standard Order (w/protection cover, w/o accessories) / inbuilt Auxiliary Contacts: 2NO2NC

Rating	Coil Voltage	3Pole
HGS 630	AC : 100 V ~ 127 V ; DC : 100 V ~ 110 V	IHPHA630800H
	AC : 200 V ~ 240 V ; DC : 200 V ~ 220 V	IHPHA630800N
	AC : 380 V ~ 450 V	IHPHA630800T
HGS 800	AC : 100 V ~ 127 V ; DC : 100 V ~ 110 V	IHPHA800800H
	AC : 200 V ~ 240 V ; DC : 200 V ~ 220 V	IHPHA800800N
	AC : 380 V ~ 450 V	IHPHA800800T

*All AC coils available in 50 Hz

Ratings and Ordering Code

HGR-X (AC)

Control Relay (HGR)

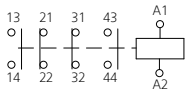
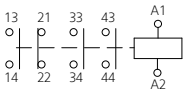
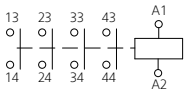
Rating

Model				SI Unit	HGR-X (AC)
Rated Insulation Voltage Ui		IEC 60947		V	AC750
		VDE0660		V	AC1,000
Rated Thermal Current [Ith] (AC1)				A	16
Rated Current [Ie]	AC15	220 V		A	4
		380 V			3
		440 V			3
		500 V			2
		690 V			2
	DC12 (Resistive Load)	24 V			4
		48 V			2.5
		125 V			1.1
		250 V			0.3
	DC13 (Coil Load)	24 V			4
		48 V			2.5
		125 V			1.1
		250 V			0.3
Mechanical Lifetime				X 10,000	1,500
Cable Size					2 x 0.75-2.5
Operating Frequency (per hour)				Times	3,000
Maximum Fuse Rating		Plug-fuse (Fast/Slow)		A	35/25
		MCB (C curve)			16
		HRC fuse (DIN/BS88)			25
Mounting Method					Screw & DIN-Rail
Auxiliary Contacts					4NC
					1NO + 3NC
					2NO + 2NC
					3NO +1NC
					4NO
Coil Power Consumption		A/C (50Hz)	Inrush	VA/W	80/64
			Hold		8/2.5
Dimensions		A/C	W x H x D	mm	45 x 75 x 85.95
Weight		A/C		kg	0.3

1) Contact Rating Code: A300 - P150

Please be careful in wiring of coil terminal +,- polarity with HGS-P model.

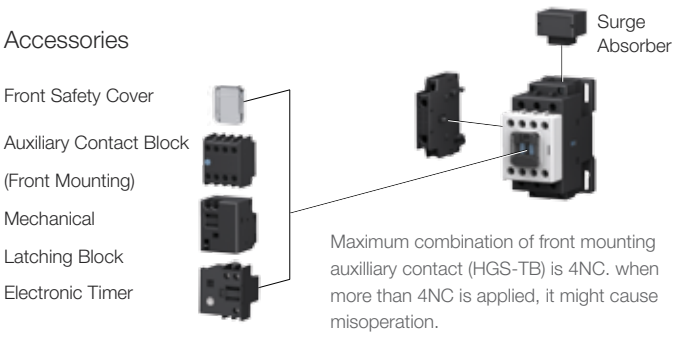
Order Information

Model	Operation Voltage (V) @ AC 50 Hz	Contact Combination		
		2NO 2NC	3NO 1NC	4NO
HGR	AC 415V	IHHAC22T	IHHAC31T	IHHAC40T
	AC 240V	IHHAC22N	IHHAC31N	IHHAC40N
	AC 220V	IHHAC22M	IHHAC31M	IHHAC40M
	AC 110V	IHHAC22H	IHHAC31H	IHHAC40H
	AC 24V	IHHAC22B	IHHAC31B	IHHAC40B
Contact Arrangement				

Note: 1NO + 3NC & 4NC codes on request

Accessories

- HGR has AC types, and 5 types of possible contact configurations.
- HGR follows IEC 60947 and protection degree is IP20.
- Usable temperature range is -25 ^{0}C - 40 ^{0}C.
- HGR which has fast response time is appropiate for application of control circuit and factory automation.
- Applicable standard IEC 60947-5-1 for HGR



Rating and Selection

Thermal Overload Relay

Exterior and Model		Rating							
Exterior	Model	Current (A)				Applicable Cable Size (mm^2)		Auxiliary Contact	Applicable Contactor
		Nominal Current	Setting Current			Main Circuit	Auxiliary Circuit		
			Min.	Mid.	Max.				
 (W x H x D) (45 × 82.7 × 77.2) mm 0.12 kg	HGST18	0.18	0.12	0.15	0.18	1 - 2.5	1 - 2.5	1NO1NC	HGS9 HGS12 HGS18
		0.26	0.18	0.22	0.26				
		0.35	0.25	0.3	0.35				
		0.5	0.34	0.42	0.5				
		0.7	0.5	0.6	0.7				
		0.9	0.6	0.75	0.9				
		1.2	0.8	1	1.2				
		1.6	1.1	1.35	1.6				
		2.1	1.5	1.8	2.1				
		3	2	2.5	3				
		4.2	2.8	3.5	4.2				
		5	3	4	5				
		6	4	5	6				
		8	5.6	6.8	8				
		9	6	7.5	9				
		12	8	10	12				
		18	12	15	18				

Code		Notes
Thermal Overload Relay (Protection Class 10 A)	Accessories	Installation Method
Screw Type Terminal (W/Terminal Cover)		Method 1. Connect Thermal Overload Relay to Contactor directly.
K-Type (3 phase, 3 elements)		
IHHR13CA	HGST18	
IHHR13CB		
IHHR13CC		
IHHR13CD		
IHHR13CE		
IHHR13CF		
IHHR13CG		
IHHR13CH		
IHHR13CJ		
IHHR13CZ		
IHHR13CK		
IHHR13CL		
IHHR13CM		
IHHR13CN		
IHHR13CP		
IHHR13CR		
IHHR13CT		

Rating and Selection

Thermal Overload Relay

Exterior and Model		Rating							
Exterior	Model	Current (A)				Applicable Cable Size (mm^2)		Auxiliary Contact	Applicable Contactor
		Nominal Current	Setting Current			Main Circuit	Auxiliary Circuit		
			Min.	Mid.	Max.				
 (W x H x D) (45 × 95.5 × 78.7) mm 0.16kg	HGST40	10	7	8.5	10	2 - 10	1 - 2.5	1NO1NC	HGS25 HGS32 HGS40
		12	8	10	12				
		18	12	15	18				
		22	15	18.5	22				
		25	17	21	25				
		32	22	27	32				
		40	28	34	40				
 (W x H x D) (55 × 110.7 × 89.3) mm 0.29 kg	HGST65	10	7	8.5	10	2 - 25	1 - 2.5	1NO1NC	HGS50 HGS65
		12	8	10	12				
		18	12	15	18				
		22	15	18.5	22				
		25	17	21	25				
		32	22	27	32				
		40	28	34	40				
		50	34	42	50				
		65	45	55	65				
 (W x H x D) (70 × 128.1 × 105) mm 0.47 kg	HGST100	25	17	21	25	6 - 38	1 - 2.5	1NO1NC	HGS75 HGS85 HGS100
		32	22	27	32				
		40	28	34	40				
		50	34	42	50				
		65	45	55	65				
		75	52	63	75				
		85	59	72	85				
		100	70	85	100				

Code		Notes
Thermal Overload Relay (Characteristics Class 10A)	Accessories Mounting Adapter	Installation Method
Screw Type Terminal (W/Terminal Cover)		Method 1.Connect Thermal Overload Relay with Contactor directly. Method 2. Thermal Overload Relay is installed individually using Mounting Adapter.
K-Type (3 phase, 3 elements)		
IHHR23CQ	HGST40	
IHHR23CR		
IHHR23CT		
IHHR23CU		
IHHR23CV		
IHHR23CW		
IHHR23CX		
IHHR33CQ	HGSTMB65	
IHHR33CR		
IHHR33CT		
IHHR33CU		
IHHR33CV		
IHHR33CW		
IHHR33CX		
IHHR33CY		
IHHR33C1		
IHHR43CV	HGSTMB100	
IHHR43CW		
IHHR43CX		
IHHR43CY		
IHHR43C1		
IHHR43C2		
IHHR43C3		
IHHR43C4		

Mounting Adapter
HGSTMB65 (0.12 kg)
HGSTMB100 (0.2 kg)

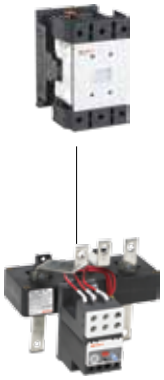
Connect to Contactor Directly

Mounting Adapter (Screw & DIN-Rail)

Rating and Selection

Thermal Overload Relay

Exterior and Model		Rating								
Exterior	Model	Current (A)					Applicable Cable (mm^2)	Auxiliary Contact	Applicable Contactor
		Nominal Current	Setting Current			CT Ratio	Auxiliary Circuit		
			Min.	Mid.	Max.				
 (W x H x D) (180 x 179.3x1 59) mm 2.0 kg	HGST150	80	48	64	80	80 : 5	1 - 2.5	1NO1NC	HGS115 HGS130 HGS150
		115	69	92	115	115 : 5			
		130	78	104	130	130 : 5			
		150	90	120	150	150 : 5			
 (W x H x D) (180 x 179.3 x 185) mm 2.2 kg	HGST265	80	48	64	80	80 : 5	1 - 2.5	1NO1NC	HGS185 HGS225 HGS265
		115	69	92	115	115 : 5			
		130	78	104	130	130 : 5			
		150	90	120	150	150 : 5			
		185	111	148	185	185 : 5			
		225	135	180	225	225 : 5			
		265	159	212	265	265 : 5			
 (W x H x D) (180 x 179.3 x 205.2) mm 2.4 kg	HGST500	150	90	120	150	150 : 5	1 - 2.5	1NO1NC	HGS300 HGS400 HGS500
		185	111	148	185	185 : 5			
		225	135	180	225	225 : 5			
		265	159	212	265	265 : 5			
		300	180	240	300	300 : 5			
		400	240	320	400	400 : 5			
		500	300	400	500	500 : 5			
 (W x H x D) (245 x 209.9 x 197) mm 6.2 kg	HGST800	630	378	504	630	630 : 5	1 - 2.5	1NO1NC	HGS630 HGS800
		800	480	640	800	800 : 5			

Code	Notes
Thermal Overload Relay (Characteristics Class 10 A)	Installation Method
Screw Type T erminal (W/Terminal Cover)	Method 1.Connect CT with Contactor directly.
K-Type (3 phase, 3 elements)	
IHHR53C5	HGS115 HGS130 HGS150  HGST150
IHHR53C6	
IHHR53C7	
IHHR53C8	
IHHR63C5	HGS185 HGS225 HGS265  HGST265
IHHR63C6	
IHHR63C7	
IHHR63C8	
IHHR63C9	
IHHR63C11	
IHHR63C12	
IHHR73C8	HGS300 HGS400 HGS500  HGST500
IHHR73C9	
IHHR73C11	
IHHR73C12	
IHHR73C13	
IHHR73C14	
IHHR73C15	
IHHR83C16	HGS630 HGS800  HGST800
IHHR83C17	

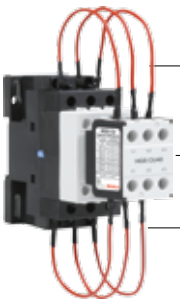
Ratings and Ordering Code

Capacitor Duty Contactor

Products		Rating						
Exterior	Model	Capacitor Capacity, kVAr (Appropriate Ambient Temperature 55 ^{0}C, 50 Hz/60 Hz)						Components
		220 V	240 V	415 V	440 V	500 V	690 V	Auxiliary Contacts
	HGS 3C	1.6	1.6	3	3	4.5	4.5	1NO / 1NC
	HGS 5C	2.5	2.5	5	5	8	8	1NO / 1NC
	HGS 10C	5	5	10	10	14	14	1NO / 1NC
	HGS 12.5C	6.7	6.7	12.5	12.5	15	15	1NO / 1NC
	HGS 15C	8.5	8.5	15	15	24	24	1NO / 1NC
	HGS 20C	10	10	20	20	26	26	1NO / 1NC
	HGS 25C	13	13	25	25	30	30	1NO / 1NC
	HGS 33.3C	15	15	33.3	33.3	35	35	1NO / 1NC
	HGS 40C	19	19	40	40	45	45	2NO + 2NC
	HGS 50C	28	28	50	50	60	60	2NO + 2NC
	HGS 66C	35	35	66	66	80	80	2NO + 2NC

Components		kVAr Rating 50 / 60 Hz	Order Information				
Capacitor Unit			AC [1]				
Model	Auxiliary Contacts	400 V - 440 V	Control Voltage AC 24 V	Control Voltage AC 110 V	Control Voltage AC 240 V	Control Voltage AC 415 V	Control Voltage AC 260 - 440 V
HGS 3C	1NO	3 kVAr	IHPHE003110B	IHPHE003110H	IHPHE003110N	IHPHE003110T	IHPHE003110W
	1NC		IHPHE003101B	IHPHE003101H	IHPHE003101N	IHPHE003101T	IHPHE003101W
HGS 5C	1NO	5 kVAr	IHPHE005110B	IHPHE005110H	IHPHE005110N	IHPHE005110T	IHPHE005110W
	1NC		IHPHE005101B	IHPHE005101H	IHPHE005101N	IHPHE005101T	IHPHE005101W
HGS 10C	1NO	10 kVAr	IHPHE010110B	IHPHE010110H	IHPHE010110N	IHPHE010110T	IHPHE010110W
	1NC		IHPHE010101B	IHPHE010101H	IHPHE010101N	IHPHE010101T	IHPHE010101W
HGS 12.5C	1NO	12.5 kVAr	IHPHE12X110B	IHPHE12X110H	IHPHE12X110N	IHPHE12X110T	IHPHE12X110W
	1NC		IHPHE12X101B	IHPHE12X101H	IHPHE12X101N	IHPHE12X101T	IHPHE12X101W
HGS 15C	1NO	15 kVAr	IHPHE015110B	IHPHE015110H	IHPHE015110N	IHPHE015110T	IHPHE015110W
	1NC		IHPHE015101B	IHPHE015101H	IHPHE015101N	IHPHE015101T	IHPHE015101W
HGS 20C	1NO	20 kVAr	IHPHE020210B	IHPHE020210H	IHPHE020210N	IHPHE020210T	IHPHE020210W
	1NC		IHPHE020201B	IHPHE020201H	IHPHE020201N	IHPHE020201T	IHPHE020201W
HGS 25C	1NO	25 kVAr	IHPHE025210B	IHPHE025210H	IHPHE025210N	IHPHE025210T	IHPHE025210W
	1NC		IHPHE025201B	IHPHE025202H	IHPHE025204N	IHPHE025205T	IHPHE025206W
HGS 33.3C	1NO	33.3 kVAr	IHPHE33X210B	IHPHE33X210H	IHPHE33X210N	IHPHE33X210T	IHPHE33X210W
	1NC		IHPHE33X201B	IHPHE33X201H	IHPHE33X201N	IHPHE33X201T	IHPHE33X201W
HGS 40C	2NO2NC	40 kVAr	IHPHE040322B	IHPHE040322H	IHPHE040322N	IHPHE040322T	IHPHE040322W
HGS 50C	2NO2NC	50 kVAr	IHPHE050422B	IHPHE050422H	IHPHE050422N	IHPHE050422T	IHPHE050422W
HGS 66C	2NO2NC	66 kVAr	IHPHE066422B	IHPHE066422H	IHPHE066422N	IHPHE066422T	IHPHE066422W

Capacitor Duty Contactor



- Range: 3 kVAr to 66 kVAr
- Complies 60947-4-1
- Utilization Category AC-6b
- Capacitor duty contactor is combined with contactor
- Contactor is assembled with damping resistors which limit the high in-rush current when the capacitors are switched on. They are assembled with early-make contact block, which is switched on before the main contacts, thus, limiting the in-rush current.
- Capacitor duty contactor is composed of 3 Pole main contacts with inbuilt auxiliary contacts.
- When power is supplied, capacitor creates oscillation frequency (1~15KHZ) and generates transient current (over 180 In). Capacitor switching unit limits the transient current, thus, protects main contacts.
- When power is supplied to contactor, the value of maximum current is reduced as following cases.

