

HFV7-GP

AUTOMOTIVE RELAY



File No.:E133481



File No.:R50452367



Typical Applications

BMS,Lithium battery storage,iPC-M off-grid battery storage,UPS,Battery breaking arrangement, Automotive air-condition,Cooling fan control, Heating control etc.

Features

- Max continuous current 120A (at 23°C)、100A (at 85°C)
- Can break 120A current
- Using double contact parallel, contact voltage drop reduced
- The sealed product initial protection level can be IP6K7
- The coil end adopts a reduced voltage holding mode to save power loss.
- Meet IEC 61000-4-5:2017surge current5000A (8/20μs)
- Wave soldering is applicable
- Small size (17161mm³, height is 25mm)

RoHS compliant

CHARACTERISTICS

Contact arrangement	1 Form A
Voltage drop	Typ.:5 mV (at 10A)initial Max:15 mV (at 10A)initial
Rated load ¹⁾	120A(at 23°C), 100A (at 85°C)
Overload resistance ability ¹⁾	180A 1min (at 23°C) 600A 1s (at 23°C)
Max switching capability ¹⁾	Connected:200A Breaking:120A(resistive),14VDC
Min. contact load	1A 12VDC
Operating current range	1A to 120A
Electrical endurance ¹⁾	See "CONTACT DATA"
Mechanical endurance	1×10 ⁷ ops(300ops/min)
Insulation resistance	100MΩ (at 500VDC 1min)@BOL 20MΩ (at 500VDC 1min)@EOL
Withstand voltage ²⁾	600VAC 1min (between contacts) 600VAC 1min (coil & contacts)
Operate time ³⁾	Typ.:8ms (at nominal voltage) Max:15ms (at nominal voltage)
Release time ³⁾	Typ.:2ms (at nominal voltage) Max:7ms (at nominal voltage)
Ambient condition	Temp: -40°C to 85°C (Coil Sustaining Voltage) Humidity: 5%RH to 85%RH (No freeze or dewing)

Vibration resistance (random)(functional) ⁴⁾	10Hz to 1000Hz, accelerated speed : 27.8 m/s ² 8h/axial direction
Shock resistance ⁴⁾	294 m/s ² (half-sine pulse:11ms)
Terminal type ⁵⁾	PCB terminal
Weight	Approx. 35g
Mechanical property	Cover retention(Pull/Push): ≥200N Terminal retention(Pull/Push): ≥50N Terminal bending strength(All direction): ≥10N

1) Test under below conditions:

- Relay installs on the PCB, nominated voltage to coil after 100ms, keeping 80% nominated voltage.
 - Using 25mm² wire to connect the PCB and loading part.
 - The PCB size: 4 layers board, copper foil thickness 2oz, the length and the width for each layer is (64±1)mm, the PCB Tg is 150°C.
- Leakage current less than 1mA.
 - Coil no paralleled resistance or diode measurement.
 - When energized, closed contact braking time shall less than 100μs; When non-energized, breaking contact shut-off time shall less than 100μs.
 - Use lead-free solder, suggest wave soldering temperature and time is(260±3)°C,(10±0.5)s.

CONTACT DATA

Load voltage VDC	Load type	Load current A	On/Off time		Electrical endurance ops	Contact material	Ambient temp.
			On s	Off s			
14	Resistive	70	2	2	3×10 ⁵	AgSnO ₂	23°C
14		100	1	9	1×10 ⁵		-40°C ~ 85°C
14		120	1	9	5×10 ⁴		(Details refer to electric endurance ambient temp. Curve)

Notes: The above are listed with the part of typical loading, electrical endurance is different due to every loading test conditions are different. Please contact Hongfa for more support.



HONGFA RELAY

ISO9001, IATF16949, ISO14001, ISO45001, IECQ QC 080000, ISO/IEC 27001 CERTIFIED

2025 Rev. 1.00

SAFETY CERTIFICATION

UL/CUL	AgSnO ₂	100A 14VDC 55°C resistive load
TÜV	AgSnO ₂	100A 14VDC 85°C resistive load

Notes: The loading data in the chart are only for coil without paralleled diode or other components, If using paralleled diode or other components, please contact Hongfa for more technical support. If the load conditions are not consistent with this table, please provide the corresponding detailed conditions to Hongfa for more support.

COIL DATA¹⁾

Nominal Voltage VDC	Operation Voltage VDC max.	Release Voltage VDC min.	Coil Resistance Ω	Allowed max.coil voltage ²⁾ VDC	Coil Sustaining Voltage ³⁾ VDC	Nominal power W (23°C)
12	8.0	1.0	110×(1±10%)	18	(50% to 100%)U _N (at 23°C)	Approx. 1.31
24	16.0	2.0	384×(1±10%)	36	(50% to 60%)U _N (at 85°C)	Approx. 1.50

Notes: 1) The above ambient temp is 23°C.

