

Electric Vehicle Relay

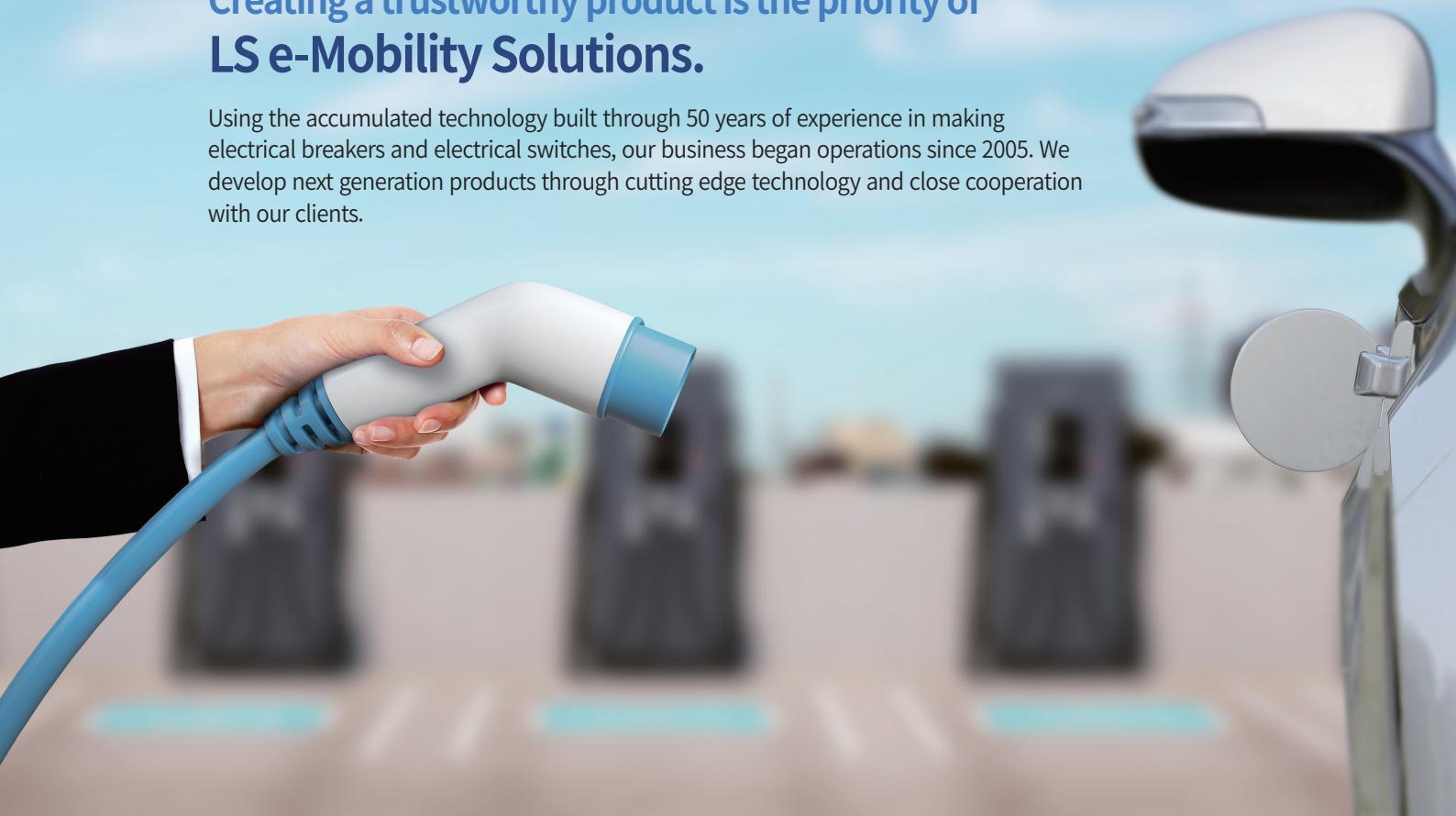


LS e-Mobility Solutions

Features

Creating a trustworthy product is the priority of LS e-Mobility Solutions.

Using the accumulated technology built through 50 years of experience in making electrical breakers and electrical switches, our business began operations since 2005. We develop next generation products through cutting edge technology and close cooperation with our clients.



What is a LS EV Relay?

EV Relays are a essential part of electric vehicles and is placed between the battery and the inverter. EV Relays play the role of turning the batteries ON and OFF based on the instructions of the BMS while also turning external chargers ON and OFF. In short, it has a role in all aspects that involve a DC load.

EV Relays are the only vehicle parts among high voltage parts(above DC 450V) that operates mechanically. Thus, durability and quality control is of paramount importance since it is placed under great stress in a short amount of time due to high electrical currents and abnormal electrical currents. Our EV Relays have proven their strengths by maintaining long term business deals with a myriad of global vehicle companies.