  - Inductance of main power supply is too high.
  - Rating of line transformer is too low.
  - Short circuit of transformer is too high.

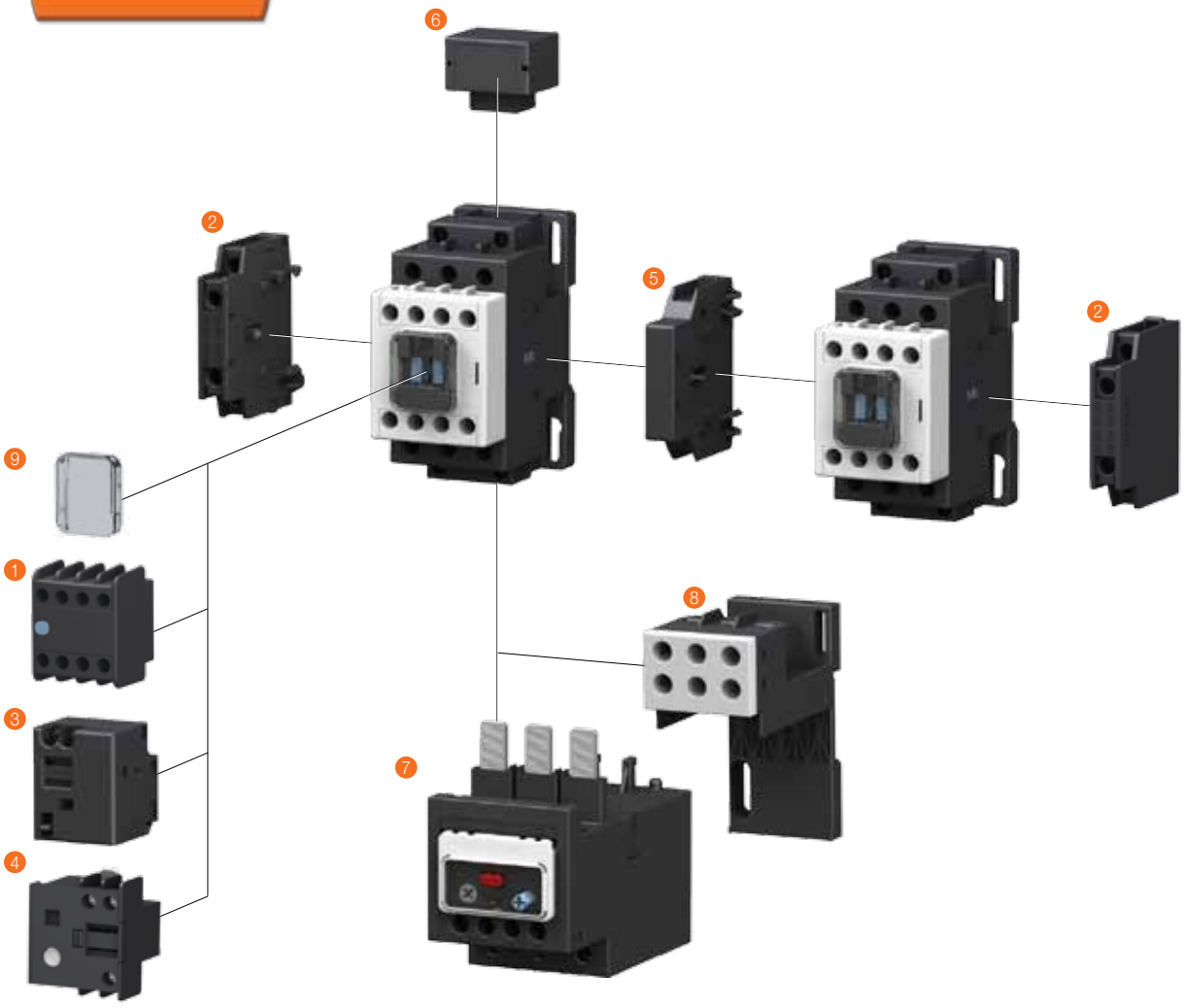
Making & Breaking Frequency and Lifetime

Making & Breaking Frequency		240 Cycles/h
Electrical Lifetime (AC-6b)	Ue ≤ 440 Vac	250,000
	500 Vac ≤ Ue ≤ 690 Vac	100,000

1) Operation Voltage
- 50 Hz: 24 V, 110 V, 240 V, 250 V to 440 V, 415 V

Accessories

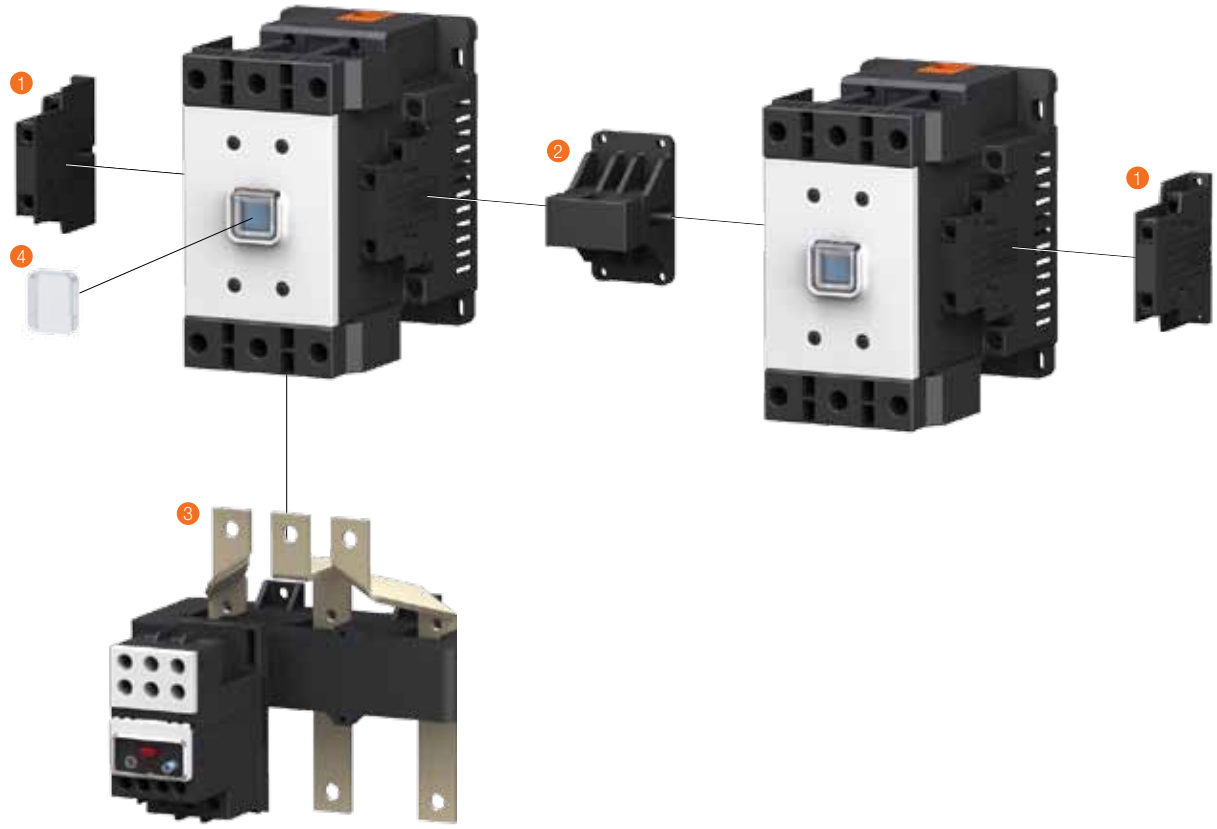
9 - 100 AF



9 - 100 AF

1. Auxiliary Contact Block (Front Side) HGS TB 48 page
2. Auxiliary Contact Block (Left/Right Side) HGS SB 48 page
3. Mechanical Latching Block HGS LB 100 51 page
4. Timer HGS ET 53 page
5. Interlock Unit HGS IU 50 page
6. Surge Absorber HGS RC/CD 52 page
7. Thermal Overload Relay HGST 38 page
8. Separate Mounting Base HGSTMB 39 page
9. Front Safety Cover

115 - 800 AF



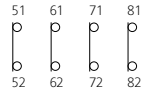
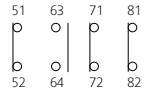
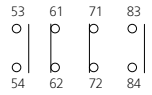
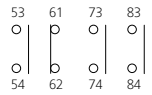
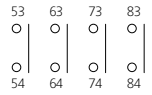
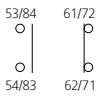
115 - 800 AF

1. Auxiliary Contact Block HGS SB
   48 page
2. Interlock Unit HGS IU
   50 page
3. Thermal Overload Relay HGST
   40 page
4. Front Safety Cover

Accessories

Auxiliary Contact Block

Products		Rating		
Exterior	Model	Contacts Rating		
Front 	HGS TB	Rated Insulation Voltage (Ui)	IEC	AC690 V
			UL	AC600 V
		Rated Thermal Current (Ith)		16A
		Operation Current AC15 (Coil Load)	120 V	6 A
			240 V	4A
			380 V	3 A
			440 V	3 A
			500 V	2 A
			690 V	2 A
		Operation Current DC13 (Coil Load)	24 V	4 A
			48 V	2.5 A
			125 V	1.1 A
			250 V	0.3 A
			480 V	0.2 A
			600 V	0.2A
Side 	HGS SB	Based on IEC 60947-4		
		Rated Insulation Voltage (Ui)		AC750 V
		Rated Thermal Current (Ith)		16 A
		Operation Current AC12 (Resistive Load)	110 V	10 A
			220 V	8 A
			440 V	6 A
			690 V	2 A
		Operation Current AC15 (Coil Load)	110 V	6 A
			220 V	4 A
			440 V	3 A
			690 V	2 A
		Operation Current DC12 (Resistive Load)	24 V	4 A
			48 V	2.5 A
			125 V	1.1 A
			250 V	0.3 A
		Operation Current DC13 (Coil Load)	24 V	4 A
			48 V	2.5 A
			125 V	1.1 A
			250 V	0.3 A

Contacts Combination		Order Information	Notes		
Combination	Arrangement	W/Terminal Cover	Weight	Applicable Contactors	Install Method
2NC		ISSPCU1961	0.031	HGS9 - 100 HGR	Front Auxiliary Contacts  Maximum combination of b auxiliary contacts is 4NC.
1NO + 1NC		ISSPCU1962			
2NO		ISSPCU1963			
4NC		ISSPCU1964			
1NO + 3NC		ISSPCU1965	0.053		
2NO + 2NC		ISSPCU1966			
3NO + 1NC		ISSPCU1967			
4NO		ISSPCU1968			
1NO + 1NC		ISSPCU1969	0.028	HGS9 - 40	Side Auxiliary Contacts   Maximum combination of b auxiliary contacts is 4NC.
		ISSPCU1970	0.053	HGS50 - 100	
		ISSPCU1971	0.042	HGS115 - 800	

Accessories

Mechanical Interlock Unit

Mechanical interlock unit is a device provided to ensure that the contactor is engaged during reverse operation.

Rating and Selection

Code	Applicable Contactor	Weight (kg)
ISSPCU1972	HGS9 - 40	0.03
ISSPCU1973	HGS50 - 100	0.03
ISSPCU1974	HGS115 - 265	0.081
ISSPCU1975	HGS300 - 800	0.101

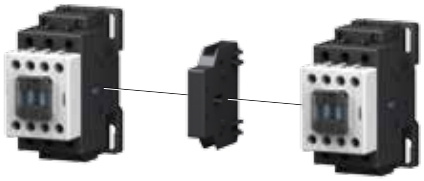
Handling

Mechanical interlock unit must not be installed vertically. The Interlock should be connected via NC contacts for stable operation. Remove side auxiliary contact block first between contactors (HGS115 - 800), then install mechanical interlock unit.

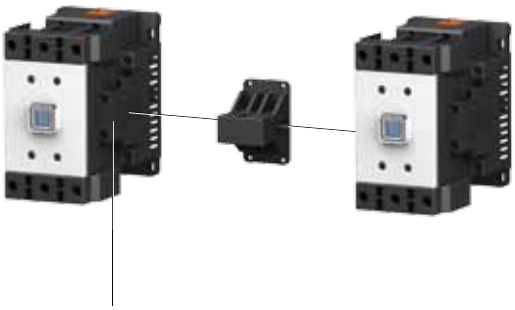
Simultaneous closing by excessive force may cause damage.

Mechanical interlock unit is not applicable for Contactor with DC coil type HGS40 - 100.

HGS9 - 100



HGS115 - 800



After disassembling side auxilliary contacts, install the mechanical interlock unit between contactors.

Control Coil

Product	Coil Voltage		Code			
	Frequency	V	Applicable Contactor			
			HGS9 - 18	HGS25 - 40	HGS50 - 65	HGS75 - 100
	AC50 Hz	24, 48, 110, 220 240, 380 415, 440	Codes on Request			
	Voltage	V	Applicable Contactor			
			HGS115 - 150	HGS185 - 265	HGS300 - 500	HGS630 - 800
	220	AC: 100 - 240 V ; DC: 100 - 220 V	ISSPCU1979	ISSPCU1980	ISSPCU1981	-
		AC: 200 - 240 V ; DC: 200 - 220 V	-	-	-	ISSPCU1982

When ordering HGS115 - 800's coil, AD Converter assembly will be provided.

Mechanical Latching Block

Mechanical Latching block keeps the contactor and control relay in the energized state even after a power failure.
Mechanical latching block which is designed as a module is easy to assemble with contactor or control relay.

Order Information

Model	Code	Current	Operation Voltage	Applicable Contactor
HGS LB100	ISSPCU1976	AC	200 V - 240 V	HGS9 - 100, HGR

Rating and Selection

		SI Unit	
Coil Power Consumption		VA	25 VA
		W	20 W
Operation Voltage		V	(0.85 - 1.1) x Uc
Operation Frequency		Cycle/h	1,200
Operation Voltage	AC	V	24, 48, 100 - 125, 200 - 240, 440
Mechanical Lifetime X 10,000		nos	50
Weight		kg	0.1 kg

Handling

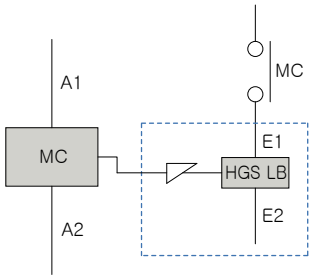
- Mechanical latching block starts to latch the contactor or control relay when it is energized, and keep latching during coil voltage drop-out of contactor or control relay.

- To Turn OFF
  - Manual: Push up the lever to "O" position.
  - Electrical: Supply power to the mechanical latching block.
    : The power should be OFF before supplying power to the latching block.

- To Turn ON
  - By pushing "I", located in the center of latching block, latching block can start to latch without the energized coil.

- Caution
  - Contactor (or control relay) and mechanical latching block should not be used at the same time to supply control power.
  - Mechanical latching block must not receive control power for more than 1 second.
  - Please refer to the circuit diagram on the right.

