Precautions of DC relay

In order to make correct use of the relay, while selecting the relay and understanding its characteristics, it is also necessary to understand some precautions in use to ensure the reliability of the relay.

1. Usage, storage and transport conditions

1.1 Please avoid direct sun radiation and keep ambient temperature, humidity and air pressure during usage,storage and transport. The allowable range of temperature and humidity are shown in non-shaded area of Figure 1:

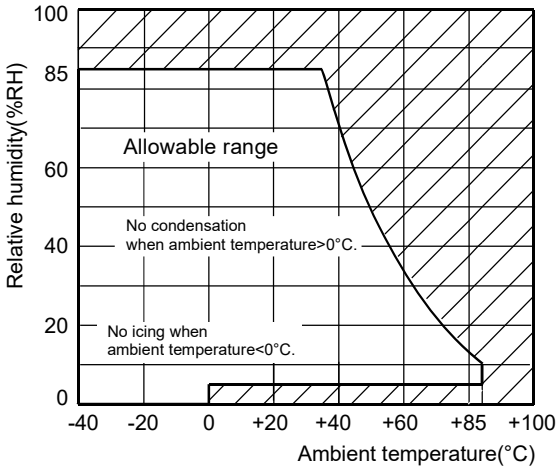


Figure 1

The recommended ambient temperature and humidity ranges for usage, storage and transport are as follows:

A)Ambient temperature: -40°C ~85°C

B)Humidity: 5%RH-85%RH

C)Air pressure: 86kPa~106kPa

1.2 For condensation: condensation occurs when the ambient temperature drops sharply from a high temperature and humidity, or when the relay is transported from a low temperature to a high temperature and humidity. Condensation may cause the failures such as insulation deterioration, coil disconnection and rust etc., which Hongfa cannot guarantee.

1.3 For low temperature and low humidity atmosphere: If the relay is exposed to a low temperature, low humidity environment for a long time, it may cause embrittlement of plastic parts.

1.4 Because the contacts of HFE82V, HFE85V-300M, HFE88P series are enclosed in the hermetically sealed chamber,which is filled with gas, and the leakage rate of gas in the chamber is proportinal to the temperature inside the chamber (ambient temperature and temperature rise due to electricity applied on contacts), so please ensure the ambient temperature is within -40°C~ 85°C.

1.5 Please avoid using relay near strong magnetic fields(around transformers, magnets)and heating objects.

1.6 Please avoid the ultrasonic, high frequency and other vibration conditions which will affect the performance of relay.

1.7 Please make sure that the relay is evaluated under the worst conditions in actual use to improve the reliability during actual use.

2. Safety precautions

2.1 Please pay attention not to touch the relay when it is at work, due to the electric shock risk.

2.2 Please pay attention to cut off the power supply before relay (including terminal, socket and other connecting parts) mounting, maintaining and fault handling.

2.3 Please refer to the wiring diagram in the specification and connect the load terminals correctly. If any wrong connection, it may cause unexpected malfunction, abnormal heating, fire, etc.

2.4 In principle, do not use the relay again in case of unexpected drop.

2.5All Hongfa relay are RoHS compliant.

3. Precautions of DC relay applications

3.1 For polarized relay, please make correct use according to the specification and the identification on the product surface (as shown in Figure 2). The electrical characteristics promised in the specification will not be guaranteed due to the reverse polariy connection of load. See Table 1 for polarity description of each series.

