

High Voltage DC Relay Catalog



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Business Introduction



Starting 2005, LS e-Mobility Solutions has been utilizing 50 years of manufacturing experience in electrical breakers and switches to offer revolutionary products to the fast growing e-Mobility industry. Our cutting edge technology and wealth of expertise enable us to provide the best DC solutions for our customers.

Product Applications

e-Car



e-Industrial Vehicle



e-Truck



e-Bus



e-Train



UAM



e-Ship



Golf cart



AGV/AMR



e-Mobility Sector

EV Charger



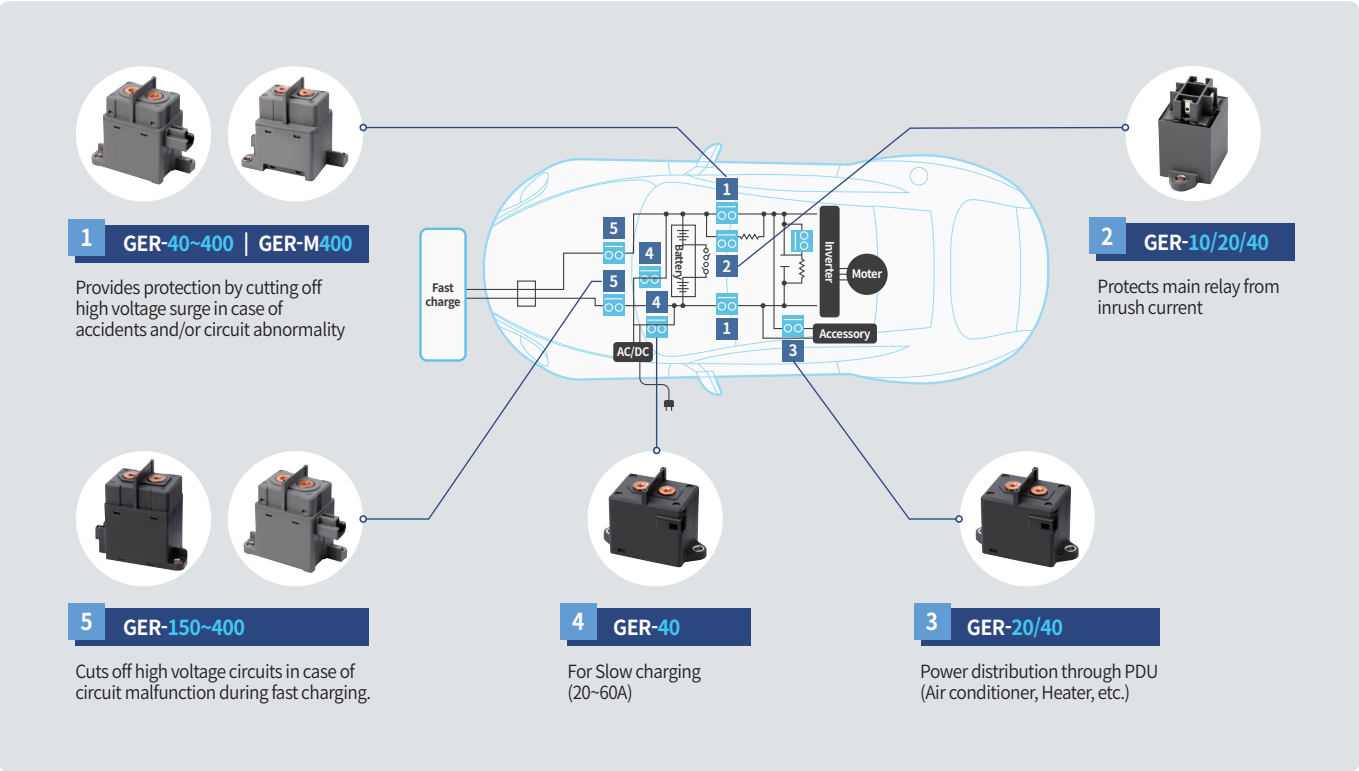
ESS



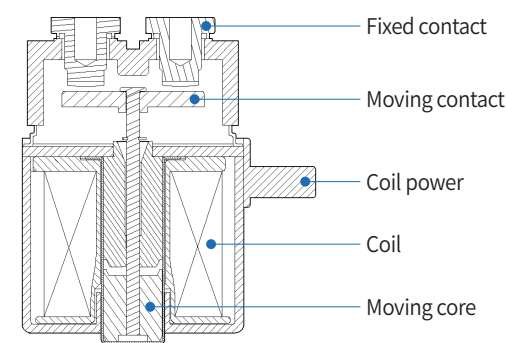
Industrial Sector

EV Relay

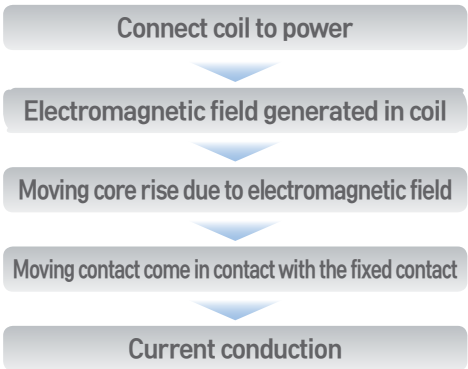
In-vehicle Mounting Locations



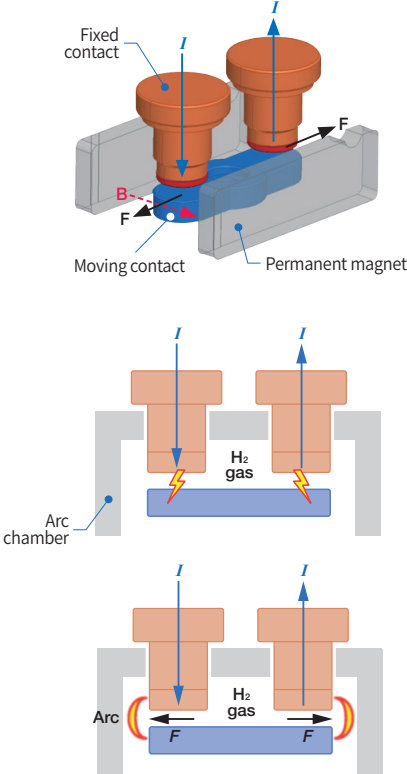
Operation Sequence



< Normal OPEN >



Arc Plasma Quenching



Adhering to Fleming's Left-hand law, the arc plasma moves towards the chamber. Minimizing the damage done to the contacts.

Hydrogen gas within the cermaic chamber provides effective environment for faster arc plasma quenching.

Minimizes the time it takes to quench the arc plasma, and therefore also the damage done to the contacts.

Ordering Information

Example

GER-M10ST DC24V SM G2

0

1

2

3

4

5

6

① Product Series

GER	Green Electric Vehicle Relay
GPR	Green Power Relay

① Rated Operating Voltage

Blank~	≤500V
M	500~1,000V
H	1,000~1,500V

② Continuous Carry Current

10	10A
20	20A
40	40A
⋮	
400	400A

③ Product Type

ST	Standard
00	Customer Name

④ Coil Rated Voltage

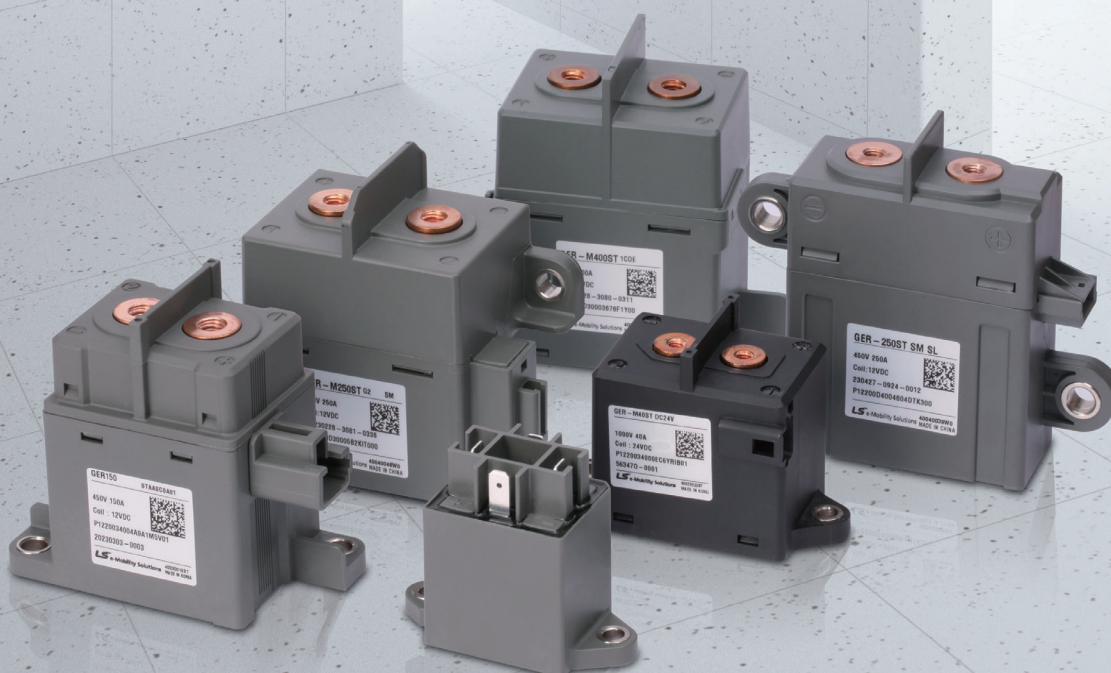
DC12V	Blank
DC24V	DC24V

⑤ Mounting Type

Blank	Bottom Mounting
SM	Side Mounting
PI	Plug in Type

⑥ Main Feature

Blank	None
G2	2nd Generation
⋮	



Specifications – 500V Relays



Model		
Rated Operating Voltage		
Continuous Carry Current		
Width×Height×Depth (mm)		
Characteristics of Item		
Contact	Contact Arrangement	
	Load Polarity	
	Contact Voltage Drop (Initial)	
	Continuous Current	
	Short-time Current (Over Current) (at 85°C, up to Δ65°C)	
Coil	Coil Type	
	Rated Voltage	
	Pick-up Voltage (at 20°C)	
	Drop-out Voltage (at 20°C)	
	Coil Resistance (at 20°C)	
	Max. Power Consumption (at 20°C)	
	Max. Allowable Voltage	
Electrical Characteristics	Operating Time (at 20°C)	
	Release Time (at 20°C)	
	Insulation Resistance (Initial)	HV to LV
		HV to HV
	Dielectric Strength (Initial)	HV to LV
		HV to HV
Mechanical Characteristics	Shock Resistance	Functional
		Destructive
	Vibration Resistance	Functional
		Destructive
Mechanical Life		
Electrical Life	Switch-on Life (Inrush)	
	Switch-off Life	Forward Direction
		Reverse Direction
		Max. Cut-off
Ambient Operating Temperature		
Ambient Operating Humidity		
Tightening Torque	Mounting	Position
		Torque
	Main Terminal	
Approx. Weight (g)		

