

ISO9001 ISO/TS16949 ISO14001 OHSAS18001 IECQ QC080000 CERTIFIED



HONGFA RELAY

● GENERAL RELAY

# HONGFA RELAY



GENERAL RELAY

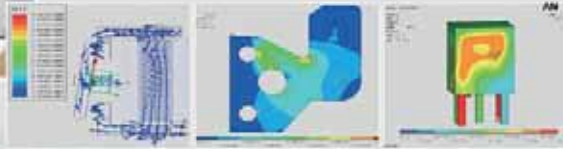
[www.hongfa.com](http://www.hongfa.com)



RoHS compliant

ISO9001 ISO/TS16949 ISO14001 OHSAS18001 IECQ QC080000 CERTIFIED

# PROFESSIONAL RELAY MANUFACTURER







## COMPANY INTRODUCTION

HONGFA

HONGFA (Stock code: 600885, SSE) always conforms to its business philosophy -- "Never rest on our laurels, make more progress" and uses this philosophy as the basis of its operational policy -- "Market-oriented concept, win by high quality". The following companies are fully or partially owned by HONGFA-- Zhangzhou Hongfa, Jinhai, Xi'an Hongfa, Hongyuanda, Hongfa Automotive Electronics, Hongfa Signal Electronics, Hongfa Hermetically Sealed Relays, Hongfa Power Electronics, Hongzhou, Hongfa Wufeng, Hongfa Electrical Safety & Control, Hongfa Electric, Jinyue, Jinbo, Jinghe, Hongfa Industrial Robot, Hongfa Precision Machinery, Shanghai Hongfa, Beijing Hongfa, Sichuan Hongfa (Sales), Hongfa Hongkong, Hongfa Europe GmbH, Hongfa America Inc., KG Technologies Inc. HONGFA products include as relays, low-voltage devices, switchgears, precise parts, automatic equipment, etc..

HONGFA has a wealth of experience in relays development and manufacturing after many years of hard work. HONGFA is now the leading relays manufacturer in China and is ranked No. 1 in the industry for overall economic efficiency. HONGFA has also become one of the leading relays sellers and manufacturers in the world. From 1995, HONGFA has continuously ranked among 'China Top-100 Electronic Components Enterprises' with a current position of the 9th and has received many awards: HONGFA has recognized as one of the China Top 100 Enterprises Of Electronic Information for the first time as the first finalist in relay, in 2014. HONGFA is authorized as "the Advanced Enterprise to implement High Technology in Torch Plan" by the Ministry of Science and Technology of PRC. HONGFA has been awarded "National Export-Oriented Enterprise of Automotive Components" by the Ministry of Commerce of PRC and National Development and Reform Commission. HONGFA is the only company being awarded this honor in the Chinese relay industry.

HONGFA has a full set of quality assurance systems including ISO9001, ISO/TS16949, ISO14001, OHSAS18001, GJB9001A, IECQ QC 080000. HONGFA has also been honorably awarded "High Quality Product exempt from National Inspection". HONGFA products are UL/CUL, VDE, TÜV, CQC and CCC approved. With high performance, top quality, competitive price and excellent technical services, HONGFA Relays have become the most perfect choice for the customers.

Since the establishment, HONGFA has been focusing on technology innovation. HONGFA has introduced the most advanced relays manufacturing technology and equipment available worldwide into the factories to upgrade our technology level and the product quality. HONGFA engineers use 3-D CAD in new product development and mould tooling design. The technology and the equipment of all the mould tooling, parts manufacturing and products assembly and the production environment are in the leading position in Chinese relays industry. HONGFA Testing Centre is the biggest relays testing and analyzing laboratory with the most advanced technology in China. HONGFA Testing Centre is approved by CNAS and it is approved by America UL as a CTDP lab. It is approved by Germany VDE as a TDAP lab -For VDE's TDAP lab, there is only one in China and only six in the world. At the same time, HONGFA Testing Centre is also the unique partnership for VDE in electronic components in the world. The testing capability on RoHS compliance in the chemistry analysis laboratory is also approved by CNAS, which means that Hongfa is able to supply to the customers accurate, credible and authorized inspection data and test reports.

HONGFA has a wide range of relays, including Signal relays, Power relays, Automotive relays & modules, Latching relays, HVDC relays, Industrial relays, Safety relays and Hermetically sealed relays. The company has the annual production capacity of 1.5 billion pieces of relays.

Now HONGFA has become the world leading relays research and manufacturing base. Hongfa People are looking forward to growing, developing and prospering with all the partners and customers worldwide together.

PERSEVERE FOR PROGRESS.

STRIVE FOR EXCELLENCE!

# WE ARE CONTROL EXPERT

Hongfa is a professional relay manufacturer and has a wide range of relays. Hongfa relays are UL/CUL, VDE, TÜV, CQC and CCC approved. They are widely used in those fields like industrial control, automotive, telecom equipment, home appliances, metering instruments, security and alarm systems, medical appliances and aviation.

## HONGFA PRODUCTS:



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### Notice

Dear Sir or Madam,

Many thanks for your choosing Hongfa products!

Please note the following important information:

1. Since all Hongfa products are RoHS compliant, we will remove the special code (551) or (555) from our current ordering types from April 1st, 2008. Please place your orders according to the newest ordering types. In the meantime, we hereby declare that all Hongfa products are RoHS compliant, no matter suffix (551) or (555) is used or not.
2. We have started to switch the old ordering type to the new one since 2005 (For example, the old ordering type is JQX-115F and the new one is HF115F). At the moment we strongly recommend that you should use the new ordering type for your orders. Please refer to "Comparative list between the old and new ordering type".
3. For the plastic sealed type, after welding, the relay should be cooled down below 40°C naturally, then start washing and surface handling, the temperature of washing liquid and surface handling cleanser should be controlled also below 40°C. When washing, please do not use washing liquid such as ultrasonic, gasoline, Freon etc. which may affect the relay structure and environment. For covers made from PC material, please prevent from contamination by some organic solvents; otherwise it is likely to bring to a chemic refection which leads to bulging or crack.

Further more, all the data sheets are subject to change without notice. For updated information please visit our website: [www.hongfa.com](http://www.hongfa.com).

Should you have any question, please feel free to contact us.



## QUICK INDEX (Classification)

<b>Signal Relay</b>	<b>44</b>	HF21FF	189
HFD16	45	HF152F	192
HFD17	48	HF152FD	195
HFD23	51	HF7520	198
HFD27	54	HF163F-L	203
HFD2	57	HFE7	206
HFD3	61	HF118F	210
HFD3-I	67	HF115F	213
HFD3-V	73	HF115F-A	217
HFD31	79	HF115F-T/TH	220
HFD4	84	HF115F-H	223
HFD4-V	90	HF115F-I	226
HFD42	95	HF115F-Q	229
		HF115F-S	232
		HF115F-L 1 pole	234
		HF115F-L 2 pole	237
		HF115F-LS	240
		HF115FP	243
		HF115FK	246
		HF115FK-T	250
		HF158F	253
		HF158F-V 1 pole	256
		HF175F	259
		HF14FF	262
		HF14FW	265
		HF140FF	268
		HF25F	272
		HF62F	276
		HF102F	279
		HF161F	282
		HF161F-W	285
		HF160F	288
		HF166F	291
		HF37F	294
		HF165FD	297
		HF165FD-G	301
		HF165F	304
		HF170F	307
		HF105F-1	309
		HF105F-2	315
		HF105F-4	319
		HF105F-5	323
		HF2100	327
		HF2110/HF2120	331
		HF2150/HF2151	337
		HF2160	341
<b>Power Relay</b>	<b>100</b>		
HF49FD	102		
HF41F	105		
HF46F	109		
HF46FB	112		
HF46F-G	114		
HF42F	117		
HF32FA	120		
HF32FA-T	123		
HF32FA-G	126		
HF32FV	129		
HF32FV-16	132		
HF32FV-T	134		
HF32FV-G	137		
HF32F	140		
HF32F-G	143		
HF171F	145		
HF33F	148		
HF36F	152		
HF36FD	155		
HF162F	157		
HF8	159		
HF3FA	162		
HF3FA-W	165		
HF3FA-T	168		
HF3FD	171		
HF3FF	174		
HF3F-L	177		
HF3FF-M	180		
HF7FF	183		
HF7FD	186		



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## QUICK INDEX (Classification)

<b>Power Relay</b>	100
HF172F-100	345
HF172F-140	347
HF116F-1	349
HF116F-2	353
HF116F-3	357
HF116F-G	361
HF116F-80	365
HF176F	367
HF167F	369
HF92F	371
HF78F	375
HF84F	378
HF94F	380
HF8565	383



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## QUICK INDEX (Alphabetical)

### HF

HF3F-L	177	HF115F	213
HF3FA	162	HF115F-A	217
HF3FA-W	165	HF115F-H	223
HF3FA-T	168	HF115F-I	226
HF3FD	171	HF115F-L 1 pole	234
HF3FF	174	HF115F-L 2 pole	237
HF3FF-M	180	HF115F-LS	240
HF7FD	186	HF115F-S	232
HF7FF	183	HF115F-T/TH	220
HF8	159	HF115FP	243
HF14FF	262	HF115FK	246
HF14FW	265	HF115FK-T	250
HF21FF	189	HF116F-1	349
HF25F	272	HF116F-2	353
HF32F	140	HF116F-3	357
HF32F-G	143	HF116F-80	365
HF32FA	120	HF116F-G	361
HF32FA-T	123	HF118F	210
HF32FA-G	126	HF140FF	268
HF32FV	129	HF152F	192
HF32FV-16	132	HF152FD	195
HF32FV-T	134	HF158F	253
HF32FV-G	137	HF158F-V 1 pole	256
HF33F	148	HF160F	288
HF36F	152	HF161F	282
HF36FD	155	HF161F-W	285
HF37F	294	HF162F	157
HF41F	105	HF163F-L	203
HF42F	117	HF165F	304
HF46F	109	HF165FD	297
HF46FB	112	HF165FD-G	301
HF46F-G	114	HF166F	291
HF49FD	102	HF167F	369
HF62F	276	HF170F	307
HF78F	375	HF171F	145
HF84F	378	HF172F-100	345
HF92F	371	HF172F-140	347
HF94F	380	HF175F	259
HF102F	279	HF176F	367
HF105F-1	309	HF2100	327
HF105F-2	315	HF2110/HF2120	331
HF105F-4	319	HF2150/HF2151	337
HF105F-5	323	HF2160	341
HF115F-Q	229	HF7520	198
		HF8565	383



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## QUICK INDEX (Alphabetical)

### HFD

HFD16	45
HFD17	48
HFD2	57
HFD23	51
HFD27	54
HFD3	61
HFD31	79
HFD3-I	67
HFD3-V	73
HFD4	84
HFD4-V	90
HFD42	95

### HFE

HFE7	206
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HONGFA RELAY

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# SELECTION GUIDE

Terminals			Coil		Relay Type	Contact Form	Page	Switching Current											[A]	
PCB	QC	Plug-in Other	DC	AC				0	5	10	15	20	25	30	40	60	80	100	200	
					HFD23															
					HF49FD															
					HF46F															
					HF32FA															
					HF32FA-T															
					HF32FV															
					HF41F															
					HF171F															
					HF163F-L															
					HF46F-G															
					HF32FA-G															
					HF32FV-T															
					HF32FV-G															
					HF32F															
					HF32F-G															
					HF33F															
					HF36F															
					HF36FD															
					HF162F															
					HF8															
					HF3FA															
					HF3FA-T															
					HF3FD															
					HF3FF															
					HF3F-L															
					HF7FF															
					HFE7															
					HF118F															
					HF115F-H															
					HF14FF															
					HF158F-V 1pole															
					HF3FF-M															
					HF21FF															
					HF32FV-16															
					HF7FD															
					HF7520															
					HF115F															
					HF115F-A															
					HF115F-T/TH															
					HF115F-I															
					HF115F-S															
					HF115F-L 1pole															
					HF115F-LS															
					HF115FK															
					HF115FK-T															
					HF158F															
					HF62F															
					HF84F															
					HF78F															
					HF94F															
					HF152F															
					HF152FD															
					HF115F-Q															
					HF14FW															
					HF25F															

1A (SPST-NO)

How to use the table: Please select the CONTACT FORM. Then choose the relay according to SWITCHING CURRENT and OTHERS (for instance, coil voltage, terminal style, etc.).

# SELECTION GUIDE

Terminals			Coil		Relay Type	Contact Form	Page	Switching Current	[A]											
PCB	QC	Plug-in/Other	DC	AC				0	5	10	15	20	25	30	40	60	80	100	200	
					HF102F	1A (SPST-NO)	279													
					HF161F		282													
					HF160F		288													
					HF161F-W		285													
					HF37F		294													
					HF165FD		297													
					HF105F-1		309													
					HF105F-2		315													
					HF105F-4		319													
					HF105F-5		323													
					HF2100		327													
					HF2110/HF2120		331													
					HF2150/HF2151		337													
					HF2160		341													
					HF172F-100		345													
					HF116F-1		349													
					HF116F-2		353													
					HF116F-3		357													
					HF165F		304													
					HF165FD-G		301													
					HF172F-140	347														
					HF116F-G	361														
					HF176F	367														
					HF116F-80	365														
					HF167F	369														
					HF42F	2A	117													
					HF118F		210													
					HFE7		206													
					HF115F		213													
					HF115F-A		217													
					HF115F-L 2 Pole		237													
					HF115FK		246													
					HF140FF		268													
					HF175F		259													
					HF116F-1		349													
					HF116F-2		353													
					HF116F-3		357													
					HF92F		371													
					HF170F		307													
					HF116F-G		361													
					HFD23	1C (SPDT)	51													
					HFD16		45													
					HFD17		48													
					HF32FA		120													
					HF32F		140													
					HF46FB		112													
					HF41F		105													
					HF171F		145													
					HF84F		378													
					HF3FA-W		165													
					HF33F		148													
					HF36F		152													

**How to use the table:** Please select the **CONTACT FORM**. Then choose the relay according to **SWITCHING CURRENT** and **OTHERS** (for instance, coil voltage, terminal style, etc.).

# SELECTION GUIDE

Terminals			Coil		Relay Type	Contact Form	Page	Switching Current [A]													
PCB	QC	Plug-in/Other	DC	AC				0	5	10	15	20	25	30	40	60	80	100	200		
					HF8	1C (SPDT)	159														
					HF3FA		162														
					HF3FA-T		168														
					HF3FD		171														
					HF3FF		174														
					HF3F-L		177														
					HF7FF		183														
					HF21FF		189														
					HF7520		198														
					HF118F		210														
					HF115F-H		223														
					HF14FF		262														
					HF7FD		186														
					HF3FF-M		180														
					HF152F		192														
					HF115F		213														
					HF115F-A		217														
					HF115F-T/TH		220														
					HF115F-I		226														
					HF115F-L 1 pole		234														
					HF115FP		243														
					HF115FK		246														
					HF115FK-T		250														
					HF158F		253														
					HF152FD		195														
					HF94F		380														
					HF14FW		265														
					HF165FD		297														
					HF105F-1		309														
					HF105F-2		315														
					HF105F-4		319														
					HF105F-5		323														
					HF2100		327														
					HF2110/HF2120		331														
					HF2150/HF2151	337															
					HF2160	341															
					HFD4-V	2C	90														
					HFD31		79														
					HFD27		54														
					HFD3		61														
					HFD3-V		73														
					HFD4		84														
					HFD2		57														
					HFD3-I		67														
					HF115F		213														
					HF115F-A		217														
					HF115F-L 2 Pole		237														
					HF115FP		243														
					HF115FK		246														
					HF140FF		268														
					HF175FF		259														
					HF92F		371														

**How to use the table:** Please select the CONTACT FORM. Then choose the relay according to SWITCHING CURRENT and OTHERS (for instance, coil voltage, terminal style, etc.).






# SELECTION GUIDE

Terminals				Coil		Relay Type	Contact Form	Page	Switching Current	[A]											
PCB	QC	Plug-in	Other	DC	AC				0	5	10	15	20	25	30	40	60	80	100	200	
■				■		HFE7	1B (SPST-NC)	206	10												
■				■		HF118F		210	10												
■				■		HF115F-H		223	10												
■				■		HF21FF		189	15												
■				■		HF165FD		297	15												
■				■	■	HF105F-1		309	15												
■	■			■	■	HF105F-2		315	15												
■	■			■	■	HF105F-4		319	15												
■	■			■	■	HF105F-5		323	15												
■	■			■		HF2100		327	15												
■	■			■		HF2110/HF2120		331	15												
■	■			■		HF2150		337	15												
■	■			■		HF2160		341	15												
■	■			■		HF115F		213	15												
■	■			■	■	HF115F-A		217	15												
■	■			■	■	HF84F		378	15												
■	■			■	■	HF94F		380	15												
■	■			■		HF115F-Q		229	20												
■	■			■		HF14FW		265	20												
■	■			■		HF8565		383	40												
■				■		HF118F	2B	210	5												
■				■		HFE7		206	10												
■				■		HF115F		213	10												
■				■	■	HF115F-A		217	10												
■				■		HFE7	1A+1B	206	10												
■	■			■	■	HF94F		380	15												
■	■			■	■	HF166F		291	20												

**How to use the table:** Please select the CONTACT FORM. Then choose the relay according to SWITCHING CURRENT and OTHERS (for instance, coil voltage, terminal style, etc.).

## SIGNAL RELAY SELECTION CHART

Type	HFD16	HFD17	HFD23
Appearance			
Dimensions(L x W x H) mm	15.7 x 10.6 x 12.0	15.7 x 10.6 x 12.0	12.5 x 7.5 x 10.0
Features	<ul style="list-style-type: none"> <li>• 8A switching capability</li> <li>• UL insulation system: Class F available</li> <li>• Plastic sealed and flux proofed types available</li> <li>• Standard PCB layout</li> <li>• Product in accordance to IEC 60335-1 available</li> </ul>	<ul style="list-style-type: none"> <li>• 8A switching capability</li> <li>• UL insulation system: Class F available</li> <li>• Plastic sealed and flux proofed types available</li> <li>• Standard PCB layout</li> <li>• Product in accordance to IEC 60335-1 available</li> </ul>	<ul style="list-style-type: none"> <li>• Max.4A switching capability</li> <li>• High sensitive: 150mW</li> <li>• Plastic sealed type available</li> </ul>

### Contact Ratings

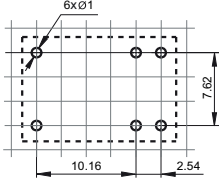
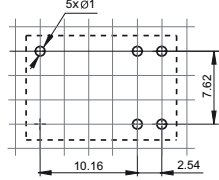
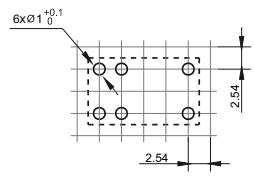
Contact Form	1C	1C	1A	1C
Contact Material	AgNi, AgSnO <sub>2</sub>	AgNi, AgSnO <sub>2</sub>	AgNi + Au plated	
Max. Switching Current (Res. load)	8A	8A	2A 1A	1A 1C
Max. Switching Voltage	250VAC / 220VDC	250VAC / 220VDC	125VAC / 60VDC	
Max. Switching Power	750VA / 90W	750VA / 90W	125VA / 60W	62.5VA / 30W
Rated Load (Resistive load)	3A 30VDC 5A 125VAC	3A 30VDC 3A 250VAC	1A 125VAC 2A 30VDC	0.5A 125VAC 1A 30VDC

### Coil Ratings

Rated Voltage	2.4VDC to 24VDC	2.4VDC to 24VDC	1.5VDC to 24VDC
Nominal Operating Power	0.2W	0.2W	0.15W, 0.2W

### Specifications



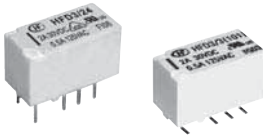
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	1100VAC	1500VAC	1000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 85°C	-40°C to 70°C
Operate / Release Time max.	5ms / 5ms	5ms / 5ms	5ms / 5ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	1x10 <sup>5</sup> OPS(NO:3A 30VDC) 1x10 <sup>4</sup> OPS(NO:5A 125VAC)	1 x 10 <sup>5</sup> OPS	9 x 10 <sup>4</sup> OPS (1C: 0.5A 125VAC 1A: 1A 125VAC)

Layout (Bottom view)			
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Terminal Type	PCB (DIP)	PCB (DIP)	PCB (DIP)
Approved Standards	UL/CUL TÜV	UL/CUL TÜV	UL/CUL CQC
File No.	E133481 R50075326	E133481 R50431434	E133481 CQC09002035070
Cross Reference	OMRON: G2E SONGCHUAN: 842 FUJITSU: FBR211 TE: OUA	FUJITSU: MZ AXICOM: V23101 HKE: HRS1K SANYOU: SYS1K	OMRON: G5V-1 PANASONIC: HY FUJITSU: SY NEC: TY TE: V23111
Page	45	48	51

Note: Specification and dimensions in this catalog are subject to change without notice.

## SIGNAL RELAY SELECTION CHART

Type	HFD27	HFD2	HFD3
Appearance			
Dimensions(L x W x H) mm	20.2 x 10.0 x 11.5	20.2 x 10.2 x 10.6	15.0 x 7.5 x 9.0
Features	<ul style="list-style-type: none"> <li>High switching capacity: 125VA/60W</li> <li>Matching 16 pin IC socket</li> <li>Epoxy plastic sealed for automatic wave soldering and cleaning</li> <li>Bifurcated contacts</li> </ul>	<ul style="list-style-type: none"> <li>High sensitive: 150mW</li> <li>High switching capacity: 90W/125VA</li> <li>Epoxy plastic sealed for automatic wave soldering and cleaning</li> <li>Matching standard 16 pin IC socket</li> <li>Bifurcated contacts</li> <li>Single side stable and latching types available</li> </ul>	<ul style="list-style-type: none"> <li>Meets EN60950/EN41003</li> <li>Surge voltage up to 2500VAC, meets FCC Part 68 and Telecordia</li> <li>2.5kV dielectric strength (between coil and contacts)</li> <li>Bifurcated contacts</li> <li>Single side stable and latching types available</li> </ul>

### Contact Ratings

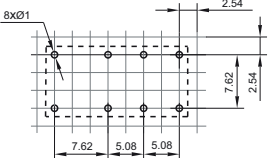
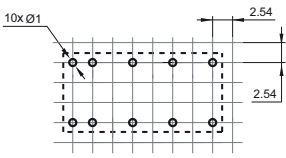
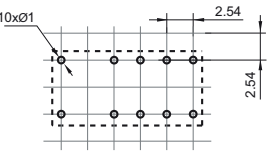
Contact Form	2C	2C	2C
Contact Material	AgNi + Au plated	Ag+Au plated, AgPd+Au plated	AgNi + Au plated
Max. Switching Current (Res. load)	20 A		
	15 A		
	10 A		
	5 A		
	3 A		
	2 A	2A	3A
1 A			
Max. Switching Voltage	240VAC / 120VDC	250VAC / 220VDC	277VAC / 220VDC
Max. Switching Power	125VA / 60W	125VA / 90W	62.5VA / 60W
Rated Load (Resistive load)	1A 125VAC 2A 30VDC	1A 125VAC 2A 30VDC 3A 30VDC	0.5A 125VAC 2A 30VDC

### Coil Ratings

Rated Voltage	3VDC to 48VDC	3VDC to 48VDC	1.5VDC to 48VDC
Nominal Operating Power	0.15W to 0.58W	0.075W, 0.1W, 0.15W, 0.2W	0.05W 0.1W, 0.14W, 0.2W

### Specifications

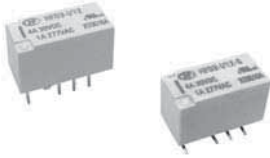
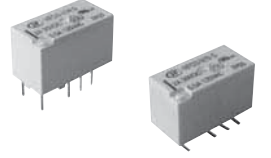
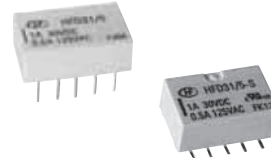
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	1500VAC	1500VAC (1 coil)	2000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
Operate / Release Time max.	7ms / 4ms	4.5ms / 3.5ms	4ms / 4ms
Mechanical Endurance min.	1 x 10 <sup>8</sup> OPS	1 x 10 <sup>8</sup> OPS	1 x 10 <sup>8</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS (at 1A 30VDC)	1 x 10 <sup>5</sup> OPS (at 1A 125VAC)	1 x 10 <sup>5</sup> OPS (at 0.5A 125VAC)

Layout (Bottom view)			
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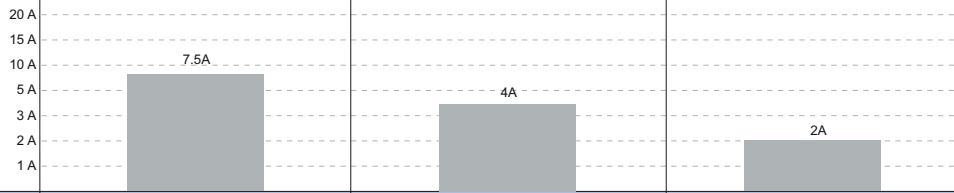
Terminal Type	PCB (DIP)	PCB (DIP)	PCB (DIP, SMT)
Approved Standards	UL/CUL TÜV CQC	UL/CUL TÜV CQC	UL/CUL VDE
File No.	E133481 R50316277 CQC09002033393	E133481 R50306253 CQC13002095175(Latching) CQC13002095174(Single side stable)	E133481 40018867 CQC14002107409
Cross Reference	OMRON: G5V-2 PANASONIC: DS2Y FUJITSU: FBR244/FTR-C2/RY NEC: MR62 AXICOM: V23105/D2N	OMRON: G6A PANASONIC: DS2Y FUJITSU: RA NEC: MR82 TE: V23042 / AXICOM: MT2	OMRON: G6S PANASONIC: TX FUJITSU: NA/BA NEC: EC2/ED2 AXICOM: P2/V23079
Page	54	57	61

Note: Specification and dimensions in this catalog are subject to change without notice.

## SIGNAL RELAY SELECTION CHART

Type	HFD3-I	HFD3-V	HFD31
Appearance			
Dimensions(L x W x H) mm	15.0 x 7.5 x 9.0	15.0 x 7.5 x 9.4	14.0 x 9.0 x 5.0
Features	<ul style="list-style-type: none"> <li>• Third generation Signal relay</li> <li>• High contact switching capacity</li> <li>• Withstand inrush current at 7.5A (Effective value)</li> <li>• SMT and DIP types available</li> <li>• Single side stable and latching types available</li> </ul>	<ul style="list-style-type: none"> <li>• 3kV dielectric strength (between coil and contacts)</li> <li>• Surge withstand voltage up to 6000VAC, meets FCC Part 68 and Telecordia</li> <li>• Meets EN60950 / EN41003</li> <li>• Bifurcated contacts</li> <li>• Single side stable and latching types available</li> </ul>	<ul style="list-style-type: none"> <li>• Surge voltage up to 1500VAC, meets FCC Part 68 and Telecordia</li> <li>• High contact capacity: 2A 30VDC</li> <li>• Single side stable and latching types available</li> </ul>

### Contact Ratings

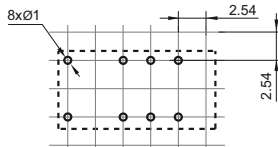
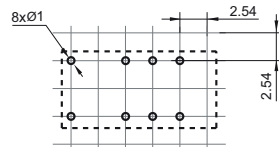
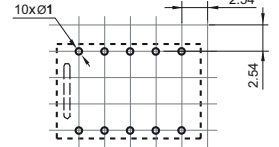
Contact Form	2C	2C	2C
Contact Material	Ag Alloy + Au plated	AgNi+Au plated, AgPd+Au plated	AgNi+Au plated, AgPd+Au plated
Max. Switching Current (Res. load)			
	20 A		
	15 A		
	10 A		
	5 A		
3 A			
2 A			
1 A			
Max. Switching Voltage	277VAC / 220VDC	277VAC / 220VDC	125VAC / 110VDC
Max. Switching Power	277VAC / 120W	62.5VA / 60W	62.5VA / 60W
Rated Load (Resistive load)	4A 30VDC 2A 30VDC 1A 277VAC	0.5A 125VAC 2A 30VDC	0.5A 125VAC 1A 30VDC 2A 30VDC

### Coil Ratings

Rated Voltage	1.5VDC to 24VDC	1.5VDC to 24VDC	1.5VDC to 24VDC
Nominal Operating Power	0.1W, 0.14W, 0.2W	0.14W, 0.2W	0.1W, 0.14W, 0.2W

### Specifications

Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	2000VAC	3000VAC	1000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 85°C	-40°C to 70°C
Operate / Release Time max.	4ms / 4ms	6ms / 6ms	3ms / 3ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>8</sup> OPS
Electrical Endurance min.	See "CONTACT DATA"	1 x 10 <sup>5</sup> OPS (at 0.5A 125VAC)	1 x 10 <sup>5</sup> OPS (at 0.5A 125VAC)

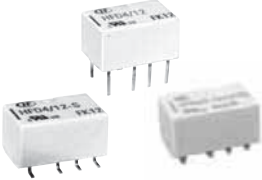

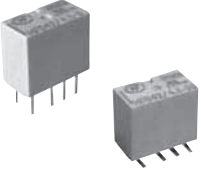
Layout (Bottom view)			
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Terminal Type	PCB (DIP, SMT)	PCB (DIP, SMT)	PCB (DIP, SMT)
Approved Standards	UL/CUL	UL/CUL VDE	UL/CUL
File No.	E133481	E133481 40018867 CQC14002107409	E133481
Cross Reference	PANASONIC :TX-TH	PANASONIC: TXD2 FUJITSU: FTR-C1	OMRON: G6H PANASONIC: TQ FUJITSU: A NEC: EA2 AXICOM: FP2
Page	67	73	79

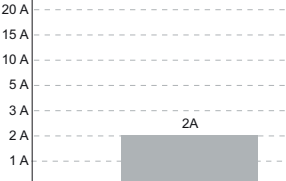
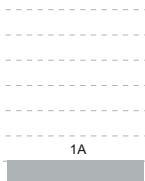
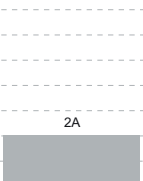
Note: Specification and dimensions in this catalog are subject to change without notice.



## SIGNAL RELAY SELECTION CHART

Type	HFD4	HFD4-V	HFD42
Appearance			
Dimensions(L x W x H) mm	10.0 x 6.5 x 5.4	10.0 x 6.5 x 5.65	10.6 x 5.7 x 9.0
Features	<ul style="list-style-type: none"> <li>• Offers excellent board space savings</li> <li>• Surge withstand voltage up to 2500V, meets FCC Part 68 and Telecordia</li> <li>• Meets EN60950/EN41003</li> <li>• SMT and DIP types available</li> <li>• Single side stable and latching type available</li> </ul>	<ul style="list-style-type: none"> <li>• Subminiature high dielectric strength signal relay</li> <li>• Surge withstand voltage up to 2500V</li> <li>• Meets EN60950/EN41003</li> <li>• gap between open contacts <math>\geq 0.4\text{mm}</math></li> <li>• Low power consumption</li> <li>• Single side stable and latching type available</li> </ul>	<ul style="list-style-type: none"> <li>• Surge withstand voltage up to 2500V, meets FCC Part 68 and Telecordia</li> <li>• Meets EN60950/EN41003</li> <li>• SMT and DIP types available</li> <li>• High contact capacity 2A 30VDC</li> <li>• Single side stable and latching type available</li> </ul>

### Contact Ratings

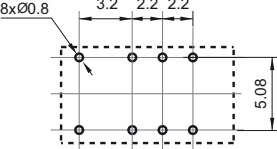
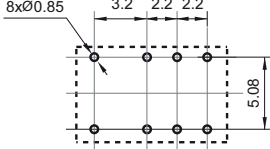
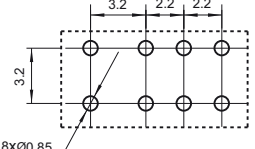
Contact Form	2C	2Z	2C
Contact Material	AgNi+Au plated, AgPd+Au plated	AgNi+Au plated	AgNi+Au plated, AgPd+Au plated
Max. Switching Current (Res. load)			
Max. Switching Voltage	250VAC / 220VDC	425VAC / 600VDC	250VAC / 220VDC
Max. Switching Power	62.5VA / 60W	62.5VA / 60W	125VA / 120W
Rated Load (Resistive load)	0.3A 125VAC 1A 30VDC	0.3A 125VAC 1A 30VDC	0.5A 125VAC 1A 30VDC 1A 125VAC 2A 30VDC

### Coil Ratings

Rated Voltage	1.5VDC to 24VDC	1.5VDC to 24VDC	1.5VDC to 24VDC
Nominal Operating Power	0.1W, 0.14W, 0.2W	0.14W, 0.2W	0.1W, 0.12W, 0.14W, 0.23W




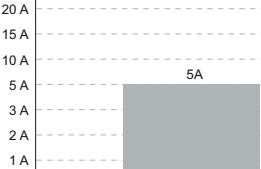
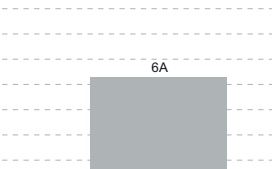
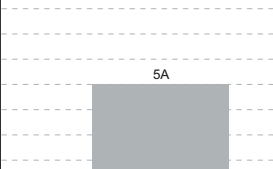
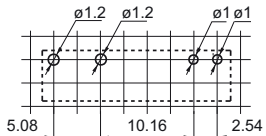
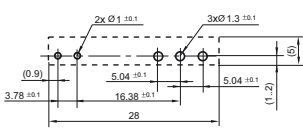
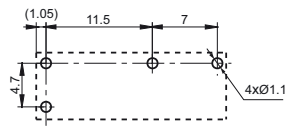
### Specifications

Insulation Resistance	1000M $\Omega$	1000M $\Omega$	1000M $\Omega$
Dielectric Strength (Between coil and contacts)	1600VAC	1600VAC	1500VAC
Ambient Temperature	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
Operate / Release Time max.	3ms / 3ms	3ms / 3ms	3ms / 3ms
Mechanical Endurance min.	1 x 10 <sup>8</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>8</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS (at 0.3A 125VAC)	1 x 10 <sup>5</sup> OPS (1A 30VDC) 1 x 10 <sup>5</sup> OPS (0.3A 125VAC) 1 x 10 <sup>5</sup> OPS (0.01A 600VDC)	1 x 10 <sup>5</sup> OPS

Layout (Bottom view)			
Terminal Type	PCB (DIP, SMT)	PCB (DIP, SMT)	PCB (DIP, SMT)
Approved Standards	UL/CUL	UL/CUL VDE	UL/CUL TÜV
File No.	E133481	E133481 40048125	E133481 R50317623
Cross Reference	OMRON: G6K PANASONIC: AGQ AXICOM: IM FUJITSU: FTR-B3 NEC: UC2/UD2		OMRON: G6J PANASONIC: AGN AXICOM: IM FUJITSU: FTR-B4 NEC: UA2/UB2
Page	84	90	95




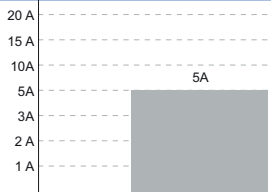
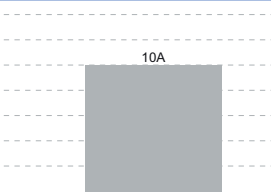
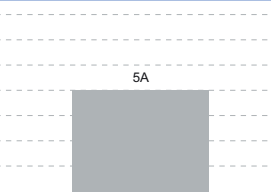
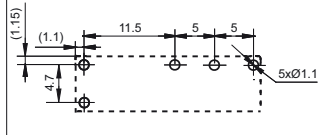
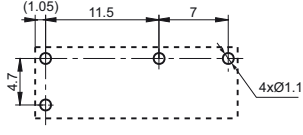
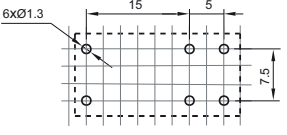
Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF49FD	HF41F	HF46F
Appearance			
Dimensions(L x W x H) mm	20.0 x 5.0 x 12.5	28.0 x 5.0 x 15.0	20.5 x 7.0 x 15.3
Features	<ul style="list-style-type: none"> <li>• 5A switching capability</li> <li>• 3kV dielectric strength (between coil and contacts)</li> <li>• Surge voltage up to 4kV (between coil and contacts)</li> <li>• Slim size (width 5mm, height 12.5mm)</li> <li>• High sensitive: 120mW</li> </ul>	<ul style="list-style-type: none"> <li>• Slim size (width 5mm)</li> <li>• 4kV dielectric strength (between coil and contacts)</li> <li>• Surge voltage up to 6kV (between coil and contacts)</li> <li>• High sensitive: 170mW</li> </ul>	<ul style="list-style-type: none"> <li>• 5A switching capability</li> <li>• 10kV impulse withstand voltage (between coil and contacts)</li> <li>• Meets VDE 0631 reinforce insulation</li> <li>• Highly efficient magnetic circuit for high sensitivity: 200mW</li> <li>• Extremely small footprint utilizing PCB area</li> </ul>
<b>Contact Ratings</b>			
Contact Form	1A	1A, 1C	1A
Contact Material	AgSnO <sub>2</sub> , AgNi	AgSnO <sub>2</sub> , AgNi	AgSnO <sub>2</sub> , AgNi
Max. Switching Current (Res. load)			
Max. Switching Voltage	250VAC / 30VDC	400VAC / 125VDC	277VAC / 30VDC
Max. Switching Power	1250VA / 150W	1500VA / 180W	1385VA / 150W
Rated Load (Resistive load)	5A 250VAC 5A 30VDC	6A 250VAC 6A 30VDC	3A 250VAC/30VDC 5A 250VAC/30VDC
<b>Coil Ratings</b>			
Rated Voltage	5VDC to 24VDC	5VDC to 60VDC	3VDC to 24VDC
Nominal Operating Power	0.12W to 0.18W	0.17W (48VDC to 60VDC:0.21W)	0.2W
<b>Specifications</b>			
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	3000VAC	4000VAC	4000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
Operate / Release Time max.	10ms / 5ms	8ms / 4ms	10ms / 10ms
Mechanical Endurance min.	2 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS	5 x 10 <sup>6</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS (at 3A 250VAC/30VDC)	1A: 6 x 10 <sup>4</sup> OPS (at 85°C) 1C: NO: 3 x 10 <sup>4</sup> OPS (at 85°C) NC: 1 x 10 <sup>4</sup> OPS (at 85°C)	1.2 x 10 <sup>5</sup> OPS (at 3A 250VAC/30VDC)
Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL TÜV CQC	UL/CUL VDE CQC	UL/CUL VDE CQC
File No.	E133481 R50149334 CQC10002049162	E133481 40020043 CQC17002175724	E134517 40025215 CQC08001024932
Cross Reference	OMRON: G6DS PANASONIC: PA FUJITSU: RB/NY SCHRACK: PCN	PANASONIC: PF FUJITSU: FTR-LY SCHRACK: V23092/SNR FINDER: 34.51	OMRON: G5NB/G5T PANASONIC: LD FUJITSU: FTR-F3
Page	102	105	109




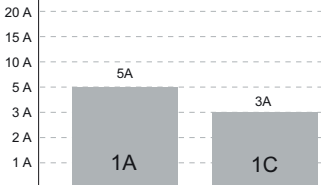
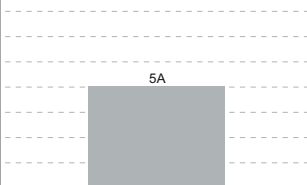
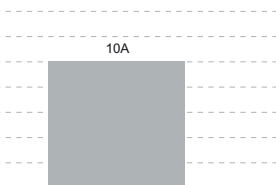
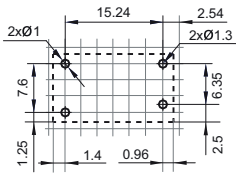
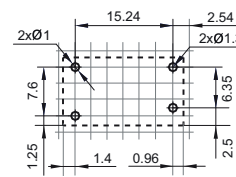
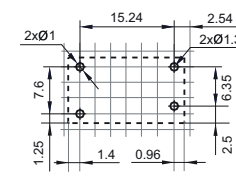
Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF46FB	HF46F-G	HF42F
Appearance			
Dimensions(L x W x H) mm	23.4 x 7.0 x 15.3	20.5 x 7.0 x 15.3	24.4 x 12.8 x 24.8
Features	<ul style="list-style-type: none"> <li>• 5A switching capability</li> <li>• 8kV impulse withstand voltage (between coil and contacts)</li> <li>• Meets reinforce insulation</li> <li>• width 7mm, Suitable for PCB intensive installation</li> <li>• UL insulation system: Class F</li> </ul>	<ul style="list-style-type: none"> <li>• 10A switching capability</li> <li>• 10kV impulse withstand voltage (between coil and contacts)</li> <li>• Meets VDE 0631 reinforce insulation</li> <li>• Highly efficient magnetic circuit for high sensitivity: 200mW</li> <li>• Extremely small footprint utilizing PCB area</li> </ul>	<ul style="list-style-type: none"> <li>• 5A switching capability</li> <li>• TV-3 125VAC approved by UL standard</li> <li>• 2 Form A slim configuration</li> </ul>
<b>Contact Ratings</b>			
Contact Form	1C	1A	2A
Contact Material	AgNi	AgSnO <sub>2</sub> , AgNi	AgSnO <sub>2</sub> , AgCdO
Max. Switching Current (Res. load)			
Max. Switching Voltage	250VAC	277VAC / 30VDC	250VAC / 30VDC
Max. Switching Power	1250VA	2770VA / 300W	1250VA / 150W
Rated Load (Resistive load)	5A 250VAC	7A 250VAC/30VDC 10A 250VAC/30VDC	5A 250VAC / 30VDC
<b>Coil Ratings</b>			
Rated Voltage	3VDC to 24VDC	3VDC to 24VDC	5VDC to 48VDC
Nominal Operating Power	0.36W	0.2W	0.53W
<b>Specifications</b>			
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	4000VAC	4000VAC	4000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 105°C (AgNi contacts) -40°C to 85°C (AgSnO <sub>2</sub> contacts)	-40°C to 70°C
Operate / Release Time max.	10ms / 10ms	10ms / 10ms	15ms / 10ms
Mechanical Endurance min.	5 x 10 <sup>6</sup> OPS	5 x 10 <sup>6</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	5 x 10 <sup>4</sup> OPS	6 x 10 <sup>4</sup> OPS	5 x 10 <sup>4</sup> OPS (at 5A 250VAC)
Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE CQC	UL/CUL TÜV CQC
File No.	E134517 40049080 CQC17002177913	E134517 40025215 CQC08001024932	E133481 R50278397 CQC09002034521
Cross Reference	FUJITSU: FTR-F3	OMRON: G5NB/G5T PANASONIC: LD FUJITSU: FTR-F3	OMRON: G5PA-2 PANASONIC: LA FUJITSU: FTR-F4 NEC: CN OEG: OSA/PCI
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Note: Specification and dimensions in this catalog are subject to change without notice.




## POWER RELAY SELECTION CHART

Type	HF32FA	HF32FA-T	HF32FA-G
Appearance			
Dimensions(L x W x H) mm	17.6 x 10.1 x 12.7	17.6 x 10.1 x 12.7	17.6 x 10.1 x 12.7
Features	<ul style="list-style-type: none"> <li>• 5A switching capability</li> <li>• Creepage/clearance distance&gt;8mm</li> <li>• 5kV dielectric strength (between coil and contacts)</li> <li>• 1 Form A meets VDE 0700/0631</li> <li>• 1 Form C meets VDE 0631</li> </ul>	<ul style="list-style-type: none"> <li>• High temperature: 105°C</li> <li>• 5A switching capability</li> <li>• Creepage/clearance distance&gt;8mm</li> <li>• 5kV dielectric strength (between coil and contacts)</li> <li>• Meets VDE 0700/0631 reinforce insulation</li> </ul>	<ul style="list-style-type: none"> <li>• 10A switching capability</li> <li>• Creepage/clearance distance&gt;8mm</li> <li>• 5kV dielectric strength (between coil and contacts)</li> <li>• Meets VDE 0700/0631 reinforce insulation</li> </ul>
<b>Contact Ratings</b>			
Contact Form	1A, 1C	1A	1A
Contact Material	AgNi	AgNi	AgSnO <sub>2</sub>
Max. Switching Current (Res. load)			
Max. Switching Voltage	250VAC / 30VDC	250VAC / 30VDC	250VAC
Max. Switching Power	1250VA / 150W	1250VA / 150W	2500VA
Rated Load (Resistive load)	1A: 5A 250VAC/30VDC 1C: 3A 250VAC/30VDC	5A 250VAC 5A 30VDC	10A 250VAC
<b>Coil Ratings</b>			
Rated Voltage	3VDC to 48VDC	3VDC to 24VDC	3VDC to 48VDC
Nominal Operating Power	0.2W, 0.45W	0.2W	0.23W, 0.45W
<b>Specifications</b>			
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	5000VAC	5000VAC	5000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 105°C	-40°C to 85°C
Operate / Release Time max.	8ms / 4ms	8ms / 4ms	8ms / 4ms
Mechanical Endurance min.	1 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>5</sup> OPS (at 5A 250VAC)	1 x 10 <sup>4</sup> OPS
Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE CQC	UL/CUL VDE CQC
File No.	E134517 40006182 CQC17002175721	E134517 40006182 CQC17002175721	E134517 40006182 CQC17002175721
Cross Reference	FUJITSU: JV OEG: OJ/OJE P&B: T77	FUJITSU: JV OEG: OJ/OJE P&B: T77	FUJITSU: JV OEG: OJ/OJE P&B: T77
Page	120	123	126

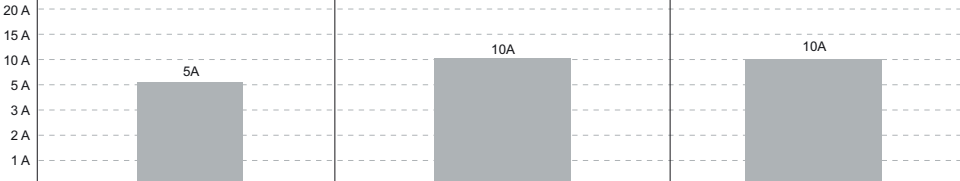
Note: Specification and dimensions in this catalog are subject to change without notice.



## POWER RELAY SELECTION CHART

Type	HF32FV	HF32FV-T	HF32FV-G
Appearance			
Dimensions(L x W x H) mm	18.4 x 10.2 x 15.3	18.4 x 10.2 x 15.5	18.4 x 10.2 x 15.3
Features	<ul style="list-style-type: none"> <li>• 5A switching capability</li> <li>• Creepage distance: 6.5mm (between coil &amp; contacts)</li> <li>• Dielectric strength 4kV</li> <li>• Standard PCB layout</li> <li>• Plastic sealed and flux proofed types available</li> <li>• UL insulation system: Class F</li> </ul>	<ul style="list-style-type: none"> <li>• High Temperature:105°C</li> <li>• 10A switching capability</li> <li>• Dielectric strength 4kV (between coil and contacts)</li> <li>• 1 Form A configurations</li> <li>• Standard PCB layout</li> <li>• UL insulation system: Class F</li> </ul>	<ul style="list-style-type: none"> <li>• 10A switching capability</li> <li>• Creepage distance: 6.5mm (between coil &amp; contacts)</li> <li>• Dielectric strength 4kV</li> <li>• Standard PCB layout</li> <li>• Plastic sealed and flux proofed types available</li> <li>• UL insulation system: Class F</li> </ul>

### Contact Ratings

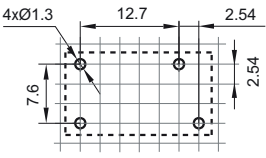
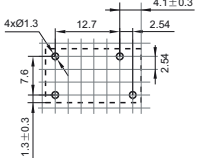
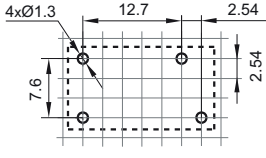
Contact Form	1A	1A	1A
Contact Material	AgSnO <sub>2</sub> , AgCdO, AgNi	AgSnO <sub>2</sub>	AgSnO <sub>2</sub> , AgCdO, AgNi
Max. Switching Current (Res. load)			
	5A	10A	10A
Max. Switching Voltage	277VAC / 30VDC	250VAC	277VAC / 30VDC
Max. Switching Power	1250VA / 150W	2500VA	2500VA / 300W
Rated Load (Resistive load)	5A 250VAC / 30VDC L type: 3A 250VAC / 30VDC	10A 250VAC	10A 250VAC / 30VDC 8A 250VAC / 30VDC (Sensitive Type)

### Coil Ratings

Rated Voltage	3VDC to 48VDC	3VDC to 48VDC	3VDC to 48VDC
Nominal Operating Power	0.2W, 0.45W	0.45W	0.2W, 0.45W




### Specifications

Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	4000VAC	4000VAC	4000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 105°C	-40°C to 85°C
Operate / Release Time max.	8ms / 5ms	8ms / 5ms	8ms / 5ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>5</sup> OPS

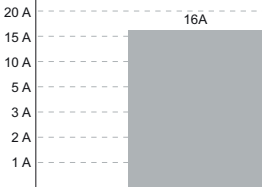
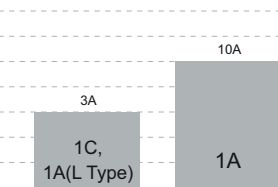
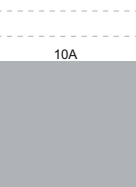
Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE CQC	UL/CUL VDE CQC
File No.	E134517 40012204 CQC14002120720	E134517 40012204 CQC14002120720	E134517 40012204 CQC14002120720
Cross Reference	FUJITSU: JV OEG: OJ/OJE P&B: T77	SANYOU: SJ MEISHUO: MPD	FUJITSU: JV OEG: OJ/OJE P&B: T77
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Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF32FV-16	HF32F	HF32F-G
Appearance			
Dimensions(L x W x H) mm	18.4 x 10.2 x 15.3	18.4 x 10.2 x 15.5	18.4 x 10.2 x 15.5
Features	<ul style="list-style-type: none"> <li>• 16A switching capability</li> <li>• Dielectric strength 4kV(between coil and contacts)</li> <li>• 1 Form A configuration</li> <li>• UL insulation system: Class F</li> <li>• Product in accordance to IEC 62368-1 available</li> </ul>	<ul style="list-style-type: none"> <li>• 1 Form A and 1 Form C configurations</li> <li>• Subminiature, standard PCB layout</li> <li>• Plastic sealed and flux proofed types available</li> <li>• UL insulation system: Class F</li> <li>• Product in accordance to IEC 60335-1 available</li> </ul>	<ul style="list-style-type: none"> <li>• 10A switching capability</li> <li>• 1 Form A configurations</li> <li>• Subminiature standard PCB layout</li> <li>• Plastic sealed and flux proofed types available</li> </ul>

### Contact Ratings

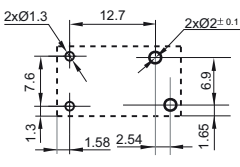
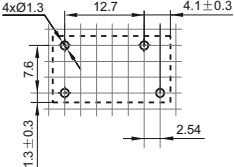
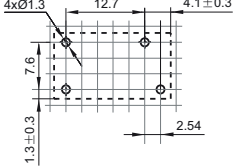
Contact Form	1A	1A, 1C	1A
Contact Material	AgSnO <sub>2</sub>	AgNi, AgCdO	AgSnO <sub>2</sub> , AgNi, AgCdO
Max. Switching Current (Res. load)			
Max. Switching Voltage	250VAC	250VAC / 30VDC	250VAC / 30VDC
Max. Switching Power	4000VA	1250VA / 150W	2500VA / 300W
Rated Load (Resistive load)	16A 250VAC	1A: 10A 125VAC 5A 250VAC/30VDC L Type: 3A 250VAC/30VDC 1C: 3A 250VAC/30VDC	10A 250VAC 10A 30VDC

### Coil Ratings

Rated Voltage	5VDC to 24VDC	3VDC to 48VDC	3VDC to 48VDC
Nominal Operating Power	0.8W, 0.4W(Sensitive Type)	0.2W, 0.45W	0.45W

### Specifications




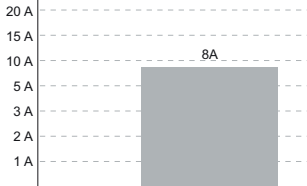
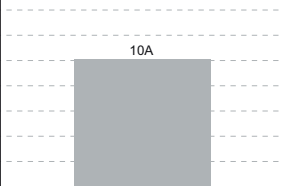
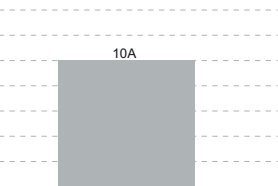
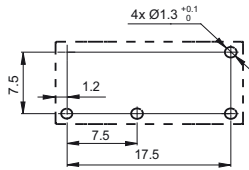
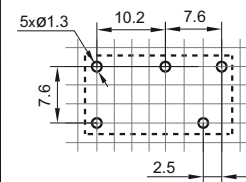
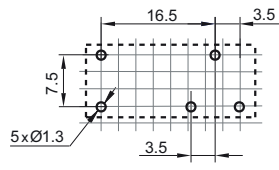
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	4000VAC	2500VAC	2500VAC
Ambient Temperature	-40°C to 85°C	-40°C to 70°C	-40°C to 85°C
Operate / Release Time max.	10ms / 5ms	8ms / 5ms	8ms / 5ms
Mechanical Endurance min.	1 x 10 <sup>5</sup> OPS	5 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS(at 16A 250VAC) 5 x 10 <sup>7</sup> OPS(at 16A 250VAC)	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>5</sup> OPS

Layout (Bottom view)			
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Terminal Type		PCB	PCB
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE CQC	UL/CUL VDE CQC
File No.	E134517 40012204 CQC14002120720	E134517 40012204 CQC12002076528 CQC16002148335	E134517 40012204 CQC12002076528 CQC16002148335
Cross Reference	OEG: OJT GOODSKY:GQ	FUJITSU: JV OEG: OJ/OJE P&B: T77	FUJITSU: JV OEG: OJ/OJE P&B: T77
Page	137	140	143




Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

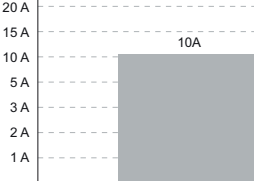
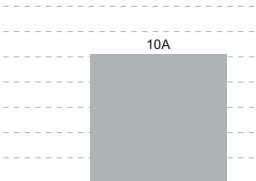
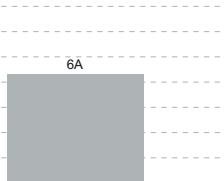
Type	HF171F	HF33F	HF36F
Appearance			
Dimensions(L x W x H) mm	20.0 x 10.0 x 10.6	20.5 x 10.2 x 15.3	23.8 x 9.5 x 24.5
Features	<ul style="list-style-type: none"> <li>• 8A switching capability</li> <li>• 1 form A and 1 form C configurations</li> <li>• High sensitivity 200mW</li> <li>• Creepage/clearance distance:&gt;6mm, meets VDE 0631reinforce insulation</li> <li>• 5KV dielectric between coil to contacts</li> <li>• Class F insulation</li> </ul>	<ul style="list-style-type: none"> <li>• 10A switching capability</li> <li>• Creepage distance:8mm (both for 1 CO and NO)</li> <li>• Clearance distance: NO type 4.5mm; NC type 4mm</li> <li>• Plastic sealed and flux proofed types available</li> </ul>	<ul style="list-style-type: none"> <li>• 10A switching capability</li> <li>• TV-5 125VAC approved by UL standard (only for 1 Form A)</li> <li>• 1 Form A and 1 Form C configurations</li> <li>• Plastic sealed and flux proofed types available</li> </ul>
<b>Contact Ratings</b>			
Contact Form	1A, 1C	1A, 1C	1A, 1C
Contact Material	AgSnO <sub>2</sub> , AgNi	AgSnO <sub>2</sub> , AgNi, AgCdO	AgSnO <sub>2</sub> , AgCdO
Max. Switching Current (Res. load)			
Max. Switching Voltage	30VDC / 277VAC	277VAC / 30VDC	250VAC / 30VDC
Max. Switching Power	1662VA / 180W	1250VA / 150W	2500VA / 300W
Rated Load (Resistive load)	1A:6A 250VAC/30VDC 1C:NO:6A 250VAC/30VDC NC:5A 250VAC/30VDC	NO: 10A 125VAC 5A 250VAC/30VDC NC: 3A 250VAC/30VDC	10A 250VAC/30VDC TV-5 125VAC
<b>Coil Ratings</b>			
Rated Voltage	3VDC to 48VDC	3VDC to 48VDC	5VDC to 48VDC
Nominal Operating Power	0.2W	0.2W, 0.45W	0.25W, 0.53W
<b>Specifications</b>			
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	5000VAC	4000VAC	4000VAC (NO), 3000VAC (NC)
Ambient Temperature	-40°C to 85°C	-40°C to 70°C	-40°C to 70°C
Operate / Release Time max.	8ms / 5ms	8ms / 5ms	15ms / 5ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	5 x 10 <sup>6</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>5</sup> OPS	5 x 10 <sup>4</sup> OPS (at 10A 250VAC)
Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE CQC	UL/CUL TÜV CQC
File No.	E133481 40048577 CQC17002177419	E134517 125661 CQC12002076530	E134517 R50356442 CQC16002159838
Cross Reference		OMRON: G5SB/G5Q PANASONIC: JQ/PQ FUJITSU: JY SCHRACK: RE/REL OEG: PCH	OMRON: G5PA-1 PANASONIC: LK FUJITSU: FTR-H2/F2 NEC: CK OEG: SDT
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Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF36FD	HF162F	HF8
Appearance			
Dimensions(L x W x H) mm	23.8 x 9.5 x 24.5	26.3 x 26.1 x 10.0	21.3 x 16.2 x 14.4
Features	<ul style="list-style-type: none"> <li>• 10A switching capability</li> <li>• TV-8 125VAC approved by UL standard(118A inrush current)</li> <li>• Ideal for device power reduction</li> </ul>	<ul style="list-style-type: none"> <li>• High inrush current: TV-8 125VAC (118A inrush current)</li> <li>• Low height, only 9.3mm (excluding buttons)</li> <li>• High sensitivity: 250mW,</li> <li>• Silent type available</li> </ul>	<ul style="list-style-type: none"> <li>• Sub miniature, high sensitive, Standard PCB layout</li> <li>• 1 Form A and 1 Form C configurations</li> <li>• Plastic sealed type for automatic wave soldering</li> </ul>

### Contact Ratings

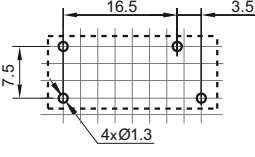
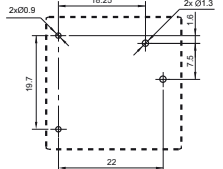
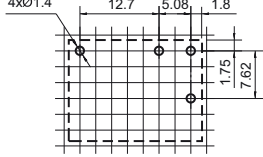
Contact Form	1A	1A	1A, 1C
Contact Material	AgSnO <sub>2</sub>	AgSnO <sub>2</sub>	AgNi
Max. Switching Current (Res. load)			
Max. Switching Voltage	250VAC / 30VDC	277VAC	300VAC / 30VDC
Max. Switching Power	2500VA / 150W	2216VA	1800VA / 300W
Rated Load (Resistive load)	10A 250VAC 5A 250VAC/30VDC TV-8 125VAC	10A 125VAC 8A/5A 277VAC TV-8 125VAC 3A/100A 250VAC (Capacitive) (Standard type)	HF8: 6A 300VAC/28VDC HF8A: 6A 277VAC/30VDC

### Coil Ratings

Rated Voltage	5VDC to 48VDC	3VDC to 24VDC	3VDC to 48VDC
Nominal Operating Power	0.25W, 0.53W	0.25W	0.33W, 0.45W, 0.6W