Circuit Diagram



A1/A2: Coil Terminal,
E1/E2: Latching Block Terminal

Accessories

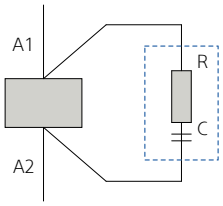
Surge Absorber

Surge Absorber (RC-Unit)

- Surge voltage occurs during the operation of contactor or control relay, and it is normally 10 - 20 times of rated voltage. Surge absorber drops the surge voltage less than 3 times of rated voltage.
- Surge absorber is required on accurate control circuit, especially for PLC circuit.
- Prevents electronic components from high surge voltage damage.
- Applicable for 50 Hz. (For RC-Unit only)

Rating and Selection

Product	Code	Operation Voltage	Applicable Contactor	Weight (kg)
RC-Unit	Codes on Request	AC24 - 48 V	HGS9 - 32, HGR	0.029
		AC110 - 220 V		
		AC240 - 380 V		
		AC24 - 48 V	HGS40 - 100	
		AC110 - 220 V		
		AC240 - 380 V		

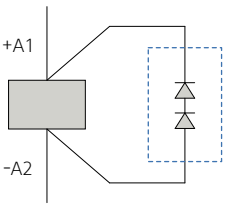


Clamping Diode

- Clamping diode is used for the purpose of preventing counter electromotive force on DC power supply.
- To be installed when coil is connected in parallel.
- Prevents electronic components from burning by counter electromotive force.

Rating and Selection

Product	Code	Operation Voltage	Applicable Contactor	Weight (kg)
Clamping Diode	ISSPCU1978	DC24 - 220 V	HGS9 - 100, HGR	0.029



Electronic Timer Block

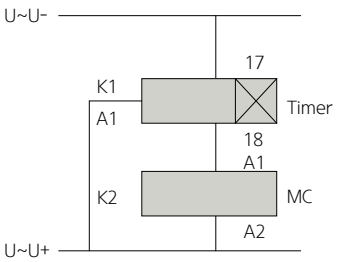
- Electronic timer block has modularized design which is space-saving and easy-assembling model.
- Wide voltage range of both AC and DC is applicable.
- Electronic timer block has both on-delay and interval function in one timer and it is suitable for various applications including Star - Delta starter.

Rating and Selection

Code	Applicable Contactor	Operation Voltage
ISSPCU1977	HGS9 - 100, HGR	AC/DC90 - 240 V

Rating and Features

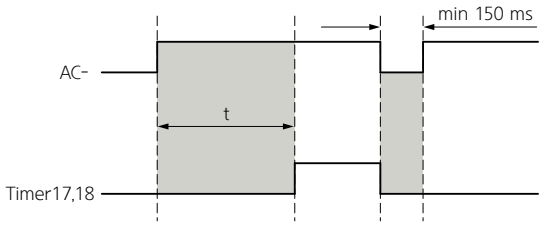
Model		SI Unit	HGS ET1	HGS ET2
Voltage Band AC/DC		V	90 - 240	24 - 60
Operation Voltage		V	(0.8 - 1.1) x rated voltage	
Breaking Capacity		VA	90	
Maximum Load		VA	15	
Delay Time	Position A		10 - 220	
	Position B		0.15 - 15	
Precision		%	±5	
Error Ratio		%	0.1	
	Time	ms	50 ms	
Weight		kg	0.053	



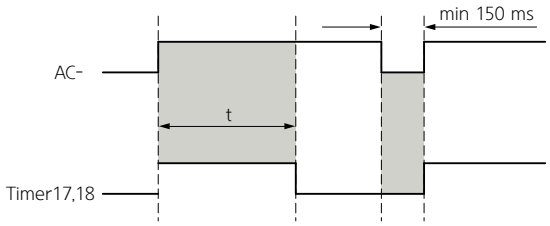
A1/A2: Coil Terminal 17/18: Timer Terminal

Operation Concept Map

After power is off, reoperation delay time is 150 ms.



- Position 1: On-Delay / t: Control Time 0.15....220 sec



- Position 2: Interval Timer

Technical Information

Features and Applications

Contactors can be selected according to categories: Rated thermal current (Ith), rated operating current (Ie), making and breaking capacities, electrical and mechanical endurance, and utilization.

IEC 60947	AC1	Non-inductive or slightly inductive loads, resistance furnaces
	AC2	Slip-ring motors: starting, plugging
	AC3	Squirrel cage motors: starting, switching off motors during running
	AC4	Squirrel cage motors: plugging, inching
	AC12	Resistive heating loads
	AC15	Coil loads
	DC1	Non-inductive or slightly inductive loads, resistance furnaces
	DC3	Shunt motors: starting, plugging, and inching
	DC5	Series motors: starting, plugging, and inching
	DC12	Resistive heating loads
	DC13	Coil loads

Making and Breaking Capacities According to Utilization Categories

Category	Making				Making & Breaking			
	Current	Voltage	Cos	Cycles	Current	Voltage	Cos	Cycles
AC1	-	-	-	-	1.5 Ie	1.05 Ue	0.8	50
AC2	-	-	-	-	4.0 Ie	1.05 Ue	0.65	50
AC3	10 Ie	Ue	0.45 (≤100 A)	50	8.0 Ie	1.05 Ue	0.45 (≤100 A)	50
AC4	12 Ie	Ue	0.35 (100 A)	50	10.0 Ie	1.05 Ue	0.35 (100 A)	50
AC15	-	-	-	-	10 Ie	1.1 Ue	0.3	10
DC1	-	-	-	-	1.5 Ie	1.05 Ue	1	50
DC3	-	-	-	-	4.0 Ie	1.05 Ue	2.5	50
DC5	-	-	-	-	4.0 Ie	1.05 Ue	15	50
DC13	-	-	-	-	1.1 Ie	1.1 Ue	6P	10

Operating Times According to Utilization Categories

Category	Making & Breaking				
	Current	Voltage	Cos	On-Time	Cycles
AC1	1.0 Ie	1.05 Ue	0.8	0.05 S	6,000
AC2	2.0 Ie	1.05 Ue	0.65	0.05 S	6,000
AC3	2.0 Ie	1.05 Ue	0.45 (Ie≤100 A)	0.05 S	6,000
AC4	6.0 Ie	1.05 Ue	0.35 (Ie 100 A)	0.05 S	6,000
AC15	10 Ie	1.1 Ue	0.3	0.05 S	6,000
DC1	1.0 Ie	1.05 Ue	1	0.05 S	6,000
DC3	2.5 Ie	1.05 Ue	2	0.05 S	6,000
DC5	2.5 Ie	1.05 Ue	7.5	0.05 S	6,000
DC13	1.1 Ie	1.1 Ue	6P	0.05 S	6,000

Electrical Endurance According to Utilzation Categories

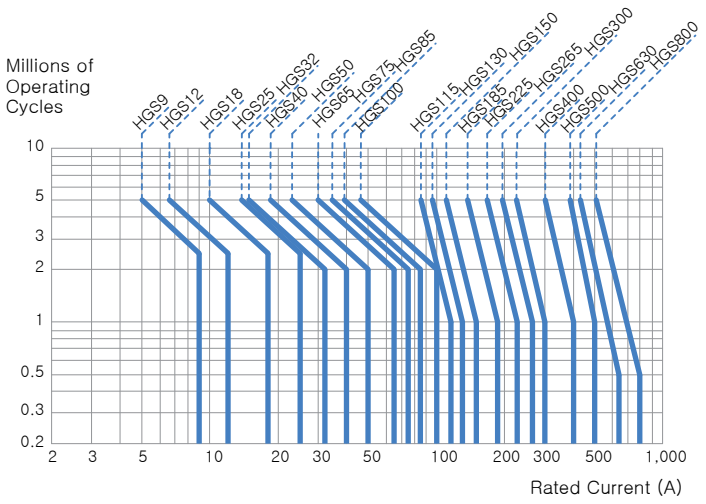
Category	Making			Breaking		
	Current	Voltage	Cos	Current	Voltage	Cos
AC1	1.0 Ie	1 Ue	0.95	1 Ie	1 Ue	0.95
AC2	2.5 Ie	1 Ue	0.65	2.5 Ie	1 Ue	0.65
AC3	6 Ie	1 Ue	0.65 (Ie≤17 A)	6 Ie	0.17 Ue	0.65 (Ie≤17 A)
AC4	6 Ie	1 Ue	0.35 (Ie 17 A)	6 Ie	1 Ue	0.35 (Ie 17 A)
DC1	1 Ie	1 Ue	1	1 Ie	1 Ue	1
DC3	2.5 Ie	1 Ue	2	2.5 Ie	1 Ue	2
DC5	2.5 Ie	1 Ue	7.5	2.5 Ie	1 Ue	7.5

Ie: Rated operational current Ue: Rated operational voltage

Selections of AC3 and AC4 Contactors

- When operation frequency is lower than the recommendation, the load capacities can be increased, but should not exceed the rated making and breaking capacities of the contactors. If the thermal overload relay is used, the short-circuit protection should be carefully considered and the recommended fuse ratings should be obeyed.
- The contactors can be chosen according to the electrical lifetime by means of the following diagrams.

AC3 Electrical Lifetime Curve (380 - 440 VAC)

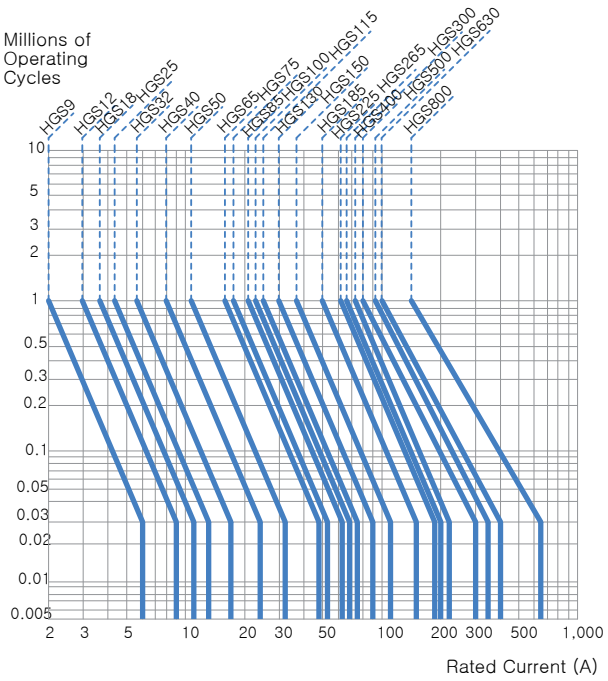


The electrical lifetime is calculated by the following formula if the load consist of AC3 and AC4 category.

$$L = \frac{1}{P1/L1 + P2/L2 + \ldots + Pn/Ln}$$

- L: Electrical lifetime of contactor
- L1: Electrical lifetime in AC3 duty
- L2: Electrical lifetime in AC4 duty
- P1: Coefficient of use in AC3 duty
- P2: Coefficient of use in AC4 duty
- P1 + P2 + … + Pn = 1

AC4 Electrical Lifetime Curve (380 - 440 VAC)



Example
Motor: 80 A full load current at AC 440 V, 480 starting current (6 times of rated current)
AC3 use: 70 A rated current with 95 % coefficient
AC4 use: 70 A rated current (420 A starting current) with 5 % coefficient

$$L = \frac{10^6}{0.95/2.0 + 0.05/0.03} = 0.47 \times 10^6$$

- On AC3 electrical lifetime curve, the life time of HGS is 2.0 x 106
- (When operation current is 70 A)
- On AC4 electrical lifetime curve, the life time of HGS100 is 0.03 x 106 (When operation current is 400 A)

Technical Information

Coil Characteristics

Contactor Model				SI Unit	HGS9	HGS12	HGS18	HGS25	HGS32	HGS40	HGS50	HGS65	HGS75	HGS85	HGS100
Power Consumption	AC Coil	AC operation coil(220 V/50 Hz)	Pull-in	VA	80	80	80	80	80	80	200	200	300	300	300
			Hold-in	VA/W	10/2.5	10/2.5	10/2.5	10/2.5	10/2.5	10/2.5	15/5	15/5	25/10	25/10	25/10
	AC & DC Common Coil	AC operation coil (220 V/50 Hz)	Pull-in	VA	-	-	-	-	-	-	-	-	-	-	-
			Hold-in	VA/W	-	-	-	-	-	-	-	-	-	-	-
		AC operation coil (110 V/50 Hz)	Pull-in	VA	-	-	-	-	-	-	-	-	-	-	-
			Hold-in	VA/W	-	-	-	-	-	-	-	-	-	-	-
		DC operation coil	Pull-in	W	-	-	-	-	-	-	-	-	-	-	-
			Hold-in	W	-	-	-	-	-	-	-	-	-	-	-
Operating Time	AC Coil	Making Coil ON Main contact ON	AC Control	ms	12 - 30	12 - 30	12 - 30	12 - 30	12 - 30	12 - 30	9 - 18	9 - 18	15 - 30	15 - 30	15 - 30
	AC & DC Common Coil		AC Control		-	-	-	-	-	-	-	-	-	-	-
			DC Control		-	-	-	-	-	-	-	-	-	-	-
	AC Coil	Breaking Coil Off Main contact Off	AC Control		8 - 15	8 - 15	8 - 15	8 - 15	8 - 15	8 - 15	13 - 20	13 - 20	13 - 20	13 - 20	13 - 20
	AC & DC Common Coil		AC Control		-	-	-	-	-	-	-	-	-	-	-
			DC Control		-	-	-	-	-	-	-	-	-	-	-
Control TR	AC Operation Coil		Min. Capacities	VA	60 V	60 V	60 V	60 V	60 V	60 V	150 V	150 V	200 V	200 V	200 V
	AC/DC Common Coil				-	-	-	-	-	-	-	-	-	-	-

Coil Control Voltage

1) Application voltage: 85 - 110 %
2) Applied with higher rated voltage could shorten the lifetime of coil and electromagnetic parts, even make it burn.
3) If other coil voltage is applied, please contact

Category	Coil Operation Voltage
AC 50 Hz	24 V, 48 V, 110 V, 120 V, 220 V, 240 V, 380 V, 440 V

For HGS9-100, A1(A2) on line side is internally connected to A1(A2) on load side.
Be careful not to wire incorrectly. It results in a short circuit failure.