GER-10ST	GER-20ST	GER-40ST		GER-100ST	
500V	500V	500V		500V	
10A	20A	40A		100A	
Refer to 12 Page	Refer to 13 Page	Refer to 14 Page		Refer to 15 Page	
Non-hermetic Sealed		Hermetic Sealed			
SPST-NO					
Uni-directional					
Max. 0.5V at 10A	Max. 0.5V at 10A	Max. 0.2V at 20A		Max. 0.01V at 20A	
10A (2.0mm ²)	20A (2.5mm ²)	40A (10.0mm ²)		100A (35.0mm ²)	
15A (2min, 2.0mm ²)	30A (5min, 2.5mm ²)	60A (15min, 10.0mm ²)		150A (15min, 35.0mm ²)	
30A (30s, 2.0mm ²)	40A (2min, 2.5mm ²)	100A (2min, 10.0mm ²)		225A (2min, 35.0mm ²)	
Single	Single	Single		Single	
12VDC	12VDC	12V	24V	12V	
Max. 9V	Max. 9V	Max. 9V	Max. 18V	Max. 9V	
Min. 1.2V	Min. 1.2V	Min. 1.2V	Min. 2.4V	Min. 1.2V	
46.5Ω±10%	46.5Ω±10%	46Ω±10%	205Ω±10%	23.5Ω±10%	
3.0W (at 12V)	3.0W (at 12V)	3.5W	3.2W	6.5W (at 12V)	
16V	16V	16V	32V	16V	
Max. 50ms	Max. 50ms	Max. 50ms		Max. 50ms	
Max. 30ms	Max. 30ms	Max. 30ms		Max. 30ms	
Min. 100MΩ (at 500VDC)					
2,200Vrms/min. (Leakage Current ≤ 10mA)		2,500Vrms/min. (Leakage Current ≤ 10mA)			
196m/s ² (20G) (Relay on: 11ms Half Sine Wave)					
490m/s ² (50G) (Relay on: 9ms Half Sine Wave)					
10 to 1,000Hz at 1.0G [Time of Vibration for each X, Y, Z Direction: 8 Hours]					
10 to 200Hz in Increments of 10 at min. 4.5G [Time of Vibration for each X, Y, Z Direction: 4 Hours]					
Min. 200,000 Cycles					
10A 450VDC 150,000 cycles	10A 450VDC 150,000 cycles	27A 400VDC 125,000 Cycles		210A 50VDC 10,000 Cycles	
20A 450VDC 3,000 Cycles	20A 450VDC 3,000 Cycles	120A 450VDC 100 Cycles		200A 450VDC 100 Cycles	
N/A	N/A	-40A 200VDC 1,000 Cycles		-100A 200VDC 1,000 Cycles	
N/A	N/A	400A 450VDC 1 Cycle		1,000A at 450VDC 1 Cycle	
-40 ~ 85°C					
5 ~ 95% R.H.					
Bottom	Bottom	Bottom		Bottom	
(M4): 1.8 ~ 2.7N · m	(M4): 1.8 ~ 2.7N · m	(M4): 1.8 ~ 2.7N · m		(M5): 3.0 ~ 4.0N · m	
N/A	N/A	(M4): 1.5 ~ 2.0N · m		(M6): 3.5 ~ 4.5N · m	
80	85	146		330	



Temperature Sensing



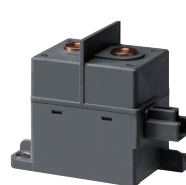
	GER-150ST	GER-200ST	GER-200ST SLIM		GER-250ST		GER-400ST	
	500V	500V	450V		500V		500V	
	150A	200A	200A		250A		400A	
	Refer to 16 Page	Refer to 17 Page	Refer to 18 Page		Refer to 19 Page		Refer to 20 Page	
	Hermetic Sealed							
	SPST-NO							
	Uni-directional							
	Max. 0.01V at 20A	Max. 0.01V at 20A	Max. 0.01V at 20A		Max. 0.02V at 20A		Max. 0.02V at 20A	
	150A (50.0mm ²)	200A (50.0mm ²)	200A (50.0mm ²)		250A (100.0mm ²)		400A (150.0mm ²)	
	225A (15min, 50.0mm ²)	300A (2min, 50.0mm ²)	350A (30sec, 50.0mm ²)		350A (15min, 100.0mm ²)		600A (15min, 150.0mm ²)	
	320A (2min, 50.0mm ²)	400A (500sec, 50.0mm ²)	550A (10sec, 50.0mm ²)		500A (2min, 100.0mm ²)		900A (2min, 150.0mm ²)	
	Single	Single	Single		Dual		Dual	
	12V	12V	12VDC	24VDC	12VDC	24VDC	12VDC	24VDC
	Max. 9V	Max. 9V	Max. 9VDC	Max. 18VDC	Max. 9VDC	Max. 18VDC	Max. 9VDC	Max. 18VDC
	Min. 1.2V	Min. 1.2V	Min. 1.2VDC	Min. 2.4VDC	Min. 1.2VDC	Min. 2.4VDC	Min. 1.2VDC	Min. 2.4VDC
	23.5Ω ±10%	23.5Ω ±10%	N/A		Pull-in: 4.6Ω ±10% Hold: 34.5Ω ±10%	Pull-in: 16.2Ω ±10% Hold: 130.8Ω ±10%	Pull-in: 2.6Ω ±10% Hold: 33.5Ω ±10%	Pull-in: 11.3Ω ±10% Hold: 136.7Ω ±10%
	6.5W (at 12V)	6.5W (at 12V)	6.5W (at 12V)	(T.B.D.)	4W (at 12V)	4W (at 24V)	4W (at 12V)	4W (at 24V)
	16V	16V	16V	32V	16V	32V	16V	32V
	Max. 50ms	Max. 50ms	Max. 50ms		Max. 30ms		Max. 30ms	
	Max. 30ms	Max. 30ms	Max. 30ms		Max. 10ms		Max. 10ms	
	Min. 100MΩ (at 500VDC)							
	2,500Vrms/min. (Leakage Current ≤ 10mA)		1,500Vrms/min. (Leakage Current ≤ 10mA)		2,500Vrms/min. (Leakage Current ≤ 10mA)			
	196m/s ² (20G) (Relay on: 11ms Half Sine Wave)							
	490m/s ² (50G) (Relay on: 9ms Half Sine Wave)							
	10 to 1,000Hz at 1.0G [Time of Vibration for each X, Y, Z Direction: 8 Hours]		5 to 2,000Hz at 1.0G [Time of Vibration for each X, Y, Z Direction: 3 Hours]		10 to 1,000Hz at 1.0G [Time of Vibration for each X, Y, Z Direction: 8 Hours]			
	10 to 200Hz in Increments of 10 at min. 4.5G [Time of Vibration for each X, Y, Z Direction: 4 Hours]		7 to 200Hz 1G to 10G [Time of Vibration for each X, Y, Z Direction: 3 Hours]		10 to 200Hz in Increments of 10 at min. 4.5G [Time of Vibration for each X, Y, Z Direction: 4 Hours]			
	Min. 200,000 Cycles		Min. 300,000 Cycles		Min. 200,000 Cycles			
	210A 50VDC 10,000 Cycles	210A 50VDC 10,000 Cycles	-		210A 21VDC 110,000 Cycles		400A 450VDC 1,000 Cycles	
	300A 450VDC 100 Cycles	300A 450VDC 100 Cycles			400A 450VDC 100 Cycles		800A 450VDC 200 Cycles	
	-150A 200VDC 500 Cycles	-150A 200VDC 500 Cycles			-250A 200VDC 100 Cycles		-400A 200VDC 1,000 Cycles	
	1,500A at 450VDC 1 Cycle	1,500A at 450VDC 1 Cycle			2,500A 450VDC 1 Cycle		3,200A 450VDC 1 Cycle	
	-40 ~ 85°C							
	5 ~ 95% R.H.							
	Bottom, Side	Bottom, Side	Side		Bottom, Side		Bottom	
	(M5): 3.0 ~ 4.0N · m	(M5): 3.0 ~ 4.0N · m	(M6): 3.0 ~ 4.0N · m		(M6): 6.0 ~ 8.0N · m		(M6): 6.0 ~ 8.0N · m	
	(M6): 3.5 ~ 4.5N · m	(M6): 3.5 ~ 4.5N · m	(M5): 3.0 ~ 4.0N · m		(M6): 4.0 ~ 4.5N · m		(M6): 6.0 ~ 8.0N · m	
	330	330	300		500		700	

Specifications – 500~1,000V Relays



Model		
Rated Operating Voltage		
Continous Carry Current		
Width×Height×Depth (mm)		
Characteristics of Item		
Contact	Contact Arrangement	
	Load Polarity	
	Contact Voltage Drop (Initial)	
	Short-time Current (Over Current) (at 85°C, up to Δ65°C)	
Coil	Coil Type	
	Rated Voltage	
	Pick-up Voltage (at 20°C)	
	Drop-out Voltage (at 20°C)	
	Coil Resistance (at 20°C)	
	Max. Power Consumption (at 20°C)	
	Max. Allowable Voltage	
Electrical Characteristics	Operating Time (at 20°C)	
	Release Time (at 20°C)	
	Insulation Resistance (Initial)	HV to LV
		HV to HV
	Dielectric Strength (Initial)	HV to LV
HV to HV		
Mechanical Characteristics	Shock Resistance	Functional
		Destructive
	Vibration Resistance	Functional
		Destructive
Mechanical Life		
Electrical Life	Switch-on Life (Inrush)	
	Switching Capacity	
	Max. Cut-off Current	
	Reverse Direction Cut-off	
Ambient Operating Temperature		
Ambient Operating Humidity		
Tightening Torque	Mounting	Position
		Torque
	Main Terminal	
Approx. Weight (g)		

