



HF7103

HIGH-VOLTAGE COUPLING SIGNAL RELAY



Features

- High-voltage Coupling Signal Relay, ideal alternative to reed relay
- Various types of contacts are available to meet different circuit designs
- Dielectric strength:
 - ≥10000VDC (between open contacts) is available
 - ≥15000VDC (between coil & contacts) is available
- Low power type with coil power consumption of 250mW is available, which consumes 30% less power than similar products.
- High voltage switching capability at 4500VDC 10mA (suitable for high voltage type)
- High power switching capability at 1000VDC 0.3A (suitable for high voltage type)
- High insulation resistance ≥1TΩ
- The version of 8A continuous carrying current available (For 2 form A type are connected in parallel)
- Meets IEC 61010-1 reinforce insulation
- With built-in component for coil reverse peak absorption, simplifying circuit design

RoHS compliant

CONTACT DATA

Type	HF7103 / □-H□ (AN7)	HF7103 / □-H
Contact arrangement	1A (High voltage type(Between open contacts))	1A (Standard type, low power consumption type)
Contact resistance ¹⁾	≤150mΩ (10mA 30mVDC,PCB type) ≤200mΩ (10mA 30mVDC,lead type)	≤150mΩ (10mA 30mVDC)
Contact material	Ag Alloy+Gold plated	Ag Alloy+Gold plated
Contact rating	4500VDC 10mA (1×10 ⁴ OPS)	2500VDC 5mA (1×10 ⁴ OPS)
Electrical endurance (Resistive,Load switching) ¹⁾	3000VAC 10mA (1×10 ⁴ OPS) 1000VDC 0.3A (1×10 ⁴ OPS)	2000VAC 5mA (1×10 ⁴ OPS) 1000VDC 0.15A (1×10 ⁴ OPS)
Max.switching voltage	5000VDC/3500VAC	3000VDC/2500VAC
Max.switching current	4.0A	4.0A
Max.continuous current	5.0A(40℃)	5.0A(40℃)
Max.switching power	300W	150W
Min. applicable load ²⁾	6VDC 1mA	6VDC 1mA
Parasitic capacitance (Typ.,10kHz)	1pF (PCB) /2pF (PCB+lead type)	1pF
Short Circuit Resistance Current ³⁾	60A	60A
Mechanical endurance	1×10 ⁸ OPS	1×10 ⁸ OPS

Type	HF7103/□-2H	HF7103/□-Z	HF7103/□-2Z
Contact arrangement	2A	1C	2C
Contact resistance ¹⁾	≤150mΩ (10mA 30mVDC)	≤150mΩ (10mA 30mVDC)	≤150mΩ (10mA 30mVDC)
Contact material	Ag Alloy+Gold plated	Ag Alloy+Gold plated	Ag Alloy+Gold plated
Contact rating	2000VDC 5mA (1×10 ⁴ OPS)	2000VDC 5mA (1×10 ⁴ OPS)	2000VDC 5mA (1×10 ⁴ OPS)
Electrical endurance (Resistive,Load switching) ¹⁾	1500VAC 5mA (1×10 ⁴ OPS) 1000VDC 0.1A (1×10 ⁴ OPS)	1500VAC 5mA (1×10 ⁴ OPS) 800VDC 0.1A (1×10 ⁴ OPS)	1500VAC 5mA (1×10 ⁴ OPS) 800VDC 0.1A (1×10 ⁴ OPS)
Max.switching voltage	2500VDC/2000VAC	2000VDC/1500VAC	2000VDC/1500VAC
Max.switching current	4.0A	3.0A	3.0A
Max.continuous current	5.0A(40℃, Single group) 8.0A(40℃, Two sets in parallel)	2.0A(40℃)	2.0A(40℃)
Max.switching power	100W	80W	80W
Min. applicable load ²⁾	6VDC 1mA	6VDC 1mA	6VDC 1mA
Parasitic capacitance (Typ.,10kHz)	1pF	1pF	1pF
Short Circuit Resistance Current ³⁾	60A	40A	40A
Mechanical endurance	1×10 ⁸ OPS	1×10 ⁸ OPS	1×10 ⁸ OPS



HONGFA RELAY

ISO9001,IATF 16949 ,ISO14001,ISO45001, IECQ QC 080000, ISO/IEC 27001 CERTIFIED XP 2024 Rev. 1.00

CONTACT DATA

- Notes:** 1) Electrical endurance switching frequency is 1s on/3s off.
 2) Min. applicable load is reference value. and this reference value may change depending on the on-off frequency, environmental conditions, desired contact resistance and reliability, etc., so please conduct a confirmation test with an actual load before use.
 3) The test waveform for short-circuit current capacity (when the contact is first connected and then powered on) is a peak at pulse width of 1ms. In practical applications, please conduct a confirmation test with actual load considering the difference in current waveform.