Auxiliary Contact Specification

IEC 60947 Standard

Rated Insulation Voltage (Ui)	AC750 V							
Conventional Thermal Current (Ith)	16 A							
Rated Operational Current	AC12 (Resistive Load)		AC15 (Coil Load)		DC12 (Resistive Load)		DC13 (Coil Load)	
	110 V	10 A	110 V	6 A	24 V	4 A	24 V	4 A
	220 V	8 A	220 V	4 A	48 V	2.5 A	48 V	2.5 A
	440 V	6 A	440 V	3 A	125 V	1.1 A	125 V	1.1 A
	690 V	2 A	690 V	2 A	220 V	0.3 A	250 V	0.3 A



HGS115	HGS130	HGS150	HGS185	HGS225	HGS265	HGS300	HGS400	HGS500	HGS630	HGS800
-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-
530	530	530	360	360	360	390	390	390	1,700	1,700
7.4/3.8	7.4/3.8	7.4/3.8	9.3/5.8	9.3/5.8	9.3/5.8	9.3/5.8	9.3/5.8	9.3/5.8	17.1/10.6	17.1/10.6
240	240	240	250	250	250	250	250	250	850	850
3.3/2.1	3.3/2.1	3.3/2.1	6.4/4.4	6.4/4.4	6.4/4.4	6.4/4.4	6.4/4.4	6.4/4.4	10.5/8	10.5/8
193	193	193	420	420	420	420	420	420	850	850
2.3	2.3	2.3	3.4	3.4	3.4	3.4	3.4	3.4	9.5	9.5
-	-	-	-	-	-	-	-	-	-	-
40 - 80	40 - 80	40 - 80	40 - 80	40 - 80	40 - 80	40 - 80	40 - 80	40 - 80	45 - 150	45 - 150
70 - 80	70 - 80	70 - 80	35 - 45	35 - 70	35 - 70	35 - 70	35 - 70	35 - 70	45 - 150	45 - 150
-	-	-	-	-	-	-	-	-	-	-
18 - 25	18 - 25	18 - 25	40 - 50	40 - 50	40 - 50	35 - 50	35 - 50	35 - 50	45 - 150	45 - 150
15 - 20	15 - 20	15 - 20	35 - 45	35 - 45	35 - 45	35 - 45	35 - 45	35 - 45	45 - 150	45 - 150
-	-	-	-	-	-	-	-	-	-	-
200	200	200	200	200	200	200	200	200	1,000	1,000

Technical Information

Rated Operational Current with DC Load

Connection	Application	Operation Voltage	HGS9	HGS12	HGS18	HGS25	HGS32	HGS40	HGS50	HGS65	HGS75	HGS85	HGS100
2 Poles in Series	DC1 Resistive Load (L/R≤1ms)	24 V	10	12	18	20	25	35	50	65	65	75	80
		48 V	10	12	18	20	25	35	40	65	65	65	65
		110 V	6	10	13	15	25	25	35	45	45	50	50
		220 V	3	7	8	10	12	12	15	15	15	20	20
	DC3,DC5 DC Motor Load (L/R≤15ms)	24 V	8	12	12	20	25	35	45	45	45	65	65
		48 V	4	6	6	15	20	20	25	25	25	40	40
		110 V	2.5	4	4	8	10	10	15	15	15	20	20
		220 V	0.8	1.2	1.2	2	3	3	3.5	3.5	3.5	5	5
	DC13 Coil Load (L/R≤40ms)	24 V	8	12	12	20	25	35	-	-	-	-	-
		48 V	4	6	6	12	15	15	-	-	-	-	-
		110 V	2	3	3	3	4	4	-	-	-	-	-
		220 V	0.3	0.5	0.5	1.2	1.2	1.2	-	-	-	-	-
3 Poles in Series	DC1 Resistive Load (L/R≤1ms)	24 V	10	12	18	20	25	35	50	65	65	75	80
		48 V	10	12	18	20	25	35	50	65	65	75	80
		110 V	8	12	18	20	25	35	50	65	65	75	80
		220 V	8	12	18	20	25	30	40	50	50	55	60
	DC3,DC5 DC Motor Load (L/R≤15ms)	24 V	8	12	12	20	25	35	50	50	50	80	80
		48 V	6	10	10	20	25	30	35	35	35	60	60
		110 V	4	8	8	15	20	20	30	30	30	50	50
		220 V	2	4	4	8	10	10	12	12	12	20	20
	DC13 Coil Load (L/R≤40 ms)	24 V	8	12	12	20	25	35	-	-	-	-	-
		48 V	6	10	10	15	25	35	-	-	-	-	-
		110 V	3	5	5	10	12	12	-	-	-	-	-
		220 V	0.8	2	2	4	4	4	-	-	-	-	-

Connection	Application	Operation Voltage	HGS115	HGS130	HGS150	HGS185	HGS225	HGS265	HGS300	HGS400	HGS500	HGS630	HGS800
2 Poles in Series	DC1 Resistive Load (L/R≤1ms)	24 V	100	120	150	180	220	260	300	400	500	630	800
		48 V	100	100	120	180	180	220	240	240	300	630	800
		110 V	80	80	100	150	150	180	200	200	220	630	630
		220 V	50	50	100	150	150	180	200	200	220	630	630
	DC3,DC5 DC Motor Load (L/R≤15ms)	24 V	100	120	150	180	220	260	300	400	500	630	800
		48 V	60	60	100	150	150	180	200	200	260	630	800
		110 V	40	40	80	120	120	130	150	150	180	630	630
		220 V	30	30	60	80	80	80	90	90	130	210	210
	DC13 Coil Load (L/R≤40ms)	24 V	-	-	-	-	-	-	-	-	-	-	-
		48 V	-	-	-	-	-	-	-	-	-	-	-
		110 V	-	-	-	-	-	-	-	-	-	-	-
		220 V	-	-	-	-	-	-	-	-	-	-	-
3 Poles in Series	DC1 Resistive Load (L/R≤1ms)	24 V	100	120	150	180	220	260	300	400	500	630	800
		48 V	100	120	150	180	220	260	300	400	500	630	800
		110 V	100	100	150	180	220	260	300	400	500	630	630
		220 V	80	80	150	180	220	260	300	300	400	630	630
	DC3,DC5 DC Motor Load (L/R≤15ms)	24 V	100	120	150	180	220	260	300	400	500	630	800
		48 V	90	90	130	180	220	260	280	280	400	630	800
		110 V	80	80	120	150	150	180	200	200	260	630	630
		220 V	50	50	80	100	100	130	150	150	180	310	310
	DC13 Coil Load (L/R≤40 ms)	24 V	-	-	-	-	-	-	-	-	-	-	-
		48 V	-	-	-	-	-	-	-	-	-	-	-
		110 V	-	-	-	-	-	-	-	-	-	-	-
		220 V	-	-	-	-	-	-	-	-	-	-	-

Specification for Transformer and Condenser Load

Load	Operational Voltage		HGS9	HGS12	HGS18	HGS25	HGS32	HGS40	HGS50	HGS65	HGS75	HGS85	HGS100
Transformer (kVA)	Single Phase	AC220 V	1	1.5	2	2.5	3	4	5	7	8	9	10
		AC440 V	1.5	2	3	4	5	7.5	10	15	17	18	20
	Three Phase	AC220 V	2	3	3.5	4	5	6.5	10	12	13	15	18
		AC440 V	2.5	4	5	7.5	10	12	18	25	27	30	35
Condenser (kVAr)	Three Phase	AC220 V	2	3	4	5	9	11	13	17	20	22	24
		AC440 V	3	4	6	10	16	20	24	34	40	45	48

Load	Operational Voltage		HGS115	HGS130	HGS150	HGS185	HGS225	HGS265	HGS300	HGS400	HGS500	HGS630	HGS800
Transformer (kVA)	Single Phase	AC220 V	-	15	17	20	25	30	33	44	55	65	90
		AC440 V	-	25	33	40	50	57	66	90	110	130	175
	Three Phase	AC220 V	-	25	30	35	42	48	57	75	90	110	150
		AC440 V	-	42	60	70	85	95	100	150	180	220	300
Condenser (kVAr)	Three Phase	AC220 V	-	29	35	42	58	63	69	92	115	145	185
		AC440 V	-	58	70	84	115	125	139	185	230	291	369

- The inrush current of transformer shall be less than 30 times of rated current (RMS).
- Electrical Lifetime: 100,000 times (IEC 60947-4-1, AC6a, 6b)

Light load - Maximum Incandescent Lamp Quantity Per Contactor

Lighting Load Application

The contactor for lighting load can be selected by the rated thermal current (Ith) on the condition that inrush current does not exceed contactor's breaking capacity. Usually, lighting load switching frequency is smaller than the other applications, so electrical lifetime would not be the major parameter to select contactor.

Incandescent Lamp

The contactor for incandescent lamps can be selected according to AC3 utilization category considering inrush current at hot condition. The resistance of the incandescent lamp filament is small at cold condition, so the inrush current can be 13 - 16 times of the rated current instantaneously. However, the inrush current at hot condition is limited to 7 - 10 times of rated current by circuit impedance and self-heating. Therefore, it is recommended to consider the inrush current at hot condition rather than cold condition to select contactor.

Power Voltage		110 V							
Lamp Power		100 W	150 W	200 W	250 W	300 W	500 W	1,000 W	1,500 W
Contactor Model	HGS9	11	7	5	4	2	2	1	-
	HGS12	14	8	6	5	4	2	1	-
	HGS18	19	13	10	7	6	3	1	1
	HGS25	20	13	10	8	6	3	1	1
	HGS32	28	18	14	11	9	5	2	1
	HGS40	38	25	19	15	12	7	3	2
	HGS50	55	35	27	22	16	10	5	3

Power Voltage		220 V							
Lamp Power		100 W	150 W	200 W	250 W	300 W	500 W	1,000 W	1,500 W
Contactor Model	HGS9	22	14	11	8	7	4	2	1
	HGS12	26	18	14	10	8	5	2	1
	HGS18	38	25	20	15	13	7	3	2
	HGS25	40	27	20	16	13	8	3	2
	HGS32	55	36	28	22	18	11	5	3
	HGS40	75	50	38	30	25	15	7	4
	HGS50	105	70	54	43	35	22	10	6

Motor Currents

Average full-load currents of 3-phase squirrel cage motors, 3-phase 4-pole motors, 50/60 Hz

Power		200 / 208 V	220 V	230 V (1)	380 V	400 V	415 V	433 / 440 V	460 V (1)	500 / 525 V	575 V (1)	660 V	690 V	750 V
kW	HP	A	A	A	A	A	A	A	A	A	A	A	A	A
0.37	0.5	2	1.8	2	1.03	0.98	-	0.99	1	1	0.8	0.6	-	-
0.55	0.75	3	2.75	2.8	1.6	1.5	-	1.36	1.4	1.21	1.1	0.9	-	-
0.75	1	3.8	3.5	3.6	2	1.9	2	1.68	1.8	1.5	1.4	1.1	-	-
1.1	1.5	5	4.4	5.2	2.6	2.5	2.5	2.37	2.6	2	2.1	1.5	-	-
1.5	2	6.8	6.1	6.8	3.5	3.4	3.5	3.06	3.4	2.6	2.7	2	-	-
2.2	3	9.6	8.7	9.6	5	4.8	5.	4.42	4.8	3.8	3.9	2.8	-	-
3	-	12.6	11.5	-	6.6	6.3	6.5	5.77	-	5	-	3.8	-	-
-	5	-	-	15.2	-	-	-	-	7.6	-	6.1	-	-	-
4	-	16.2	14.5	-	8.5	8.1	8.4	7.9	-	6.5	-	4.9	-	-
5.5	7.5	22	20	22	11.5	11	11	10.4	11	9	9	6.6	-	-
7.5	10	28.8	27	28	15.5	14.8	14	13.7	14	12	11	6.9	-	-
9	-	36	32	-	18.5	18.8	17	16.9	-	13.9	-	10.6	-	-
11	15	42	39	42	22	21	21	20.1	21	18.4	17	14	12.1	11
15	20	57	52	54	30	28.5	28	26.5	27	23	22	17.3	16.5	15
18.5	25	70	64	68	47	35	35	32.8	34	28.5	27	21.9	20.2	18.5
22	30	84	75	80	44	42	40	39	40	33	32	25.4	24.2	22
30	40	114	103	104	60	57	55	51.5	52	45	41	54.6	33	30
37	50	138	126	130	72	69	66	64	65	55	52	42	40	36
45	60	162	150	154	85	81	80	76	77	65	62	49	46.8	42
55	75	200	182	192	105	100	100	90	96	80	77	61	58	52
75	100	270	240	248	138	131	135	125	124	105	99	82	75.7	69
90	125	330	295	312	170	162	165	146	156	129	125	98	94	85
110	150	400	356	360	205	195	200	178	180	156	144	118	113	103
132	-	480	425	-	245	233	240	215	-	187	-	140	135	123
-	200	520	472	480	273	222	260	236	240	207	192	152	128	136
160	-	560	520	-	300	285	280	256	-	220	-	170	165	150
-	250	-	-	600	-	-	-	-	300	-	240	200	-	-
200	-	680	626	-	370	252	340	325	-	281	-	215	203	185
220	300	770	700	720	408	388	385	353	360	310	288	235	224	204
250	350	850	800	840	460	437	425	401	420	360	336	274	253	230
280	-	-	-	-	528	-	-	-	-	-	-	-	-	-
315	-	1070	990	-	584	555	535	505	-	445	-	337	321	292
-	450	-	-	1080	-	-	-	-	540	-	432	-	-	-
355	-	-	1150	-	635	605	580	549	-	500	-	370	350	318
-	500	-	-	1200	-	-	-	-	600	-	480	-	-	-
400	-	-	1250	-	710	675	650	611	-	540	-	410	390	356
450	600	-	-	1440	-	-	-	-	720	-	576	-	-	-
500	-	-	-1570	-	900	855	820	780	-	680	-	515	494	450
560	-	-	1760	-	1000	950	920	870	-	760	-	575	549	500
630	-	-	1980	-	1100	1045	1020	965	-	850	-	645	605	550
710	-	-	-	-	1260	1200	1140	1075	-	960	-	725	694	630

These values are given as a guide. They may vary depending on the type of motor and manufacturer.
(1) values conforming to the NEC (National Electrical Code).

Applicable Wire Size and Screwing Torque

Main Circuit

Model	Terminal Screw	Single Wire Size (mm^2)	Stranded Wire size (mm^2)	Screwing Torque (kgf.cm)
HGS9	M4	1 - 10	1-10	15
HGS12				
HGS18				
HGS25	M5	2.5 - 16	2.5 - 16	26
HGS32				
HGS40				
HGS50	M6	6 - 25	6 - 25	40
HGS65				
HGS75	M8	10 - 50	10 - 50	60
HGS85				
HGS100				
HGS115		35 - 95	35 - 95	
HGS130				
HGS150				
HGS185	M10	50 - 185	50 - 185	100
HGS225				
HGS265				
HGS300	M12	95 - 240	95 - 240	140
HGS400		185 ~ 185x2	185 ~ 185x2	
HGS500		185 ~ 240x2	185 ~ 240x2	
HGS630		240 ~ 240x2	NA	
HGS800		2xbusbar (60x5)	NA	

Control Circuit

Model	Terminal Screw	Single Wire Size (mm^2)	Stranded Wire size (mm^2)	Screwing Torque (kgf.cm)
HGS 9 - 100	M3.5	0.75 - 5.5	0.75 - 5.5	12
HGS 115 - 800				

Technical Information

Inching and Plugging Duty

- AC4 Utilization Category

Category	Voltage	Ratio	Electrical Lifetime		HGS9	HGS12	HGS18	HGS25	HGS32	HGS40	HGS50	HGS65	HGS75	HGS85	HGS100
Inching	220 V	10 %	100,000	kW	2.2	2.7	3.7	4	5.5	7.5	11	15	18.5	19	25
			500,000		1	1.5	2.7	3.7	4.5	5.5	7.5	11	15	15	15
		50 %	100,000		1	1.5	2.7	3.7	4.5	5.5	7.5	11	15	15	19
			500,000		0.5	0.75	1.1	1.5	2.2	3.7	3.7	5.5	7.5	7.5	9
		100 %	100,000		0.75	1.1	1.5	2.5	4.5	4.5	5.5	7.5	9	11	11
			500,000		0.3	0.5	0.75	1.1	1.8	2.7	3.7	4	4	5.5	5.5
	440 V	10 %	100,000		2.7	4	4	7.5	11	15	22	30	37	37	50
			500,000		1.5	2.2	3.7	7.5	9	11	15	22	30	30	37
		50 %	100,000		1.5	3.7	4	7.5	9	11	15	22	30	30	37
			500,000		0.75	1.5	2.2	3.7	4.5	5.5	7.5	11	15	15	18.5
		100 %	100,000		1.1	2.2	3.7	5.5	7.5	11	15	15	15	22	25
			500,000		0.5	1.1	1.5	2.2	3.7	3.7	5.5	7.5	7.5	11	13
Plugging	220 V	Plugging Brake 100 %	100,000		0.75	0.75	1.5	2.2	2.5	3.7	5.5	7.5	9	9	11
			500,000		0.2	0.4	0.5	0.75	1.1	1.5	22	3	3.7	3.7	4.5
	440 V		100,000		0.75	1	2.2	3.7	4.5	4.5	7.5	11	18.5	18.5	22
			500,000		0.2	0.4	0.75	1.5	2.2	2.2	3.7	5.5	7.5	7.5	11

Category	Voltage	Ratio	Electrical Lifetime		HGS 115	HGS 130	HGS 150	HGS 185	HGS 225	HGS 265	HGS 300	HGS 400	HGS 500	HGS 630	HGS 800
Inching	220 V	10 %	100,000	kW	30	30	37	45	55	65	75	110	132	160	200
			500,000		15	22	25	30	37	45	50	65	70	75	132
		50 %	100,000		22	22	30	37	45	50	55	75	80	90	150
			500,000		9	9	11	15	19	22	25	30	32	37	45
		100 %	100,000		11	15	19	25	30	32	37	45	50	55	75
			500,000		5.5	7.5	9	11	15	17	22	25	30	37	45
	440 V	10 %	100,000		50	60	75	90	110	132	150	200	250	300	400
			500,000		37	45	55	75	90	110	125	132	140	150	190
		50 %	100,000		37	45	55	75	90	110	132	150	167	190	220
			500,000		18.5	22	30	37	37	42	50	75	80	90	110
		100 %	100,000		25	30	45	55	60	65	75	110	120	132	160
			500,000		13	15	22	25	30	32	37	55	63	75	90
Plugging	220 V	Plugging Brake 100 %	100,000		11	15	19	22	25	30	37	45	50	55	75
			500,000		4.5	5.5	7.5	11	13	15	18.5	22	25	30	37
	440 V		100,000		22	30	37	45	45	49	55	75	90	110	150
			500,000		11	15	19	22	25	26	30	37	40	45	75

The inching limit of making and breaking frequency is below 10 continuous operation (1 sec/1 cycle)

$$\text{Ratio of Inching Operation (\%)} = \frac{\text{Inching Operations}}{\text{Standard Operations + Inching Operations}} \times 100$$

Technical Information

Effect of Cable Length on Contactor

Voltage Drop by Inrush Current and Resistive Circuit

Voltage drop occurs on control circuit when inrush current caused by resistance of conductor is supplied to coil. Excessive voltage drop on power control cable (for both AC and DC) might cause coil to burn. Therefore, the length of connection cable should be decided considering input power, supply voltage, and cross sectional area of conducting wire.