2) Contact no loading current, allowed coil maximum continuous operation voltage is 1 hr, cannot exceed for long time to avoid coil too hot to burn out.

3) The value for coil sustaining voltage is under the condition of non-vibration, shocking condition, coil sustaining voltage with 100ms nominated voltage.

ORDERING INFORMATION¹⁾

Type	HFV7-GP /	12	-24	-H	S	T	C	(XXX)
Load voltage ²⁾	12: 12VDC							
Coil voltage	12: 12VDC 24: 24VDC							
Contact arrangement	H: 1 Form A							
Protection class	S: Sealed(IP6K7) ³⁾							
Contact material	T: AgSnO ₂							
Terminal type	C: Routine terminal width, long terminal (A size is 3.8mm, refer to outline dimensions) N/A: Routine terminal width, short terminal (A size is 2.25mm, refer to outline dimensions)							
Special code ⁴⁾	XXX: Customer special requirement Nil: Standard							

Notes: 1) If using paralleled diode or other components within or without relay in actual situation, please contact Hongfa for more technical support.

2) When contact voltage and the coil voltage are the same, the contact voltage and the connector will be omitted; When contact voltage and the coil voltage are not the same, it should show contact voltage.

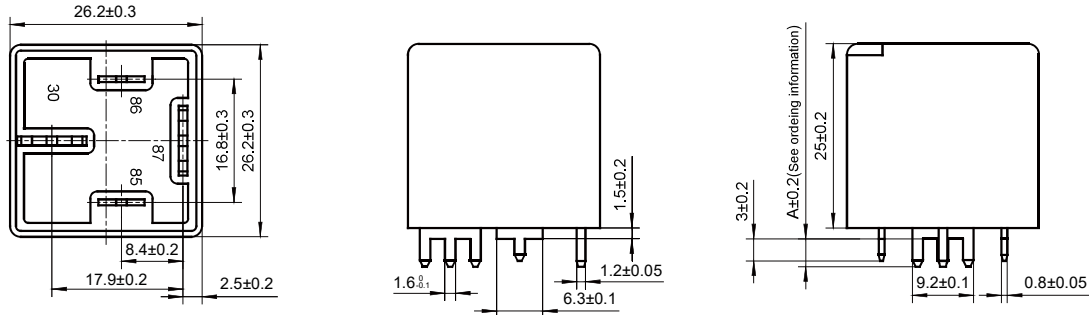
3) Hongfa only guarantee the sealed status before installation. If the using environment has phosphorus, H₂S, SO₂, NO₂ noxious gas, need to test first; Using relay in organosilicone environment is prohibited; In order to enhance the relay heat resisting ability, recommend to use sealed relay; When relay put in PCB and soldered, if the whole board needs to wash or surface treatment, please contact with Hongfa for proper soldering condition and part specification.

4) The parameters for the product with special code will subject to the actual specification.

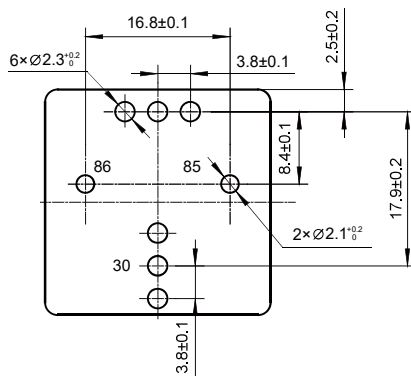
OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT¹⁾⁴⁾

Unit: mm

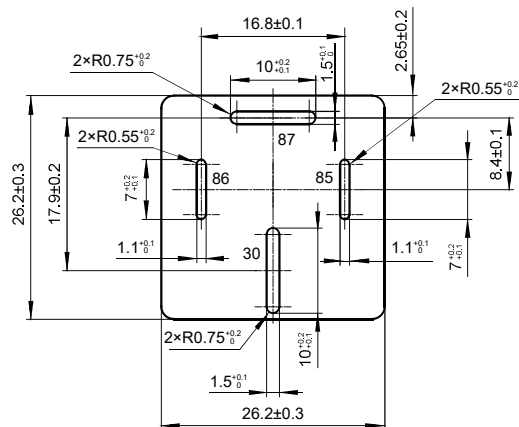
Outline Dimensions



PCB Layout1⁽²⁾
(Bottom view)