CHARACTERISTICS

23°C

Type		HF7103 / □-H□ (AN7)	HF7103 / □-H
Insulation resistance		1TΩ (500VDC)	1TΩ (500VDC)
Dielectric strength	Between open contacts	10000VDC 1min	6500VDC 1min
	Between coil & contacts	10000VDC 1min	Standard type: 15000VDC 1min Low power consumption type(AL7): 10000VDC 1min
Surge Voltage	Between open contacts	12000V (1.2/50μs)	7000V (1.2/50μs)
	Between coil & contacts	12000V (1.2/50μs)	16000V (1.2/50μs)
Operate time (Including bounce time)		≤6.0ms	≤6.0ms
Release time (With built-in component for coil reverse peak absorption)		≤3.0ms	≤3.0ms
Vibration resistance	Destructive	10Hz to 55Hz, DC 3.3mm	10Hz to 55Hz, DC 3.3mm
	Functional	10Hz to 55Hz, DC 5.0mm	10Hz to 55Hz, DC 5.0mm
Shock resistance	Destructive	735m/s ²	735m/s ²
	Functional	980m/s ²	980m/s ²
Ambient temperature		-20°C to 70°C	-20°C to 70°C
Humidity		5% to 85% RH	5% to 85% RH
Termination		PCB/PCB+lead type	PCB
Unit weight		Approx. 12g (PCB) / Approx. 21g (PCB+lead type)	Approx. 12g
Construction		Plastic sealed	Plastic sealed

Type		HF7103/□-2H	HF7103/□-Z	HF7103/□-2Z
Insulation resistance		1TΩ (500VDC)	1TΩ (500VDC)	1TΩ (500VDC)
Dielectric strength	Between open contacts	6000VDC 1min	6000VDC 1min	6000VDC 1min(NO) 4500VDC 1min(NC)
	Between coil & contacts	8500VDC 1min	7000VDC 1min	7000VDC 1min
	Between contacts	6000VDC 1min	6000VDC 1min	6000VDC 1min
Surge Voltage	Between open contacts	6500V (1.2/50μs)	6500V (1.2/50μs)	6500V (1.2/50μs) (NO) 5000V (1.2/50μs) (NC)
	Between coil & contacts	9000V (1.2/50μs)	7500V (1.2/50μs)	7500V (1.2/50μs)
	Between contacts	6500V (1.2/50μs)	6500V (1.2/50μs)	6500V (1.2/50μs)
Operate time (Including bounce time)		≤6.0ms	≤6.0ms	≤6.0ms
Release time (With built-in component for coil reverse peak absorption)		≤3.0ms	≤3.0ms	≤3.0ms
Vibration resistance	Destructive	10Hz to 55Hz, DC 3.3mm	10Hz to 55Hz, DC 3.3mm	10Hz to 55Hz, DC 3.3mm
	Functional	10Hz to 55Hz, DC 5.0mm	10Hz to 55Hz, DC 5.0mm	10Hz to 55Hz, DC 5.0mm
Shock resistance	Destructive	735m/s ²	735m/s ²	735m/s ²
	Functional	980m/s ²	980m/s ²	980m/s ²
Ambient temperature		-20°C to 70°C	-20°C to 70°C	-20°C to 70°C
Humidity		5% to 85% RH	5% to 85% RH	5% to 85% RH
Termination		PCB/PCB+lead type	PCB	PCB
Unit weight		Approx. 12g	Approx. 12g	Approx. 12g
Construction		Plastic sealed	Plastic sealed	Plastic sealed

Notes: The data shown above are initial values.