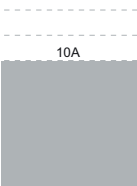
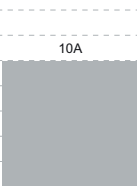
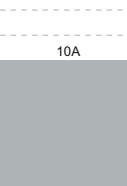
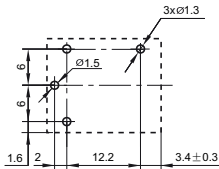
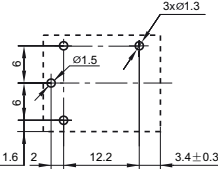
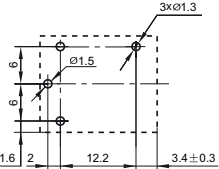
### Specifications

Insulation Resistance	1000MΩ	1000MΩ	100MΩ
Dielectric Strength (Between coil and contacts)	4000VAC	4000VAC	2000VAC
Ambient Temperature	-40°C to 70°C	-40°C to 70°C	-55°C to 90°C
Operate / Release Time max.	15ms / 5ms	15ms / 5ms	6ms / 3ms
Mechanical Endurance min.	1 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	5 x 10 <sup>4</sup> OPS (at 10A 250VAC)	5 x 10 <sup>4</sup> OPS (at 10A 125VAC)	1 x 10 <sup>5</sup> OPS

Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL TÜV CQC	UL/CUL VDE CQC	UL/CUL VDE
File No.	E134517 R50356444 CQC16002159846	E133481 40032669 CQC10002050942	E134517 40025189
Cross Reference	OMRON: G5PA-1 PANASONIC: LK NEC: CK OEG: SDT	OMRON: G5PF PANASONIC: LK-F	FUJITSU: LZ P&B: T73 OEG: OUDH
Page	155	157	159




Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

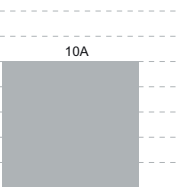
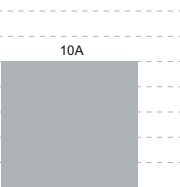
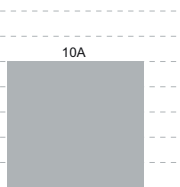
Type	HF3FA	HF3FA-W	HF3FA-T
Appearance			
Dimensions(L x W x H) mm	19.0 x 15.2 x 15.5	19.0 x 15.2 x 16.1	19.0 x 15.2 x 15.5
Features	<ul style="list-style-type: none"> <li>• 15A switching capability</li> <li>• 2.5kV dielectric strength (between coil and contacts)</li> <li>• Flammability class according to UL94, V-0</li> <li>• CTI 250</li> </ul>	<ul style="list-style-type: none"> <li>• 10A switching capability</li> <li>• Flammability class according to UL94, V-0</li> <li>• Product in accordance to IEC 60335-1 available</li> <li>• Plastic sealed and flux proofed types available</li> <li>• Subminiature, standard PCB layout</li> <li>• UL insulation system: Class F</li> </ul>	<ul style="list-style-type: none"> <li>• High Temperature:105°C</li> <li>• 15A 125VAC switching capability</li> <li>• Flame resistance rating UL94.V-0</li> <li>• Product in accordance to IEC 60335-1 available</li> <li>• Subminiature, standard PCB layout</li> <li>• Plastic sealed and flux proofed types available</li> <li>• UL insulation system: Class F</li> </ul>
<b>Contact Ratings</b>			
Contact Form	1A, 1C	1C	1A, 1C
Contact Material	AgSnO <sub>2</sub>	AgSnO <sub>2</sub>	AgSnO <sub>2</sub>
Max. Switching Current (Res. load)			
Max. Switching Voltage	277VAC / 30VDC	277VAC / 36VDC	250VDC
Max. Switching Power	2770VA / 280W	2770VA/360W	2500VA
Rated Load (Resistive load)	1A: 10A 250VAC 1C: NO: 10A 250VAC NO/NC: 5A/5A 250VAC	NO: 8A 277VAC/10A 24VDC NC: 5A 250VAC	1A: 10A 250VAC 1C: NO: 10A 250VAC NC: 6A 250VAC
<b>Coil Ratings</b>			
Rated Voltage	3VDC to 48VDC	12VDC and 24VDC	3VDC to 48VDC
Nominal Operating Power	0.36W	0.8W	0.36W
<b>Specifications</b>			
Insulation Resistance	100MΩ	100MΩ(500VDC)	100MΩ(500VDC)
Dielectric Strength (Between coil and contacts)	2500VAC	2500VAC	2500VAC
Ambient Temperature	-40°C to 85°C	-40°C to 85°C	-40°C to 105°C
Operate / Release Time max.	10ms / 5ms	10ms / 5ms	10ms / 5ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS (NO, at 8A 250VAC)	1 x 10 <sup>5</sup> OPS (NO, at 10A 36VDC)	1 x 10 <sup>5</sup> OPS (10A 250VAC)
Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE CQC	UL/CUL VDE CQC
File No.	E134517 40023708 CQC12002076529	E134517 40023708 CQC12002076529	E134517 40023708 CQC12002076529
Cross Reference	OMRON: G5LA PANASONIC: JS SCHRACK: T7S SONG CHUAN: 899	GOLDEN:GH-1C	OMRON: G5LA SANYOU:SRDI SONG CHUAN: 833H
Page	162	165	168

Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF3FD	HF3FF	HF3F-L
Appearance			
Dimensions(L x W x H) mm	19.0 x 15.2 x 15.5	19.0 x 15.2 x 15.5	19.0 x 15.2 x 15.5
Features	<ul style="list-style-type: none"> <li>• 15A switching capability</li> <li>• Subminiature, standard PCB layout</li> <li>• Flammability class according to UL94, V-0</li> <li>• Plastic sealed and flux proofed types available</li> </ul>	<ul style="list-style-type: none"> <li>• 15A 125VAC, 10A 250VAC switching capability</li> <li>• Subminiature, standard PCB layout</li> <li>• 1 Form A and 1 Form C configurations</li> <li>• Plastic sealed and flux proofed types available</li> </ul>	<ul style="list-style-type: none"> <li>• Subminiature high power latching relay</li> <li>• Low coil power</li> <li>• 15A switching capability</li> <li>• 1 Form A and 1 Form C configurations</li> <li>• Subminiature, standard PCB layout</li> <li>• Plastic sealed and flux proofed types available</li> </ul>

### Contact Ratings

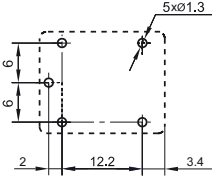
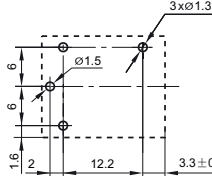
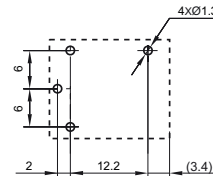
Contact Form	1A, 1C	1A, 1C	1A, 1C
Contact Material	AgSnO <sub>2</sub>	AgSnO <sub>2</sub> , AgCdO	AgSnO <sub>2</sub>
Max. Switching Current (Res. load)			
Max. Switching Voltage	277VAC / 30VDC	277VAC / 28VDC	277VAC / 30VDC
Max. Switching Power	2770VA / 300W	2770VA / 280W	2770VA / 300W
Rated Load (Resistive load)	1A: 10A 250VAC 1C: NO: 10A 250VAC NO/NC: 5A/5A 250VAC	10A 277VAC 10A 28VDC	10A 277VAC

### Coil Ratings

Rated Voltage	3VDC to 48VDC	5VDC to 48VDC	5VDC to 48VDC
Nominal Operating Power	0.36W	0.36W (48VDC: 0.51W)	0.4W, 0.8W

### Specifications




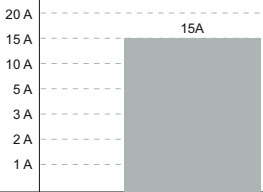
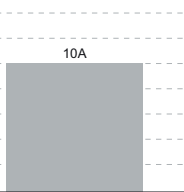
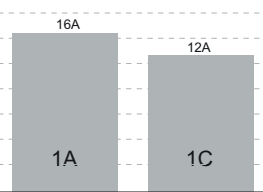
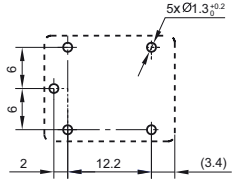
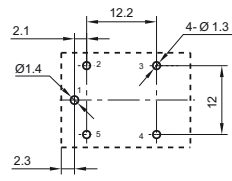
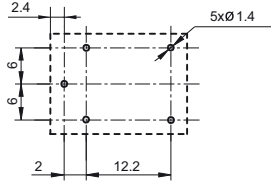
Insulation Resistance	100MΩ	100MΩ	100MΩ
Dielectric Strength (Between coil and contacts)	2000VAC	1500VAC	2000VAC
Ambient Temperature	-40°C to 105°C	-40°C to 85°C	-40°C to 85°C
Operate / Release Time max.	10ms / 5ms	10ms / 5ms	8ms / 5ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	5 x 10 <sup>4</sup> OPS (NO, at 10A 250VAC)	5 x 10 <sup>4</sup> OPS (NO, at 10A 250VAC)	1 x 10 <sup>4</sup> OPS

Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE TÜV CQC	UL/CUL VDE CQC
File No.	E134517 40014057 CQC14002114760	E134517 40025218 R50148356 CQC13002098175	E134517 40040757 CQC15002121475
Cross Reference	OMRON: G5LB(White) PANASONIC: JS SCHRACK: T7S SONG CHUAN: 899	OMRON: G5LB(Black) PANASONIC: JS P&B: T72 OEG: PCE/ORWH FINDER: 36.11 SONG CHUAN: 833	
Page	171	174	177

Note: Specification and dimensions in this catalog are subject to change without notice.






## POWER RELAY SELECTION CHART

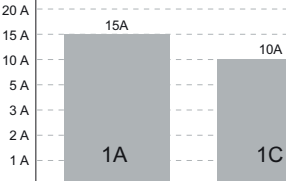
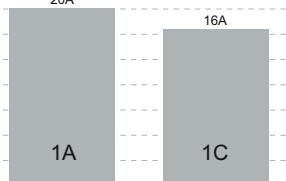
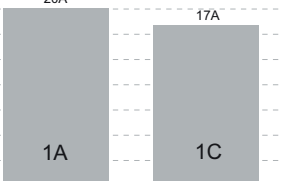
Type	HF3FF-M	HF7FF	HF7FD
Appearance			
Dimensions(L x W x H) mm	19.0 x 15.2 x 15.5	22.5 x 16.5 x 16.5	22.0 x 16.0 x 16.4
Features	<ul style="list-style-type: none"> <li>• 15A switching capability</li> <li>• Subminiature, standard PCB layout</li> <li>• Plastic sealed and Flux proofed types available</li> <li>• RoHS &amp; ELV compliant</li> </ul>	<ul style="list-style-type: none"> <li>• 10A switching capability</li> <li>• Low cost, small package</li> <li>• 1 Form A and 1 Form C configurations</li> <li>• Plastic sealed and flux proofed types available</li> </ul>	<ul style="list-style-type: none"> <li>• 12A switching capability</li> <li>• High performance, Low profile</li> <li>• 2kV dielectric strength (between coil and contacts)</li> <li>• UL94, V-0, CTI250 flammability class</li> </ul>
<b>Contact Ratings</b>			
Contact Form	1A, 1C	1A, 1C	1A, 1C
Contact Material	AgSnO <sub>2</sub>	AgSnO <sub>2</sub> , AgCe	AgSnO <sub>2</sub> , AgCdO
Max. Switching Current (Res. load)			
Max. Switching Voltage	30VDC	250VAC / 30VDC	250VAC / 28VDC
Max. Switching Power		2400VA / 280W	4000VA / 280W, 2500VA / 196W
Rated Load (Resistive load)	1A: 15A 13.5VDC 1C: NO: 15A 13.5VDC NC: 5A 13.5VDC	10A 250VAC/28VDC 5A 250VAC/30VDC	1A: 16A 250VAC (7FD-T) 12A 250VAC, Double pin, 10A 250VAC 1C: 12A 125VAC (NO) NO/NC: 7A 250VAC
<b>Coil Ratings</b>			
Rated Voltage	9VDC to 24VDC	3VDC to 48VDC	3VDC to 48VDC
Nominal Operating Power	0.45W, 0.64W, 0.80W	0.36W (48VDC: 0.51W)	0.36W
<b>Specifications</b>			
Insulation Resistance	100MΩ	100MΩ	100MΩ
Dielectric Strength (Between coil and contacts)	1500VAC	1500VAC	2000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 70°C	-40°C to 85°C
Operate / Release Time max.	10ms / 10ms	10ms / 5ms	10ms / 5ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>5</sup> OPS	5 x 10 <sup>4</sup> OPS(1A)
Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB
Approved Standards		UL/CUL CQC	UL/CUL VDE CQC
File No.		E134517 CQC09002028260	E134517 40008374 CQC09002037921
Cross Reference	OMRON: G8SN PANASONIC: JSM SCHRACK: T72N	OMRON: G5LC/G5LE PANASONIC: JSM FUJITSU: CS SCHRACK: T7N OEG: PCE	OMRON: G5LE-VD PANASONIC: JSM FUJITSU: FBR160 NEC: KB SCHRACK: T7N-WG
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Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF21FF	HF152F	HF152FD
Appearance			
Dimensions(L x W x H) mm	20.2 x 16.5 x 20.2	21.0 x 16.0 x 20.6	21.2 x 16.0 x 20.6
Features	<ul style="list-style-type: none"> <li>• 15A switching capability</li> <li>• 1 Form A, 1 Form B and 1 Form C configurations</li> <li>• Standard PCB layout</li> <li>• Plastic sealed and flux proofed available</li> </ul>	<ul style="list-style-type: none"> <li>• 20A switching capacity</li> <li>• Surge voltage up to 6000VAC (between coil and contacts)</li> <li>• 1 Form C and 1 Form A configurations</li> <li>• Plastic sealed and dust protected types available</li> </ul>	<ul style="list-style-type: none"> <li>• 20A switching capability</li> <li>• Ambient temperature meets 105°C</li> <li>• High temperature load: 17A 277VAC at 105°C</li> <li>• 1 Form C &amp; 1 Form A configurations available</li> <li>• Product in accordance to EN 60335-1 available</li> </ul>

### Contact Ratings

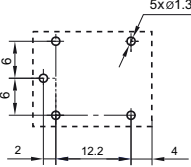
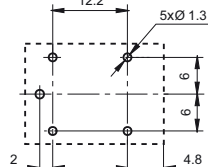
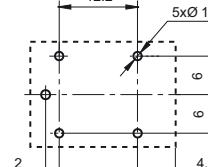
Contact Form	1A, 1B, 1C	1A, 1C	1A, 1C
Contact Material	AgSnO <sub>2</sub>	AgSnO <sub>2</sub> , AgNi	AgSnO <sub>2</sub> , AgNi
Max. Switching Current (Res. load)			
Max. Switching Voltage	120VAC	1A: 400VAC / 1C: 400VAC(NO)	400VAC
Max. Switching Power	1800VA	1A: 4700VA / 1C: 4000VA	4700VA
Rated Load (Resistive load)	1A: 15A 120VAC 1C: 10A 120VAC 1B: 15A 120VAC 1800VA(Ballast)	1A: 20A 125VAC / 17A 277VAC 7A 400VAC 1C: 16A 250VAC NO: 7A 400VAC	1A: 7A 400VAC 17A 277VAC 20A 125VAC 1C: NO:17A 277VAC NC:10A 277VAC

### Coil Ratings

Rated Voltage	5VDC to 48VDC	3VDC to 48VDC	3VDC to 48VDC
Nominal Operating Power	0.36W (48VDC: 0.53W)	0.36W	0.36W

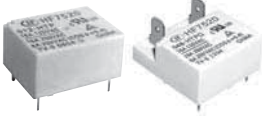


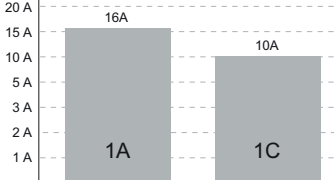
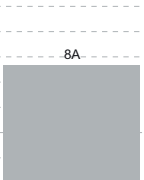
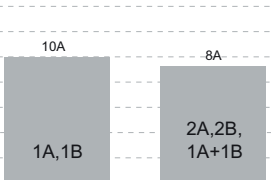
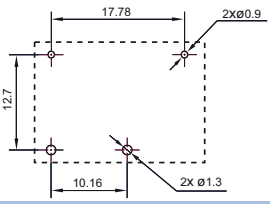
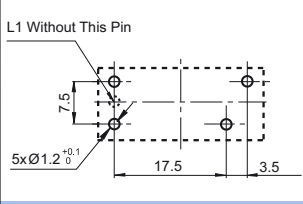
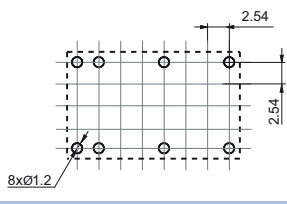
### Specifications

Insulation Resistance	1000MΩ	100MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	1500VAC	2500VAC	2500VAC
Ambient Temperature	-40°C to 70°C	-40°C to 105°C (HF152F-T)	-40°C to 105°C
Operate / Release Time max.	10ms / 5ms	10ms / 5ms	10ms / 5ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS	1A: 1 x 10 <sup>5</sup> OPS / 1C: 5 x 10 <sup>4</sup> OPS	1A: 1 x 10 <sup>5</sup> OPS / 1C: 5 x 10 <sup>4</sup> OPS

Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL	UL/CUL VDE CQC	UL/CUL VDE CQC
File No.	E133481	E134517 40017837 CQC09002034520	E134517 40031203 CQC12002083404
Cross Reference	OMRON: G5L SCHRACK: LN/41896 OEG: SRUDH/SRUUH	OMRON: G5LE-VD PANASONIC: JSM	OMRON: G5LE-VD PANASONIC: JSM SCHRACK: LN-H
Page	189	192	195




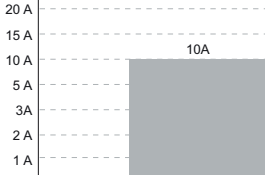
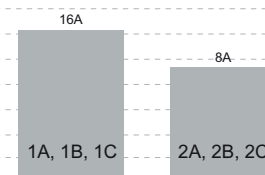
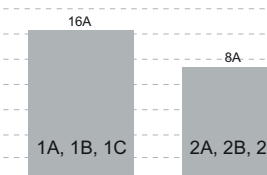
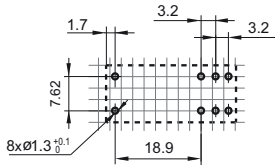
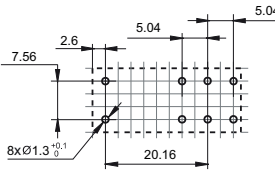
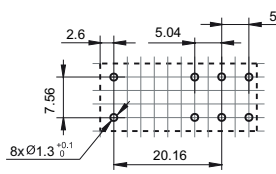
Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF7520	HF163F-L	HFE7
Appearance			
Dimensions(L x W x H) mm	22.0 x 16.0 x 10.5	24.0 x 10.0 x 18.8	20.0 x 15.0 x 10.2
Features	<ul style="list-style-type: none"> <li>• Low height, flat construction</li> <li>• 16A switching capability</li> <li>• High sensitive 200mW</li> <li>• PCB &amp; QC terminals available</li> <li>• Plastic sealed and flux proofed types available (with vent-hole cover)</li> </ul>	<ul style="list-style-type: none"> <li>• Latching relay</li> <li>• High sensitive</li> <li>• Breakdown voltage (between contact and coil): 5,000 V</li> <li>• High switching capacity: 8A 250VAC</li> <li>• Surge breakdown voltage(between contact and coil): 12,000 V</li> <li>• Reflow soldering available</li> </ul>	<ul style="list-style-type: none"> <li>• High switching capacity 1A: 10A 250VAC/8A 30VDC; 2A, 1A + 1B: 8A 250VAC/30VDC</li> <li>• High sensitive</li> <li>• 1 Form A, 2 Form A and 1A + 1B contact arrangement</li> <li>• Single side stable and latching types available</li> </ul>
<b>Contact Ratings</b>			
Contact Form	1A   1C	1A	1A, 1B   2A, 2B, 1A+1B
Contact Material	AgSnO <sub>2</sub> , AgNi, AgCdO	AgSnO <sub>2</sub>	AgSnO <sub>2</sub> , AgNi
Max. Switching Current (Res. load)			
Max. Switching Voltage	250VAC / 30VDC	250VAC / 30VDC	277VAC
Max. Switching Power	4000VA/300W   2500VA/1500VA	2500VA/150W	2500VA   2000VA
Rated Load (Resistive load)	1A: 16A 250VAC 10A 250VAC/30VDC TV-5 1C: NO/NC:10A/6A 125/250VAC	8A 250VAC 5A 30VDC	10A 250VAC 10A 30VDC   8A 250VAC 10A 30VDC
<b>Coil Ratings</b>			
Rated Voltage	5VDC to 48VDC	3VAC to 24VAC / 3VDC to 24VDC	3VDC to 24VDC
Nominal Operating Power	0.2W, 0.4W	0.2W, 0.4W	0.2W, 0.28W, 0.3W, 0.42W
<b>Specifications</b>			
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	2500VAC	5000VAC	4000VAC
Ambient Temperature	-40°C to 105°C	-40°C to 85°C	-40°C to 70°C
Operate / Release Time max.	15ms / 5ms	15ms / 15ms	10ms / 10ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>6</sup> OPS	5 x 10 <sup>7</sup> OPS
Electrical Endurance min.	5 x 10 <sup>4</sup> OPS	5 x 10 <sup>4</sup> OPS (at 8A 250VAC)	1 x 10 <sup>5</sup> OPS(2 Form A: 3 x 10 <sup>4</sup> OPS)
Layout (Bottom view)			
Terminal Type	PCB, QC	PCB	PCB
Approved Standards	UL/CUL TÜV CQC	UL/CUL VDE	UL/CUL VDE
File No.	E133481 R50351269 CQC09002034524	E134517 40039460	E134517 40027342
Cross Reference	OMRON: G5CA PANASONIC: JV/JVN NEC: CQ OEG: PCD	PANASONIC: DW	OMRON: G6C PANASONIC: DK
Page	198	203	206




Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

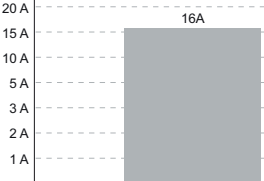
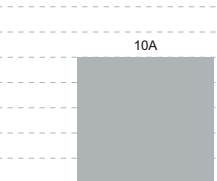
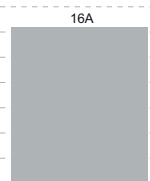
Type	HF118F	HF115F	HF115F-A
Appearance			
Dimensions(L x W x H) mm	28.5 x 10.1 x 12.5	29.0 x 12.7 x 15.7	29.0 x 12.7 x 15.7
Features	<ul style="list-style-type: none"> <li>• 10A switching capability</li> <li>• 5kV dielectric strength (between coil and contacts)</li> <li>• Low height: 12.5 mm</li> <li>• Creepage distance &gt;8mm (VDE0435/0631/0700)</li> <li>• Product in accordance to IEC 60335-1 available</li> </ul>	<ul style="list-style-type: none"> <li>• Low height: 15.7 mm</li> <li>• 16A switching capability</li> <li>• 5kV dielectric strength (between coil and contacts)</li> <li>• Creepage distance: 10mm</li> <li>• Meet VDE0435/0631/0700</li> <li>• Product in accordance to IEC 60335-1 available</li> </ul>	<ul style="list-style-type: none"> <li>• AC coil voltage type</li> <li>• 16A switching capability</li> <li>• 5kV dielectric strength (between coil and contacts)</li> <li>• Creepage distance: 10mm</li> <li>• Meet VDE0700/0631</li> <li>• Product in accordance to IEC 60335-1 available</li> </ul>
<b>Contact Ratings</b>			
Contact Form	1A, 1B, 1C	1A, 1B, 1C   2A, 2B, 2C	1A, 1B, 1C   2A, 2B, 2C
Contact Material	AgSnO <sub>2</sub> , AgNi	AgSnO <sub>2</sub> , AgNi, AgCdO	AgSnO <sub>2</sub> , AgNi, AgCdO
Max. Switching Current (Res. load)			
Max. Switching Voltage	440VAC / 125VDC	440VAC / 300VDC	440VAC / 300VDC
Max. Switching Power	2500VA/300W	3000VA/4000VA   2000VA	3000VA/4000VA   2000VA
Rated Load (Resistive load)	10A 250VAC 10A 30VDC	16A 250VAC 12A 250VAC   8A 250VAC	16A 250VAC 12A 250VAC   8A 250VAC
<b>Coil Ratings</b>			
Rated Voltage	5VDC to 60VDC	5VDC to 110VDC	24VAC, 115VAC, 230VAC
Nominal Operating Power	0.22W to 0.29W	0.4W	0.75VA
<b>Specifications</b>			
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	5000VAC	5000VAC	5000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 85°C	-40°C to 70°C
Operate / Release Time max.	10ms / 5ms	15ms / 8ms	
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>5</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS (at 8A 250VAC)	1 x 10 <sup>5</sup> OPS	5 x 10 <sup>4</sup> OPS
Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE CQC	UL/CUL VDE
File No.	E134517 40010480 CQC09002035071	E134517 116934 CQC08002028130	E134517 116934
Cross Reference	OMRON: G6RN FUJITSU: JS SCHRACK: RYII	OMRON: G2RL PANASONIC: LZ SCHRACK: RT FUJITSU: FTR-K1 FINDER: 41 SERIES RELPOL: RM84/85	OMRON: G5RL-AC SCHRACK: RT RELPOL: RM84/85
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Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF115F-T/TH	HF115F-H	HF115F-I
Appearance			
Dimensions(L x W x H) mm	29.0 x 12.7 x 15.7	29.0 x 12.7 x 15.7	29.0 x 12.7 x 15.7
Features	<ul style="list-style-type: none"> <li>• High temperature: 105°C</li> <li>• 5kV dielectric strength (between coil and contacts)</li> <li>• Creepage distance: 10mm</li> <li>• Meet VDE0700/0631</li> <li>• Product in accordance to IEC 60335-1 available</li> </ul>	<ul style="list-style-type: none"> <li>• High sensitive: 0.25W</li> <li>• 5kV dielectric strength (between coil and contacts)</li> <li>• Creepage distance: 10mm</li> <li>• Meet VDE0700/0631</li> <li>• Product in accordance to IEC 60335-1 available</li> </ul>	<ul style="list-style-type: none"> <li>• High inrush: TV-5 80A(at 120VAC)</li> <li>• 5kV dielectric strength (between coil and contacts)</li> <li>• Creepage distance: 10mm</li> <li>• Meet VDE0700/0631</li> <li>• Product in accordance to IEC 60335-1 available</li> </ul>

### Contact Ratings

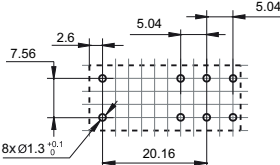
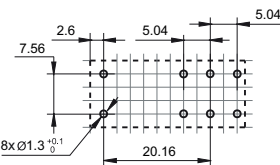
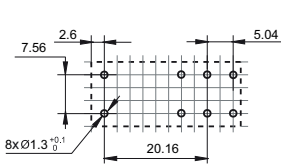
Contact Form	1A, 1C	1A, 1B, 1C	1A,1C
Contact Material	AgSnO <sub>2</sub> , AgNi, AgCdO	AgSnO <sub>2</sub> , AgNi, AgCdO	AgSnO <sub>2</sub>
Max. Switching Current (Res. load)			
Max. Switching Voltage	440VAC / 300VDC	440VAC / 300VDC	440VAC / 300VDC
Max. Switching Power	HF115F-T: 4000VA HF115F-TH: 2500VA	2500VA	4000VA
Rated Load (Resistive load)	HF115F-T: 16A 250VAC HF115F-TH: 10A 250VAC	10A 250VAC	1A: 16A 250VAC

### Coil Ratings

Rated Voltage	5VDC to 60VDC	5VDC to 60VDC	5VDC to 110VDC
Nominal Operating Power	0.25W, 0.4W	0.25W	0.4W

### Specifications




Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	5000VAC	5000VAC	5000VAC
Ambient Temperature	-40°C to 105°C	-40°C to 85°C	-40°C to 85°C
Operate / Release Time max.	15ms / 8ms	15ms / 8ms	15ms / 8ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>5</sup> OPS	7.5 x 10 <sup>4</sup> OPS

Layout (Bottom view)			
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Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE CQC	UL/CUL VDE CQC
File No.	E134517 116934 CQC08002028130	E134517 116934 CQC08002028130	E134517 116934 CQC08002028130
Cross Reference	SCHRACK: RTH105 16A P&B: RT FUJITSU: FTR-K1	SCHRACK: RT1 Sensitive P&B: RT FUJITSU: FTR-K1	SCHRACK: RT1 Inrush P&B: RT FUJITSU: FTR-H1
Page	220	223	226

Note: Specification and dimensions in this catalog are subject to change without notice.

# POWER RELAY SELECTION CHART

Type	HF115F-Q	HF115F-S	HF115F-L
Appearance			
Dimensions(L x W x H) mm	Vertical: (41.0 x 12.7 x 15.7) Horizontal: (45.0 x 12.7 x 15.7)	29.0 x 12.7 x 15.7	29.0 x 12.7 x 15.7
Features	<ul style="list-style-type: none"> <li>Ambient temperature up to 125°C</li> <li>5kV dielectric strength (between coil and contacts)</li> <li>Creepage distance &gt;8mm</li> <li>Meet VDE0700/0631</li> <li>UL94, V-0 flammability class</li> <li>Product in accordance to IEC 60335-1 available</li> </ul>	<ul style="list-style-type: none"> <li>Special contact struction</li> <li>Incandescent lamp load: 3000W 230VAC</li> <li>Inrush current: 165A/20ms, 800A/200µs</li> <li>5kV dielectric strength (between coil and contacts)</li> <li>Creepage distance: 10mm</li> <li>Product in accordance to IEC 60335-1 available</li> <li>Plastic sealed and flux proofed types available</li> </ul>	<ul style="list-style-type: none"> <li>Latching relay</li> <li>20A switching capability</li> <li>5kV dielectric strength (between coil and contacts)</li> <li>Creepage distance: 11mm-NO/10mm-CO version</li> <li>Meeting VDE 0700, 0631 reinforce insulation</li> <li>Product in accordance to IEC 60335-1 available</li> </ul>

## Contact Ratings

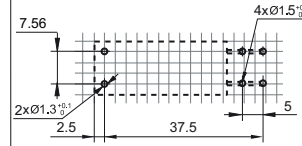
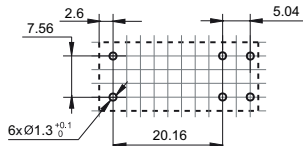
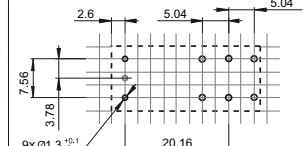
Contact Form	1A, 1B	1A	1A, 1C	2A, 2C
Contact Material	AgSnO <sub>2</sub> , AgNi	W+AgSnO <sub>2</sub>	AgSnO <sub>2</sub>	
Max. Switching Current (Res. load)	20A	16A	16A (1C)	8A (2C)
Max. Switching Voltage	440VAC / 300VDC	440VAC	440VAC / 300VDC	
Max. Switching Power	5000VA	4000VA	4000VA	2000VA
Rated Load (Resistive load)	20A 250VAC	Resistive: 16A 250VAC Incandescent Lamp: 3000W 230VAC Inrush current: 165A / 20ms flourescent: 800A/200µs	16A 250VAC	8A 250VAC

## Coil Ratings

Rated Voltage	5VDC to 60VDC	5VDC to 110VDC	5VDC to 24VDC
Nominal Operating Power	0.4W	0.4W	0.4W, 0.6W

## Specifications

Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	5000VAC	5000VAC	5000VAC
Ambient Temperature	-40°C to 125°C	-40°C to 85°C	-40°C to 85°C
Operate / Release Time max.	15ms / 8ms	15ms / 8ms	10ms / 10ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	5 x 10 <sup>6</sup> OPS	2 x 10 <sup>6</sup> OPS
Electrical Endurance min.	3 x 10 <sup>4</sup> OPS	1 x 10 <sup>4</sup> OPS (at 3000W 230VAC)	5 x 10 <sup>4</sup> OPS




Layout (Bottom view)			
Terminal Type	PCB, QC	PCB	PCB
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE CQC	UL/CUL VDE CQC
File No.	E134517 116934 CQC08002028130	E134517 116934 CQC08002028130	E134517 116934 CQC17002176310

Cross Reference	SCHRACK: RF/41063 125°C	TE: RTS3T	PANASONIC: DJ SCHRACK: RT1 bistable FUJITSU: FTR-K1L
Page	229	232	234

Note: Specification and dimensions in this catalog are subject to change without notice.



## POWER RELAY SELECTION CHART

Type	HF115F-LS	HF115FP	HF115FK
Appearance			
Dimensions(L x W x H) mm	29.0 x 12.7 x 15.7	29.0 x 13.0 x 25.5	29.0 x 12.7 x 15.7
Features	<ul style="list-style-type: none"> <li>Latching relay</li> <li>Incandescent lamp load: 3500W 277VAC</li> <li>5kV dielectric strength (between coil and contacts)</li> <li>Creepage distance: 11mm</li> <li>Low height: 15.7 mm</li> <li>Meeting reinforce insulation</li> </ul>	<ul style="list-style-type: none"> <li>Manual test device, Type with mechanical indicator / electrical indicator</li> <li>5kV dielectric strength (between coil to contacts)</li> <li>Creepage distance: 8mm</li> <li>Meet VDE0700/0631</li> <li>Sockets available</li> </ul>	<ul style="list-style-type: none"> <li>Low height: 15.7 mm</li> <li>16A switching capability</li> <li>5kV dielectric strength (between coil and contacts)</li> <li>Creepage distance: 10mm</li> <li>Meeting reinforce insulation</li> <li>Product in accordance to IEC 60335-1 available</li> </ul>

### Contact Ratings

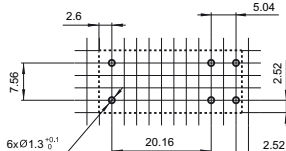
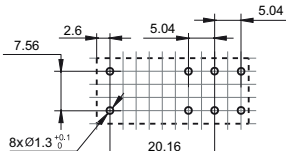
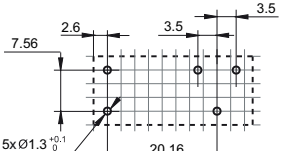
Contact Form	1A	1C	2C	1A, 1C	2A, 2C
Contact Material	W + AgSnO <sub>2</sub>	AgNi		AgSnO <sub>2</sub>	
Max. Switching Current (Res. load)	16A	16A	8A	16A	8A
Max. Switching Voltage	440VAC	440VAC		400VAC	
Max. Switching Power	4000VA	4000VA	2000VA	3000VA/4000VA	2000VA
Rated Load (Resistive load)	16A 250VAC	16A 250VAC	8A 250VAC	12A/16A 250VAC	8A 250VAC

### Coil Ratings

Rated Voltage	5VDC to 24VDC	24VAC to 230VAC / 12VDC to 110VDC	5VDC to 48VDC
Nominal Operating Power	0.4W, 0.6W	0.75VA, 0.4W	0.4W

### Specifications




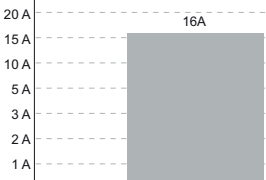
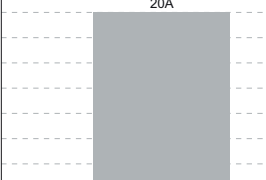
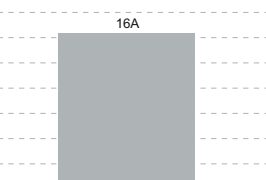
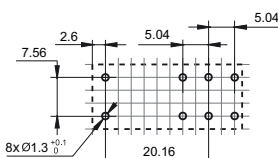
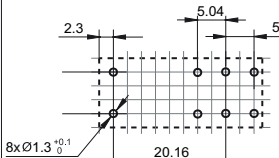
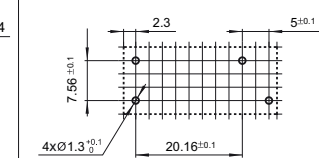
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	5000VAC	5000VAC	5000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 70°C	-40°C to 85°C
Operate / Release Time max.	10ms / 10ms	15ms / 15ms (DC)	10ms / 5ms
Mechanical Endurance min.	2 x 10 <sup>6</sup> OPS	DC type: 5 x 10 <sup>6</sup> OPS AC type: 1 x 10 <sup>6</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	6 x 10 <sup>3</sup> OPS	3 x 10 <sup>4</sup> OPS	5 x 10 <sup>4</sup> OPS

Layout (Bottom view)			
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Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE	UL/CUL VDE CQC
File No.	E134517 116934 CQC14002104529	E133481 116934	E134517 116934 CQC13002103948
Cross Reference	TE: RTX/RTS3T	SCHRACK: XT	OMRON: G2RL FUJITSU: FTR-K1 PANASONIC: LZ SCHRACK: RZ
Page	240	243	246




Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

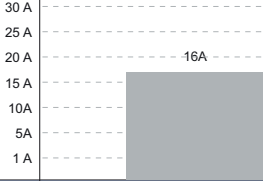
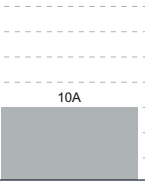
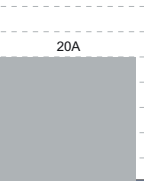
Type	HF115FK-T	HF158F	HF158F-V
Appearance			
Dimensions(L x W x H) mm	29.0 x 12.7 x 15.7	29.0 x 12.7 x 15.7	29.0 x 12.7 x 20.0
Features	<ul style="list-style-type: none"> <li>High temperature: 105°C</li> <li>Low height: 15.7 mm</li> <li>16A switching capability</li> <li>5kV dielectric strength (between coil and contacts)</li> <li>Creepage distance: 10mm</li> <li>Meeting reinforce insulation</li> <li>Sockets available</li> </ul>	<ul style="list-style-type: none"> <li>20A switching capability</li> <li>Low height: 12.5 mm</li> <li>5kV dielectric strength (between coil and contacts)</li> <li>Creepage distance: 10mm</li> <li>Product in accordance to IEC 60335-1 available</li> </ul>	<ul style="list-style-type: none"> <li>10A 300VDC high-voltage switching capability</li> <li>5kV dielectric strength (between coil and contacts)</li> <li>Creepage distance: 10mm</li> <li>Product in accordance to IEC60335-1 available</li> </ul>
<b>Contact Ratings</b>			
Contact Form	1A   1C	1A, 1C	1A
Contact Material	AgSnO <sub>2</sub>	AgSnO <sub>2</sub> , AgNi	AgSnO <sub>2</sub>
Max. Switching Current (Res. load)			
Max. Switching Voltage	400VAC	440VAC	420VDC/300VAC
Max. Switching Power	4000VA	5000VA	3000W/3324VA
Rated Load (Resistive load)	16A 250VAC	16A 250VAC	10A 300VDC 12A 277VAC
<b>Coil Ratings</b>			
Rated Voltage	5VDC to 48VDC	5VDC to 48VDC	5VDC to 24VDC
Nominal Operating Power	0.4W	0.4W	0.4W
<b>Specifications</b>			
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	5000VAC	5000VAC	5000VAC
Ambient Temperature	-40°C to 105°C	-40°C to 85°C	-40°C to 85°C
Operate / Release Time max.	10ms / 5ms	15ms / 8ms	10ms / 5ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	2 x 10 <sup>7</sup> OPS	2 x 10 <sup>6</sup> OPS
Electrical Endurance min.	3 x 10 <sup>4</sup> OPS	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>4</sup> OPS
Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE	UL/CUL VDE CQC
File No.	E134517 116934 CQC13002103948	E134517 40032833 CQC15002129497	E134517 40032833 CQC15002129497
Cross Reference	P&B: RT SCHRACK:RZ FUJITSU: FTR-K1	OMRON: G2RL SCHRACK: RT PANASONIC: LZ RELPOL: RM85 FINDER: 41 SERIES FUJITSU: FTR-K1	
Page	250	253	256

Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF175F	HF14FF	HF14FW
Appearance			
Dimensions(L x W x H) mm	29.0 x 19.6 x 15.7	29.0 x 13.0 x 26.0	29.0 x 13.0 x 26.5
Features	<ul style="list-style-type: none"> <li>• 2 Form A and 2 Form C configurations</li> <li>• Low height, only 15.7mm</li> <li>• 5kV dielectric strength (between coil and contacts)</li> <li>• Creepage/clearance distance &gt; 10mm, Meets reinforce insulation</li> <li>• Product in accordance to IEC 60335-1 available</li> <li>• UL insulation system: Class F</li> </ul>	<ul style="list-style-type: none"> <li>• 10A switching capability</li> <li>• 5kV dielectric strength (between coil and contacts)</li> <li>• 1 Form A and 1 Form C configurations</li> <li>• Plastic sealed and flux proofed types available</li> </ul>	<ul style="list-style-type: none"> <li>• 20A switching capability</li> <li>• 4kV dielectric strength (between coil and contacts)</li> <li>• Plastic sealed and flux proofed types available</li> </ul>

### Contact Ratings

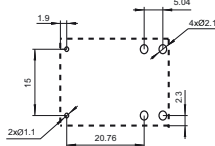
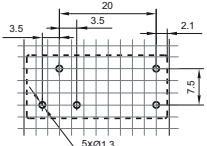
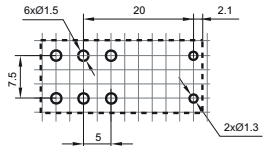
Contact Form	2A, 2C	1A, 1C	1A, 1B, 1C
Contact Material	AgSnO <sub>2</sub>	AgSnO <sub>2</sub> , AgNi, AgCdO	AgSnO <sub>2</sub> , AgCdO
Max. Switching Current (Resistive load)			
Max. Switching Voltage	277VAC	277VAC / 30VDC	277VAC / 30VDC
Max. Switching Power	4432VA	2770VA / 300W	5540VA / 480W
Rated Load (Resistive load)	16A 277VAC	10A 277VAC/30VDC TV-5 120VAC	Resistive: 16A 277VAC/24VDC Motor: 1HP 240VAC TV-8 125VAC (NO contact)

### Coil Ratings

Rated Voltage	5VDC to 48VDC	3VDC to 60VDC	5VDC to 110VDC
Nominal Operating Power	0.8W	0.53W	0.53W, 0.72W




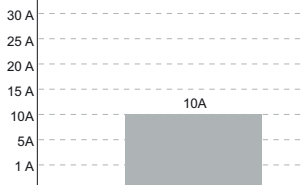
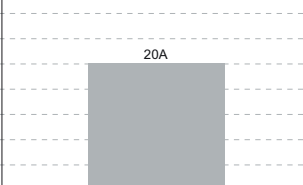
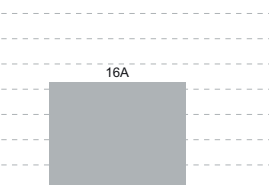
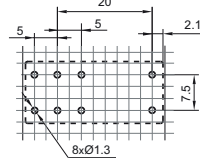
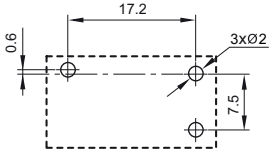
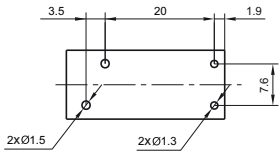
### Specifications

Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	5000VAC	5000VAC	4000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 70°C	-40°C to 85°C
Operate / Release Time max.	10ms / 5ms	15ms / 5ms	15ms / 5ms
Mechanical Endurance min.	5 x 10 <sup>6</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	5 x 10 <sup>4</sup> OPS	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>5</sup> OPS

Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL TÜV CQC	UL/CUL TÜV CQC	UL/CUL VDE CQC
File No.	E133481 R50412801 CQC18002196447 CQC18002202622	E134517 R50140759 CQC10002046169	E134517 40023508 CQC10002046170
Cross Reference		OMRON: G2R PANASONIC: JR1/JR1A FUJITSU: VS NEC: CH P&B: RKA/RKS	OMRON: G2R PANASONIC: JR1AF FUJITSU: FBR610 P&B: RKA/RKS
Page	259	262	265




Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART


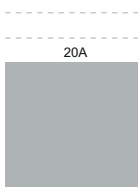

Type	HF140FF	HF25F	HF62F
Appearance			
Dimensions(L x W x H) mm	29.0 x 13.0 x 26.3	22.8 x 12.3 x 24.4	29.0 x 12.6 x 24.4
Features	<ul style="list-style-type: none"> <li>• 10A switching capability</li> <li>• 5kV dielectric strength (between coil and contacts)</li> <li>• 2.0mm contact gap available</li> <li>• Plastic sealed and flux proofed types available</li> </ul>	<ul style="list-style-type: none"> <li>• 20A switching capability</li> <li>• 5kV impulse withstand voltage (between coil and contacts)</li> <li>• small and for microwave oven</li> <li>• PCB &amp; QC layouts</li> <li>• Flux proofed types available</li> </ul>	<ul style="list-style-type: none"> <li>• 20A switching capability</li> <li>• 5kV dielectric strength (between coil and contacts)</li> <li>• 10kV impulse withstand voltage (between coil and contacts)</li> <li>• creepage distance: 8mm</li> </ul>
<b>Contact Ratings</b>			
Contact Form	2A, 2C	1A	1A
Contact Material	AgSnO <sub>2</sub> , AgNi, AgCdO	AgSnO <sub>2</sub>	AgSnO <sub>2</sub>
Max. Switching Current (Resistive load)			
Max. Switching Voltage	250VAC / 30VDC	250VAC / 30VDC	277VAC / 30VDC
Max. Switching Power	2500VA / 240W	5000VA / 480W	4000VA / 480W
Rated Load (Resistive load)	5A 250VAC 10A 250VAC 8A 30VDC	20A 250VAC Motor: 1.5HP 250VAC	16A 250VAC/30VDC
<b>Coil Ratings</b>			
Rated Voltage	3VDC to 110VDC	5VDC to 24VDC	5VDC to 48VDC
Nominal Operating Power	0.53W, 0.8W, 1.4W	0.5W	0.54W
<b>Specifications</b>			
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	5000VAC	5000VAC	5000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
Operate / Release Time max.	15ms / 5ms	15ms / 5ms	20ms / 10ms
Mechanical Endurance min.	Standard: 1 x 10 <sup>7</sup> OPS W Type(1.5mm): 5 x 10 <sup>5</sup> OPS W Type(2.0mm): 3 x 10 <sup>5</sup> OPS	2 x 10 <sup>6</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	Standard: 1 x 10 <sup>5</sup> OPS W Type(1.5mm): 1 x 10 <sup>3</sup> OPS W Type(2.0mm): 3 x 10 <sup>3</sup> OPS	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>5</sup> OPS
Layout (Bottom view)			
Terminal Type	PCB	PCB, QC	PCB, QC
Approved Standards	UL/CUL TÜV CQC	UL/CUL VDE TÜV CQC	UL/CUL TÜV CQC
File No.	E134517 R50149131 CQC09002030294	E134517 40026917 R50207576 CQC09002028692	E133481 R50147086 CQC09002028470
Cross Reference	OMRON: G2R/G2RG PANASONIC: JR2/JR2A FUJITSU: FBR-F1/VSB NEC: TP P&B: RKA/RKS	OMRON: G5G PANASONIC: LE	OMRON: G5J PANASONIC: JR1AF-TMP FUJITSU: VR OEG: OMIF
Page	268	272	276

Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF102F	HF161F	HF161F-W
Appearance			
Dimensions(L x W x H) mm	30.5 x 16.0 x 23.5	30.4 x 15.9 x 23.3	30.4 x 15.9 x 23.3
Features	<ul style="list-style-type: none"> <li>• Heavy load up to 5000VA</li> <li>• Ideal for motor switching</li> <li>• Withstand inrush current of 80A</li> <li>• PCB &amp; QC layouts available</li> </ul>	<ul style="list-style-type: none"> <li>• 4.5kV dielectric strength (between coil and contacts)</li> <li>• Heavy load up to 6250VA</li> <li>• Ideal for motor switching</li> <li>• PCB layouts available</li> </ul>	<ul style="list-style-type: none"> <li>• 31A switching capitable</li> <li>• Applicable to inverter used for photovoltaic power generation systems</li> <li>• Ideal for UPS</li> <li>• 1.5mm contact gap (compliant to European Photovoltaic Standard VDE0126)</li> <li>• The clearance distance between contact and coil is bigger than 6.4mm, the creepage distance is bigger than 8mm.</li> </ul>

### Contact Ratings

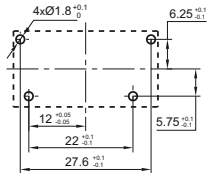
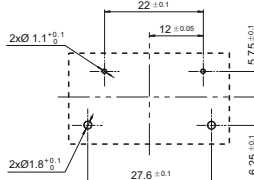
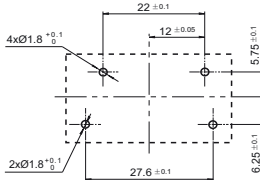
Contact Form	1A	1A	1A
Contact Material	AgSnO <sub>2</sub> , AgCdO	AgSnO <sub>2</sub> , AgCdO	AgSnO <sub>2</sub>
Max. Switching Current (Resistive load)			
Max. Switching Voltage	250VAC	250VAC	277VAC
Max. Switching Power	6250VA	6250VA	7750VA
Rated Load (Resistive load)	20A 250VAC Motor: 2HP 240VAC	20A 250VAC Motor: 2HP 240VAC	Resistive: 26A 250VAC Inductive: 31A 250VAC

### Coil Ratings

Rated Voltage	5VDC to 48VDC	5VDC to 48VDC	9VDC to 24VDC
Nominal Operating Power	0.9W	0.9W	1.4W




### Specifications

Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	4500VAC	4500VAC	4500VAC
Ambient Temperature	-25°C to 85°C	-40°C to 85°C	-40°C to 85°C (Apply holding voltage to coil, which is 45% to 80% that of rated voltage)
Operate / Release Time max.	20ms / 10ms	20ms / 10ms	20ms / 10ms
Mechanical Endurance min.	2 x 10 <sup>6</sup> OPS	2 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>5</sup> OPS	3 x 10 <sup>4</sup> OPS

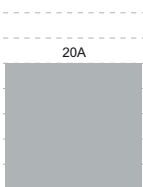
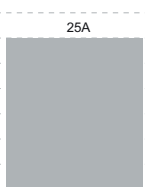
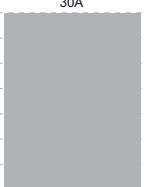
Layout (Bottom view)			
Terminal Type	PCB, QC	PCB	PCB
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE CQC	UL/CUL VDE CQC
File No.	E134517 40024142 CQC13002098165	E134517 40031410 CQC10002050943	E134517 40031410 CQC10002050943
Cross Reference	OMRON: G4A PANASONIC: LF OEG: PCFN	OMRON: G4A PANASONIC: LF OEG: PCFN	PANASONIC: LF-G OEG: PCFN SOLAR
Page	279	282	285

Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF160F	HF166F	HF37F
Appearance			
Dimensions(L x W x H) mm	30.4 x 15.9 x 25.4	50.0 x 27.0 x 20.0	35.2 x 32.2 x 24.0
Features	<ul style="list-style-type: none"> <li>• 4.5kV dielectric strength (between coil and contacts)</li> <li>• Heavy load up to 6250VA</li> <li>• Ideal for motor switching</li> <li>• PCB &amp; QC layouts</li> </ul>	<ul style="list-style-type: none"> <li>• Latching relay</li> <li>• 4mm contact gap available</li> <li>• 25A switching capability</li> <li>• 5kV dielectric strength (between coil and contacts)</li> <li>• Creepage distance between coil and contacts:10mm</li> </ul>	<ul style="list-style-type: none"> <li>• 30A switching capability</li> <li>• 1 Form A configuration</li> <li>• 70A withstands inrush current</li> <li>• TV-15(at 120VAC) available</li> </ul>

### Contact Ratings

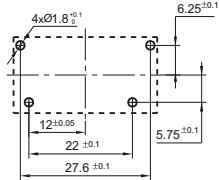
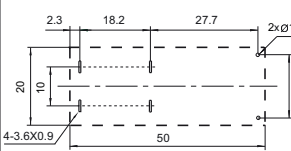
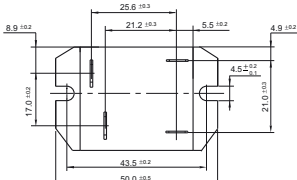
Contact Form	1A	1A+1B	1A
Contact Material	AgSnO <sub>2</sub> , AgCdO	AgSnO <sub>2</sub>	AgSnO <sub>2</sub> , AgCdO
Max. Switching Current (Resistive load)			
Max. Switching Voltage	250VAC	277VAC	277VAC
Max. Switching Power	6250VA	6925VA	7500VA
Rated Load (Resistive load)	20A 250VAC Motor: 2HP 240VAC	25A 277VAC	30A 250VAC

### Coil Ratings

Rated Voltage	5VDC to 48VDC	5VDC to 48VDC	5VDC to 60VDC
Nominal Operating Power	0.9W	1.2W, 2.4W	1.2W

### Specifications




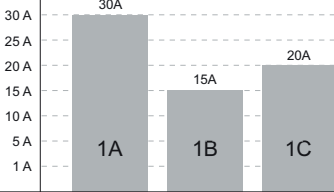
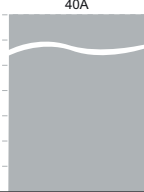
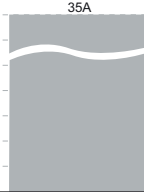
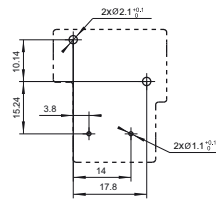
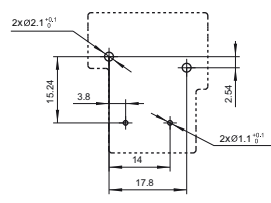
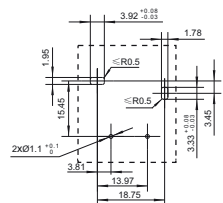
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	4500VAC	5000VAC	4000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 85°C	-40°C to 70°C
Operate / Release Time max.	20ms / 10ms	25ms / 25ms	20ms / 5ms
Mechanical Endurance min.	2 x 10 <sup>6</sup> OPS	6 x 10 <sup>5</sup> OPS	5 x 10 <sup>6</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS	3 x 10 <sup>4</sup> OPS	1 x 10 <sup>5</sup> OPS

Layout (Bottom view)			
Terminal Type	PCB, QC	PCB	QC
Approved Standards	UL/CUL VDE CQC	UL/CUL TÜV	UL/CUL VDE CQC
File No.	E134517 40024142 CQC12002072207	E133481 B130453286009	E134517 40025378 CQC13002102287
Cross Reference	OMRON: G4A PANASONIC: JM FUJITSU: FTR-K3/VH OEG: PCF		FUJITSU: VF
Page	288	291	294

Note: Specification and dimensions in this catalog are subject to change without notice.