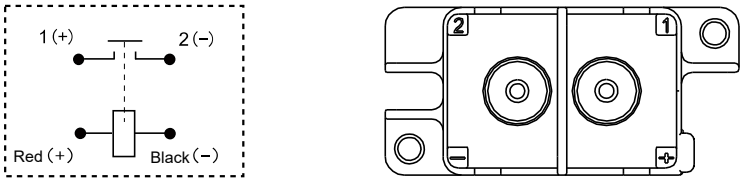


Figure 2

Table 1

Series	Without polarity		With polarity	
	Coil	Load terminal	Coil	Load terminal
HFE82V series	HFE82V-60B HFE82V-100D HFE82V-150D HFE82V-200B HFE82V-250 HFE82V-250C HFE82V-300C HFE82V-400M	HFE82V-60B HFE82V-150F HFE82V-250C HFE82V-300C HFE82V-400M HFE82V-1000	HFE82V-600 HFE82V-1000	HFE82V-100D HFE82V-150D HFE82V-200B HFE82V-250 HFE82V-600
HFE80V series	Without-polarity for all series	HFE80V-60 HFE80V-80 HFE80V-200	–	HFE80V-20B/C/D
HFE85V-300M	–	–	HFE85V-300M	HFE85V-300M
HFE88P series	–	HFE88P-150 HFE88P-250 HFE88P-350	HFE88P-150 HFE88P-250 HFE88P-350	–

3.2 Please apply rated voltage to relay to achieve the specified performance during operation. It is not allowed to apply maximum voltage to coil continuously. The performance of relay can not be ensured in case of the applied voltage exceeds the maximum allowable voltage range.

Operation under overvoltage or undervoltage condition for a long time may affect the service life of relay. In order to better ensure the life cycle of relay, it is recommended to operate relay under the rated voltage.

It is required to ensure the stable coil voltage when starting, disconnecting and operating to avoid the failure of welding and even continuous arcing burnout due to unstable voltage, such as frequent coil power failure.

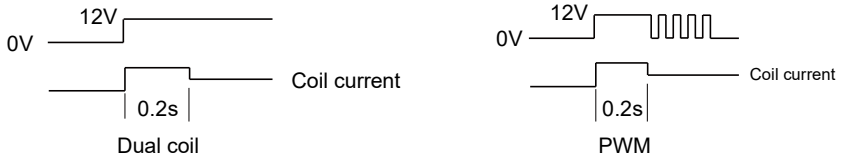
Please contact with Hongfa for confirmation in case of PWM control or power switching is required in your application.

3.3 In order to suppress the reverse electromotive force of the coil, it is recommended to use transient voltage suppressor(TVS), varistor(ZNR) or zener diode(ZN). Please take care that if the freewheeling diode is used, it may cause the release time gets longer and the deterioration of breaking performance. (For economized relay, such as 600A,1000A type of HFE82V series, HFE85V-300M, which is equipped with built-in reverse electromotive force suppression circuit,the surge suppressor is not needed.)

3.4 The rated values in the contact parameters are the values under resistive load. When inductive load (L/R＞1ms) is applied, please connect surge current protection device in parallel with the load. If no measures are taken, it may cause the electrical endurance deterioration and on-off failure. Please consider sufficient margin in the design.

3.5 The relay is a high-voltage DC switching device, which may cause failure when exceeding the service life times and load capacity specified in the specification. The protection circuit that can cut off the load in case of emergency shall be applied. As a product with limited service life, the relay shall be replaced in time to ensure safety.

3.6 Please take care that the coil of economized relay, such as 600A,1000A type of HFE82V series,HFE85V-300M with dual coil, and HFE85P-150/200/250 with PWM, will switch automatically after making for 0.2s, and multiple on-off operation less than 0.2s will cause malfunction.



3.7 When measuring operation voltage of relay with dual coil economizer, such as and 600A,1000A type of HFE82V series and HFE85-300M, the slow ramp-up mode is not allowed. Please energize coil (see Figure 3) with quick start-up voltage (step power supply mode), otherwise the relay will not operate.

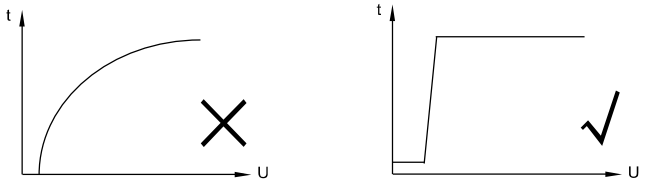


Figure 3

3.8 The screw tightening torque of each part of the relay shall be within the following specified range. The looseness of screw may cause fire due to abnormal heat when power on. Beyond the maximum range may result in damage of sealed chamber and screw. The mounting direction is not limited. See Table 2 for mounting way, torque range of each model.