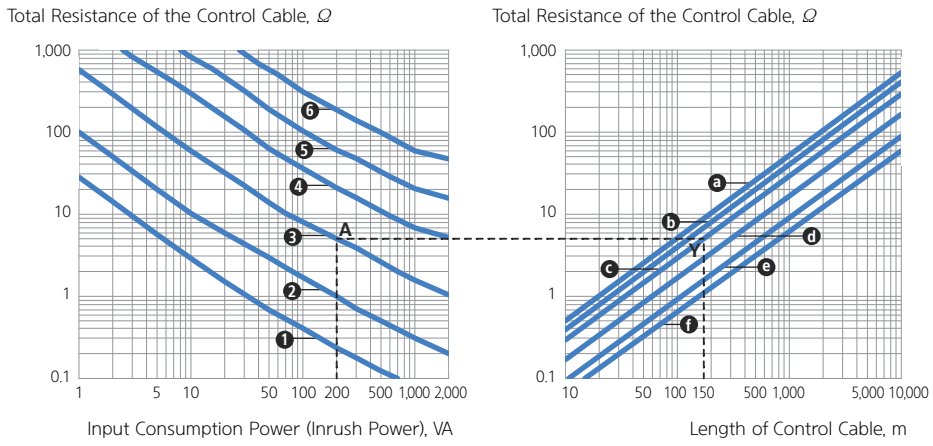
Selection for Conductor C.S.A. According to Inrush Power

These graphs show maximum 5 % line voltage drop.

AC Circuit

Supply Voltage
- ❶ : AC24 V
- ❷ : AC48 V
- ❸ : AC115 V
- ❹ : AC230 V
- ❺ : AC400 V
- ❻ : AC690 V

C.S.A. of Cu Cables
- ⓐ : 0.75 mm^2
- ⓑ : 1 mm^2
- ⓒ : 1.5 mm^2
- ⓓ : 2.5 mm^2
- ⓔ : 4 mm^2
- ⓕ : 6 mm^2

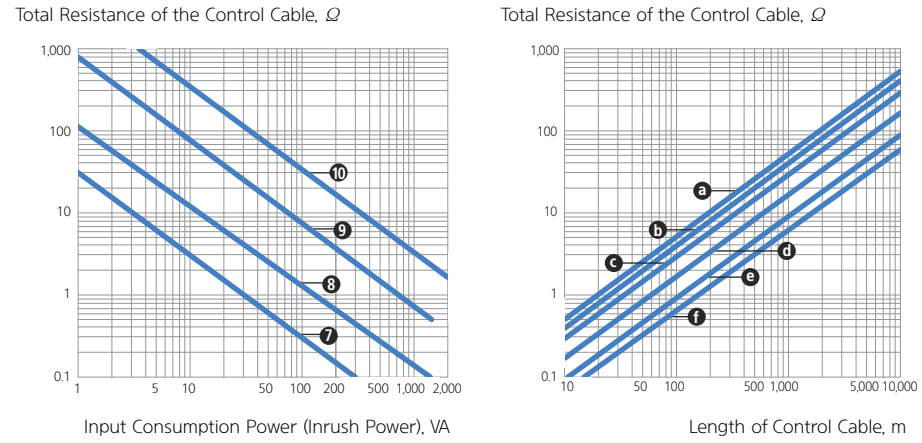


Example: The maximum length of conductor required when using 1.5 mm 2 Cu control cable, HGS 40 A, 115 V with inrush power 200 VA is 150 m.

DC Circuit

Supply Voltage
- ❼ : DC24 V
- ❽ : DC48 V
- ❾ : DC125 V
- ❿ : DC250 V

C.S.A. of Cu Cables
- ⓐ : 0.75 mm^2
- ⓑ : 1 mm^2
- ⓒ : 1.5 mm^2
- ⓓ : 2.5 mm^2
- ⓔ : 4 mm^2
- ⓕ : 6 mm^2



Maximum Cable Distance Calculation

$$L = \frac{U^2}{SA} .s.K$$

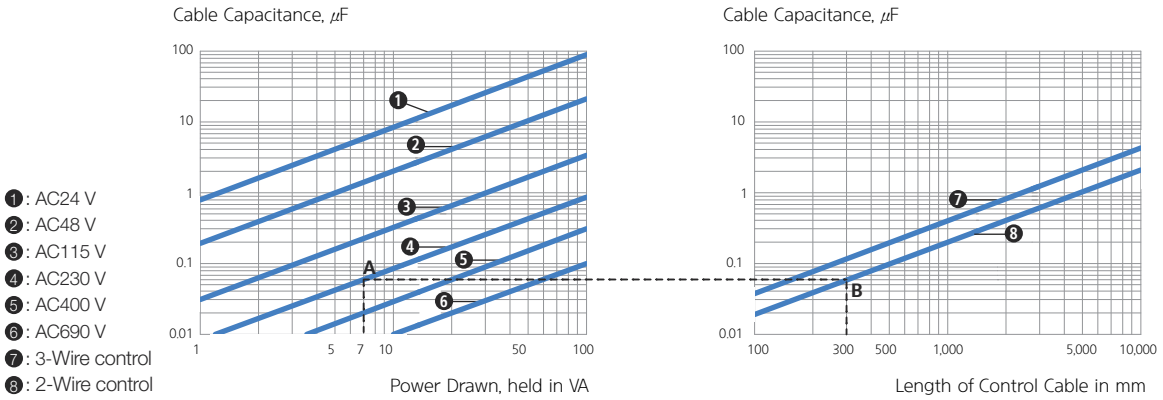
L: Distance between conductors and controlling equipment (length of cable)
U: Power supply in V
SA: Apparent inrush power for coil in VA
s: Conductor C.S.A. in mm^2
K: Factors given in following table

AC Supply	SA (VA)	20	40	100	150	200
	K	1.38	1.5	1.8	2	2.15
DC Supply	Irrespective of the apparent inrush power SA, expressed in W					
	k = 1.38					

Trip Failure Due to Cable Capacitance (AC)

Control cable's capacitance might cause trip failure when the control circuit of contactors is opened.
This phenomenon can be worsened by the following conditions, so when deciding the length of conducting cable, the following should be considered.

- Too long distance between coil terminal and power source or between coil terminal and contactors.
- Too high of control circuit voltage
- Too low of coil power consumption
- Too low of drop-out voltage



Example: The maximum distance for control cable of HGS12 contact which is operated by 230 V and 2-wire control with hold in power of 7 VA, is 300 m.

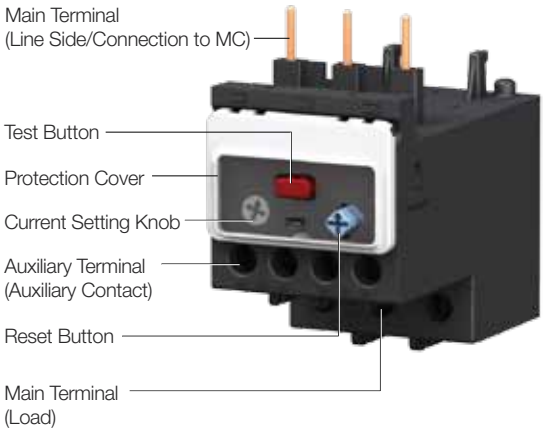
Maximum Cable Distance Calculation According to Cable Capacitance

$$L = 455. \frac{S}{U^2.Co}$$

L: Distance between contact and control equipment m (cable length)
S: Apparent sealed power VA
U: Control voltage V
Co: Line capacitance capacity for cable

Technical Information

Structure and Features of TOR



Test Button

- When test button is pushed, the contact from Contactor is opened which makes the motor stop. This button is also used for emergency stop.
- If the test button is pulled up, the status of Thermal Overload Relay becomes trips status; trip indictor comes up, NC contact opens, and NO contact closes.

Protection Cover

- Unintended change of set current or pushing reset button can be prevented by the protection cover.
- When changing TOR settings, raise the cover and change the settings.

Current Setting Knob

- Three steps of setting current can be adjusted by "+" or "-" driver.

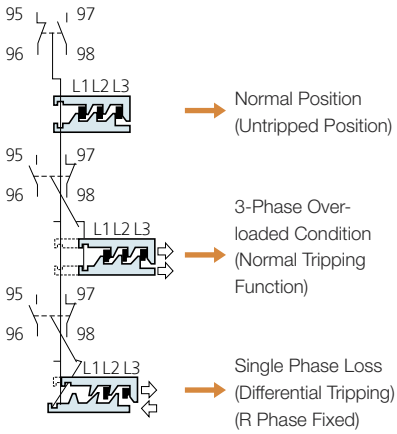
Phase Loss Protection: Differential Tripping Mechanism

- Differential tripping mechanism makes trip faster in the case of single phase loss than all three phase overloaded condition. As shown in the figure, when R phase in loss, the bimetal of R phase remains, so it fixes up the lower slide. At the same time, the other bimetals of Y and B phase are bent, then they move the upper slide. It is also the same for Y and B phase in loss.

Reset Button

·A (Automatic) Position: Automatic reset

·H (Manual) Position: Manual reset



- L1/L2/L3: LINE3 Phase (R. Y. B Phase)
- 95/96/97/98: TOR Auxiliary Contact Terminal

Selection Method

Short Starting Time Motors

- For the normal starting time motors within a few seconds relays can be selected by the table of page 56. The full load current (FLC) of the motor must be in the setting range of the thermal overload relay. The starting time of high-inertia motor is an important factor at the selection of thermal overload relays
- The tripping time of the motors, whose starting current is 6-7 times of the rated current, can be obtained from the HGST tripping curves. This time should be longer than about 125 % of the motor starting time.

Long Starting Time Motors

- If the starting time of the motor is longer than the tripping time of HGST, the current transformer type is applicable.
- The current transformer type relays include the non-tripping features during the motor starting time. The rated current can be decreased by looping primary cable several times on the transformer according to the following table.

Current Configuration Ratio According to Loop Turns (Example: 130 A)

Primary Loop Turns	Current Range (A)	Current Ratio
1	78 - 130	130/5
2	39 - 65	65/5
3	26 - 26.7	26.7/5
4	19.5 - 43.3	43.3/5
5	15.6 - 26	26/5
6	13 - 21.7	21.7/5
7	11.14 - 18.5	18.5/5
8	9.75 - 16.25	16.25/5

$$\text{Setting Current (A)} = \frac{\text{Rated Current of Motor}}{\text{Current Ratio}}$$

- The second rated current of current transformer is 5 A, the overload relay is able to control the current between 3 A and 5 A.
- The corresponding setting value for the relay can be calculated by using the following formula.

Making and Breaking Current of Auxiliary Contacts

Class	AC15 [1]		Class	DC13 [2]	
Voltage (V)	Aux. Contact 95 - 96	Alarm Contact 97 - 98	Voltage (V)	Aux. Contact 95 - 96	Alarm Contact 97 - 98
	Ie (A)	Ie (A)		Ie (A)	Ie (A)
110	2	1.2	24	1	1
220	1.5	1	110	0.4	0.4
500	1	0.5	220	0.15	0.15
660	0.5	0.3	440	0.07	0.07

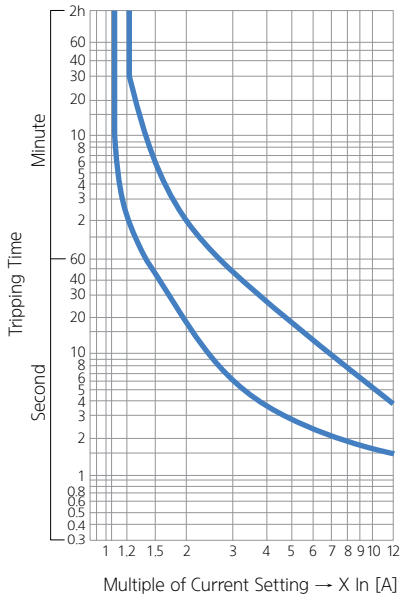
1) AC15: Making/Breaking Current = Ie×10
2) DC13: Making/Breaking Current = Ie×1.1

Technical Information

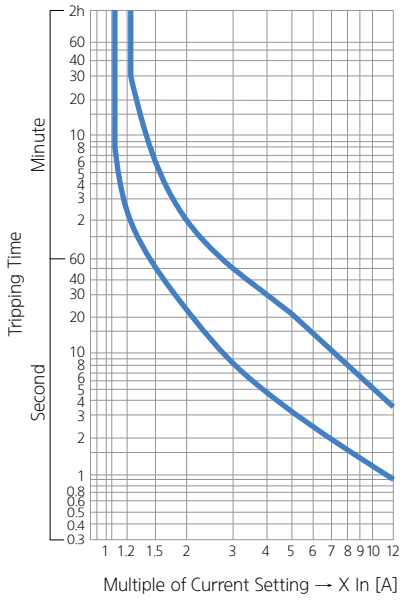
Characteristic Curve of Thermal Overload Relay

- Tripping curve of 3 phase overloaded condition shows the average tripping time based on the cold starting at + 20 ambient temperaure. (Tripping time of hot starting is 20 - 40 % of cold starting)
- Average tripping time of single phase overloaded condition is 40 - 60 % of three phase overload.