## POWER RELAY SELECTION CHART

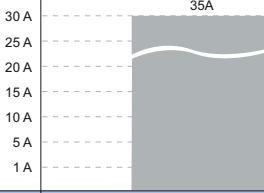
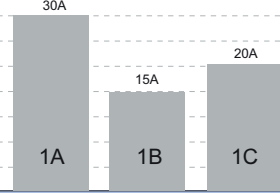

Type	HF165FD	HF165FD-G	HF165F
Appearance			
Dimensions(L x W x H) mm	32.2 x 27.5 x 20.4	32.2 x 27.5 x 20.4	32.2 x 27.4 x 19.4
Features	<ul style="list-style-type: none"> <li>• 30A switching capability</li> <li>• 4kV dielectric strength (between coil and contacts)</li> <li>• Creepage distance: 5.5mm</li> <li>• Product in accordance to IEC 60335-1 available</li> <li>• UL insulation system: Class F</li> </ul>	<ul style="list-style-type: none"> <li>• 40A switching capability</li> <li>• 4kV dielectric strength (between coil and contacts)</li> <li>• Creepage distance: 5.5mm</li> <li>• Product in accordance to IEC 60335-1 available</li> <li>• UL insulation system: Class F</li> </ul>	<ul style="list-style-type: none"> <li>• 35A switching capability</li> <li>• Applicable to inverter used for photovoltaic power generation systems</li> <li>• Ideal for UPS</li> <li>• 1.8mm contact gap (compliant to European Photovoltaic Standard VDE0126)</li> <li>• Low coil holding voltage contributes to saving energy of equipment</li> </ul>
<b>Contact Ratings</b>			
Contact Form	1A, 1B, 1C	1A	1A
Contact Material	AgSnO <sub>2</sub>	AgSnO <sub>2</sub>	AgSnO <sub>2</sub>
Max. Switching Current (Resistive load)			
Max. Switching Voltage	277VAC	277VAC	277VAC
Max. Switching Power	8310VA / 4155VA	11080VA	9695VA
Rated Load (Resistive load)	1A: 30A 277VAC 1B: 15A 277VAC 1C: 20A 277VAC/10A 277VAC	40A 277VAC	Resistive: 35A 250VAC Inductive: 35A 277VAC
<b>Coil Ratings</b>			
Rated Voltage	5VDC to 110VDC	5VDC to 110VDC	5VDC to 48VDC
Nominal Operating Power	0.9W	0.9W	2.25W
<b>Specifications</b>			
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	4000VAC	4000VAC	4000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
Operate / Release Time max.	15ms / 10ms	15ms / 10ms	15ms / 10ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>6</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>4</sup> OPS	3 x 10 <sup>4</sup> OPS
Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE CQC	UL/CUL VDE
File No.	E134517 40043143 CQC15002130956	E134517 40043143 CQC15002130956	E134517 40037289
Cross Reference	OMRON: G8P PANASONIC: JTN/JTV OEG: ORU P&B: T9A/T90	SONGCHUAN: 832HA	P&B: T9S SOLAR
Page	297	301	304

Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF170F	HF105F-1	HF105F-2
Appearance			
Dimensions(L x W x H) mm	36.0 x 30.0 x 40.0	32.3 x 27.1 x 20	32.2 x 27.5 x 27.8
Features	<ul style="list-style-type: none"> <li>• 35A switching capability</li> <li>• Applicable to solar photovoltaic inverter</li> <li>• 3.6 mm contact gap</li> <li>• Low coil holding voltage contributes to saving energy of equipment</li> <li>• UL insulation system: Class F</li> </ul>	<ul style="list-style-type: none"> <li>• 40A switching capability</li> <li>• PCB coil terminals, ideal for heavy duty load</li> <li>• 4kV dielectric strength (between coil and contacts)</li> <li>• Heavy load up to 7200VA</li> <li>• Unenclosed, plastic sealed and dust protected types available</li> </ul>	<ul style="list-style-type: none"> <li>• 40A switching capability</li> <li>• PCB coil terminals, ideal for heavy duty load</li> <li>• Heavy load up to 7200VA</li> <li>• Plastic sealed and dust protected types available</li> </ul>

### Contact Ratings

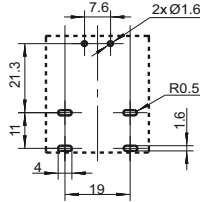
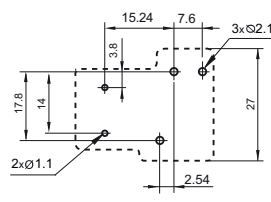
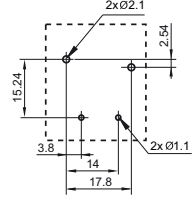
Contact Form	2A	1A, 1B, 1C	1A, 1B, 1C
Contact Material	AgSnO <sub>2</sub> , AgNi	AgSnO <sub>2</sub> , AgCdO	AgSnO <sub>2</sub> , AgCdO
Max. Switching Current (Resistive load)			
Max. Switching Voltage	277VAC	277VAC / 28VDC	277VAC / 28VDC
Max. Switching Power	9695VA	7200VA / 560W	7200VA / 560W
Rated Load (Resistive load)	35A 277VAC	1A: 30A 240VAC/20A 28VDC 1B: 15A 240VAC/10A 28VDC 1C: 20A/10A 240VAC/28VDC L Type(1A): 25A 240VAC/20A 28VDC	1A: 30A 240VAC/20A 28VDC 1B: 15A 240VAC/10A 28VDC 1C: 20A/10A 240VAC/28VDC L Type(1A): 25A 240VAC/20A/28VDC

### Coil Ratings

Rated Voltage	6VDC to 48VDC	12VAC to 277VAC / 5VDC to 110VDC	12VAC to 277VAC / 5VDC to 110VDC
Nominal Operating Power	1.88W	2.0VA, 0.9W	2.0VA, 0.9W




### Specifications

Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	5000VAC	2500VAC / 4000VAC	2500VAC
Ambient Temperature	-40°C to 85°C	DC: -55°C to 85°C AC: -55°C to 60°C	DC: -55°C to 85°C AC: -55°C to 60°C
Operate / Release Time max.	30ms / 10ms	15ms / 10ms(DC type)	15ms / 10ms(DC type)
Mechanical Endurance min.	1 x 10 <sup>6</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	3 x 10 <sup>4</sup> OPS	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>5</sup> OPS

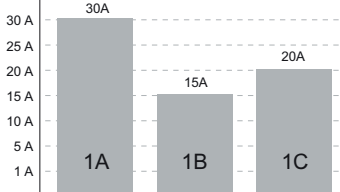
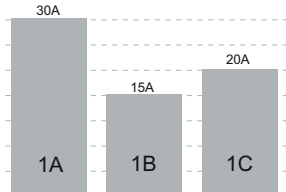
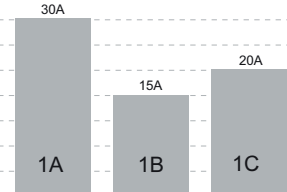
Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB, QC
Approved Standards	UL/CUL TÜV CQC	UL/CUL VDE CQC	UL/CUL VDE CQC
File No.	E133481 R50384178 CQC17002175164	E134517 40025518(DC Type) CQC09002031229(Ningbo Factory, DC Type) CQC12002071130(Ningbo Factory, AC Type)	E134517 40025518(DC Type) CQC10002049165(DC Type) CQC16002140270(Hong Yuanda Factory,DC Type)
Cross Reference	PANASONIC: HES	OMRON: G8P PANASONIC: JTN/JTV OEG: ORU P&B: T9A/T90	OMRON: G7G/G8P PANASONIC: JT OEG: ORU P&B: 491/T9A
Page	307	309	315

Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF105F-4	HF105F-5	HF2100
Appearance			
Dimensions(L x W x H) mm	50.0 x 27.2 x 27.8	32.4 x 27.3 x 27.8	32.0 x 27.5 x 28.0
Features	<ul style="list-style-type: none"> <li>• 40A switching capability</li> <li>• 2.5kV dielectric strength (between coil and contacts)</li> <li>• Heavy load up to 7200VA</li> <li>• Plastic sealed and dust protected types available</li> </ul>	<ul style="list-style-type: none"> <li>• 40A switching capability</li> <li>• PCB coil terminals, ideal for heavy duty load</li> <li>• Heavy load up to 7200VA</li> <li>• 4kV dielectric strength (between coil and contacts)</li> <li>• Plastic sealed and dust protected types available</li> </ul>	<ul style="list-style-type: none"> <li>• PCB coil terminals, ideal for heavy duty load</li> <li>• 2.5kV dielectric strength (between coil and contacts)</li> <li>• Plastic sealed and flux proofed types available</li> </ul>

### Contact Ratings

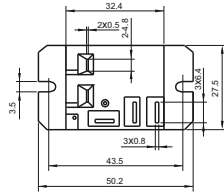
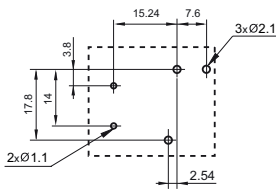
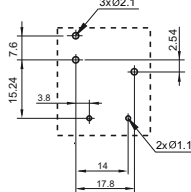
Contact Form	1A, 1B, 1C	1A, 1B, 1C	1A, 1B, 1C
Contact Material	AgSnO <sub>2</sub> , AgCdO	AgSnO <sub>2</sub> , AgCdO	AgSnO <sub>2</sub> , AgCdO
Max. Switching Current (Resistive load)			
Max. Switching Voltage	277VAC / 28VDC	277VAC / 28VDC	277VAC / 30VDC
Max. Switching Power	7200VA / 560W	7200VA / 560W	7200VA / 600W
Rated Load (Resistive load)	1A: 30A 240VAC/20A 28VDC 1B: 15A 240VAC/10A 28VDC 1C: 20A/10A 240VAC/28VDC L Type(1A): 25A 240VAC/20A/28VDC	1A: 30A 240VAC/20A 28VDC 1B: 15A 240VAC/10A 28VDC 1C: 20A/10A 240VAC/28VDC L Type(1A): 25A 240VAC/20A/28VDC	1A: 30A 240VAC/20A 30VDC 1B: 15A 240VAC/10A 30VDC 1C: 20A/10A 240VAC/30VDC

### Coil Ratings

Rated Voltage	12VAC to 277VAC / 5VDC to 110VDC	12VAC to 277VAC / 5VDC to 110VDC	5VDC to 110VDC
Nominal Operating Power	2.0VA, 0.9W	2.0VA, 0.9W	0.9W

### Specifications




Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	2500VAC	4000VAC / 2500VAC	2500VAC
Ambient Temperature	DC: -55°C to 85°C AC: -55°C to 60°C	DC: -55°C to 85°C AC: -55°C to 60°C	-55°C to 85°C
Operate / Release Time max.	15ms / 10ms(DC type)	15ms / 10ms(DC type)	15ms / 10ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>5</sup> OPS (at 30A 240VAC)

Layout (Bottom view)			
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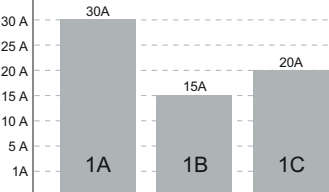
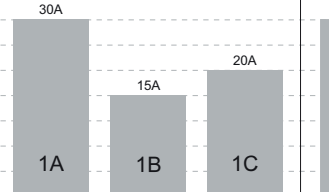
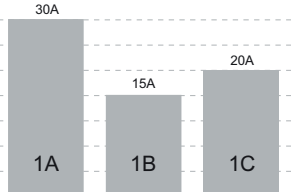
Terminal Type	QC	PCB, QC	PCB, QC
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE CQC	UL/CUL TÜV CQC
File No.	E134517 40025518(DC Type) CQC09002031229(DC Type)	E134517 40025518(DC Type) CQC10002049185(DC Type) CQC16002140270(Hong Yuanda Factory,DC Type)	E134517 R50153835 CQC10002049166
Cross Reference	OMRON: G7G/G8P PANASONIC: JT OEG: ORU P&B: T9A	OMRON: G7G/G8P PANASONIC: JTN OEG: ORU P&B: T90/T9A	OMRON: G7G PANASONIC: JT P&B: 491/T9A ZETTLER: AZ2100
Page	319	323	327

Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF2110 / HF2120	HF2150 / HF2151	HF2160
Appearance			
Dimensions(L x W x H) mm	28.4 x 23.5 x 15.3	31.8 x 27.0 x 19.1	32.0 x 27.5 x 19.8
Features	<ul style="list-style-type: none"> <li>• 30A switching capability</li> <li>• 2.5kV dielectric strength (between coil and contacts)</li> <li>• Plastic sealed and flux proofed types available</li> </ul>	<ul style="list-style-type: none"> <li>• 30A switching capability</li> <li>• 2.5kV dielectric strength (between coil and contacts)</li> <li>• Heavy load up to 7200VA</li> <li>• Plastic sealed and flux proofed type available</li> </ul>	<ul style="list-style-type: none"> <li>• 30A switching capability</li> <li>• PCB coil terminals, ideal for heavy duty load</li> <li>• 2.5KV dielectric strength (between coil and contacts)</li> <li>• Plastic sealed and Dust proofed types available</li> </ul>

### Contact Ratings

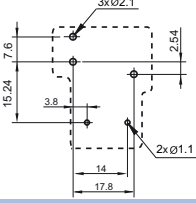
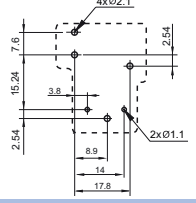
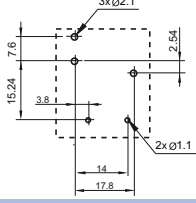
Contact Form	1A, 1B, 1C	1A, 1B, 1C	1A, 1B, 1C
Contact Material	AgSnO <sub>2</sub> , AgCdO	AgSnO <sub>2</sub> , AgCdO	AgSnO <sub>2</sub> , AgCdO
Max. Switching Current (Resistive load)			
Max. Switching Voltage	277VAC / 30VDC	277VAC / 30VDC	277VAC / 30VDC
Max. Switching Power	7200VA / 600W	7200VA / 600W	7200VA / 600W
Rated Load (Resistive load)	1A: 30A 240VAC/20A 30VDC 1B: 15A 240VAC/10A 30VDC 1C: 20A/10A 240VAC/30VDC	1A: 30A 240VAC/20A 30VDC 1B: 15A 240VAC/10A 30VDC 1C: 20A/10A 240VAC/30VDC	1A: 30A 240VAC/20A 30VDC 1B: 15A 240VAC/10A 30VDC 1C: 20A/10A 240VAC/30VDC

### Coil Ratings

Rated Voltage	5VDC to 110VDC	5VDC to 110VDC	5VDC to 110VDC
Nominal Operating Power	0.9W	0.9W	0.9W




### Specifications

Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	2500VAC	2500VAC	2500VAC
Ambient Temperature	-55°C to 85°C	-55°C to 85°C	-55°C to 85°C
Operate / Release Time max.	15ms / 10ms	15ms / 10ms	15ms / 10ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS (at 30A 240VAC)	1 x 10 <sup>5</sup> OPS (at 30A 240VAC)	1 x 10 <sup>5</sup> OPS (at 30A 240VAC)

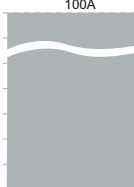

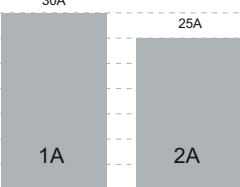
Layout (Bottom view)			
Terminal Type	PCB, QC	PCB	PCB, QC
Approved Standards	UL/CUL CQC	UL/CUL TÜV CQC	UL/CUL TÜV CQC
File No.	E134517 CQC10002049166	E134517 R50153835 CQC10002049166	E134517 R50153835 CQC10002049166
Cross Reference	OMRON: G7G PANASONIC: JT NEC: CT P&B: 491/T90 ZETTLER: AZ2110/AZ2120	OMRON: G7G PANASONIC: JTN/JTV NEC: CT P&B: T9A/T90 ZETTLER: AZ2150/AZ2151	PANASONIC: JT NEC: CT P&B: T9A/T90 ZETTLER: AZ2160
Page	331	337	341

Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF172F-100	HF172F-140	HF116F-1
Appearance			
Dimensions(L x W x H) mm	45.0 x 41.3 x 43	45.0 x 41.4 x 43	50.5 x 32.9 x 36.0
Features	<ul style="list-style-type: none"> <li>• 100A switching capability</li> <li>• Applicable to solar photovoltaic inverter</li> <li>• 4.0 mm contact gap</li> <li>• Low coil holding voltage contributes to saving energy of equipment</li> <li>• UL insulation system: Class F</li> </ul>	<ul style="list-style-type: none"> <li>• 140A switching capability</li> <li>• Applicable to solar photovoltaic inverter</li> <li>• 3.0 mm contact gap</li> <li>• Low coil holding voltage contributes to saving energy of equipment</li> <li>• UL insulation system: Class F</li> </ul>	<ul style="list-style-type: none"> <li>• 30A switching capability</li> <li>• 4kV dielectric strength (between coil and contacts)</li> <li>• Heavy load up to 8310VA</li> <li>• 3mm contact gap available</li> </ul>

### Contact Ratings

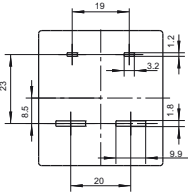
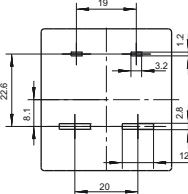
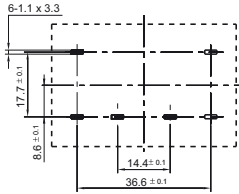
Contact Form	1A	1A	1A, 2A
Contact Material	AgNi	AgNi	AgSnO <sub>2</sub> , AgCdO
Max. Switching Current (Resistive load)			
Max. Switching Voltage	800VAC	800VAC	277VAC
Max. Switching Power	24000VA	24000VA	8310VA
Rated Load (Resistive load)	Making 30A, carrying 100A, breaking 30A 690VAC 85°C	Making 30A, carrying 140A, breaking 30A 400VAC 85°C	1A: 30A 240VAC/30A 277VAC 2A: 25A 240VAC/25A 277VAC

### Coil Ratings

Rated Voltage	6VDC to 24VDC	6VDC to 24VDC	6VAC to 220/240VAC 3VDC to 200VDC
Nominal Operating Power	2.5W	2.5W	2.7VA, 1.9W

### Specifications




Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	5000VAC	5000VAC	4000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 85°C	-55°C to 70°C
Operate / Release Time max.	30ms / 10ms	30ms / 10ms	30ms / 30ms
Mechanical Endurance min.	1 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS	1 x 10 <sup>7</sup> OPS
Electrical Endurance min.	3 x 10 <sup>4</sup> OPS	3 x 10 <sup>4</sup> OPS	1 x 10 <sup>5</sup> OPS

Layout (Bottom view)			
Terminal Type	PCB	PCB	PCB, QC, Panel Mount
Approved Standards	UL/CUL TÜV	UL/CUL TÜV	UL/CUL TÜV CQC
File No.	E133481 R50393929	E133481 R50393829	E134517 R50154722 CQC09002031231(DC Type)

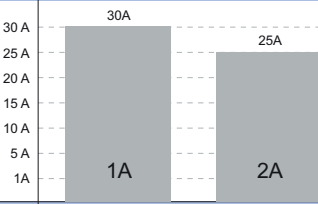
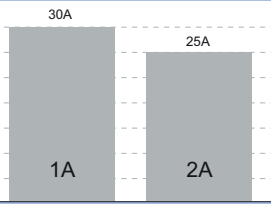
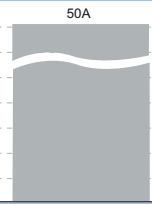
Cross Reference	SONGCHUAN:511HP1	SONGCHUAN:511EP	OMRON: G7L PANASONIC: HE
Page	345	347	349

Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF116F-2	HF116F-3	HF116F-G
Appearance			
Dimensions(L x W x H) mm	51.5 x 34.9 x 36.0	50.5 x 32.9 x 51.0	51.5 x 34.9 x 36.0
Features	<ul style="list-style-type: none"> <li>• 30A switching capability</li> <li>• 4kV dielectric strength (between coil and contacts)</li> <li>• 3mm contact gap available</li> </ul>	<ul style="list-style-type: none"> <li>• 30A switching capability</li> <li>• 4kV dielectric strength (between coil and contacts)</li> <li>• Heavy load up to 8310VA</li> <li>• 3mm contact gap available</li> </ul>	<ul style="list-style-type: none"> <li>• 50A switching capability</li> <li>• Applicable to inverter used for photovoltaic power generation systems</li> <li>• 4kV dielectric strength (between coil and contacts)</li> <li>• 3mm contact gap (compliant to European Photovoltaic Standard VDE0126, compliant to IEC 62109-2-2011)</li> </ul>

### Contact Ratings

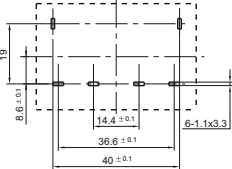
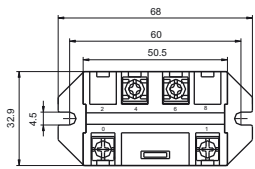
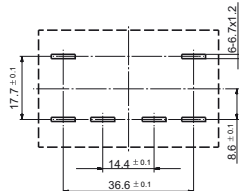
Contact Form	1A, 2A	1A, 2A	1A, 2A
Contact Material	AgSnO <sub>2</sub> , AgCdO	AgSnO <sub>2</sub> , AgCdO	AgSnO <sub>2</sub> , AgNi
Max. Switching Current (Resistive load)			
Max. Switching Voltage	277VAC	277VAC	277VAC
Max. Switching Power	8310VA	8310VA	15235VA
Rated Load (Resistive load)	1A: 30A 240VAC/30A 277VAC 2A: 25A 240VAC/25A 277VAC	1A: 30A 240VAC/30A 277VAC 2A: 25A 240VAC/25A 277VAC	50A 277VAC

### Coil Ratings

Rated Voltage	6VAC to 220/240VAC 3VDC to 200VDC	6VAC to 220/240VAC 3VDC to 200VDC	3VDC to 48VDC
Nominal Operating Power	2.7VA, 1.9W	2.7VA, 1.9W	3.2W

### Specifications




Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	4000VAC	4000VAC	4000VAC
Ambient Temperature	-55°C to 70°C	-55°C to 70°C	-40°C to 85°C
Operate / Release Time max.	30ms / 30ms	30ms / 30ms	30ms / 30ms
Mechanical Endurance min.	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>6</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>5</sup> OPS	3 x 10 <sup>4</sup> OPS

Layout (Bottom view)			
Terminal Type	PCB, QC, Panel Mount	Screw	PCB
Approved Standards	UL/CUL TÜV CQC	UL/CUL TÜV CQC	UL/CUL TÜV
File No.	E134517 R50154722 CQC09002031231(DC Type)	E134517 R50154722 CQC09002031231(DC Type)	E134517 R50154722
Cross Reference	OMRON: G7L PANASONIC: HE	OMRON: G7L PANASONIC: HE	PANASONIC: HE SONGCHUAN: 510H
Page	353	357	361

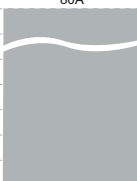

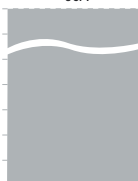
Note: Specification and dimensions in this catalog are subject to change without notice.



## POWER RELAY SELECTION CHART

Type	HF116F-80	HF176F	HF167F
Appearance			
Dimensions(L x W x H) mm	50.5 x 32.9 x 36	38.0 x 33.0 x 36.8	38.0 x 33.0 x 39.5
Features	<ul style="list-style-type: none"> <li>• 80A switching capability</li> <li>• Applicable to solar photovoltaic inverter</li> <li>• Applicable to UPS</li> <li>• 3mm contact gap (compliant to European Photovoltaic Standard VDE0126, compliant to IEC 62109-2-2011)</li> <li>• 4kV dielectric strength (between coil and contacts)</li> </ul>	<ul style="list-style-type: none"> <li>• 65A switching capability.</li> <li>• Applicable to solar photovoltaic inverter</li> <li>• 3mm contact gap</li> <li>• Low coil holding voltage contributes to saving energy of equipment.</li> <li>• UL insulation system: Class F</li> </ul>	<ul style="list-style-type: none"> <li>• 90A switching capability</li> <li>• Applicable to solar photovoltaic inverter</li> <li>• 3mm contact gap</li> <li>• Low coil holding voltage contributes to saving energy of equipment</li> <li>• UL insulation system: Class F</li> </ul>

### Contact Ratings

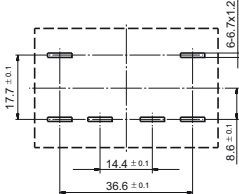
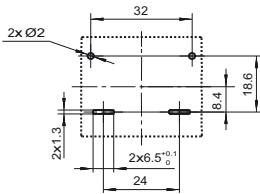
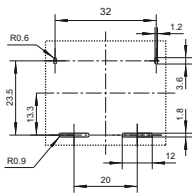
Contact Form	1A	1A	1A
Contact Material	AgSnO <sub>2</sub> , AgNi	AgSnO <sub>2</sub> , AgNi	AgSnO <sub>2</sub> , AgNi
Max. Switching Current (Resistive load)	80A	65A	90A
			
Max. Switching Voltage	277VAC/60VDC	400VAC	400VAC
Max. Switching Power	24930VA	18005VA	25920VA
Rated Load (Resistive load)	80A 60VDC/80A 250VAC	Making 20A, carrying 65A, breaking 20A 277VAC 85°C	Making 30A, carrying 100A, breaking 30A 400VAC 85°C

### Coil Ratings

Rated Voltage	3VDC to 48VDC	6VDC to 24VDC	6VDC to 24VDC
Nominal Operating Power	3.2W	1.92W	1.92W

### Specifications




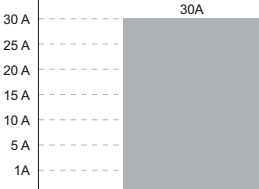

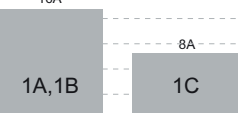
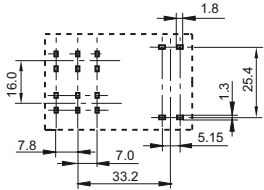
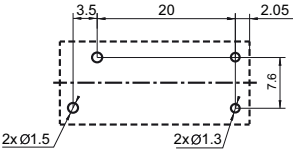
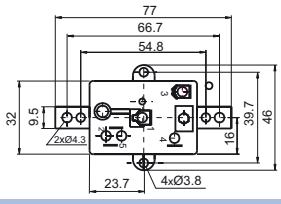
Insulation Resistance	1000MΩ	1000MΩ	1000MΩ
Dielectric Strength (Between coil and contacts)	4000VAC	5000VAC 1min	5000VAC
Ambient Temperature	-40°C to 85°C	-40°C to 85°C	-40°C to 85°C
Operate / Release Time max.	30ms / 30ms	30ms / 10ms	30ms / 10ms
Mechanical Endurance min.	1 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS
Electrical Endurance min.	6 x 10 <sup>3</sup> OPS	3 x 10 <sup>4</sup> OPS	3 x 10 <sup>4</sup> OPS

Layout (Bottom view)			
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Terminal Type	PCB	PCB	PCB
Approved Standards	UL/CUL TÜV	UL/CUL TÜV	UL/CUL TÜV CQC
File No.	E134517 R50154722	E133481 R50411032	E133481 R50360703 CQC17002164558
Cross Reference	PANASONIC: HE SONGCHUAN: 511E	PANASONIC: HE	PANASONIC: HE
Page	365	367	369



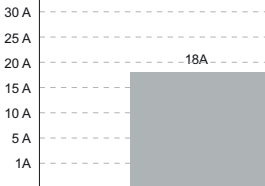

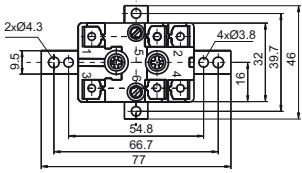
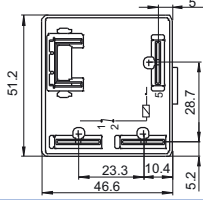
Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF92F	HF78F	HF84F
Appearance			
Dimensions(L x W x H) mm	52.0 x 33.7 x 26.7	25.5 x 12.5 x 28.5	47.0 x 32.0 x 28.5
Features	<ul style="list-style-type: none"> <li>• 30A switching capability</li> <li>• Creepage distance: 8mm</li> <li>• 4kV dielectric strength (between coil and contacts)</li> <li>• Plastic sealed and flux proofed types</li> <li>• PCB &amp; QC layouts</li> </ul>	<ul style="list-style-type: none"> <li>• Small and for microwave oven</li> <li>• 20A switching capability</li> <li>• 4.0kV dielectric strength (between coil and contacts)</li> <li>• Low height: 28.5 mm</li> </ul>	<ul style="list-style-type: none"> <li>• 16A switching capability</li> <li>• 2.5kV dielectric strength (between coil and contacts)</li> <li>• Panel mount, various terminal types</li> </ul>
<b>Contact Ratings</b>			
Contact Form	2A, 2C	1A	1A, 1B, 1C
Contact Material	AgSnO <sub>2</sub> , AgCdO	AgSnO <sub>2</sub>	AgCe
Max. Switching Current (Resistive load)			
Max. Switching Voltage	277VAC	277VAC	240VAC
Max. Switching Power	8310VA	4432VA	3840VA
Rated Load (Resistive load)	NO: 30A 250VAC/30A 277VAC NC: 3A 250VAC/3A 277VAC	16A 250VAC 16A 30VDC	1A, 1B: 16A 120/240VAC 1C: 8A 120/240VAC
<b>Coil Ratings</b>			
Rated Voltage	24VAC to 277VAC 5VDC to 110VDC	3VDC to 36VDC	6VAC to 277VAC / 6VDC to 120VDC
Nominal Operating Power	4.0VA, 1.7W	0.54W	3.5VA, 2.1W
<b>Specifications</b>			
Insulation Resistance	1000MΩ	1200MΩ	500MΩ
Dielectric Strength (Between coil and contacts)	4000VAC	4000VAC	2500VAC
Ambient Temperature	AC : -40°C to 65°C DC: -40°C to 85°C	-40°C to 85°C	-40°C to 65°C
Operate / Release Time max.	25ms / 25ms(DC type)	15ms / 5ms	25ms / 25ms
Mechanical Endurance min.	5 x 10 <sup>6</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>6</sup> OPS
Electrical Endurance min.	1 x 10 <sup>5</sup> OPS	1 x 10 <sup>7</sup> OPS	1 x 10 <sup>5</sup> OPS (at 16A 250VAC)
Layout (Bottom view)			
Terminal Type	PCB, QC	PCB, QC	QC
Approved Standards	UL/CUL VDE CQC	UL/CUL VDE CQC	UL/CUL
File No.	E134517 40016109 CQC09002037814(DC type)	E133481 R50375929 CQC17002171481	E134517
Cross Reference	P&B, SCHRACK: T92 FEME: CS/CF30	SONGCHUAN:302	WHITE RODGERS 90-290 to 295 90-203, 204, 205
Page	371	375	378

Note: Specification and dimensions in this catalog are subject to change without notice.

## POWER RELAY SELECTION CHART

Type	HF94F	HF8565	
Appearance			
Dimensions(L x W x H) mm	47.0 x 32.0 x 28.5	51.2 x 46.6 x 36.5	
Features	<ul style="list-style-type: none"> <li>• 25A switching capability</li> <li>• 2kV dielectric strength (between coil and contacts)</li> <li>• Panel mount, various terminal types</li> </ul>	<ul style="list-style-type: none"> <li>• Motor start potential relay</li> <li>• 50A switching capability</li> <li>• 1 Form B configurations</li> <li>• 250" quick connect termination</li> <li>• Variety of mounting positions</li> </ul>	
<b>Contact Ratings</b>			
Contact Form	1A, 1B, 1C, 1A+1B	1B	
Contact Material	AgCe, AgCdO	AgCdO	
Max. Switching Current (Resistive load)	 <p>18A</p>	 <p>50A</p>	
Max. Switching Voltage	277VAC		
Max. Switching Power	4986VA		
Rated Load (Resistive load)	18A 277VAC	16A(make and break) 400VAC 35A(break only) 400VAC 50A(break only) 400VAC	
<b>Coil Ratings</b>			
Rated Voltage	6VAC to 277VAC / 6VDC to 120VDC		
Nominal Operating Power	4.0VA, 2.4W	5.0VA	
<b>Specifications</b>			
Insulation Resistance	500MΩ		
Dielectric Strength (Between coil and contacts)	2000VAC		
Ambient Temperature	-40°C to 65°C		
Operate / Release Time max.	25ms / 25ms		
Mechanical Endurance min.	1 x 10 <sup>6</sup> OPS	7.5 x 10 <sup>5</sup> OPS	
Electrical Endurance min.	5 x 10 <sup>4</sup> OPS (at 25A 277VAC)	5 x 10 <sup>5</sup> OPS (at 16A 400VAC)	
Layout (Bottom view)			
Terminal Type	QC	QC	
Approved Standards	UL/CUL	UL/CUL	
File No.	E134517	SA13318	
Cross Reference	WHITE RODGERS 90-360, 362, 364 90-370, 372, 374 90-380, 382, 384	GE: 3ARR22 ELECTRICA: RVA	
Page	380	383	

Note: Specification and dimensions in this catalog are subject to change without notice.



# HFD16

# SUBMINIATURE SIGNAL RELAY



File No.: E133481



File No.: R50075328



## Features

- 5A switching capability
- UL insulation system: Class F available
- Plastic sealed and flux proofed types available
- Standard PCB layout
- Product in accordance to IEC 60335-1 available

## CONTACT DATA

Contact arrangement	1C
Contact resistance <sup>1)</sup>	100mΩ max. (AgNi gold-plated specifications: 0.1A 30mVDC, AgNi non gold-plated specifications and AgSnO <sub>2</sub> :1A 30mVDC)
Contact material	AgNi, AgSnO <sub>2</sub>
Contact rating (Res. load)	3A 30VDC 1A 125VAC
Max. switching voltage	250VAC / 220VDC
Max. switching current	8A(30VDC)
Max. switching power	625VA / 90W
Min. applicable load	5V 1mA(Suitable for AgNi gold-plated specifications)
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance	1X10 <sup>5</sup> OPS(NO:AgNi, 85°C, 1s on 9s off, 3A 30VDC) 1X10 <sup>5</sup> OPS(NO:AgNi, 85°C, 1s on 9s off, 5A 125VAC)

**Notes:** 1) The data shown above are initial values.  
2) Min. applicable load is reference value. Please perform the confirmation test with the actual load before production since reference value may change according to switching frequencies, environmental conditions and expected contact resistance and reliability.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	between coil & contacts	1100VAC 1min
	between open contacts	750VAC 1min
Operate time (at rated voltage.)	5ms max.	
Release time (at rated voltage.)	5ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	Functional	10Hz to 55Hz 1.5mm DA
	Destructive	10Hz to 55Hz 3.3mm DA
Surge withstand voltage between open contacts(10/160 μ s)	1000V(FCC part 68)	
between coil & contacts(2/10 μ s)	1500V(Telecordia)	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB (DIP)	
Unit weight	Approx. 4g	
Construction	Plastic sealed, Flux proofed	

**Notes:** 1) The data shown above are initial values.  
2) UL insulation system: Class F.

## COIL

Coil power H type: 200mW;

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC <sup>1)</sup> max.	Drop-out Voltage VDC <sup>1)</sup> min.	Max. Voltage <sup>2)</sup> VDC	Coil Resistance x (1±10%) Ω
				H
2.4	≤1.80	≥0.24	3.12	28.8
3	≤2.25	≥0.3	3.90	45.0
4.5	≤3.38	≥0.45	5.85	101.3
5	≤3.75	≥0.5	6.50	120
6	≤4.5	≥0.6	6.63	180
9	≤6.75	≥0.9	11.7	400
12	≤9.00	≥1.2	15.6	700
18	≤13.5	≥1.8	23.4	1620
24	≤18.0	≥2.4	31.2	2800

**Notes:** 1) The data shown above are initial values.  
2) Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## SAFETY APPROVAL RATINGS

UL/CUL	AgNi	5A 125VAC 1A 125VAC, 85°C 3A 30VDC, 85°C
	AgSnO <sub>2</sub>	1A 125VAC, 85°C 3A 30VDC, 85°C TV-1 125VAC
TÜV	AgNi	1A 250VAC 1A 125VAC, 85°C 3A 30VAC, 85°C
	AgSnO <sub>2</sub>	1A 250VAC, 85°C 3A 30VAC, 85°C 1(1) 250VAC

**Notes:** 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.10

## ORDERING INFORMATION

Type	HFD16/ 24 -Z F H -3 N (XXX)	
Coil voltage	2.4, 3, 4.5, 5, 6, 9, 12, 18, 24 VDC	
Contact arrangement	Z:1 Form C	
Construction	F: Flux proofed	Nil: Plastic sealed
Coil power	H: High sensitive (200mW)	
Contact material	3: AgNi	T: AgSnO <sub>2</sub>
Contact plating	Nil: gold plated <sup>3)</sup>	N: No gold plated
Special code <sup>1)</sup>	XXX: Customer special requirement	Nil: Standard

Notes: 1) The customer special requirement express as special code after evaluating by Hongfa.

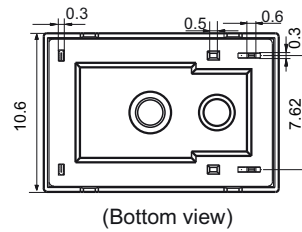
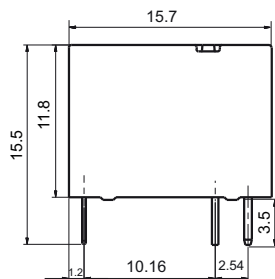
2) The standard size of this product tube package is 409mm.

3) Only suitable for AgNi contact specifications .

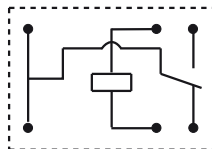
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

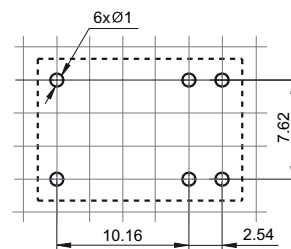
### Outline Dimensions



Wiring Diagram  
(Bottom view)



PCB Layout  
(Bottom view)



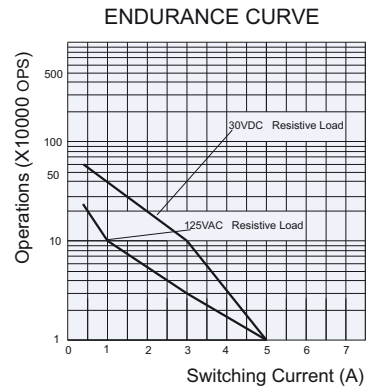
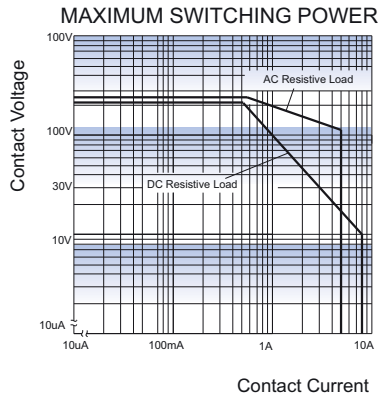
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.

2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.

3) The width of the gridding is 2.54mm.



## CHARACTERISTIC CURVES



**Test conditions:**

NO:AgNi, Resistive load, 85°C, 1s on 9s off.

**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) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 4) Plastic sealed type is recommended for an environment with noxious gas such as H<sub>2</sub>S, SO<sub>2</sub> and NO<sub>2</sub>,ect., and/or when load current is low, and/or the PCB boards need to be washed after relays are soldered. For other using conditions flux proofed type could be adopted.
- 5) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 6) 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.
- 7) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidelines of relay".
- 8) Please contact us for more details if you have different conditions of application.

**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.

# HFD17

# SUBMINIATURE SIGNAL RELAY



File No.: E133481



File No.:R50431434



## Features

- 8A switching capability
- UL insulation system: Class F available
- Plastic sealed and flux proofed types available
- Standard PCB layout
- Product in accordance to IEC 60335-1 available

## CONTACT DATA

Contact arrangement	1C
Contact resistance <sup>1)</sup>	100mΩ max. (AgNi gold-plated specifications: 0.1A 6VDC, AgNi non gold-plated specifications and AgSnO <sub>2</sub> :1A 6VDC)
Contact material	AgNi, AgSnO <sub>2</sub>
Contact rating (Res. load)	3A 30VDC 3A 250VAC
Max. switching voltage	250VAC / 220VDC
Max. switching current	8A
Max. switching power	750VA / 90W
Min. applicable load	5V 1mA(Suitable for AgNi gold-plated specifications)
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance	1x10 <sup>5</sup> OPS(AgNi, 85°C, 1s on 9s off, NO. HFD17:3A 125VAC HFD17-1:1A 125VAC)

**Notes:** 1) The data shown above are initial values.  
2)Min. applicable load is reference value. Please perform the confirmation test with the actual load before production since reference value may change according to switching frequencies, environmental conditions and expected contact resistance and reliability.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	between open contacts	750VAC 1min
	between coil & contacts	1500VAC 1min
Surge withstand voltage	1500V(FCC part 68) 2000V(Telecordia)	
Operate time (at rated voltage.)	5ms max.	
Release time (at rated voltage.)	5ms max.	
Ambient temperature	-40°C to 85°C	
Humidity	5% to 85% RH	
Shock resistance	Functional	147m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	Functional	10Hz to 55Hz 2.5mm DA
	Destructive	10Hz to 55Hz 5mm DA
Termination	DIP	
Unit weight	Approx. 4g	
Construction	Plastic sealed Flux proofed	

**Notes:** 1) The data shown above are initial values.  
2) UL insulation system: Class F.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.10

## COIL

Coil power	200mW;
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## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC <sup>1)</sup> max.	Drop-out Voltage VDC <sup>1)</sup> min.	Max. Voltage <sup>2)</sup> VDC	Coil Resistance x (1±10%) Ω
				Standard
2.4	≤1.80	≥0.24	3.12	28.8
3	≤2.25	≥0.3	3.90	45.0
4.5	≤3.38	≥0.45	5.85	101.3
5	≤3.75	≥0.5	6.50	120
6	≤4.5	≥0.6	6.63	180
9	≤6.75	≥0.9	11.7	400
12	≤9.00	≥1.2	15.6	700
18	≤13.5	≥1.8	23.4	1620
24	≤18.0	≥2.4	31.2	2800

**Notes:** 1) The data shown above are initial values.  
2)Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## SAFETY APPROVAL RATINGS

UL/CUL		HFD17	HFD17-1
		AgNi	3A 125VAC,85°C 3A 250VAC,Room temp 3A 30VDC,85°C
TÜV	AgNi	3A 125VAC,85°C 3A 250VAC,Room temp 3A 30VDC,85°C	1A 250VAC,85°C 1A 250VAC,Room temp 1A 30VDC,85°C
	AgSnO <sub>2</sub>	3A 250VAC,85°C 3A 30VDC,85°C 1(1) 250VAC,Room temp	1A 250VAC,85°C 1A 30VDC,85°C 1(1) 250VAC,Room temp

**Notes:** 1)Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

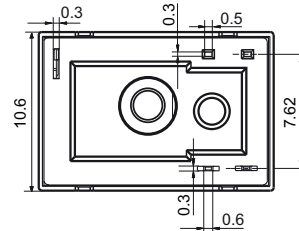
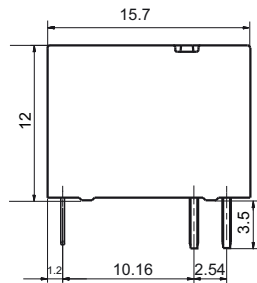
	<b>HFD17/</b>	<b>24</b>	<b>-Z</b>	<b>F</b>	<b>-3</b>	<b>N</b>	<b>(XXX)</b>
<b>Type</b>	HFD17:3A contact rating HFD17-1:1A contact rating						
<b>Coil voltage</b>	2.4, 3, 4.5, 5, 6, 9, 12, 18, 24 VDC						
<b>Contact arrangement</b>	Z:1 Form C						
<b>Construction</b>	F: Flux proofed			Nil: Plastic sealed			
<b>Contact material</b>	3: AgNi			T: AgSnO <sub>2</sub>			
<b>Contact plating</b>	N: No gold plated			Nil: Gold plated (Only for AgNi type)			
<b>Special code<sup>1)</sup></b>	XXX: Customer special requirement						

Notes: 1) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

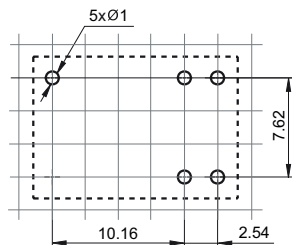
Unit: mm

### Outline Dimensions

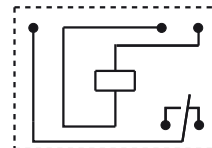


(Bottom view)

### PCB Layout (Bottom view)



### Wiring Diagram (Bottom view)



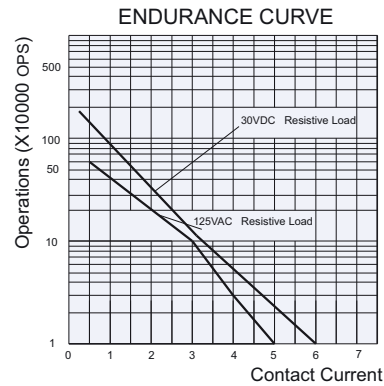
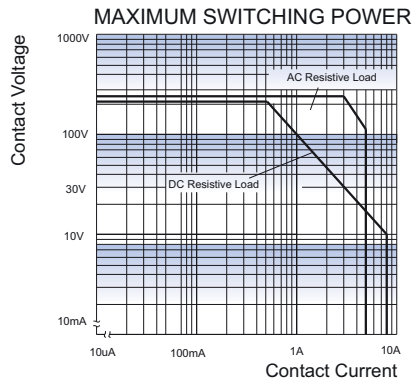
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.

2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.

3) The width of the gridding is 2.5mm.

## CHARACTERISTIC CURVES

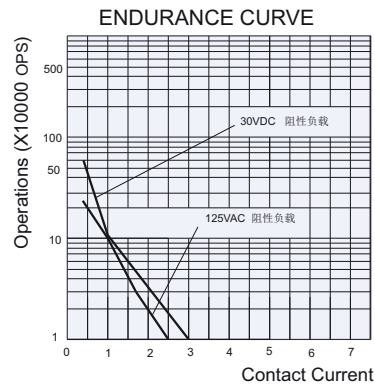
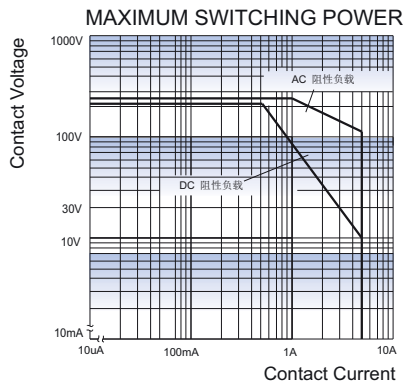
### HFD17



**Test conditions:**

AgNi, NO contact, Resistive load, 85°C.

### HFD17-1



**Test conditions:**

AgNi, NO contact, Resistive load, 85°C.

#### 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) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 4) Plastic sealed type is recommended for an environment with noxious gas such as H<sub>2</sub>S, SO<sub>2</sub> and NO<sub>2</sub>, etc., and/or when load current is low, and/or the PCB boards need to be washed after relays are soldered. For other using conditions flux proofed type could be adopted.
- 5) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 6) 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.
- 7) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidelines of relay".
- 8) Please contact us for more details if you have different conditions of application.

#### 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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# HFD23

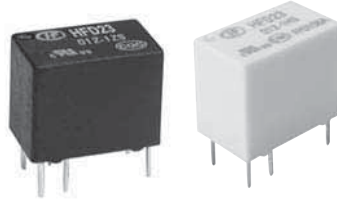
# SUBMINIATURE SIGNAL RELAY



File No.:E133481



File No.:CQC09002035070



## Features

- Max.4A switching capability
- High sensitive: 150mW
- 1 Form C configuration
- Plastic sealed type available

## CONTACT DATA

Contact arrangement	1A	1C
Contact resistance	100mΩ max. (at 10mA 30mVDC)	
Contact material	AgNi +Au plated	
Contact rating (Res. load)	1A 125VAC/2A 30VDC	0.5A 125VAC/1A 30VDC
Max. switching voltage	125VAC / 60VDC	
Max. switching current	4A	2A
Max. switching power	125VA / 60W	62.5VA / 30W
Min. applicable load 1)	1mA 5V	
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance 2)	9 x 10 <sup>4</sup> OPS (1H:1A 125VAC; 1Z:0.5A 125VAC, Resistive load., Room temp., 1s on 9s off)	

**Notes:** 1) Min. applicable load is reference value. Please perform the confirmation test with the actual load before production since reference value may change according to switching frequencies, environmental conditions and expected contact resistance and reliability.  
2) Electric endurance data are collected in the NO or NC contact test.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	1000VAC 1min
	Between open contacts	500VAC 1min
Operate time (at rated. volt.)	5ms max.	
Release time (at rated. volt.)	5ms max.	
Temperature rise (at rated.volt.)	65K max.	
Vibration resistance	10Hz to 55Hz 3.3mm DA	
Shock resistance	Functional	196m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Humidity	5% to 98% RH	
Ambient temperature	-40°C to 70°C	
Unit weight	Approx. 2.2g	
Termination	PCB (DIP)	
Construction	Plastic sealed	

**Notes:** 1) The data shown above are initial values.  
2) UL insulation system: Class A

## COIL

Coil power	Sensitive: Approx. 150mW; Standard: Approx. 200mW
------------	--

## COIL DATA

at 23°C

### Standard type

Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Max. Voltage VDC	Coil Resistance Ω
1.5	1.20	0.15	2.25	11.3 x (1±10%)
2.4	1.92	0.24	3.6	28.8 x (1±10%)
3	2.40	0.30	4.5	45 x (1±10%)
3.5	3.60	0.45	5.75	101.3 x (1±10%)
5	4.00	0.50	7.5	125 x (1±10%)
6	4.80	0.60	9.0	180 x (1±10%)
9	7.20	0.90	13.5	405 x (1±10%)
12	9.60	1.20	18.0	720 x (1±10%)
24	19.20	2.40	36.0	2880 x (1±15%)

### Sensitive type

Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Max. Voltage VDC	Coil Resistance Ω
1.5	1.20	0.15	2.25	15 x (1±10%)
2.4	1.90	0.24	3.6	38.4 x (1±10%)
3	2.40	0.30	4.5	60 x (1±10%)
4.5	3.60	0.45	5.75	135 x (1±10%)
5	4.00	0.50	7.5	167 x (1±10%)
6	4.80	0.60	9.0	240 x (1±10%)
9	7.20	0.90	13.5	540 x (1±10%)
12	9.60	1.20	18.0	960 x (1±10%)
24	19.20	2.40	36.0	3840 x (1±15%)

**Notes:** 1) When user's requirements can't be found in the above table, special order allowed.

2) In case 5V of transistor drive circuit, it is recommended to use 4.5V type relay, and 3V to use 2.4V type relay.

## SAFETY APPROVAL RATINGS

UL/CUL	1H type: 1A 30VDC 2A 30VDC 1A 125VAC	1Z type: 1A 30VDC 0.3A 60VDC 0.5A 125VAC
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**Notes:** 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

Type	HFD23 / 012 -1Z S (XXX)
Coil voltage	1.5, 2.4, 3, 4.5, 5, 6, 9, 12, 24VDC
Contact arrangement	1H: 1 Form A 1Z: 1 Form C
Coil power	S: Sensitive type P: Standard type
Special code <sup>2)</sup>	XXX: Customer special requirement Nil: Standard

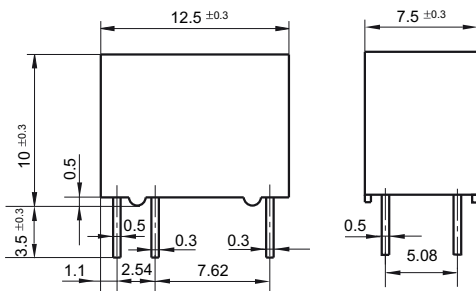
- Notes: 1) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.  
 2) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

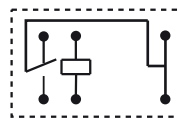
Unit: mm

### Outline Dimensions

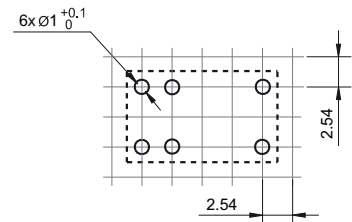
HFD23/1Z type



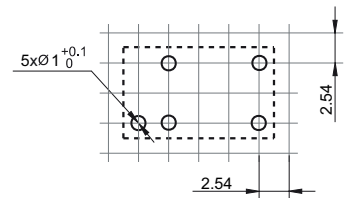
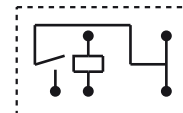
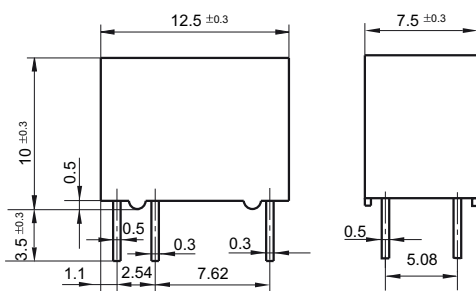
### Wiring Diagram (Bottom view)



### PCB Layout (Bottom view)



HFD23/1H type

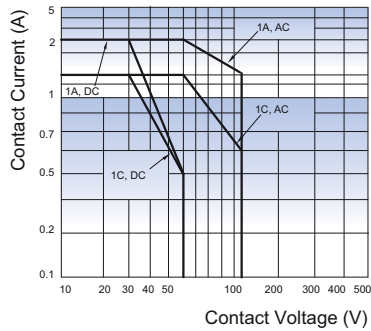


- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.  
 3) The width of the gridding is 2.54mm.

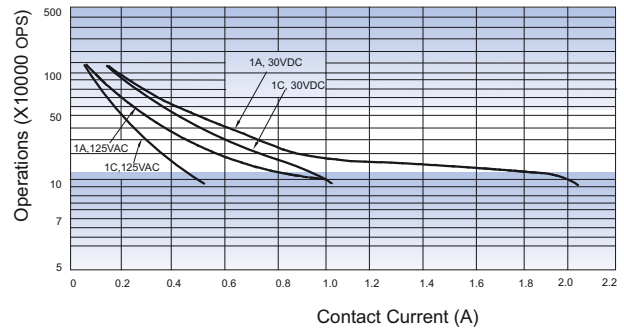


## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER



ENDURANCE CURVE



**Test conditions:**

Resistive load, Room temp., 1s on 9s off.

**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) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 3) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 4) 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.
- 5) 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. Regarding latching relay, in order to maintain the "set" or "reset" status, impulse width of the rated voltage applied to coil should be more than 5 times of "set" or "reset" time.
- 6) 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.

# HFD27

# SUBMINIATURE DIP RELAY



File No.:E133481



File No.:R50316277



File No.:CQC09002033393



## Features

- 2 Form C configuration
- High switching capacity: 125VA/60W
- Matching 16 pin IC socket
- Bifurcated contacts
- Epoxy sealed for automatic-wave soldering and cleaning

## CONTACT DATA

Contact arrangement	2C
Contact resistance	100mΩ max. (at 10mA 30mVDC)
Contact material	AgNi + Au plated
Contact rating (Res. load)	1A 125VAC, 2A 30VDC
Max. switching voltage	240VAC / 120VDC
Max. switching current	2A
Max. switching power	125VA / 60W
Min. applicable load <sup>1)</sup>	10mV 10μA
Mechanical endurance	1x10 <sup>8</sup> OPS
Electrical endurance <sup>2)</sup>	1 x 10 <sup>5</sup> OPS (1A 125VAC, Resistive load, at 85°C, 1s on 9s off)

**Notes:** 1) Min. applicable load is reference value. Please perform the confirmation test with the actual load before production since reference value may change according to switching frequencies, environmental conditions and expected contact resistance and reliability.  
2) Electric endurance data are collected in one pair CO contact test.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	1500VAC 1min
	Between open contacts	M, S type: 1000VAC 1min H type: 750VAC 1min
Operate time (at nomi. volt.)	7ms max.	
Release time (at nomi. volt.)	4ms max.	
Ambient temperature	-40°C to 85°C	
Humidity	5% to 85% RH	
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Shock resistance	Functional	196m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Termination	PCB (DIP)	
Unit weight	Approx. 5g	
Construction	Plastic sealed	

**Notes:** 1) The data shown above are initial values.  
2) UL insulation system: Class A.

## COIL

Coil power	Standard: Approx. 280mW to 580mW
	Sensitive: Approx. 200mW
	High Sensitive: Approx. 150mW
Temperature rise	65K max.

## COIL DATA

at 23°C

### Standard type (280mW to 580mW)

Coil Code	Coil Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Max. Voltage VDC	Coil Resistance Ω
003-M	3	2.25	0.3	4.5	30 x (1±10%)
005-M	5	3.75	0.5	8.0	90 x (1±10%)
006-M	6	4.50	0.6	10.0	130 x (1±10%)
009-M	9	6.80	0.9	14.5	280 x (1±10%)
012-M	12	9.00	1.2	18.5	450 x (1±10%)
015-M	15	11.3	1.5	22.0	625 x (1±10%)
024-M	24	18.0	2.4	35.5	1600 x (1±10%)
048-M	48	36.0	4.8	56.0	4000 x (1±10%)

### Sensitive type (200mW)

Coil Code	Coil Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Max. Voltage VDC	Coil Resistance Ω
003-S	3	2.25	0.3	6	45 x (1±10%)
005-S	5	3.75	0.5	10	125 x (1±10%)
006-S	6	4.50	0.6	12	180 x (1±10%)
009-S	9	6.80	0.9	18	405 x (1±10%)
012-S	12	9.00	1.2	24	720 x (1±10%)
015-S	15	11.3	1.5	30	1125 x (1±10%)
024-S	24	18.0	2.4	48	2880 x (1±10%)



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## COIL DATA at 23°C

### High sensitive type (150mW)

Coil Code	Coil Voltage VDC	Pick-up Voltage VDC	Drop-out Voltage VDC	Max. Voltage VDC	Coil Resistance $\Omega$
003-H	3	2.4	0.3	7.0	60 x (1±10%)
005-H	5	4.0	0.5	11.5	167 x (1±10%)
006-H	6	4.8	0.6	13.8	240 x (1±10%)
009-H	9	7.2	0.9	20.8	540 x (1±10%)
012-H	12	9.6	1.2	27.7	960 x (1±10%)
015-H	15	12.0	1.5	34.6	1500 x (1±10%)
024-H	24	19.2	2.4	55.2	3840 x (1±10%)

Notes: 1) When user's requirements can't be found in the above table, special order allowed.

2) In case 5V of transistor drive circuit, it is recommended to use 4.5V type relay, and 3V to use 2.4V type relay.

## SAFETY APPROVAL RATINGS

UL/CUL	2A 30VDC
	1A 125VAC
TÜV	2A 30VDC
	1A 125VAC

Notes: 1) All values unspecified are at 85°C.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

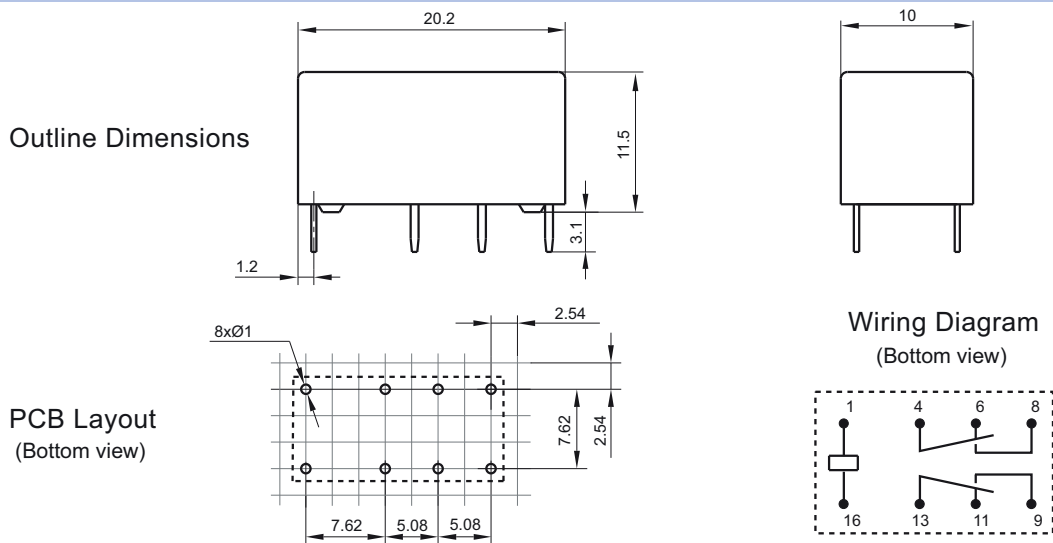
Type	HFD27 / 012 -S (XXX)			
Coil voltage	3, 5, 6, 9, 12, 15, 24, 48VDC <sup>1)</sup>			
Coil power	M: Standard (280mW to 580mW) S: Sensitive (200mW) H: High sensitive (150mW)			
Special code <sup>2)</sup>	XXX: Customer special requirement	Nil: Standard		

Notes: 1) 48VDC coil voltage is only for standard version.

2) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm



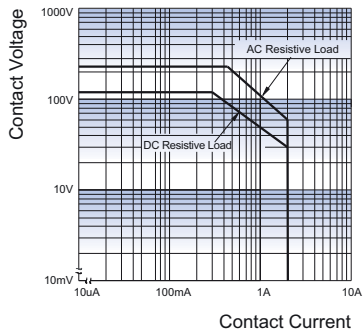
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.

2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.

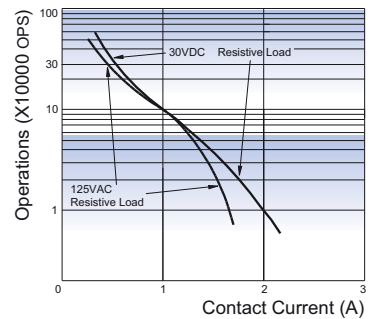
3) The width of the gridding is 2.54mm.

## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER



ENDURANCE CURVE



**Test conditions:**

Resistive load, at 85°C, 1s on 9s off.

**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) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 3) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 4) 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.
- 5) 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. Regarding latching relay, in order to maintain the "set" or "reset" status, impulse width of the rated voltage applied to coil should be more than 5 times of "set" or "reset" time.
- 6) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidelines of relay".

**Disclaimer**

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# HFD2

# SUBMINIATURE DIP RELAY



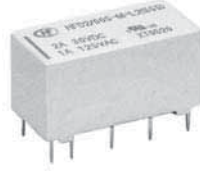
File No.:E133481



File No.: R 50306253



File No.:CQC13002095174(Single side stable)  
CQC13002095175(Latching)



## Features

- High sensitive: 150mW
- Matching standard 16 pin IC socket
- High switching capacity: 125VA / 90W
- Bifurcated contacts
- Epoxy sealed for automatic wave soldering and cleaning
- Single side stable and latching type available

## CONTACT DATA

Contact arrangement	2C
Contact resistance	100mΩ max. (at 10mA 30mVDC)
Contact material	see ordering info.
Contact rating (Res. load)	1A 125VAC, 2A 30VDC 3A 30VDC
Max. switching voltage	250VAC / 220VDC
Max. switching current	3A
Max. switching power	125VA / 90W
Min. applicable load <sup>1)</sup>	10mV 10μA
Mechanical endurance	1 x 10 <sup>8</sup> OPS
Electrical endurance <sup>2)</sup>	5 x 10 <sup>4</sup> OPS (2A 30VDC, Ag contact, Resistive load, at 70°C, 1s on 9s off)

**Notes:** 1) Min. applicable load is reference value. Please perform the confirmation test with the actual load before production since reference value may change according to switching frequencies, environmental conditions and expected contact resistance and reliability.

2) Electric endurance data are collected in one pair CO contact test.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)
Dielectric strength	Between coil & contacts 1 coil: 1500VAC 1min 2 coils: 1000VAC 1min
	Between open contacts 1000VAC 1min
Operate time (at rated. volt.)	4.5ms max.
Release time (at rated. volt.)	3.5ms max.
Set time (latching)	4.5ms max.
Reset time (latching)	4.5ms max.
Ambient temperature	-40 °C to 85°C
Humidity	5% to 85% RH
Vibration resistance	10Hz to 55Hz 1.5mm DA
Shock resistance	Functional 490m/s <sup>2</sup>
	Destructive 980m/s <sup>2</sup>
Termination	PCB (DIP)
Unit weight	Approx. 4.5g
Construction	Plastic sealed

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

2) UL insulation system: Class A

## COIL

Coil power		Sensitive	Standard
	Single side stable	Approx. 150mW	Approx. 200mW
	1 coil latching	Approx. 75mW	Approx. 100mW
	2 coils latching	Approx. 150mW	Approx. 200mW
Temperature rise	65K max.		