Characteristics of LS EV Relay



Compact design



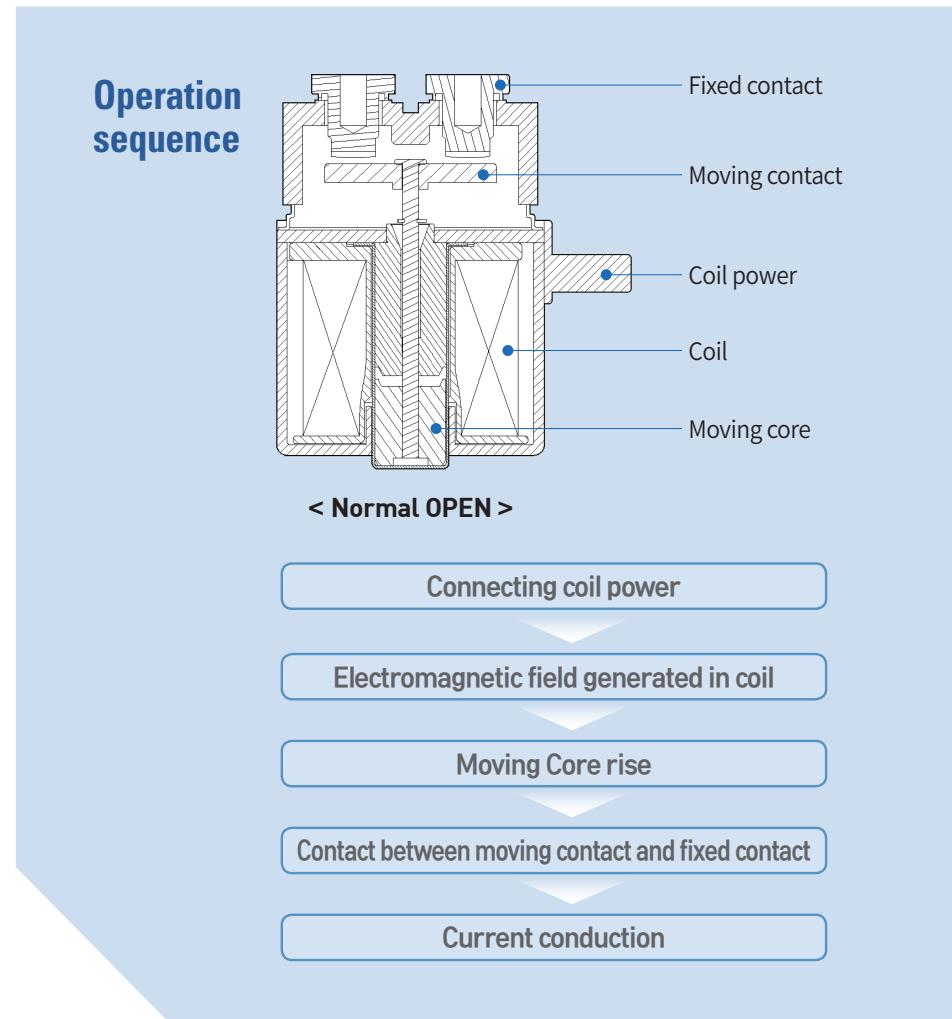
Proven safety



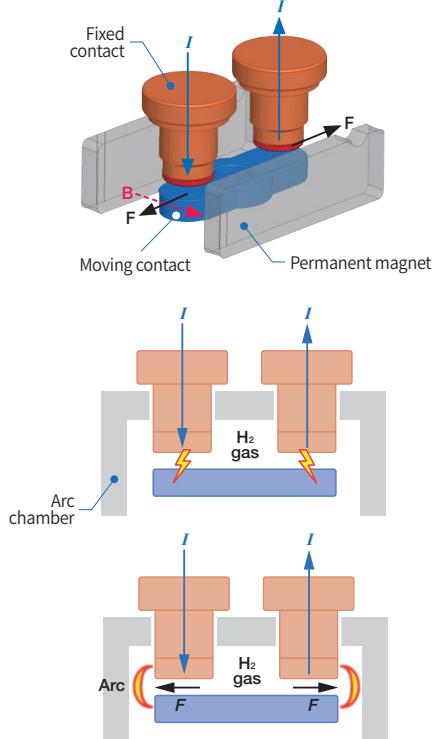
Superior reliability



Customizable



Arc quenching



When contacts are separated, an arc is generated between contacts

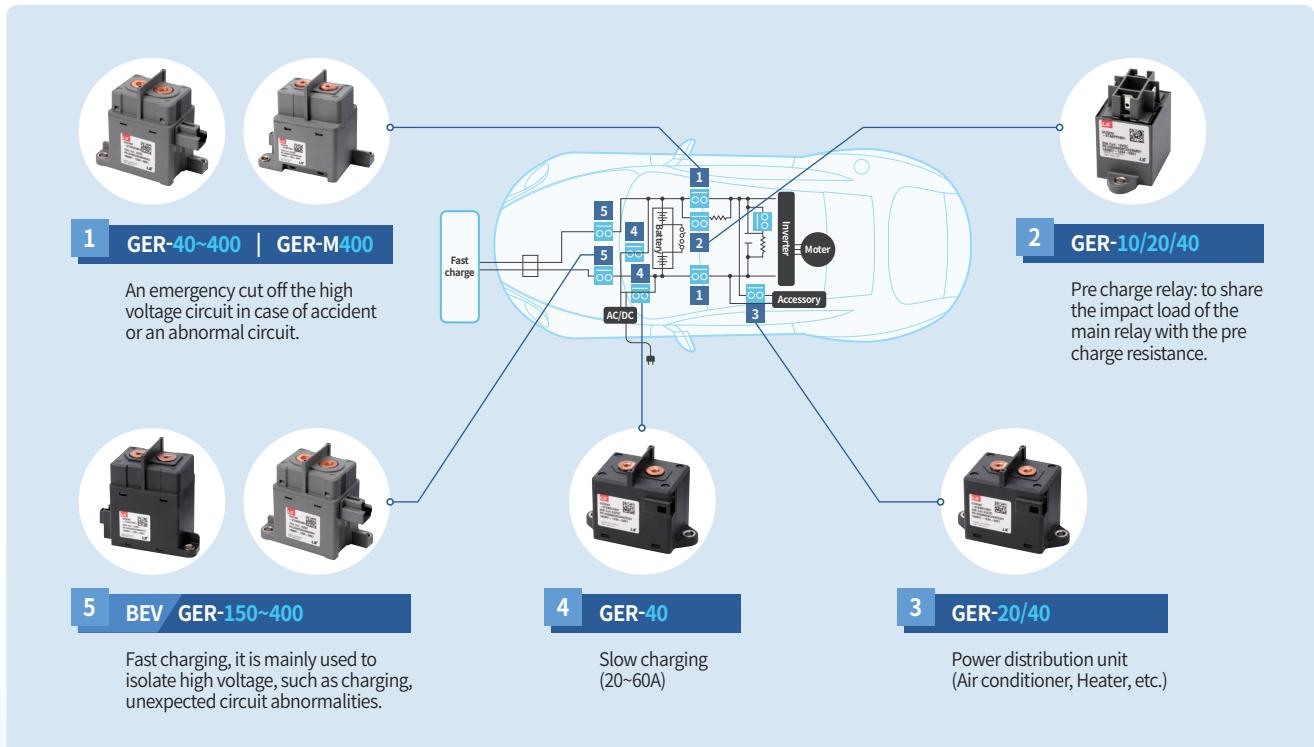
Due to magnetic field by permanent magnet, the arc can move toward the arc chamber by Fleming's left-hand law.

The arc would be quickly cooled and quickly quenched by H₂ gas.

Minimized contact damage by reducing arc quenching duration

Field of application

Electric vehicle field



Small electric mobile battery field

Electric bicycle



Electric scooter



Electric wheel



Electric segway



Electric skate



Electric kickboard



Drone



Golf cart



AGV



Industrial renewable energy field



Ordering information

Electric Vehicle Relay

Ordering information

GER-M10ST DC24V SM G2

1 2 3

4

5

6

① Operating voltage

Blank	450V
-M	450~1000V

② Conventional thermal current

10	10A
20	20A
40	40A

③ Customer

ST	Standard
00	Customer name

④ Control voltage

DC12V	DC12V
DC24V	DC24V

⑤ Mounting type

Blank	Bottom mounting
SM	Side mounting

⑥ Type or characteristics

Blank	None
SL	SLIM
G2	2nd generation
CN	China
BF	Black frame



Specifications



EV Relay Specifications

Model		GER-10ST	GER-20ST	GER-40ST
Width×Height×Depth (mm)		56×45×28	56×45×28	67×47×35
Characteristics	Item	Specifications		
Contact	Contact form	SPST-NO		
	Contact structure	Double break, Single		
	Contact voltage drop (initial)	0.5V at 10A		0.2V at 20A
	Short-time current (Over current)	10A (continuously 2mm ²) 15A (2min 2mm ²) 30A (30sec 2mm ²)	20A (continuously 2.5mm ²) 30A (2min 2.5mm ²) 40A (15min 2.5mm ²)	40A (continuously 10mm ²) 60A (15min 10mm ²) 100A (2min 10mm ²)
	Max. Cut-off current	N/A	N/A	400A at 450VDC (1cycle)
	Reverse direction cut-off	N/A	N/A	-40A 200VDC (1,000 cycles at 20 CPM)
	Switch-off life	N/A	N/A	120A at 450VDC (100 cycle)
Coil	Rated voltage	12VDC	12VDC	12VDC, 24VDC
	Pick-up voltage (at 20°C)	Max. 9VDC	Max. 9VDC	Max. 9VDC, 18VDC
	Drop-out voltage (at 20°C)	Min. 1.2VDC	Min. 1.2VDC	Min. 1.2VDC, 2.4VDC
	Coil resistance (at 20°C)	60.8Ω ± 10%	60.8Ω	49.3Ω, 205Ω
	Max power consumption	2.5W (at 12VDC)	3.0W (at 12VDC)	3.2W (at 12/24VDC)
	Max. Allowable voltage	16VDC	16VDC	16VDC, 32VDC
Electrical characteristics	Operating time (at 20°C)	Max. 50ms	Max. 50ms	Max. 50ms
	Release time (at 20°C)	Max. 30ms	Max. 30ms	Max. 30ms
	Insulation resistance (Initial)	Between coil and contacts		Min. 1,000MΩ (at 500VDC)
		Between contacts of the same polarity		
	Dielectric strength (initial)	Between coil and contacts		2,500Vrms/sec (Detection Current: 10mA)
		Between contacts of the same polarity		
Mechanical characteristics	Shock resistance	Functional Destroyive	196m/s ² (20G) [Relay On: 11ms half sine] 490m/s ² (50G) [Relay On: 9ms half sine wave]	
	Vibration resistance	Functional Destroyive	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. 150,000ops (at 60CPM)	
			10A, 450VDC 150,000cycles (at 6CPM)	
Expected life	Mechanical	Min. 150,000ops (at 60CPM)	Min. 150,000ops (at 60CPM)	Min. 200,000ops (at 60CPM)
	Electrical (Resistive load)	N/A	N/A	40A, 450VDC 1,000cycles (at 20CPM)
				N/A
Ambient operating temp.		-40 ~ 85°C		
Ambient operating humidity		5 ~ 95%R.H.		
Tightening torque	Mounting EV Relay	(M4): 1.8 to 2.7 N·m	(M4): 1.8 to 2.7 N·m	(M4): 1.8 to 2.7 N·m
	Main terminal	N/A	N/A	(M4): 2.0N·m
Weight (g)		80	85	145
Option		N/A	N/A	N/A



