G-Lin ISO9001 Quality Management System Certified Enterprise

Instruction Manual for HHG1A, G1C, G1K, G1S Series Solid-State Relays

I. Purpose

The HHG1 series solid-state relays (hereinafter referred to as relays) are manufactured in accordance with the enterprise standard Q/ZXL10013 - 2009, and comply with the national standards GB/T14048.4 and GB/T14048.5 - 1993. They are suitable for automatic control circuits with various input voltages in AC 50Hz (60Hz) single-phase systems with a rated output power supply voltage of AC1200V and below, and DC600V and below. They serve as control circuit devices to connect and disconnect external circuits in a predetermined state. They can be conveniently interfaced with computers and various digital circuits, and are widely used in the field of industrial automation control. For example, they are used for the control of lighting equipment, power supplies, various solenoid valves, and motors, etc. They can also be used as the driving stage for various high-power devices and electromagnetic contactors, as well as for capacitor switching in power grid transformation, etc. They are small in size and convenient to use. Since there are no contacts, they are especially suitable for harsh environments such as corrosion, humidity, and explosion-proof conditions.

II. Model Naming Rules

HHG1A-1/□F-□□Z

- Enterprise identification
- Solid-state relay
- Design serial number
- A: Enhanced type
- C: Capacitor switching type
- K: Industrial air-cooled type
- S: Industrial water-cooled type
- 1: AC single-phase output
- Z: Zero-crossing type
- Rated output current: 60~1000A
- Rated output voltage: 38 (for 40~440VAC); 120 (for 60~1200VAC)
- Input control voltage: - (for DC); ~ (for AC)
- Closed type
- 032: Constant current input voltage: DC3-32V
- 014: Linear input voltage: DC3-14V

III. Main Technical Parameters

3.1 Input Parameters

Serial Number	Name	DC Linear	Constant Current
1	Input Voltage U s(V)	DC3～14V	DC3～32V
2	Input Current I s(mA)	8～38	8～26
3	Turn-on Voltage U on(V)	3	3
4	Turn-off Voltage U oFF(V)	1.8	1.8
5	Turn-on Time t on(ms)	≤10	
6	Turn-off Time t o FF(ms)		

3.2 Output Parameters

Serial Number	Name	AC380V Range	AC1200V Range
1	Output Voltage Ue(V)	AC40～440V	AC60～1200V
2	Output Current Ie(mA)	60～1000A/ per phase (selectable)	60～1000A/ per phase (selectable)
3	Output Voltage Drop Ue(V)	≤1.8	≤1.8
4	Output Leakage Current Ido(mA)	≤15	≤15
5	Transient Voltage Up(V)	1200VAC	1600VAC
6	Insulation Resistance Ri(MΩ)	≥100	
7	Dielectric Withstand Voltage (V)	AC2500V	
8	Operating Temperature (°C)	-20℃～+70℃	

IV. Installation and Use

4.1 Before installation and use, please carefully check whether the model and specification of the solid - state relay match the actual operating conditions.

4.2 Pay attention to correct wiring:

a. The input end and output end must not be connected reversely;

b. The polarity of "+" and "-" of the input power supply must not be connected reversely;

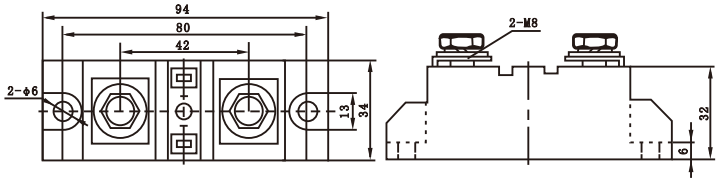
c. The polarity of "+" and "-" of the output power supply of the DC relay must not be connected reversely;

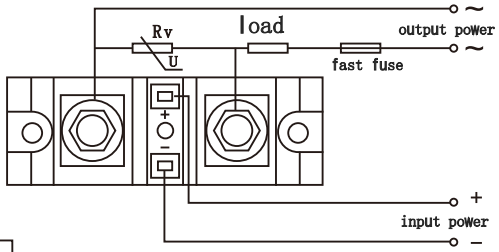
d. The cross - sectional area of wires and the installation contact area must be large enough.

4.3 Overvoltage Protection

a. When the input voltage approaches or exceeds the rated value, an appropriate dropping resistor should be connected in series.
b. Even if the output voltage does not exceed the rated voltage, a varistor *R* should be connected in parallel (see the wiring diagram for details).

Outline and Installation Dimensions Diagram for 200 - 350A Series





Output Current	Air - cooled Outline Dimensions (mm)	Water - cooled Outline Dimensions (mm)	Mounting Hole Spacing (mm)
60-150A	94×25×38	No Water - cooled type	80mm
200-350A	94×34×43	No Water - cooled type	80mm
500-600A	115×53×53	150×53×68	80×38mm
800-1000A	125×63×52	160×63×72	93×48mm

Table of Product Outline Dimensions and Mounting Hole Spacing

Note: In the diagram, *R* is a varistor selected by the user. In the diagram, *R* is a varistor selected by the user.

Load Circuit Voltage	Varistor Voltage
AC380V	750V
AC1200V	1800V

Selection Table of Varistors

4.4 Overcurrent Protection

Relays are not allowed to have overcurrent. Although a safety factor is considered during model selection, overcurrent (such as during load startup, short circuits, or other abnormal conditions) may cause permanent failure of the relay. Therefore, protection measures must be taken:
Method 1: Connect a fast fuse with a response time of ≤20ms in the output load circuit;
Method 2: Select a suitable circuit breaker with an operating time of ≤30ms.

4.5 According to the actual steady - state operating current of the relay, a corresponding heat sink should be selected. Mount the relay on the heat sink and fasten it tightly, and thermal grease should be applied between the bonding surface of the relay and the heat sink. When the actual operating current is too large and the surface temperature approaches 60 °C, forced air cooling should be adopted.

Model	Applicable Heat Dissipation Current (A)	Length (mm)	Width (mm)	Height (mm)	Material
HH-036	≤120	150	100	80	Special - shaped Aluminum
HH-038	≤300	150	125	135	
HH-039	≤500	200	125	135	
HH-040	≤800	300	125	135	

Selection Table of Heat Sink Dimensions and Current

4.6 Safety Factor

Overcurrent is not allowed when the relay operates normally. Therefore, during type selection, a sufficient derating factor should be reserved for the rated output current of the relay to ensure the safe operation of the relay.

Recommended Derating Factors for Various Loads at Normal Temperature

Typical Load	Pure Resistance	Electric Heating Wire	Incandescent Lamp	Transformer/ Electromagnet	Single - phase AC Motor	Three - phase AC Motor
Derating Factor	1	0.5～0.7	0.35～0.5	0.22～0.4	0.12～0.24	0.18～0.33

Note: If a capacitive load is connected, a sufficient current - limiting resistor or reactor should be connected in series according to the capacitance value!

4.7During system power - on commissioning, check the working status of the relay to verify whether it can connect and disconnect the external circuit as preset.

4.8 Ordering Information

When placing an order, the name, model, input voltage range, output voltage, current, and quantity should be specified.
Example: 10 pieces of single - phase AC solid - state relay HHG1A - 1/032F - 38 120Z, and 10 pieces of heat sink HH - 038.

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