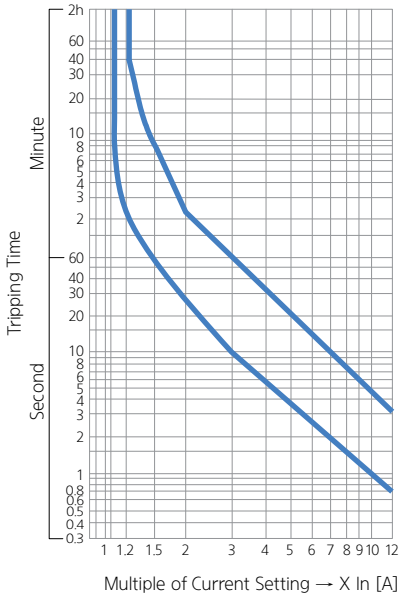
HGST18K



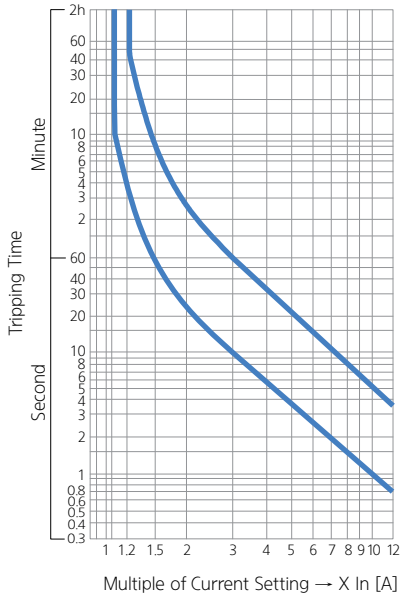
HGST40K



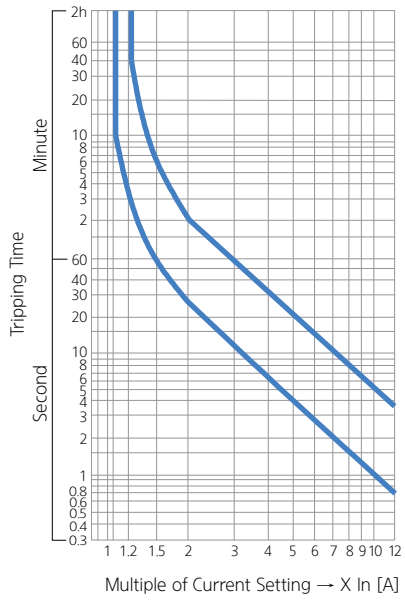
HGST65K



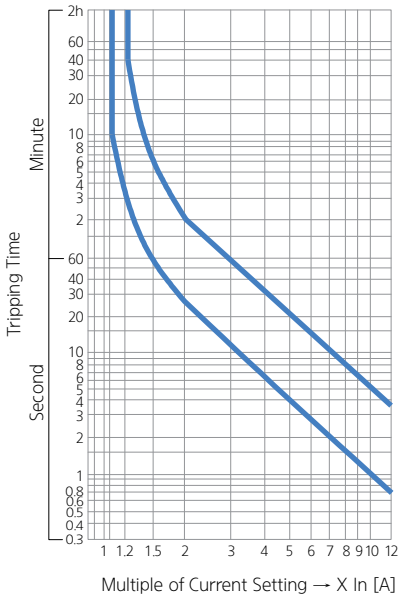
HGST100K



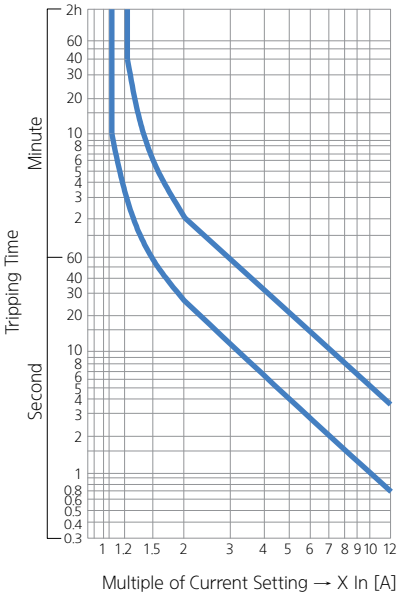
HGST150K



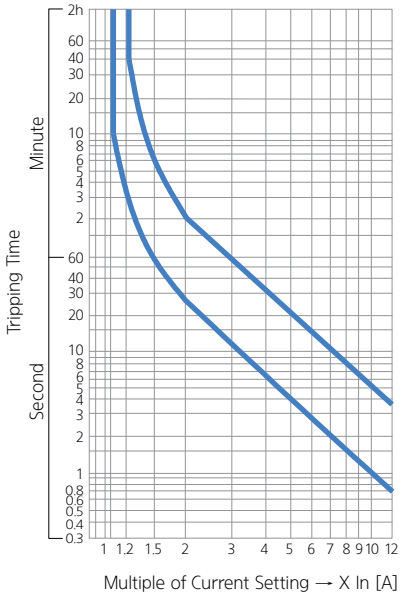
HGST265K



HGST400K



HGST800K

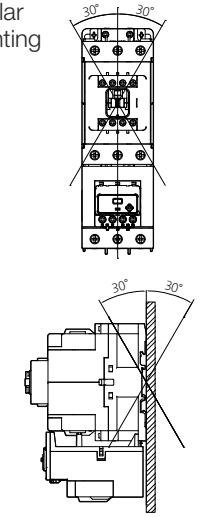


Technical Information

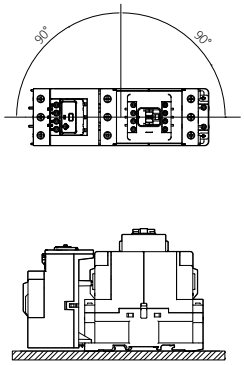
Cautions for Installing

- Install the contactor in a place free from moisture and vibration.
- It is recommended to install the contactor in a vertical plane, but +30^0 slant is acceptable as standard installation.
- Lateral or horizontal installation could decrease the mechanical lifetime and electrical performance of contactor compared with standard installation.
- The contactor may get damaged by arc if the insulation distance stated in the below table is not followed.
- Ambient temperature (Standard) : -5 ^{0}C ~ + 40 ^{0}C

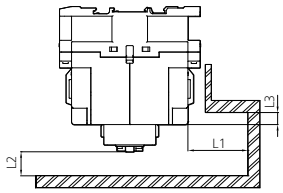
Regular Mounting



Vertical and Horizontal Mounting



Insulation Distance



(Unit: mm)

Distance \ Model	Above HGS75				
	HGS75 - 100	HGS115 - 150	HGS185 - 265	HGS300 - 500	HGS630 - 800
L1	30	30	80	80	80
L2	5	15	15	15	20
L3	6	11	32	32	40

Precautions

Safety Precautions

- All procedures must be conducted only by qualified persons. Otherwise, electrical shock, personal injury, or a fire could occur.
- The product shall not be stored or operated in abnormal environment, such as, but not limited to, high temperature, high humidty, over vibration, dust, and corrosive gas.
- All care must be taken to prevent dust, moisture, and foreign objects from entering the product.

Transportation and Storage

- Do not open the package.
- Do not leave the products on the ground. Place it on a table or similar.
- Do not store in high temperature, high humidty, or corrosive gas areas.

Check Point Before Operation

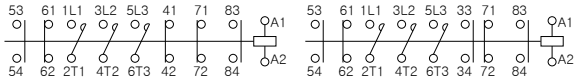
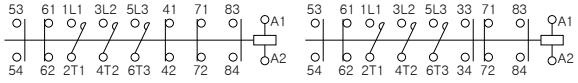
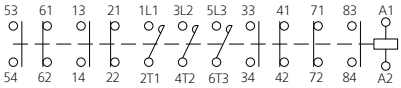
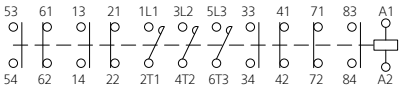
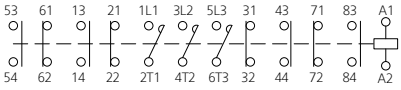
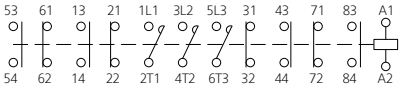
- Do not operate before setting and adjustment.

Precautions for Installation, Operation, and Maintenance

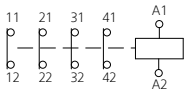
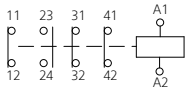
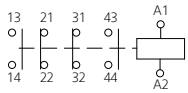
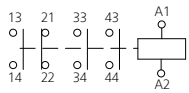
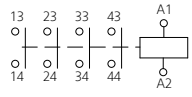
- The product, bolt tightness, assembled status, and operating condition shall be checked visually and electrically from time to time. If any damage occurs, the product or parts must be replaced immediately.
- Rated current, rated voltage, load capacity, frequency, but not limited to, of the product must meet the load.
- Power must be OFF before wiring work.
- Supply voltage should be applied with right rating of the product. Otherwise, electrical shock, personal injury, or a fire could occur.
- Cable and terminal must be suitable for the product and the load.
- All wirings, especially for main terminal and coil terminal, shall be tightened by proper torque in correct manner.
- Routine check for the connection of circuit is needed.
- The funcion of product and contacts shall be checked occasionally and if defect is found, proper replacement is needed.
- Lubrication is prohibited on the product, parts, and wirings.
- Proper tool should be used for maintenance.

Contact Arrangement

Contactor

Model	Contacts		Contact Arrangement	
	Main	Auxiliary	AC	DC
HGS9 HGS12 HGS18 HGS25 HGS32 HGS40	1NO/1NC	2NO + 2NC		-
	1NO/1NC	2NO + 2NC		-
HGS50 HGS65 HGS75 HGS85 HGS100	2NO + 2NC	2NO + 2NC		-
	2NO + 2NC	2NO + 2NC		
HGS115 HGS130 HGS150 HGS185 HGS225	2NO + 2NC	2NO + 2NC		Same as left
HGS265 HGS300 HGS400 HGS500 HGS630 HGS800	2NO + 2NC	2NO + 2NC		Same as left

Control Relay

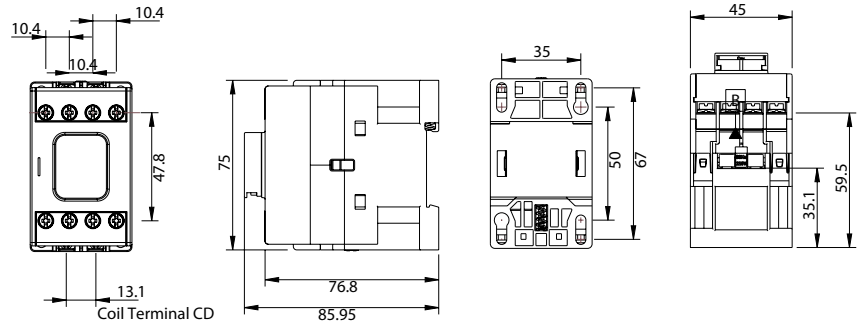
Model	Contacts	Contact Arrangement
HGR04	4NC	
HGR13	1NO + 3NC	
HGR22	2NO + 2NC	
HGR31	3NO + 1NC	
HGR40	4NO	

Dimensions

Contactor

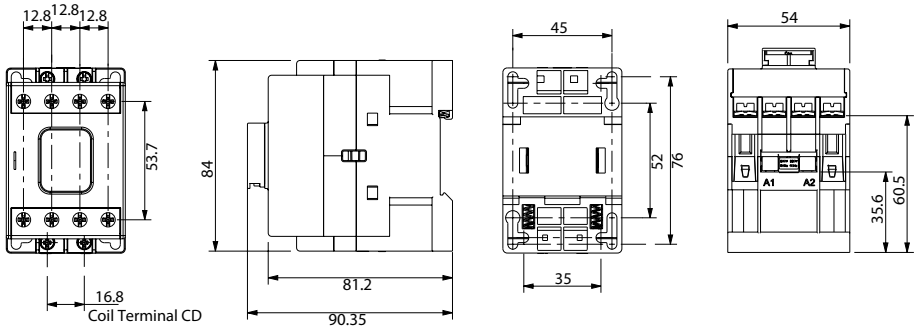
(Unit: mm)

HGS9 / HGS12 / HGS18



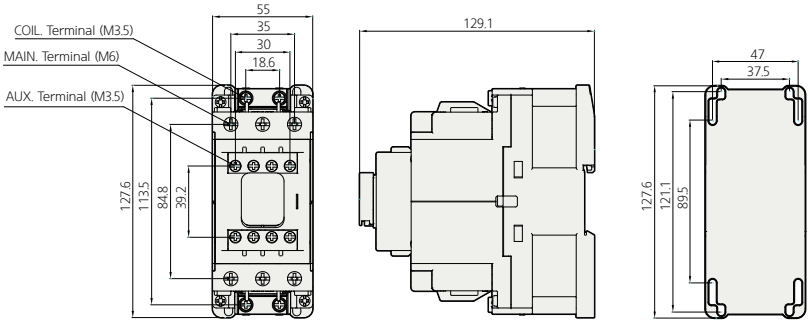
Accessories	A (mm)
Aux. Contact HGSTB	35
Latching Block HGSLB	42.5
Timer HGSET	39

HGS25 / HGS32 / HGS40



Accessories	A (mm)
Aux. Contact HGSTB	35
Latching Block HGSLB	42.5
Timer HGSET	39

HGS50 / HGS65 (AC)



Accessories	A (mm)
Aux. Contact HGSTB	35
Latching Block HGSLB	42.5
Timer HGSET	39

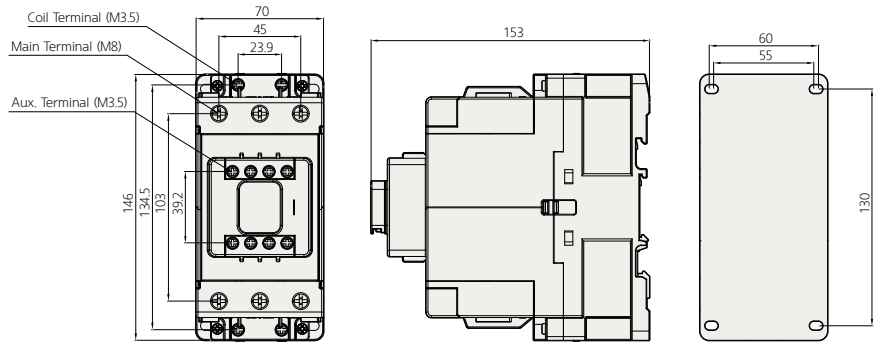
( ) is for DC.

Dimensions

Contactor

(Unit: mm)

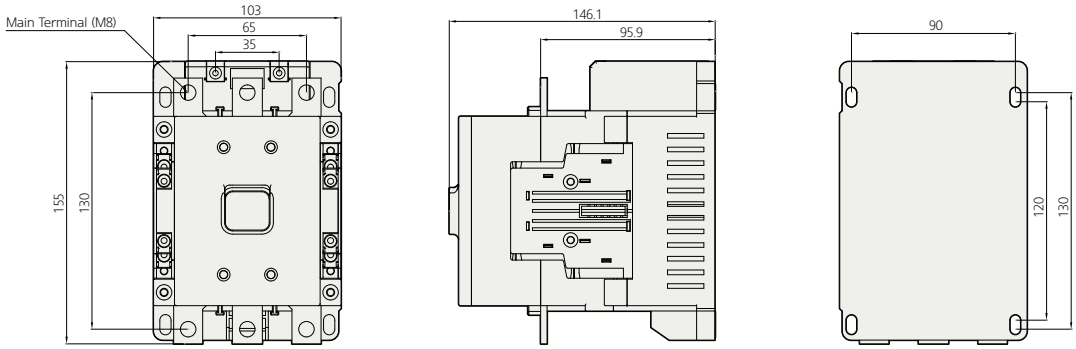
HGS75 / HGS85 / HGS100 (AC)



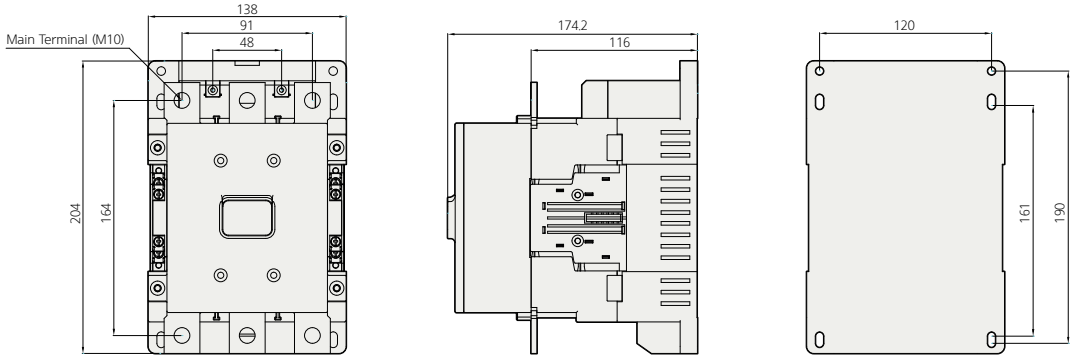
Accessories	A (mm)
Aux. Contact HGSTB	35
Latching Block HGSLB	42.5
Timer HGSET	39

( ) is for DC.