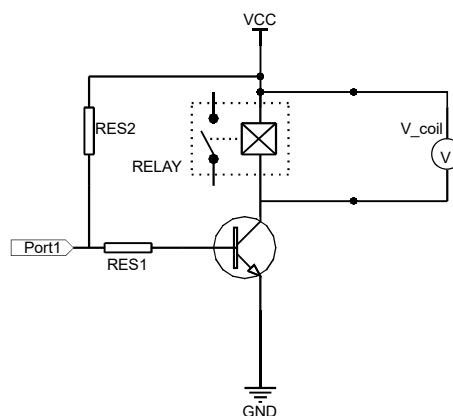
COIL DATA

at 23°C

Coil Code	Coil voltage VDC	Pick-up Voltage ¹⁾ VDC max.	Drop-out Voltage ¹⁾ VDC min.	Nominal Power mW approx.	Coil Voltage Current mA approx.	Max. Voltage VDC ³⁾
HF7103/5-H(AN7)	5	4.0	0.5	500	100	7.5
HF7103/12-H(AN7)	12	9.0	1.2	500	42	18.0
HF7103/24-H(AN7)	24	18.0	2.4	500	21	36.0
HF7103/5-HW(AN7)	5	4.0	0.5	500	100	7.5
HF7103/12-HW(AN7)	12	9.0	1.2	500	42	18.0
HF7103/24-HW(AN7)	24	18.0	2.4	500	21	36.0
HF7103/5-H	5	4.0	0.5	430	86	7.5
HF7103/12-H	12	9.0	1.2	480	40	18.0
HF7103/24-H	24	18.0	2.4	650	27	36.0
HF7103/5-H(AL7)	5	4.0	0.5	250	50	7.5
HF7103/12-H(AL7)	12	9.0	1.2	250	21	18.0
HF7103/24-H(AL7)	24	18.0	2.4	250	10.5	36.0
HF7103/5-2H	5	4.0	0.5	500	100	7.5
HF7103/12-2H	12	9.0	1.2	500	42	18.0
HF7103/24-2H	24	18.0	2.4	500	21	36.0
HF7103/5-Z	5	4.0	0.5	400	80	7.5
HF7103/12-Z	12	9.0	1.2	400	33.4	18.0
HF7103/24-Z	24	18.0	2.4	400	17	36.0
HF7103/5-2Z	5	4.0	0.5	400	80	7.5
HF7103/12-2Z	12	9.0	1.2	400	33.4	18.0
HF7103/24-2Z	24	18.0	2.4	400	17	36.0

Notes:1) The data shown above are initial values.

2) To supply rated step voltage to coil is the foundation of relay proper operation. Please make sure the applied voltage to the coil reach at rated values. Please refer to the typical diagram below for single side stable relay. The "V-coil" is the rated voltage.



3) Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

4) The relay has integrated coil anti peak absorption devices internally, so there is no need to reverse parallel the freewheeling diodes at both ends of the coil in practical use.

5) During the relay pick-up or drop-out processes, there are stages of contact pressure change, contact vibration and unstable contact etc. When the voltage applied to coil is gradually changed, it will lengthen the unstable stage and affect relay endurance. To reduce this influence, please apply step voltage (switching circuit) to relay coil.

ORDERING INFORMATION

Type	HF7103/	12	-H	W	(XXX)
Coil voltage	5, 12, 24VDC				
Contact arrangement	H: 1 Form A 2H: 2 Form A Z: 1 Form C 2Z: 2 Form C				
Terminal type	Nil: PCB W: PCB+lead type (Only for 1 form A(Electrical endurance10 kVDC between open contacts), With Special code AN7)				
Special code	XXX: Customer special requirement Nil: Standard type AC9: for AC system that needs to meet arc monitoring level-9 AN7: High voltage type (Only for 1 form A(Electrical endurance10 kVDC between open contacts)) AL7: Low power consumption type (Only for 1 form A(Electrical endurance6.5 kVDC between open contacts))				

Notes: 1) For specifications with lead wire installation, the length of the lead wire can be customized according to customer needs.
 2) Products with 1 form A are available in two Pin type.
 With Special code AN7: Indicates that the withstand voltage between the open contacts is 10 kVDC, and the specifications are HF7103 /□-H (AN7) and HF7103 /□-HW(AN7).
 Without Special code AN7: Indicates that the withstand voltage between the disconnecting contacts is 6.5 kVDC, and the specifications are HF7103 /□-H and HF7103 /□-H(AL7).
 3) Except for 1h, the contact forms are all unique pin positions.
 4) The customer special requirement express as special code after evaluating by Hongfa.