GER-M10ST		GER-M20ST		GER-M40ST		GER-M100ST		
600V		600V		1,000V		1,000V		
10A		20A		40A		100A		
Refer to 12 Page		Refer to 13 Page		Refer to 14 Page		Refer to 15 Page		
Non-hermetic Sealed				Hermetic Sealed				
SPST-NO								
Uni-directional								
Max. 0.5V at 10A		Max. 0.5V at 10A		Max. 0.2V at 20A		Max. 0.02V at 20A		
15A (15min, 2.0mm ²)		15A (15min, 2.5mm ²)		60A (15min, 10.0mm ²)		150A (15min, 35.0mm ²)		
30A (2min, 2.0mm ²)		40A (1min 2.5mm ²)		100A (2min, 10.0mm ²)		225A (2min, 35.0mm ²)		
Single		Single		Single		Single		
12VDC	24VDC	12VDC	24VDC	12VDC	24VDC	12VDC	24VDC	
Max. 9VDC	Max. 18VDC	Max. 9VDC	Max. 18VDC	Max. 9VDC	Max. 18VDC	Max. 9VDC	Max. 18VDC	
Min. 1.2VDC	Min. 2.4VDC	Min. 1.2VDC	Min. 2.4VDC	Min. 1.0VDC	Min. 2.4VDC	Min. 1.2VDC	Min. 2.4VDC	
46.5Ω±10%	206.5Ω±10%	46.5Ω±10%	206.5Ω±10%	46Ω±10%	205Ω±10%	23.5Ω±10%	93.1Ω±10%	
3.0W		3.0W		3.5W	3.2W	6.5W		
15VDC	30VDC	15VDC	30VDC	15VDC	30VDC	15VDC	30VDC	
Max. 50ms		Max. 50ms		Max. 50ms		Max. 50ms		
Max. 30ms		Max. 30ms		Max. 30ms		Max. 30ms		
Min. 100MΩ (at 1,000VDC)								
3,000Vrms/min. (Leakage Current ≤ 10mA)								
196m/s ² (20G) [Relay on: 11ms. Half Sine Wave]								
Min. 490m/s ² (50G) [Relay on: 9ms. Half Sine Wave]								
10 to 1,000Hz at 1.0G [Time of Vibration for each X,Y,Z Direction: 8 Hours]								
10 to 200Hz in Increments of 10 at min. 4.5G [Time of Vibration for each X,Y,Z Direction: 4 Hours]								
Min. 200,000 Cycles								
10A at 450VDC 75,000 Cycles		20A at 450VDC 75,000 Cycles		-		-		
5A at 600VDC 1,000 Cycles		10A at 450VDC 150,000 Cycles 20A at 450VDC 3,000 Cycles 30A at 450VDC 40 Cycles		20A at 1,000VDC 3,000 Cycles 30A at 800VDC 3,000 Cycles 40A at 600VDC 3,000 Cycles 25A at 1,000VDC 1,000 Cycles		40A at 1,000VDC 3,000 Cycles 50A at 800VDC 3,000 Cycles 60A at 600VDC 3,000 Cycles 50A at 1,000VDC 1,000 Cycles		
N/A		N/A		100A at 450VDC 50 Cycles		1,000A at 450VDC 1 Cycle		
N/A		20A at 200VDC 1,000 Cycles		40A at 200VDC 1,000 Cycles		100A at 200VDC 1,000 Cycles		
-40 ~ 85°C								
5 ~ 95% R.H.								
Bottom		Bottom		Bottom		Bottom		
(M4): 1.8 ~ 2.7N · m		(M4): 1.8 ~ 2.7N · m		(M4): 1.8 ~ 2.7N · m		(M6): 3.0 ~ 4.0N · m		
N/A		N/A		(M4): 1.5 ~ 2.0N · m		(M6): 3.5 ~ 4.5N · m		
80		85		145		330		



	GER-M150ST		GER-M250ST		GER-M400ST		GER-M300ST G2		GER-M400ST G2		
	1,000V		1,000V		1,000V		1,000V		1,000V		
	150A		250A		400A		300A		400A		
	Refer to 16 Page		Refer to 19 Page		Refer to 20 Page		Refer to 21 Page		Refer to 22 Page		
	Hermetic Sealed										
	SPST-NO										
	Uni-directional						Bi-directional				
	Max. 0.02V at 20A		Max. 0.02V at 20A		Max. 0.02V at 20A		Max. 0.02V at 20A		Max. 0.02V at 20A		
	225A (15min, 50.0mm ²)		350A (15min, 120.0mm ²)		500A (15min, 120.0mm ²)		500A (340sec, 75.0mm ²)		500A (100sec, 120.0mm ²)		
	320A (2min, 50.0mm ²)		500A (2min, 120.0mm ²)		750A (2min, 120.0mm ²)		600A (165sec, 75.0mm ²)		700A (30sec, 120.0mm ²)		
	Single		Dual		Dual		Single		Single	Dual	
	12VDC	24VDC	12VDC	24VDC	12VDC	24VDC	12VDC	24VDC	12VDC		
	Max. 9VDC	Max. 18VDC	Max. 9VDC	Max. 18VDC	Max. 9VDC	Max. 18VDC	Max. 9VDC	Max. 18VDC	Max. 9VDC		
	Min. 1.2VDC	Min. 2.4VDC	Min. 1.2VDC	Min. 2.4VDC	Min. 1.2VDC	Min. 2.4VDC	Min. 1.2VDC	Min. 2.4VDC	Min. 1.2VDC		
	23.5Ω±10%	93.1Ω±10%	Pull-in: 4.78Ω±10% Hold: 37.0Ω±10%	Pull-in: 19.2Ω±10% Hold: 156.3Ω±10%	Pull-in: 3.4Ω±10% Hold: 38.5Ω±10%	Pull-in: 15.2Ω±10% Hold: 157.3Ω±10%	20.5Ω±10%	80.9Ω±10%	3.2Ω±10%	Pull-in: 6.9Ω±10% Hold: 33.7Ω±10%	
	6.5W		4.5W		4.5W		7.5W		-	4.5W	
	15VDC	30VDC	15VDC	30VDC	15VDC	30VDC	16VDC	32VDC		16VDC	
	Max. 50ms		Max. 30ms		Max. 30ms		Max. 50ms			Max. 30ms	
	Max. 30ms		Max. 10ms		Max. 10ms		Max. 30ms			Max. 10ms	
	Min. 100MΩ (at 1,000VDC)										
	3,000Vrms/min. (Leakage Current ≤ 10mA)						2,500Vrms/sec. (Leakage Current ≤ 10mA)				
	196m/s ² (20G) [Relay on: 11ms. Half Sine Wave]										
	Min. 490m/s ² (50G) [Relay on: 9ms. Half Sine Wave]										
	10 to 1,000Hz at 1.0G [Time of Vibration for each X,Y,Z Direction: 8 Hours]										
	10 to 200Hz in Increments of 10 at min. 4.5G [Time of Vibration for each X,Y,Z Direction: 4 Hours]										
	Min. 200,000 Cycles										
	100A at 1,500VDC 3,000 Cycles		250A at 20VDC 100,000 Cycles		400A at 200VDC 30,000 Cycles		-		-		
	75A at 1,000VDC 1,000 Cycles 90A at 800VDC 3,000 Cycles 120A at 600VDC 3,000 Cycles		125A at 1,000VDC 1,000 Cycles 150A at 800VDC 3,000 Cycles 200A at 600VDC 3,000 Cycles		200A at 1,000VDC 1,000 Cycles 250A at 800VDC 3,000 Cycles 300A at 600VDC 3,000 Cycles		250A at 500VDC, 100 Cycles		400A at 500VDC, 100 Cycles		
	1,000A at 450VDC 1 Cycle		2,000A at 450VDC 1 Cycle		3,200A at 450VDC 1 Cycle		800A at 800VDC 1 Cycle 1,800A at 500VDC 1 Cycle		1,300A at 800VDC 1 Cycle 2,000A at 500VDC 1 Cycle		
	200A at 300VDC 1,000 Cycles		250A at 200VDC 1,000 Cycles		200A at 300VDC 1,000 Cycles						
	-40 ~ 85°C										
	5 ~ 95% R.H.										
	Bottom		Bottom		Bottom		Bottom, Side		Bottom, Side		
	(M6): 3.0 ~ 4.0N · m		(M6): 6.0 ~ 8.0N · m		(M6): 6.0 ~ 8.0N · m		(M5): 3.0 ~ 4.0N · m		(M5): 3.0 ~ 4.0N · m		
	(M6): 3.5 ~ 4.5N · m		(M6): 3.5 ~ 4.5N · m		(M6): 3.5 ~ 4.5N · m		(M6): 3.5 ~ 4.5N · m		(M6): 3.5 ~ 4.5N · m		
	330		500		630		420		-	500	

Coil Rating / Connection and Mounting

Coil Rating

Model	Rated Voltage	Pick-up Voltage (at 20°C)	Drop-out Voltage (at 20°C)	Power Consumption	Max. Allowable Voltage
GER-10ST	12VDC, 24VDC	Max. 9VDC, 18VDC	Min. 1.2VDC, 2.4VDC	3.0W (at 12VDC)	16VDC
GER-20ST					
GER-40ST					
GER-100ST	12VDC	Max. 9VDC	Min. 1.2VDC	6.5W (at 12VDC)	16VDC
GER-150ST					
GER-200ST					
GER-200ST SLIM	12VDC, 24VDC	Max. 9VDC, 18VDC	Min. 1.2VDC, 2.4VDC	6.5W (at 12VDC)	16VDC, 32VDC
GER-250ST	12VDC, 24VDC	Max. 9VDC, 18VDC	Min. 1.2VDC, 2.4VDC	4.0W (*inrush current: 2.9/1.25A for 12/24V)	16VDC, 32VDC
GER-400ST				4.0W (*inrush current: 4.2/2.1A for 12/24V)	
GER-M10ST	12VDC, 24VDC	Max. 9VDC, 18VDC	Min. 1.2VDC, 2.4VDC	3.0W (at 12/24VDC)	15VDC, 30VDC
GER-M20ST				3.0W (at 12/24VDC)	
GER-M40ST				3.2W (at 12/24VDC)	
GER-M100ST				6.5W (at 12/24VDC)	
GER-M150ST				6.5W (at 12/24VDC)	
GER-M250ST				4.5W (at 12/24VDC)	
GER-M400ST				4.5W (at 12/24VDC)	
GER-M300ST G2	12VDC, 24VDC	Max. 9VDC, 18VDC	Min. 1.2VDC, 2.4VDC	7.5W (at 12VDC/24VDC)	16VDC
GER-M400ST G2	12VDC	Max. 9VDC	Min. 1.2VDC	6.0W (inrush current: 2.8A / for 12V)	