Table 2

Model	Mounting for load terminal					Mounting for relay body	
	Mounting way	Length of thread	Torque	Hole dia. of copper busbar	Thickness of copper busbar	Mounting way	Torque
HFE82V-60B	M4 screw	6.5mm	2N·m~3N·m	Ø4.0~Ø4.5mm	1~2mm	M5 screw	3N·m~4N·m
HFE82V-100D	M4 screw	6mm	2N·m~3N·m	Ø4.0~Ø4.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE82V-150D	M4 screw	6mm	2N·m~3N·m	Ø4.0~Ø4.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE82V-150F	M5 screw	8.6mm	3N·m~4N·m	Ø5.0~Ø5.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE82V-200B	M6 screw	7.5mm	5N·m~6N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE82V-200W	M6 screw	10mm	6N·m~8N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE82V-200D	M6 screw	8.5mm	6N·m~8N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE82V-250	M6 screw	8.5mm	9N·m~11N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE82V-250C	M6 screw	9.5mm	6N·m~8N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE82V-300C	M6 screw	9.5mm	6N·m~8N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE82V-400M	M6 screw	9.5mm	6N·m~8N·m	Ø6.0~Ø6.5mm	2~3mm	M6 screw	6N·m~8N·m
HFE82V-600	M10 bolt	22mm	20N·m~25N·m	Ø10~Ø10.5mm	⩾4mm	M5 screw	3N·m~4N·m
HFE82V-1000	M10 bolt	22mm	20N·m~25N·m	Ø10~Ø10.5mm	⩾8mm	M6 screw	6N·m~8N·m
HFE85V-300M							
HFE85V-300M (Female screw)	M6 screw	13	6N·m~8N·m	Ø6.8~Ø7.5mm	3~4mm	M5 screw	3N·m~4N·m
HFE80V series							
HFE80V-20B	-	-	-	-	-	M4 screw	2N·m~3N·m
HFE80V-20C	-	-	-	-	-	M4 screw (HTQ2B/LJ)	2N·m~3N·m
HFE80V-20D	-	-	-	-	-	M4 screw	2N·m~3N·m
HFE80V-40	-	-	-	-	-	M4 screw (HTQ2BJ)	2N·m~3N·m
HFE80V-200	M6 screw	8mm	6N·m~8N·m	Ø6~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m

HFE82P/85P/88P series

Table 2

Model	Mounting for load terminal					Mounting for relay body	
	Mounting way	Length of thread	Torque	Hole dia. of copper busbar	Thickness of copper busbar	Mounting way	Torque
HFE82P-20	-	-	-	-	-	M5 screw	3N·m~4N·m
HFE82P-60B	M4 screw	6.5mm	2N·m~3N·m	Ø4.0~Ø4.5mm	1~2mm	M5 screw	3N·m~4N·m
HFE82P-200B	M6 screw	7.5mm	5N·m~6N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE82P-250C	M6 screw	9.5mm	6N·m~8N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE82P-250	M6 screw	8.5mm	9N·m~11N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE85P-150	M6 screw	8mm	6N·m~8N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE85P-250	M6 screw	8mm	6N·m~8N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE85P-300	M6 screw	8mm	6N·m~8N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE88P-150	M6 screw	14mm	6N·m~8N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE88P-250	M6 screw	14mm	6N·m~8N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m
HFE88P-350	M6 screw	14mm	6N·m~8N·m	Ø6.0~Ø6.5mm	2~3mm	M5 screw	3N·m~4N·m

3.9 The screws shall be pre-tightened before tightening. If the pre-tightening is insufficient or exceeds the value recommended in Table 2, it will cause loose mounting or thread sliding. It is not recommended to mount two copper busbars on the same side to avoid short circuit or spark due to small clearance.