	GER-100ST	GER-150ST	GER-200ST	GER-250ST	GER-400ST
	81×70×39	81×70×39	81×70×39	92×87×45	100×91×58
Specifications					
SPST-NO					
Double break, Single					
	0.04V at 20A	0.04V at 20A	0.02V at 20A	0.02V at 20A	0.02V at 20A
	100A (continuously 35mm ²)	150A (continuously 50mm ²)	200A (continuously 50mm ²)	250A (continuously 100mm ²)	400A (continuously 150mm ²)
	150A (15min 35mm ²)	225A (15min 50mm ²)	300A (2min 50mm ²)	350A (15min 100mm ²)	600A (15min 150mm ²)
	225A (2min 35mm ²)	320A (2min 50mm ²)	400A (500sec 50mm ²)	500A (2min 100mm ²)	900A (2min 150mm ²)
	1,000A at 450VDC (1cycle)	1,500A at 450VDC (1cycle)	1,500A at 450VDC (1cycle)	2,500A at 450VDC (1cycle)	3,200A at 450VDC (1cycle)
	-100A 200VDC (1,000 cycles at 20 CPM)	-150A 200VDC (500 cycles at 20 CPM)	-150A 200VDC (500 cycles at 20 CPM)	-250A 200VDC (100 cycles at 6 CPM)	-400A 200VDC (1,000 cycles at 1 CPM)
	200A 450VDC (100 cycles)	300A 450VDC (100 cycles at 1 CPM)	300A 450VDC (100 cycles at 1 CPM)	400A 450VDC (100 cycles at 1 CPM)	800A 450VDC (200 cycles at 1 CPM)
	12VDC	12VDC	12VDC	12VDC, 24VDC	12VDC, 24VDC
	Max. 9VDC	Max. 9VDC	Max. 8VDC	Max. 9VDC, 18VDC	Max. 9VDC, 18VDC
	Min. 1.2VDC	Min. 1.2VDC	Min. 1.2VDC	Min. 1.2VDC, 2.4VDC	Min. 1.2VDC, 2.4VDC
	23.5Ω		23.5Ω	38.9Ω, 157Ω	38.2Ω, 152.8Ω
	6.5W (at 12VDC)		6.5W (at 12VDC)	4W (*inrush current: 2.9/1.25A for 12/24V)	4W (*inrush current: 4.2/2.1A for 12/24V)
	16VDC	16VDC	16VDC	16VDC, 32VDC	16VDC, 32VDC
	Max. 50ms	Max. 50ms	Max. 50ms	Max. 30ms	Max. 30ms
	Max. 30ms	Max. 30ms	Max. 30ms	Max. 10ms	Max. 10ms
Min. 1,000MΩ (at 500VDC)					
2,500Vrms/sec (Detection Current: 10mA)					
196m/s ² (20G) [Relay On: 11ms half sine] 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. 200,000ops (at 60CPM)	Min. 200,000ops (at 60CPM)	Min. 200,000ops (at 60CPM)	Min. 200,000ops (at 60CPM)	Min. 200,000ops (at 60CPM)	Min. 200,000ops (at 60CPM)
100A, 450VDC, 1,000ops. (at 20CPM)	150A, 450VDC, 1,000ops. (at 20CPM)	200A 450V 1,000ops (at 6cpm)	250A, 450VDC, 1,000ops. (at 6CPM)	400A, 450VDC, 1,000ops. (at 6CPM)	
40A, 450VDC, 20,000ops. (at 20CPM)	15A, 450VDC, 50,000ops. (at 20CPM)	240A 50V 75,000ops (at 6cpm)	100A, 450VDC, 10,000ops. (at 6CPM)	200A, 450VDC, 3,000ops. (at 12CPM)	
-40 ~ 85°C					
5 ~ 95%R.H.					
(M5): 3 to 4 N·m	(M5): 3 to 4 N·m	(M5): 3 to 4 N·m	(M6): 6 to 8 N·m	(M6): 6 to 8 N·m	
[M6]: 3 to 4N·m	[M6]: 3.5 to 4.5N·m	[M6]: 3.5 to 4.5N·m	(M6): 4 to 4.5 N·m	(M6): 6 to 8 N·m	
330	380	326	500	700	
N/A	BUS BAR Type, Side Mounting Type	BUS BAR Type, Side Mounting Type	Side Mounting Type	N/A	

Specifications



EV Relay Specifications

Model		GER-M300ST G2	GER-M400ST G2
Width×Height×Depth (mm)		83.2×72.2×42.7	86.9×73.4×42.7
Characteristics	Item	Specifications	
Contact	Contact form	SPST-NO	
	Contact structure	Double break, Single	
	Contact voltage drop (initial)	0.02V at 20A	0.02V at 20A
	Short-time current (Over current)	300A (continuously 75mm ²) 500A (340s 75mm ²) 600A (165s 75mm ²)	- - -
	Max. Cut-off current	800A at 800VDC (1cycle) 1800A at 500VDC (1cycle)	1300A at 800VDC (1cycle) 2000A at 500VDC (1cycle)
	Reverse direction cut-off	-1800A at 500VDC (1cycle)	-2000A at 500VDC (1cycle)
	Switch-off life	250A, 500VDC, 100ops. (at 6CPM)	400A, 500VDC, 100ops. (at 6CPM)
Coil	Rated voltage	12VDC, 24VDC	12VDC
	Pick-up voltage (at 20°C)	Max. 9VDC	Max. 9VDC
	Drop-out voltage (at 20°C)	Min. 1.2VDC	Min. 1.2VDC
	Coil resistance (at 20°C)	20.5Ω, 80.9Ω	33.7Ω
	Max power consumption	7.5W (at 12VDC)	5W (*inrush current: 2.0A/ for 12V)
	Max. Allowable voltage	16VDC	16VDC
Electrical characteristics	Operating time (at 20°C)	Max. 50ms	Max. 30ms
	Release time (at 20°C)	Max. 30ms	Max. 10ms
	Insulation resistance (Initial)	Between coil and contacts Between contacts of the same polarity	
		Min. 100MΩ (at 1,000VDC)	
	Dielectric strength (initial)	Between coil and contacts Between contacts of the same polarity	
		2,500Vrms/sec (Detection Current: 10mA)	
Mechanical characteristics	Shock resistance	Functional 490m/s ² (50G) [Relay On: 9ms half sine wave]	196m/s ² (20G) [Relay On: 11ms half sine]
	Vibration resistance	Functional 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]
	Mechanical	Min. 200,000ops (at 60CPM)	Min. 200,000ops (at 60CPM)
	Electrical (Resistive load)	250A, 500VDC, 100ops. (at 6CPM)	400A, 500VDC, 100ops. (at 6CPM)
Expected life		N / A	N / A
Ambient operating temp.		-40 ~ 85°C	
Ambient operating humidity		5 ~ 95%R.H.	
Tightening torque	Mounting EV Relay	(M5): 3 to 4 N · m	(M5): 3 to 4 N · m
	Main terminal	[M6]: 3.5 to 4.5N · m, 9.0 to 10.0N · m, 3Time, 100rpm	[M6]: 3.5 to 4.5N · m, 9.0 to 10.0N · m, 3Time, 100rpm
Weight (g)		420	-
Option		Side Mounting Type	3 Coil Type

