

Instruction Manual for HHG1F Series Three-Phase Motor Forward and Reverse Rotation Solid-State Relays

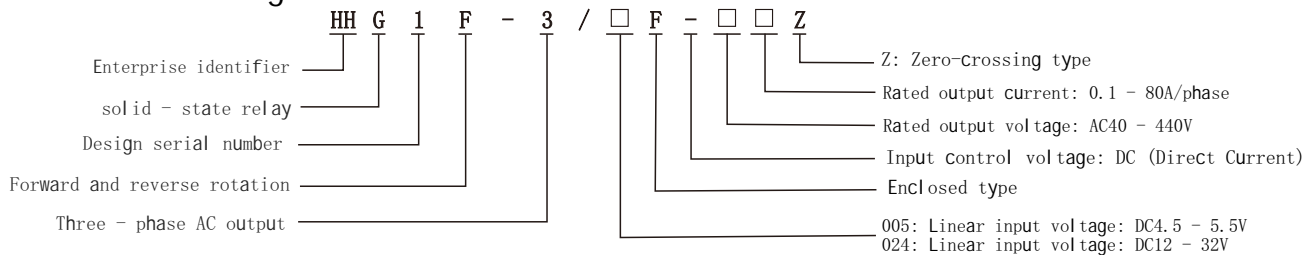
Caution: Please read this manual carefully before using this product to ensure correct use and keep it for a long time.

■ Purpose

The HHG1F series solid - state relay for forward and reverse rotation of three - phase motors (hereinafter referred to as the relay) is specially developed for three - phase motor control. It complies with the national standards GB/T14048.4 - 2010 and GB/T14048.5 - 2008, and is suitable for the rotation direction control circuit of induction motors with a three - phase rated voltage of AC380V and an AC frequency of 50Hz (60Hz). It can change direction, connect and disconnect the external circuit according to the predetermined state. It can be quickly connected with computers and various digital circuits. The control loop includes an interlocking circuit and a delay circuit. The switching time between forward and reverse rotation is more than 100ms, avoiding damage caused by excessive inrush current during forward/reverse rotation. There are two specifications for the relay to choose from:

- Three - phase two - control: Two terminals are internally connected with thyristor forward - reverse phase - shifting switches, and the other terminal is directly connected with a short - circuit line inside;
- Three - phase three - control: All three terminals are internally connected with thyristor switches, which have better overvoltage resistance and anti - interference ability than three - phase two - control, and high reliability. There are two control modes: common cathode and common anode. The load voltage of the relay is 40 - 440VAC, and it is built - in with an RC circuit and a varistor. The thyristor adopts high dv/dt, and is widely used in the field of industrial automation control and some harsh operating conditions, such as the control of electric actuators, including actuators such as steam valves, flow control valves, throttle valves, and elevators. It has the advantages of small size, no spark, corrosion resistance, etc.

■ Model Naming Rules



■ Main Technical Parameters

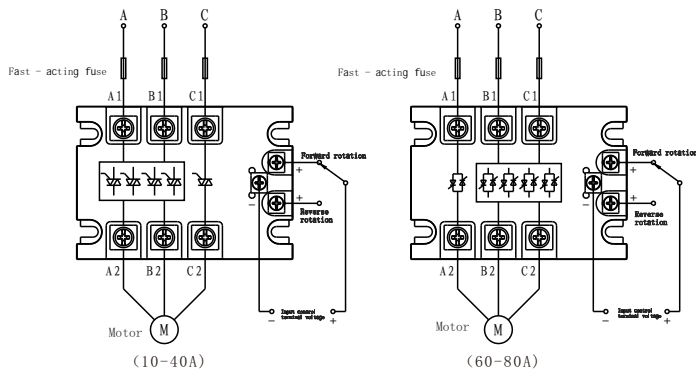
► Input Parameters

Serial Number	Name	DC Linear	
		DC4.5~5.5V	DC12~32V
1	Input Voltage U_s (V)	DC4.5~5.5V	DC12~32V
2	Input Current I_s (mA)	< 35mA	
3	Turn - on Voltage U_{on} (V)	4.5	12
4	Turn - off Voltage U_{off} (V)	3.5	8
5	Forward - reverse Delay Interlock (ms)	≥100ms	
6	Forward-reverse switching	External Non - stop Switching	