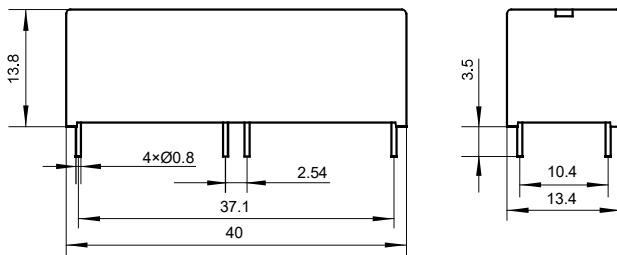
OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

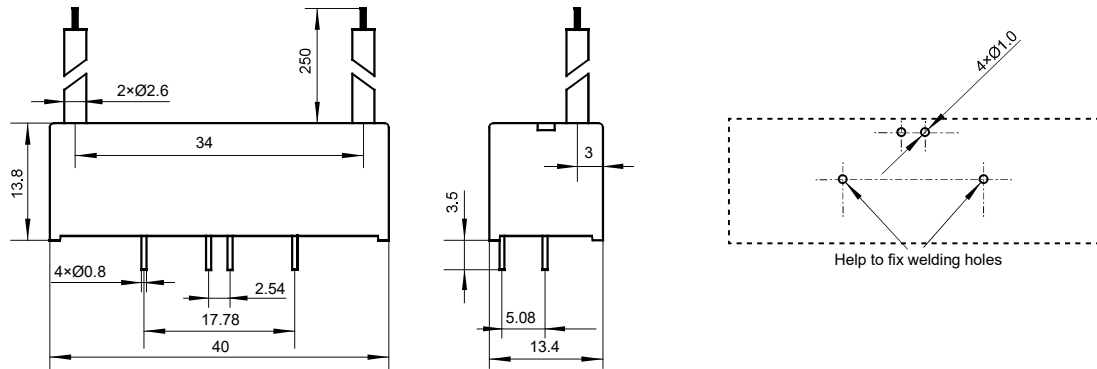
Outline Dimensions

PCB Layout (Top view)

HF7103/□-H (AN7)



HF7103/□-HW (AN7)



Notes: "□" indicates coil voltage.

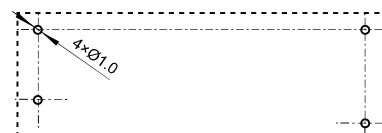
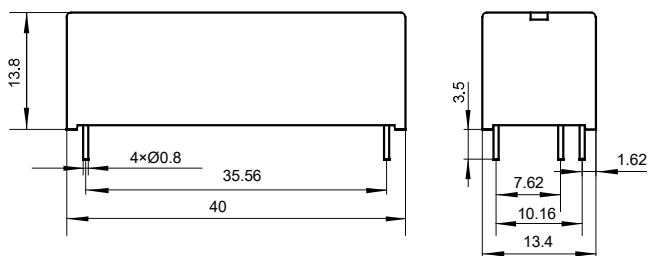
OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

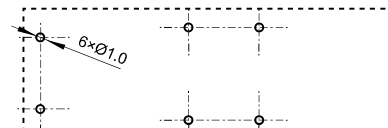
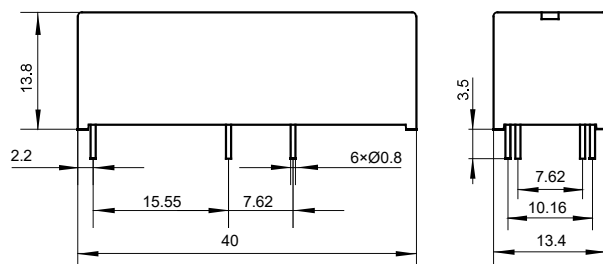
Outline Dimensions

PCB Layout (Top view)