Coil rating / Connection and mounting

Electric Vehicle Relay

Coil rating

Model	Rated voltage	Pick-up voltage (at 20°C)	Drop-out voltage (at 20°C)	Power consumption	Max. Allowable voltage
GER10-ST	12VDC	Max. 9VDC	Min. 1.2VDC	2.5W (at 12VDC)	16VDC
GER20-ST				3.0W (at 12VDC)	
GER40-ST	12VDC, 24VDC	Max. 9VDC, 18VDC	Min. 1.2VDC, 2.4VDC	3.2W (at 12/24VDC)	16VDC, 32VDC
GER100-ST	12VDC	Max. 9VDC	Min. 1.2VDC	6.5W (at 12VDC)	16VDC
GER150-ST		Max. 9VDC			
GER200-ST		Max. 8VDC			
GER250-ST	12VDC, 24VDC	Max. 9VDC, 18VDC	Min. 1.2VDC, 2.4VDC	4W (*inrush current: 2.9/1.25A for 12/24V)	16VDC, 32VDC
GER400-ST				4W (*inrush current: 4.2/2.1A for 12/24V)	
GER-M300ST G2	12VDC	Max. 9VDC	Min. 1.2VDC	7.5W (at 12VDC)	16VDC
GER-M400ST G2				5W (*inrush current: 2.0A for 12V)	

Connection and mounting

Model	Main terminal connection			Mounting	
	Screw	Allowed torque	Wire for main terminal (mm ²)	Allowed SCREW	Allowed torque
GER10-ST	N / A	N / A	2mm ²	M4	1.8~2.7 N·m
GER20-ST			2.5mm ²		
GER40-ST	M4	1.5~2.0 N·m	10mm ²	M5	3~4 N·m
GER100-ST		3~4 N·m	35mm ²		
GER150-ST	M6	3.5~4.5 N·m	50mm ²	M6	6~8 N·m
GER200-ST		4~4.5 N·m	100mm ²		
GER250-ST	M6	6~8 N·m	150mm ²	M5	3~4 N·m
GER400-ST		9~10 N·m, 100rpm	75mm ²		
GER-M300ST G2			-		
GER-M400ST G2					

Selection of relay type

For the proper use of a relay, you must not only be well informed of the characteristics of the relay and service conditions to determine whether the selected one fits for the conditions for application, but also fully understand the specifications of coil and contact, operate time, mechanical characteristics, and other conditions for the relay to be used. Please refer to the table below for details and considerations for selection.

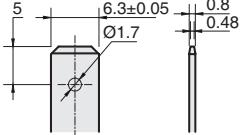
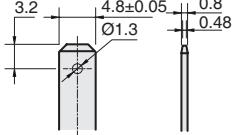
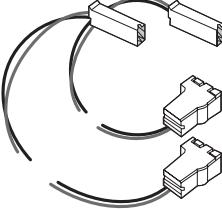
Items		Details	Considerations for selection
Coil	Pick-up voltage (Current)	The value at which a relay should function when increasing the voltage to an unoperated relay.	<ul style="list-style-type: none"> - Select a relay by considering a power supply ripple - Specifically take into account ambient temperature, coil temperature, and hot start - Be careful with the voltage drop when using the relay in conjunction with semiconductors - Be careful with the voltage drop when starting up
	Drop-out voltage (Current)	The value at which a relay should revert to the unoperated state when decreasing the voltage to an operated relay.	
	Maximum continuous voltage	The maximum allowable voltage to be continuously applied to the coil without causing damage. Short duration spikes of a higher voltage can be tolerated, but you must consult with the manufacturer above all.	
	Coil resistance	The DC resistance of the coil of DC type relays.	
	Temperature rise	If power is supplied to coil, the coil's temperature is increased and saturated. Temperature rise refers to the difference between the temperatures before and after the power application to the coil.	
Contact	Contact rating	The allowable rated voltage and current.	<ul style="list-style-type: none"> - Note that the life of relay is balanced with that of the device in which the relay is embedded. - If often exposed to high temperature, the rated life of the relay may be reduced. It is required to test the life in an actual environment. - Test and review need to be performed with actual load and application under an actual environment.
	Contact material	Material that forms contacts.	
	Life	The minimum number of times a relay can be operated under the normal condition while contacts are switching specific load.	
	Contact resistance	The value combined together the resistance produced when contacts touch each other, that of terminals, and that of contact spring.	
Operate time	Operating time	The time elapsed since power is first supplied to the coil until the open contacts are normally closed, excluding bounce time.	<ul style="list-style-type: none"> - Note that the operate time and bounce time may be changed according to the ambient temperature and applied voltage. - Note that bounce time is not excluded from both operate time and release time. - Note that switching life is affected by switching frequency.
	Release time	The time elapsed since power is cut off from the coil until the normally closed contacts are reclosed, excluding bounce time.	
	Bounce time	The phenomenon that contacts intermittently switches on and off as movable parts and contacts collide.	
	Switching frequency	The frequency of switching that repeats operations while satisfying the electrical life or mechanical life through the application of a pulse train to the operating coil at the rated voltage.	

Items		Details	Considerations for selection
Mechanical characteristics	Vibration resistance	<p>1) Functional: The vibration allowed to relay during operation, with contact not open for the specified time.</p> <p>2) Destructive: The vibration the relay can endure in the process of shipment, installation or use without causing damage and change in the operating characteristics of the relay.</p>	<ul style="list-style-type: none"> - Consider the performance of a relay during the service with vibration and shock - Check the allowable ambient temperature of the relay.
	Shock resistance	<p>1) Functional: The acceleration allowed to relay during operation, with contact not open for the specified time.</p> <p>2) Destructive: The acceleration a relay can endure in the process of shipment or installation without causing damage and change in the operating characteristics of the relay.</p>	
	Ambient Use temperature	The allowable temperature of the environment in which the relay is mounted.	
	Life	The minimum number of times a relay can be operated under the normal condition without load on the contacts.	
Other items	Breakdown voltage (Dielectric strength)	The maximum voltage tolerated by a relay without causing damage for a specific period, which is measured at the same points as insulation resistance.	<ul style="list-style-type: none"> - Select among plug-in type, soldering type, screwfastening type, and printed circuit board type to be used for connection
	Mounting, connection	<p>Mounting: Parallel type and vertical type</p> <p>Connection: Screw type and plug-in type used to connect to main circuit</p>	<ul style="list-style-type: none"> - Select PCB mounting methods including soldering and cleaning to be used for protection
	Size	Size of relay (Width, Height, Depth)	<ul style="list-style-type: none"> - Select sealed construction type to be used in an adverse environment