Connection and Mounting

Model	Main Terminal Connection			Mounting	
	Screw	Allowed Torque	Wire for Main Terminal (mm ²)	Allowed Screw	Allowed Torque
GER-10ST	N / A	N / A	2.0	M4	1.8 ~ 2.7 N·m
GER-20ST			2.5		
GER-40ST			10.0		
GER-100ST	M6	3.5 ~ 4.5N·m	35.0	M5	3.0 ~ 4.0N·m
GER-150ST			50.0		
GER-200ST					
GER-200ST SLIM	M5	3.0 ~ 4.0N·m	50	M6	3.0 ~ 4.0N·m
GER-250ST	M6	4.0 ~ 4.5N·m	100.0	M6	6.0 ~ 8.0N·m
GER-400ST		6.0 ~ 8.0N·m	150.0		
GER-M10ST	N / A	N / A	2.0	M4	1.8 ~ 2.7N·m
GER-M20ST			2.5		
GER-M40ST	M4	1.5 ~ 2.0N·m	10.0		
GER-M100ST	M6	3.5 ~ 4.5N·m	35.0	M6	3.0 ~ 4.0N·m
GER-M150ST			50.0		
GER-M250ST			120.0		
GER-M400ST			240.0		
GER-M300ST G2			75.0	M5	3.0 ~ 4.0N·m
GER-M400ST G2			120.0		

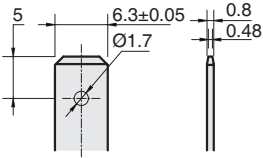
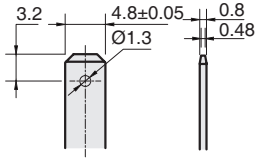
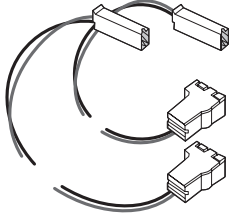
Relay Selection Guide

Items		Details	Considerations for Selection
Coil	Pick-up Voltage (Current)	Voltage at which the Relay is turned on.	- Consider the ripple of the applied current when selecting a Relay. - Especially consider the ambient temperature and coil temperature - Consider the voltage drop of Relays when using it with Semiconductors. - Consider the voltage drop of Relays when the vehicle starts.
	Drop-out Voltage (Current)	Voltage at which the Relay is turned off.	
	Maximum Continuous Voltage	The maximum voltage applicable to the coil without causing damage to it. Higher voltage may be applied but consultation with the producer is needed.	
	Coil Resistance	The DC resistance of the coil.	
	Temperature Rise	When power is supplied to the coil, the temperature of the coil increases and eventually becomes saturated. Temperature rise refers to the difference in temperature before and after power is supplied to the coil.	
Contact	Contact Rating	Continuous current and voltage.	- The endurance of a Relay is influenced by the environment in which it is used. - The endurance of a Relay may be shortened when used in high temperature. Please test the Relay in the actual environment in which it will be used to test the endurance. - Test and review with actual load and application under an actual environment.
	Contact Material	Material of the contacts.	
	Coil Endurance	The minimum amount of times a relay can switch on/off under normal circumstances.	
	Contact Resistance	The resistance between the fixed contact(+) and the moving contact(-) when they are in contact.	
Operate Time	Operating Time	The time needed for the contact to connect power when power is applied.	- Note that the operate time and bounce time may change according to the ambient temperature and applied voltage. - Note that the bounce time is included in the operating time. . - Note that switching life is affected by switching frequency.
	Release Time	The time needed for the Relay to turn off when power supply is halted.	
	Bounce Time	The duration of the 'Bounce' phenomenon, which is the phenomenon where a Relay continuously alternate between on and off state during initial contact between fixed and moving contact.	
	Switching Frequency	A continuous frequency that is applied to the coil under continuous voltage which enables the relay to achieve its electrical/mechanical endurance.	
Mechanical Characteristics	Vibration Resistance	1) Functional: The amount of vibration that the Relay can withstand without the contacts separating for a set amount of time. 2) Destructive: The vibration a relay can endure in the process of shipment, installation or use without receiving any change or damage.	- The endurance of the Relay is influenced by the environment. - The endurance of a Relay may be shortened when used in high temperature. Please test the Relay in the actual environment in which it will be used to test the endurance. - Test and review with actual load and application under an actual environment.
	Shock Resistance	1) Functional: the maximum acceleration allowed without causing the contacts to open when the Relay is on. 2) Destructive: The acceleration a relay can endure in the process of shipment, installation or use without receiving any change or damage.	
	Ambient Use Temperature	Ambient temperature for the Relay to operate normally.	
	Mechanical Endurance	Minimum number of times the relay can be operated under normal conditions without any load on the contacts.	
Other Items	Breakdown Voltage(Dielectric Strength)	The maximum voltage a given location in the Relay can withstand without destroying the insulation effect.	- Check the connection type (plug-in, soldering, screw, fixed, PCB, etc.) before using the Relay
	Mounting, Connection	Mounting: Horizontal type and vertical type. Connection: how the relay is connected to the main circuit (Screw type and plug-in type).	
	Size	Size of relay (Width, Height, Depth).	

GER-10ST / GER-M10ST

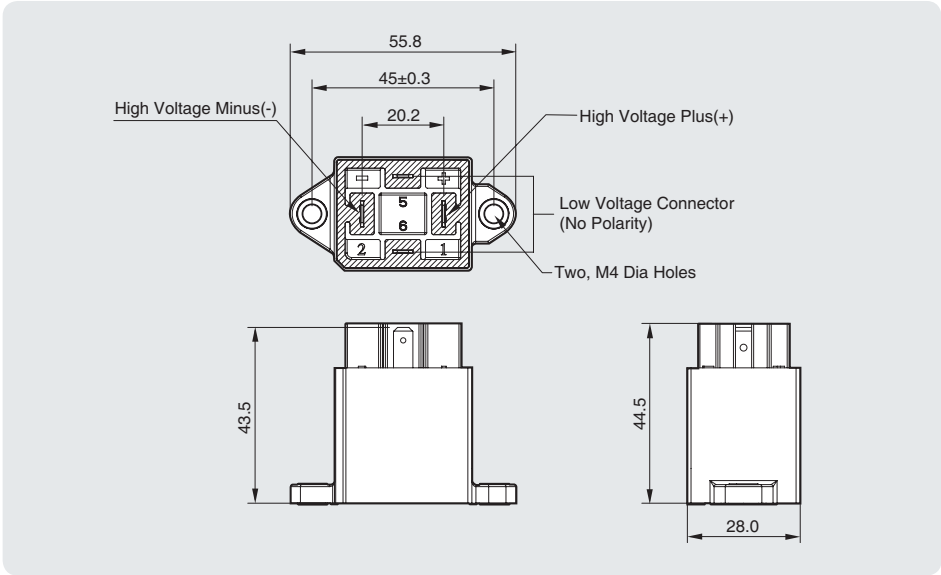
Coil Terminal Accessory



Main Terminal	Coil Terminal	Accessory(Not included)
 Pin Type Features • Terminal Type = Tab • Mating Area Interface • Dimensions(mm) 6.3×0.80 • Material = Brass	 Pin Type Features • Terminal Type = Tab • Mating Area Interface • Dimensions(mm) 4.8×0.80 • Material = Brass	 Components • Main Terminal Accessory: 2EA • Coil Terminal Accessory: 2EA • Wire Length: 300mm

Dimensions

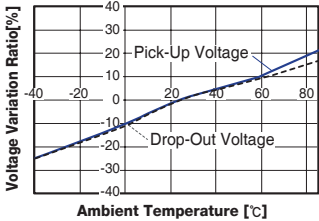
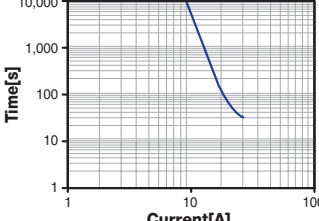
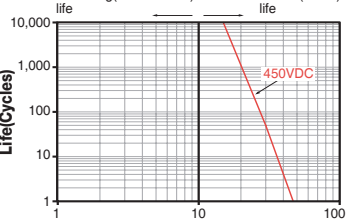
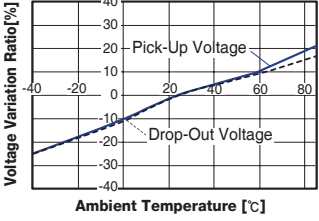
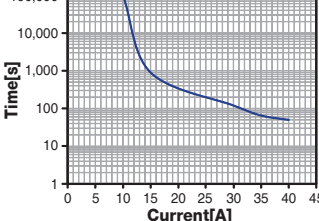
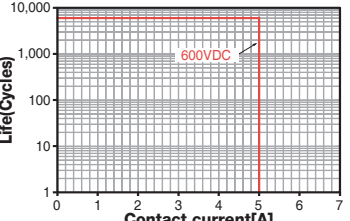
(Unit : mm)



General Tolerance

Less than 10: ±0.3
10 ~50: ±0.5
More than: ±0.8

Engineering Data

	Operating Voltage Characteristic	I-T Curve	Switching Life / Cut-off Curves
GER-10ST			
GER-M10ST			

GER-20ST / GER-M20ST

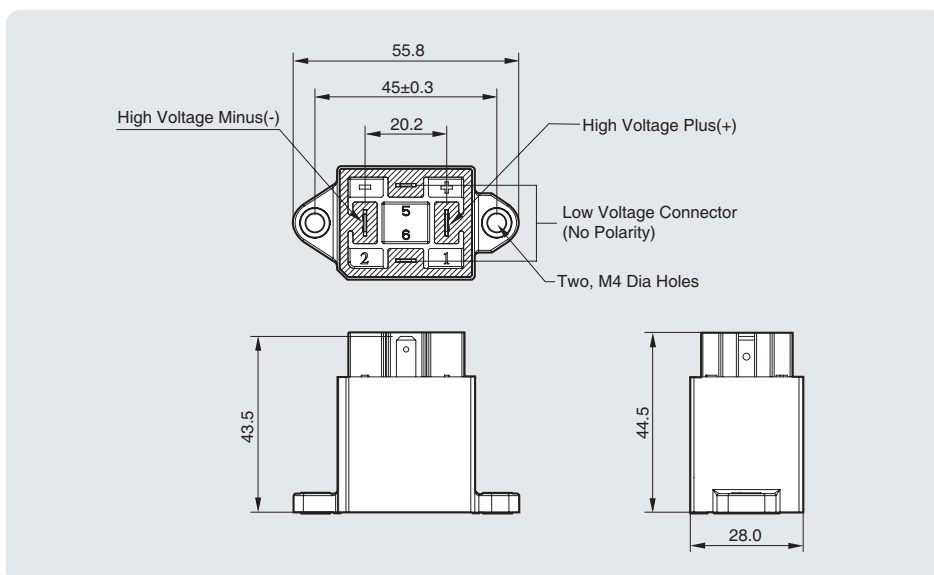
Coil Terminal Accessory



Main Terminal	Coil Terminal	Accessory(Not included)
Pin Type Features - Terminal Type = Tab - Mating Area Interface - Dimensions(mm) 6.3×0.80 - Material = Brass	Pin Type Features - Terminal Type = Tab - Mating Area Interface - Dimensions(mm) 4.8×0.80 - Material = Brass	Components - Main Terminal Accessory: 2EA - Coil Terminal Accessory: 2EA - Wire Length: 300mm