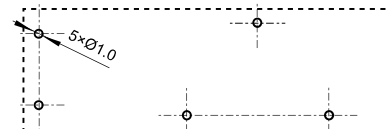
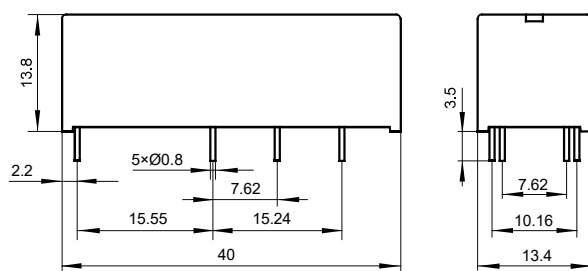
HF7103/□-H, HF7103/□-H (AL7)



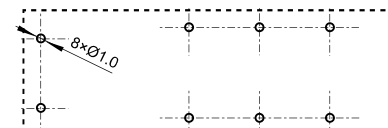
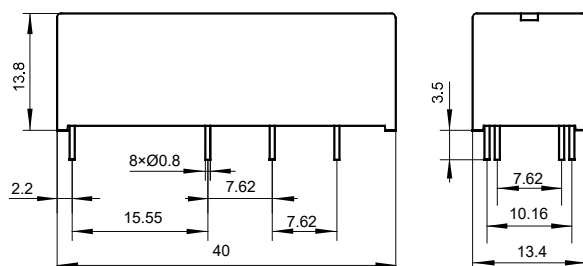
HF7103/□-2H



HF7103/□-Z



HF7103/□-2Z



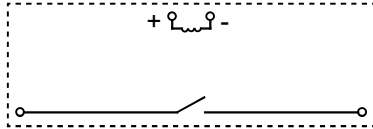
Notes: "□" indicates coil voltage.

OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

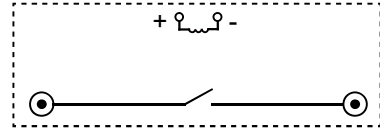
Unit: mm

Wiring Diagram (Top view)

HF7103/□-H (AN7)



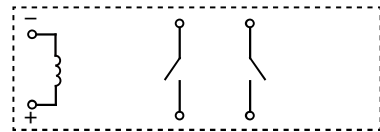
HF7103/□-HW (AN7)



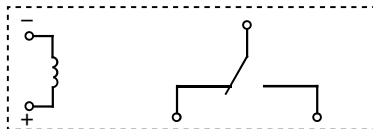
HF7103/□-H, HF7103/□-H (AL7)



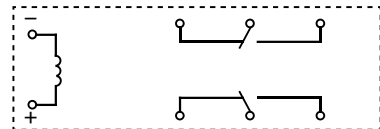
HF7103/□-2H



HF7103/□-Z



HF7103/□-2Z



Notes: 1) In case of no tolerance shown in outline dimension: outline dimension $\leq 1\text{mm}$, tolerance should be $\pm 0.2\text{mm}$; outline dimension $> 1\text{mm}$ and $\leq 5\text{mm}$, tolerance should be $\pm 0.3\text{mm}$; outline dimension $\geq 5\text{mm}$, tolerance should be $\pm 0.4\text{mm}$.
2) The tolerance without indicating for PCB layout is always $\pm 0.1\text{mm}$.

CHARACTERISTIC CURVES

Notice

- 1) To avoid using relays under strong magnetic field which will change the parameters of relays such as pick-up voltage and drop-out voltage.
- 2) Energizing coil with rated voltage is basic for normal operation of a relay, please make sure the energized voltage to relay coil have reached the rated voltage.
- 3) During the relay pick-up or drop-out process, there are stages such as changes in contact pressure, contact bouncing and unstable contact. When the voltage applied to the coil changes gradually, it will lengthen the duration of these stable phases, which would affect the life endurance. To minimize the impact on relay, please use step voltage (using a switching circuit) to power the coil.
- 4) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 5) Please use wave soldering or manual soldering for straight-in relay. Do not reflow soldering.
- 6) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 7) Regarding the plastic sealed relay, we should leave it cooling naturally until below 40°C after welding, then clean it and deal with coating, remarkably the temperature of solvents should also be controlled below 40°C . Please avoid cleaning the relay by ultrasonic, avoid using the solvents like gasoline, Freon, and so on, which would affect the configuration of relay or influence the environment.
- 8) When applied with continuous current, the heat from relay coil will age its isolation. Thus, please do not ground connected the coil to reduce electrical erosion if possible. And please provide protection circuit to avoid broken wire and losses.
- 9) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidelines of relay."

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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