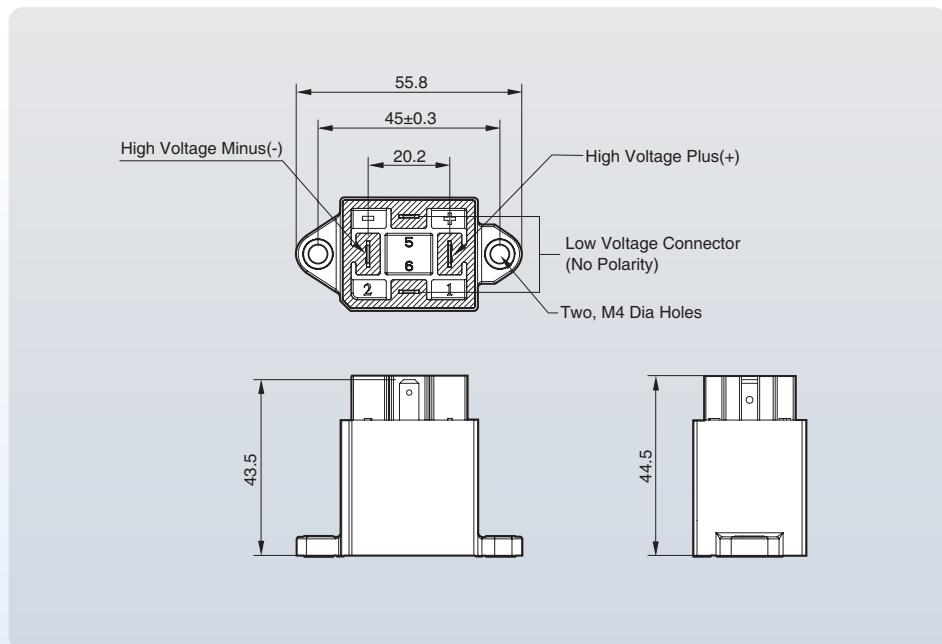
GER-10ST



Coil terminal accessory

Main Terminal	Coil Terminal	Accessory(Not included)
 <p>Pin Type Features</p> <ul style="list-style-type: none"> Terminal Type = Tab Mating Area Interface Dimensions(mm) 6.3×0.80 Material = Brass <p>Applicable Connector</p> <ul style="list-style-type: none"> Terminal Type = Receptacle Tyco 5-160429-1 61945-1 	 <p>Pin Type Features</p> <ul style="list-style-type: none"> Terminal Type = Tab Mating Area Interface Dimensions(mm) 4.8×0.80 Material = Brass <p>Applicable Connector</p> <ul style="list-style-type: none"> Terminal Type = Receptacle Tyco 5-160429-1 61945-1 	 <p>Components</p> <ul style="list-style-type: none"> Main Terminal accessory: 2EA Coil Terminal accessory: 2EA Wire length: 300mm

Dimensions

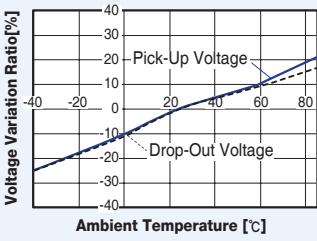
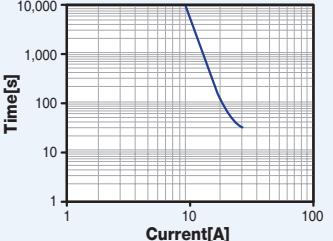


General Tolerance

Less Than 10: ± 0.3 /10~50: ± 0.5

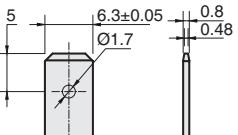
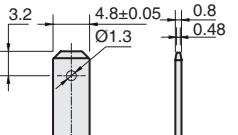
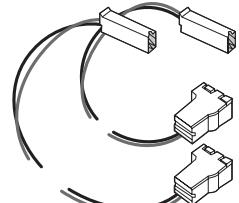
More Than 50: ± 0.8

Engineering data

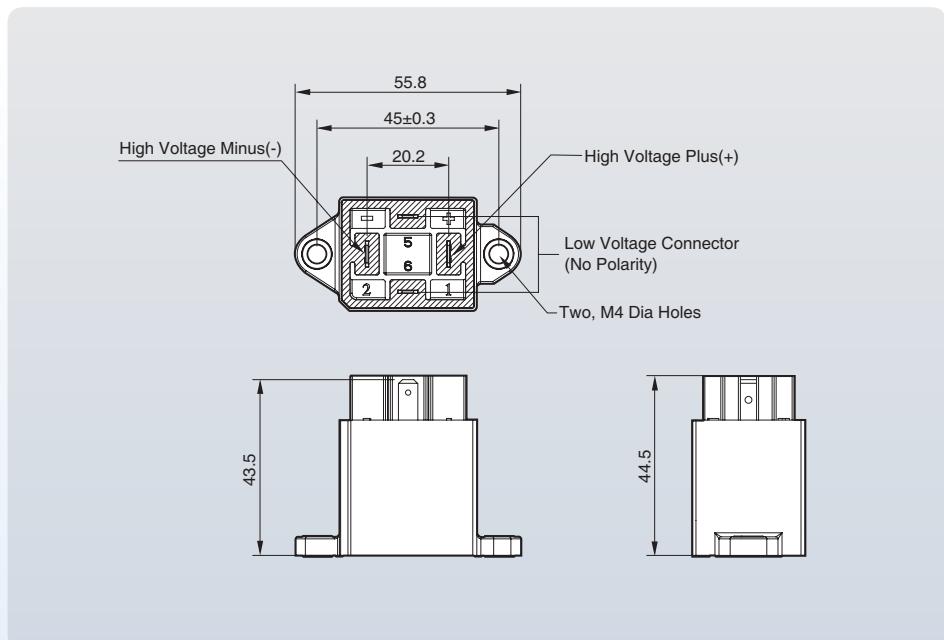
	Operating voltage characteristics	Current distribution	Switching life and cutoff curves
GER-10ST	 <p>Ambient Temperature [°C]</p> <p>Voltage Variation Ratio[%]</p>	 <p>Current [A]</p> <p>Time [s]</p>	 <p>Contact current [A]</p> <p>Life[Cycles]</p> <p>Switching(make+break) life</p> <p>Cut-off(break) life</p> <p>450VDC</p>



Coil terminal accessory

Main Terminal	Coil Terminal	Accessory(Not included)
 <p>Pin Type Features</p> <ul style="list-style-type: none"> Terminal Type = Tab Mating Area Interface Dimensions(mm) 6.3×0.80 Material = Brass <p>Applicable Connector</p> <ul style="list-style-type: none"> Terminal Type = Receptacle Tyco 63445-2 	 <p>Pin Type Features</p> <ul style="list-style-type: none"> Terminal Type = Tab Mating Area Interface Dimensions(mm) 4.8×0.80 Material = Brass <p>Applicable Connector</p> <ul style="list-style-type: none"> Terminal Type = Receptacle Tyco 5-160429-1 61945-1 	 <p>Components</p> <ul style="list-style-type: none"> Main Terminal accessory: 2EA Coil Terminal accessory: 2EA Wire length: 300mm