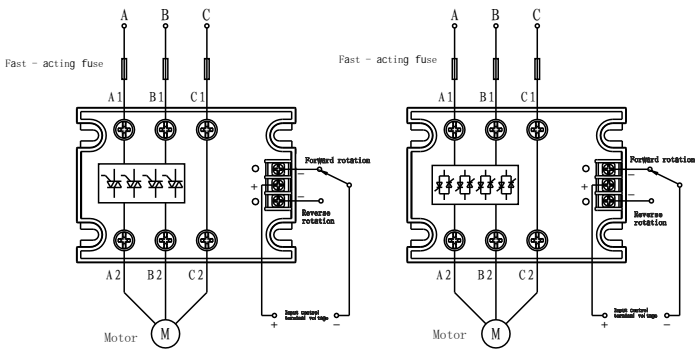
► Output Parameters

Serial Number	Name	AC380V							
		AC40~440V 50/60Hz							
1	Output Voltage U_e (V)	AC40~440V 50/60Hz							
2	Rated Output Current I_e (A)	10	15	20	25	30	40	60	80
3	Output Voltage Drop U_r (V)	≤1.8							
4	Output Leakage Current I_{do} (mA)	≤10							
5	Transient Voltage U_p (V)	1200							
6	Insulation Resistance R_i (MΩ)	≥100							
7	Dielectric Withstand Voltage (V)	2500VAC							
8	Operating Temperature (°C)	-20°C ~ +70°C							
9	Electrical Life	1,000,000 cycles							
10	Applicable Three - phase Motor (KW)	≤0.5	≤0.75	≤1	≤1.2	≤1.5	≤2	≤3	≤4
11	Working Status Indication	Forward/Reverse: Red/Green Light							

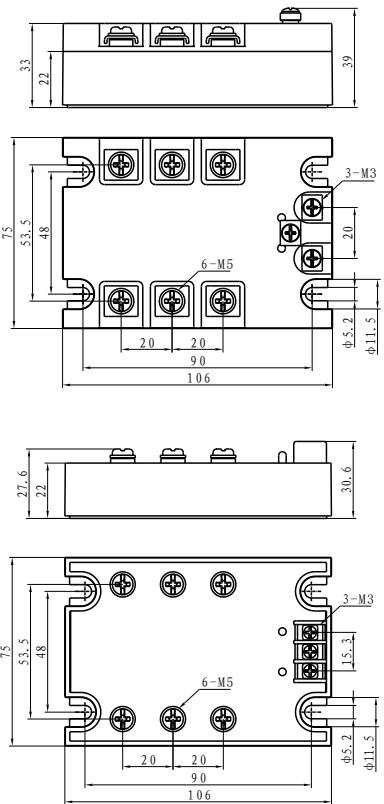
■ Wiring Diagram, Outline and Installation Dimension Diagram



Wiring Diagram for Forward and Reverse Rotation of Motor
(Three-phase Three-control / Common Cathode)



Wiring Diagram for Forward and Reverse Rotation of Motor
(Three-phase Three-control / Common Anode)



■ Use Instructions

Before installation and use, please carefully check whether the model and specification of the solid-state relay match the actual operating conditions. Pay attention to correct wiring:

The load terminal and the control terminal must not be connected reversely;

The polarity of “+” and “-” of the control terminal power supply must not be connected reversely.

The power lines and motor lines should be wired according to the schematic diagram. It is strictly forbidden to use the forward-reverse rotation relay at the rear end of the frequency conversion power supply.

Confirm the forward/reverse rotation debugging of the motor, the initial phase of the three-phase power supply, and the red/green indication for forward/reverse.

▶ Overcurrent Protection

Relays are not allowed to have overcurrent. Although a safety factor has been considered during model selection, overcurrent during short circuits or other abnormal conditions at the moment when the load starts may cause permanent failure of the relay. Therefore, protection must be provided.

Method 1: Connect a fast fuse with a breaking time 20 ms in series in the input load circuit;

Method 2: Select a suitable circuit breaker with an operating time 20 ms.

▶ Selection of Heat Sink

According to the actual steady-state operating current of the relay, an appropriate heat sink (>5A) should be selected. The selection of the heat sink refers to the selection manual. Install the relay on the heat sink and tighten it. Thermal conductive silicone grease should be applied between the joint surface of the relay and the heat sink. When the actual operating current is too large and the surface temperature is close to 60°C, forced air cooling should be adopted.

■ Notice for Ordering

When placing an order, the name, model, input voltage range, output voltage, current, and quantity should be clearly stated. Example: Three-phase motor forward and reverse solid-state relay HHG1F-3/024F-38 80A, 10 pieces; Heat sink (HH-037), 10 pieces.

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