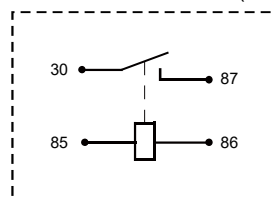
PCB Layout2⁽³⁾
(Bottom view)



- Notes:**
- 1) In order to raise the loading ability of relay, when choosing terminal A size is 2.25mm and the PCB layout 2, need to pay attention to the soldering condition, to avoid relay housing stick to PCB in high temperature for a long time that the housing will have slightly deformation. PCB Tg is 150°C.
 - 2) In principle, Hongfa recommends relay terminal A size is 3.8mm, match PCB layout 1.
 - 3) In special occasion, customer needs terminal A size 2.25mm matches installation, matching PCB layout 2, customer should be responsible for soldering condition and application.
 - 4) To improve the short circuit current resistance of the product, it is required to connect the 30 and 86 leads to both the positive or negative terminals of the power supply.

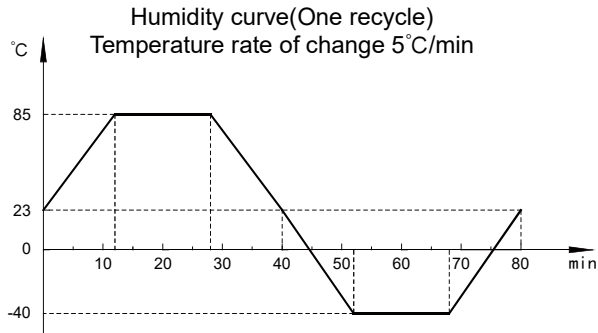
Wiring diagram

HFV7-GP/12-□□-HST□(XXX)



CHARACTERISTIC CURVES

1. Electrical endurance test ambient temperature curve

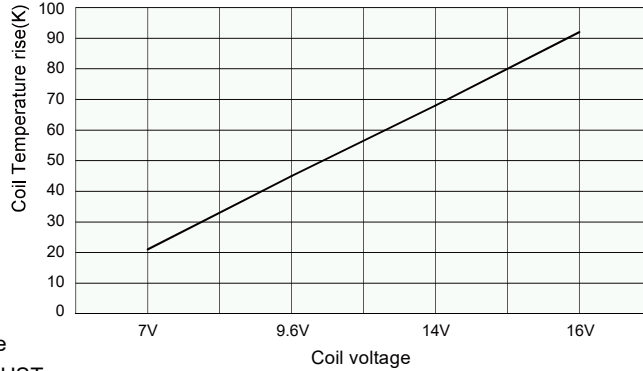


Remark:
1) Lowest temp:-40°C
2) Highest temp:85°C

2. Coil temperature rise and terminal temperature

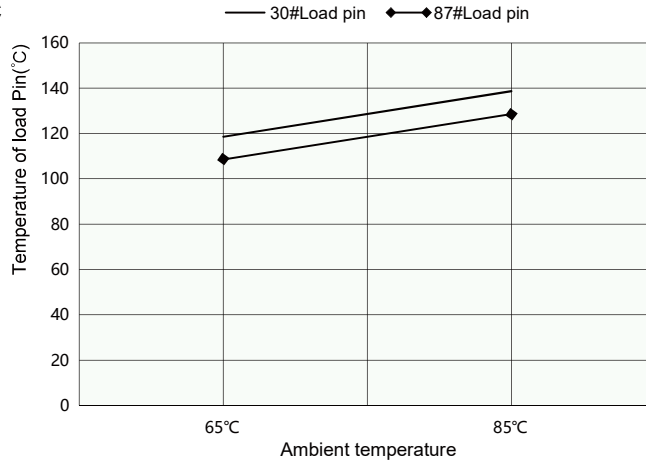
1) Coil temperature rise curve(85°C)

DUTs:HFV7-GP/12-HST
Qty:3pcs
Contact current:100A



2) Terminal temp curve

DUTs:HFV7-GP/12-HST
Qty:3 pcs
Contact current:100A
Coil voltage:14VDC



- Notes:** 1) Relay is installed on the PCB, using 25mm² wire to connect the PCB and loading component.
2) The PCB size: 4 layers board, copper foil thickness 2oz, the length and the width for each layer is (64±1)mm, the PCB Tg is 150°C.
3) The above data are collected based on samples test, the different batches samples may have small differences, only for reference.

Disclaimer

The specification is for reference only. See to "Terminology and Guidelines" for more information. Specifications subject to change without notice. We could not evaluate all the performance and all the parameters for every possible application. Thus the user should be in a right position to choose the suitable product for their own application. If there is any query, please contact Hongfa for the technical service. However, it is the user's responsibility to determine which product should be used only.

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