Dimensions

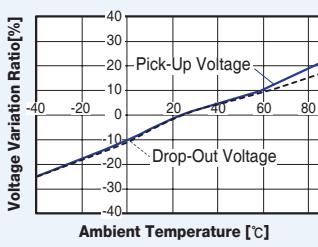
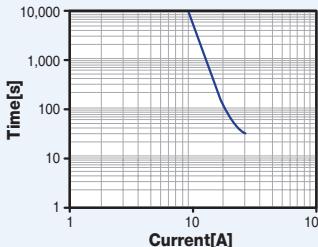
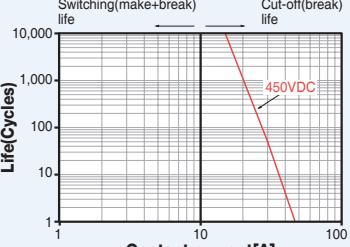


General Tolerance

Less Than 10: ± 0.3 /10~50: ± 0.5

More Than 50: ± 0.8

Engineering data

	Operating voltage characteristics	Current distribution	Switching life and cutoff curves
GER-20ST			

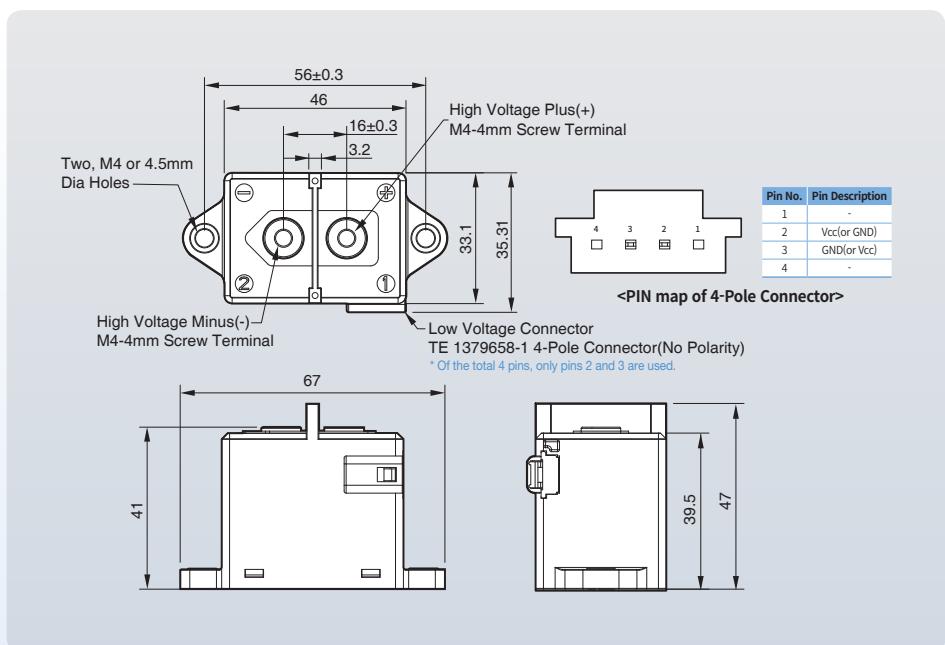
GER-40ST

Coil terminal accessory



Housing: 1379658-1	Terminal: 1123343-1	Accessory(Not included)
<ul style="list-style-type: none"> • Connector Style = Receptacle • Contact Type = Tab • Receptacle Configuration =025 	<ul style="list-style-type: none"> • Contact Type = Receptacle • Applies To Wire/Cable • Wire/Cable Type = Discrete Wire • Wire Range = 0.20-0.602 [24-20] mm [AWG] 	<p>Components</p> <ul style="list-style-type: none"> • Main Terminal accessory: 1EA • Flange Bolt M4-2EA • Wire length: 300mm

Dimensions



General Tolerance

Less Than 10: ± 0.3 /10~50: ± 0.5

More Than 50: ± 0.8

Engineering data

	Operating voltage characteristics	Current distribution	Switching life and cutoff curves
GER-40ST	<p>This graph plots the variation in operating voltage against ambient temperature. The solid line represents the 'Pick-Up Voltage' and the dashed line represents the 'Drop-Out Voltage'. Both curves show a positive correlation with temperature, with the drop-out voltage being slightly higher than the pick-up voltage across the measured range of -40°C to 80°C.</p>	<p>This graph shows the relationship between time and current for current distribution. The y-axis is logarithmic, ranging from 1 to 10,000 seconds. The x-axis is logarithmic, ranging from 10 to 1,000 amperes. The curve shows that as current increases, the time required for a specific event decreases.</p>	<p>This graph plots switching life (make+break) and cut-off life against contact current. The y-axis is logarithmic, ranging from 1 to 10,000 cycles. The x-axis is logarithmic, ranging from 1 to 100 amperes. Two curves are shown: a red curve for '450VDC' and a black curve for 'Cut-off(break) life'. The red curve starts at approximately 10,000 cycles for 1A and decreases rapidly. The black curve starts at approximately 1,000 cycles for 1A and increases with current.</p>

Coil terminal accessory

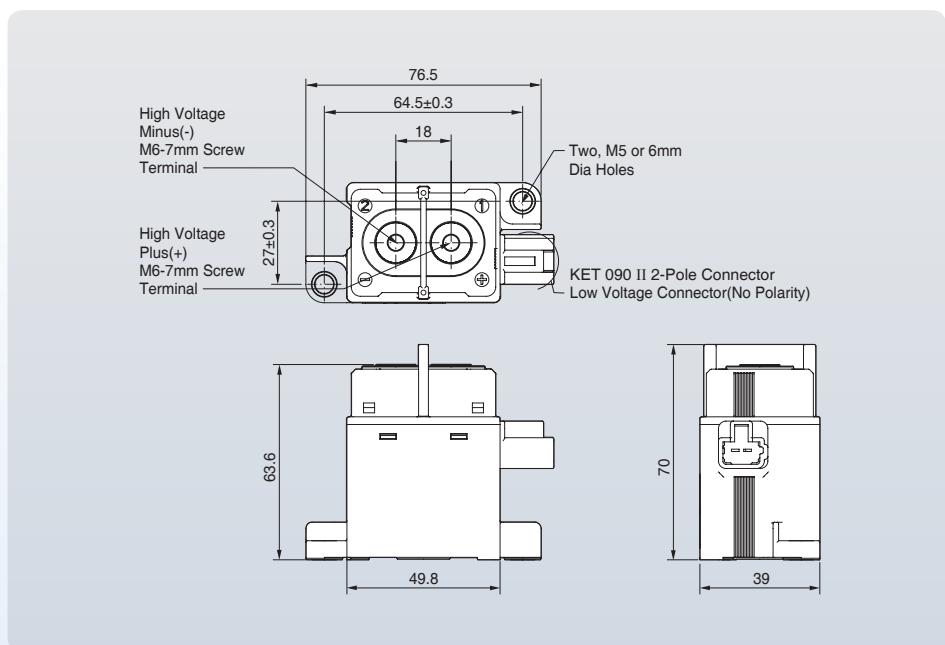


Housing: MG651026(L)		Terminal: ST730676-3		Accessory(Not included)	
Part No.	Wire Range		Tab Thick	Material	
	AWG	mm ²		Thick	Finish
ST730675-3	20	AVSS(CAVS) 0.5	0.64	0.25	Copper Alloy Pre-Tin

Components

- Main Terminal accessory: 1EA
- Flange Bolt M6-7 2EA
- Wire length: 300mm

Dimensions



General Tolerance

Less Than 10: ± 0.3 /10~50: ± 0.5

More Than 50: ± 0.8

Engineering data

	Operating voltage characteristics	Current distribution	Switching life and cutoff curves
GER-100ST			