Dimensions

(Unit : mm)



General Tolerance

Less than 10: ± 0.3

10 ~ 50: ± 0.5

More than: ± 0.8

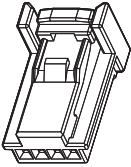
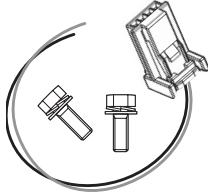
Engineering Data

	Operating Voltage Characteristic	I-T Curve	Switching Life / Cut-off Curves
GER-20ST			
GER-M20ST			

GER-40ST / GER-M40ST

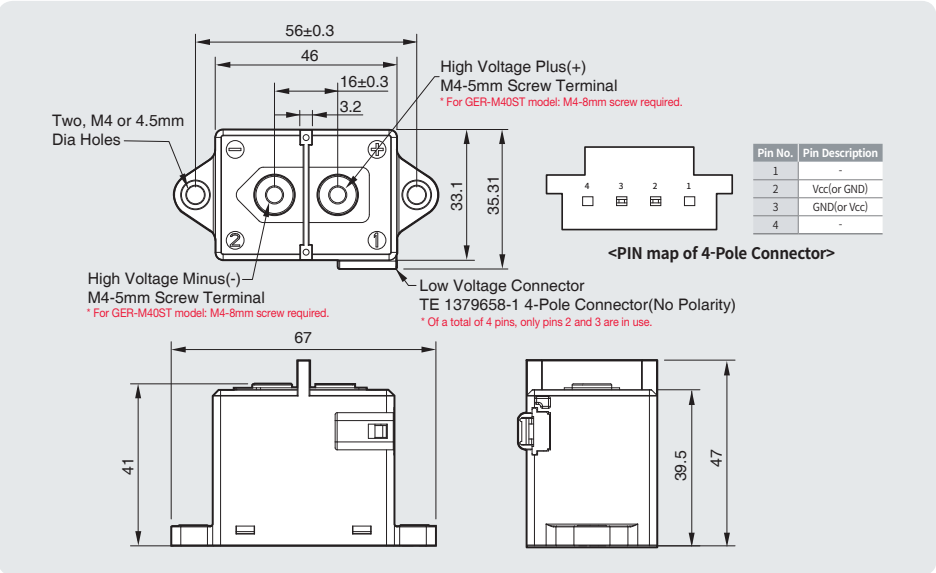
Coil Terminal Accessory



Housing: 1379658-1	Terminal: 1123343-1	Accessory(Not included)
 - Connector Style = Receptacle - Contact Type = Tab - Receptacle Configuration =025	 - Contact Type = Receptacle - Applies To Wire/Cable - Wire/Cable Type = Discrete Wire - Wire Range = 0.20-0.602 [24-20] mm [AWG]	 Components - Main Terminal Accessory: 1EA - Flange Bolt M4-4: 2EA - Wire Length: 300mm

Dimensions

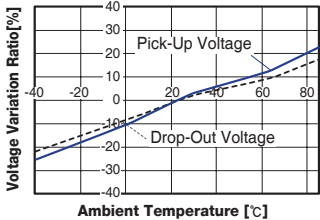
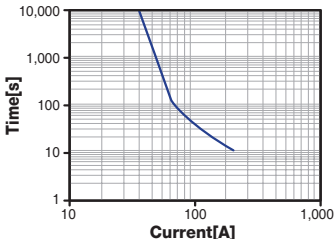
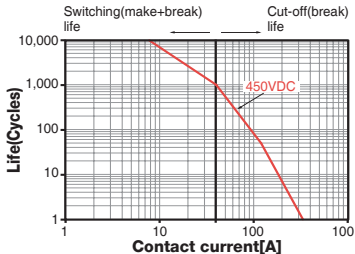
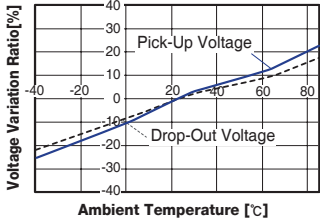
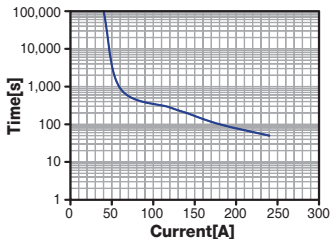
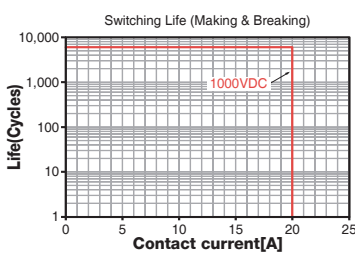
(Unit : mm)



General Tolerance

- Less than 10: ±0.3
- 10~50: ±0.5
- More than: ±0.8

Engineering Data

	Operating Voltage Characteristic	I-T Curve	Switching Life / Cut-off Curves
GER-40ST			
GER-M40ST			

Coil Terminal Accessory



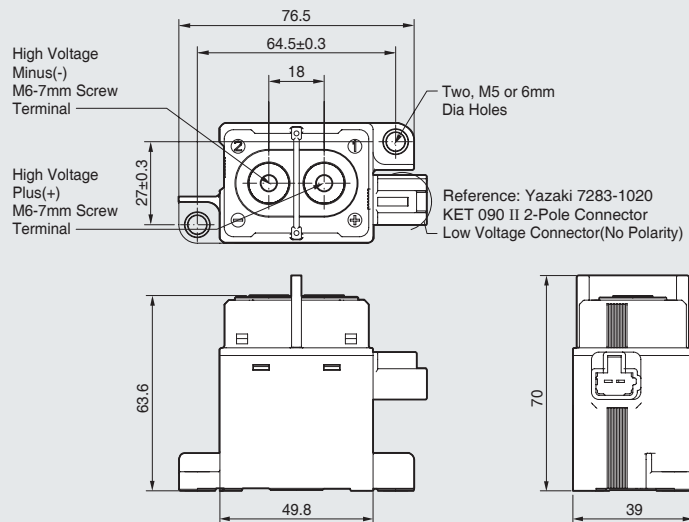
Housing: MG651026(L)			Terminal: ST730675-3		Accessory(Not included)
Part No.	Wire Range		Tab Thick	Material	
	AWG	mm ²		Thick	Finish
ST730675-3	20	AVSS(CAVS) 0.5	0.64	0.25	Copper Alloy Pre-Tin

Components

- Main Terminal Accessory: 1EA
- Flange Bolt M6-7: 2EA
- Wire Length: 300mm

Dimensions

(Unit : mm)



General Tolerance

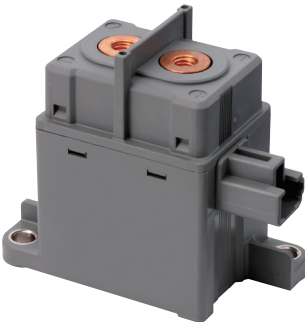
- Less than 10: ±0.3
- 10~50: ±0.5
- More than: ±0.8

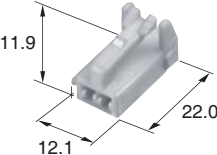
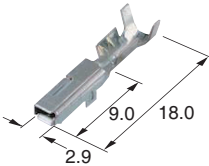
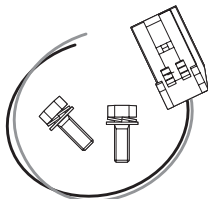
Engineering Data

	Operating Voltage Characteristic	I-T Curve	Switching Life / Cut-off Curves
GER-100ST			
GER-M100ST			

GER-150ST / GER-M150ST

Coil Terminal Accessory

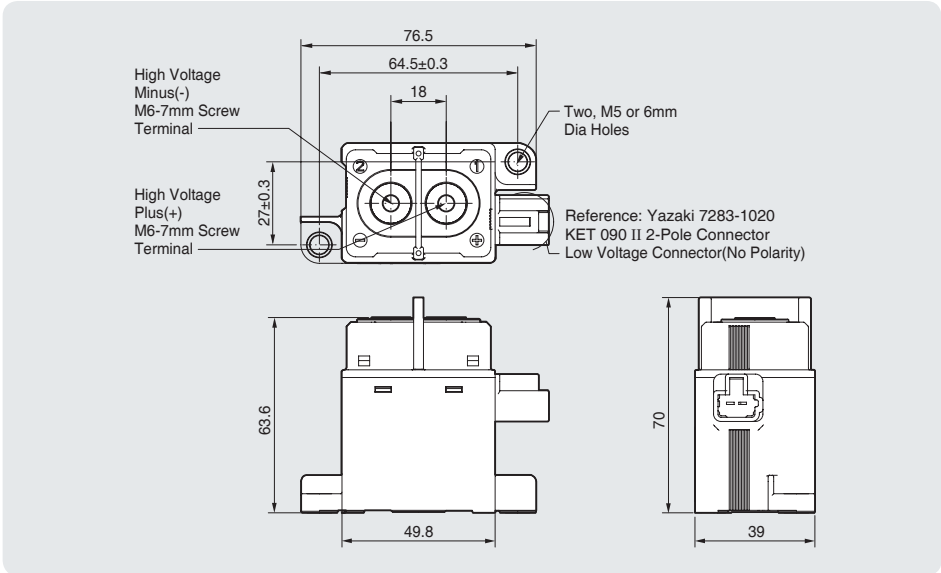


Housing: MG651026(L)			Terminal: ST730675-3		Accessory(Not included)	
						
Part No.	Wire Range		Tab Thick	Material		
	AWG	mm ²		Thick	Finish	
ST730675-3	20	AVSS(CAVS) 0.5	0.64	0.25	Copper Alloy Pre-Tin	