## COIL DATA

at 23°C

### Single side stable Standard type

Coil Code	Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Coil Resistance x(1±10%) Ω	Max. Voltage VDC
003-M	3	2.30	0.3	45	6
005-M	5	3.75	0.5	125	10
006-M	6	4.50	0.6	180	12
009-M	9	6.75	0.9	405	18
012-M	12	9.00	1.2	720	24
015-M	15	11.25	1.5	1125	30
024-M	24	18.0	2.4	2880	48
048-M	48	36.0	4.8	11520	96

### Single side stable Sensitive type

Coil Code	Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Coil Resistance x(1±10%) Ω	Max. Voltage VDC
005-S	5	4.0	0.5	167	11.5
006-S	6	4.8	0.6	240	13.8
009-S	9	7.2	0.9	540	20.8
012-S	12	9.6	1.2	960	27.7
015-S	15	12.0	1.5	1500	34.6
024-S	24	19.2	2.4	3840	55.4



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.02

## COIL DATA

at 23°C

### 1 coil latching Standard type

Coil Code	Nominal Voltage VDC	Set / Reset Voltage VDC max.	Coil Resistance x(1±10%) Ω	Max. Voltage VDC
003-M-L1	3	2.25	90	8.4
005-M-L1	5	3.75	250	14
006-M-L1	6	4.5	360	17
009-M-L1	9	6.75	810	25
012-M-L1	12	9.0	1440	34
015-M-L1	15	11.25	2220	42
024-M-L1	24	18.0	4000	56

### 2 coils latching Standard type

Coil Code	Nominal Voltage VDC	Set / Reset Voltage VDC max.	Coil Resistance x(1±10%) Ω	Max. Voltage VDC
003-M-L2	3	2.25	45	6
005-M-L2	5	3.75	125	10
006-M-L2	6	4.5	180	12
009-M-L2	9	6.75	405	18
012-M-L2	12	9.0	720	24
015-M-L2	15	11.25	1125	30
024-M-L2	24	18.0	2040	48

### 1 coil latching Sensitive type

Coil Code	Nominal Voltage VDC	Set / Reset Voltage VDC max.	Coil Resistance x(1±10%) Ω	Max. Voltage VDC
003-S-L1	3	2.4	60	6.9
005-S-L1	5	4.0	330	16
006-S-L1	6	4.8	480	19
009-S-L1	9	7.2	1080	29
012-S-L1	12	9.6	1920	39
015-S-L1	15	12.0	3000	43
024-S-L1	24	19.2	7680	78

### 2 coils latching Sensitive type

Coil Code	Nominal Voltage VDC	Set / Reset Voltage VDC max.	Coil Resistance x(1±10%) Ω	Max. Voltage VDC
003-S-L2	3	2.4	60	6.9
005-S-L2	5	4.0	167	11.5
006-S-L2	6	4.8	240	13.8
009-S-L2	9	7.2	540	20.8
012-S-L2	12	9.6	960	27.7
015-S-L2	15	12.0	1500	34.6
024-S-L2	24	19.2	3840	55.4

**Notes:** 1) When user's requirements can't be found in the above table, special order allowed.

2) In case 5V of transistor drive circuit, it is recommended to use 4.5V type relay, and 3V to use 2.4V type relay.

## TYPICAL CONTACT LIFE EXPECTANCY

Voltage	Power	Electrical endurance	
		Resistive Load	Inductive Load (For AC cosφ=0.7)
50mVDC	50μW	5 x 10 <sup>7</sup> OPS	5 x 10 <sup>7</sup> OPS
30VDC	20W	3 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS
30VDC	30W	1 x 10 <sup>6</sup> OPS	3 x 10 <sup>5</sup> OPS
30VDC	60W	1 x 10 <sup>5</sup> OPS	1.5 x 10 <sup>4</sup> OPS
60VDC	20W	3 x 10 <sup>6</sup> OPS	--
60VDC	30W	5 x 10 <sup>5</sup> OPS	--
60VDC	60W	1 x 10 <sup>5</sup> OPS	--
30VAC	40VA	3 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS
30VAC	80VA	1 x 10 <sup>6</sup> OPS	3 x 10 <sup>5</sup> OPS
30VAC	120VA	1 x 10 <sup>5</sup> OPS	1.5 x 10 <sup>4</sup> OPS
60VAC	40VA	3 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS
60VAC	80VA	1 x 10 <sup>6</sup> OPS	3 x 10 <sup>5</sup> OPS
60VAC	120VA	1 x 10 <sup>5</sup> OPS	1.5 x 10 <sup>4</sup> OPS
125VAC	40VA	3 x 10 <sup>6</sup> OPS	1 x 10 <sup>6</sup> OPS
125VAC	80VA	1 x 10 <sup>6</sup> OPS	3 x 10 <sup>5</sup> OPS
125VAC	125VA	1 x 10 <sup>5</sup> OPS	1.5 x 10 <sup>4</sup> OPS

## SAFETY APPROVAL RATINGS

UL/CUL	AgPd/AgPd+Gold plated AgPd/Ag+Gold plated	0.5A 60VDC 2A 30VDC 1A 125VAC 2A 125VAC
	AgPd/Ag+Gold plated	3A 40VDC(40°C)
	Ag+Gold plated/ Ag+Gold plated	2A 30VDC 3A 30VDC(70°C) 1A 125VAC 2A 125VAC
TÜV	AgPd/AgPd+Gold plated AgPd/Ag+Gold plated Ag+鍍金/Ag+Gold plated	2A 30VDC(70°C) 3A 30VDC(70°C) 1A 125VAC(70°C)

**Notes:** 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



## ORDERING INFORMATION

	<b>HFD2 / 012 -S -L2 -A (XXX)</b>	
<b>Type</b>		
<b>Coil voltage</b>	3, 5, 6, 9, 12, 15, 24, 48VDC <sup>1)</sup>	
<b>Coil power</b>	<b>M:</b> Standard	<b>S:</b> Sensitive
<b>Sort</b>	<b>L1:</b> 1 coil latching <b>L2:</b> 2 coils latching <b>Nil:</b> Single side stable	
<b>Contact material</b>	<b>A:</b> AgPd/AgPd+Gold plated <b>D:</b> Ag+Gold plated/Ag+Gold plated <b>Nil:</b> AgPd/Ag+Gold plated <sup>2)</sup>	
<b>Special code</b> <sup>3)</sup>	<b>XXX:</b> Customer special requirement	<b>Nil:</b> Standard

**Notes:** 1) 48VDC coil voltage is only for single side stable & standard type.

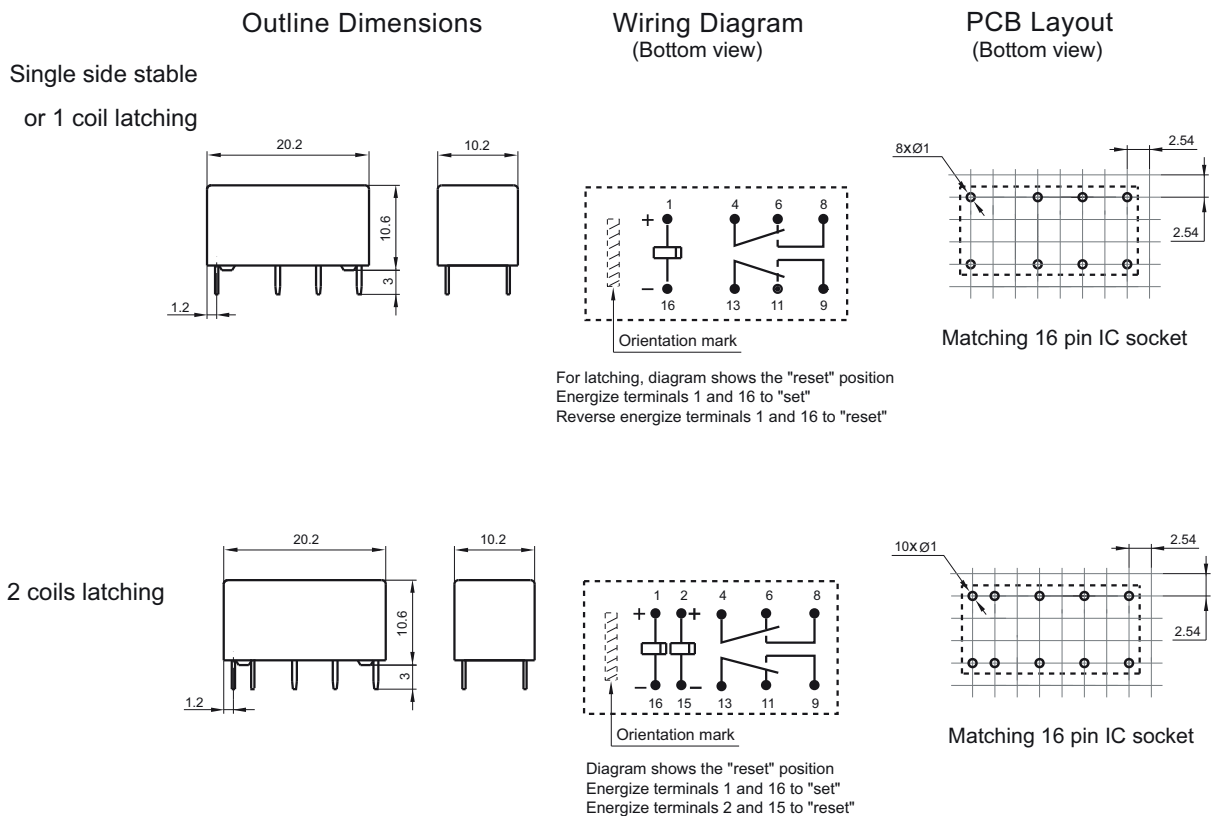
2) Not for new design.

3)XXX1/XXX2 : XXX1 stands for movable contact material, XXX2 stands for stationary contact material, for example, "A" means that the movable contact material is AgPd,stationary contact material AgPd+Gold plated.

4) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm



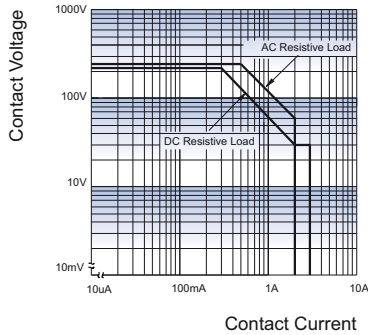
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .

2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .

3) The width of the gridding is 2.54mm.

## CHARACTERISTIC CURVES

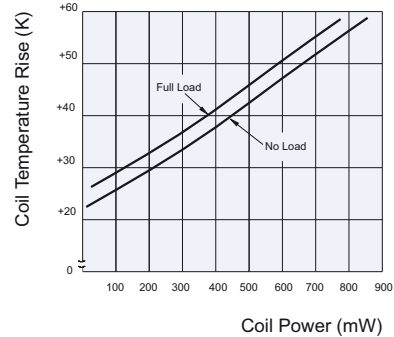
MAXIMUM SWITCHING POWER



**Test conditions:**

Resistive load, at 70°C, 1s on 9s off.

COIL TEMPERATURE RISE



**Notice**

- 1) This relay is highly sensitive polarized relay, if correct polarity is not applied to the coil terminals, the relay does not operate properly.
- 2) To avoid using relays under strong magnetic field which will change the parameters of relays such as pick-up voltage and drop-out voltage.
- 3) Relay is on the "reset" status when being released from stock, with the consideration of shock risen from transit and relay mounting, it should be changed to the "set" status when application(connecting to the power supply). Please reset the relay to "set" or "reset" status on request.
- 4) 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. Regarding latching relay, in order to maintain the "set" or "reset" status, impulse width of the rated voltage applied to coil should be more than 5 times of "set" or "reset" time.
- 5) For 2 coil latching relay, do not energize voltage to "set" coil and "reset" coil simultaneously.
- 6) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 7) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 8) 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.
- 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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# HFD3

# SUBMINIATURE SIGNAL RELAY



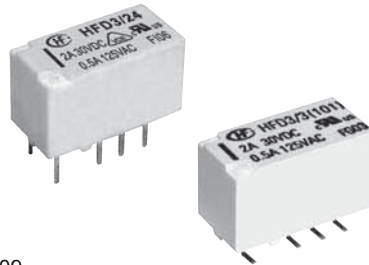
File No.:E133481



File No.:40018867



File No.:CQC1400207409



## Features

- Surge withstand voltage up to 2500VAC, meets FCC Part 68 and Telecordia
- Meets EN60950 / EN41003
- SMT and DIP types available
- Bifurcated contacts
- Single side stable and latching type available

## CONTACT DATA

Contact arrangement	2C
Contact resistance	100mΩ max.(at 10mA 30mVDC)
Contact material	AgPd + Au plated, AgNi + Au plated
Contact rating (Res. load)	2A 30VDC 3A 30VDC 0.5A 125VAC
Max. switching current	4A
Max. switching voltage	277VAC / 220VDC
Max. switching power	62.5VA / 90W
Min. applicable load <sup>1)</sup>	10mV 10μA
Mechanical endurance	1 x 10 <sup>8</sup> OPS
Electrical endurance <sup>2)</sup>	1 x 10 <sup>5</sup> OPS (0.5A 125VAC, Resistive load, AgNi + Au plated, at 85°C, 1s on 9s off)

**Notes:** 1) Min. applicable load is reference value. Please perform the confirmation test with the actual load before production since reference value may change according to switching frequencies, environmental conditions and expected contact resistance and reliability.

2) Electric endurance data are collected in one pair CO contact test.

## SAFETY APPROVAL RATINGS

UL/CUL	AgNi + Au plated	2A 30VDC at 85°C
		3A 30VDC at 85°C
		0.5A 125VAC at 85°C
VDE	AgPd + Au plated	0.5A 125VAC at 70°C
		2A 30VDC at 85°C
		3A 30VDC at 70°C
	AgNi + Au plated	0.5A 125VAC at 85°C

**Notes:** 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2000VAC 1min <sup>1)</sup>
	Between open contacts	1000VAC 1min
	Between contact sets	1500VAC 1min
Surge withstand voltage		
Between open contacts (10/160μs)	1500VAC (FCC part 68)	
Between coil & contacts (2/10μs)	2500VAC (Telecordia)	
Operate time (Set time)	4ms max.	
Release time (Reset time)	4ms max.	
Ambient temperature	-40°C to 85°C	
Humidity	5% to 85% RH	
Vibration resistance	10Hz to 55Hz 3.3mm DA	
Shock resistance	Functional	735m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Termination	DIP, SMT	
Unit weight	Approx. 2g	
Moisture sensitivity levels (Only for SMT type, JEDEC-STD-020)	MSL-3	
Construction	Plastic sealed	

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

2) UL insulation system: Class A

## COIL

Coil power	Single side stable	Approx. 140mW
	1 coil latching	Approx. 100mW
	2 coils latching	Approx. 200mW
Temperature rise	50K max.	



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## COIL DATA

at 23°C

### Single side stable

Coil Code	Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Coil Resistance $\Omega$	Nominal Power mW approx.	Max. Voltage VDC
HFD3/1.5	1.5	1.13	0.15	16 x (1±10%)	140	2.2
HFD3/2.4	2.4	1.8	0.24	41 x (1±10%)	140	3.6
HFD3/3	3	2.25	0.3	64.3 x (1±10%)	140	4.5
HFD3/4.5	4.5	3.38	0.45	145 x (1±10%)	140	6.7
HFD3/5	5	3.75	0.5	178 x (1±10%)	140	7.5
HFD3/6	6	4.5	0.6	257 x (1±10%)	140	9
HFD3/9	9	6.75	0.9	579 x (1±10%)	140	13.5
HFD3/12	12	9	1.2	1028 x (1±10%)	140	18
HFD3/24	24	18	2.4	4114 x (1±10%)	140	36
HFD3/48	48	36	4.8	8533 x (1±10%)	270	57.6

### 1 coil latching

Coil Code	Nominal Voltage VDC	Set Voltage VDC max.	Reset Voltage VDC max.	Coil Resistance $\Omega$	Nominal Power mW approx.	Max. Voltage VDC
HFD3/1.5-L1	1.5	1.13	1.13	22.5 x (1±10%)	100	2.7
HFD3/2.4-L1	2.4	1.8	1.8	58 x (1±10%)	100	4.3
HFD3/3-L1	3	2.25	2.25	90 x (1±10%)	100	5.4
HFD3/4.5-L1	4.5	3.38	3.38	203 x (1±10%)	100	8.1
HFD3/5-L1	5	3.75	3.75	250 x (1±10%)	100	9
HFD3/6-L1	6	4.5	4.5	360 x (1±10%)	100	10.8
HFD3/9-L1	9	6.75	6.75	810 x (1±10%)	100	16.2
HFD3/12-L1	12	9	9	1440 x (1±10%)	100	21.6
HFD3/24-L1	24	18	18	5760 x (1±10%)	100	43.2

### 2 coils latching

Coil Code	Nominal Voltage VDC	Set Voltage VDC max.	Reset Voltage VDC max.	Coil Resistance $\Omega$	Nominal Power mW approx.	Max. Voltage VDC
HFD3/1.5-L2	1.5	1.13	1.13	11.2 x (1±10%)	200	2.2
HFD3/2.4-L2	2.4	1.8	1.8	29 x (1±10%)	200	3.6
HFD3/3-L2	3	2.25	2.25	45 x (1±10%)	200	4.5
HFD3/4.5-L2	4.5	3.38	3.38	101 x (1±10%)	200	6.7
HFD3/5-L2	5	3.75	3.75	125 x (1±10%)	200	7.5
HFD3/6-L2	6	4.5	4.5	180 x (1±10%)	200	9.0
HFD3/9-L2	9	6.75	6.75	405 x (1±10%)	200	13.5
HFD3/12-L2	12	9	9	720 x (1±10%)	200	18
HFD3/24-L2	24	18	18	2880 x (1±10%)	200	36

**Notes:** 1) When user's requirements can't be found in the above table, special order allowed.

2) In case 5V of transistor drive circuit, it is recommended to use 4.5V type relay, and 3V to use 2.4V type relay.

## ORDERING INFORMATION

	<b>HFD3 / 24 -L2 4 S R (XXX)</b>							
<b>Type</b>								
<b>Coil voltage</b>	1.5, 2.4, 3, 4.5, 5, 6, 9, 12, 24, 48VDC <sup>1)</sup>							
<b>Sort</b>	<b>L1:</b> 1 coil latching		<b>Nil:</b> Single side stable					
	<b>L2:</b> 2 coils latching							
<b>Contact material</b>	<b>4:</b> AgPd+Gold plated		<b>Nil:</b> AgNi+Gold plated					
<b>Terminal type</b>	<b>S:</b> Standard SMT		<b>S1:</b> Short terminal SMT			<b>Nil:</b> DIP		
<b>Packing style</b>	<b>R:</b> Tape and reel packing (Only for SMT type) <sup>2)</sup>							
	<b>Nil:</b> Tube packing(Only for DIP type)							
<b>Special code<sup>3)</sup></b>	<b>XXX:</b> Customer special requirement				<b>Nil:</b> Standard			

**Notes:** 1) 48VDC coil voltage is only for single side stable version.

2) R type (tape and reel) packing is moisture-proof which meets requirement of MSL-3. Please choose R type packing for SMT products. For R type, the letter "R" will only be printed on packing tag but not on relay cover. Tube packing is normally not available for SMT products unless specially requested by customer. But please note that tube packing is not moisture-proof so please bake the products before use according to description of Notice 11 herewith. In addition, tube packaging will be adopted when the ordering quantity of R type is equal to or less than 100 pieces unless otherwise specified.

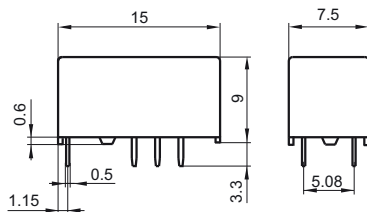
3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(131): The Dielectric strength between coil & contacts is 3000VAC 1min for single side stable and 1 coil latching version.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

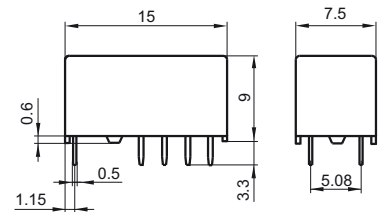
Unit: mm

Outline Dimensions  
(DIP type)

Single side stable & 1 coil latching

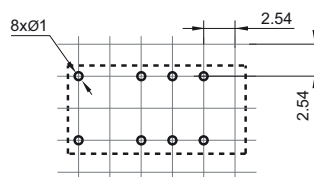


2 coils latching

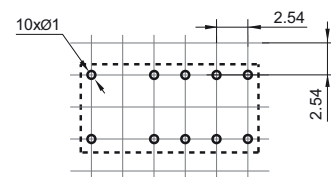


PCB Layout  
(DIP type)  
(Bottom view)

Single side stable & 1 coil latching

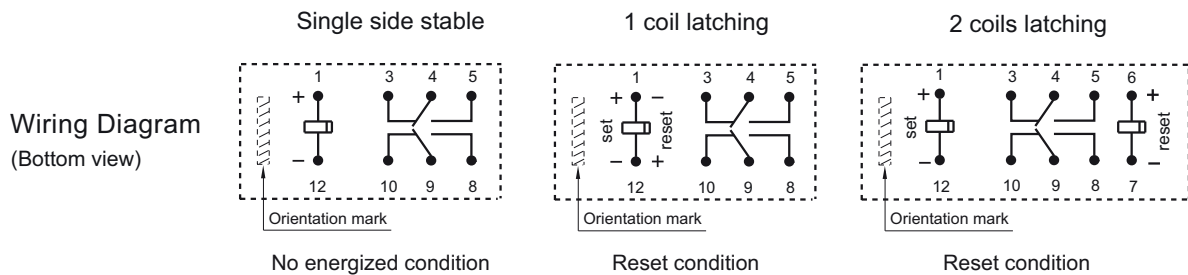
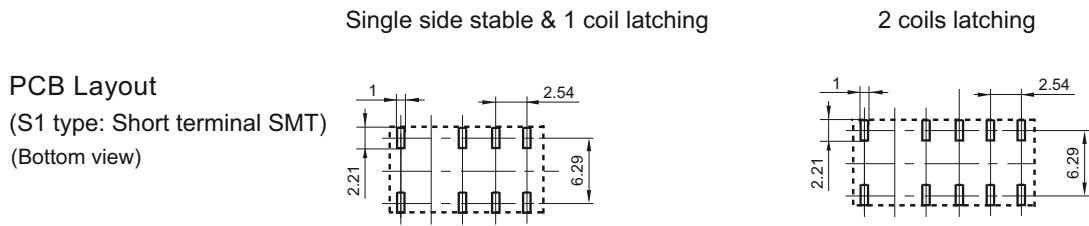
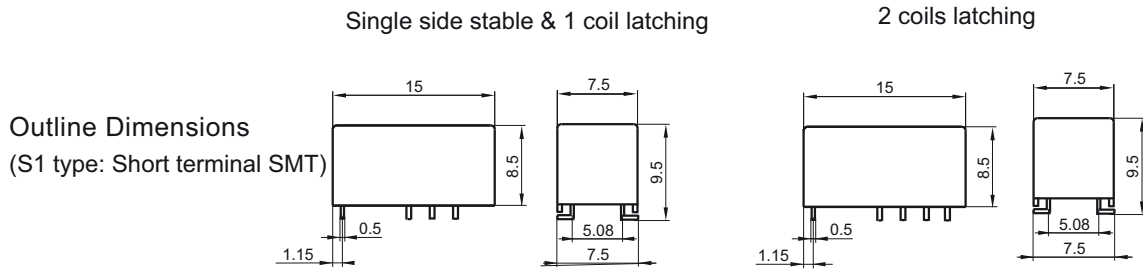
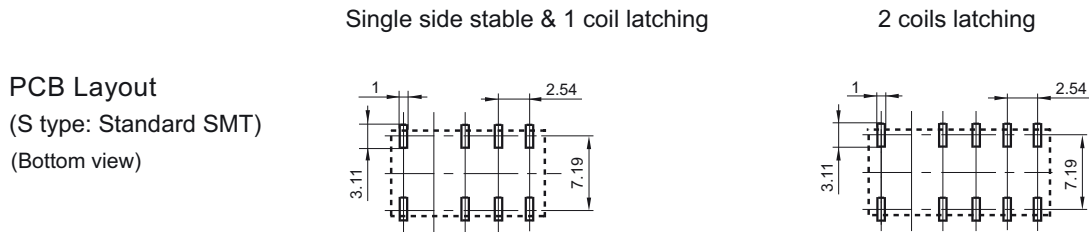
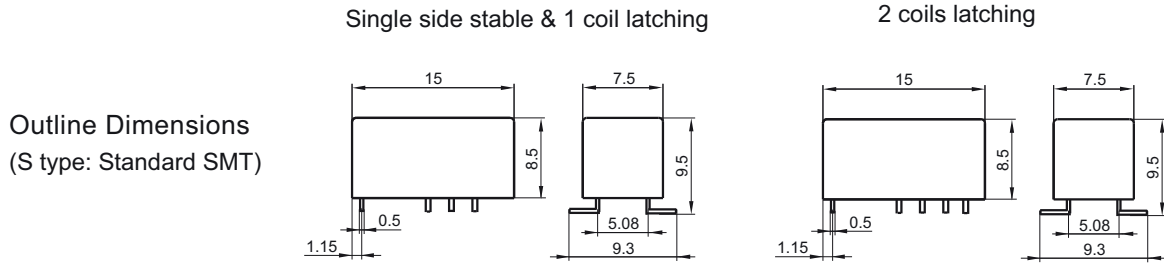


2 coils latching



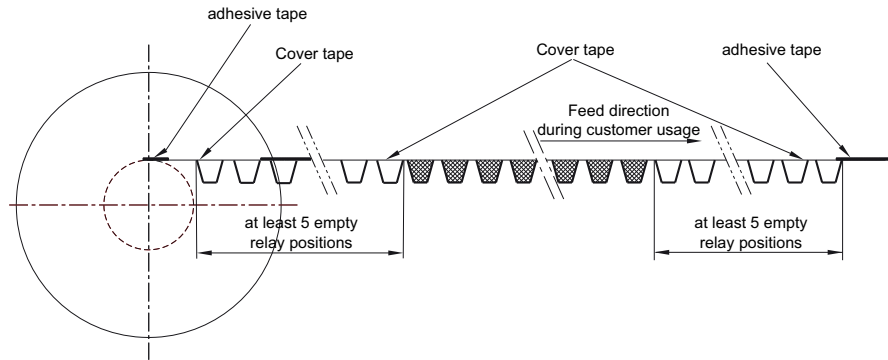
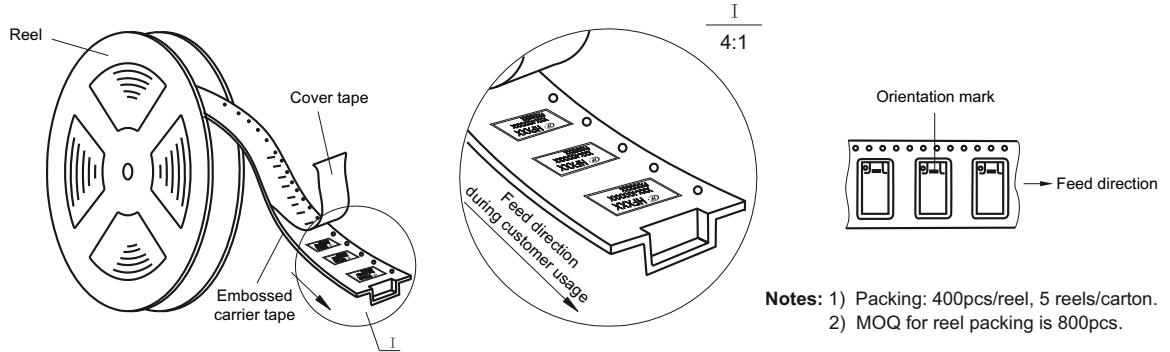
# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

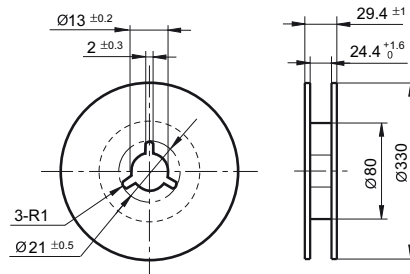




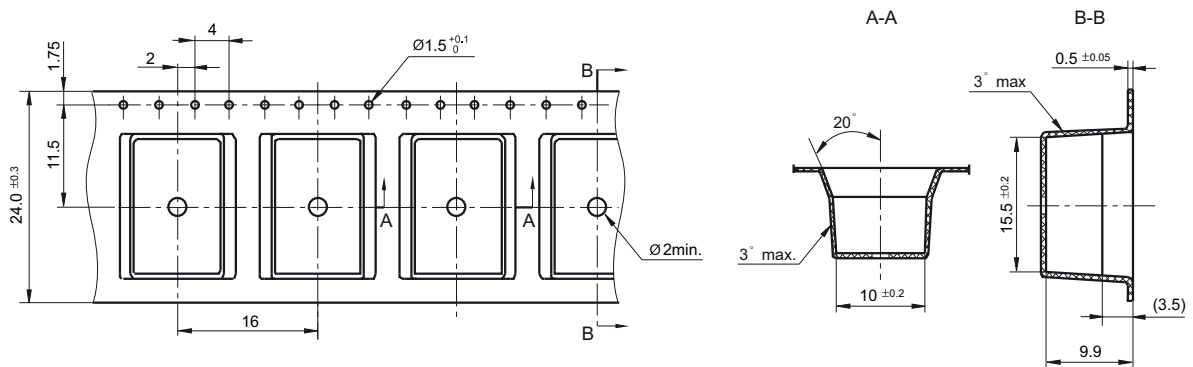
Direction of Relay Insertion



Reel Dimensions



Tape Dimensions (S type: Standard SMT)



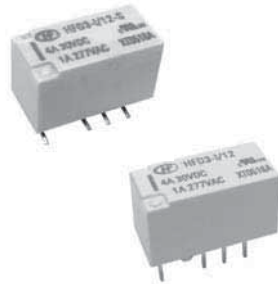


# HFD3-I

# MINIATURE SIGNAL RELAY



File No.:E133481



## Features

- Third generation Signal relay
- High contact switching capacity
- Withstand inrush current at 7.5A(Effective value)
- SMT and DIP types available
- Single side stable and latching type available

## CONTACT DATA

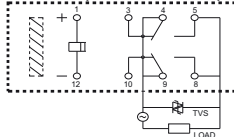
Contact arrangement	2C
Contact resistance <sup>1)</sup>	≤100mΩ (10mA 30mVDC)
Contact material	Ag Alloy + Au plated
Contact rating (Res. load)	4A 30VDC 2A 30VDC 1A 277VAC
Max. switching voltage	277VAC / 220VDC
Max. switching current	4A (Single contact) 7.5A(Two sets of open contacts in parallel,Effective value)
Max. switching power	277VA / 120W
Min. applicable load <sup>2)</sup>	5V 1mA
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance <sup>4)</sup>	1 x 10 <sup>5</sup> OPS (Resistive load,40°C 4A 30VDC) 1 x 10 <sup>5</sup> OPS (Resistive load,85°C 2A 30VDC) 1 x 10 <sup>5</sup> OPS(Resistive load,85°C 1A 277VAC) 2 x 10 <sup>5</sup> OPS (Inductive load,Room temp. 250ms Inrush current 7.5A(effective value) / Stable current 1.5A(effective value) 30VAC(COSØ=0.4)(ON:OFF=1s:9s ), TVS protection for contacts (two sets of open contacts in parallel)

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

2) Min. applicable load is reference value. Please perform the confirmation test with the actual load before production since reference value may change according to switching frequencies, environmental conditions and expected contact resistance and reliability.

3) The electrical endurance of resistive load is from the tests of one set of open contacts or one sets of close contacts.The electrical endurance of inductive load is from the test with two sets of open contacts in parallel.

Two sets of open contacts in parallel:



It is in released status are in the diagram(single side stable type)

## COIL

Coil power	Single side stable	Approx. 140mW
	1 coil latching	Approx. 100mW
	2 coils latching	Approx. 200mW
Temperature rise	60K max(2A Resistive load 85°C environment)	

## CHARACTERISTICS

Insulation resistance		1000MΩ (500VDC)
Dielectric strength	Between open contacts	1000VAC 1min
	Between contact sets	1500VAC 1min
	Between coil&contact	2000VAC 1min
Surge withstand voltage		1500VAC (FCC part 68) 2500VAC (Telecordia)
Between open contacts (10/160μs)		
Between coil & contacts (2/10μs)		
Operate time (Set time)		≤ 4ms
Release time (Reset time)		≤ 4ms
Ambient temperature		-40°C ~ 85°C
Humidity		5% ~ 85% RH
Shock resistance	Functional	735m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	Functional	10Hz ~ 55Hz 3.3mm DA
	Destructive	10Hz ~ 55Hz 5.0mm DA
Termination		DIP、SMT
Unit weight		Approx.2g
Moisture sensitivity levels (Only for SMT type, JEDEC-STD-020)		MSL-3
Construction		Plastic

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

## SAFETY APPROVAL RATINGS

UL/CUL	Ag Alloy + Au plated	4A 30VDC, 40°C
		2A 30VDC, 85°C
		1A 277VAC, 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001、ISO/TS16949、ISO14001、OHSAS18001、IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

## COIL DATA

### Single side stable

Coil Code	Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Coil Resistance $\Omega$	Nominal Power mW approx.	Max. Voltage VDC
HFD3-I/1.5	1.5	1.13	0.15	16 x (1±10%)	140	2.2
HFD3-I/2.4	2.4	1.8	0.24	41 x (1±10%)	140	3.6
HFD3-I/3	3	2.25	0.3	64.3 x (1±10%)	140	4.5
HFD3-I/4.5	4.5	3.38	0.45	145 x (1±10%)	140	6.7
HFD3-I/5	5	3.75	0.5	178 x (1±10%)	140	7.5
HFD3-I/6	6	4.5	0.6	257 x (1±10%)	140	9
HFD3-I/9	9	6.75	0.9	579 x (1±10%)	140	13.5
HFD3-I/12	12	9	1.2	1028 x (1±10%)	140	18
HFD3-I/24	24	18	2.4	4114 x (1±10%)	140	36

### 1 coil latching

Coil Code	Nominal Voltage VDC	Set Voltage VDC max.	Reset Voltage VDC max.	Coil Resistance $\Omega$	Nominal Power mW approx.	Max. Voltage VDC
HFD3-I/1.5-L1	1.5	1.13	1.13	22.5 x (1±10%)	100	2.7
HFD3-I/2.4-L1	2.4	1.8	1.8	58 x (1±10%)	100	4.3
HFD3-I/3-L1	3	2.25	2.25	90 x (1±10%)	100	5.4
HFD3-I/4.5-L1	4.5	3.38	3.38	203 x (1±10%)	100	8.1
HFD3-I/5-L1	5	3.75	3.75	250 x (1±10%)	100	9
HFD3-I/6-L1	6	4.5	4.5	360 x (1±10%)	100	10.8
HFD3-I/9-L1	9	6.75	6.75	810 x (1±10%)	100	16.2
HFD3-I/12-L1	12	9	9	1440 x (1±10%)	100	21.6
HFD3-I/24-L1	24	18	18	5760 x (1±10%)	100	43.2

### 2 coils latching

Coil Code	Nominal Voltage VDC	Set Voltage VDC max.	Reset Voltage VDC max.	Coil Resistance $\Omega$	Nominal Power mW approx.	Max. Voltage VDC
HFD3-I/1.5-L2	1.5	1.13	1.13	11.2 x (1±10%)	200	2.2
HFD3-I/2.4-L2	2.4	1.8	1.8	29 x (1±10%)	200	3.6
HFD3-I/3-L2	3	2.25	2.25	45 x (1±10%)	200	4.5
HFD3-I/4.5-L2	4.5	3.38	3.38	101 x (1±10%)	200	6.7
HFD3-I/5-L2	5	3.75	3.75	125 x (1±10%)	200	7.5
HFD3-I/6-L2	6	4.5	4.5	180 x (1±10%)	200	9.0
HFD3-I/9-L2	9	6.75	6.75	405 x (1±10%)	200	13.5
HFD3-I/12-L2	12	9	9	720 x (1±10%)	200	18
HFD3-I/24-L2	24	18	18	2880 x (1±10%)	200	36

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

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

3) When user's requirements can't be found in the above table, special order allowed.

4) In case 5V of transistor drive circuit, it is recommended to use 4.5V type relay, and 3V to use 2.4V type relay.

## ORDERING INFORMATION

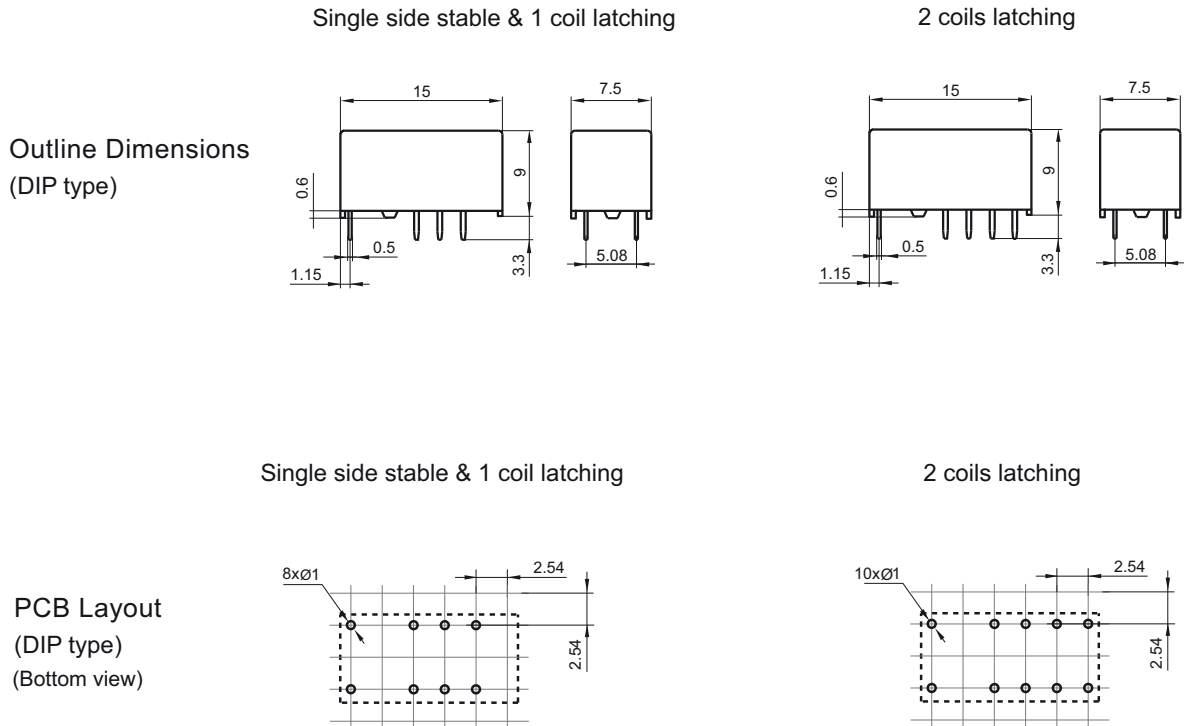
Type	HFD3-I /	24	-L1	S	R	(XXX)
Coil voltage	1.5, 2.4, 3, 4.5, 5, 6, 9, 12, 24VDC					
Sort	L1: 1 coil latching		Nil: Single side stable			
	L2: 2 coils latching					
Terminal type	S: Standard SMT		S1: Short terminal SMT			
	Nil: DIP					
Packing style	R: Tape and reel packing (Only for SMT type) <sup>1)</sup>					
	Nil: Tube packing(Only for DIP type)					

**Special code<sup>3)</sup>**    **XXX:** Customer special requirement    **Nil:** Standard

- Notes:** 1) R type (tape and reel) packing is moisture-proof which meets requirement of MSL-3. Please choose R type packing for SMT products. For R type, the letter "R" will only be printed on packing tag but not on relay cover. Tube packing is normally not available for SMT products unless specially requested by customer. But please note that tube packing is not moisture-proof so please bake the products before use according to description of Notice 11 herewith. In addition, tube packaging will be adopted when the ordering quantity of R type is equal to or less than 100 pieces unless otherwise specified.
- 2) When coil sort, contact material, terminal type or packing style are needed, please add "-" after coil voltage is selected. For instance, HFD3-I/12-SR.
- 3) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

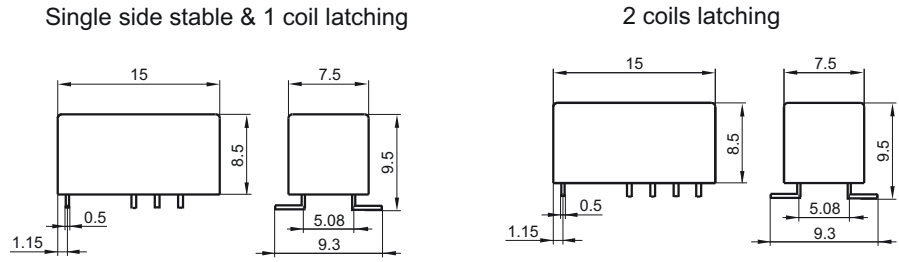
Unit: mm



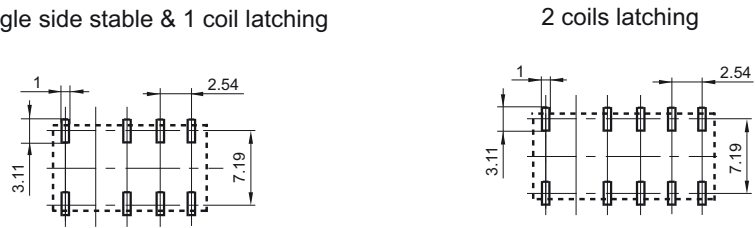
# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

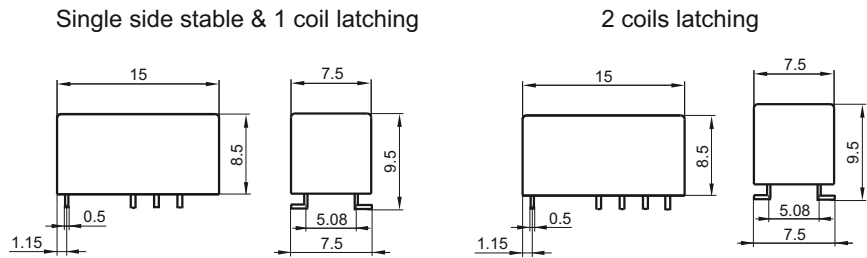
Outline Dimensions  
(S type: Standard SMT)



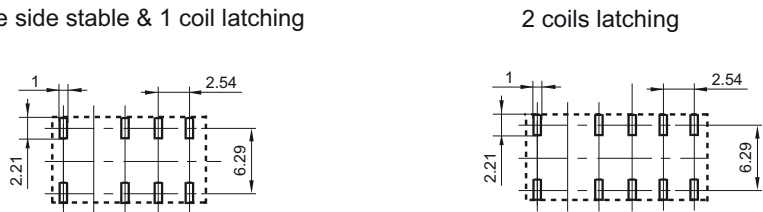
PCB Layout  
(S type: Standard SMT)  
(Bottom view)



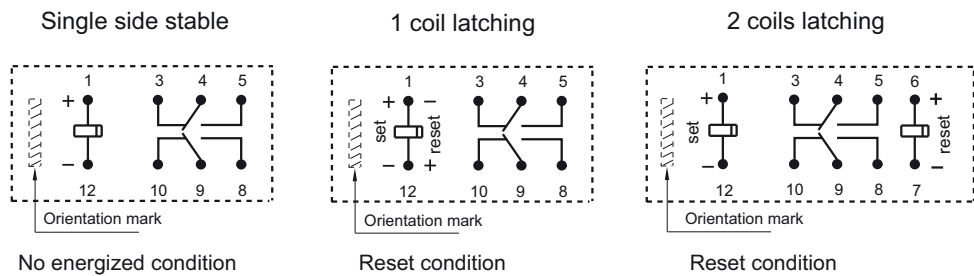
Outline Dimensions  
(S1 type: Standard SMT)



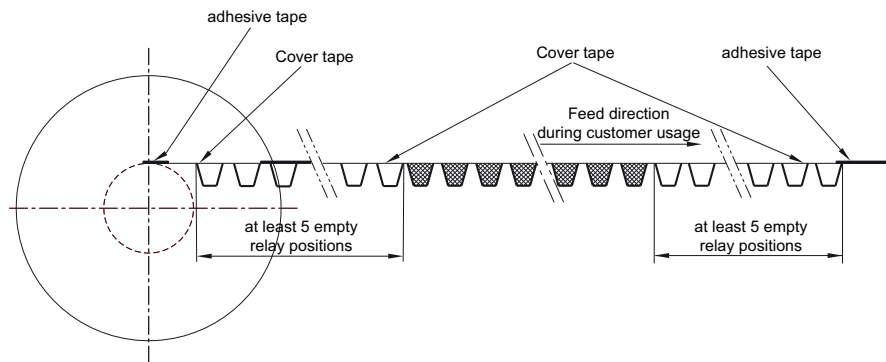
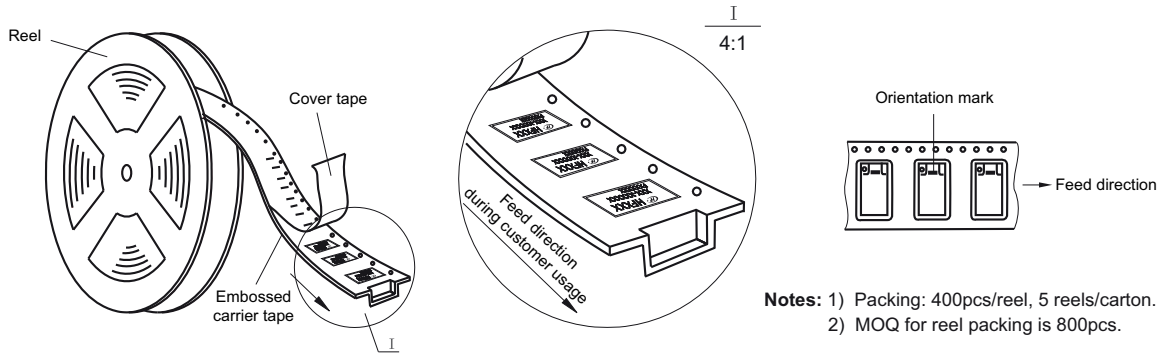
PCB Layout  
(S1 type: Standard SMT)  
(Bottom view)



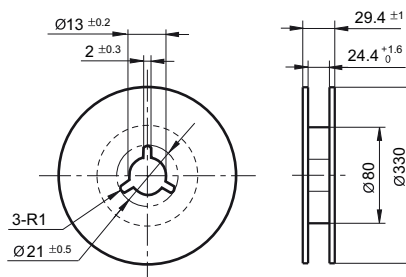
Wiring Diagram  
(Bottom view)



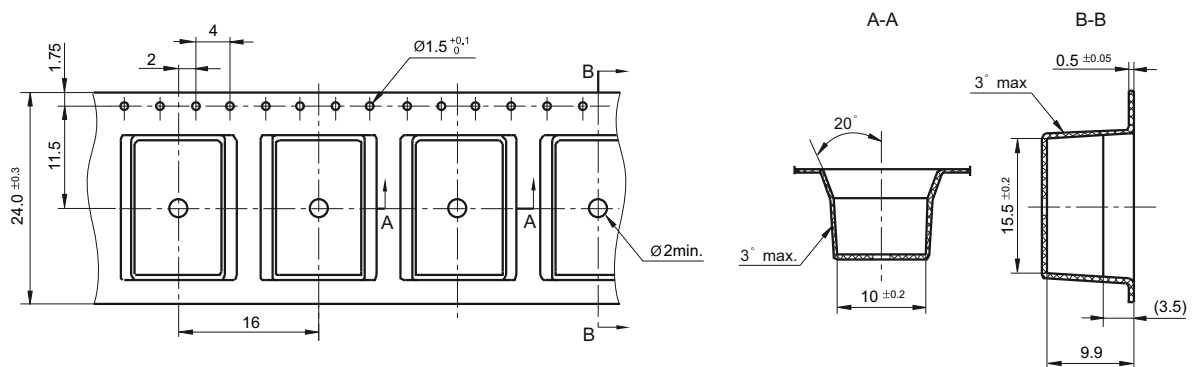
Direction of Relay Insertion



Reel Dimensions



Tape Dimensions (S type: Standard SMT)

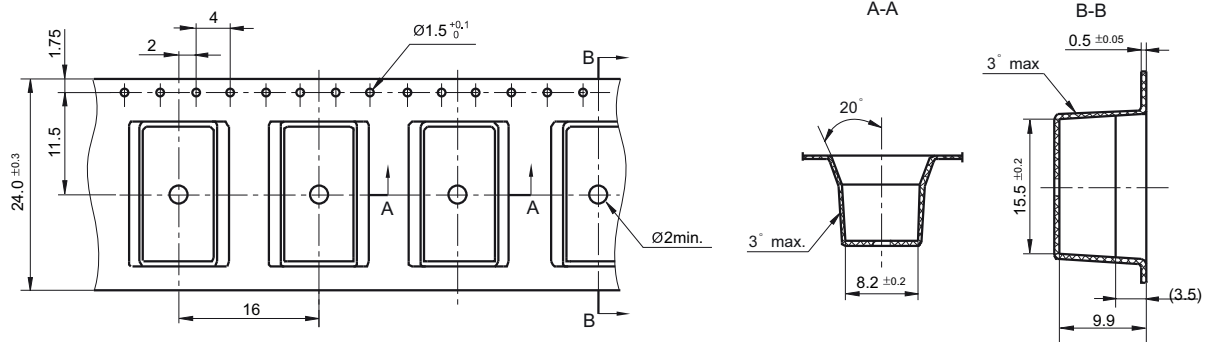




## TAPE PACKING

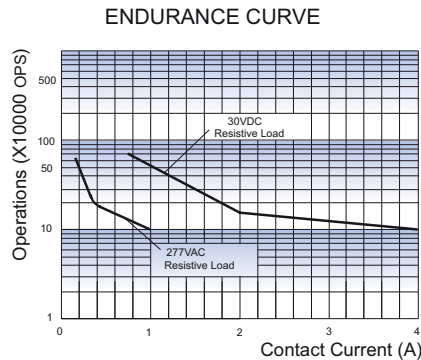
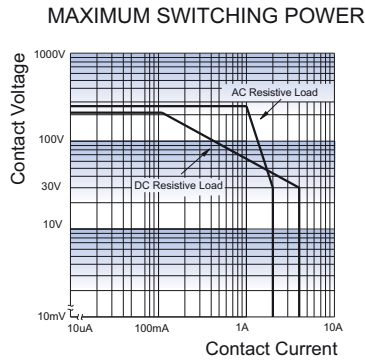
Unit: mm

### Tape Dimensions (S1 type: Short terminal SMT)

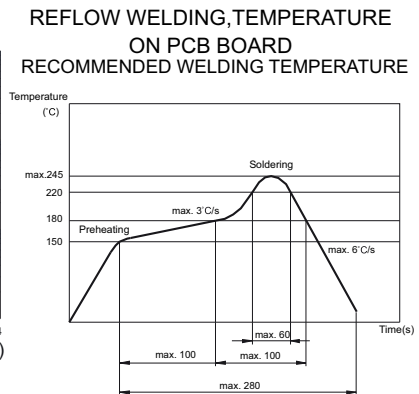


- Remark: 1) The pin dimensions are before tin dipping(it will be larger after tin dipping).The mount hole dimensions are recommended for PCB hole design. The final PCB hole dimensions can be adjusted according to the actual measured values of products.
- 2) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.
- 3) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.

## CHARACTERISTIC CURVES



**Test conditions:**  
1 Form A, 1 Form B  
Resistive load, at 40°C, 1s on 9s off.



### Notice

- 1) This relay is highly sensitive polarized relay, if correct polarity is not applied to the coil terminals, the relay does not operate properly.
- 2) To avoid using relays under strong magnetic field which will change the parameters of relays such as pick-up voltage and drop-out voltage.
- 3) Relay is on the "reset" status when being released from stock, with the consideration of shock arisen from transit and relay mounting, it should be changed to the "set" status when application(connecting to the power supply). Please reset the relay to "set" or "reset" status on request.
- 4) 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. Regarding latching relay, in order to maintain the "set" or "reset" status, impulse width of the rated voltage applied to coil should be more than 5 times of "set" or "reset" time.
- 5) For 2 coil latching relay, do not energize voltage to "set" coil and "reset" coil simultaneously.
- 6) For single side stable relay,after it pick up stably,the holding voltage can be reduced to  $>60\%$  of rated voltage.
- 7) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 8) For SMT products, validation with real application should be done before your series production, if the reflow-soldering temperature curve is out of our recommendation. Generally, two-time reflow-soldering is not recommended for the relay. However, if two-time reflow-soldering is required, a 60-min. interval should be guaranteed and a validation should be done before production.
- 9) For THT type,please use wave solder or hand solder.If reflow solder is needed,please contact us for further confirmation.
- 10) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 11) Regarding the plastic sealed relay, we should leave it cooling naturally untill 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.
- 12) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidetines of relay".
- 13) Relays packaged in moisture barrier bags meet MSL-3 requirements. The relays should be stored at ambient conditions of  $\leq 30^\circ\text{C}$  and  $\leq 60\%$  RH after they are removed from their packaging, and should be used within 168 hours. If the relays cannot be used within 168 hours, please repack them or store them in a drying oven at  $25^\circ\text{C} \pm 5^\circ\text{C}$ ,  $\leq 10\%$  RH. Otherwise, relays may be subjected to a soldering test to check their performance, or they may be used after keeping them in an oven for 72 hours at with  $50^\circ\text{C} \pm 5^\circ\text{C}$ ,  $\leq 30\%$  RH.

### 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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# HFD3-V

# SUBMINIATURE SIGNAL RELAY



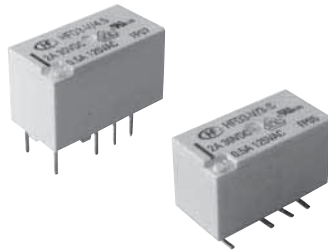
File No.: E133481



File No.: 40018867



File No.:CQC14002107409



## Features

- 3kV dielectric strength (between coil and contacts)
- Surge withstand voltage up to 6000VAC, meets FCC Part 68 and Telecordia
- Min. creepage is 2.5mm (between coil and contact), Min. clearance is 2.0mm (between coil and contact)
- 2 pairs of NO contacts connected in series with contact gap  $\geq 1.5$ mm, product in accordance to IEC60776 available.
- Meets EN60950 / EN41003
- SMT and DIP types available
- Bifurcated contacts
- Single side stable and latching types available

## CONTACT DATA

Contact arrangement	2C
Contact resistance <sup>1)</sup>	100mΩ max. (at 10mA 30mVDC)
Contact material	AgPd + Au plated, AgNi + Au plated
Contact rating (Res. load)	2A 30VDC 0.5A 125VAC 1A 277VAC 10mA 1000VDC
Max. switching current	4A
Max. switching voltage	1000VAC / 1500VDC (2 pairs of NO / NC contacts connected in series) 400VAC / 600VDC (1 pair of contacts)
Max. switching power	277VA / 60W
Min. applicable load <sup>2)</sup>	10mV 10μA
Mechanical endurance	1 x 10 <sup>7</sup> ops
Electrical endurance <sup>3)</sup>	1 x 10 <sup>5</sup> ops (0.5A 125VAC, Resistive load, AgNi + Au plated, at 85°C, 1s on 9s off)

- Notes:**1) The data shown above are initial values.  
2) Min. applicable load is reference value. Please perform the confirmation test with the actual load before production since reference value may change according to switching frequencies, environmental conditions and expected contact resistance and reliability.  
3) Electric endurance data are collected in one pair CO contact test.

## SAFETY APPROVAL RATINGS

UL/CUL	AgNi + Au plated	2A 30VDC at 85°C 0.5A 125VAC at 85°C 1A 277VAC at 85°C 10mA 1000VDC at 105°C
	AgPd + Au plated	0.5A 125VAC at 70°C
VDE	AgNi + Au plated	2A 30VDC at 85°C 0.5A 125VAC at 85°C

- Notes:** 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	3000VAC/4200VDC 1min
	Between open contacts	1500VAC/2100VDC 1min
	Between contact sets	1500VAC/2100VDC 1min
Surge withstand voltage		
Between open contacts(10/160μs)	2.5kV	
Between coil & contacts(1.2/50μs)	6kV	
Operate time (Set time)	6ms max.	
Release time (Reset time)	6ms max.	
Ambient temperature	-40°C to 85°C	
Humidity	5% to 85% RH	
Vibration resistance	Functional	10Hz to 55Hz 3.3mm DA
	Destructive	10Hz to 55Hz 5.0mm DA
Shock resistance	Functional	735m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Termination	DIP, SMT	
Unit weight	Approx. 2g	
Moisture sensitivity levels (Only for SMT type, JEDEC-STD-020)	MSL-3	
Construction	Plastic sealed	

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

## COIL

Coil power	Single side stable	200mW
	1 coil latching	140mW
Temperature rise	70K max.	



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## COIL DATA

at 23°C

### Single side stable

Coil Code	Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Coil Resistance Ω	Nominal Power mW	Max. Voltage VDC
HFD3-V/1.5	1.5	1.13	0.15	11.2 x (1±10%)	200	2.2
HFD3-V/2.4	2.4	1.8	0.24	28.8 x (1±10%)	200	3.6
HFD3-V/3	3	2.25	0.3	45 x (1±10%)	200	4.5
HFD3-V/4.5	4.5	3.38	0.45	101 x (1±10%)	200	6.7
HFD3-V/5	5	3.75	0.5	125 x (1±10%)	200	7.5
HFD3-V/6	6	4.5	0.6	180 x (1±10%)	200	9
HFD3-V/9	9	6.75	0.9	405 x (1±10%)	200	13.5
HFD3-V/12	12	9	1.2	720 x (1±10%)	200	18
HFD3-V/24	24	18	2.4	2880 x (1±10%)	200	36

### 1 coil latching

Coil Code	Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC max. <sup>1)</sup>	Coil Resistance Ω	Nominal Power mW	Max. Voltage VDC
HFD3-V/1.5-L1	1.5	1.13	1.13	16.1 x (1±10%)	140	2.7
HFD3-V/2.4-L1	2.4	1.8	1.8	41 x (1±10%)	140	4.3
HFD3-V/3-L1	3	2.25	2.25	64.3 x (1±10%)	140	5.4
HFD3-V/4.5-L1	4.5	3.38	3.38	145 x (1±10%)	140	8.1
HFD3-V/5-L1	5	3.75	3.75	178 x (1±10%)	140	9
HFD3-V/6-L1	6	4.5	4.5	257 x (1±10%)	140	10.8
HFD3-V/9-L1	9	6.75	6.75	579 x (1±10%)	140	16.2
HFD3-V/12-L1	12	9	9	1028 x (1±10%)	140	21.6
HFD3-V/24-L1	24	18	18	4114 x (1±10%)	140	43.2

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

2)In case 5V of transistor drive circuit, it is recommended to use 4.5V type relay, and 3V to use 2.4V type relay.

## ORDERING INFORMATION

<b>Type</b>	HFD3-V /	24	-L1	4	S	R	(XXX)
<b>Coil voltage</b>	1.5, 2.4, 3, 4.5, 5, 6, 9, 12, 24VDC						
<b>Sort</b>	L1: 1 coil latching		Nil: Single side stable				
<b>Contact material</b>	4: AgPd+Gold plated		Nil: AgNi+Gold plated				
<b>Terminal type</b>	S: Standard SMT		S1: Short terminal SMT		Nil: DIP		
<b>Packing style</b>	R: Tape and reel packing (Only for SMT type) <sup>1)</sup> Nil: Tube packing(Only for DIP type) <sup>3)</sup>						
<b>Special code<sup>4)</sup></b>	XXX: Customer special requirement			Nil: Standard			

Notes: 1) R type (tape and reel) packing is moisture-proof which meets requirement of MSL-3. Please choose R type packing for SMT products. For R type, the letter "R" will only be printed on packing tag but not on relay cover. Tube packing is normally not available for SMT products unless specially requested by customer. But please note that tube packing is not moisture-proof so please bake the products before use according to description of Notice 10 herewith. In addition, tube packaging will be adopted when the ordering quantity of R type is equal to or less than 100 pieces unless otherwise specified.