Note: it is recommended to mount the load less than 2 times to avoid poor tightening of the relay due to multiple mounting.

3.10 For products with female screw of the load terminal, it is recommended that the length of thread engagement of load shall be 70% - 80% of the thread length.

3.11 The insertion strength of tab terminal for quick connection model, such as HFE82V-60, 20A, 40A, 60A, 80A type of HFE80V series,shall be within 40N ~ 70N.

Please select the specifications of tab terminals according to table 3.

Table 3

Model	Coil side	Load side
HFE82V-60	#250 t=0.8mm	#375 t=1.2mm
HFE80V-20/20B/20C/20D/40	#187 t=0.5mm	#250 t=0.8mm
HFE80V-60	#250 t=0.8mm	#375 t=1.2mm

Notes: 1. For HFE80V-20B/450-XX-HTQ2BJ relay, the tab terminal is #187 with thickness of 0.5mm for coil side, #250 tab terminal with thickness of 0.8mm for load side.

2. For HFE80V-20C/450-XX-HTQ2BJ relay, the tab terminal is #187 with thickness of 0.8mm both for coil and load side.

It is required to make sure that the main power supply line is closest to the relay terminal, and then mount and tighten it in the order of flat washer, spring washer and nut, or directly use self-locking nut when mounting. Incorrect mounting sequence may cause severe overheating and melting of the insulation layer of the connecting cable.

3.12 Please make sure that there is sufficient insulation distance between each terminal and the grounding wire when mounting.

3.13 When multiple relays are mounted adjacently to each other, please pay attention to abnormal heating caused by mutual interference of heat and magnetic field, insufficient insulation distance between external terminals and copper busbars of the relay, and magnetic field interference of energized conductor under high current, which may cause failure. Please contact with Hongfa in time.

3.14 Please take care that the bending of the terminal and connector terminal shall meet the specified requirements when terminal or connector wiring. Do not apply force on it after wiring, otherwise it will cause wire disconnection.

3.15 The service life of the relay is closely related to the environment and use conditions. We hope customer to confirm the relay status under actual conditions before use.

Continued use of relay with deteriorated performance may cause insulation degradation, abnormal heating, smoking or fire. In order to avoid the above situation, it is recommended that customers can consider protection or error prevention design for safety, including design to prevent fire spread, design to prevent failure and design for regular maintenance, so as not to cause casualties, fire and other risks due to relay with reduced performance or service life.

3.16 The on-off lifetime is specified under the standard test conditions in IEC60664-1 (at temperature 15 ℃ to 35 ℃, humidity 25% RH to 85% RH) with the recommended copper busbar and tightening torque.

The on-off lifetime varies with coil drive circuit, load type, duty factor and ambient conditions. Please confirm the service life under actual conditions.

3.17 Unless otherwise specified, the load promised by Hongfa refers to the rated load. Hongfa is not responsible for any usage beyond our guarantee.

3.18 The guarantee range of overcurrent is limited to single energization only. The malfunction may be caused by overheating when multiple energization. Please confirm in actual installation. When multiple overcurrent is required, the temperature of each part shall be restored to the allowable ambient temperature before the next energizing.

3.19 Please use the product with reference to Hongfa specifications and instructions. Hongfa cannot guarantee any failure caused by the use beyond the conditions specified in the specification. When the use conditions are out of the specification, please contact with Hongfa for confirmation in time.

3.20 For Hongfa, it is impossible to evaluate all the performance requirements of the relay in each specific application field. Therefore, the customer should select the appropriate products according to the specific application conditions. If any inquiries, please contact us for more technical support. However, it is only customer’s responsibility for product selection.

3.21 Hongfa reserves the right to make change for the product. The customer shall confirm the content of this specification before making an order for the first time, and request a new specification if necessary.