HGS115 / HGS130 / HGS150



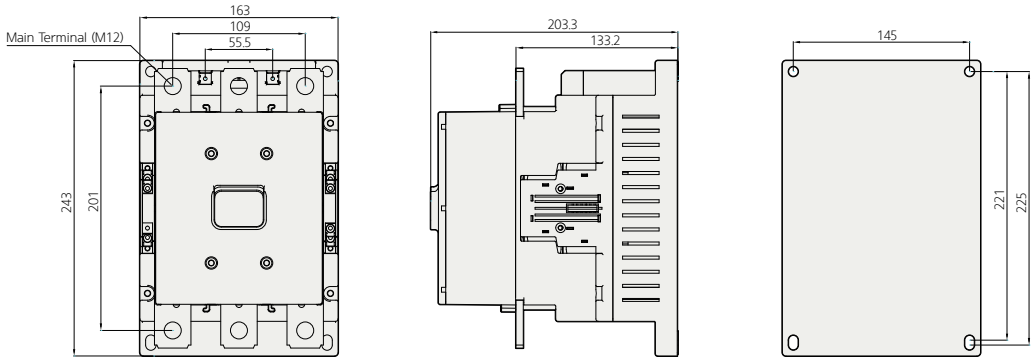
HGS185 / HGS225 / HGS265



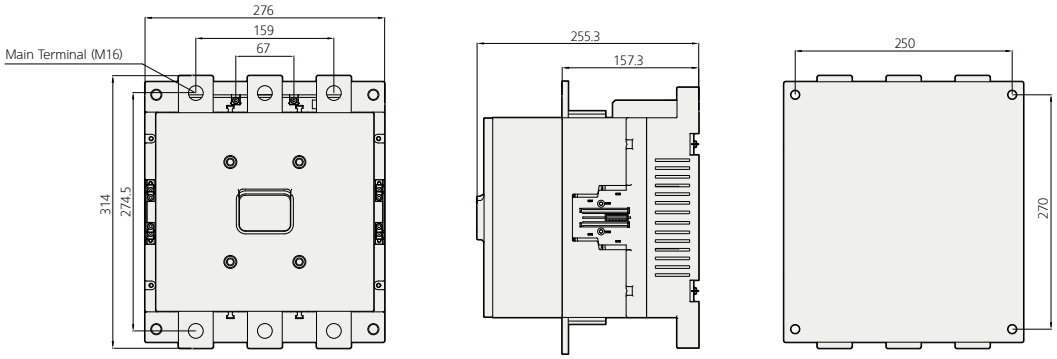
Contactor

(Unit: mm)

HGS300 / HGS400 / HGS500



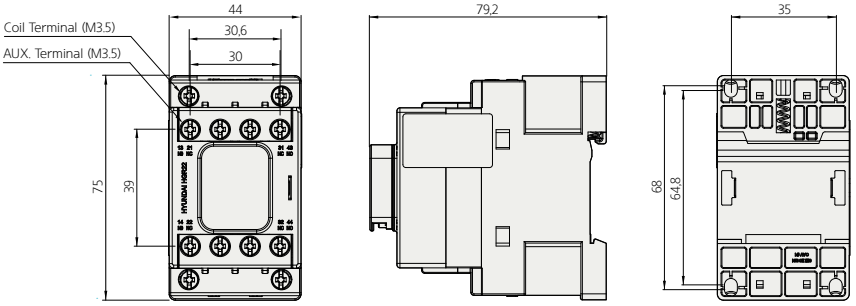
HGS630 / HGS800



Control Relay

(Unit: mm)

HGR (AC)

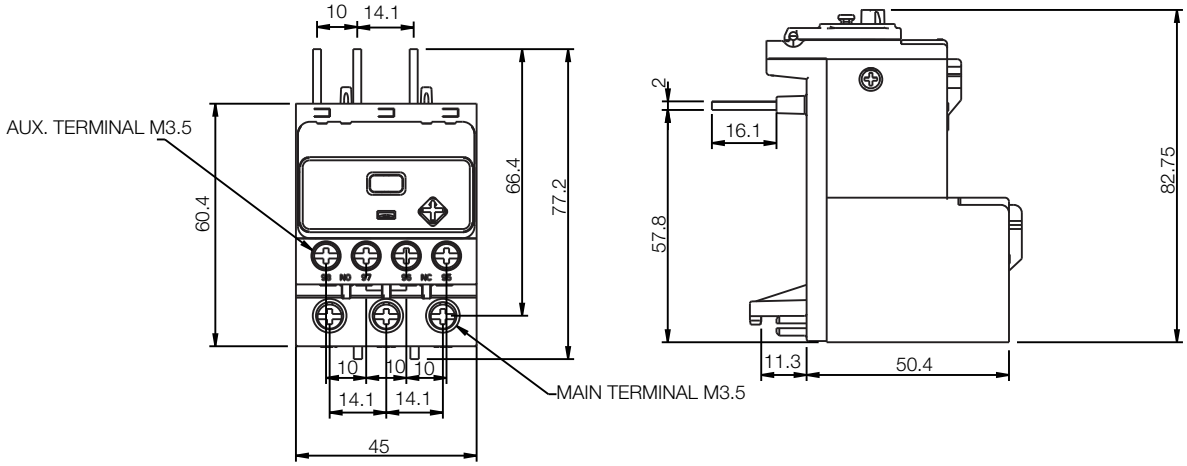


Accessories	A (mm)
Aux. Contact HGSTB	35
Latching Block HGSLB	42.5
Timer HGSET	39

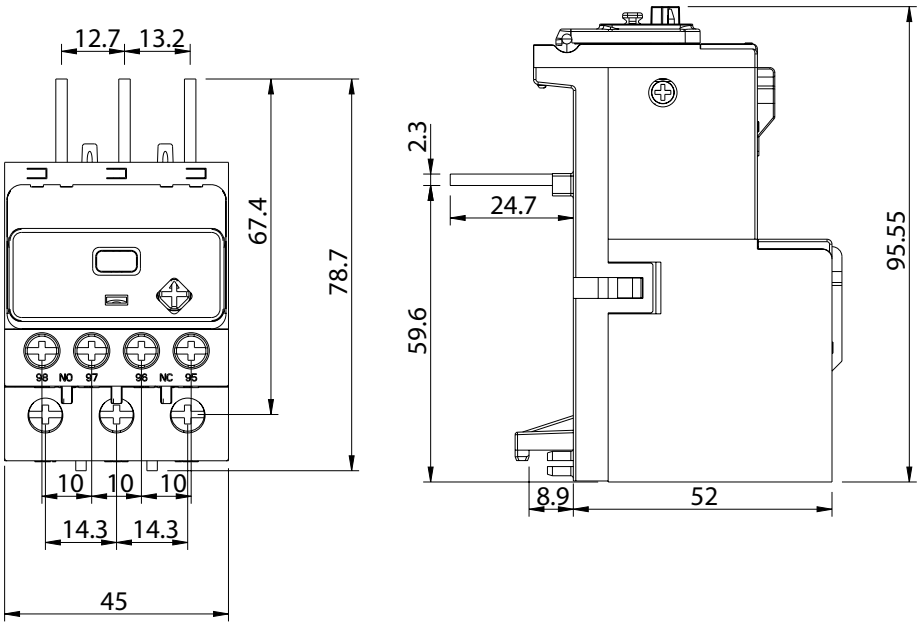
Thermal Overload Relay

(Unit: mm)

HGST18



HGST40

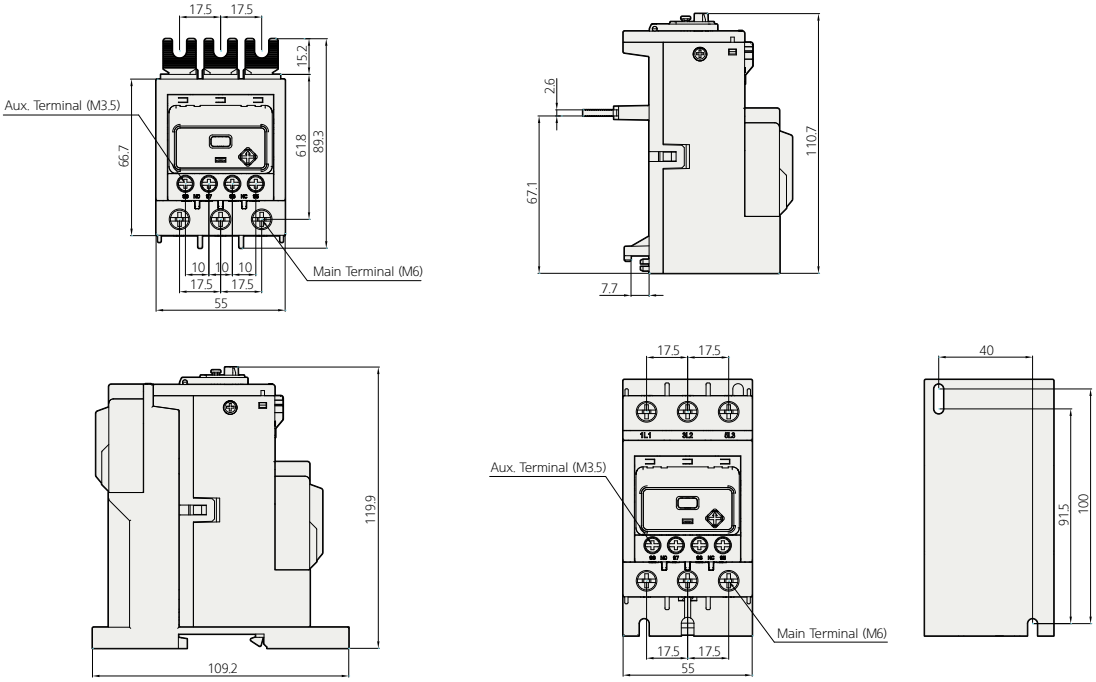


Dimensions

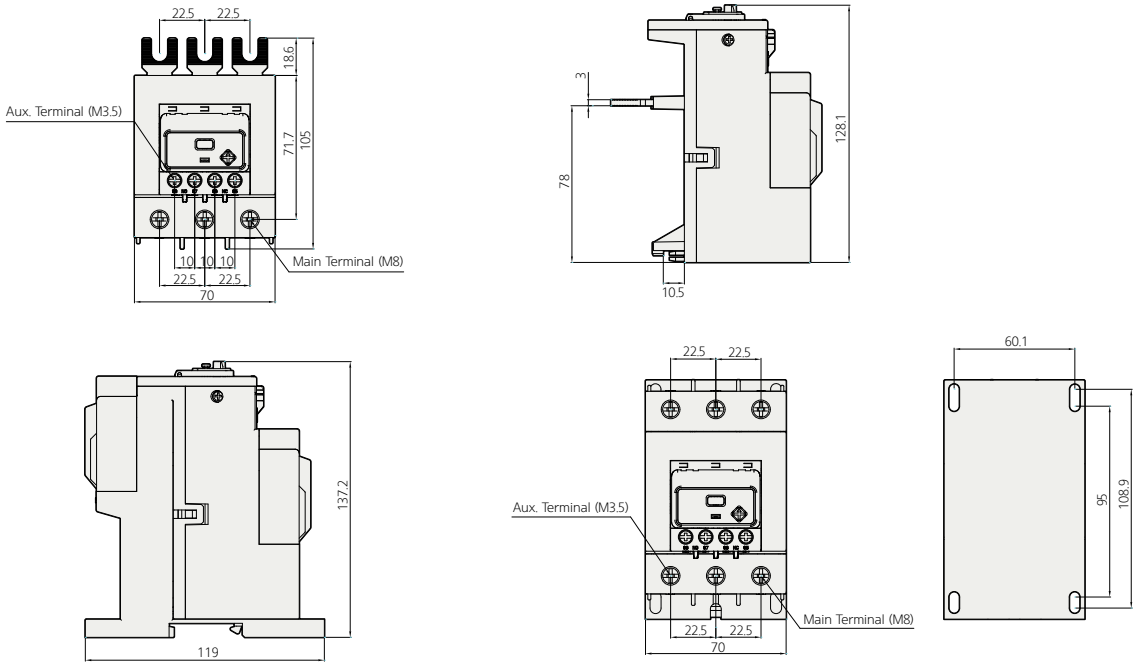
Thermal Overload Relay

(Unit: mm)

HGST65

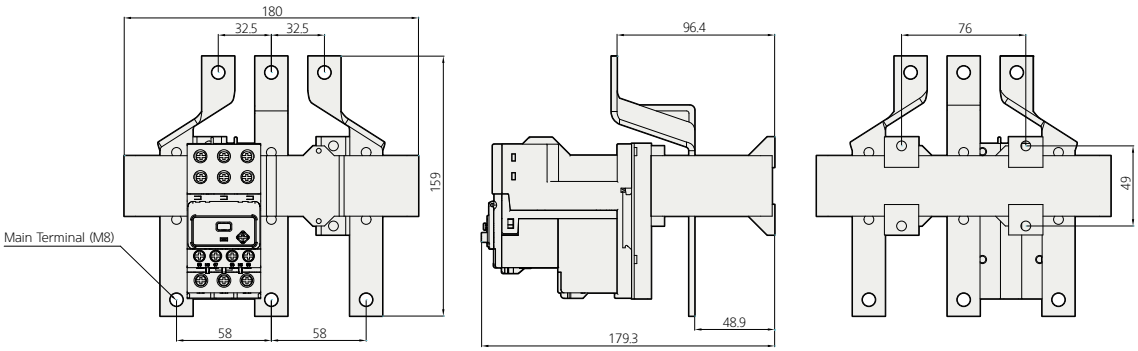


HGST100

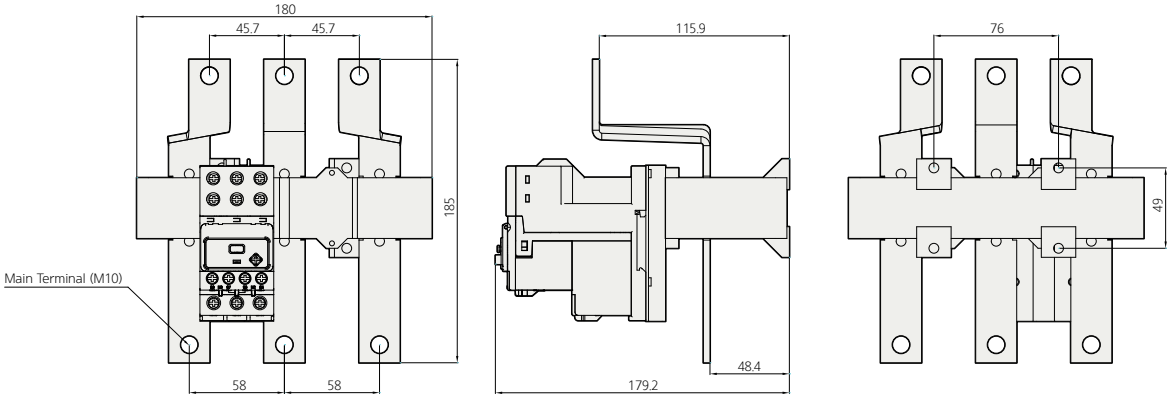


(Unit: mm)