2) When coil sort, contact material, terminal type or packing style are needed, please add "-" after coil voltage is selected. For instance, HFD3-V/12-4SR.

3)The standard tube length is 624mm.

4) The customer special requirement express as special code after evaluating by Hongfa. e.g.(131): The Dielectric strength between coil & contacts is 3000VAC 1min for single side stable and 1 coil latching version.

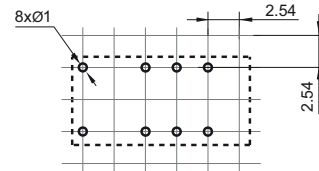
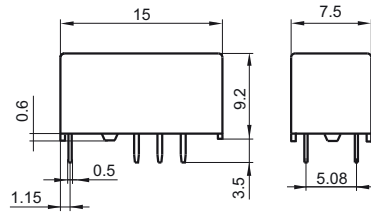
# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

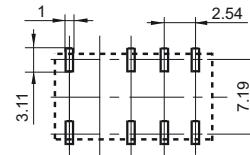
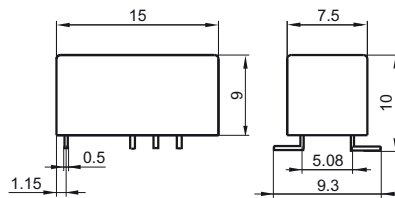
## Outline Dimensions

## PCB Layout (Bottom view)

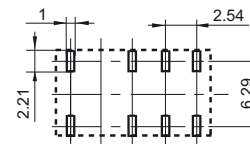
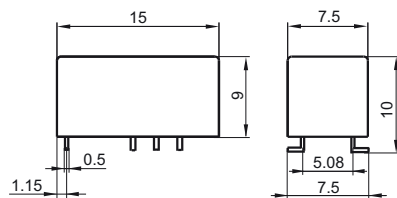
DIP type



S type:  
Standard SMT

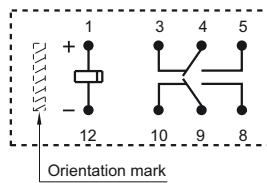


S1 type:  
Short terminal SMT



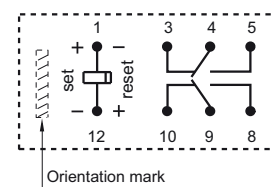
Wiring Diagram  
(Bottom view)

### Single side stable



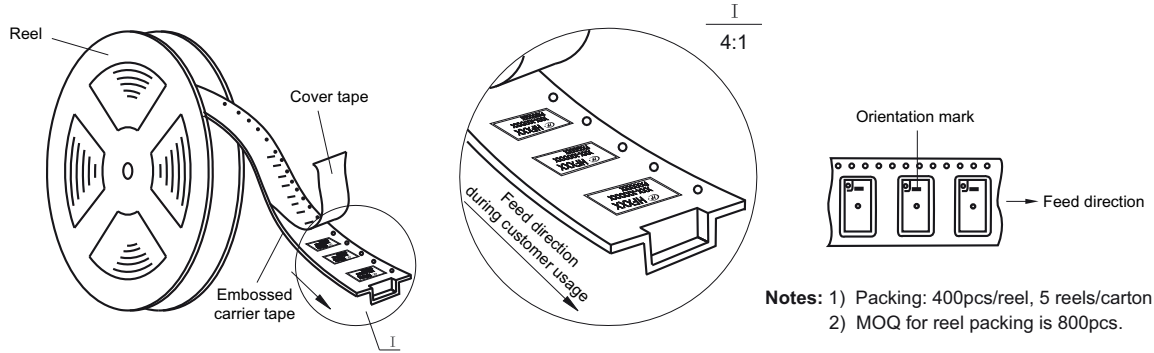
No energized condition

### 1 coil latching

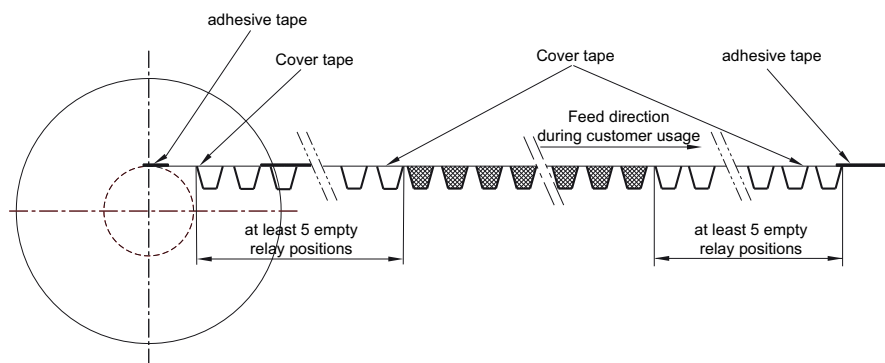


reset condition

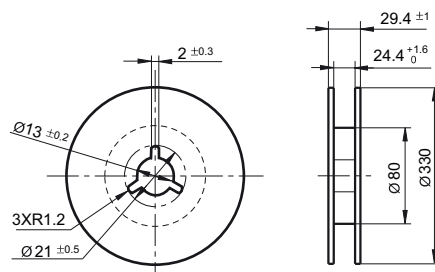
Direction of Relay Insertion



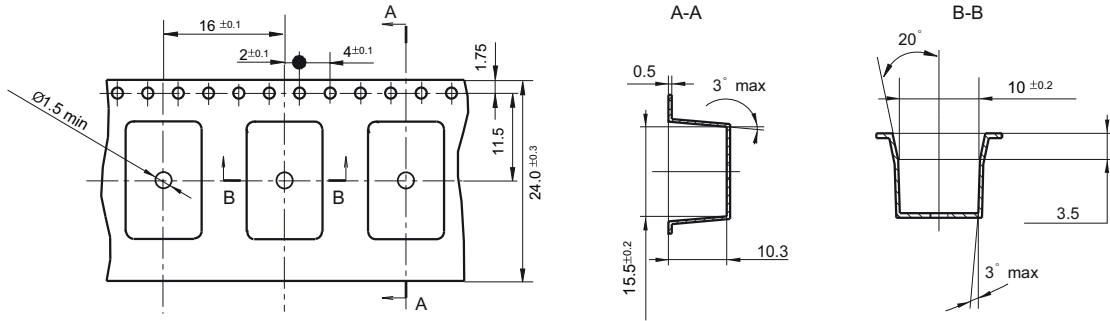
Notes: 1) Packing: 400pcs/reel, 5 reels/carton.  
2) MOQ for reel packing is 800pcs.



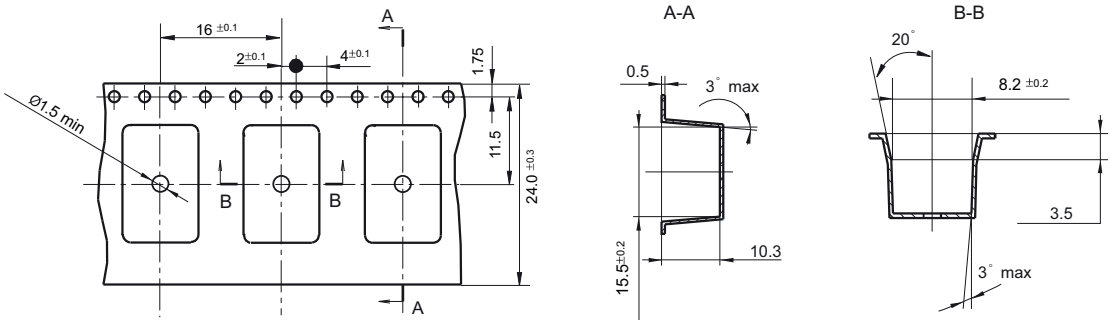
Reel Dimensions



Tape Dimensions (S type: Standard SMT)



Tape Dimensions (S1 type: Short terminal SMT)

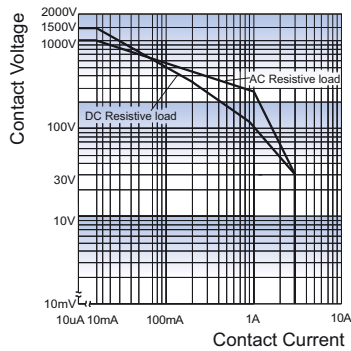


- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.  
 3) The width of the gridding is 2.54mm.

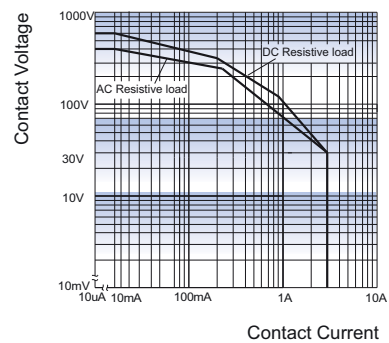
CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER

2 pairs of NO contacts connected in series

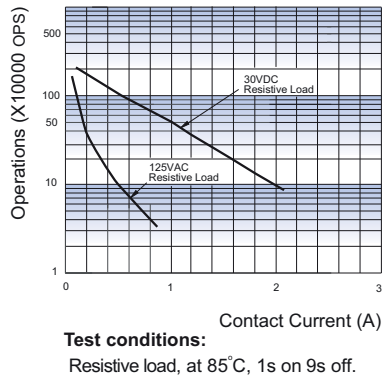


1 pair of contacts

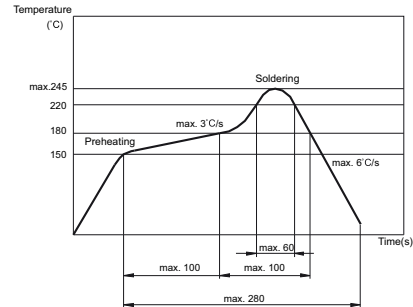


## CHARACTERISTIC CURVES

ENDURANCE CURVE



REFLOW WELDING, TEMPERATURE ON PCB BOARD  
RECOMMENDED WELDING TEMPERATURE



### Notice

- 1) This relay is highly sensitive polarized relay, if correct polarity is not applied to the coil terminals, the relay does not operate properly.
- 2) To avoid using relays under strong magnetic field which will change the parameters of relays such as pick-up voltage and drop-out voltage.
- 3) Relay is on the "reset" status when being released from stock, with the consideration of shock risen from transit and relay mounting, it should be changed to the "set" status when application(connecting to the power supply). Please reset the relay to "set" or "reset" status on request.
- 4) 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. Regarding latching relay, in order to maintain the "set" or "reset" status, impulse width of the rated voltage applied to coil should be more than 5 times of "set" or "reset" time.
- 5) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 6) For SMT products, validation with real application should be done before your series production, if the reflow-soldering temperature curve is out of our recommendation. Generally, two-time reflow-soldering is not recommended for the relay. However, if two-time reflow-soldering is required, a 60-min. interval should be guaranteed and a validation should be done before production.
- 7) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 8) 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.
- 9) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidelines of relay".
- 10) Relays packaged in moisture barrier bags meet MSL-3 requirements. The relays should be stored at ambient conditions of  $\leq 30^\circ\text{C}$  and  $\leq 60\%$  RH after they are removed from their packaging, and should be used within 168 hours. If the relays cannot be used within 168 hours, please repack them or store them in a drying oven at  $25^\circ\text{C} \pm 5^\circ\text{C}$ ,  $\leq 10\%$  RH. Otherwise, relays may be subjected to a soldering test to check their performance, or they may be used after keeping them in an oven for 72 hours at with  $50^\circ\text{C} \pm 5^\circ\text{C}$ ,  $\leq 30\%$  RH.

### 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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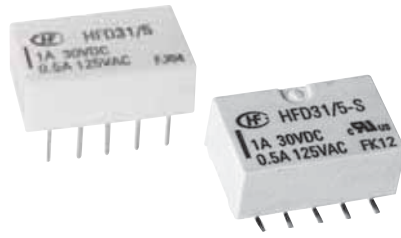


# HFD31

# SUBMINIATURE SIGNAL RELAY



File No.:E133481



## Features

- Offers excellent board space savings
- Surge withstand voltage up to 1500V, meets FCC Part 68
- High contact capacity 2A 30VDC
- Low power consumption
- Single side stable and latching type available
- Single or double coil winding type available

## CONTACT DATA

Contact arrangement	2C
Contact resistance	100mΩ max. (at 10mA 30mVDC)
Contact material	AgPd + Au plated, AgNi + Au plated
Contact rating (Res. load)	1A 30VDC 2A 30VDC 0.5A 125VAC
Max. switching current	2A
Max. switching voltage	125VAC/110VDC
Max. switching power	62.5VA / 30W
Min. applicable load <sup>1)</sup>	10mV 10μA
Mechanical endurance	1 x 10 <sup>8</sup> OPS
Electrical endurance <sup>2)</sup>	1 x 10 <sup>5</sup> OPS (0.5A 125VAC, Resistive load, AgNi + Au plated, at 70°C, 1s on 9s off)

**Notes:** 1) Min. applicable load is reference value. Please perform the confirmation test with the actual load before production since reference value may change according to switching frequencies, environmental conditions and expected contact resistance and reliability.

2) Electrical endurance test is conducted with load being connected to NO or NC contacts.

## COIL

Coil power	Single side stable	Approx. 140mW (24VDC: Approx. 200mW)
	1 coil latching	Approx. 100mW (24VDC: Approx. 150mW)
	2 coils latching	Approx. 200mW (24VDC: Approx. 300mW)

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	1000VAC 1min
	Between open contacts	750VAC 1min
	Between contact sets	1000VAC 1min
Surge withstand voltage Between open contacts (10/160μs)	1500VAC (FCC part 68)	
Operate time (Set time)	3ms max.	
Release time (Reset time)	3ms max.	
Ambient temperature	-40°C to 70°C	
Humidity	5% to 85% RH	
Vibration resistance	10Hz to 55Hz 3.0mm DA	
Shock resistance	Functional	490m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Termination	DIP, SMT	
Unit weight	Approx. 1.8g	
Moisture sensitivity levels (Only for SMT type, JEDEC-STD-020)	MSL-3	
Construction	Plastic sealed	

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

2) UL insulation system: Class A

## SAFETY APPROVAL RATINGS

UL/CUL	AgNi + Au plated	1A 30VDC 2A 30VDC 0.5A 125VAC
	AgPd + Au plated	0.5A 125VAC

**Notes:** 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

**COIL DATA**

at 23°C

**Single side stable**

Coil Code	Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Coil Resistance $\Omega$	Nominal Power mW approx.	Max. Voltage VDC
HFD31/1.5	1.5	1.13	0.15	16 x (1±10%)	140	2.25
HFD31/2.4	2.4	1.8	0.24	41.3 x (1±10%)	140	3.6
HFD31/3	3	2.25	0.3	64.3 x (1±10%)	140	4.5
HFD31/4.5	4.5	3.38	0.45	145 x (1±10%)	140	6.7
HFD31/5	5	3.75	0.5	178 x (1±10%)	140	7.5
HFD31/6	6	4.5	0.6	257 x (1±10%)	140	9
HFD31/9	9	6.75	0.9	579 x (1±10%)	140	13.5
HFD31/12	12	9	1.2	1028 x (1±10%)	140	18
HFD31/24	24	18	2.4	2880 x (1±10%)	200	36

**1 coil latching**

Coil Code	Nominal Voltage VDC	Set Voltage VDC max.	Reset Voltage VDC max.	Coil Resistance $\Omega$	Nominal Power mW approx.	Max. Voltage VDC
HFD31/1.5-L1	1.5	1.13	1.13	22.5 x (1±10%)	100	2.25
HFD31/2.4-L1	2.4	1.8	1.8	58 x (1±10%)	100	3.6
HFD31/3-L1	3	2.25	2.25	90 x (1±10%)	100	4.5
HFD31/4.5-L1	4.5	3.38	3.38	203 x (1±10%)	100	6.7
HFD31/5-L1	5	3.75	3.75	250 x (1±10%)	100	7.5
HFD31/6-L1	6	4.5	4.5	360 x (1±10%)	100	9
HFD31/9-L1	9	6.75	6.75	810 x (1±10%)	100	13.5
HFD31/12-L1	12	9	9	1440 x (1±10%)	100	18
HFD31/24-L1	24	18	18	3840 x (1±10%)	150	36

**2 coils latching**

Coil Code	Nominal Voltage VDC	Set Voltage VDC max.	Reset Voltage VDC max.	Coil Resistance $\Omega$	Nominal Power mW approx.	Max. Voltage VDC
HFD31/1.5-L2	1.5	1.13	1.13	11.3 x (1±10%)	200	2.25
HFD31/2.4-L2	2.4	1.8	1.8	29 x (1±10%)	200	3.6
HFD31/3-L2	3	2.25	2.25	45 x (1±10%)	200	4.5
HFD31/4.5-L2	4.5	3.38	3.38	101 x (1±10%)	200	6.7
HFD31/5-L2	5	3.75	3.75	125 x (1±10%)	200	7.5
HFD31/6-L2	6	4.5	4.5	180 x (1±10%)	200	9.0
HFD31/9-L2	9	6.75	6.75	405 x (1±10%)	200	13.5
HFD31/12-L2	12	9	9	720 x (1±10%)	200	18
HFD31/24-L2	24	18	18	1920 x (1±10%)	300	36

**Notes:** 1) When user's requirements can't be found in the above table, special order allowed.

2) In case 5V of transistor drive circuit, it is recommended to use 4.5V type relay, and 3V to use 2.4V type relay.

## ORDERING INFORMATION

	HFD31 /		24	-L1	4	S	R	(XXX)
<b>Type</b>								
<b>Coil voltage</b>	1.5, 2.4, 3, 4.5, 5, 6, 9, 12, 24VDC							
<b>Sort</b>	L1: 1 coil latching		L2: 2 coils latching					
	Nil: Single side stable							
<b>Contact material</b>	4: AgPd+Gold plated		Nil: AgNi+Gold plated					
<b>Terminal type</b>	S: Standard SMT		Nil: DIP					
<b>Packing style</b>	R: Tape and reel packing (Only for SMT type)							
	Nil: Tube packing(Only for DIP type)							
<b>Special code<sup>2)</sup></b>	XXX: Customer special requirement		Nil: Standard					

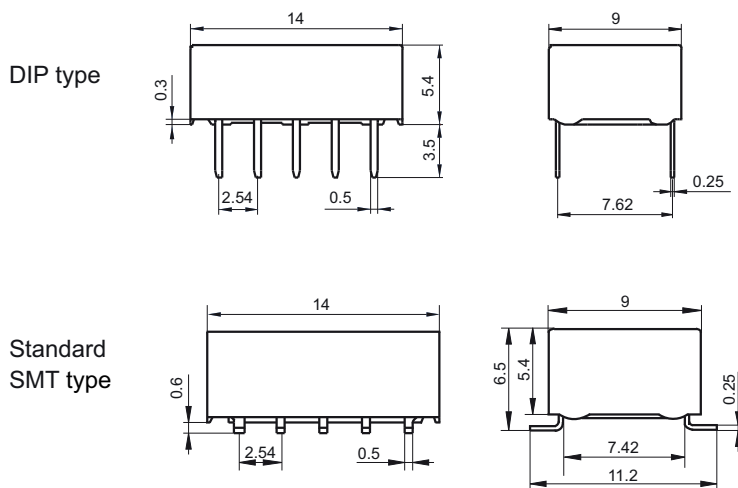
**Notes:** 1) R type (tape and reel) packing is moisture-proof which meets requirement of MSL-3. Please choose R type packing for SMT products. For R type, the letter "R" will only be printed on packing tag but not on relay cover. Tube packing is normally not available for SMT products unless specially requested by customer. But please note that tube packing is not moisture-proof so please bake the products before use according to description of Notice 11 herewith. In addition, tube packaging will be adopted when the ordering quantity of R type is equal to or less than 100 pieces unless otherwise specified.

2) The customer special requirement express as special code after evaluating by Hongfa.

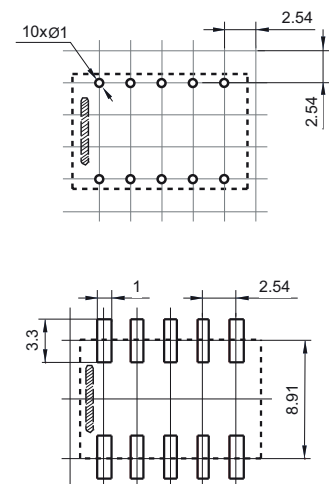
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

Outline Dimensions



PCB Layout  
(Bottom view)



Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.

2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.

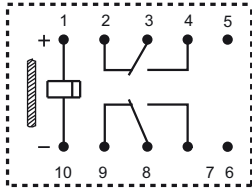
3) The width of the gridding is 2.54mm.

# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

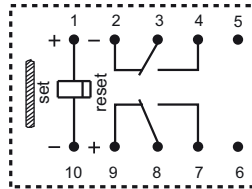
## Wiring Diagram (Bottom view)

Single side stable



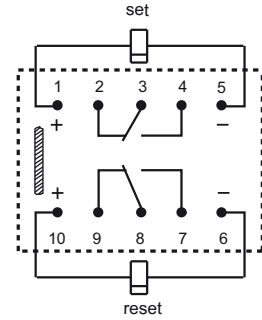
Deenergized condition

1 coil latching



Reset condition

2 coils latching

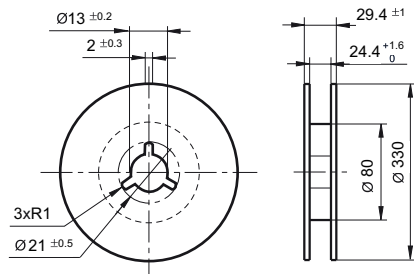


Reset condition

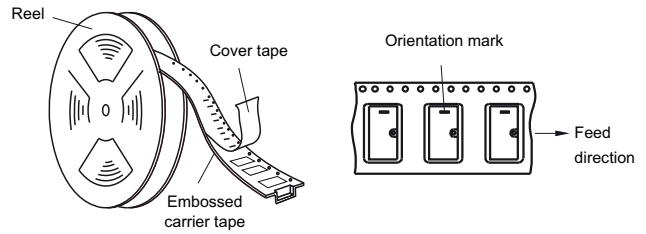
# TAPE & REEL PACKING CONSTRUCTION AND DIMENSION

Unit: mm

Reel Dimensions

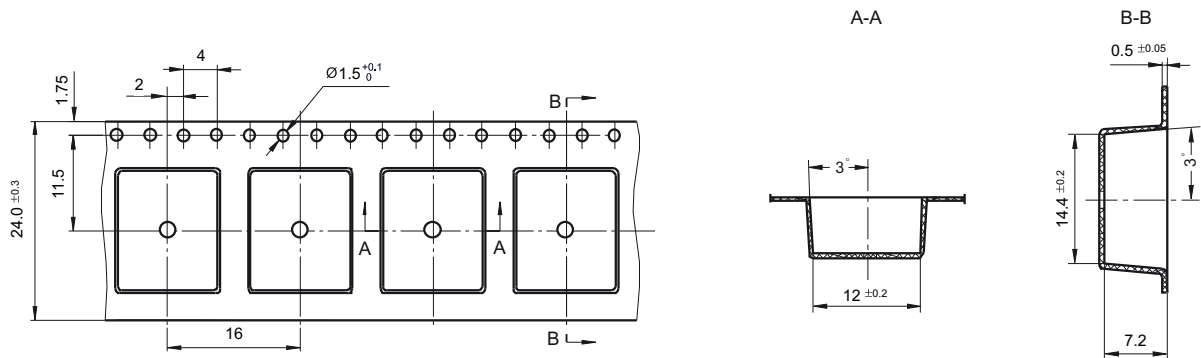


Direction of Relay Insertion



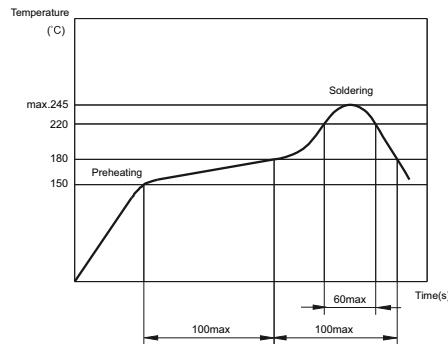
- Notes:** 1) Packing: 550pcs/reel, 4 reels/carton.  
2) MOQ for reel packing is 550pcs.

Tape Dimensions



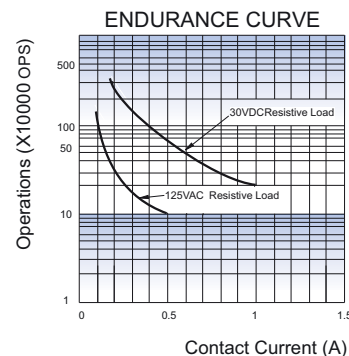
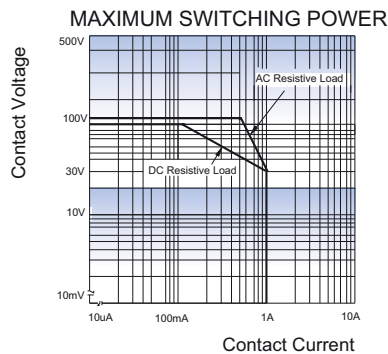
## RECOMMENDED SOLDERING CONDITIONS

Temperature/Time profile of Reflow Soldering see below:



- Notes:** 1) Temperature profile shows Printed Circuit Board surface temperature on the relay terminal portion.  
2) Please check the actual soldering condition to use other method except above mentioned temperature profiles.

## CHARACTERISTIC CURVES



**Test conditions:**  
Resistive load, at 40°C, 1s on 9s off.

### Notice

- 1) This relay is highly sensitive polarized relay, if correct polarity is not applied to the coil terminals, the relay does not operate properly.
- 2) To avoid using relays under strong magnetic field which will change the parameters of relays such as pick-up voltage and drop-out voltage.
- 3) Relay is on the "reset" status when being released from stock, with the consideration of shock risen from transit and relay mounting, it should be changed to the "set" status when application(connecting to the power supply). Please reset the relay to "set" or "reset" status on request.
- 4) 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. Regarding latching relay, in order to maintain the "set" or "reset" status, impulse width of the rated voltage applied to coil should be more than 5 times of "set" or "reset" time.
- 5) For 2 coil latching relay, do not energize voltage to "set" coil and "reset" coil simultaneously.
- 6) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 7) For SMT products, validation with real application should be done before your series production, if the reflow-soldering temperature curve is out of our recommendation. Generally, two-time reflow-soldering is not recommended for the relay. However, if two-time reflow-soldering is required, a 60-min. interval should be guaranteed and a validation should be done before production.
- 8) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 9) 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.
- 10) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidelines of relay".
- 11) Relays packaged in moisture barrier bags meet MSL-3 requirements. The relays should be stored at ambient conditions of  $\leq 30^{\circ}\text{C}$  and  $\leq 60\%$  RH after they are removed from their packaging, and should be used within 168 hours. If the relays cannot be used within 168 hours, please repack them or store them in a drying oven at  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ,  $\leq 10\%$  RH. Otherwise, relays may be subjected to a soldering test to check their performance, or they may be used after keeping them in an oven for 72 hours at with  $50^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ,  $\leq 30\%$  RH.

### 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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# HFD4

# SUBMINIATURE SIGNAL RELAY



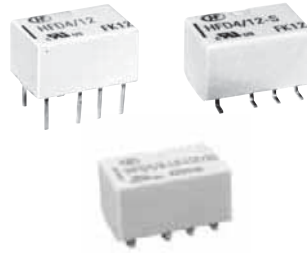
File No.:E133481



File No.:R50333270



File No.:CQC16002154335(Single side stable)  
CQC16002154336(Latching)



## Features

- Offers excellent board space savings
- Surge withstand voltage up to 2500V, meets FCC Part 68 and Telecordia
- Meets EN60950/EN41003
- SMT and DIP types available
- High contact capacity 2A 30VDC
- Low power consumption
- Single side stable and latching type available

## CONTACT DATA

Contact arrangement	2C
Contact resistance <sup>1)</sup>	100mΩ max. (at 10mA 30mVDC)
Contact material	AgPd + Au plated, AgNi + Au plated
Contact rating (Res. load)	1A 30VDC 0.3A 125VAC
Max. switching current	2A
Max. switching voltage	250VAC / 220VDC
Max. switching power	62.5VA / 60W
Min. applicable load <sup>2)</sup>	10mV 10μA
Mechanical endurance	1 x 10 <sup>8</sup> OPS
Electrical endurance <sup>3)</sup>	1 x 10 <sup>5</sup> OPS (AgNi + Au plated, 0.3A 125VAC, Resistive load, at 85°C, 1s on 9s off)

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

2) Min. applicable load is reference value. Please perform the confirmation test with the actual load before production since reference value may change according to switching frequencies, environmental conditions and expected contact resistance and reliability.

3) Electric endurance data are collected in the NO or NC contact test.

## COIL

Coil power	Single side stable	See "COIL DATA"
	1 coil latching	See "COIL DATA"
Temperature rise	50K max.(At 1A load, 85°C environment)	

## CHARACTERISTICS

Insulation resistance		1000MΩ (at 500VDC)
Dielectric strength	Between coil & contacts	1600VAC 1min
	Between open contacts	1000VAC 1min
	Between contact sets	1800VAC 1min
Surge withstand voltage		1500VAC (FCC part 68) 2500VAC (Telecordia)
Between open contacts (10/160μs)		
Between coil & contacts (2/10μs)		
Operate time (Set time)		3ms max.
Release time (Reset time)		3ms max.
Ambient temperature		-40°C to 85°C
Humidity		5% to 85% RH
Vibration resistance		10Hz to 55Hz 3.3mm DA
Shock resistance	Functional	735m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Termination		DIP, SMT
Unit weight		Approx. 0.8g
Moisture sensitivity levels (Only for SMT type, JEDEC-STD-020)		MSL 3
Construction		Plastic sealed

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

## SAFETY APPROVAL RATINGS

UL/CUL	AgPd + Au plated	0.5A 125VAC at 70°C 1A 30VDC at 85°C
	AgNi + Au plated	2A 30VDC at 40°C 0.3A 125VAC at 85°C 0.5A 125VAC at 40°C
TUV	AgPd + Au plated	0.5A 125VAC at 85°C
	AgNi + Au plated	1A 30VDC at 85°C 0.3A 125VAC at 85°C 0.5A 125VAC at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

## COIL DATA

at 23°C

### Single side stable

Coil Code	Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Coil Resistance Ω	Nominal Power mW approx.	Max. Voltage VDC
HFD4/1.5	1.5	1.13	0.15	16 x (1±10%)	140	2.2
HFD4/2.4	2.4	1.8	0.24	41 x (1±10%)	140	3.6
HFD4/3	3	2.25	0.3	64.3 x (1±10%)	140	4.5
HFD4/4.5	4.5	3.38	0.45	145 x (1±10%)	140	6.7
HFD4/5	5	3.75	0.5	178 x (1±10%)	140	7.5
HFD4/6	6	4.5	0.6	257 x (1±10%)	140	9.0
HFD4/9	9	6.75	0.9	579 x (1±10%)	140	13.5
HFD4/12	12	9	1.2	1028 x (1±10%)	140	18.0
HFD4/24	24	18	2.4	2880 x (1±10%)	200	36.0

### 1 coil latching

Coil Code	Nominal Voltage VDC	Set Voltage VDC max. <sup>1)</sup>	Reset Voltage VDC <sup>1)</sup> max.	Coil Resistance Ω	Nominal Power mW approx.	Max. Voltage VDC
HFD4/1.5-L	1.5	1.13	1.13	22.5 x (1±10%)	100	3.0
HFD4/2.4-L	2.4	1.8	1.8	58 x (1±10%)	100	4.8
HFD4/3-L	3	2.25	2.25	90 x (1±10%)	100	6.0
HFD4/4.5-L	4.5	3.38	3.38	203 x (1±10%)	100	9.0
HFD4/5-L	5	3.75	3.75	250 x (1±10%)	100	10.0
HFD4/6-L	6	4.5	4.5	360 x (1±10%)	100	12.0
HFD4/9-L	9	6.75	6.75	810 x (1±10%)	100	18.0
HFD4/12-L	12	9	9	1440 x (1±10%)	100	24.0
HFD4/24-L	24	18	18	2880 x (1±10%)	200	36.0

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

2)When user's requirements can't be found in the above table, special order allowed.

3)In case 5V of transistor drive circuit, it is recommended to use 4.5V type relay, and 3V to use 2.4V type relay.

## ORDERING INFORMATION

Type	HFD4 / 24 -L 4 S R (XXX)						
Coil voltage	1.5, 2.4, 3, 4.5, 5, 6, 9, 12, 24VDC						
Sort	L: 1 coil latching Nil: Single side stable						
Contact material	4: AgPd+Gold plated Nil: AgNi+Gold plated						
Terminal type	S: Standard SMT S1: Short terminal SMT S3: J-legs SMT Nil: DIP						
Packing style	R: Tape and reel packing (Only for SMT type) <sup>1)</sup> Nil: Tube packing(Only for DIP type)						
Special code <sup>3)</sup>	XXX: Customer special requirement Nil: Standard						

Notes: 1) R type (tape and reel) packing is moisture-proof which meets requirement of MSL-3. Please choose R type packing for SMT products. For R type, the letter "R" will only be printed on packing tag but not on relay cover. Tube packing is normally not available for SMT products unless specially requested by customer. But please note that tube packing is not moisture-proof so please bake the products before use according to description of Notice 10 herewith. In addition, tube packaging will be adopted when the ordering quantity of R type is equal to or less than 100 pieces unless otherwise specified.

2) When coil sort, contact material, terminal type or packing style are needed, please add "-" after coil voltage is selected. For instance, HFD4/24-4SR.

3) The customer special requirement express as special code after evaluating by Hongfa.

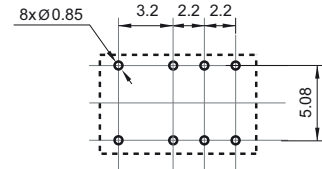
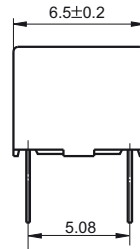
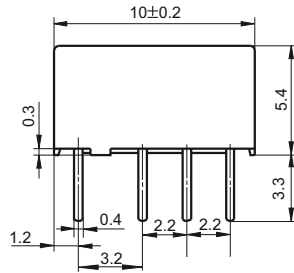
4) The standard tube length is 520mm.



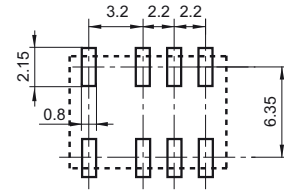
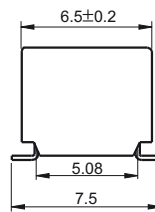
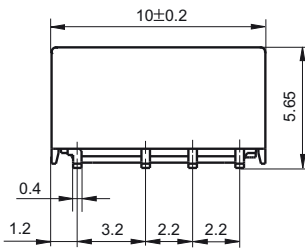
Outline Dimensions

PCB Layout  
(Bottom view)

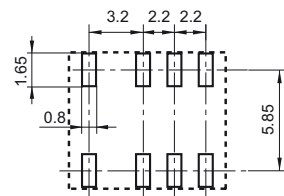
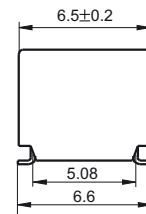
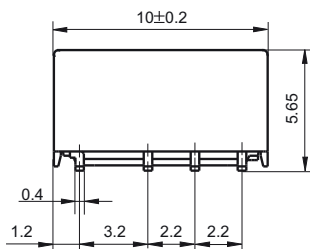
DIP type



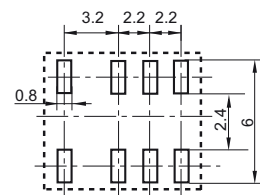
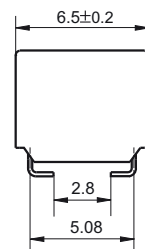
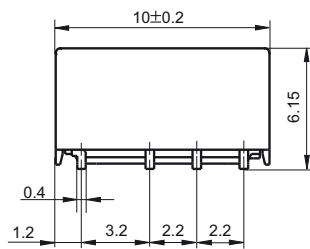
Standard SMT type



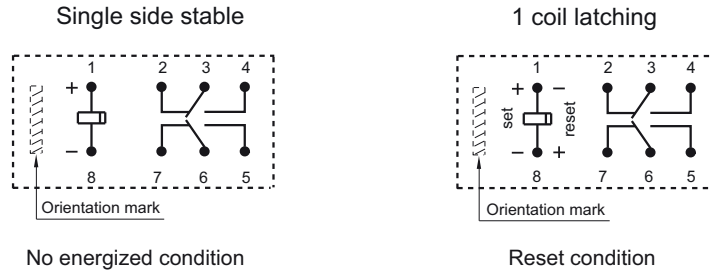
Short terminal SMT type



J-legs SMT type

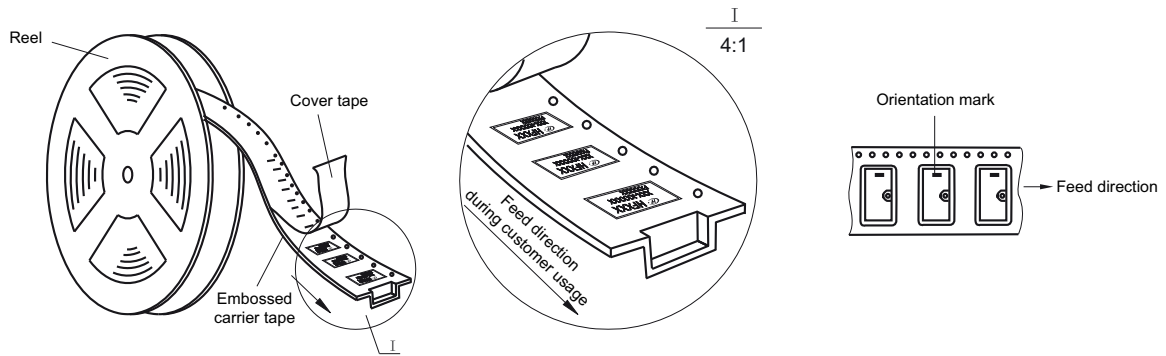


**Wiring Diagram**  
(Bottom view)

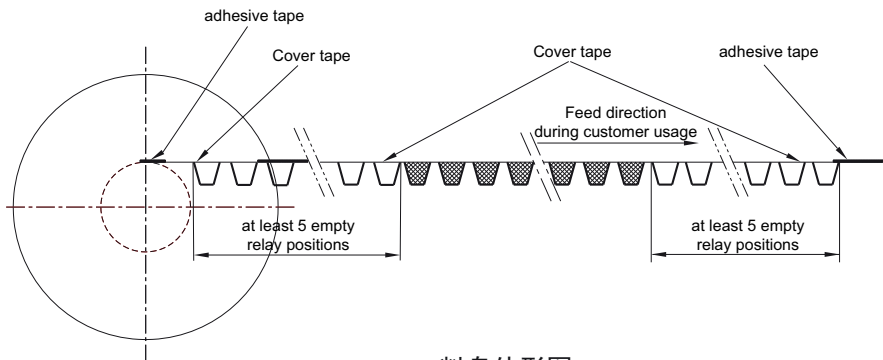


Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be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

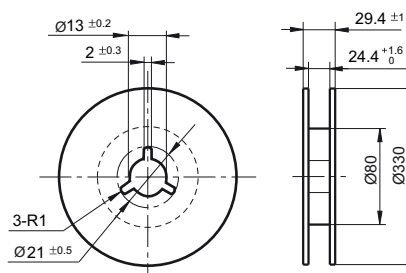
**Direction of Relay Insertion**



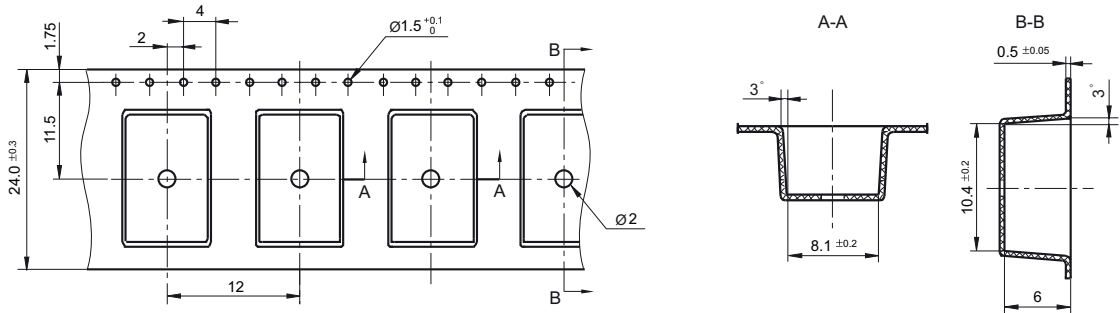
**Notes:** 1、S type/S1 type: 1) Packing: 900pcs/reel, 4 reels/carton.  
2) MOQ for reel packing is 900pcs  
2、S3 type: 1) Packing: 850pcs/reel, 4 reels/carton.  
2) MOQ for reel packing is 850pcs..



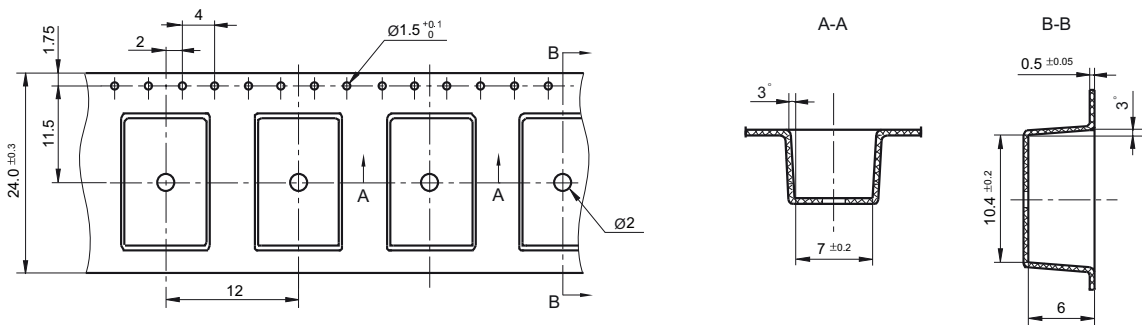
**料盘外形图**



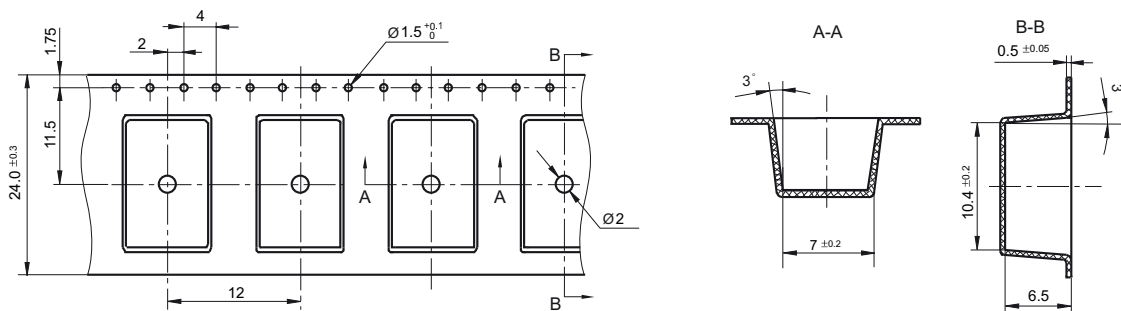
Tape Dimensions (S type: Standard SMT)



Tape Dimensions (S1 type: Short terminal SMT)



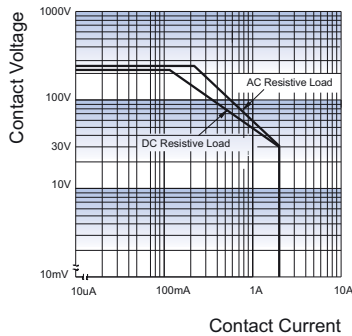
Tape Dimensions (S3 type: J-legs SMT)



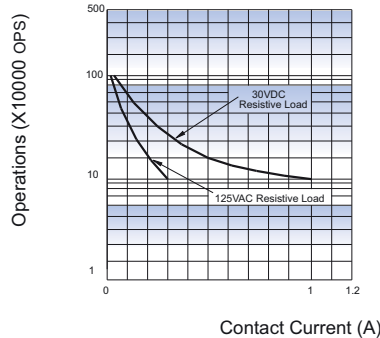
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.  
 3) The width of the gridding is 2.54mm.

## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER



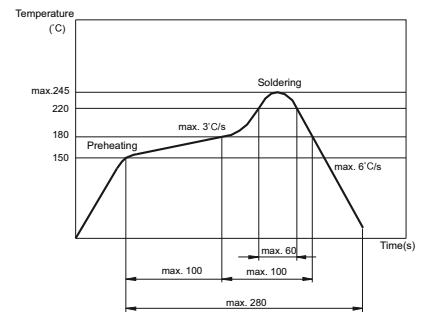
ENDURANCE CURVE



**Test conditions:**

Energized with rated voltage  
Resistive load, at 85°C, 1s on 9s off.

REFLOW WELDING, TEMPERATURE ON PCB BOARD  
RECOMMENDED WELDING TEMPERATURE



**Notice**

- 1) This relay is highly sensitive polarized relay, if correct polarity is not applied to the coil terminals, the relay does not operate properly.
- 2) To avoid using relays under strong magnetic field which will change the parameters of relays such as pick-up voltage and drop-out voltage.
- 3) Relay is on the "reset" status when being released from stock, with the consideration of shock risen from transit and relay mounting, it should be changed to the "set" status when application(connecting to the power supply). Please reset the relay to "set" or "reset" status on request.
- 4) 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. Regarding latching relay, in order to maintain the "set" or "reset" status, impulse width of the rated voltage applied to coil should be more than 5 times of "set" or "reset" time.
- 5) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 6) For SMT products, validation with real application should be done before your series production, if the reflow-soldering temperature curve is out of our recommendation. Generally, two-time reflow-soldering is not recommended for the relay. However, if two-time reflow-soldering is required, a 60-min. interval should be guaranteed and a validation should be done before production.
- 7) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 8) 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.
- 9) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidelines of relay".
- 10) Relays packaged in moisture barrier bags meet MSL-3 requirements. The relays should be stored at ambient conditions of  $\leq 30^{\circ}\text{C}$  and  $\leq 60\%$  RH after they are removed from their packaging, and should be used within 168 hours. If the relays cannot be used within 168 hours, please repack them or store them in a drying oven at  $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ,  $\leq 10\%$  RH. Otherwise, relays may be subjected to a soldering test to check their performance, or they may be used after keeping them in an oven for 72 hours at with  $50^{\circ}\text{C} \pm 5^{\circ}\text{C}$ ,  $\leq 30\%$  RH.

**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.

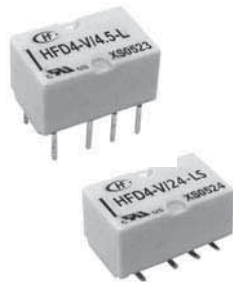
# HFD4-V SUBMINIATURE HIGH DIELECTRIC STRENGTH SIGNAL RELAY



File No.:E133481



File No.:40048125



## Features

- Subminiature high dielectric strength signal relay
- Surge withstand voltage up to 2500V
- Meets EN60950/EN41003
- gap between open contacts  $\geq 0.4\text{mm}$
- Low power consumption
- Single side stable and latching type available

## CONTACT DATA

Contact arrangement	2C
Contact resistance	100m $\Omega$ max. (at 10mA 30mVDC)
Contact material	AgNi + Au plated
Contact rating (Res. load)	1A 30VDC 0.3A 125VAC
Max. switching voltage	425VAC / 600VDC
Max. switching current	2A
Max. switching power	62.5VA / 60W
Min. applicable load <sup>1)</sup>	10mV 10 $\mu$ A
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance <sup>2)</sup>	1 x 10 <sup>5</sup> OPS(1A 30VDC) 1 x 10 <sup>5</sup> OPS(0.3A 125VAC) 1 x 10 <sup>5</sup> OPS(10mA 600VDC, 2 sets of NO contacts in series)

**Notes:** 1) Min. applicable load is reference value. Please perform the confirmation test with the actual load before production since reference value may change according to switching frequencies, environmental conditions and expected contact resistance and reliability.

2) Electric endurance data are collected in one pair of NO contacts test.

## COIL

Coil power	Single side stable	See "COIL DATA"
	1 coil latching	See "COIL DATA"
Temperature rise	70K max.(At 1A load, 85°C environment)	

## CHARACTERISTICS

Insulation resistance		1000M $\Omega$ (at 500VDC)
Dielectric strength	Between open contacts	1200VAC 1min
	Between coil & contacts	1600VAC 1min
	Between contact sets	1800VAC 1min
Surge withstand voltage		
Between open contacts (10/160 $\mu$ s)		1500V (FCC part 68)
Between coil & contacts (2/10 $\mu$ s)		2500V (Telecordia)
Operate time (Set time)		3ms max.
Release time (Reset time)		3ms max.
Ambient temperature		-40°C to 85°C
Humidity		5% to 85% RH
Shock resistance	Functional	735m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	Functional	10Hz to 55Hz 3.3mm DA
	Destructive	10Hz to 55Hz 5.0mm DA
Termination		DIP, SMT
Unit weight		Approx. 0.8g
Construction		Plastic sealed

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

2) UL insulation system: Class F

## SAFETY APPROVAL RATINGS

UL/CUL	AgNi + Au plated	1A 30VDC at 85°C 0.3A 125VAC at 85°C
VDE	AgNi + Au plated	1A 30VDC at 85°C 0.3A 125VAC at 85°C

**Notes:** 1) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## COIL DATA

at 23°C

### Single side stable

Coil Code	Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Coil Resistance $\Omega$	Nominal Power mW approx.	Max. Voltage VDC
HFD4-V/1.5	1.5	$\leq 1.2$	$\geq 0.15$	11.3 x (1 $\pm$ 10%)	200	2.2
HFD4-V/2.4	2.4	$\leq 1.92$	$\geq 0.24$	28.9 x (1 $\pm$ 10%)	200	3.6
HFD4-V/3	3	$\leq 2.4$	$\geq 0.3$	45 x (1 $\pm$ 10%)	200	4.5
HFD4-V/4.5	4.5	$\leq 3.6$	$\geq 0.45$	101.3 x (1 $\pm$ 10%)	200	6.7
HFD4-V/5	5	$\leq 4$	$\geq 0.5$	125 x (1 $\pm$ 10%)	200	7.5
HFD4-V/6	6	$\leq 4.8$	$\geq 0.6$	180 x (1 $\pm$ 10%)	200	9.0
HFD4-V/9	9	$\leq 7.2$	$\geq 0.9$	405 x (1 $\pm$ 10%)	200	13.5
HFD4-V/12	12	$\leq 9.6$	$\geq 1.2$	720 x (1 $\pm$ 10%)	200	18.0
HFD4-V/24	24	$\leq 19.2$	$\geq 2.4$	2880 x (1 $\pm$ 10%)	200	36.0

### 1 coil latching

Coil Code	Nominal Voltage VDC	Set Voltage VDC max.	Reset Voltage VDC max.	Coil Resistance $\Omega$	Nominal Power mW approx.	Max. Voltage VDC
HFD4/1.5-L	1.5	$\leq 1.2$	$\leq 1.2$	16 x (1 $\pm$ 10%)	140	3.0
HFD4/2.4-L	2.4	$\leq 1.92$	$\leq 1.92$	41.1x (1 $\pm$ 10%)	140	4.8
HFD4/3-L	3	$\leq 2.4$	$\leq 2.4$	64.3 x (1 $\pm$ 10%)	140	6.0
HFD4/4.5-L	4.5	$\leq 3.6$	$\leq 3.6$	145 x (1 $\pm$ 10%)	140	9.0
HFD4/5-L	5	$\leq 4$	$\leq 4$	178 x (1 $\pm$ 10%)	140	10.0
HFD4/6-L	6	$\leq 4.8$	$\leq 4.8$	257 x (1 $\pm$ 10%)	140	12.0
HFD4/9-L	9	$\leq 7.2$	$\leq 7.2$	579 x (1 $\pm$ 10%)	140	18.0
HFD4/12-L	12	$\leq 9.6$	$\leq 9.6$	1028 x (1 $\pm$ 10%)	140	24.0
HFD4/24-L	24	$\leq 19.2$	$\leq 19.2$	2880 x (1 $\pm$ 10%)	200	36.0

Notes: 1) Max voltage refers to the over voltage that the relay coil can withstand in a very short time.

2) When user's requirements can't be found in the above table, special order allowed.

3) In case 5V of transistor drive circuit, it is recommended to use 4.5V type relay, and 3V to use 2.4V type relay.

## ORDERING INFORMATION

Type	HFD4-V/	24	-L	S	R	(XXX)
Coil voltage	1.5, 2.4, 3, 4.5, 5, 6, 9, 12, 24VDC					
Sort	L: 1 coil latching		Nil: Single side stable			
Terminal type	S: Standard SMT		S1: Short terminal SMT		Nil: DIP	
Packing style	R: Tape and reel packing (Only for SMT type) <sup>(1)</sup> Nil: Tube packing(Only for DIP type)					
Special code						

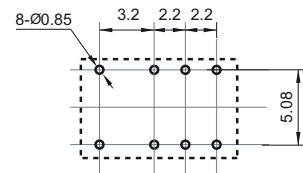
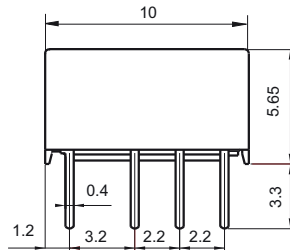
Notes: 1) R type (tape and reel) packing is moisture-proof which meets requirement of MSL-3. Please choose R type packing for SMT products. For R type, the letter "R" will only be printed on packing tag but not on relay cover. Tube packing is normally not available for SMT products unless specially requested by customer. But please note that tube packing is not moisture-proof so please bake the products before use according to description of Notice 12 herewith. In addition, tube packaging will be adopted when the ordering quantity of R type is equal to or less than 100 pieces unless otherwise specified.

2) The customer special requirement express as special code after evaluating by Hongfa.

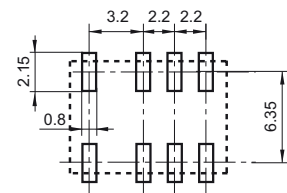
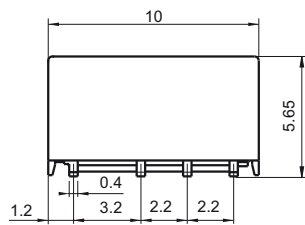
**Outline Dimensions**

**PCB Layout  
(Bottom view)**

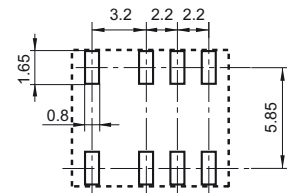
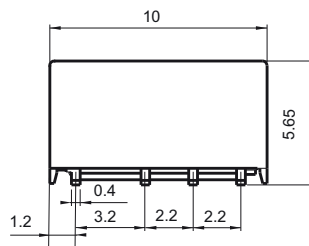
DIP type



Standard SMT type

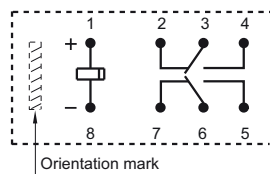


Short terminal SMT type



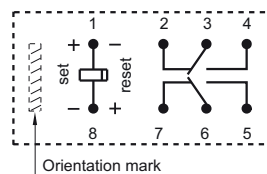
**Wiring Diagram  
(Bottom view)**

Single side stable



No energized condition

1 coil latching

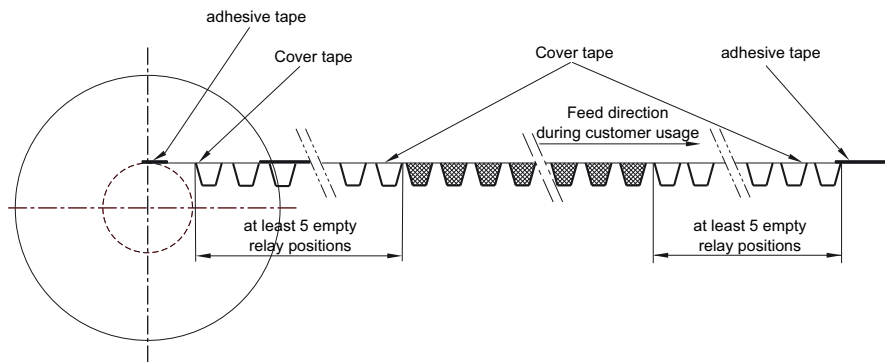
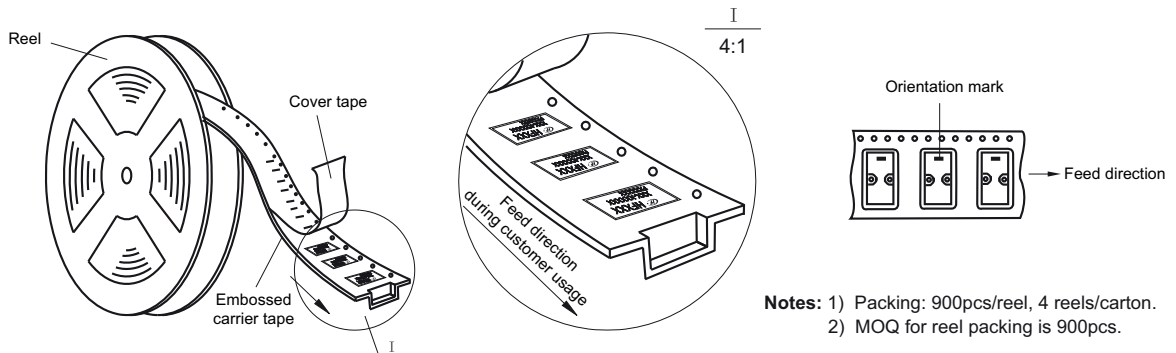


Reset condition

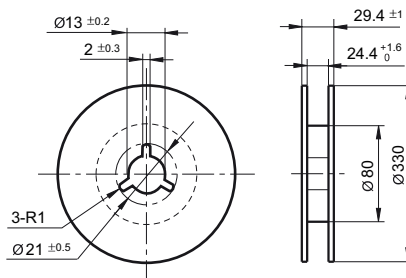
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be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



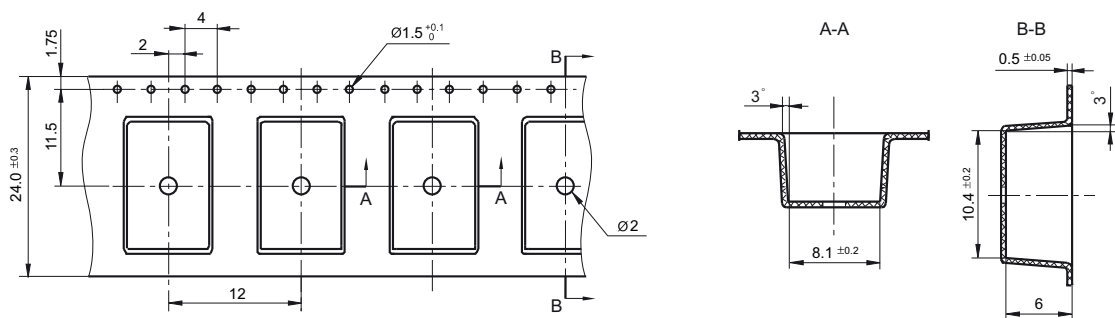
Direction of Relay Insertion



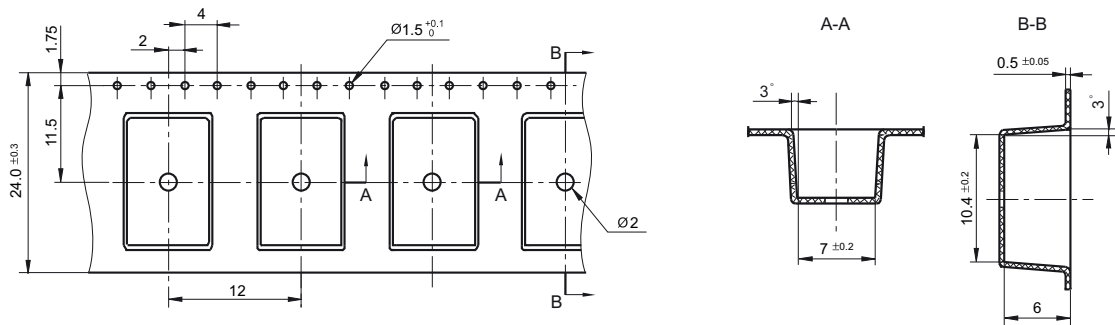
Reel Dimensions



Tape Dimensions (S type: Standard SMT)



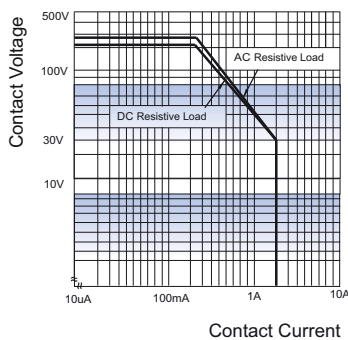
**Tape Dimensions (S1 type: Short terminal SMT)**



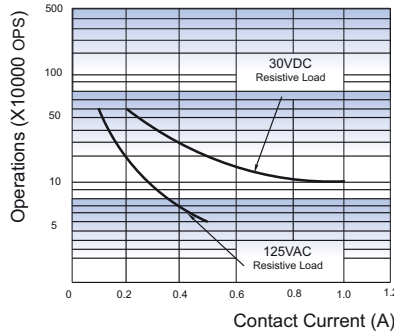
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension >1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension >5mm, tolerance should be ±0.4mm.  
 2) The tolerance without indicating for PCB layout is always ±0.1mm.  
 3) The width of the gridding is 2.54mm.