GER-150ST

Coil terminal accessory

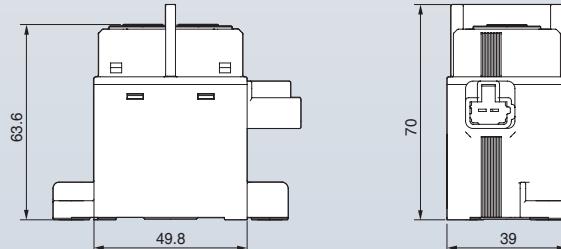
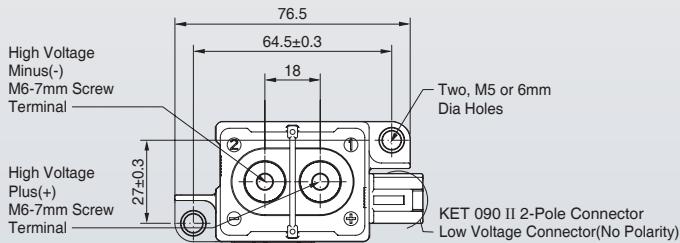


Housing: MG651026(L)	Terminal: ST730676-3	Accessory(Not included)			
Part No.	Wire Range		Tab Thick	Material	
	AWG	mm ²		Thick	Finish
ST730675-3	20	AVSS(CAVS) 0.5	0.64	0.25	Copper Alloy Pre-Tin

Components

- Main Terminal accessory: 1EA
- Flange Bolt M6-7 2EA
- Wire length: 300mm

Dimensions



General Tolerance

Less Than 10: ± 0.3 /10~50: ± 0.5

More Than 50: ± 0.8

Engineering data

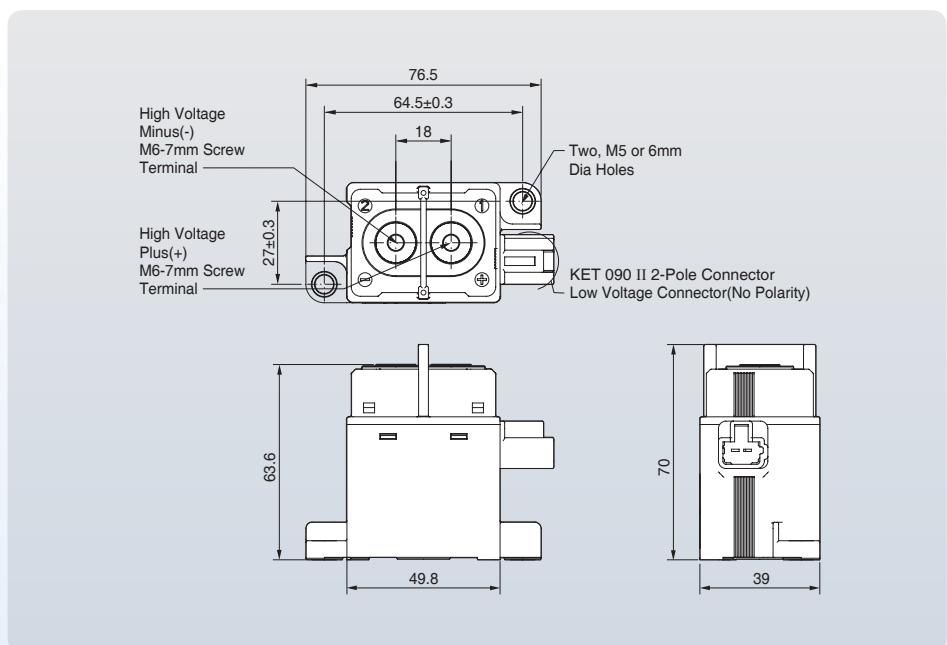
Operating voltage characteristics	Current distribution	Switching life and cutoff curves
<p>GER-150ST</p>		

Coil terminal accessory



Housing: MG651026(L)	Terminal: ST730676-3	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

Dimensions



General Tolerance

Less Than 10: ± 0.3 /10~50: ± 0.5

More Than 50: ± 0.8

Engineering data

	Operating voltage characteristics	Current distribution	Switching life and cutoff curves
GER-200ST			

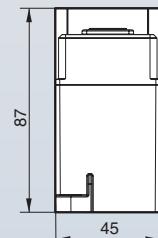
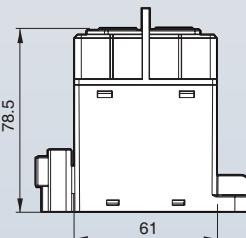
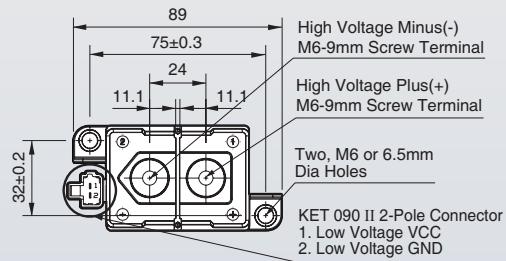
GER-250ST

Coil terminal accessory



Housing: MG651026(L)	Terminal: ST730676-3	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

Dimensions



General Tolerance

Less Than 10: ±0.3/10~50: ±0.5

More Than 50: ±0.8

Engineering data

Operating voltage characteristics	Current distribution	Switching life and cutoff curves
<p>GER-250ST</p> <p>Pick-Up Voltage: Solid line, Drop-Out Voltage: Dashed line.</p>		<p>Switching(make+break) life: Red curve, Cut-off(break) life: Blue curve, 450VDC: Horizontal line.</p>

Coil terminal accessory

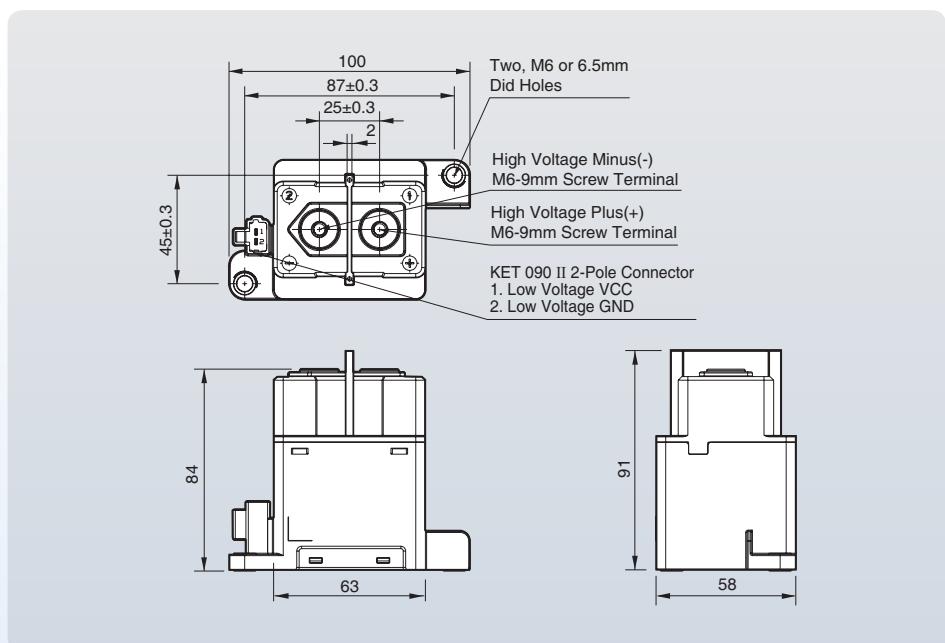


Housing: MG651026(L)	Terminal: ST730676-3	Accessory(Not included)			
Part No.	Wire Range		Tab Thick	Material	
	AWG	mm ²		Thick	Finish
ST730676-3	18-16	AVSS(CAVS) 0.85~1.25	0.64	0.25	Copper Alloy Pre-Tin