- Components**
- Main Terminal Accessory: 1EA
 - Flange Bolt M6-7: 2EA
 - Wire Length: 300mm

Dimensions

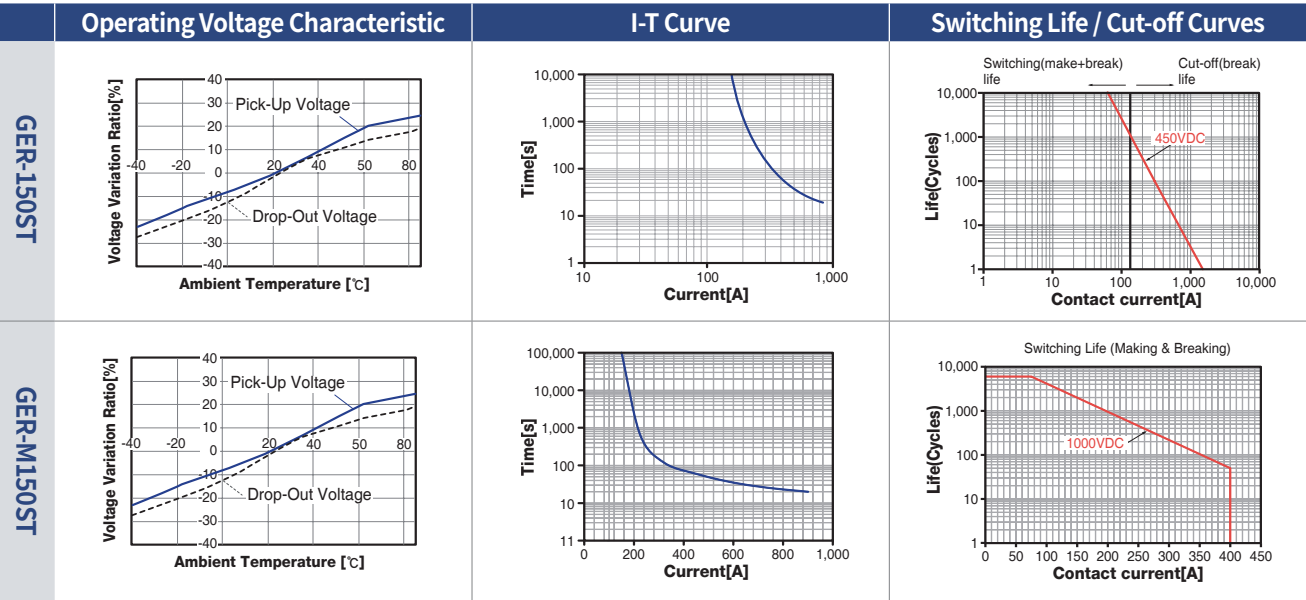
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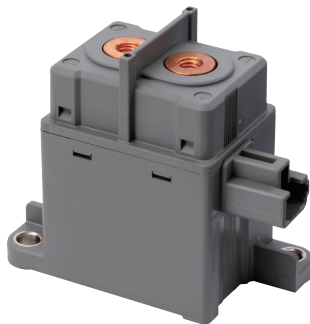
General Tolerance

- Less than 10: ±0.3
- 10~50: ±0.5
- More than: ±0.8

Engineering Data



Coil Terminal Accessory

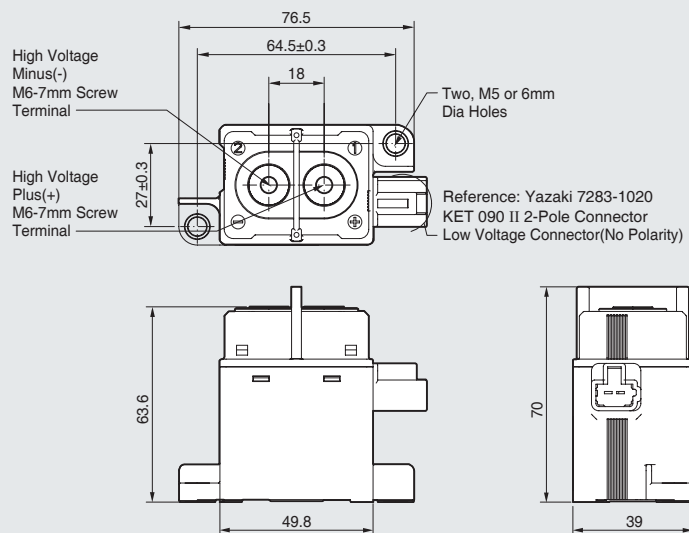


Housing: MG651026(L)			Terminal: ST730675-3		Accessory(Not included)
Part No.	Wire Range		Tab Thick	Material	
	AWG	mm ²		Thick	Finish
ST730675-3	20	AVSS(CAVS) 0.5	0.64	0.25	Copper Alloy Pre-Tin

- Components**
- Main Terminal Accessory: 1EA
 - Flange Bolt M6-7: 2EA
 - Wire Length: 300mm

Dimensions

(Unit : mm)



General Tolerance

- Less than 10: ±0.3
- 10~50: ±0.5
- More than: ±0.8

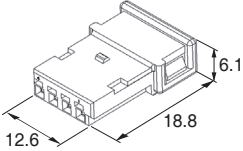
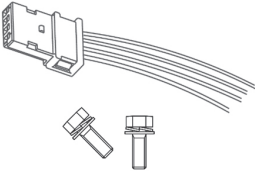
Engineering Data

	Operating Voltage Characteristic	I-T Curve	Switching Life / Cut-off Curves
GER-200ST			

GER-200ST SLIM

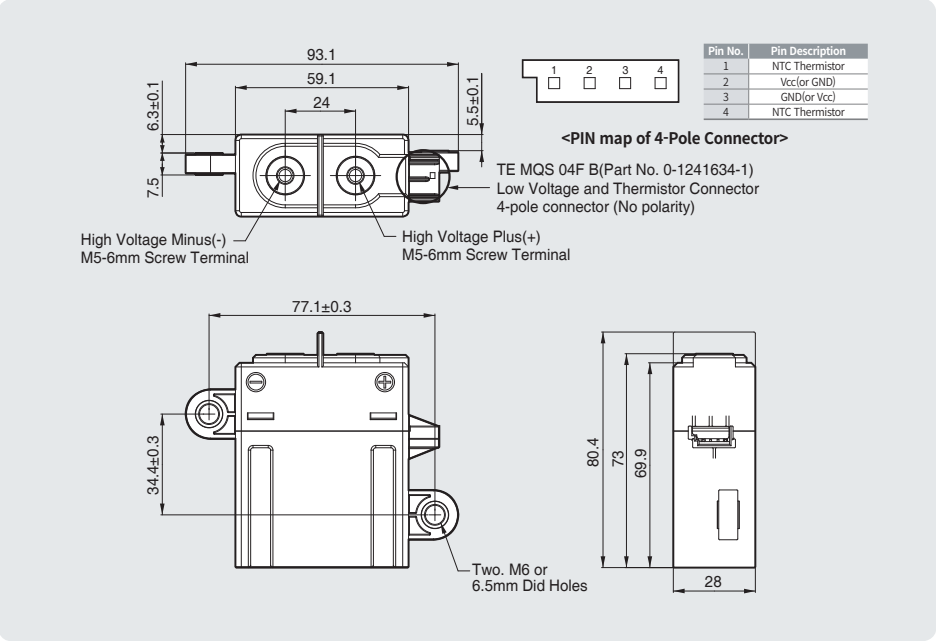
Coil Terminal Accessory



Housing: 0-1241634-1			Terminal: 5-928999-1		Accessory(Not included)	
						
Part No.	Wire Range		Tab Thick	Material		Components
	AWG	mm ²		Thick	Finish	
0-1241634-1	24-22	AVSS(CAVS) 0.3	0.63	0.14	Copper Alloy Pre-Tin	• Main Terminal Accessory: 1EA • Flange Bolt M5-6: 2EA • Wire Length: 300mm

Dimensions

(Unit : mm)



General Tolerance

- Less than 10: ± 0.3
- 10~50: ± 0.5
- More than: ± 0.8



Coil Terminal Accessory

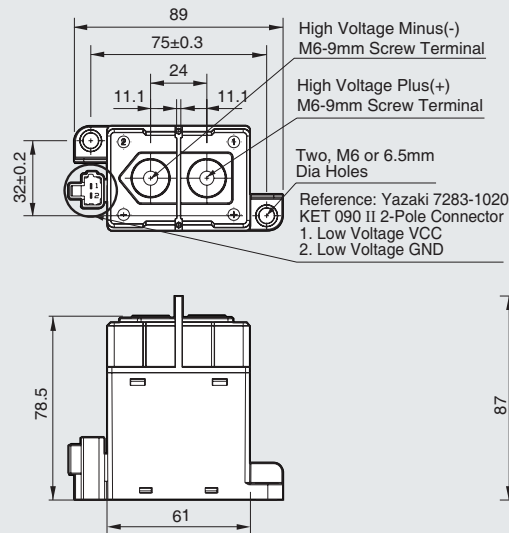


Housing: MG651026(L)			Terminal: ST730675-3		Accessory(Not included)
Part No.	Wire Range		Tab Thick	Material	
	AWG	mm ²		Thick	Finish
ST730675-3	20	AVSS(CAVS) 0.5	0.64	0.25	Copper Alloy Pre-Tin

- Components**
- Main Terminal Accessory: 1EA
 - Flange Bolt M6-9: 2EA
 - Wire Length: 300mm

Dimensions

(Unit : mm)



General Tolerance

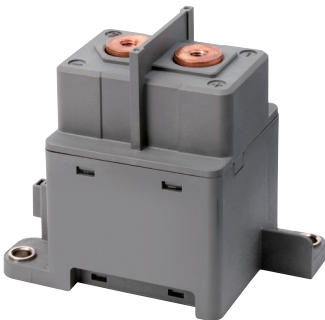
- Less than 10: ± 0.3
- 10~50: ± 0.5
- More than: ± 0.8

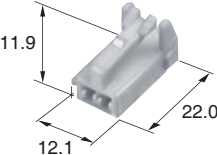
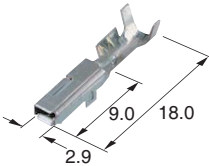
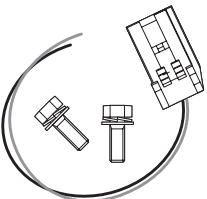
Engineering Data