**CHARACTERISTIC CURVES**

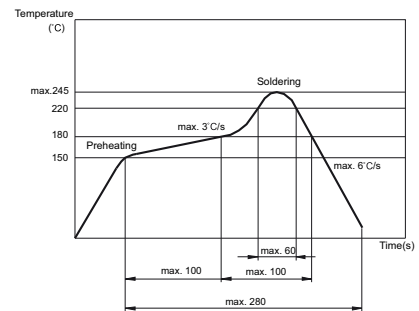
**MAXIMUM SWITCHING POWER**



**ENDURANCE CURVE**



**REFLOW WELDING, TEMPERATURE ON PCB BOARD  
RECOMMENDED WELDING TEMPERATURE**



**Test conditions:**  
Resistive load, at 85°C, 1s on 9s off.

**Notice**

- 1) This relay is highly sensitive polarized relay, if correct polarity is not applied to the coil terminals, the relay does not operate properly.
- 2) To avoid using relays under strong magnetic field which will change the parameters of relays such as pick-up voltage and drop-out voltage.
- 3) Relay is on the "reset" status when being released from stock, with the consideration of shock arisen from transit and relay mounting, it should be changed to the "set" status when application(connecting to the power supply). Please reset the relay to "set" or "reset" status on request.
- 4) 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. Regarding latching relay, in order to maintain the "set" or "reset" status, impulse width of the rated voltage applied to coil should be more than 5 times of "set" or "reset" time.
- 5) For mono-stable type, in case the holding volatage will be reduced after relay operates reliably, please ensure that the effective value of the holding voltage is over 60% of rated voltage.
- 6) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 7) For SMT products, validation with real application should be done before your series production, if the reflow-soldering temperature curve is out of our recommendation. Generally, two-time reflow-soldering is not recommended for the relay. However, if two-time reflow-soldering is required, a 60-min. interval should be guaranteed and a validation should be done before production.
- 8) For THT type, please adopt wave soldering or manual welding. If reflow soldering is needed, please contact us to further confirm the applicability.
- 9) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 10) 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 zgasoline, Freon, and so on, which would affect the configuration of relay or influence the environment.
- 11) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidetines of relay".
- 12) Relays packaged in moisture barrier bags meet MSL-3 requirements. The relays should be stored at ambient conditions of ≤30°C and ≤60% RH after they are removed from their packaging, and should be used within 168 hours. If the relays cannot be used within 168 hours, please repack them or store them in a drying oven at 25°C ±5°C, ≤10% RH. Otherwise, relays may be subjected to a soldering test to check their performance, or they may be used after keeping them in an oven for 72 hours at with 50°C ±5°C, ≤30% RH.

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# HFD42

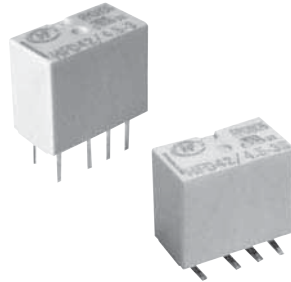
# SUBMINIATURE SIGNAL RELAY



File No.:E133481



File No.:R50317623



## Features

- Offers excellent board space savings
- Surge withstand voltage up to 2500V, meets FCC Part 68 and Telecordia
- Meets EN60950/EN41003
- SMT and DIP types available
- High contact capacity 1A 30VDC
- Low power consumption
- Single side stable and latching type available

## CONTACT DATA

Contact arrangement	2C
Contact resistance	100mΩ max. (at 10mA 30mVDC)
Contact material	AgNi + Au plated, AgPd + Au plated
Contact rating (Res. load)	1A 30VDC 0.5A 125VAC 2A 30VDC 1A 125VAC
Max. switching current	4A
Max. switching voltage	250VAC / 220VDC
Max. switching power	125VA / 120W
Min. applicable load	10mV 10μA
Mechanical endurance	1 x 10 <sup>8</sup> ops
Electrical endurance	1 x 10 <sup>5</sup> ops( 1A 30VDC, Resistive load, at 85°C, 1s on 9s off) 1 x 10 <sup>5</sup> ops( 0.5A 125VAC, Resistive load, at 85°C, 1s on 9s off)

## COIL

Coil power	Single side stable: 140mW, 230mW
	1 coil latching: 100mW, 120mW

## SAFETY APPROVAL RATINGS

UL/CUL	1A 30VDC 85°C
	0.5A 125VAC 85°C
	2A 30VDC 85°C
	1A 125VAC 85°C
TÜV	0.5A 125VAC 85°C
	1A 30VDC 85°C
	2A 30VDC 85°C
	1A 125VAC 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## CHARACTERISTICS

Insulation resistance		1000MΩ (at 500VDC)
Dielectric strength	Between coil & contacts	1500VAC 1min
	Between open contacts	1000VAC 1min
	Between contact sets	1800VAC 1min
Surge withstand voltage		
Between open contacts (10/160μs)		1500VAC (FCC part 68)
Between coil & contacts (2/10μs)		2500VAC (Telecordia)
Operate time (Set time)		3ms max.
Release time (Reset time)		3ms max.
Ambient temperature		-40°C to 85°C
Humidity		5% to 85% RH
Vibration resistance	Functional	10Hz to 55Hz 3.3mm DA
	Destructive	10Hz to 55Hz 5.0mm DA
Shock resistance	Functional	735m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Termination		DIP, SMT
Unit weight		Approx. 1.1g
Moisture sensitivity levels (Only for SMT type, JEDEC-STD-020)		MSL3
Construction		Plastic sealed

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



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## COIL DATA

at 23°C

### Single side stable

Coil Code	Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Coil Resistance Ω	Max. Voltage VDC
HFD42/1.5	1.5	1.13	0.15	16 x (1±10%)	2.2
HFD42/2.4	2.4	1.8	0.24	41 x (1±10%)	3.6
HFD42/3	3	2.25	0.3	64.3 x (1±10%)	4.5
HFD42/4.5	4.5	3.38	0.45	145 x (1±10%)	6.7
HFD42/5	5	3.75	0.5	178 x (1±10%)	7.5
HFD42/6	6	4.5	0.6	257 x (1±10%)	9.0
HFD42/9	9	6.75	0.9	579 x (1±10%)	13.5
HFD42/12	12	9	1.2	1028 x (1±10%)	18.0
HFD42/24	24	18	2.4	2504 x (1±10%)	36.0

Notes: 1) Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

### 1 coil latching

Coil Code	Nominal Voltage VDC	Set Voltage VDC max.	Reset Voltage VDC max.	Coil Resistance Ω	Max. Voltage VDC
HFD42/1.5-L	1.5	1.13	1.13	22.5 x (1±10%)	3.0
HFD42/2.4-L	2.4	1.8	1.8	58 x (1±10%)	4.8
HFD42/3-L	3	2.25	2.25	90 x (1±10%)	6.0
HFD42/4.5-L	4.5	3.38	3.38	203 x (1±10%)	9.0
HFD42/5-L	5	3.75	3.75	250 x (1±10%)	10.0
HFD42/6-L	6	4.5	4.5	360 x (1±10%)	12.0
HFD42/9-L	9	6.75	6.75	810 x (1±10%)	18.0
HFD42/12-L	12	9	9	1440 x (1±10%)	24.0
HFD42/24-L	24	18	18	2880 x (1±10%)	36.0

Notes: 1) When user's requirements can't be found in the above table, special order allowed.

2) In case 5V of transistor drive circuit, it is recommended to use 4.5V type relay, and 3V to use 2.4V type relay.

## ORDERING INFORMATION

	<b>HFD42 /</b>	<b>24</b>	<b>-L1</b>	<b>4</b>	<b>S</b>	<b>R</b>	<b>(XXX)</b>
<b>Type</b>							
<b>Coil voltage</b>	1.5, 2.4, 3, 4.5, 6, 9, 12, 24VDC						
<b>Sort</b>	L1: 1 coil latching		Nil: Single side stable				
<b>Contact material</b>	3: AgNi+Gold plated		4: AgPd+Gold plated				
<b>Terminal type</b>	S: Standard SMT		S1: Short terminal SMT		Nil: DIP		
<b>Packing style</b>	R: Tape and reel packing (Only for SMT type) <sup>1)</sup>						
	Nil: Tube packing (Only for DIP type)						
<b>Special code<sup>2)</sup></b>	XXX: Customer special requirement			Nil: Standard			

Notes: 1) R type (tape and reel) packing is moisture-proof which meets requirement of MSL-3. Please choose R type packing for SMT products. For R type, the letter "R" will only be printed on packing tag but not on relay cover. Tube packing is normally not available for SMT products unless specially requested by customer. But please note that tube packing is not moisture-proof so please bake the products before use according to description of Notice 10 herewith. In addition, tube packaging will be adopted when the ordering quantity of R type is equal to or less than 100 pieces unless otherwise specified.

2) The customer special requirement express as special code after evaluating by Hongfa.

# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

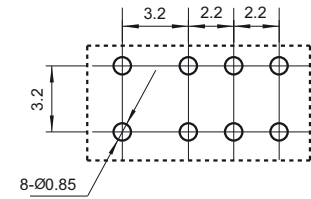
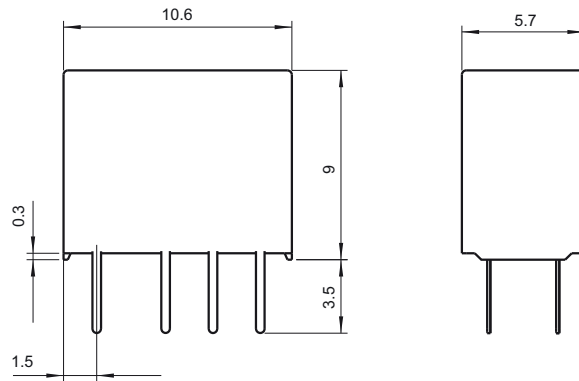
Unit: mm

## Outline Dimensions

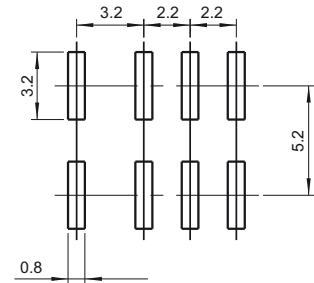
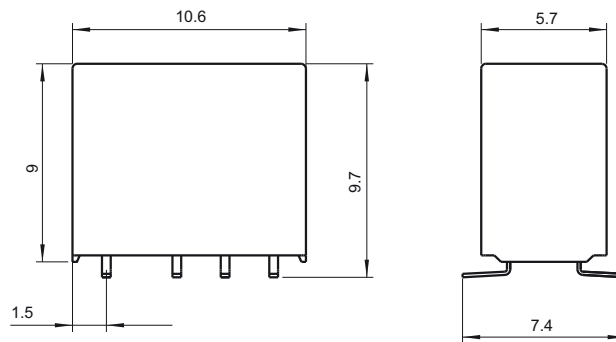
## PCB Layout

(Bottom view)

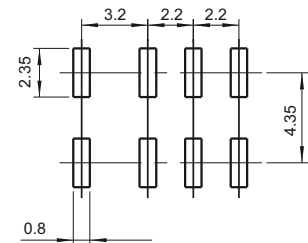
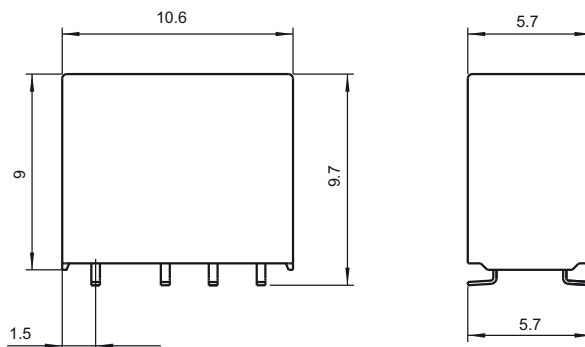
DIP type



Standard SMT type



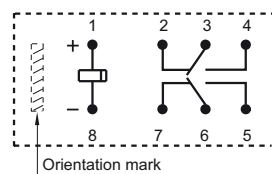
Short terminal SMT type



## Wiring Diagram

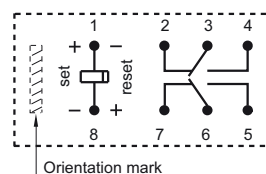
(Bottom view)

Single side stable



No energized condition

1 coil latching



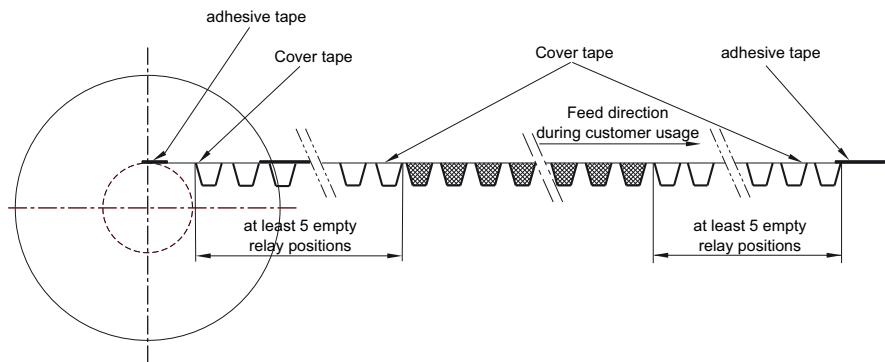
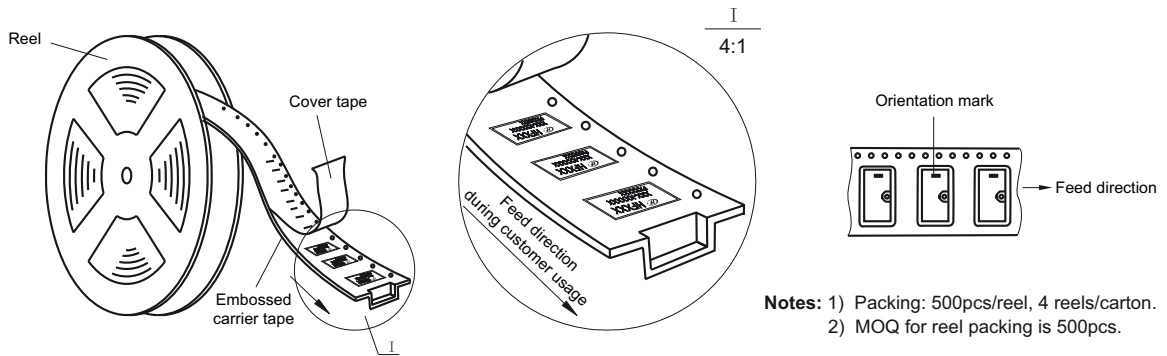
Reset condition

Remark: 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  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .

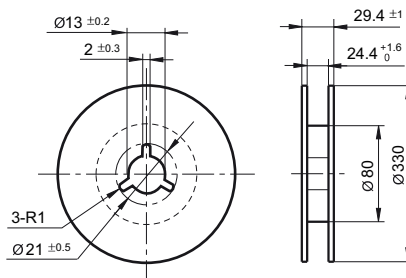
2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .

3) The width of the gridding is 2.5mm.

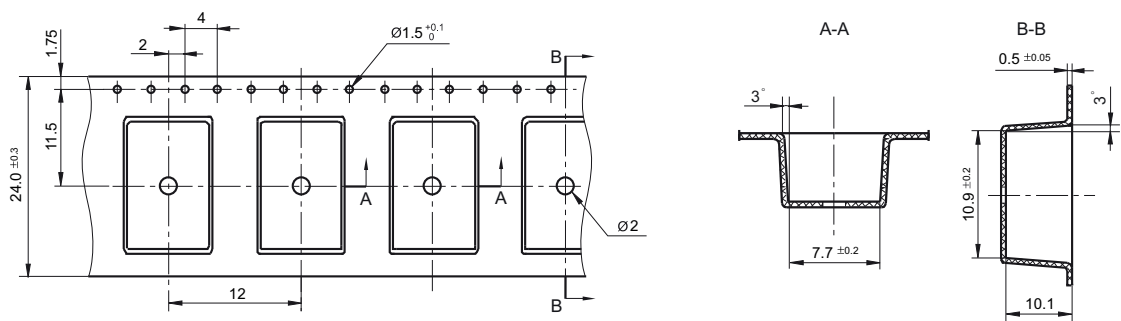
**Direction of Relay Insertion**



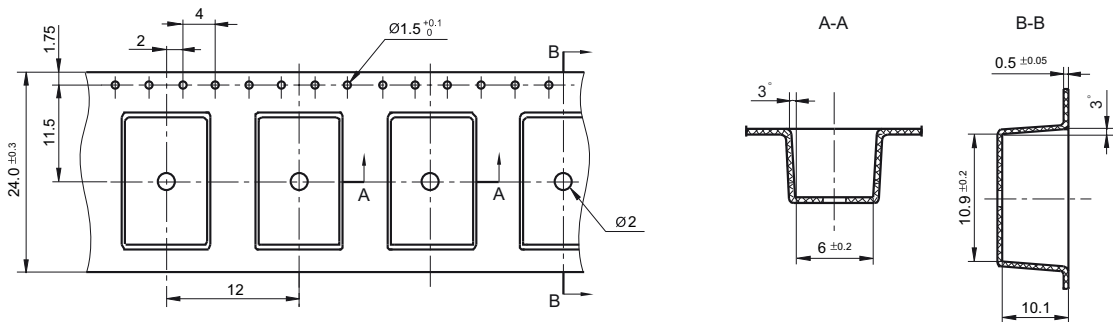
**Reel Dimensions**



**Tape Dimensions (S type: Standard SMT)**



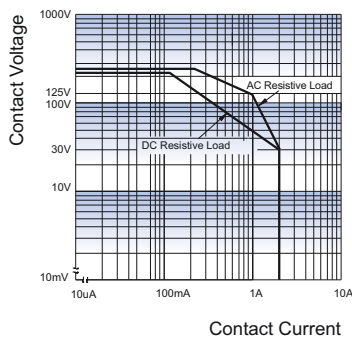
**Tape Dimensions (S1 type: Short terminal SMT)**



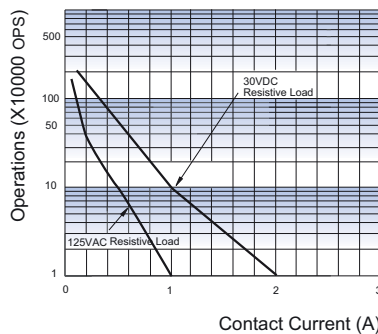
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .  
 3) The width of the gridding is 2.54mm.

**CHARACTERISTIC CURVES**

**MAXIMUM SWITCHING POWER**



**ENDURANCE CURVE**

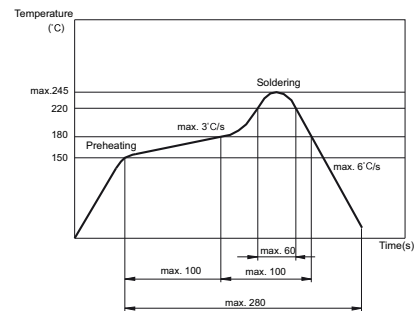


**Test conditions:**

Resistive load, at 40°C, 1s on 9s off.

**REFLOW WELDING, TEMPERATURE ON PCB BOARD**

**RECOMMENDED WELDING TEMPERATURE**



**Notice**

- 1) This relay is highly sensitive polarized relay, if correct polarity is not applied to the coil terminals, the relay does not operate properly.
- 2) To avoid using relays under strong magnetic field which will change the parameters of relays such as pick-up voltage and drop-out voltage.
- 3) Relay is on the "reset" status when being released from stock, with the consideration of shock arisen from transit and relay mounting, it should be changed to the "set" status when application(connecting to the power supply). Please reset the relay to "set" or "reset" status on request.
- 4) 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. Regarding latching relay, in order to maintain the "set" or "reset" status, impulse width of the rated voltage applied to coil should be more than 5 times of "set" or "reset" time.
- 5) The relay may be damaged because of falling or when shocking conditions exceed the requirement.
- 6) For SMT products, validation with real application should be done before your series production, if the reflow-soldering temperature curve is out of our recommendation. Generally, two-time reflow-soldering is not recommended for the relay. However, if two-time reflow-soldering is required, a 60-min. interval should be guaranteed and a validation should be done before production.
- 7) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 8) 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.
- 9) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidelines of relay".
- 10) Relays packaged in moisture barrier bags meet MSL-3 requirements. The relays should be stored at ambient conditions of  $\leq 30^\circ\text{C}$  and  $\leq 60\%$  RH after they are removed from their packaging, and should be used within 168 hours. If the relays cannot be used within 168 hours, please repack them or store them in a drying oven at  $25^\circ\text{C} \pm 5^\circ\text{C}$ ,  $\leq 10\%$  RH. Otherwise, relays may be subjected to a soldering test to check their performance, or they may be used after keeping them in an oven for 72 hours at with  $50^\circ\text{C} \pm 5^\circ\text{C}$ ,  $\leq 30\%$  RH.

**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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# 2

## Power Relay

HF49FD	102	HF115F-T/TH	220
HF41F	105	HF115F-H	223
HF46F	109	HF115F-I	226
HF46FB	112	HF115F-Q	229
HF46F-G	114	HF115F-S	232
HF42F	117	HF115F-L 1 pole	234
HF32FA	120	HF115F-L 2 pole	237
HF32FA-T	123	HF115F-LS	240
HF32FA-G	126	HF115FP	243
HF32FV	129	HF115FK	246
HF32FV-16	132	HF115FK-T	250
HF32FV-T	134	HF158F	253
HF32FV-G	137	HF158F-V 1 pole	256
HF32F	140	HF175F	259
HF32F-G	143	HF14FF	262
HF171F	145	HF14FW	265
HF33F	148	HF140FF	268
HF36F	152	HF25F	272
HF36FD	155	HF62F	276
HF162F	157	HF102F	279
HF8	159	HF161F	282
HF3FA	162	HF161F-W	285
HF3FA-W	165	HF160F	288
HF3FA-T	168	HF166F	291
HF3FD	171	HF37F	294
HF3FF	174	HF165FD	297
HF3F-L	177	HF165FD-G	301
HF3FF-M	180	HF165F	304
HF7FF	183	HF170F	307
HF7FD	186	HF105F-1	309
HF21FF	189	HF105F-2	315
HF152F	192	HF105F-4	319
HF152FD	195	HF105F-5	323
HF7520	198	HF2100	327
HF163F-L	203	HF2110/HF2120	331
HFE7	206	HF2150/HF2151	337
HF118F	210	HF2160	341
HF115F	213	HF172F-100	345
HF115F-A	217	HF172F-140	347

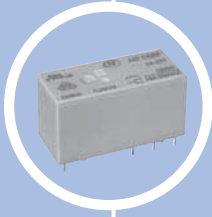




# 2

## Power Relay

HF116F-1	349
HF116F-2	353
HF116F-3	357
HF116F-G	361
HF116F-80	365
HF176F	367
HF167F	369
HF92F	371
HF78F	375
HF84F	378
HF94F	380
HF8565	383



# HF49FD

# MINIATURE POWER RELAY



File No. : E133481



File No. : 40033644



File No. : R50149334



File No.:CQC17002175722



## Features

- 5A switching capability
- 3kV dielectric strength (between coil and contacts)
- Slim size (width 5mm, height 12.5mm)
- High sensitive: Min. 120mW
- Meets IEC61131-2 reinforce insulation
- Creepage/clearance distance: Min. 3.5mm
- Sockets available

## CONTACT DATA

Contact arrangement	1A
Contact Resistance <sup>1)</sup> (at 1A 6VDC)	No gold plated: 100mΩ max. Gold plated: 50mΩ max.
Contact material	AgSnO <sub>2</sub> , AgNi
Contact rating (Res. load)	5A 250VAC/30VDC
Max. switching voltage	250VAC /30VDC
Max. switching current	5A
Max. switching power	1250VA / 150W
Min. contact load <sup>1)</sup>	No gold plated: 5VDC 10mA Gold plated: 5VDC 1mA
Mechanical endurance	2 x 10 <sup>7</sup> ops
Electrical endurance	1 x 10 <sup>5</sup> ops (3A 250VAC/30VDC, Resistive load, AgNi, at 85°C, 1s on 9s off) 5 x 10 <sup>4</sup> ops (5A 250VAC/30VDC, Resistive load, AgNi, Room temp., 1s on 9s off)

**Notes:** 1) Min. contact load is reference value. Please perform the confirmation test with the actual load before usage since reference value may change according to switching frequencies, environmental conditions and expected life cycles.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	3000VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage(between coil & contacts) <sup>4)</sup>	6kV (1.2 / 50μs)	
Operate time (at rated.volt.)	10ms max.	
Release time (at rated.volt.)	5ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5%RH to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 3g	
Construction	Plastic sealed	

**Notes:** 1) The data shown above are initial values.  
2) Please find coil temperature curve in the characteristic curves below.  
3) UL insulation system: Class F, Class B, Class A.  
4) Contact refers to the mov.-contact.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

## COIL

Coil power	Approx. 120mW (at 5VDC to 18VDC) Approx. 180mW (at 24VDC)
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## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>2)</sup>	Drop-out Voltage VDC min. <sup>2)</sup>	Max. Voltage VDC <sup>3)</sup>	Coil Resistance Ω
5	3.50	0.25	6.0	208 x (±10%)
6	4.20	0.30	7.2	300 x (±10%)
9	6.30	0.45	10.8	675 x (±10%)
12	8.40	0.60	14.4	1200 x (±10%)
18	12.6	0.90	21.6	2700 x (±15%)
24	16.8	1.20	28.8	3200 x (±15%)

**Notes:** 1) All above data are tested when the relays terminals are downward position. Other positions of the terminals, the pick-up and drop-out voltages will have ±5% tolerance. For example, when the relay terminals are transverse position, the max. pick-up voltage change is 75% of nominal voltage.  
2) The data shown above are initial values.

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

4) 24VDC 120mW type are also available, please see ordering information for more details.

## SAFETY APPROVAL RATINGS

UL/CUL	1H1 type	AgSnO <sub>2</sub>	3A 250VAC COSØ=1 at 85°C 3A 30VDC L/R =0ms at 85°C
		AgNi	5A 250VAC COSØ=1 5A 30VDC L/R =0ms
VDE	1H2 type	AgNi	3A 250VAC COSØ=1 at 85°C 3A 30VDC L/R =0ms at 85°C
			5A 250VAC COSØ=1 5A 30VDC L/R =0ms
TÜV			5A 250VAC COSØ=1 at 85°C 5A 30VDC L/R =0ms at 85°C
			5A 250VAC COSØ=1 at 70°C 5A 30VDC L/R =0ms at 70°C

**Notes:** 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

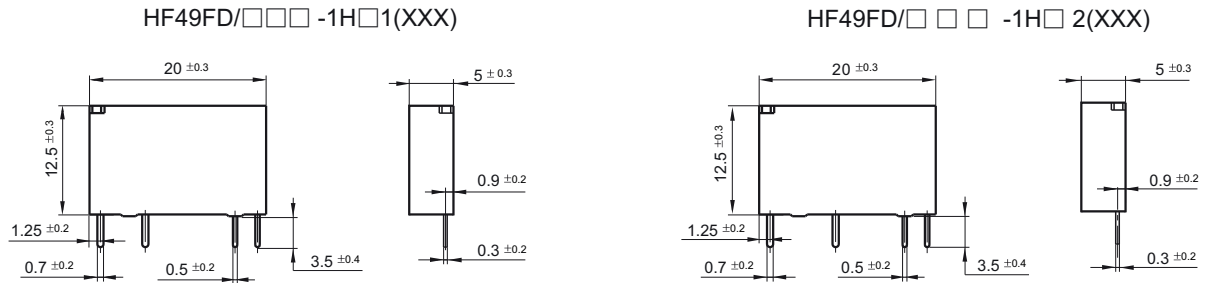
## ORDERING INFORMATION

<b>Type</b>		HF49FD / 012 -1H 1 2 G T F L (XXX)	
<b>Coil voltage</b>		5, 6, 9, 12, 18, 24VDC	
<b>Contact arrangement</b>		1H: 1 Form A	
<b>Contact version</b>		1: Single contact 2: Bifurcated contact(Only for gold plated)	
<b>Space between terminals</b> (See the following)		1: 5.08mm 2: 7.62mm	
<b>Contact plating</b>		G: Gold plated Nil: No gold plated (Only for single contact)	
<b>Contact material</b>		T: AgSnO <sub>2</sub> (Only for single contact) Nil: AgNi	
<b>Insulation standard</b>		F: Class F B: Class B Nil: Class A	
<b>Coil power</b>		L: Sensitive (Only for 24VDC) Nil: Standard	
<b>Special code<sup>2)</sup></b>		XXX: Customer special requirement Nil: Standard	

- Notes:** 1) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.  
 2) The customer special requirement express as special code after evaluating by Hongfa.  
 3) If customer need to fix HF49FD in 49F socket (HF49FD+49F socket) in application, please choose HF49FD relay with suffix (009) or suffix (086).

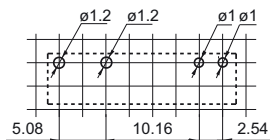
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

### Outline Dimensions

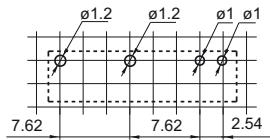


### PCB Layout (Bottom view)

HF49FD/□□□-1H□1(XXX)



HF49FD/□□□-1H□2(XXX)

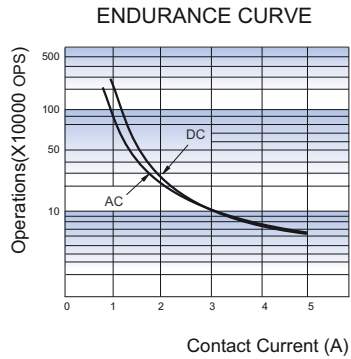
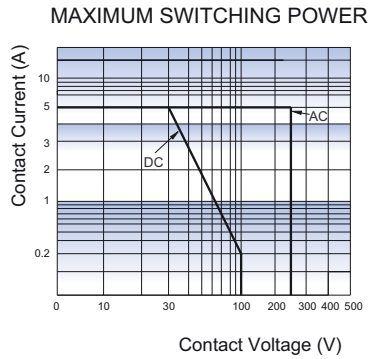


### Wiring Diagram (Bottom view)

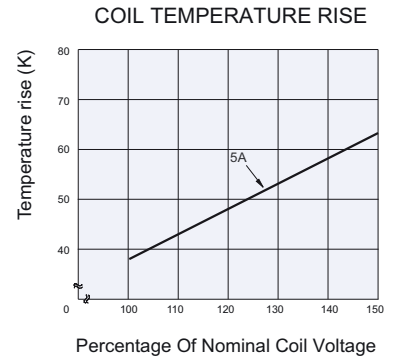


- Remark:** 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.  
 3) The width of the gridding is 2.54mm.

## CHARACTERISTIC CURVES



**Test conditions:**  
 1H1 type: AgNi, Resistive load, 250VAC/30VDC,  
 Room temp., 1s on 9s off.



**Test conditions:**  
 5A 85°C  
 (Typical curve of 24VDC standard type)

### 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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# HF41F

# SUBMINIATURE POWER RELAY



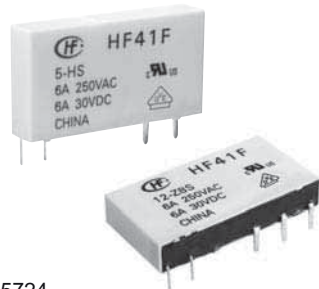
File No.: E133481



File No.: 40020043



File No.: CQC17002175724



## Features

- Slim size (width 5mm)
- 6A switching capability 4kV dielectric strength (between coil and contacts)
- Surge voltage up to 6kV (between coil and contacts)
- Meeting VDE 0700, 0631 reinforce insulation
- High sensitive: Approx.170mW
- Sockets available
- 1 Form A and 1 Form C configurations

## CONTACT DATA

Contact arrangement	1A, 1C
Contact resistance <sup>1)</sup>	No gold plated:100mΩ max. (at 1A 6VDC) Gold plated: 30mΩ max. (at 1A 6VDC)
Contact material	AgSnO <sub>2</sub> , AgNi
Contact rating (Res. load)	6A 250VAC / 30VDC
Max. switching voltage	400VAC / 125VDC
Max. switching current	6A
Max. switching power	1500VA / 180W
Mechanical endurance	1 x 10 <sup>7</sup> ops
Electrical endurance	H type: 6 x 10 <sup>4</sup> ops (6A 250VAC/30VDC, Resistive load, AgNi, at 85°C, 1s on 9s off) Z type: 3 x 10 <sup>4</sup> ops (NO, 6A 250VAC/30VDC, Resistive load, AgNi, at 85°C, 1s on 9s off) 1 x 10 <sup>4</sup> ops (NC, 6A 250VAC/30VDC, Resistive load, AgNi, at 85°C, 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1 min
	Between open contacts	1000VAC 1 min
Operate time (at rated.volt.)	8ms max.	
Release time (at rated.volt.)	4ms max.	
Shock resistance* <sup>1)</sup>	Functional	49m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance* <sup>1)</sup>	10Hz to 55Hz 1mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 5g	
Construction	Plastic sealed, Flux proofed	

Notes: 1) \*Index is that of relay without socket and is not in relay length direction.

- 2) The data shown above are initial values.
- 3) Please find coil temperature curve in the characteristic curves below.
- 4) Please do not install a SPDT(1 Form C) type relay on either of the smallest sides or facing downward.
- 5) UL insulation system: Class A.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

## COIL

Coil power	5VDC to 24VDC: Approx. 170mW 48VDC, 60VDC: Approx. 210mW
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## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>2)</sup>	Drop-out Voltage VDC min. <sup>2)</sup>	Max. Voltage VDC <sup>3)</sup>	Coil Resistance Ω
5	3.75	0.25	7.5	147 x (1±10%)
6	4.50	0.30	9.0	212 x (1±10%)
9	6.75	0.45	13.5	476 x (1±10%)
12	9.00	0.60	18	848 x (1±10%)
18	13.5	0.90	27	1906 x (1±15%)
24	18.0	1.20	36	3390 x (1±15%)
48 <sup>4)</sup>	36.0	2.40	72	10600 x (1±15%)
60 <sup>4)</sup>	45.0	3.00	90	16600 x (1±15%)

Notes: 1) When require pick-up voltage ≤ 70% nominal voltage, special order allowed .

2) The data shown above are initial values.

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

4) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).

## SAFETY APPROVAL RATINGS

UL/CUL	6A 30VDC at 85°C
	6A 277VAC at 85°C
	R300 B300
VDE	6A 30VDC at 85°C 6A 250VAC at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

Type	HF41F / 12 -H 8 S T G (XXX)					
Coil voltage	5, 6, 9, 12, 18, 24, 48, 60VDC					
Contact arrangement	H: 1 Form A		Z: 1 Form C			
Version <sup>1)</sup>	8: Flat pack version		Nil: Vertical version			
Construction <sup>2)3)</sup>	S: Plastic sealed		Nil: Flux proofed			
Contact material	T: AgSnO <sub>2</sub>		Nil: AgNi			
Contact plating <sup>4)</sup>	G: Gold plated		Nil: No gold plated			
Special code <sup>5)</sup>	XXX: Customer special requirement		Nil: Standard			

**Notes:** 1) We recommend flux proofed types for the flat pack version.

2) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

3) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

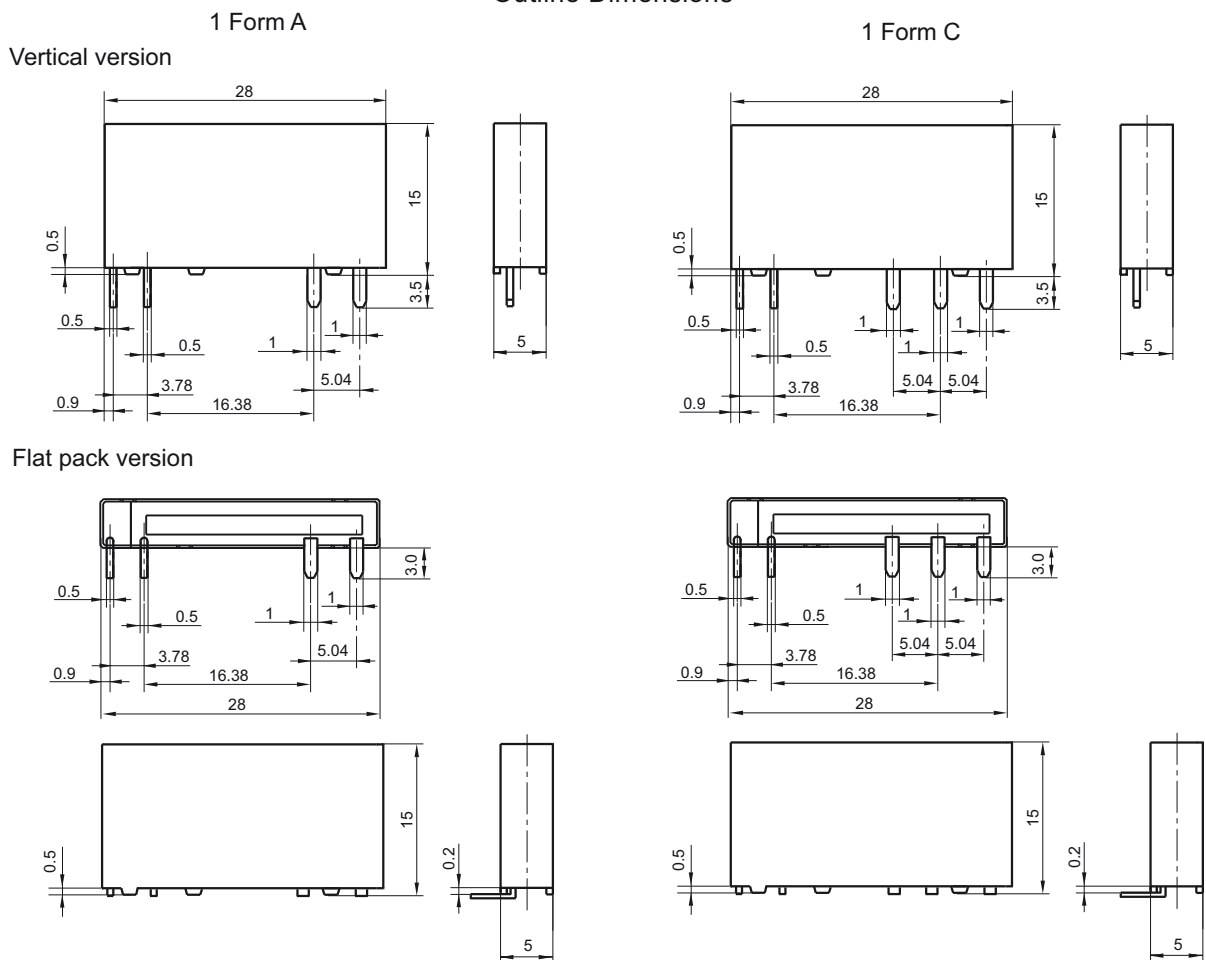
4) For gold plated type, the min. switching current and min. switching voltage is 10mA 5VDC.

5) The customer special requirement express as special code after evaluating by Hongfa. e.g. (210) stands for pick-up voltage less than 70% of nominal voltage. e.g. (414) stands for wide coil pin type.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

### Outline Dimensions

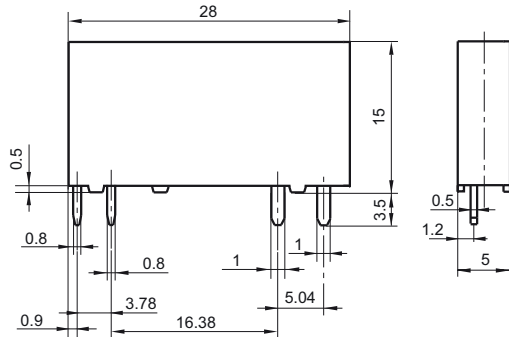


# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

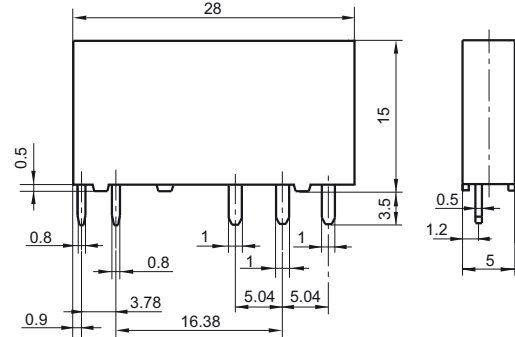
Unit: mm

## Outline Dimensions

1 Form A  
Special code: (414)



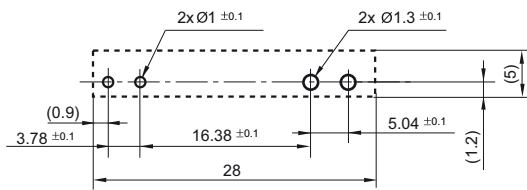
1 Form C



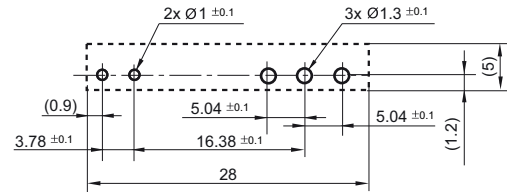
## PCB Layout (Bottom view)

1 Form A

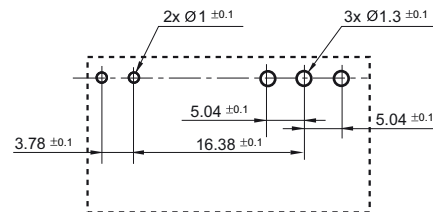
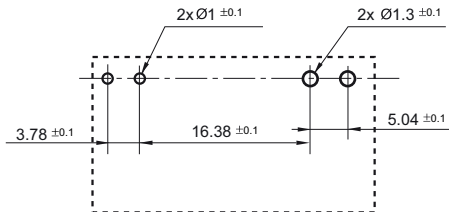
Vertical version



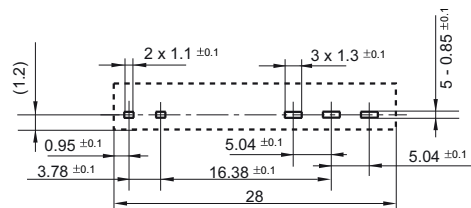
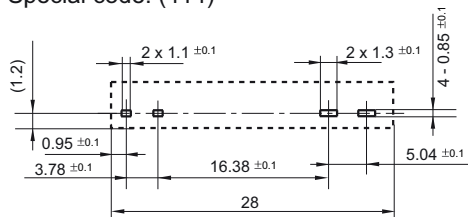
1 Form C



Flat pack version

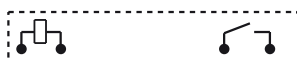


Special code: (414)



## Wiring Diagram (Bottom view)

1 Form A



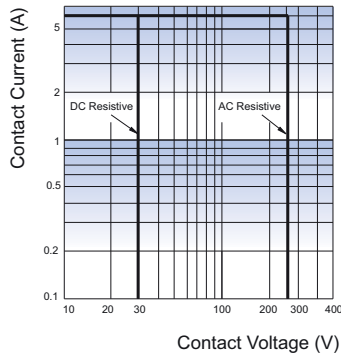
1 Form C



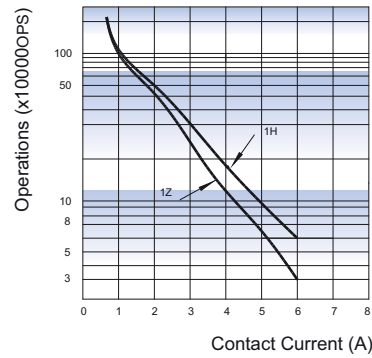
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
2) The tolerance without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

## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER

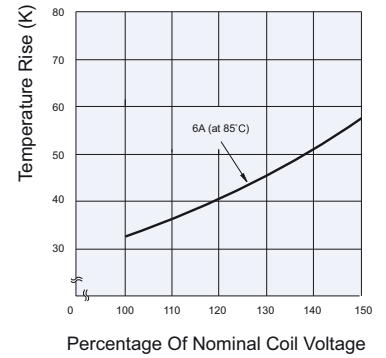


ENDURANCE CURVE



**Test conditions:**  
NO, AgNi, Resistive load, 250VAC,  
Flux proofed, Room temp., 1s on 9s off.

COIL TEMPERATURE RISE



**Test conditions:**  
6A 85°C  
(Typical curve of 24VDC standard type)

### Disclaimer

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# HF46F

# SUBMINIATURE INTERMEDIATE POWER RELAY



File No.: E134517



File No.: 40025215



File No.: CQC17002168380



## Features

- 5A switching capability
- 10kV impulse withstand voltage (between coil and contacts)
- Meets VDE 0631 reinforce insulation
- Highly efficient magnetic circuit for high sensitivity: 200mW
- Extremely small footprint utilizing PCB area

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max. (at 1A 6VDC)
Contact material	AgSnO <sub>2</sub> , AgNi
Contact rating (Res. load)	3A 250VAC/30VDC 5A 250VAC/30VDC
Max. switching voltage	277VAC / 30VDC
Max. switching current	5A
Max. switching power	1385VA / 150W
Mechanical endurance	5 x 10 <sup>6</sup> OPS
Electrical endurance	1 x 10 <sup>5</sup> OPS (5A 250VAC, Resistive load, AgNi, at 85°C, 1s on 1s off) 5 x 10 <sup>4</sup> OPS (5A 250VAC, Resistive load, AgSnO <sub>2</sub> , at 85°C, 3s on 3s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage (between coil & movable contacts)	10kV (1.2 / 50μs)	
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	10ms max.	
Shock resistance <sup>1)</sup>	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance <sup>1)</sup>	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 3g	
Construction	Plastic sealed	

- Notes: 1) Shock malfunction: 49m/s<sup>2</sup> for the length direction.  
Vibration: 10Hz to 55Hz 1mm DA for the length direction.  
2) The data shown above are initial values.  
3) UL insulation system: Class F, Class B.

## COIL

Coil power	Approx. 200mW
------------	---------------

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC * <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.18	3.90	45 x (1±10%)
5	3.75	0.25	6.50	125 x (1±10%)
6	4.50	0.30	7.80	180 x (1±10%)
9	6.75	0.45	11.7	405 x (1±10%)
12	9.00	0.60	15.6	720 x (1±10%)
18	13.5	0.90	23.4	1620 x (1±10%)
24	18.0	1.20	31.2	2880 x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	AgNi	5A 125VAC/250VAC at 85°C 5A 277VAC/30VDC at 85°C 3A 125VAC/250VAC at 85°C 3A 277VAC/30VDC at 85°C
	AgSnO <sub>2</sub>	5A 125VAC/250VAC at 85°C 5A 277VAC/30VDC at 85°C 3A 125VAC/250VAC at 85°C 3A 277VAC/30VDC at 85°C B300 R300
VDE	AgNi	5A 250VAC/30VDC at 85°C
	AgSnO <sub>2</sub>	5A 250VAC/30VDC at 85°C

- Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

Type	HF46F / 12 -H S 1 T G F (XXX)					
Coil voltage	3, 5, 6, 9, 12, 18, 24VDC					
Contact arrangement	H: 1 Form A					
Construction <sup>1)2)</sup>	S: Plastic sealed					
Termination	1: type 1					
Contact material <sup>3)</sup>	T: AgSnO <sub>2</sub>		Nil: AgNi			
Contact plating	G: Gold plated		Nil: No gold plated			
Insulation standard	F: Class F		Nil: Class B			
Special code <sup>5)</sup>	XXX: Customer special requirement			Nil: Standard		

**Notes:** 1) We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).

2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

3) For the loads which can bring high inrush current when relay contacts connect instantly (eg. lamp, capacitive load), AgSnO<sub>2</sub> contact material is recommended on priority.

4) For gold plated type, the min. switching current and min. switching voltage is 10mA 5VDC.

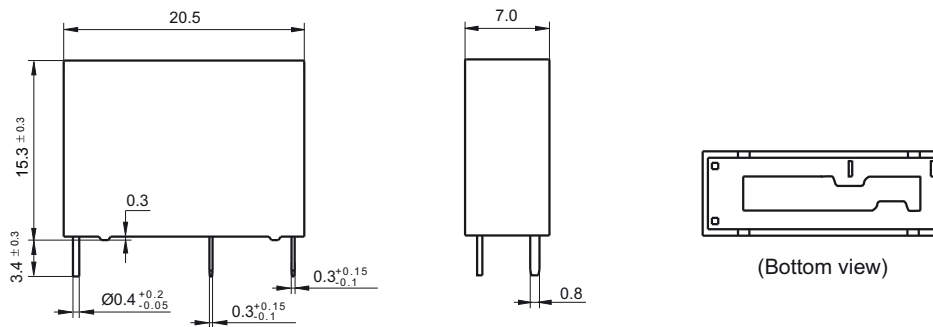
5) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

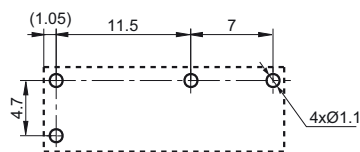
Unit: mm

### Outline Dimensions

HF46F/□□-HS1□□ (XXX)



PCB Layout  
(Bottom view)



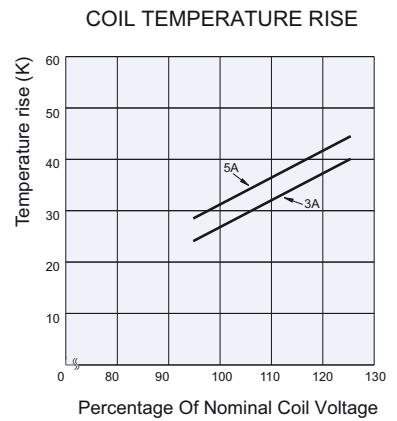
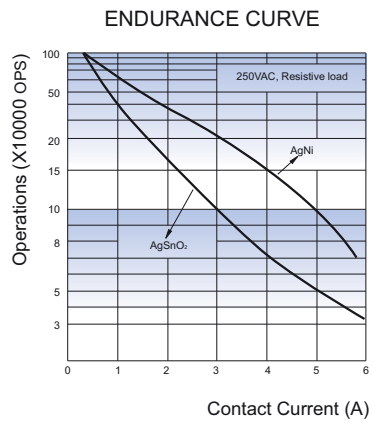
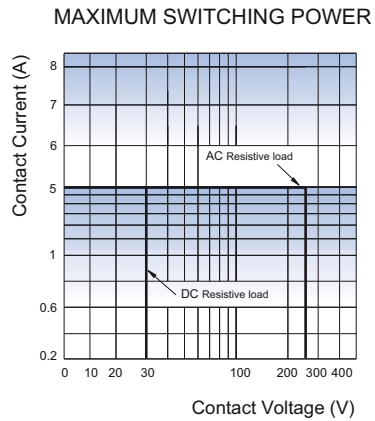
Wiring Diagram  
(Bottom view)



Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.

2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.

## CHARACTERISTIC CURVES



**Test conditions:**  
 AgNi, at 85°C, 1s on 1s off,  
 AgSnO<sub>2</sub>, at 85°C, 3s on 3s off

### Disclaimer

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# HF46FB

# SUBMINIATURE INTERMEDIATE POWER RELAY



File No.: E134517



File No.: 40049080



File No.: CQC17002177913



### Features

- 5A switching capability
- 8kV impulse withstand voltage (between coil and contacts)
- Meets reinforce insulation
- width 7mm, Suitable for PCB intensive installation
- UL insulation system: Class F

### CONTACT DATA

Contact arrangement	1C
Contact resistance <sup>1)</sup>	100mΩ max. (at 1A 6VDC)
Contact material	AgNi
Contact rating (Res. load)	5A 250VAC
Max. switching voltage	250VAC
Max. switching current	5A
Max. switching power	1250VA
Mechanical endurance	5 x 10 <sup>6</sup> OPS
Electrical endurance	5 x 10 <sup>4</sup> OPS (CO:5A 250VAC, Resistive load, at 85°C, 3s on 3s off)

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

### CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage (between coil & movable contacts)	8kV (1.2 / 50μs)	
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	10ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 4.5g	
Construction	Plastic sealed	

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

### COIL

Coil power	Approx. 360mW
------------	---------------

### COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.18	3.9	25 x (1±10%)
5	3.75	0.25	6.5	69 x (1±10%)
6	4.50	0.30	7.8	100 x (1±10%)
9	6.75	0.45	11.7	225 x (1±10%)
12	9.00	0.60	15.6	400 x (1±10%)
18	13.5	0.90	23.4	900 x (1±10%)
24	18.0	1.20	31.2	1600 x (1±10%)

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

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

### SAFETY APPROVAL RATINGS

UL/CUL	5A 250VAC 85°C
VDE	

Notes: 1) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

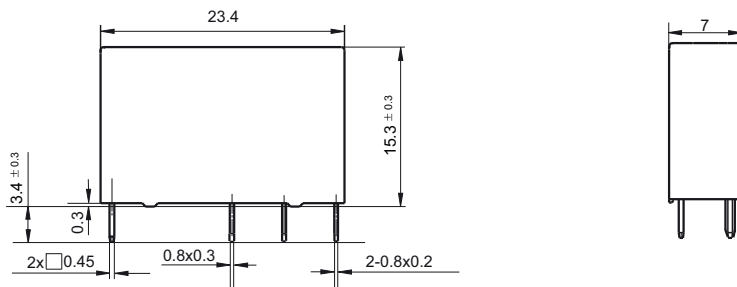
Type	HF46FB /	12	-Z	S	3	(XXX)
Coil voltage	3, 5, 6, 9, 12, 18, 24VDC					
Contact arrangement	Z: 1 Form C					
Construction	S: Plastic sealed					
Contact material	3: AgNi					
Special code	XXX: Customer special requirement			Nil: Standard		

**Notes:** 1) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).  
2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

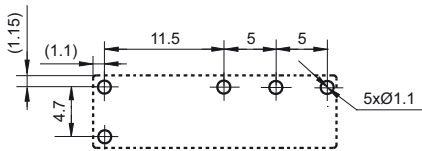
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

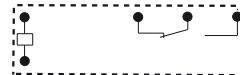
### Outline Dimensions



### PCB Layout (Bottom view)



### Wiring Diagram (Bottom view)



Remark: 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  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .  
2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .

### Disclaimer

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# HF46F-G

## SUBMINIATURE INTERMEDIATE POWER RELAY



File No.: E134517



File No.: 40025215



File No.: CQC17002168380



### Features

- 10A switching capability
- 10kV impulse withstand voltage (between coil and contacts)
- Meets VDE 0631 reinforce insulation
- Highly efficient magnetic circuit for high sensitivity: 200mW
- Extremely small footprint utilizing PCB area

### CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub> , AgNi
Contact rating (Res. load)	7A 250VAC / 30VDC
Max. switching voltage	277VAC / 30VDC
Max. switching current	10A
Max. switching power	2770VA / 300W
Mechanical endurance	5 x 10 <sup>6</sup> OPS
Electrical endurance	5 x 10 <sup>4</sup> OPS (7A 250VAC, Resistive load, AgNi, at 105°C, 3s on 3s off) 6 x 10 <sup>4</sup> OPS (7A 250VAC, Resistive load, AgSnO <sub>2</sub> , at 85°C, 3s on 3s off) 1 x 10 <sup>4</sup> OPS (10A 250VAC, Resistive load, AgNi, at 85°C, 1s on 9s off) 1 x 10 <sup>4</sup> OPS (10A 250VAC, Resistive load, AgSnO <sub>2</sub> , at 85°C, 1s on 9s off)

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

### CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage (between coil & movable contacts)	10kV (1.2 / 50μs)	
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	10ms max.	
Shock resistance <sup>1)</sup>	Functional	98m/s <sup>2</sup>
	Destructive	980m/s
Vibration resistance <sup>1)</sup>	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 3g	
Construction	Plastic sealed	

- Notes: 1) Shock malfunction: 49m/s<sup>2</sup> for the length direction.  
Vibration: 10Hz to 55Hz 1mm DA for the length direction.  
2) The data shown above are initial values.  
3) UL insulation system: Class F, Class B.