Components

- Main Terminal accessory: 1EA
- Flange Bolt M6-9 2EA
- Wire length: 300mm

Dimensions



General Tolerance

Less Than 10: ± 0.3 /10~50: ± 0.5
More Than 50: ± 0.8

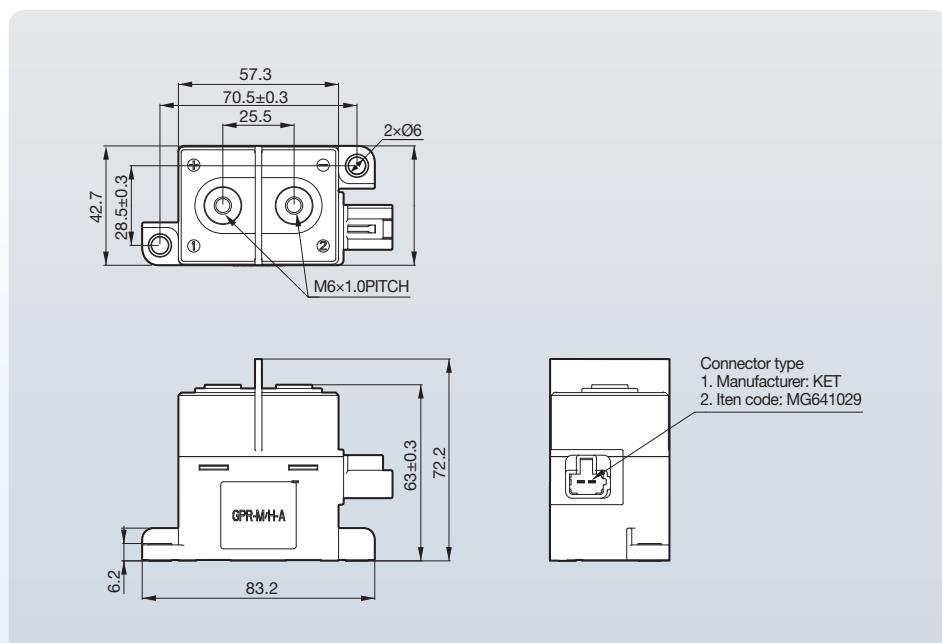
Engineering data

	Operating voltage characteristics	Current distribution	Switching life and cutoff curves
GER-400ST			

GER-M300ST G2

Housing: MG651026(L)	Terminal: ST730676-3	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

Dimensions



General Tolerance

Less Than 10: ± 0.3 /10~50: ± 0.5

More Than 50: ± 0.8

Engineering data

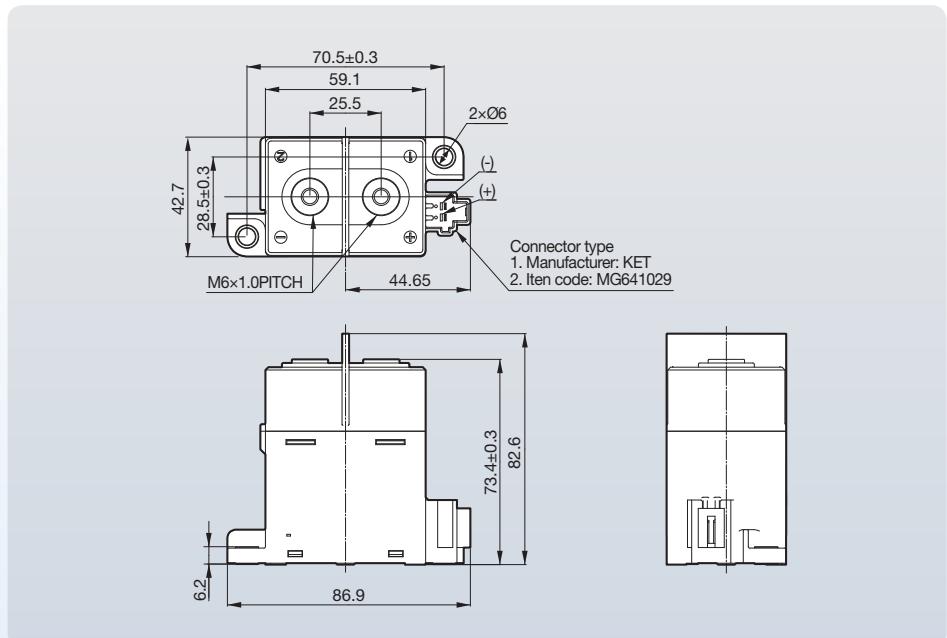
Operating voltage characteristics		Current distribution	

Coil terminal accessory



Housing: MG651026(L)	Terminal: ST730676-3	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

Dimensions



General Tolerance

Less Than 10: ±0.3/10~50: ±0.5
More Than 50: ±0.8

Precautions

Application Notes

Specification range

- Please use it according to specification range such as coil rating, mounting information. Otherwise it may result in overheating or malfunction.

Installation and maintenance

- If power is applied to the relay main contact, it may cause electric shock. Never touch it. During installation, maintenance and troubleshooting, the power to the relay must be disconnected.

Connection

- Incorrect connection may cause malfunction, overheating or fire.

Fail-safe

- It could be dangerous, when welding or sticking to contacts occurs. So, take double safety precautions and make sure that operation is foolproof.

Polarity

- Relays have polarity. Check the polarity indicated on the housing and connect. If connected in the opposite polarity, the electric durability performance can not be guaranteed.
- Relay coils with PCBs are polarized. Check the indicated polarity and connect. If connected in the opposite polarity, the relay will not operate.

Magnetism

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

Vibration/shock

- To maintain initial performance, do not apply physical shock or drop the relay. Do not use dropped products. 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 case. If the case is removed, relay performance can not be guaranteed.

Temperature

- Condensation may also occur at contacts if the relay is used at temperatures below 0°C or in an environment where the ambient temperature changes rapidly below zero. This condensation can delay operation time or interfere in operation of the relay.
- If the relay is operated continuously, the coil temperature may rise and the operating voltage may rise.

Coil voltage

- If you apply coil voltage very slowly, it may cause an operation error. Therefore, apply the coil voltage quickly.

Mounting conditions

- When exposed to high temperature or high humidity or to an environment containing organic or sulphide gas for a long time (including shipping period), sulfide or oxide film may form on the surface of the contacts and cause poor contact, and malfunction. Please check the environment when you transport the product.
- Do not use the product in an environment where the main terminals may be exposed to foreign substances such as organic solvents (eg alcohol, benzene, thinner) or strong alkalis (eg ammonia, caustic soda). It may cause abnormal heat at the terminal part.
- This product is not waterproof. If you install it in a place where waterproofing is required, please find a way to meet your requirements.

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 the operation time of relay is delayed and electrical performance is degraded.
- 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, and electrical life can 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.



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.



■ **Headquarter:** 127 LS-ro (Hogye-dong) Dongan-gu, Anyang-si, Gyeonggi-Do, 14119, Korea

■ **Sales team**

- US sales mykim2@ls-electric.com
- European sales mykim2@ls-electric.com
- Asian sales syoon@ls-electric.com
- China sales kjyim@lselectric.com.cn

■ **Technical team**

- Technical consultation center tahn@ls-electric.com

■ **Purchase team**

- Purchasing manager bcjeon@ls-electric.com