	Operating Voltage Characteristic	I-T Curve	Switching Life / Cut-off Curves
GER-250ST			
GER-M250ST			

GER-400ST / GER-M400ST

Coil Terminal Accessory

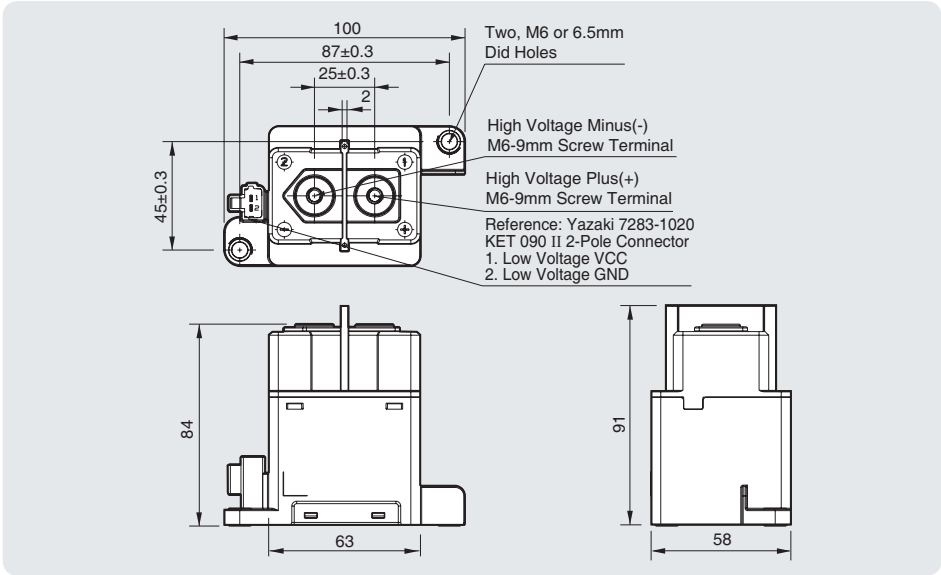


Housing: MG651026(L)			Terminal: ST730675-3		Accessory(Not included)	
						
Part No.	Wire Range		Tab Thick	Material		
	AWG	mm ²		Thick	Finish	
ST730675-3	20	AVSS(CAVS) 0.5	0.64	0.25	Copper Alloy Pre-Tin	

- Components**
- Main Terminal Accessory: 1EA
 - Flange Bolt M6-9: 2EA
 - Wire Length: 300mm

Dimensions

(Unit : mm)



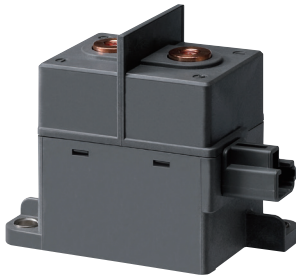
General Tolerance

- Less than 10: ±0.3
- 10~50: ±0.5
- More than: ±0.8

Engineering Data

	Operating Voltage Characteristic	I-T Curve	Switching Life / Cut-off Curves
GER-400ST			
GER-M400ST			

Coil Terminal Accessory



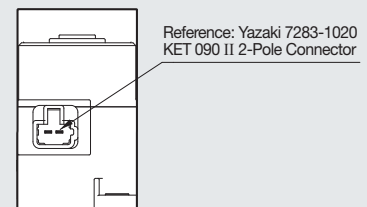
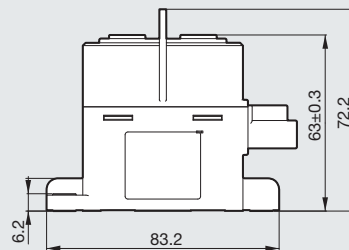
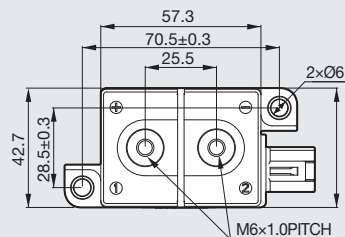
Housing: MG651026(L)			Terminal: ST730675-3		Accessory(Not included)
Part No.	Wire Range		Tab Thick	Material	
	AWG	mm ²		Thick	Finish
ST730675-3	20	AVSS(CAVS) 0.5	0.64	0.25	Copper Alloy Pre-Tin

Components

- Main Terminal Accessory: 1EA
- Flange Bolt M6-7: 2EA
- Wire Length: 300mm

Dimensions

(Unit : mm)



General Tolerance

- Less than 10: ±0.3
- 10~50: ±0.5
- More than: ±0.8

Engineering Data

GER-M300ST G2	Operating Voltage Characteristic	I-T Curve
	Operating voltage data Y-axis: Voltage(V) from 0.0 to 12.0 X-axis: Temperature(°C) from -40°C to 85°C Pick-up voltage(V) (blue line) Drop-out voltage(V) (orange line)	Y-axis: Time(S) on log scale from 0.001 to 100000 X-axis: Contact current[A] on log scale from 100 to 10000 Regions: Normal prearation region, Contact welding region, Repulsion region, Fuse protection area, Contact + Fuse protection area

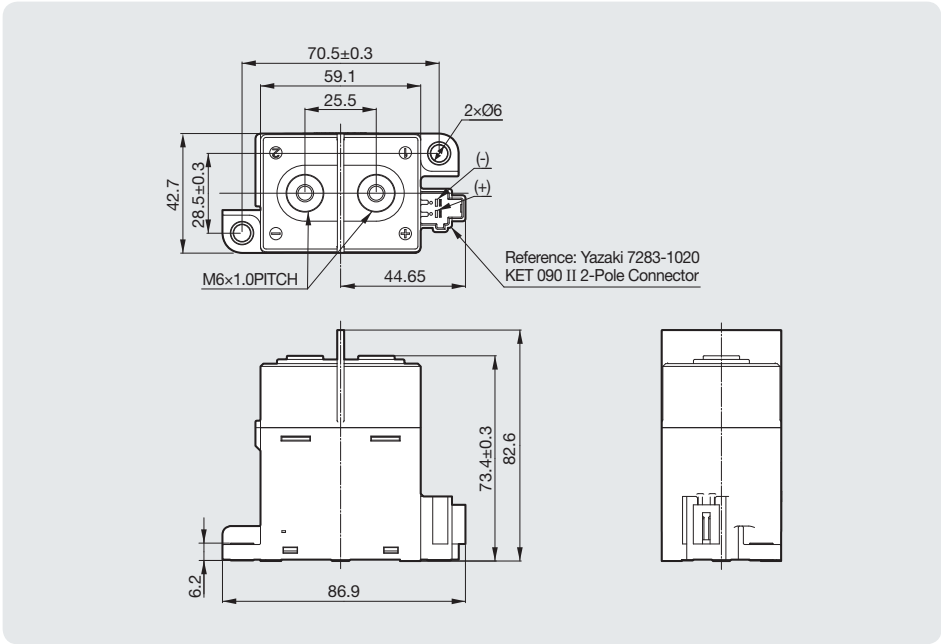
Coil Terminal Accessory



Housing: MG651026(L)			Terminal: ST730675-3			Accessory(Not included)
Part No.	Wire Range		Tab Thick	Material		Components
	AWG	mm²		Thick	Finish	
ST730675-3	20	AVSS(CAVS) 0.5	0.64	0.25	Copper Alloy Pre-Tin	• Main Terminal Accessory: 1EA • Flange Bolt M6-7: 2EA • Wire Length: 300mm

Dimensions

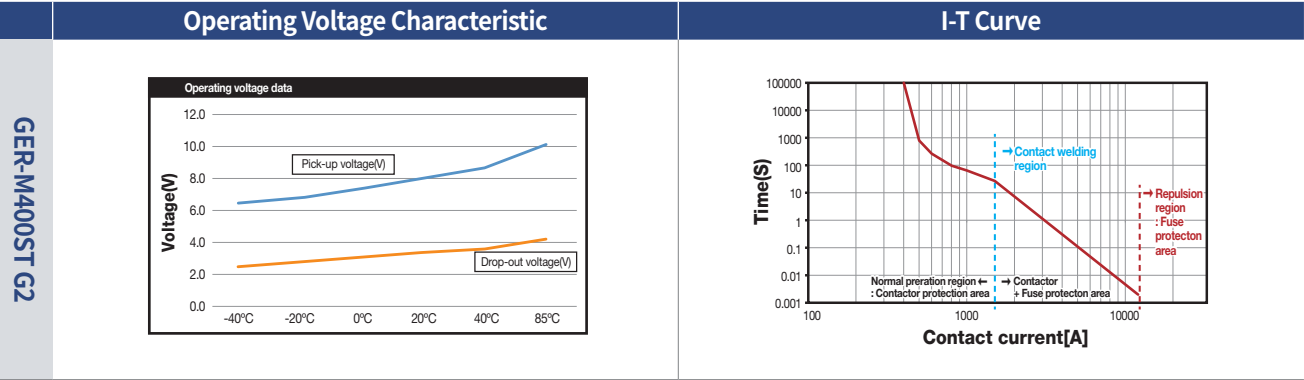
(Unit : mm)



General Tolerance

- Less than 10: ±0.3
- 10~50: ±0.5
- More than: ±0.8

Engineering Data



Precautions

Application Notes

Specification Range

- Please use the product in accordance with the specification range above (E.g, coil rating, mounting information). Otherwise, the product may overheat or malfunction.

Installation & Maintenance

- Do not touch the Relay when power is connected to the main contact to avoid being injured from electric shock.
Power must be disconnected from the Relay when troubleshooting, installing and maintaining.

Connection

- Faulty connection may cause malfunction, overheating and/or fire.

Fail-Safe

- When checking for the Relay's functionality, be prepared with a fail-safe measure. Relays that are jammed or welded may be dangerous to operate.

Polarity

- Relays have polarity. Check the polarity indicated on the housing when connecting the Relay. The electrical durability is not guaranteed when the Relay is connected to the opposite pole.

Magnetism

- If the relays are in close contact with each other, or are installed close to strong magnetic parts such as a motor or a speaker, their operating characteristics may change, or it may cause malfunction. Therefore, check the influence of magnetic effects during the actual installation.

Vibration / Shock

- To maintain initial performance, do not use relays affected by physical shock or drop the relay. Do not use the relays that were dropped. Use shock absorbers during transportation.
- The relay is designed not to be separated under normal use conditions. To maintain initial performance, do not disassemble the housing. If the housing is removed, the relay performance would no longer be guaranteed.

Temperature

- Condensation may occur at the contact area of the Relay when used at below 0°C environment or when there's a volatility in temperature change, which could hinder the movement inside the Relay.
- Consecutive operation of the Relays could cause the coil to heat up, which may cause an increase in operating voltage.