HGST150



HGST265

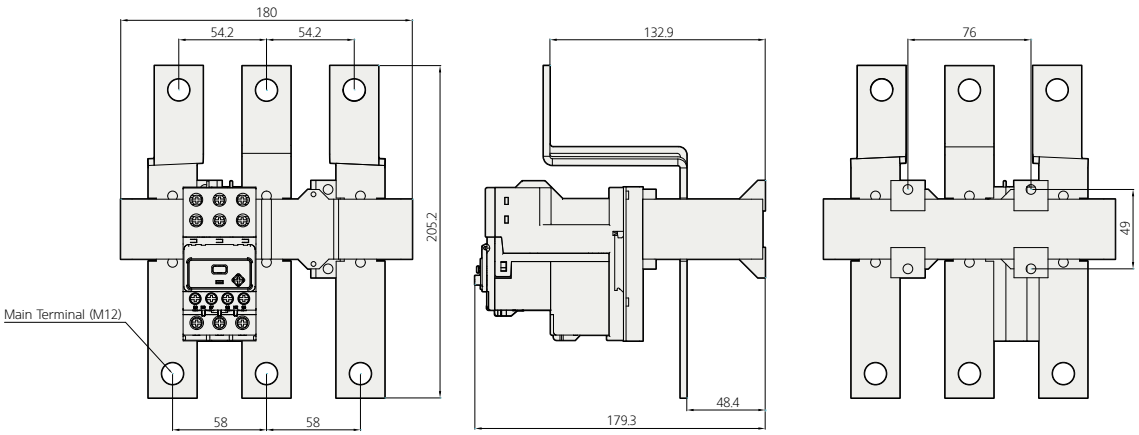


Dimensions

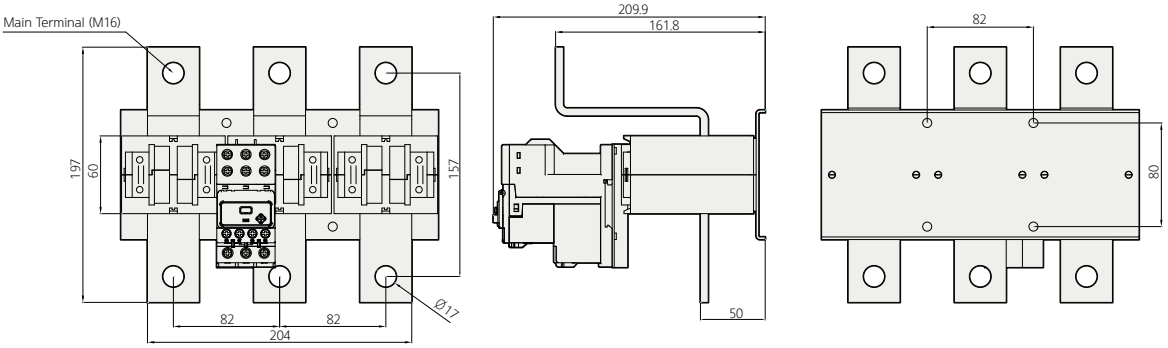
Thermal Overload Relay

(Unit: mm)

HGST500



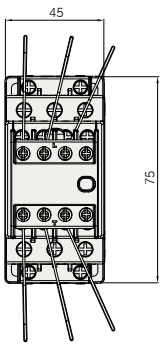
HGST800

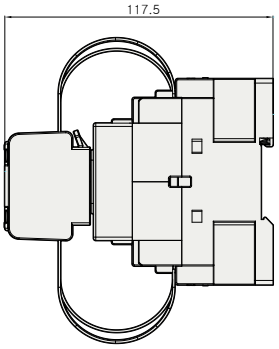


Capacitor Duty Contactor

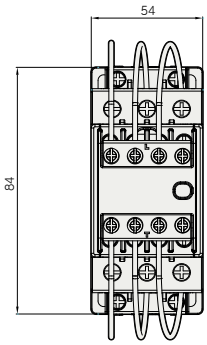
(Unit: mm)

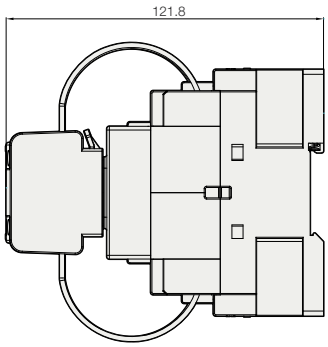
HGS 3C-HGS 15C



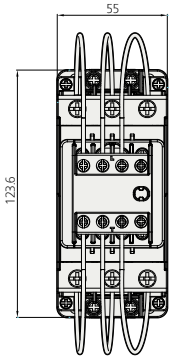


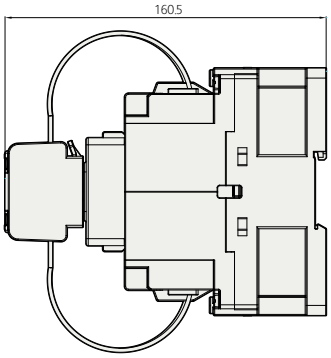
HGS 20C-HGS 33.3C



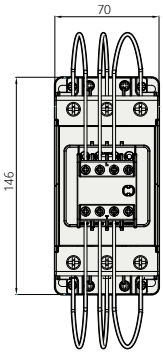


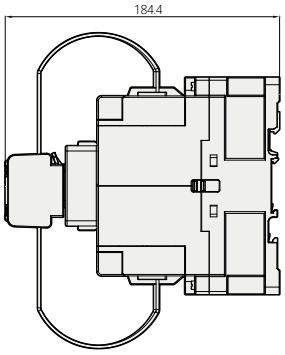
HGS 40C





HGS 50C-HGS 66C



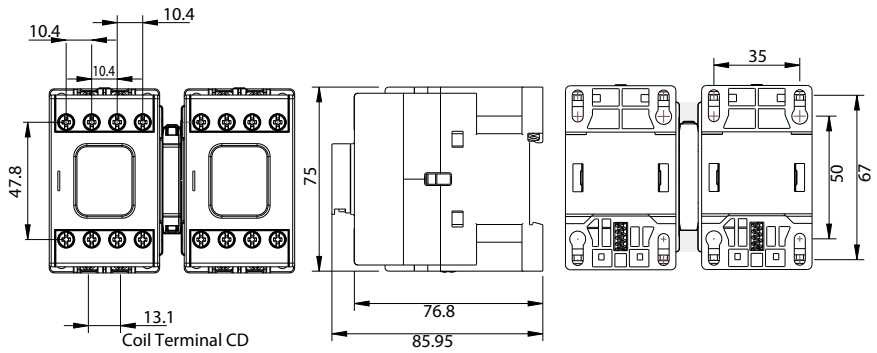


Dimensions

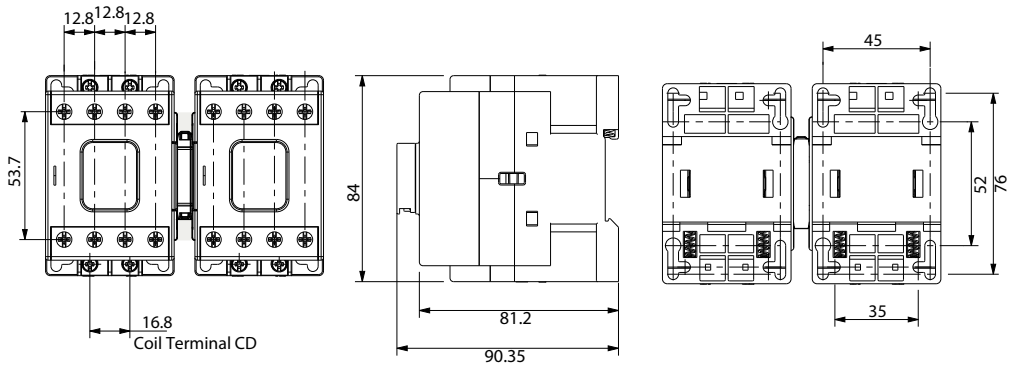
Reversing Contactor (With Interlock Unit)

(Unit: mm)

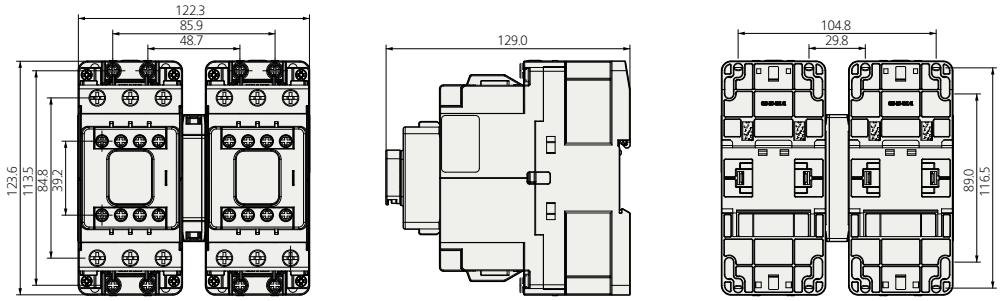
HGS18R



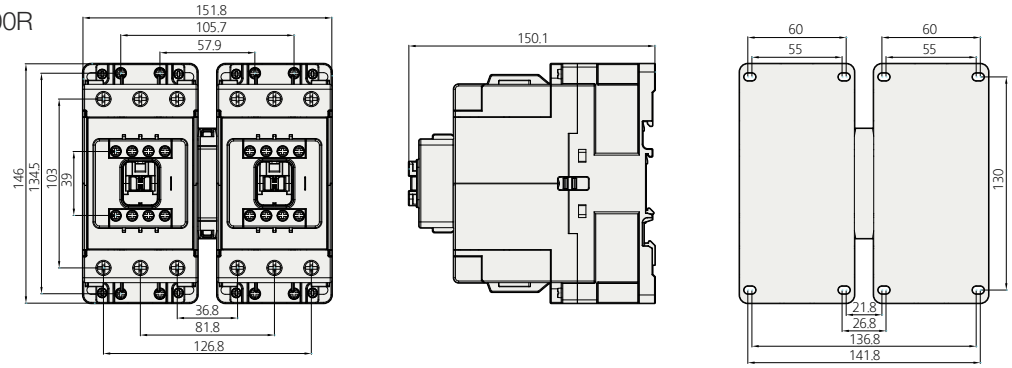
HGS40R



HGS65R



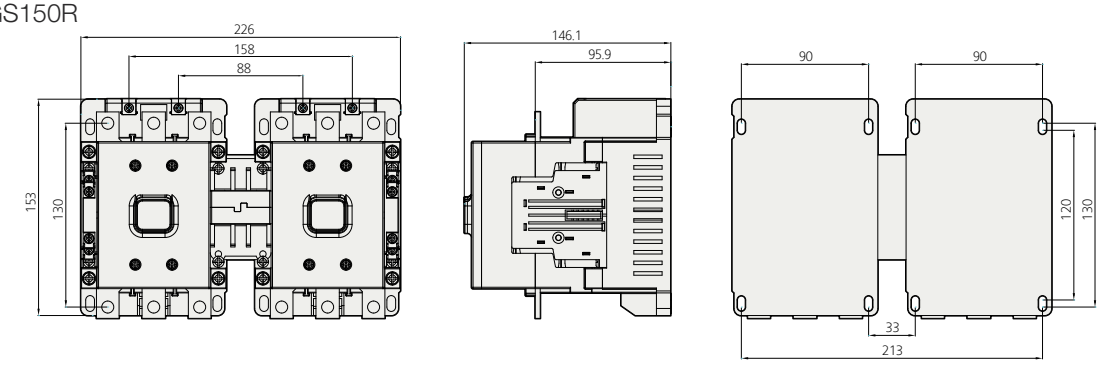
HGS100R



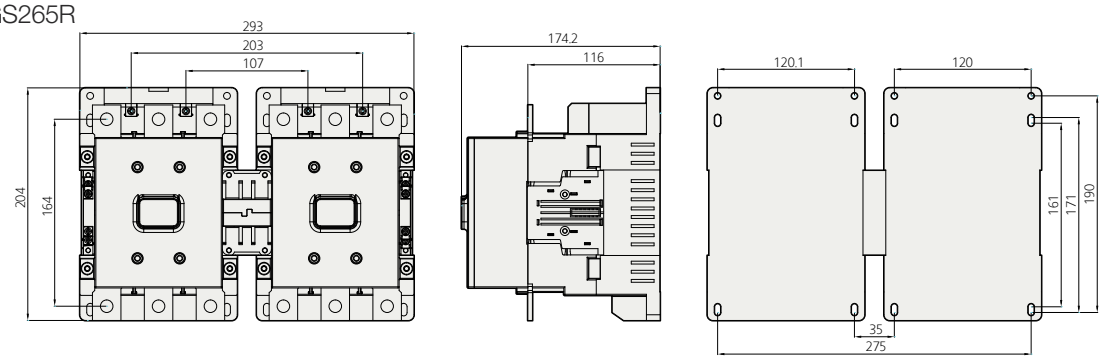
Reversing Contactor (With Interlock Unit)

(Unit: mm)

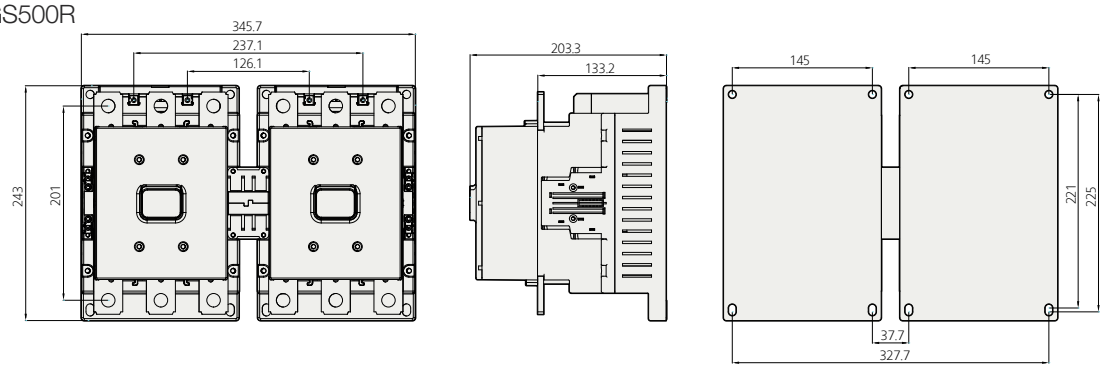
HGS150R



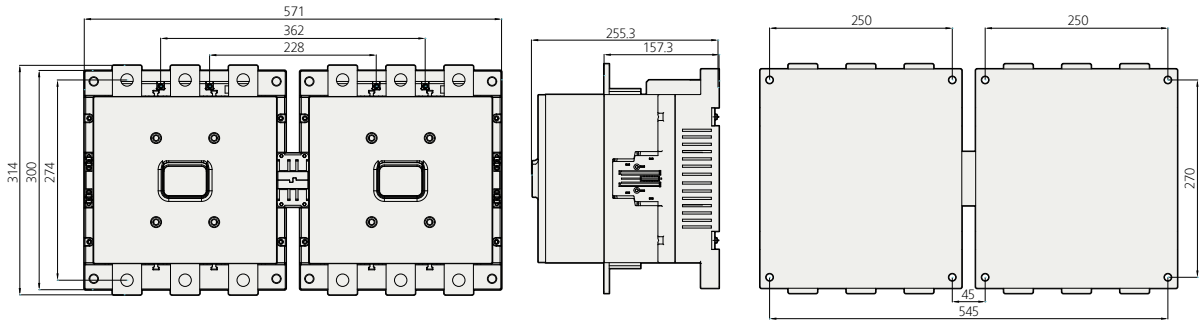
HGS265R



HGS500R



HGS800R



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