Coil Voltage

- Applying coil voltage slowly could cause malfunction in the Relay. Therefore, apply the coil voltage quickly.

Precautions

Application Notes

Mounting Conditions

- If the Relay is exposed to heat, humidity or organic/sulphide gas for a prolonged period of time (even during transit), sulfide or oxide film could form on the surface of the contact area, which could cause malfunction. Therefore, be sure to check the inventory and transportation environment conditions mentioned above.
- Do not use the product in an environment where the main terminals may be exposed to foreign substances such as organic solvents (i.e. alcohol, benzene, or thinner) or strong alkaline substance (i.e. ammonia, caustic soda). It may cause the terminal to heat up.
- Also, please note that this product is not waterproof, and therefore, is not guaranteed for water damages.
- Relays can be assembled in forward and 90-degree rotation but cannot be assembled in 180-degree rotation.

Additional Information

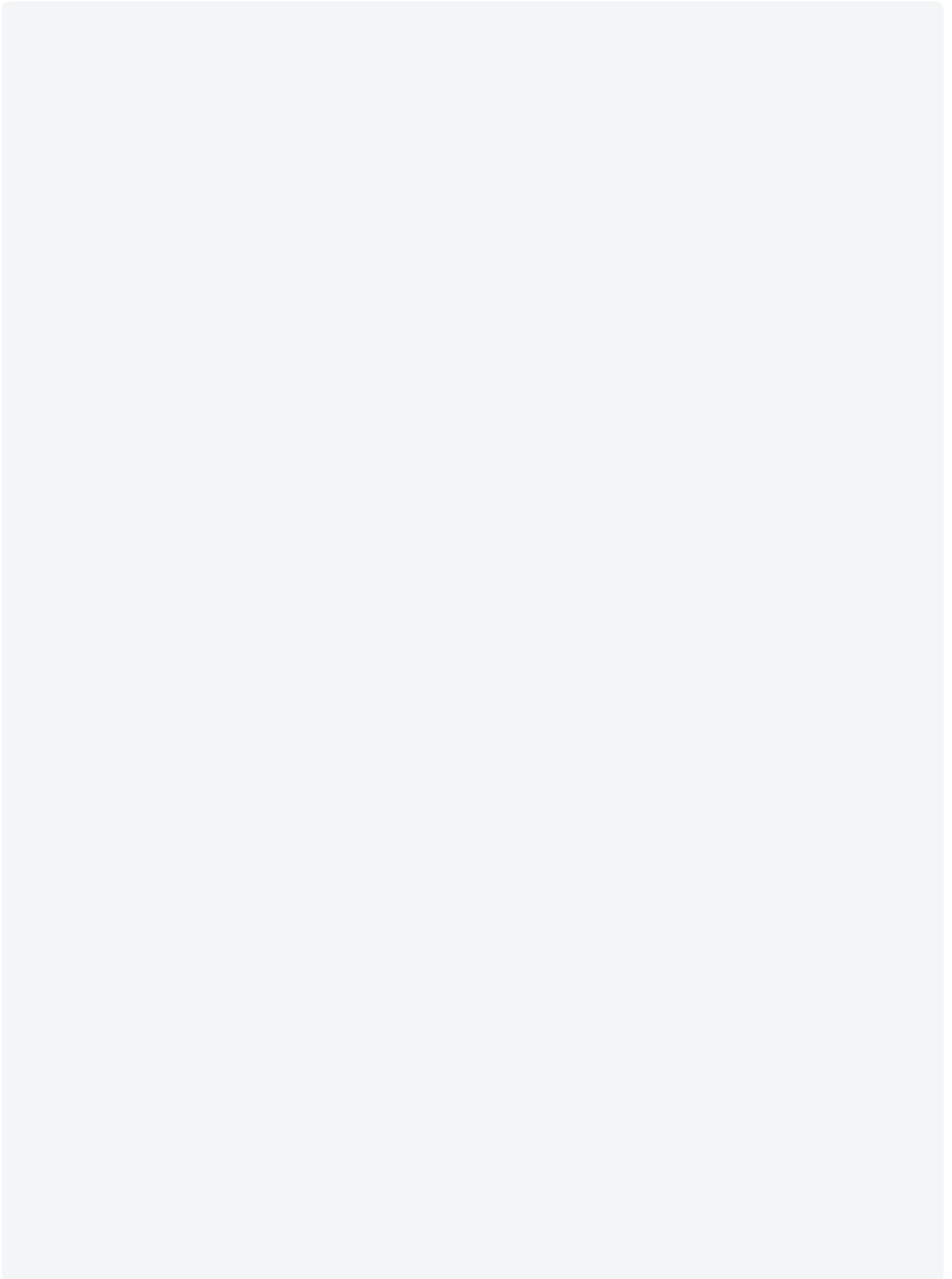
- The reverse surge voltage generated by the coil of the relay may cause burnout of the load element. Therefore, take measures to prevent reverse surge voltage. Do not use DIODE because it could delay the operation time, and could also degrade electrical performance.
- When using a capacitive load (C-load), we recommend applying a precharge circuit so that the inrush current does not exceed the rated current.
- Electrical performance has been verified without L load, so the electrical life could be shortened if you use L load.
- When checking the conduction of the main contact, apply the minimum voltage (DC24V) and current (1A) to the main contact.
- To check the auxiliary contact conduction, apply DC5V 1mA ~ DC30V 100mA.

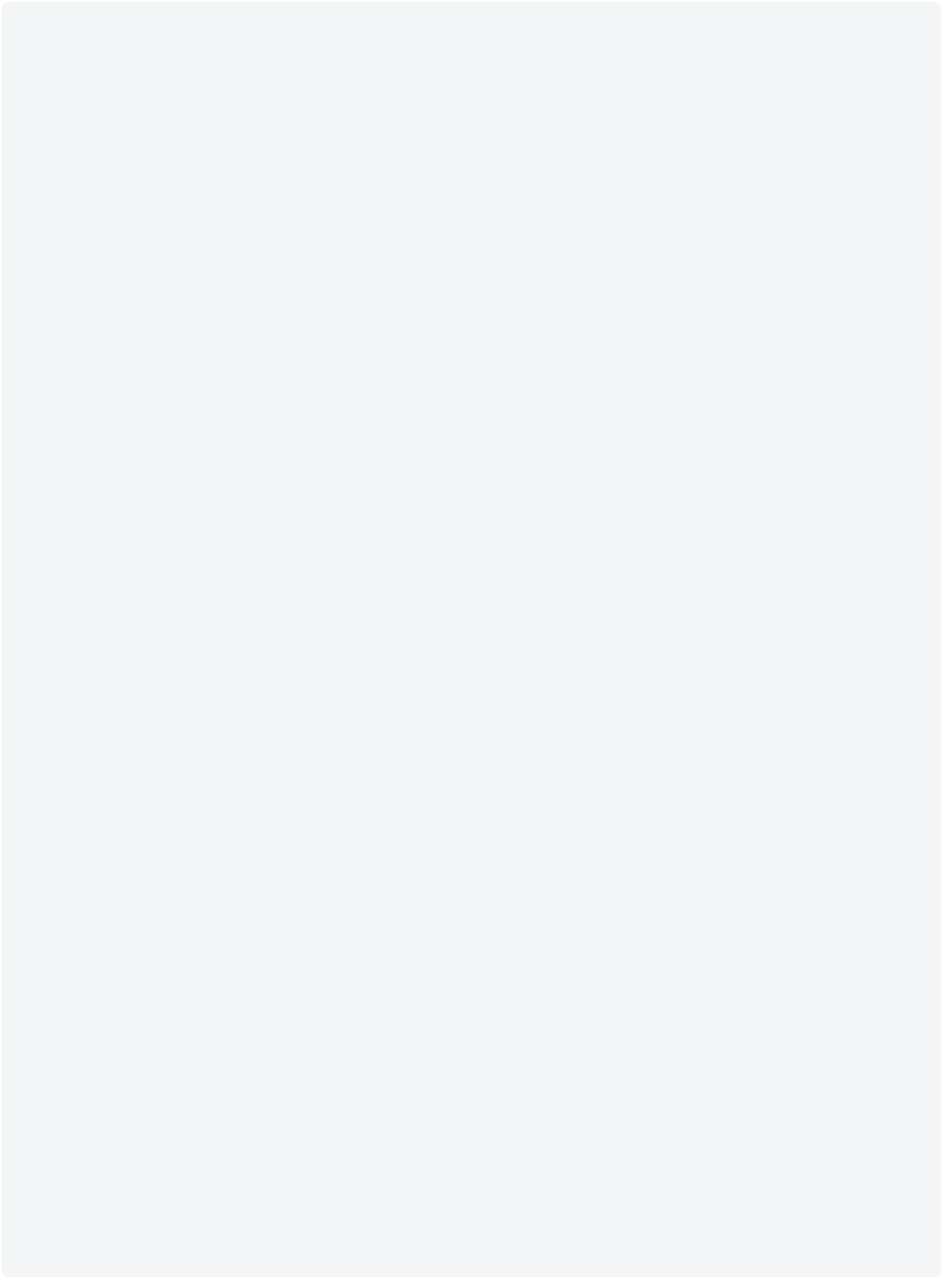
Warranty

LS e-Mobility Solutions ("Seller") guarantees that the product shall be free from any defect in material and workmanship, and shall provide warranty for a period of twenty four (24) months counted from the manufacturing date of the product. When a product failure is determined to be at the Seller's fault, the extent of the Seller's liability under this warranty shall be limited to the repair and/or complete replacement of the product at the Seller's expense. The Seller's obligation to the warranty is contingent upon the receipt of a written service request which must include the description of the defect with sufficient evidence. The service request must be submitted within seven (7) days counted from the date when defect was found.

Notwithstanding the foregoing, the warranty above shall lose effect immediately if the products have been determined to have been subjected to misuse, abuse, negligence, improper installation, improper maintenance, improper transportation or handling, accident, alteration or unauthorized design change, or if the original name, serial number and/or identification markings have been defaced, altered or removed.

Under any circumstance, LS e-Mobility Solutions shall not have any other obligations, guaranties, conditions or liabilities, express or implied arising by law or otherwise (including, without limitation, any obligation of LS e-Mobility Solutions with respect to consequential damages) and whether or not occasioned by LS e-Mobility Solutions' negligence, than the above statement and shall not be extended, altered or varied.







Safety Instructions

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

LS e-Mobility Solutions

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