### COIL

Coil power	Approx. 200mW
------------	---------------

### COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC * <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.18	3.90	45 x (1±10%)
5	3.75	0.25	6.50	125 x (1±10%)
6	4.50	0.30	7.80	180 x (1±10%)
9	6.75	0.45	11.7	405 x (1±10%)
12	9.00	0.60	15.6	720 x (1±10%)
18	13.5	0.90	23.4	1620 x (1±10%)
24	18.0	1.20	31.2	2880 x (1±10%)

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

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

### SAFETY APPROVAL RATINGS

UL/CUL	AgNi	10A 125VAC/250VAC at 85°C 10A 277VAC/30VDC at 85°C 7A 125VAC/250VAC at 105°C 7A 277VAC/30VDC at 105°C
	AgSnO <sub>2</sub>	10A 125VAC/250VAC at 85°C 10A 277VAC/30VDC at 85°C 7A 125VAC/250VAC at 85°C 7A 277VAC/30VDC at 85°C TV-3
VDE	AgNi	7A 250VAC/30VDC at 105°C 10A 250VAC/30VDC at 85°C
	AgSnO <sub>2</sub>	7A 250VAC/30VDC at 85°C 10A 250VAC/30VDC at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

HF46F-G / 12 -H S 1 T G F (XXX)	
Type	
Coil voltage	3, 5, 6, 9, 12, 18, 24VDC
Contact arrangement	H: 1 Form A
Construction <sup>1)2)</sup>	S: Plastic sealed
Termination	1: type 1
Contact material <sup>3)</sup>	T: AgSnO <sub>2</sub> Nil: AgNi
Contact plating	G: Gold plated      Nil: No gold plated
Insulation standard	F: Class F      Nil: Class B
Special code <sup>5)</sup>	XXX: Customer special requirement      Nil: Standard

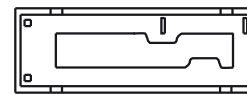
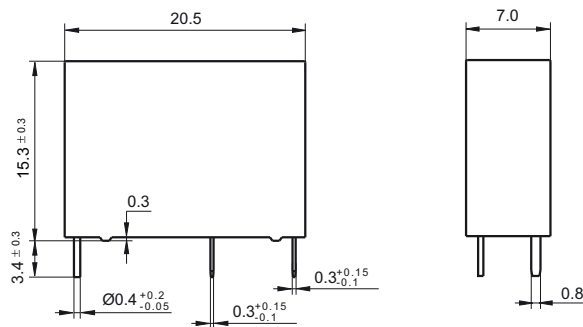
- Notes:** 1) We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).  
 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.  
 3) For the loads which can bring high inrush current when relay contacts connect instantly (eg. lamp, capacitive load), AgSnO<sub>2</sub> contact material is recommended on priority.  
 4) For gold plated type, the min. switching current and min. switching voltage is 10mA 5VDC.  
 5) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

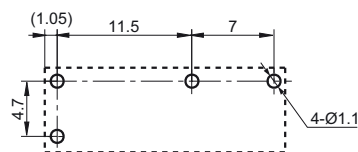
### Outline Dimensions

HF46F-G/□□-HS1□□ (XXX)

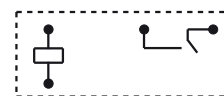


(Bottom view)

### PCB Layout (Bottom view)

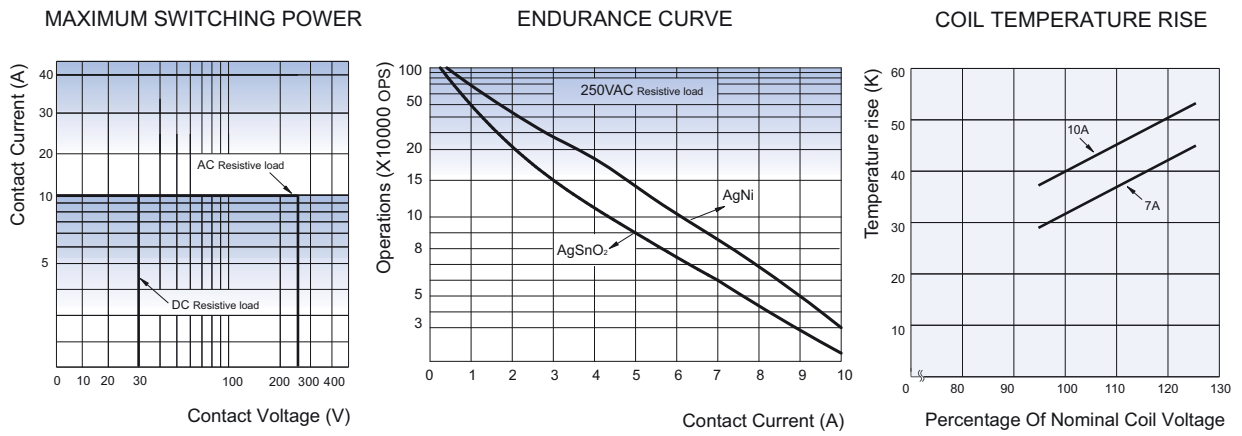


### Wiring Diagram (Bottom view)



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

## CHARACTERISTIC CURVES



**Test conditions:** at 85°C, 3s on 3s off

### 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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# HF42F

## SUBMINIATURE INTERMEDIATE POWER RELAY



File No.:E133481



File No.:R50356443



File No.:CQC09002034521  
CQC16002159853



### Features

- 5A switching capability
- TV-3 125VAC approved by UL standard
- 2 Form A slim configuration

### CONTACT DATA

Contact arrangement	2A
Contact resistance <sup>1)</sup>	100mΩ max. (at 1A 6VDC)
Contact material	AgSnO <sub>2</sub> , AgCdO
Contact rating (Res. load)	5A 250VAC/30VDC
Max. switching voltage	250VAC / 30VDC
Max. switching current	5A
Max. switching power	1250VA / 150W
Mechanical endurance	1 x 10 <sup>6</sup> ops
Electrical endurance	2H: 5 x 10 <sup>4</sup> ops (5A 250VAC, Resistive load, Room temp., 1.5s on 1.5s off)

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

### CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1000VAC 1min
	Between contact sets	2000VAC 1min
Operate time (at rated. volt.)	15ms max.	
Release time (at rated. volt.)	10ms max.	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 70°C	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Termination	PCB	
Unit weight	Approx. 14.5g	
Construction	Plastic sealed	

- Notes: 1) The data shown above are initial values.  
2) Please find coil temperature curve in the characteristic curves below.  
3) UL insulation system: Class A  
4) For sealed type, the vent-hole cover should be excised.

### COIL

Coil power	Approx. 530mW
------------	---------------

### COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.75	0.25	6.5	47 x (1±10%)
6	4.50	0.30	7.8	68 x (1±10%)
9	6.75	0.45	11.7	155 x (1±10%)
12	9.00	0.60	15.6	270 x (1±10%)
18	13.5	0.90	23.4	620 x (1±10%)
24	18.0	1.20	31.2	1080 x (1±10%)
48	36.0	2.40	62.4	4400 x (1±10%)

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

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

### SAFETY APPROVAL RATINGS

UL/CUL	5A 250VAC 5A 30VDC TV-3 125VAC
TÜV	5A 250VAC 5A 30VDC

- Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

Type	HF42F / 012 -2H S T (XXX)
Coil voltage	5, 6, 9, 12, 18, 24, 48VDC
Contact arrangement	2H: 2 Form A
Construction <sup>1)</sup>	S: Plastic sealed
Contact material	T: AgSnO <sub>2</sub> Nil: AgCdO
Special code <sup>2)</sup>	XXX: Customer special requirement Nil: Standard

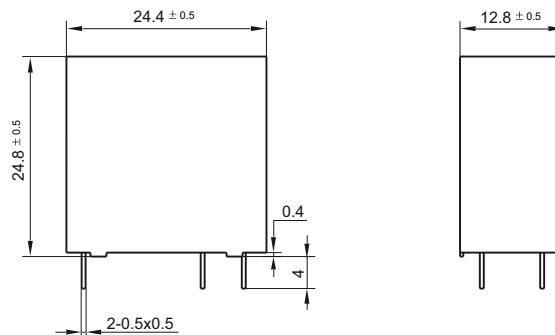
**Notes:** 1) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

2) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

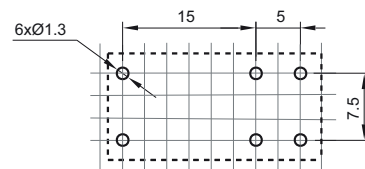
### Outline Dimensions



Wiring Diagram  
(Bottom view)



PCB Layout  
(Bottom view)



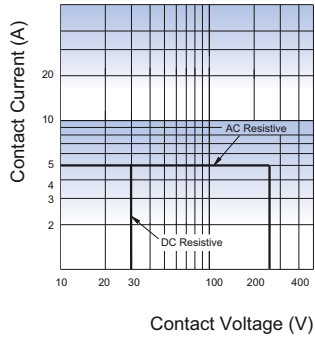
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .

2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .

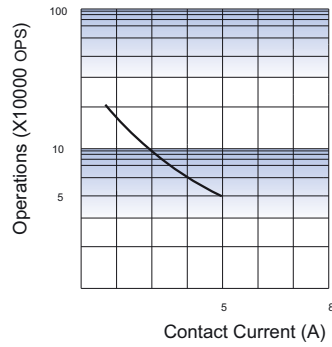
3) The width of the gridding is 2.5mm.

## CHARACTERISTIC CURVES

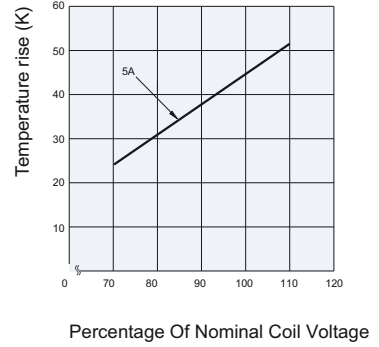
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Test conditions:**

5A 250VAC, Resistive load,  
Room temp., 1s on 9s off

**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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# HF32FA

# SUBMINIATURE INTERMEDIATE POWER RELAY



File No.:E134517



File No.:40006182



File No.:CQC17002175721



## Features

- 5A switching capability
- Creepage/clearance distance > 8mm
- 5kV dielectric strength (between coil and contacts)
- 1 Form A meets VDE 0700, 0631 reinforce insulation
- 1 Form C meets VDE 0631 reinforce insulation
- UL insulation system: Class F
- Product in accordance to IEC 60335-1 available

## CONTACT DATA

Contact arrangement	1A, 1C	
Contact resistance <sup>1)</sup>	70mΩ max.(at 1A 6VDC)	
Contact material	AgNi	
Contact rating (Res. Load)	1A	1C
	Standard/Sensitive	Standard
	5A 250VAC 5A 30VDC	3A 250VAC 3A 30VDC
Max. switching voltage	250VAC / 30VDC	
Max. switching current	5A	
Max. switching power	1250VA / 150W	
Mechanical endurance	1 x 10 <sup>6</sup> OPS	
Electrical endurance	H type: 1 x 10 <sup>5</sup> OPS (5A 250VAC, Resistive load, Room temp., 1.5s on 1.5s off)	
	Z type: 1 x 10 <sup>5</sup> OPS (NO/NC, 3A 250VAC, Resistive load, Room temp., 1.5s on 1.5s off)	

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at rated. volt.)	8ms max.	
Release time (at rated. volt.)	4ms max.	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Shock resistance*	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance*	NO	10Hz to 55 Hz 1.65mm DA
	NC	10Hz to 55 Hz 0.6mm DA
Termination	PCB	
Unit weight	Approx.4.6g	
Construction	Plastic sealed, Flux proofed	

Notes: 1) \*Index is not in relay length direction.

2) The data shown above are initial values.

3) Please find coil temperature curve in the characteristic curves below.

## COIL

Coil power	Sensitive: Approx. 200mW; Standard: Approx. 450mW
------------	--

## COIL DATA

at 23°C

### Standard type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.15	3.9	20 x (1±10%)
5	3.75	0.25	6.5	55 x (1±10%)
6	4.50	0.30	7.8	80 x (1±10%)
9	6.75	0.45	11.7	180 x (1±10%)
12	9.00	0.60	15.6	320 x (1±10%)
18	13.5	0.90	23.4	720 x (1±10%)
24	18.0	1.20	31.2	1280 x (1±10%)
48 <sup>2)</sup>	36.0	2.40	62.4	5120 x (1±10%)

### Sensitive type (Only for 1 Form A)

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.15	5.1	45 x (1±10%)
5	3.75	0.25	8.5	125 x (1±10%)
6	4.50	0.30	10.2	180 x (1±10%)
9	6.75	0.45	15.3	400 x (1±10%)
12	9.00	0.60	20.4	720 x (1±10%)
18	13.5	0.90	30.6	1600 x (1±10%)
24	18.0	1.20	40.8	2800 x (1±10%)

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

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

3) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).

## SAFETY APPROVAL RATINGS

UL/CUL	1 Form A	5A 250VAC 5A 30VDC 1/8HP 125VAC/250VAC TV-2 C300
	1 Form C	3A 250VAC 3A 30VDC
VDE		5A 250VAC at 85°C 2A 250VAC cosφ=0.5 at 85°C 1 Form A, Sensitive: 3A 400VAC at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

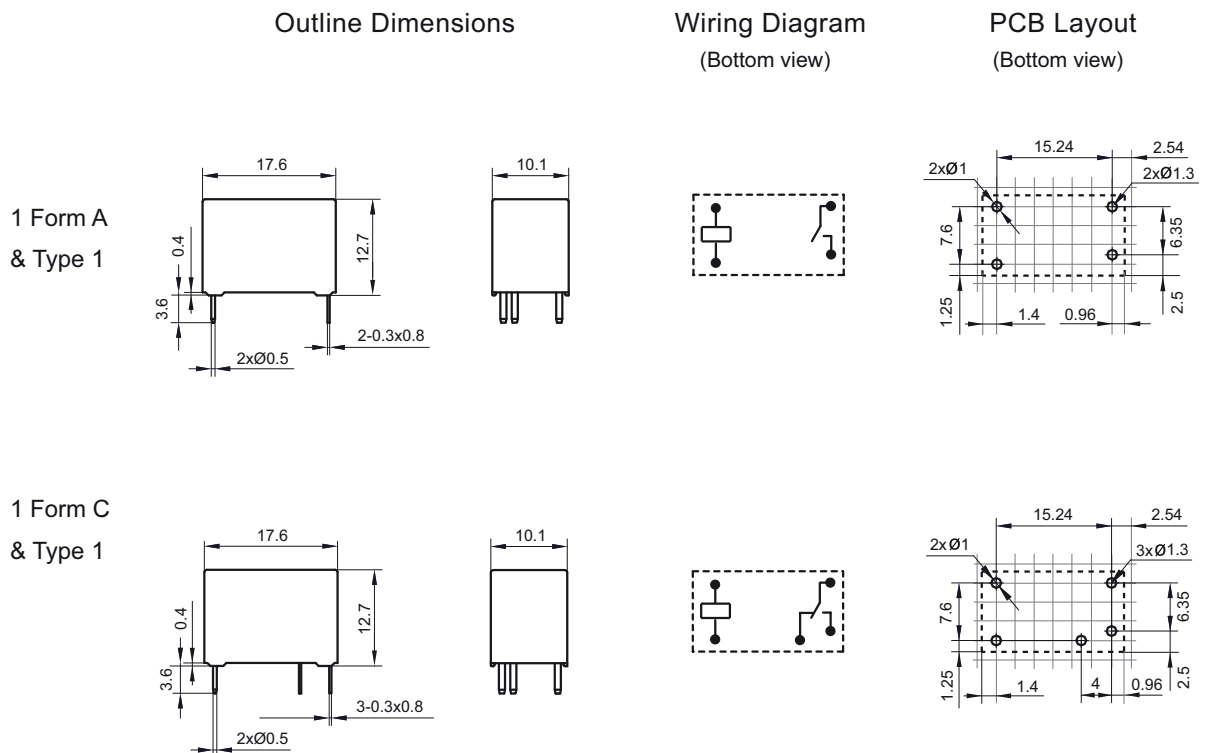
## ORDERING INFORMATION

<b>HF32FA / 012 -H S L 1 G (XXX)</b>	
<b>Type</b>	
<b>Coil voltage</b>	3, 5, 6, 9, 12, 18, 24, 48VDC
<b>Contact arrangement</b>	<b>H:</b> 1 Form A <b>Z:</b> 1 Form C
<b>Construction<sup>1)2)</sup></b>	<b>S:</b> Plastic sealed <b>Nil:</b> Flux proofed
<b>Coil power</b>	<b>L:</b> Sensitive (Only for 1 Form A) <b>Nil:</b> Standard
<b>Termination</b>	<b>1:</b> Type 1 <b>2:</b> Type 2
<b>Contact plating<sup>3)</sup></b>	<b>G:</b> Gold plated <b>Nil:</b> No gold plated
<b>Special code<sup>4)</sup></b>	<b>XXX:</b> Customer special requirement <b>Nil:</b> Standard

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) For gold plated type, the min. switching current and min. switching voltage is 10mA 5VDC.
- 4) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

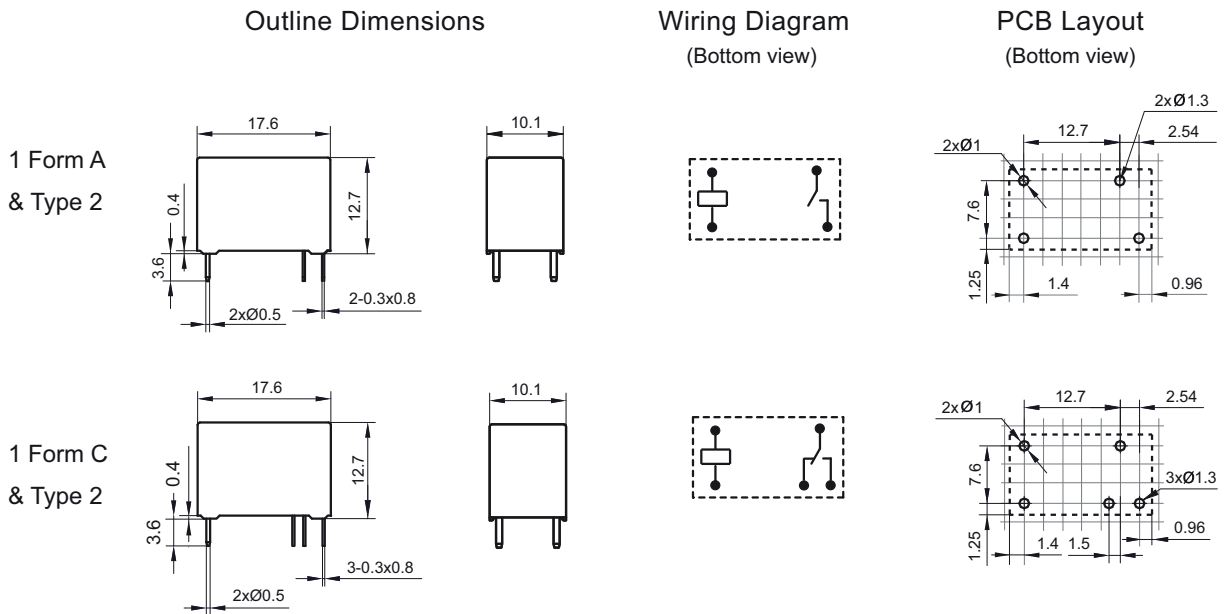
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm



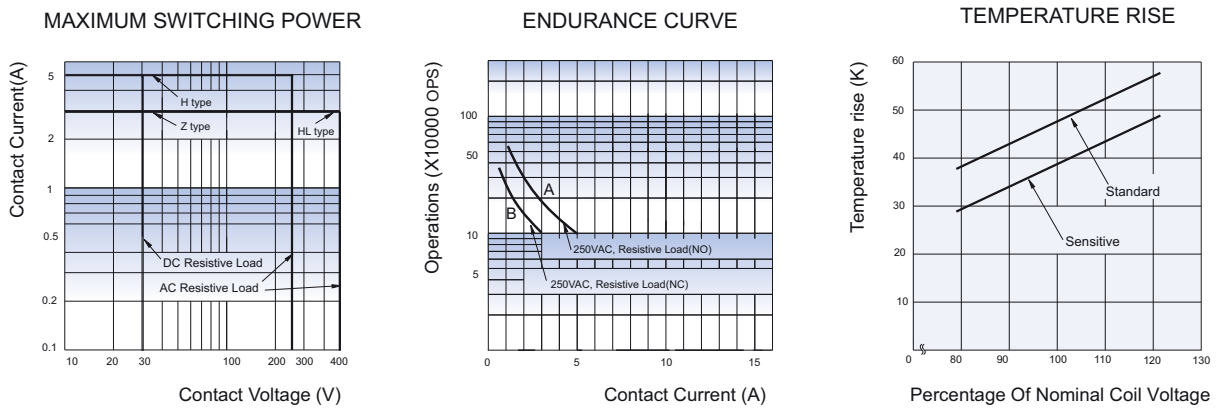
# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm



- Remark: 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  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .  
 3) The width of the gridding is 2.54mm.

## CHARACTERISTIC CURVES



**Notes:**

- Curve A: H type, Curve B: Z type
- Test conditions: Flux proofed, Room temp., 1.5s on 1.5s off.

**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.

# HF32FA-T

## SUBMINIATURE INTERMEDIATE HIGH TEMPERATURE POWER RELAY



File No.:E134517



File No.:40006182



File No.: CQC17002175721



### Features

- High temperature: 105°C
- 5A switching capability
- 1 Form A configuration
- Creepage/clearance distance>8mm
- 5kV dielectric strength (between coil and contacts)
- UL insulation system: Class F
- Meeting VDE 0700, 0631 reinforce insulation
- Product in accordance to IEC 60335-1 available

### CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	70mΩ max.(at 1A 6VDC)
Contact material	AgNi
Contact rating (Res. load)	5A 250VAC 5A 30VDC
Max. switching voltage	250VAC/30VDC
Max. switching current	5A
Max. switching power	1250VA/150W
Mechanical endurance	1 x 10 <sup>6</sup> OPS
Electrical endurance	1 x 10 <sup>5</sup> OPS ( 5A 250VAC, Resistive load, Room temp., 1.5s on 1.5s off)

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

### CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at rated. volt.)	8ms max.	
Release time (at rated. volt.)	4ms max.	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 105°C	
Shock resistance*	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance*	10Hz to 55Hz 1.65mm DA	
Termination	PCB	
Unit weight	Approx.4.6g	
Construction	Plastic sealed, Flux proofed	

- Notes: 1) \*Index is not in relay length direction.  
2) The data shown above are initial values.  
3) Please find coil temperature curve in the characteristic curves below.

### COIL

Coil power	Sensitive: Approx. 200mW
------------	--------------------------

### COIL DATA

at 23°C

#### Sensitive type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC *2)	Coil Resistance Ω
3	2.25	0.15	5.1	45 x (1±10%)
5	3.75	0.25	8.5	125 x (1±10%)
6	4.50	0.30	10.2	180 x (1±10%)
9	6.75	0.45	15.3	400 x (1±10%)
12	9.00	0.60	20.4	720 x (1±10%)
18	13.5	0.90	30.6	1600 x (1±10%)
24	18.0	1.20	40.8	2800 x (1±10%)

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

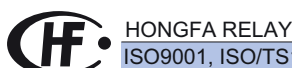
2) \* Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

### SAFETY APPROVAL RATINGS

UL/CUL	5A 250VAC
VDE	5A 250VAC at 105°C 3A 400VAC at 105°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

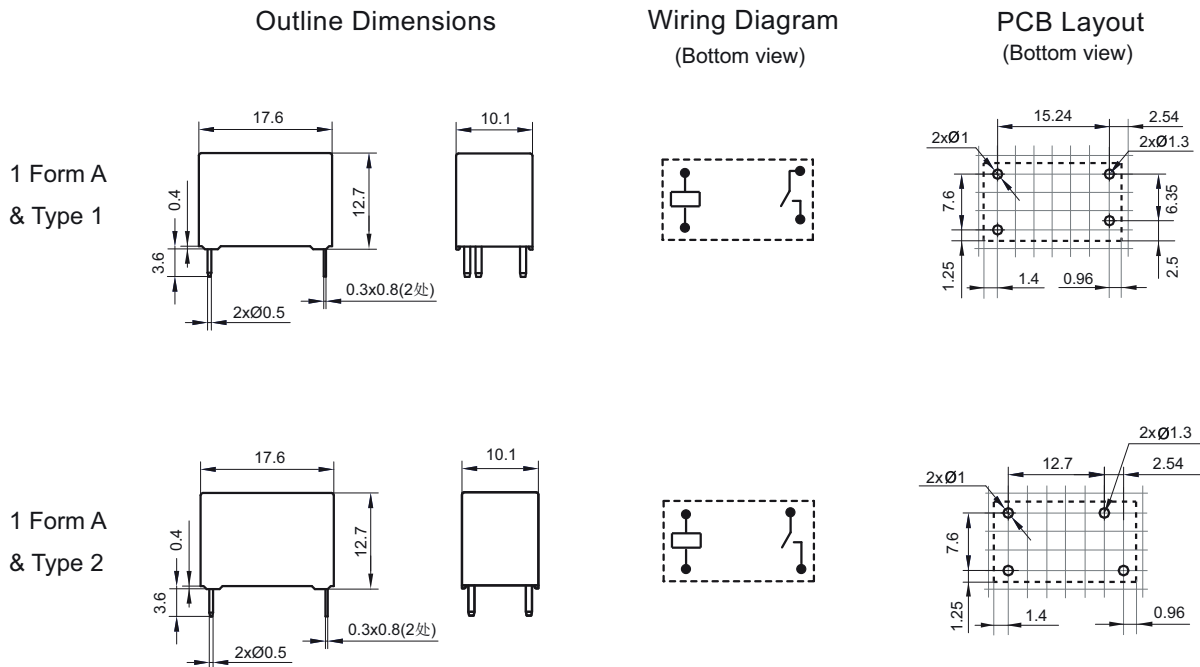
## ORDERING INFORMATION

Type	HF32FA-T / 012 -H S L 1 G (XXX)					
Coil voltage	3, 5, 6, 9, 12, 18, 24VDC					
Contact arrangement	H: 1 Form A					
Construction <sup>1)2)</sup>	S: Plastic sealed		Nil: Flux proofed			
Coil power	L: Sensitive					
Termination	1: Type 1		2: Type 2			
Contact plating <sup>3)</sup>	G: Gold plated		Nil: No gold plated			
Special code <sup>4)</sup>	XXX: Customer special requirement		Nil: Standard			

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) For gold plated type, the min. switching current and min. switching voltage is 10mA 5VDC.
- 4) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

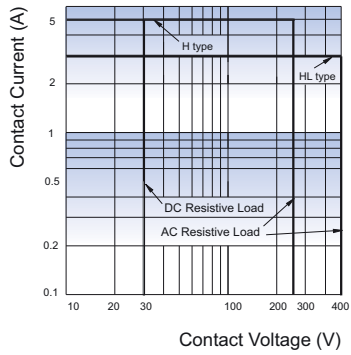


- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.
- 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.
- 3) The width of the gridding is 2.54mm.

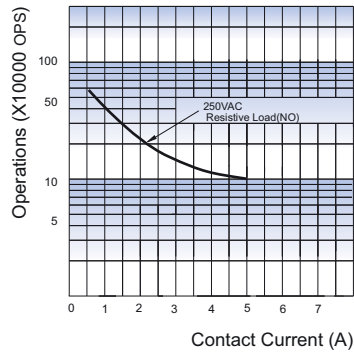


## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER

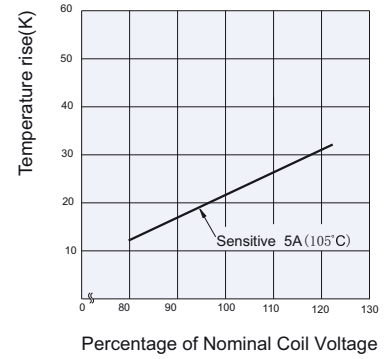


ENDURANCE CURVE



Test conditions: Flux proofed,  
Room temp., 1.5s on 1.5s off

TEMPERATURE RISE



### 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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# HF32FA-G

# SUBMINIATURE INTERMEDIATE POWER RELAY



File No.:E134517



File No.:40006182



File No.:CQC17002175721



## Features

- 10A switching capability
- Creepage/clearance distance > 8mm
- 5kV dielectric strength (between coil and contacts)
- UL insulation system: Class F
- Meets VDE 0700, 0631 reinforce insulation
- Product in accordance to IEC 60335-1 available

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	70mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating (Res. Load)	10A 250VAC
Max. switching voltage	250VAC
Max. switching current	10A
Max. switching power	2500VA
Mechanical endurance	1 x 10 <sup>6</sup> OPS
Electrical endurance	1.5 x 10 <sup>4</sup> OPS (10A 250VAC, Resistive load, at 85°C, 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at rated. volt.)	8ms max.	
Release time (at rated. volt.)	4ms max.	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Shock resistance*	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance*	10Hz to 55 Hz 1.65mm DA	
Termination	PCB	
Unit weight	Approx.4.6g	
Construction	Plastic sealed, Flux proofed	

Notes: 1) \*Index is not in relay length direction.

2) The data shown above are initial values.

3) Please find coil temperature curve in the characteristic curves below.

4) For plastic sealed type, the venting-hole should be excised in electrical endurance test.

## COIL

Coil power	Standard: Approx. 450mW; Sensitive: Approx. 230mW
------------	--

## COIL DATA

at 23°C

### Standard type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.15	3.9	20 x (1±10%)
5	3.75	0.25	6.5	55 x (1±10%)
6	4.50	0.30	7.8	80 x (1±10%)
9	6.75	0.45	11.7	180 x (1±10%)
12	9.00	0.60	15.6	320 x (1±10%)
18	13.5	0.90	23.4	720 x (1±10%)
24	18.0	1.20	31.2	1280 x (1±10%)
48 <sup>3)</sup>	36.0	2.40	62.4	5120 x (1±10%)

### Sensitive type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.15	5.1	38 x (1±10%)
5	3.75	0.25	8.5	108 x (1±10%)
6	4.50	0.30	10.2	155 x (1±10%)
9	6.75	0.45	15.3	350 x (1±10%)
12	9.00	0.60	20.4	620 x (1±10%)
18	13.5	0.90	30.6	1390 x (1±10%)
24	18.0	1.20	40.8	2480 x (1±10%)
48 <sup>3)</sup>	36.0	2.40	81.6	9920 x (1±10%)

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

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

3) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).

## SAFETY APPROVAL RATINGS

UL/CUL	10A 250VAC at 85°C B300
VDE	10A 250VAC at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

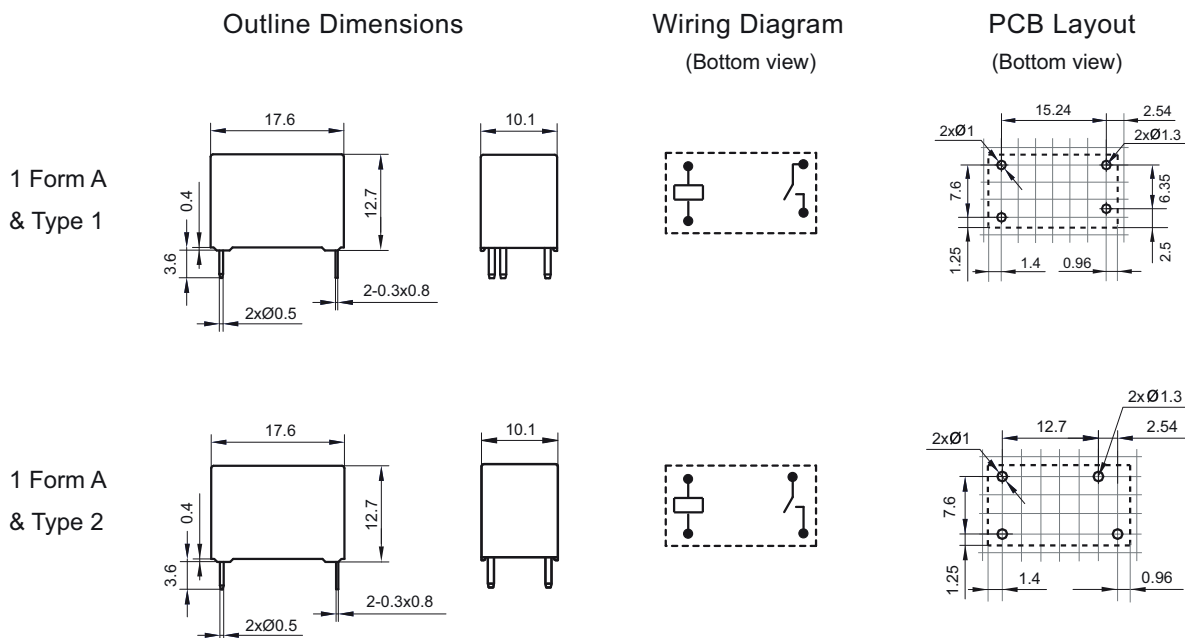
## ORDERING INFORMATION

Type	HF32FA-G / 012 -H S L 1 G (XXX)		
Coil voltage	3, 5, 6, 9, 12, 18, 24, 48VDC		
Contact arrangement	H: 1 Form A		
Construction <sup>1)2)</sup>	S: Plastic sealed	Nil: Flux proofed	
Coil power	L: Sensitive	Nil: Standard	
Termination	1: Type 1	2: Type 2	
Contact plating <sup>3)</sup>	G: Gold plated	Nil: No gold plated	
Special code <sup>4)</sup>	XXX: Customer special requirement	Nil: Standard	

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) For gold plated type, the min. switching current and min. switching voltage is 10mA 5VDC.
- 4) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

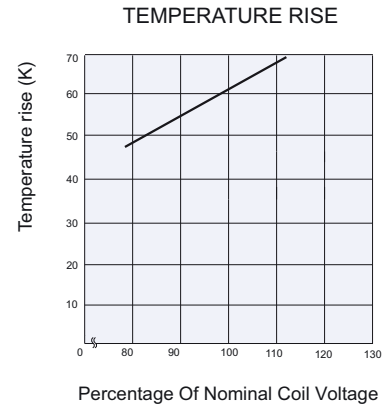
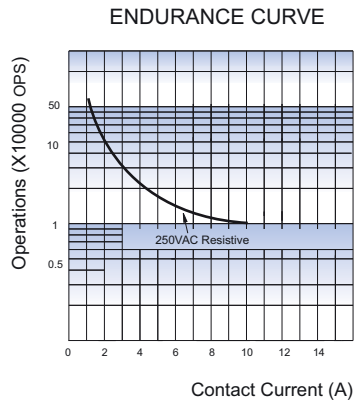
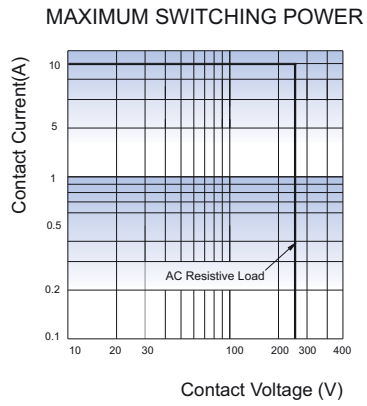
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm



- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.
- 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.
- 3) The width of the gridding is 2.54mm.

## CHARACTERISTIC CURVES



**Test conditions:** Flux proofed, at 85°C  
5s on 5s off

### 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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# HF32FV

## SUBMINIATURE INTERMEDIATE POWER RELAY



File No.:E134517



File No.:40012204



File No.:CQC14002120720



### Features

- 5A switching capability
- Dielectric strength 4kV (between coil and contacts)
- 1 Form A configurations
- Standard PCB layout
- Plastic sealed and flux proofed types available
- UL insulation system: Class F
- Product in accordance to IEC 60335-1 available
- Meet reinforce insulation
- Relow soldering version available
- Halogen-free products are available

### CONTACT DATA

Contact arrangement	1A	
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)	
Contact material	AgSnO <sub>2</sub> , AgCdO, AgNi	
Contact rating (Res. load)	Standard	Sensitive
	5A 250VAC 5A 30VDC	3A 250VAC 3A 30VDC
Max. switching voltager	250VAC / 30VDC	
Max. switching current	5A	3A
Max. switching power	1250VA / 150W	750VA / 90W
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance	Standard	1 x 10 <sup>5</sup> OPS (5A 250VAC Resistive load, at room temp., 1s on 9s off) 5 x 10 <sup>4</sup> OPS (5A 250VAC Resistive load, at 85°C, 1s on 9s off)
	Sensitive	1 x 10 <sup>5</sup> OPS (3A 250VAC Resistive load, at room temp., 1s on 9s off) 5 x 10 <sup>4</sup> OPS (3A 250VAC Resistive load, at 85°C, 1s on 9s off)

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

### CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1000VAC 1min
Surge withstand voltage	6kV(1.2 / 50μs)	
Operate time (at rated. volt.)	8ms max.	
Release time (at rated. volt.)	5ms max.	
Coil temperature rise(at nomi. volt.)	60k max.	
Shock * resistance	Functional	294m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	Functional	10Hz to 55Hz 1.5mm DA
Humidity	5% to 85% RH	
Ambient oprating temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 6g	
Construction	Plastic sealed, Flux proofed	

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

2) \*Index is not in relay length direction.

3) In order to obtain better electrical endurance, it's better not use this product in the high temperature environment.

### COIL

Coil power	Standard: Approx. 450mW; Sensitive: Approx. 200mW
------------	--

### COIL DATA

at 23°C

#### Standard Type

Nominal Voltage VDC	Pick-up Voltage VDC max.1)	Drop-out Voltage VDC min. 1)	Max. Voltage VDC*2)	Coil Resistance Ω
3	2.25	0.15	3.9	20 x (1±10%)
5	3.75	0.25	6.5	55 x (1±10%)
6	4.50	0.30	7.8	80 x (1±10%)
9	6.75	0.45	11.7	180 x (1±10%)
12	9.00	0.60	15.6	320 x (1±10%)
18	13.5	0.90	23.4	720 x (1±10%)
24	18.0	1.20	31.2	1280 x (1±10%)
48	36.0	2.40	62.4	5120 x (1±10%)

#### Sensitive Type

Nominal Voltage VDC	Pick-up Voltage VDC max.1)	Drop-out Voltage VDC min.1)	Max. Voltage VDC*2)	Coil Resistance Ω
3	2.25	0.15	4.5	45 x (1±10%)
5	3.75	0.25	7.5	125 x (1±10%)
6	4.50	0.30	9.0	180 x (1±10%)
9	6.75	0.45	13.5	400 x (1±10%)
12	9.00	0.60	18.0	720 x (1±10%)
18	13.5	0.90	27.0	1600 x (1±10%)
24	18.0	1.20	36.0	2800 x (1±10%)
48	36.0	2.40	72.0	11520 x (1±10%)

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

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



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## SAFETY APPROVAL RATINGS

<b>UL/CUL</b>	AgSnO <sub>2</sub>	5A 277VAC /250VAC General Use at 40°C 5A 277VAC/250VAC General Use at 85°C 5A 30VDC Resistive at 85°C 300W 120VAC Tunsten at 40°C 1/4HP 250VAC at 85°C 3A 277VAC/250VAC General Use (Sensitive) at 85°C 3A 30VDC Resistive (Sensitive) at 85°C TV-3 120VAC at 40°C
	AgCdO	5A 277VAC/250VAC General Use at 85°C 5A 30VDC Resistive at 85°C
	AgNi	5A 277VAC/250VAC General Use at 85°C 5A 30VDC Resistive at 85°C 3A 30VDC Resistive (Sensitive) at 85°C 3A 277VAC/250VAC General Use (Sensitive) at 85°C
<b>VDE</b>	AgSnO <sub>2</sub>	250VAC 4(2) Inductive load at 85°C 5A 30VDC Resistive at 85°C 5A 277VAC/250VAC Resistive at 85°C 3A 277VAC/250VAC Resistive at 85°C 3A 30VDC Resistive (Sensitive) at 85°C
	AgCdO	5A 277VAC/250VAC Resistive at 85°C 5A 30VDC Resistive at 85°C
	AgNi	5A 277VAC/250VAC Resistive at 85°C 3A 277VAC/250VAC Resistive (Sensitive) at 85°C
<b>CQC</b>	AgSnO <sub>2</sub>	5A 277VAC/250VAC Resistive at 85°C 5A 30VDC Resistive at 85°C 3A 277VAC/250VAC Resistive (Sensitive) at 85°C
	AgCdO	5A 277VAC/250VAC Resistive at 85°C 5A 30VDC Resistive at 85°C
	AgNi	5A 277VAC/250VAC Resistive at 85°C 5A 30VDC Resistive at 85°C 3A 30VDC Resistive (Sensitive) at 85°C 3A 277VAC/250VAC Resistive (Sensitive) at 85°C

**Notes:** 1) All values unspecified are at room temperature.  
 2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

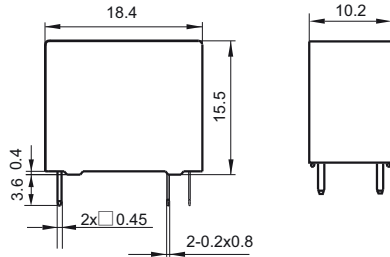
	<b>HF32FV / 12 -H S L T F (XXX)</b>
<b>Type</b>	
<b>Coil voltage</b>	3, 5, 6, 9, 12, 18, 24, 48VDC
<b>Contact arrangement</b>	H: 1 Form A
<b>Construction</b> <sup>1)2)</sup>	S: Plastic sealed      Nil: Flux proofed
<b>Coil power</b>	L: Sensitive <sup>3)</sup> Nil: Standard
<b>Contact material</b>	T: AgSnO <sub>2</sub> Nil: AgCdO      3: AgNi
<b>Insulation standard</b>	F: Class F
<b>Customer special code</b> <sup>5)</sup>	XXX: Customer special requirement      Nil: Standard

**Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).  
 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.  
 3) Sensitive loading: 3A.  
 4) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT); e.g.(590) stands for product in accordance to TV-3 loading,only for standard type.

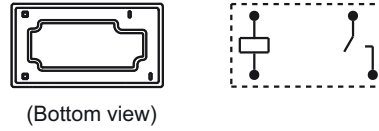
# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

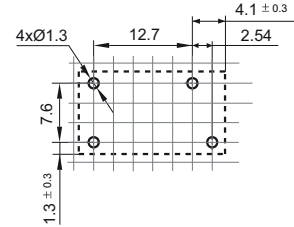
Outline Dimensions



Wiring Diagram  
(Bottom view)



PCB Layout  
(Bottom view)

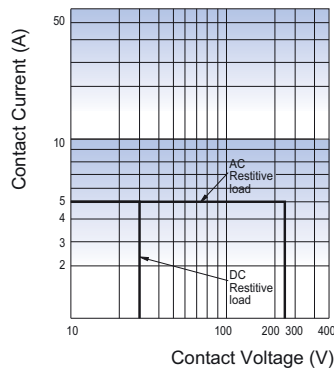


Remark: 1) \*The additional tin top is max. 1mm.

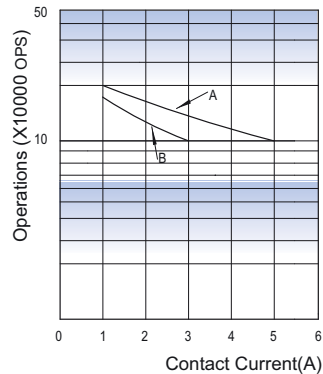
- 2) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.
- 3) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.
- 4) The width of the gridding is 2.54mm.

## CHARACTERISTIC CURVES

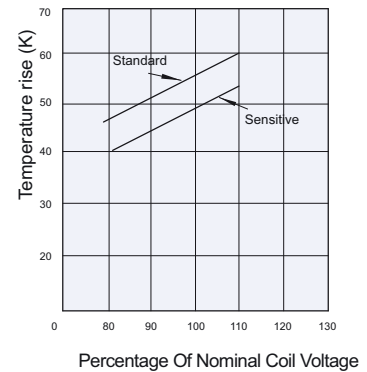
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Remark:**

1. Curve A: standard  
Curve B: sensitive
2. Testing conditions:  
Standard: flux proofed, resistive load, 5A 250VAC, at room temp. 1s on 9s off.  
Sensitive: flux proofed, resistive load, 3A 250VAC, at room temp. 1s on 9s off.

**Testing conditions:**

- Standard: 5A at 85°C.
- Sensitive: 3A at 85°C
- Mounting distance: 5mm

**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.

# HF32FV-16

# SUBMINIATURE HIGH POWER RELAY



File No.: E134517



File No.: 40012204



File No.: CQC14002120720



## Features

- 16A switching capability
- Dielectric strength 4kV(between coil and contacts)
- 1 Form A configuration
- UL insulation system: Class F
- Product in accordance to IEC 62368-1 available

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	≤100mΩ (at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating(General use)	16A 250VAC
Max. switching voltage	250VAC
Max. switching current	16A
Max. switching power	4000VA
Mechanical endurance	1 x 10 <sup>6</sup> OPS
Electrical endurance	1 x 10 <sup>4</sup> OPS (16A 250VAC, General use, 85°C, 1s on 9s off) 5 x 10 <sup>4</sup> OPS (16A 250VAC, Resistive load, 85°C, 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at nomi. volt.)	10ms max.	
Release time (at nomi. volt.)	5msmax.	
Humidity	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 7g	
Construction	Flux proofed	

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

## COIL

Coil power	Standard:Approx. 800mW Sensitive type:Approx.400mW
------------	---

## COIL DATA

at 23°C

### Standard type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>*2)</sup>	Coil Resistance Ω
12	≤9	≥1.2	13.2	180 x (1±10%)
24	≤18	≥2.4	26.4	720 x (1±10%)

### L type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>*2)</sup>	Coil Resistance Ω
5	≤3.5	≥0.5	6.5	62 x (1±10%)
12	≤9	≥1.2	15.6	360x (1±10%)
24	≤18	≥2.4	31.2	1440 x (1±10%)

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

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

3) When using standard products,it needs to drive at rated voltage,and then step down the voltage ( 50% of rated voltage) to hold.

## SAFETY APPROVAL RATINGS

UL/CUL	1 Form A	16A 250 / 277VAC at 85°C
VDE	1 Form A	16A 250VAC at 85°C
CQC	1 Form A	16A 250VAC at 85°C

Notes: 1) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00



## ORDERING INFORMATION

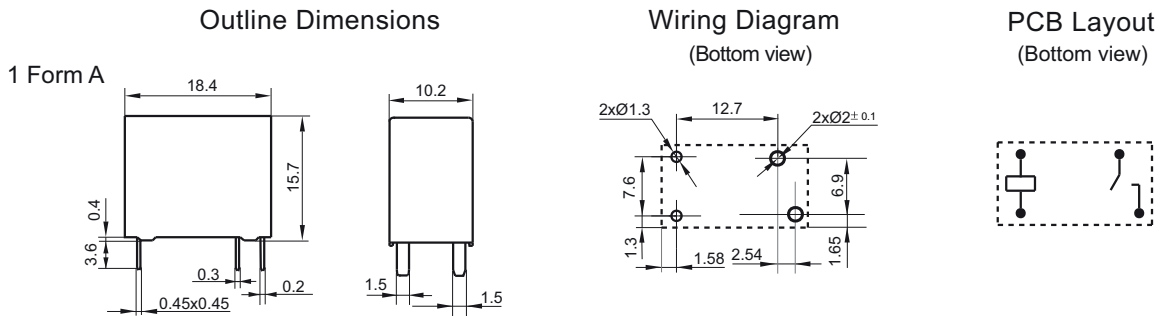
Type	HF32FV-16/	12	-H	L <sup>1)</sup>	T	F	(XXX)
Coil voltage	5(Only for L type), 12, 24VDC						
Contact arrangement	H: 1 Form A						
Coil power	L: Sensitive Nil: Standard						
Contact material	T: AgSnO <sub>2</sub>						
Insulation standard	F: Class F						
Special code <sup>1)</sup>	XXX: Customer special requirement		Nil: Standard				

Notes: 1) Sensitive type approval is pending.

2) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

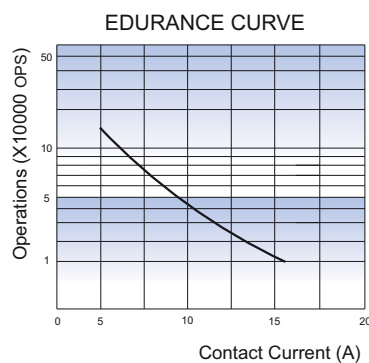
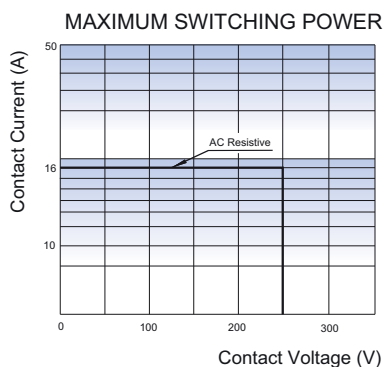
Unit: mm



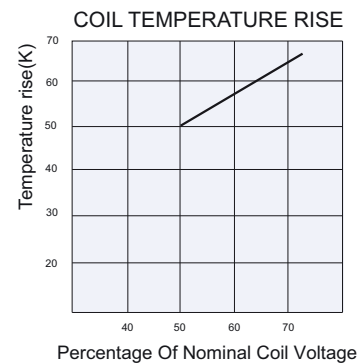
Remark:1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .

2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .

## CHARACTERISTIC CURVES



Test conditions: General use, 250VAC  
 $\cos \phi 0.75$ ,  $85^\circ\text{C}$ , 1s on 9s off



Percentage Of Nominal Coil Voltage

Test conditions:  $85^\circ\text{C}$  16A  
 Mounting distance: 10mm  
 Driving voltage: Coil activated with rated voltage, then reduce to 50% of rated voltage.

### 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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# HF32FV-T

# SUBMINIATURE INTERMEDIATE POWER RELAY



File No.:E134517



File No.:40012204



File No.:CQC14002120720



## Features

- High Temperature:105°C
- 10A switching capability
- Dielectric strength 4kV (between coil and contacts)
- 1 Form A configurations
- Standard PCB layout
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating(Res. load)	Standard: 10A 250VAC
Max. switching voltager	250VAC
Max. switching current	10A
Max. switching power	2500VA
Mechanical endurance	1 x 10 <sup>7</sup> ops
Electrical endurance	Standard: 1 x 10 <sup>5</sup> OPS (5A 250VAC Resistive load, at 105°C, 1s on 9s off) 5 x 10 <sup>4</sup> OPS (10A 250VAC Resistive load, at 105°C, 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1000VAC 1min
Surge withstand voltage	6kV(1.2 x 50μs)	
Operate time (at rated. volt.)	8ms max.	
Release time (at rated. volt.)	5ms max.	
Coil temperature rise(at rated. volt.)	50k max.	
Shock resistance	Functional	294m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	Functional	10Hz to 55Hz 1.5mm DA
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 105°C	
Termination	PCB	
Unit weight	Approx. 6g	
Construction	Flux proofed	

**Notes:** The data shown above are initial values.

## COIL

Coil power	Standard: Approx. 450mW;
------------	--------------------------

## COIL DATA

at 23°C

### Standard Type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.15	3.9	20 x (1±10%)
5	3.75	0.25	6.5	55 x (1±10%)
6	4.50	0.30	7.8	80 x (1±10%)
9	6.75	0.45	11.7	180 x (1±10%)
12	9.00	0.60	15.6	320 x (1±10%)
18	13.5	0.90	23.4	720 x (1±10%)
24	18.0	1.20	31.2	1280 x (1±10%)
48	36.0	2.40	62.4	5120 x (1±10%)

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

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



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## SAFETY APPROVAL RATINGS

<b>UL</b>	AgSnO <sub>2</sub>	10A 277VAC /250VAC General Use at 105°C 10A 277VAC/250VAC Resistive at 105°C 1/3HP 250VAC Horsepower at 105°C
<b>VDE</b>	AgSnO <sub>2</sub>	10A 277VAC/250VAC Resistive at 105°C 5A 250VAC COSφ=0.6 at 105°C
<b>CQC</b>	AgSnO <sub>2</sub>	10A 277VAC/250VAC Resistive at 105°C

**Notes:** 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

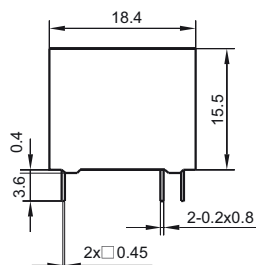
<b>Type</b>	HF32FV-T / 12 -H T F (XXX)
<b>Coil voltage</b>	3, 5, 6, 9, 12, 18, 24, 48VDC
<b>Contact arrangement</b>	H: 1 Form A
<b>Contact material</b>	T: AgSnO <sub>2</sub>
<b>Insulation standard</b>	F: Class F
<b>Special code</b> <sup>1)</sup>	XXX: Customer special requirement Nil: Standard

**Notes:** 1) Two packing methods available: paper box package, tube package. Standard tube packing length is 553mm. Any special requirement needed, please contact us for more details.

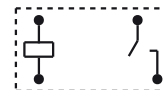
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

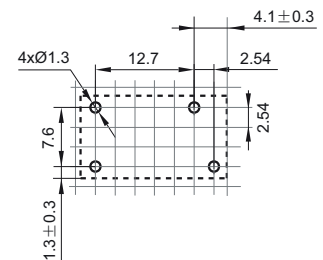
Outline Dimensions



Wiring Diagram  
(Bottom view)



PCB Layout  
(Bottom view)

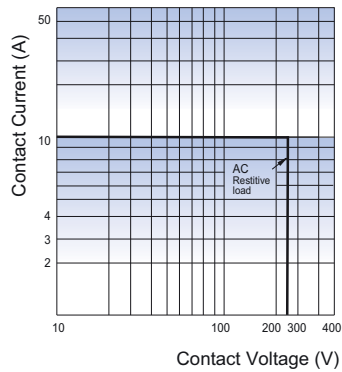


Remark: 1) \* The additional tin top is max. 1mm.

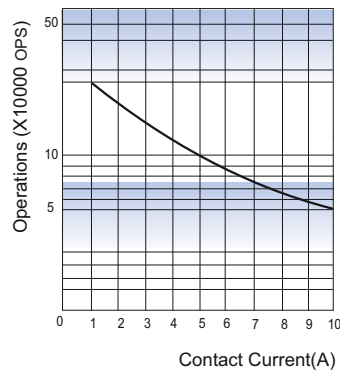
- In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.
- The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.
- The width of the gridding is 2.54mm.

## CHARACTERISTIC CURVES

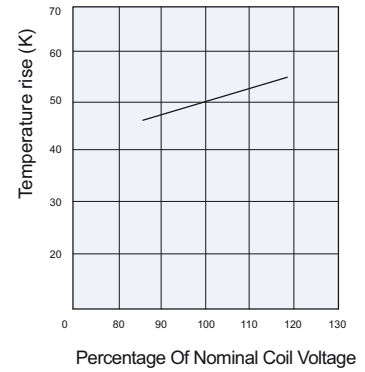
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Remark:**

1. Testing conditions:  
Standard: flux proofed, resistive load,  
10A/250VAC, at room temp. 1s on 9s off.

**Testing conditions:**

Standard: 10A at 105°C.  
Mounting distance: 10mm

**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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# HF32FV-G

# SUBMINIATURE INTERMEDIATE POWER RELAY



File No.:E134517



File No.:40012204



File No.:CQC14002120720



## Features

- 10A switching capability
- Dielectric strength 4kV (between coil and contacts)
- 1 Form A configurations
- Standard PCB layout
- Plastic sealed and flux proofed types available
- UL insulation system: Class F
- Product in accordance to IEC60335-1 available
- Meet reinforce insulation
- Relow soldering version available
- Halogen-free products are available

## CONTACT DATA

Contact arrangement	1A	
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)	
Contact material	AgNi,AgSnO <sub>2</sub> , AgCdO	
Contact rating (Res. load)	Standard	Sensitive
	10A 250VAC 10A 30VDC	8A 250VAC 8A 30VDC
Max. switching voltager	250VAC / 30VDC	
Max. switching current	10A	8A
Max. switching power	2500VA/300W	2000VA/ 240W
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance	Standard	1 x 10 <sup>5</sup> OPS (10A 250VAC Resistive load, at room temp., 1s on 9s off) 5 x 10 <sup>4</sup> OPS (10A 250VAC Resistive load, at 85°C, 1s on 9s off)
	Sensitive	1 x 10 <sup>5</sup> OPS (8A 250VAC Resistive load, at room temp., 1s on 9s off) 5 x 10 <sup>4</sup> OPS (8A 250VAC Resistive load, at 85°C, 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1000VAC 1min
Surge withstand voltage	6kV(1.2 / 50μs)	
Operate time (at rated. volt.)	8ms max.	
Release time (at rated. volt.)	5ms max.	
Coil temperature rise(at rated. volt.)	70k max.	
Shock * resistance	Functional	294m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	Functional	10Hz to 55Hz 1.5mm DA
Humidity	5% to 85% RH	
Ambient oprating temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 6g	
Construction	Plastic sealed, Flux proofed	

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

2) \*Index is not in relay length direction.

3) In order to obtain better electrical endurance, it's better not use this product in the high temperature environment.

## COIL

Coil power	Standard: Approx. 450mW; Sensitive: Approx. 200mW
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## COIL DATA

at 23°C

### Standard Type

Nominal Voltage VDC	Pick-up Voltage VDC max. 1)	Drop-out Voltage VDC min. 1)	Max. Voltage VDC*2)	Coil Resistance Ω
3	2.25	0.15	3.9	20 x (1±10%)
5	3.75	0.25	6.5	55 x (1±10%)
6	4.50	0.30	7.8	80 x (1±10%)
9	6.75	0.45	11.7	180 x (1±10%)
12	9.00	0.60	15.6	320 x (1±10%)
18	13.5	0.90	23.4	720 x (1±10%)
24	18.0	1.20	31.2	1280 x (1±10%)
48	36.0	2.40	62.4	5120 x (1±10%)

### Sensitive Type

Nominal Voltage VDC	Pick-up Voltage VDC max. 1)	Drop-out Voltage VDC min. 1)	Max. Voltage VDC*2)	Coil Resistance Ω
3	2.25	0.15	4.5	45 x (1±10%)
5	3.75	0.25	7.5	125 x (1±10%)
6	4.50	0.30	9.0	180 x (1±10%)
9	6.75	0.45	13.5	400 x (1±10%)
12	9.00	0.60	18.0	720 x (1±10%)
18	13.5	0.90	27.0	1600 x (1±10%)
24	18.0	1.20	36.0	2800 x (1±10%)
48	36.0	2.40	72.0	11520 x (1±10%)

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

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



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## SAFETY APPROVAL RATINGS

<b>UL/CUL</b>	AgSnO <sub>2</sub>	10A 277VAC /250VAC Resistive at 85°C 10A 277VAC/250VAC Resistive at 40°C 8A 277VAC/250VAC General use (Sensitive) at 85°C TV-5 120VAC at 40°C TV-3 120VAC(Sensitive) at 40°C
	AgCdO	10A 277VAC/250VAC General use at 85°C 10A 30VDC Resistive at at 85°C 10A 277VAC/250VAC Resistive at 40°C 8A 277VAC/250VAC Resistive Load(Sensitive) at 85°C
	AgNi	10A 277VAC/250VAC Resistive at 40°C 8A 277VAC/250VAC Resistive Load (Sensitive) at 40°C
<b>VDE</b>	AgSnO <sub>2</sub>	10A 277VAC/250VAC Resistive at 85°C 8A 277VAC/250VAC Resistive (Sensitive) at 85°C
	AgCdO	10A 277VAC/250VAC Resistive at 85°C
	AgNi	10A 277VAC/250VAC Resistive at 85°C 8A 277VAC/250VAC Resistive (Sensitive) at 85°C
<b>CQC</b>	AgSnO <sub>2</sub>	10A 277VAC/250VAC Resistive at 85°C 8A 277VAC/250VAC Resistive (Sensitive) at 85°C
	AgCdO	10A 277VAC/250VAC Resistive at 85°C
	AgNi	10A 277VAC/250VAC Resistive at 85°C 10A 30VDC Resistive at 85°C 8A 30VDC Resistive (Sensitive) at 85°C 8A 277VAC/250VAC Resistive (Sensitive) at 85°C

- Notes:** 1) Opening the vent hole under contact material AgSnO<sub>2</sub> testing.  
2) All values unspecified are at room temperature.  
3) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

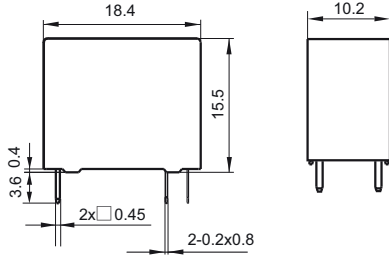
<b>Type</b>	HF32FV-G / 12 -H S L T F (XXX)		
<b>Coil voltage</b>	3, 5, 6, 9, 12, 18, 24, 48VDC		
<b>Contact arrangement</b>	H: 1 Form A		
<b>Construction</b> <sup>1)2)</sup>	S: Plastic sealed	Nil: Flux proofed	
<b>Coil power</b>	L: Sensitive <sup>3)</sup>	Nil: Standard	
<b>Contact material</b>	T: AgSnO <sub>2</sub>	3: AgNi	Nil: AgCdO
<b>Insulation standard</b>	F: Class F		
<b>Special code</b> <sup>5)</sup>	XXX: Customer special requirement	Nil: Standard	

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).  
2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.  
3) Sensitive loading: 8A.  
4) The customer special requirement express as special code after evaluating by Hongfa. e.g. (335) stands for product in accordance to IEC 60335-1 (GWT); (590) stands for product in accordance to TV loading. For standard type is TV-5, for sensitive type is TV-3.

# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

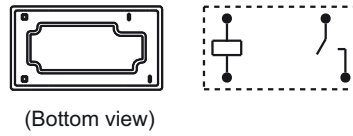
Unit: mm

Outline Dimensions



Wiring Diagram

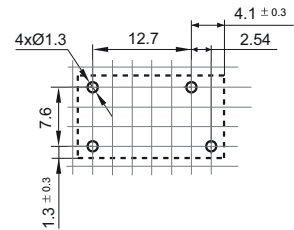
(Bottom view)



(Bottom view)

PCB Layout

(Bottom view)

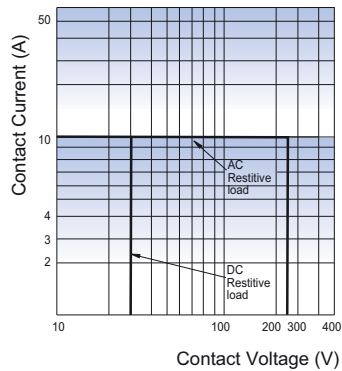


Remark: 1) \* The additional tin top is max. 1mm.

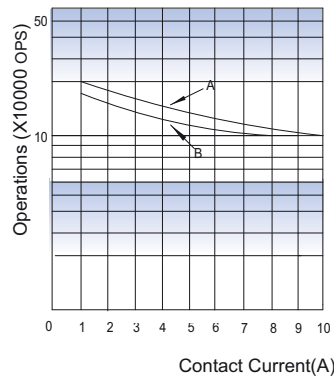
- 2) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .
- 3) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .
- 4) The width of the gridding is 2.54mm.

## CHARACTERISTIC CURVES

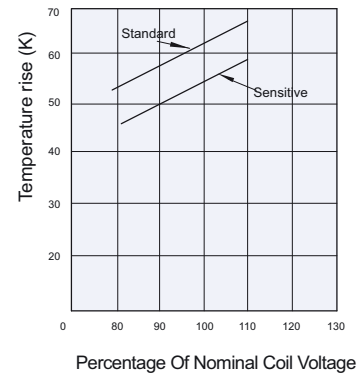
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Remark:**

1. Curve A: standard  
Curve B: sensitive
2. Testing conditions:  
Standard: flux proofed, resistive load, 10A/250VAC, at room temp. 1s on 9s off.  
Sensitive: flux proofed, resistive load, 8A/250VAC, at room temp. 1s on 9s off.

**Testing conditions:**

- Standard: 10A at 85°C.
- Sensitive: 8A at 85°C
- Mounting distance: 10mm

### 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.

# HF32F

## SUBMINIATURE INTERMEDIATE POWER RELAY



File No.: E134517



File No.: 40012204



File No.: CQC12002076528  
CQC16002148335



### Features

- 1 Form A and 1 Form C configurations
- Subminiature, standard PCB layout
- Plastic sealed and flux proofed types available
- UL insulation system: Class F
- Product in accordance to IEC 60335-1 available

### CONTACT DATA

Contact arrangement	1A, 1C		
Contact resistance <sup>1)</sup>	100mΩ max(at 1A 6VDC)		
Contact material	AgNi, AgCdO		
Contact rating (Res. load)	1A		1C
	H type: 5A 250VAC 5A 30VDC 10A 125VAC	HL type: 3A 250VAC 3A 30VDC	3A 250VAC 3A 30VDC
Max. switching current	10A		3A
Max. switching power	1250VA/150W		750VA/90W
Max. switching voltage	250VAC/30VDC		
Mechanical endurance	5 x 10 <sup>6</sup> OPS		
Electrical endurance	H type: 1 x 10 <sup>5</sup> OPS (5A 250VAC, Resistive load, Room temp., 1s on 1s off)		
	HL type: 1x 10 <sup>5</sup> OPS (3A 250VAC, Resistive load, Room temp., 1s on 1s off)		
	Z type: 1x 10 <sup>5</sup> OPS (NO:3A/NC:3A, 250VAC, Resistive load, Room temp., 1.5s on 1.5s off)		

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

### CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2500VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at rated. volt.)	8ms max.	
Release time (at rated. volt.)	5ms max.	
Humidity	5% to 85% RH	
Operation ambient temperature	-40°C to 70°C	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Termination	PCB	
Unit weight	Approx. 6g	
Construction	Plastic sealed, Flux proofed	

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

### COIL

Coil power	Standard: Approx. 450mW; Sensitive: Approx. 200mW
------------	--

### COIL DATA

at 23°C

#### Standard type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC * <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.15	3.9	20 x (1±10%)
5	3.75	0.25	6.5	55 x (1±10%)
6	4.50	0.30	7.8	80 x (1±10%)
9	6.75	0.45	11.7	180 x (1±10%)
12	9.00	0.60	15.6	320 x (1±10%)
18	13.5	0.90	23.4	720 x (1±10%)
24	18.0	1.20	31.2	1280 x (1±10%)
48	36.0	2.40	62.4	5120 x (1±10%)

#### Sensitive type (Only for 1 Form A)

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC * <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.15	4.5	45 x (1±10%)
5	3.75	0.25	7.5	125 x (1±10%)
6	4.50	0.30	9.0	180 x (1±10%)
9	6.75	0.45	13.5	400 x (1±10%)
12	9.00	0.60	18.0	720 x (1±10%)
18	13.5	0.90	27.0	1600 x (1±10%)
24	18.0	1.20	36.0	2800 x (1±10%)
48	36.0	2.40	72.0	11520 x (1±10%)

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

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



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01



## SAFETY APPROVAL RATINGS

UL/CUL	1 Form A	AgCdO, AgNi	H type: 5A 250VAC /30VDC at 70°C 10A 125VAC at 70°C HL type: 3A 250VAC /30VDC at 70°C
		AgCdO	H type: 1/10HP 125VAC at 70°C 1/6HP 250VAC at 70°C 10LRA /1.5FLA 120VAC at 70°C HL type: 5A 125VAC at 70°C
	1 Form C	AgCdO, AgNi	3A 250VAC/30VDC at 70°C
VDE	1 Form A	AgCdO, AgNi	H type: 5A 250VAC /30VDC at 70°C HL type: 3A 250VAC /30VDC at 70°C
	1 Form C	AgCdO, AgNi	3A 250VAC/30VDC at 70°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

Type	HF32F / 012 -H S L 3 (XXX)
Coil voltage	3, 5, 6, 9, 12, 18, 24, 48VDC
Contact arrangement	H: 1 Form A Z: 1 Form C
Construction <sup>1)</sup>	S: Plastic sealed Nil: Flux proofed
Coil Power	L: Sensitive (Only for 1 Form A) Nil: Standard
Contact material	3: AgNi Nil: AgCdO
Special code <sup>3)</sup>	XXX: Customer special requirement Nil: Standard

Notes: 1) Under the ambience with dangerous gas like H<sub>2</sub>S, SO<sub>2</sub> or NO<sub>2</sub>, plastic sealed type is recommended; Please test the relay in real applications. If the ambience allows, flux proofed type is preferentially recommended.

2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

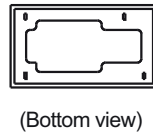
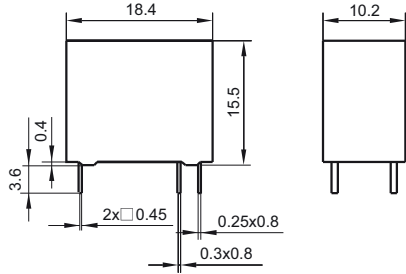
4) Three packing methods available: paper box package, tube package, Standard tube packing length is 553mm. Any special requirement needed, please contact us for more details.

# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

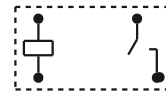
Unit: mm

## Outline Dimensions

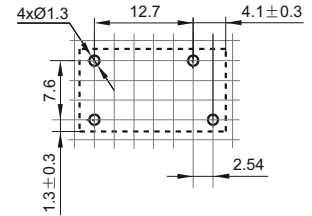
### 1 Form A



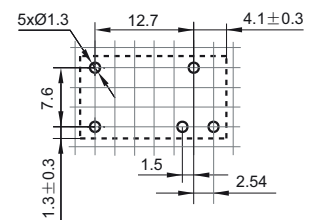
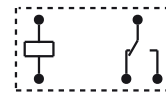
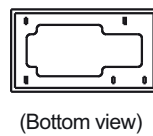
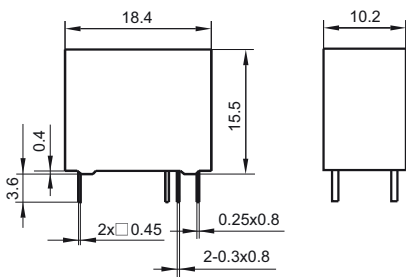
## Wiring Diagram (Bottom view)



## PCB Layout (Bottom view)



### 1 Form C

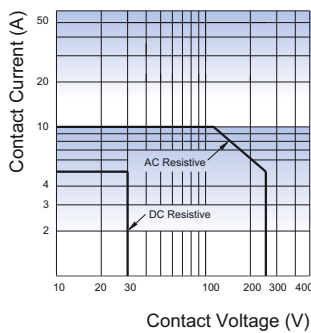


Remark:1) \* The additional tin top is max. 1mm.

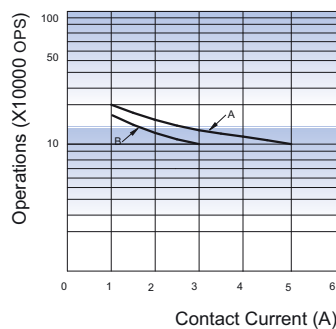
- In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$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

## CHARACTERISTIC CURVES

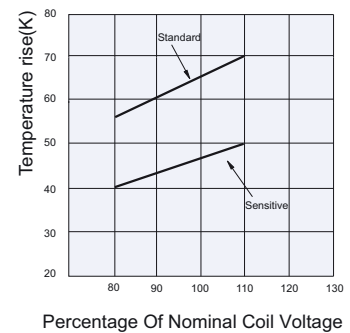
### MAXIMUM SWITCHING POWER



### EDURANCE CURVE



### COIL TEMPERATURE RISE



#### Notes:

- Curve A: H type  
Curve B: HL type, Z type
- Test conditions:**  
H type: Resistive load, 5A 250VAC, Room temp., 1s on 1s off  
HL type: Resistive load, 5A 250VAC, Room temp., 1s on 1s off  
Z type: NO/NC, Resistive load, 3A 250VAC, Room temp., 1.5s on 1.5s off

#### Test conditions:

- Standard: 5A at 70°C  
Sensitive: 3A at 70°C  
Mounting distance: 5mm

### 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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# HF32F-G

## SUBMINIATURE INTERMEDIATE POWER RELAY



File No.: E134517



File No.: 40012204



File No.: CQC12002076528  
CQC16002148335



### Features

- 10A switching capability
- 1 Form A configuration
- Subminiature, standard PCB layout
- Plastic sealed and flux proofed types
- Product in accordance to IEC 60335-1 available
- UL insulation system: Class F

### CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub> , AgNi, AgCdO
Contact rating (Res. load)	10A 250VAC 10A 30VDC
Max. switching voltage	250VAC / 30VDC
Max. switching current	10A
Max. switching power	2500VA / 300W
Mechanical endurance	1 x 10 <sup>6</sup> OPS
Electrical endurance	1 x 10 <sup>5</sup> OPS (10A 250VAC, Resistive load, Room temp., 1s on 9s off)

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

### CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2500VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at rated. volt.)	8ms max.	
Release time (at rated. volt.)	5ms max.	
Humidity	5% to 85% RH	
Operation ambient temperature	-40°C to 85°C	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Termination	PCB	
Unit weight	Approx. 6g	
Construction	Plastic sealed, Flux proofed	

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

### COIL

Coil power	Approx. 450mW
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### COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC * <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.15	3.9	20 x (1±10%)
5	3.75	0.25	6.5	55 x (1±10%)
6	4.50	0.30	7.8	80 x (1±10%)
9	6.75	0.45	11.7	180 x (1±10%)
12	9.00	0.60	15.6	320 x (1±10%)
18	13.5	0.90	23.4	720 x (1±10%)
24	18.0	1.20	31.2	1280 x (1±10%)
48	36.0	2.40	62.4	5120 x (1±10%)

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

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

### SAFETY APPROVAL RATINGS

UL/CUL	10A 277VAC / 250VAC / 30VDC at 85°C
	12A 125VAC at 85°C
VDE	10A 250VAC at 85°C
	4A 400VAC at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

## ORDERING INFORMATION

Type	HF32F-G /	012	-H	S	3	(XXX)
Coil voltage	3, 5, 6, 9, 12, 18, 24, 48VDC					
Contact arrangement	H: 1 Form A					
Construction <sup>1)</sup>	S: Plastic sealed	Nil: Flux proofed				
Contact material	T: AgSnO <sub>2</sub>	3: AgNi	Nil: AgCdO			
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard			

**Notes:** 1) Under the ambience with dangerous gas like H<sub>2</sub>S, SO<sub>2</sub> or NO<sub>2</sub>, plastic sealed type is recommended; please test the relay in real applications. If the ambience allows, flux proofed is preferentially recommended.

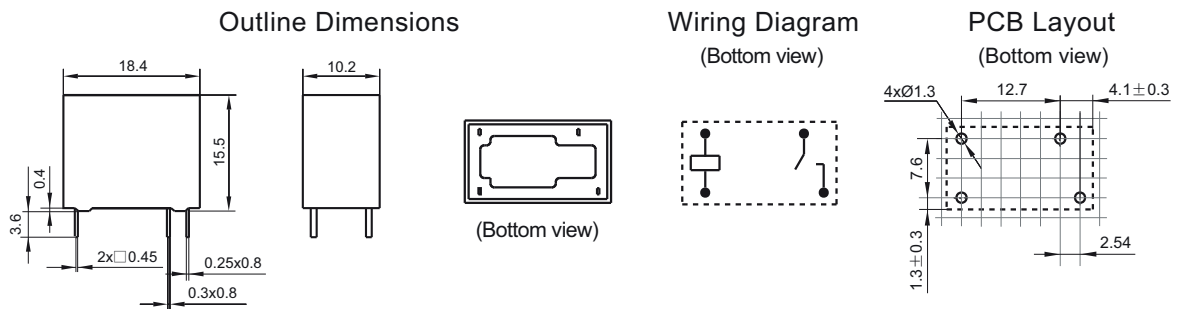
2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

4) Two packing methods available: paper box package, tube package, Standard tube packing length is 553mm. Any special requirement needed, please contact us for more details.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm



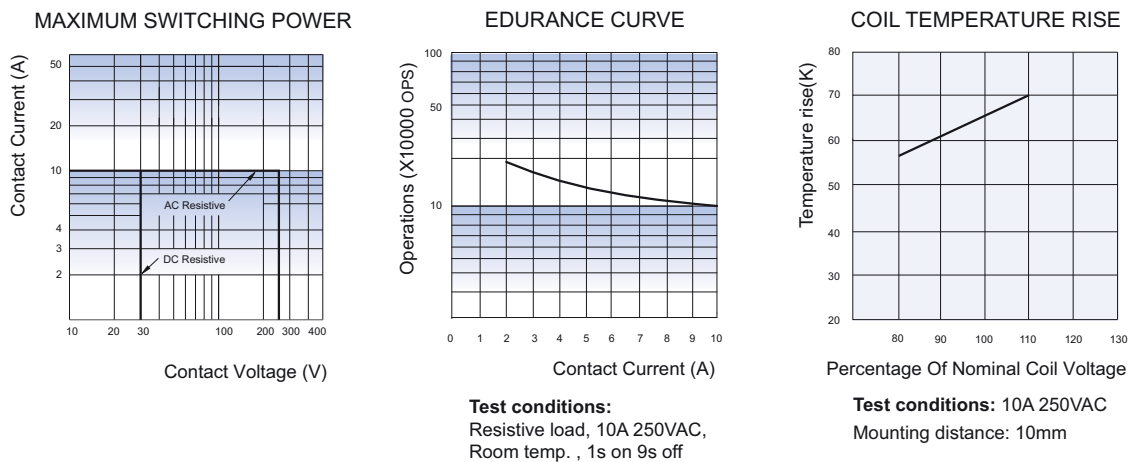
Remark: 1) \* The additional tin top is max. 1mm.

2) In case of no tolerance shown in outline dimension: outline dimension ≤ 1mm, tolerance should be ±0.2mm; outline dimension > 1mm and ≤ 5mm, tolerance should be ±0.3mm; outline dimension > 5mm, tolerance should be ±0.4mm.

3) The tolerance without indicating for PCB layout is always ±0.1mm.

4) The width of the gridding is 2.54mm.

## CHARACTERISTIC CURVES



### 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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# HF171F

# MINIATURE HIGH POWER RELAY



File No.:E133481



File No.:40048577



File No.:17002177419



### Features

- 8A switching capability
- 1 form A and 1 form C configurations
- High sensitivity 200mW
- Creepage/clearance distance:>6mm,meets VDE 0631reinforce insulation
- 5KV dielectric between coil to contacts
- Class F insulation

### CONTACT DATA

Contact arrangement	1A	1C	
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)		
Contact material	AgSnO <sub>2</sub> AgNi		
Contact rating (Res. load)	1A	1C	
		NO	NC
	6A 250VAC	6A 250VAC	5A 250VAC
	6A 30VDC	6A 30VDC	5A 30VDC
Max. switching voltage	30VDC / 277VAC		
Max. switching current	8A		
Max. switching power	180W/1662VA		
Mechanical endurance	1 x 10 <sup>7</sup> OPS		
Electrical endurance	1 x 10 <sup>5</sup> OPS(Resistive load, Room temp., 1.5s on 1.5s off)		

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

### CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage(Between coil & contacts)	10KV(1.2/50 μs)	
Operate time (at rated. volt.)	8ms max.	
Release time (at rated. volt.)	5ms max.	
Temperature rise ( at rated.volt.)	60K max.	
Shock resistance*	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 4.6g	
Construction	Flux proofed	

Notes: 1)\*Index is not in relay length direction.

2)The data shown above are initial values.

### COIL

Coil power	Approx. 200mW
------------	---------------

### COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC <sup>1)</sup> max.	Drop-out Voltage VDC <sup>1)</sup> min.	Max. <sup>2)</sup> Allowable Voltage VDC	Coil Resistance Ω
3	2.25	0.30	3.90	45 x (1±10%)
5	3.75	0.50	6.50	125 x (1±10%)
6	4.50	0.60	7.80	180 x (1±10%)
9	6.75	0.90	11.7	405 x (1±10%)
12	9.00	1.20	15.6	720 x (1±10%)
18	13.5	1.80	23.4	1600 x (1±10%)
24	18.0	2.40	31.2	2880 x (1±10%)
36	27.0	3.60	46.8	6480 x (1±10%)
48	36.0	4.80	62.4	11520 x (1±10%)

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

2) Maximum voltage is refers to the relay coil in a short period of time can bear the biggest values.

### SAFETY APPROVAL RATINGS(PENDING)

UL/CUL	VDE
1 Form A	1 Form A
1 Form C	1 Form C

8A 250/277VAC Resistive 85°C  
 6A 250/277VAC Resistive 85°C  
 5A 30VDC Resistive 85°C  
 6A 250VAC General purpose 85°C  
 10A 120VAC General purpose 85°C  
 1/4HP 240/277VAC Motor 40°C  
 B300 Pilot duty 40°C  
 NO:8A 250/277VAC Resistive 85°C  
 NO:6A 250/277VAC Resistive 85°C  
 CO:5A 250/277VAC Resistive 85°C  
 8A 250/277VAC Resistive 85°C  
 6A 250/277VAC Resistive 85°C  
 6A 30VDC Resistive 85°C AgSnO<sub>2</sub>  
 8A 30VDC Resistive 85°C AgSnO<sub>2</sub>  
 NO:8A 250/277VAC Resistive 85°C  
 NO:6A 250/277VAC Resistive 85°C  
 NO:6A 30VDC Resistive 85°C AgSnO<sub>2</sub>  
 NO:8A 30VDC Resistive 85°C AgSnO<sub>2</sub>  
 CO:5A 250VAC/30VDC Resistive 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

## ORDERING INFORMATION

Type	HF171F /	12	-H	T	(XXX)
Coil voltage :	3,5,6,9,12,18,24,36,48VDC				
Contact arrangement	H: 1 Form A	Z: 1 Form C			
Construction	T: AgSnO <sub>2</sub>	3: AgNi			
Special code <sup>2)</sup>	XXX: Customer special requirement		Nil: Standard		

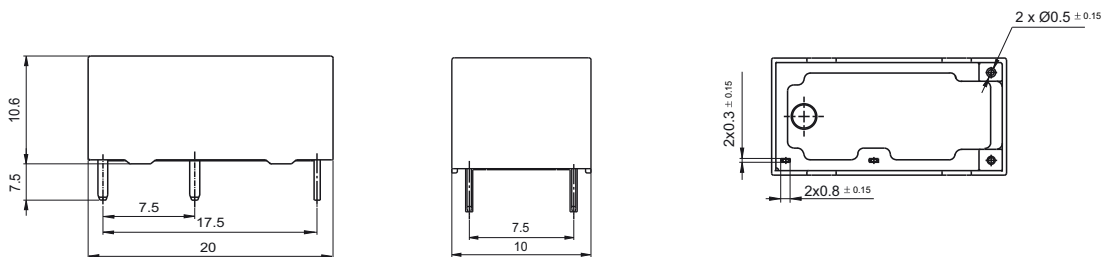
Notes: 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S,SO<sub>2</sub>,NO<sub>2</sub> dust,etc).  
 2) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

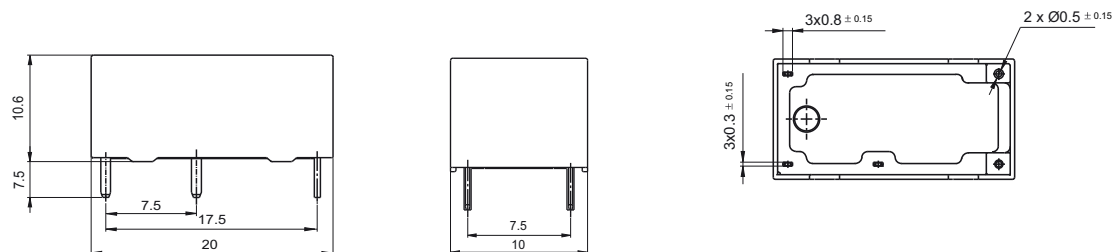
Unit: mm

### Outline Dimensions

#### 1 Form A

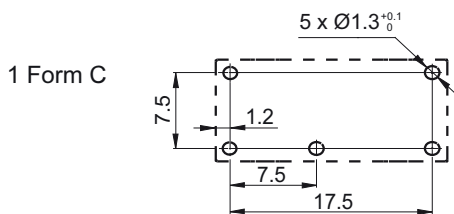
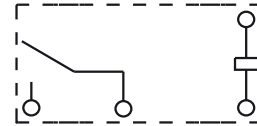
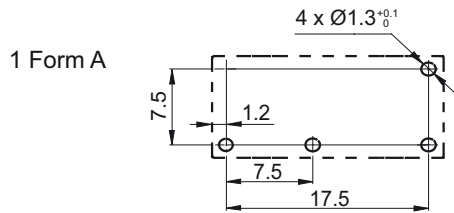


#### 1 Form C



**Wiring Diagram**  
(Bottom view)

**PCB Layout**  
(Bottom view)



Remark: 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  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .  
2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .

**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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# HF33F

# SUBMINIATURE INTERMEDIATE POWER RELAY



File No.:E134517



File No.:125661



File No.:CQC12002076530



## Features

- Provide 5A 250VAC to meet 300000 switching capability specifications
- Creepage distance: 8mm (coil & contacts)
- Clearance distance: NO type 4.5mm, NC type 4mm
- 1 Form A , 1 Form B and 1 Form C configurations
- Subminiature, standard PCB layout
- Plastic sealed and flux proofed types available
- UL insulation system: Class F
- Product in accordance to IEC 60335-1 available

## CONTACT DATA

Contact arrangement	1A, 1C,1B			
Contact resistance	100mΩ max.(at 1A 6VDC)			
Contact material	AgSnO <sub>2</sub> , AgNi, AgCdO			
Contact rating (Res. load)	1A	1C		1B
		NO	NC	NC
	5A 250VAC 5A 30VDC 10A 125VAC	5A 250VAC 5A 30VDC 10A 125VAC	3A 250VAC 3A 30VDC	5A 250VAC
Max. switching current	10A		3A	5A
Max. switching power	1250VA /150W		750V	1250V
Max. switching voltage	250VAC / 30VDC			250VAC
Mechanical endurance	5 x 10 <sup>6</sup> ops			
Electrical endurance	H type:3 x 10 <sup>5</sup> ops (5A 250VAC, Resistive load, Room temp., 1s on 1s off) Z type:1 x 10 <sup>5</sup> ops (NO:5A/NC:3A 250VAC,Resistive load, Room temp., 1.5s on 1.5s off) D type:1 x 10 <sup>4</sup> ops (5A 250VAC, Resistive load, Room temp., 1s on 1s off)			

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at rated. volt.)	8ms max.	
Release time (at rated. volt.)	5ms max.	
Ambient operating temperature	-40°C to 70°C	
Humidity	5% to 85% RH	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Termination	PCB	
Unit weight	Approx. 7g	
Construction	Plastic sealed, Flux proofed	

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

## COIL

Coil power	Standard: Approx. 450mW; Sensitive: Approx. 200mW
------------	--

## COIL DATA

at 23°C

### Standard Type

Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Max. Voltage VDC *	Coil Resistance Ω
3	2.25	0.15	3.9	20 x (1±10%)
5	3.75	0.25	6.5	55 x (1±10%)
6	4.50	0.30	7.8	80 x (1±10%)
9	6.75	0.45	11.7	180 x (1±10%)
12	9.00	0.60	15.6	320 x (1±10%)
18	13.5	0.90	23.4	720 x (1±10%)
24	18.0	1.20	31.2	1280 x (1±10%)
48	36.0	2.40	62.4	5120 x (1±10%)

### Sensitive type (Only for 1 Form A)

Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Max. Voltage VDC *	Coil Resistance Ω
3	2.25	0.15	4.5	45 x (1±10%)
5	3.75	0.25	7.5	125 x (1±10%)
6	4.50	0.30	9.0	180 x (1±10%)
9	6.75	0.45	13.5	400 x (1±10%)
12	9.00	0.60	18.0	720 x (1±10%)
18	13.5	0.90	27.0	1600 x (1±10%)
24	18.0	1.20	36.0	2800 x (1±10%)
48	36.0	2.40	72.0	11520 x (1±10%)

Notes: \*Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.10



## SAFETY APPROVAL RATINGS

<b>UL/CUL</b>	1 Form A	AgCdO	5A 250VAC/30VDC at 40°C 8A 250VAC at 40°C 10A 125VAC at 40°C 10A 277VAC COSØ=0.4 at 40°C 1/10HP 125VAC, 1/6HP 250VAC at 40°C
		AgNi	5A 250VAC/30VDC at 70°C 8A 250VAC at 70°C 10A 125VAC at 70°C 10A 277VAC COSØ=0.4 at 70°C 1/10HP 125VAC, 1/6HP 250VAC at 70°C
		AgSnO <sub>2</sub>	5A 250VAC/30VDC at 70°C 10A 125VAC at 70°C
	1 Form C	AgCdO	NO:5A 250VAC/30VDC at 40°C NC:3A 250VAC/30VDC at 40°C
		AgNi AgSnO <sub>2</sub>	NO:5A 250VAC/30VDC at 70°C NC:3A 250VAC/30VDC at 70°C
	<b>VDE</b>	1 Form A	AgNi
AgCdO			5A 250VAC at 70°C
AgSnO <sub>2</sub>			5A 250VAC at 70°C
1 Form C		AgCdO AgNi AgSnO <sub>2</sub>	NO: 5A 250VAC at 70°C* NC: 3A 250VAC at 70°C*
<b>CQC</b>	1 Form A	AgNi AgCdO AgSnO <sub>2</sub>	5A 250VAC/30VDC at 85°C NO: 5A 250VAC at 70°C NC: 5A 250VAC at 70°C
	1 Form C	AgNi AgCdO AgSnO <sub>2</sub>	NO:5A 250VAC/30VDC at 85°C NC:3A 250VAC/30VDC at 85°C
	1 Form B	AgNi AgCdO AgSnO <sub>2</sub>	NC:5A 250VAC at 40°C

**Notes:** 1) \*The vent hole is kept open during load approval;  
2) All values unspecified are at room temperature.  
3) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

<b>Type</b>	HF33F / 012 -H S L 3 F (XXX)
<b>Coil voltage</b>	3, 5, 6, 9, 12, 18, 24, 48VDC
<b>Contact arrangement</b>	H: 1 Form A      Z: 1 Form C D: 1 Form B
<b>Construction</b> <sup>1)</sup>	S: Plastic sealed      Nil: Flux proofed
<b>Coil power</b>	L: Sensitive (Only for 1 Form A)      Nil: Standard
<b>Contact material</b>	T: AgSnO <sub>2</sub> 3: AgNi      Nil: AgCdO
<b>Insulation standard</b>	F: Class F
<b>Special code</b> <sup>3)</sup>	XXX: Customer special requirement      Nil: Standard

**Notes:** 1) Under the ambience with dangerous gas like H<sub>2</sub>S, SO<sub>2</sub> or NO<sub>2</sub>, plastic sealed type is recommended; Please test the relay in real applications. If the ambience allows, flux proofed type is preferentially recommended.  
2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.  
3) The customer special requirement express as special code after evaluating by Hongfa.

# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

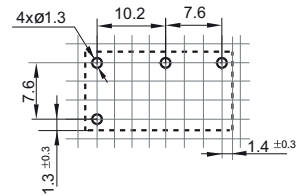
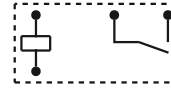
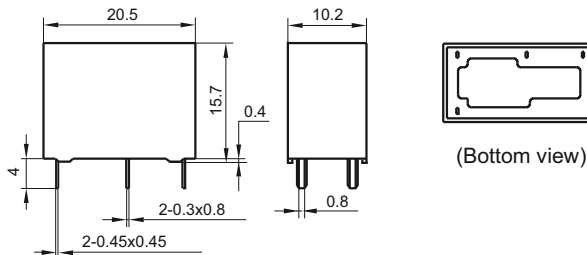
Unit: mm

## Outline Dimensions

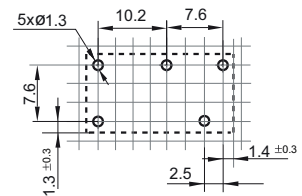
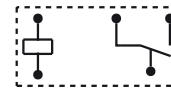
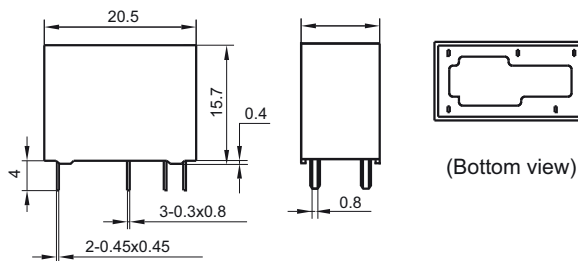
## Wiring Diagram (Bottom view)

## PCB Layout (Bottom view)

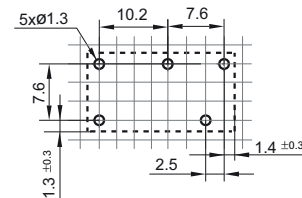
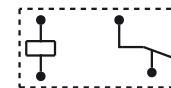
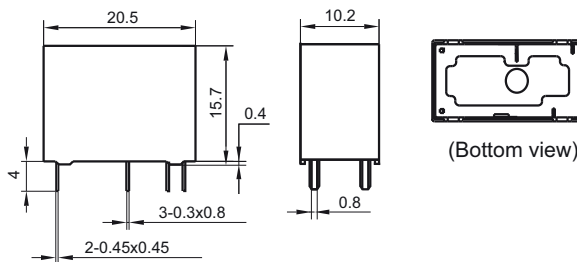
### 1 Form A



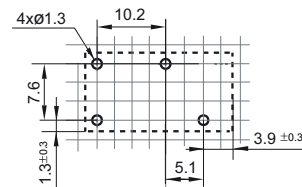
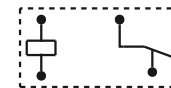
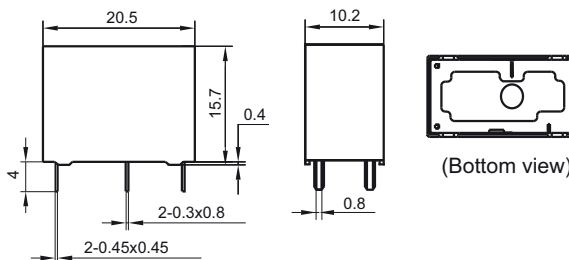
### 1 Form C



### 1 Form B (With 5 terminal)



### 1 Form B (With 4 terminal)



Remark:1) \* The additional tin top is max. 1mm.

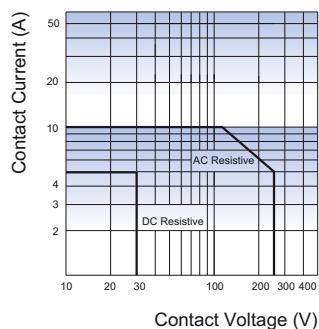
2) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.

3) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.

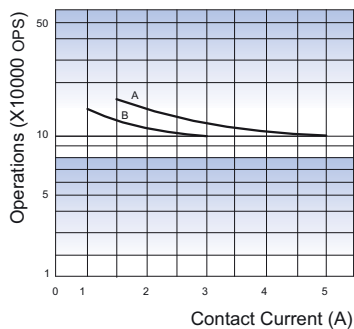
4) The width of the gridding is 2.54mm.

## CHARACTERISTIC CURVES

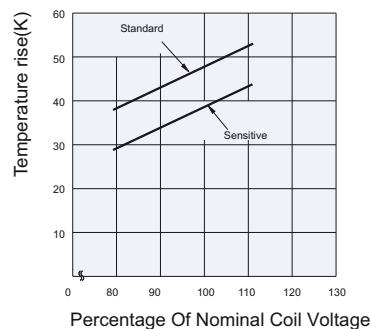
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Notes:**

1. Curve A: NO contact
- Curve B: NC contact

**2. Test conditions:**

Curve A: NO, Resistive load, Room temp., flux proofed, 250VAC/30VDC, 1s on 9s off  
 Curve B: NC, Resistive load, Room temp., flux proofed, 250VAC/30VDC, 1s on 9s off

**Notes:**

Standard: 5A at 70°C  
 Sensitive: 5A at 70°C  
 Mounting distance: 10mm

**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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# HF36F

# SUBMINIATURE INTERMEDIATE POWER RELAY



File No.:E134517



File No.:R50356442



File No.:CQC16002159838



## Features

- 10A switching capability
- TV-5 125VAC approved by UL standard (only for 1 Form A)
- Plastic sealed and flux proofed types available
- 1 Form A and 1 Form C configurations

## CONTACT DATA

Contact arrangement	1A, 1C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub> , AgCdO
Contact rating	10A 250VAC 10A 30VDC TV-5 125VAC
Max. switching voltage	250VAC / 30VDC
Max. switching current	10A
Max. switching power	2500VA / 300W
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance	5 x 10 <sup>4</sup> OPS (10A 250VAC, Resistive load, Room temp., 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)
Dielectric strength	Between coil & contacts NO: 4000VAC 1min NC: 3000VAC 1min
	Between open contacts 1000VAC 1min
Operate time (at rated. volt.)	15ms max.
Release time (at rated. volt.)	5ms max.
Humidity	5% to 85% RH
Ambient temperature	-40°C to 70°C
Shock resistance	Functional 196m/s <sup>2</sup>
	Destructive 980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA
Termination	PCB
Unit weight	Approx. 12g
Construction	Plastic sealed, Flux proofed

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

2) Please find coil temperature curve in the characteristic curves below.

3) UL insulation system: Class A.

## COIL

Coil power	Standard: Approx. 530mW; Sensitive: Approx. 250mW
------------	--

## COIL DATA

at 23°C

### Standard type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC * <sup>2)</sup>	Coil Resistance Ω
5	3.75	0.25	6.5	47 x (1±10%)
6	4.50	0.30	7.8	68 x (1±10%)
9	6.75	0.45	11.7	155 x (1±10%)
12	9.00	0.60	15.6	270 x (1±10%)
18	13.5	0.90	23.4	620 x (1±10%)
24	18.0	1.20	31.2	1080 x (1±10%)
48	36.0	2.40	62.4	4400 x (1±10%)

### Sensitive type (Only for 1 Form A)

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC * <sup>2)</sup>	Coil Resistance Ω
5	3.75	0.25	6.5	100 x (1±10%)
6	4.50	0.30	7.8	145 x (1±10%)
9	6.75	0.45	11.7	325 x (1±10%)
12	9.00	0.60	15.6	575 x (1±10%)
18	13.5	0.90	23.4	1300 x (1±10%)
24	18.0	1.20	31.2	2310 x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	1 Form C	10A 250VAC 10A 30VDC
	1 Form A	10A 250VAC 10A 30VDC TV-5 125VAC
TÜV		10A 250VAC COSØ =1 10A 30VDC L/R=0

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

Type	HF36F / 012 -H S L T (XXX)					
Coil voltage	5, 6, 9, 12, 18, 24, 48VDC					
Contact arrangement	H: 1 Form A		Z: 1 Form C			
Construction <sup>1)</sup>	S: Plastic sealed		Nil: Flux proofed			
Coil power	L: Sensitive (Only for 1 Form A)		Nil: Standard			
Contact material	T: AgSnO <sub>2</sub>		Nil: AgCdO			
Special code <sup>3)</sup>	XXX: Customer special requirement			Nil: Standard		

Notes: 1) Under the ambience with dangerous gas like H<sub>2</sub>S, SO<sub>2</sub> or NO<sub>2</sub>, plastic sealed type is recommended; Please test the relay in real applications. If the ambience allows, flux proofed type is preferentially recommended.

2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

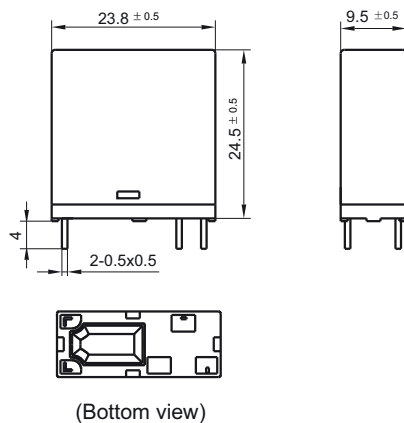
3) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

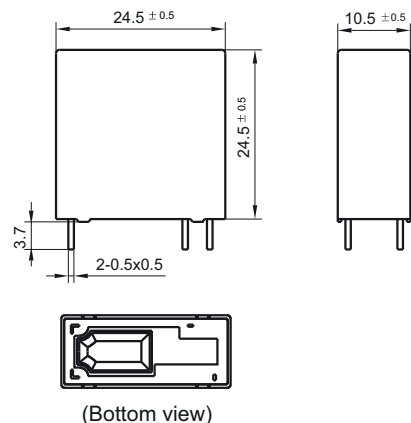
Unit: mm

### Outline Dimensions

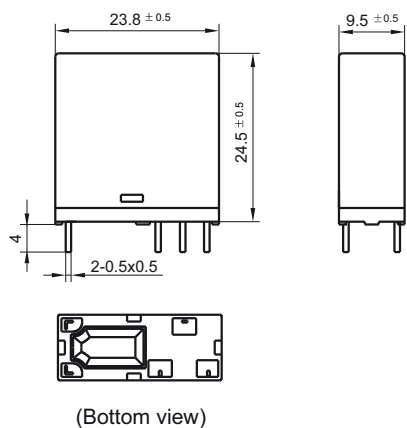
1 Form A & Flux proofed



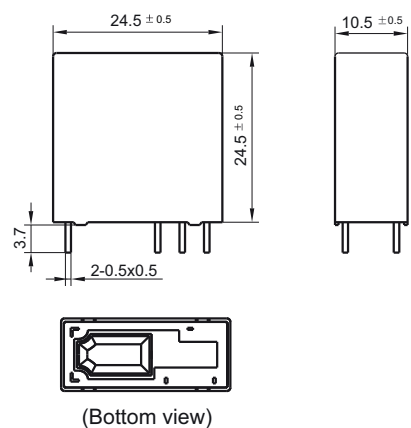
1 Form A & Plastic sealed



1 Form C & Flux proofed



1 Form C & Plastic sealed

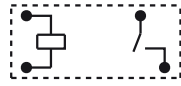


# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

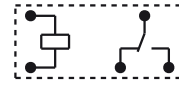
Unit: mm

## Wiring Diagram (Bottom view)

1 Form A

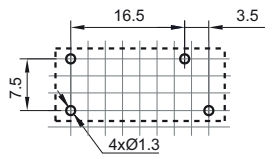


1 Form C

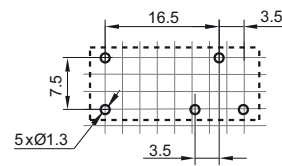


## PCB Layout (Bottom view)

1 Form A



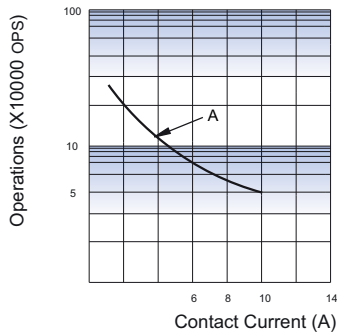
1 Form C



- Remark: 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  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .  
 3) The width of the gridding is 2.5mm.

# CHARACTERISTIC CURVES

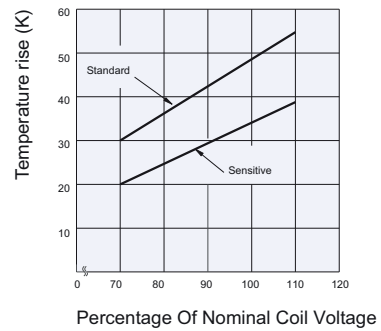
ENDURANCE CURVE



**Notes:**

- (1) Curve A: H type
- (2) Test conditions:  
 10A 250VAC, Resistive load,  
 Room temp., 1s on 9s off

COIL TEMPERATURE RISE



## Disclaimer

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# HF36FD

# SUBMINIATURE INTERMEDIATE POWER RELAY



File No.:E134517



File No.:R50356444



File No.:CQC16002159846



## Features

- 10A switching capability
- TV-8 125VAC approved by UL standard (118A inrush current)
- Ideal for device power reduction

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating	10A 250VAC 5A 250VAC 5A 30VDC TV-8 125VAC
Max. switching voltage	250VAC / 30VDC
Max. switching current	10A
Max. switching power	2500VA / 150W
Mechanical endurance	1 x 10 <sup>6</sup> OPS 5 x 10 <sup>4</sup> OPS
Electrical endurance	(10A 250VAC, Resistive load, Room temp., 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage	10kV (1.2 / 50μs)	
Operate time (at rated. volt.)	15ms max.	
Release time (at rated. volt.)	5ms max.	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 70°C	
Shock resistance	Functional	196m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Termination	PCB	
Unit weight	Approx. 12g	
Construction	Flux proofed	

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

2) Please find coil temperature curve in the characteristic curves below.

3) UL insulation system: Class A

## COIL

Coil power	Standard: Approx. 530mW; Sensitive: Approx. 250mW
------------	--

## COIL DATA

at 23°C

### Standard type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC *2)	Coil Resistance Ω
5	3.75	0.25	6.5	47 x (1±10%)
6	4.50	0.30	7.8	68 x (1±10%)
9	6.75	0.45	11.7	155 x (1±10%)
12	9.00	0.60	15.6	270 x (1±10%)
18	13.5	0.90	23.4	620 x (1±10%)
24	18.0	1.20	31.2	1080 x (1±10%)
48	36.0	2.40	62.4	4400 x (1±10%)

### Sensitive type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC *2)	Coil Resistance Ω
5	4.00	0.25	6.5	100 x (1±10%)
6	4.80	0.30	7.8	145 x (1±10%)
9	7.20	0.45	11.7	325 x (1±10%)
12	9.60	0.60	15.6	575 x (1±10%)
18	14.4	0.90	23.4	1300 x (1±10%)
24	19.2	1.20	31.2	2310 x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	10A 250VAC 5A 250VAC TV-8 125VAC
TÜV	10A 250VAC 5A 250VAC/30VDC

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

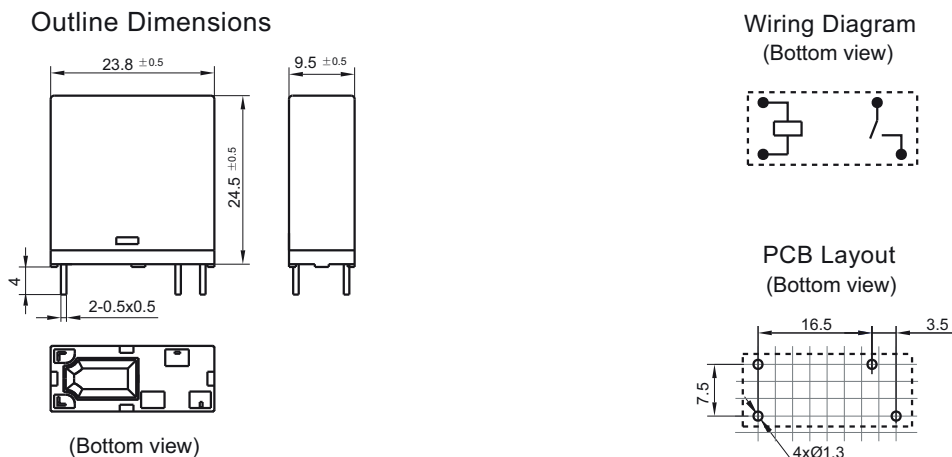
## ORDERING INFORMATION

Type	HF36FD / 012 -H L T (XXX)		
Coil voltage	5, 6, 9, 12, 18, 24, 48VDC		
Contact arrangement	H: 1 Form A		
Coil power	L: Sensitive	Nil: Standard	
Contact material	T: AgSnO <sub>2</sub>		
Special code <sup>3)</sup>	XXX: Customer special requirement	Nil: Standard	

- Notes: 1) Water cleaning or surface process is not suggested after the flux-proofed relays are assembled on PCB.  
 2) Flux-proofed relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.  
 3) The customer special requirement express as special code after evaluating by Hongfa.

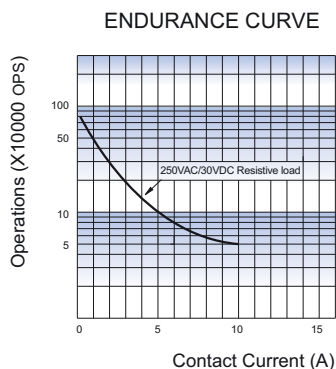
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

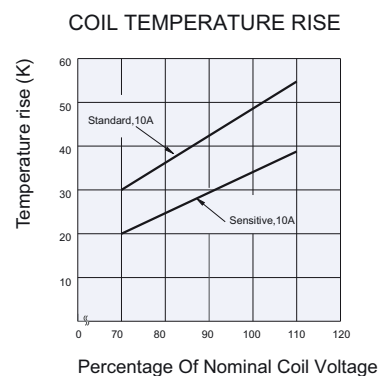


- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤ 1mm, tolerance should be ±0.2mm; outline dimension > 1mm and ≤ 5mm, tolerance should be ±0.3mm; outline dimension > 5mm, tolerance should be ±0.4mm.  
 2) The tolerance without indicating for PCB layout is always ±0.1mm.  
 3) The width of the gridding is 2.5mm.

## CHARACTERISTIC CURVES



**Test conditions:**  
 10A 250VAC, Resistive load,  
 Room temp., 1s on 9s off.



### Disclaimer

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# HF162F

# SUBMINIATURE INTERMEDIATE POWER RELAY



File No.:E133481



File No.:40032669



File No.:CQC10002050942



## Features

- High inrush current: TV-8 125VAC (117A inrush current)
- 3A/100A 250VAC capacitive load
- High sensitivity: 250mW,  
Ideal for device power reduction
- Typical applications: Flat-panel TVs, Audio visual equipment and other slim profile devices

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	Silver alloy
Contact rating	10A 125VAC 8A 277VAC 5A 277VAC TV-8 125VAC 3A/100A 250VAC (Capacitive)
Max. switching voltage	277VAC
Max. switching current	10A
Max. switching power	2216VA
Mechanical endurance	1 x 10 <sup>6</sup> OPS 5 x 10 <sup>4</sup> OPS
Electrical endurance	(10A 125VAC, Resistive load, Room temp., 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 / 50μs)	
Operate time (at rated. volt.)	15ms max.	
Release time (at rated. volt.)	5ms max.	
Ambient temperature	-40°C to 70°C	
Humidity	5% to 85% RH	
Shock resistance	Functional	196m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Termination	PCB	
Unit weight	Approx. 12g	
Construction	Flux proofed	

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

2) Please find coil temperature curve in the characteristic curves below.

3) UL insulation system: Class A

## COIL

Coil power	Approx. 250mW
------------	---------------

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. 1)	Drop-out Voltage VDC min. 1)	Max. Voltage VDC *2)	Coil Resistance Ω
3	2.25	0.3	3.9	36 x (1±10%)
5	3.75	0.5	6.5	100 x (1±10%)
6	4.5	0.6	7.8	145 x (1±10%)
9	6.75	0.9	11.7	325 x (1±10%)
12	9.0	1.2	15.6	575 x (1±10%)
18	13.5	1.8	23.4	1300 x (1±10%)
24	18.0	2.4	31.2	2300 x (1±10%)

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

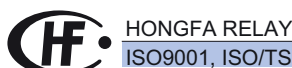
2)\*Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## SAFETY APPROVAL RATINGS

UL/CUL	10A 125VAC
	8A 277VAC
	5A 277VAC
	TV-8 125VAC
VDE	8A 250VAC
	5A 250VAC
	3A/100A 250VAC

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

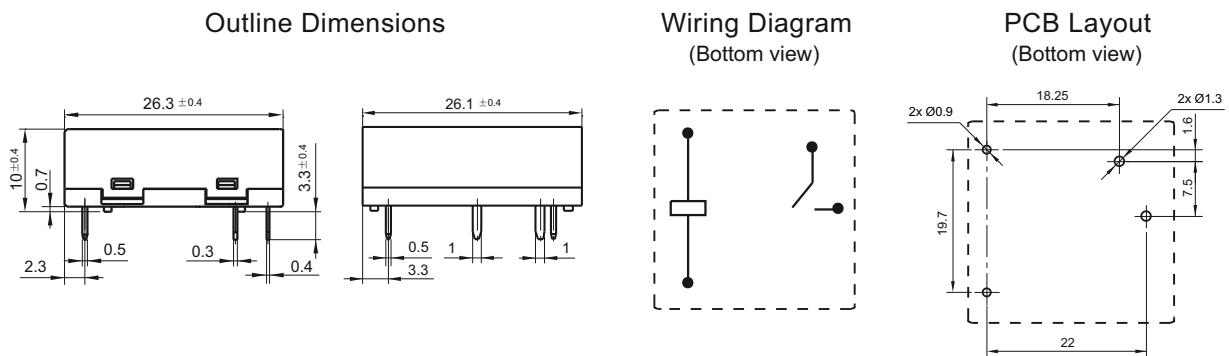
## ORDERING INFORMATION

Type	HF162F /	12	-H	(XXX)
Coil voltage	3, 5, 6, 9, 12, 18, 24VDC			
Contact arrangement	H: 1 Form A			
Special code <sup>1)</sup>	XXX: Customer special requirement	Nil: Standard		

Notes: 1) The customer special requirement express as special code after evaluating by Hongfa.

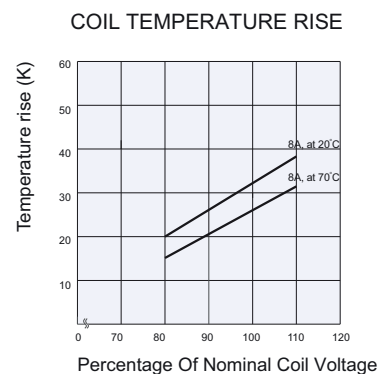
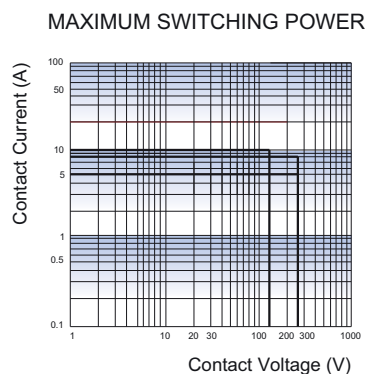
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm



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

## CHARACTERISTIC CURVES



### 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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# HF8

# SUBMINIATURE INTERMEDIATE POWER RELAY



File No.:E134517



File No.:40025189



## Features

- 4kV impulse withstand voltage (between coil and contacts)
- 1 Form A and 1 Form C configurations
- Subminiature, high sensitive, PCB layout
- Plastic sealed type for automatic wave soldering

## CONTACT DATA

Contact arrangement	1A, 1C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 24VDC)
Contact material	AgNi
Contact rating (Res. load)	HF8: 6A 300VAC/28VDC HF8A: 6A 277VAC/30VDC
Max. switching voltage	300VAC / 30VDC
Max. switching current	6A
Max. switching power	1800VA / 300W
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance <sup>2)</sup>	Plastic sealed: 1 x 10 <sup>4</sup> OPS Flux proofed, Standard type: 1 x 10 <sup>5</sup> OPS Flux proofed, Sensitive type: 5 x 10 <sup>4</sup> OPS (NO, 6A 300VAC, Resistive load, Room temp., 1s on 9s off)

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

2) For plastic sealed type, the venting-hole should be excised in electrical endurance test.

## CHARACTERISTICS

Insulation resistance	100MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2000VAC 1min
	Between open contacts	750VAC 1min
Operate time (at rated. volt.)	6ms max.	
Release time (at rated. volt.)	3ms max.	
Humidity	5% to 85% RH	
Operation ambient temperature	-55°C to 90°C	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Termination	PCB	
Unit weight	Approx. 11g	
Construction	Plastic sealed, Flux proofed	

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

2) Please find coil temperature curve in the characteristic curves below.

3) UL insulation system: Class F, Class B, Class A.

## COIL

Coil power	Standard: Approx. 450mW (48VDC: Approx. 600mW)
	Sensitive: Approx. 330mW

## COIL DATA

at 23°C

### Standard type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>2)</sup>	Drop-out Voltage VDC min. <sup>2)</sup>	Max. Voltage VDC * <sup>3)</sup>	Coil Resistance Ω
3	2.25	0.15	3.90	20 x (1±10%)
5	3.75	0.25	6.50	56 x (1±10%)
6	4.50	0.30	7.80	80 x (1±10%)
9	6.75	0.45	11.7	180 x (1±10%)
12	9.00	0.60	15.6	320 x (1±10%)
18	13.5	0.90	23.4	720 x (1±10%)
24	18.0	1.20	31.2	1280 x (1±10%)
48	36.0	2.40	62.4	3800 x (1±10%)

### Sensitive type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>2)</sup>	Drop-out Voltage VDC min. <sup>2)</sup>	Max. Voltage VDC * <sup>3)</sup>	Coil Resistance Ω
3	2.25	0.15	3.90	28 x (1±10%)
5	3.75	0.25	6.50	80 x (1±10%)
6	4.50	0.30	7.80	110 x (1±10%)
9	6.75	0.45	11.7	250 x (1±10%)
12	9.00	0.60	15.6	440 x (1±10%)
18	13.5	0.90	23.4	1000 x (1±10%)
24	18.0	1.20	31.2	1780 x (1±10%)
48	36.0	2.40	62.4	7120 x (1±10%)

Notes: 1) When requiring pick-up voltage < 75% of nominal voltage, special order allowed.

2) The data shown above are initial values.

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



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

## SAFETY APPROVAL RATINGS

UL/CUL	Medium Duty HF8-1CH/1AH	6A 28VDC 6A 300VAC
	General Duty HF8-1C/1A	2A 28VDC 2A 300VAC 3A 120VAC
	HF8A	6A 30VDC(NO/NC) 6A 277VAC(NO/NC)
VDE	HF8....A	2.5A 250VAC COS $\phi$ =0.4 2.5A 250VAC COS $\phi$ =0.5 5A 250VAC COS $\phi$ =1 6A 250VAC COS $\phi$ =1

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

	<b>HF8</b> <b>HF8A</b>	<b>-1C</b>	<b>H</b>	<b>-12</b>	<b>D</b>	<b>S</b>	<b>E</b>	<b>F</b>	<b>(XXX)</b>
Type	HF8: Standard type HF8A: Low cost type								
Contact arrangement:	1A: 1 Form A 1C: 1 Form C								
Contact capacity	H: Medium Duty (6A) Nil: General Duty (3A/2A)								
Coil voltage	3, 5, 6, 9, 12, 18, 24, 48VDC								
Coil voltage form	D: DC								
Coil power	S: Sensitive      Nil: Standard								
Construction <sup>1)</sup>	E: Plastic sealed      Nil: Flux proofed								
Insulation standard	F: Class F      A: Class A (VDE version, Only for HF8-1AH/1CH) Nil: Class B								
Special code <sup>3)</sup>	XXX: Customer special requirement      Nil: Standard								

Notes: 1) Under the ambience with dangerous gas like H<sub>2</sub>S, SO<sub>2</sub> or NO<sub>2</sub>, plastic sealed type is recommended; Please test the relay in real applications. If the ambience allows, flux proofed type is preferentially recommended.

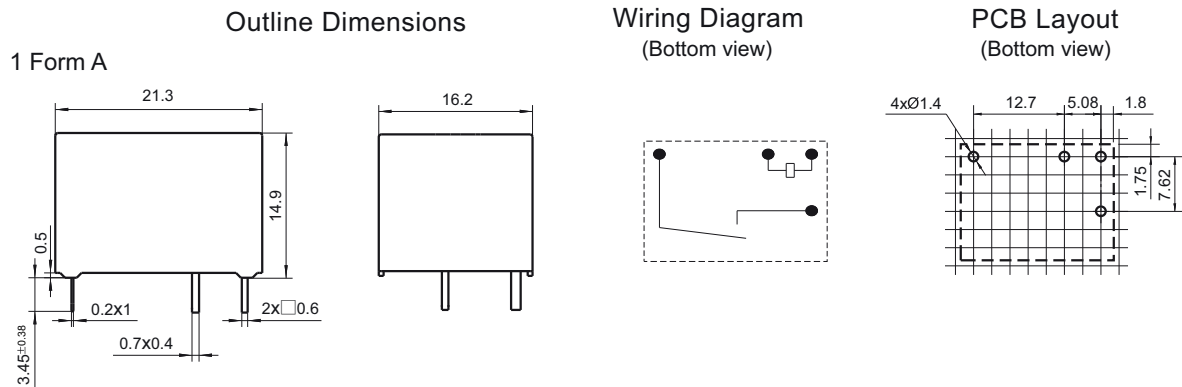
2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

3) The customer special requirement express as special code after evaluating by Hongfa.

4) One packing methods available: tube package, Standard tube packing length is 345mm. Any special requirement needed, please contact us for more details.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm



# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

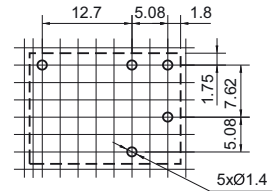
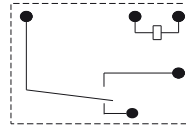
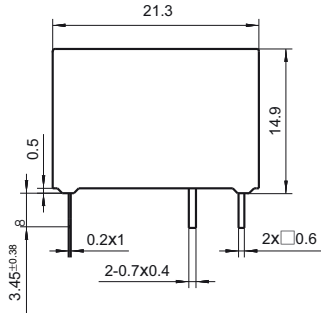
Unit: mm

## Outline Dimensions

## Wiring Diagram (Bottom view)

## PCB Layout (Bottom view)

### 1 Form C

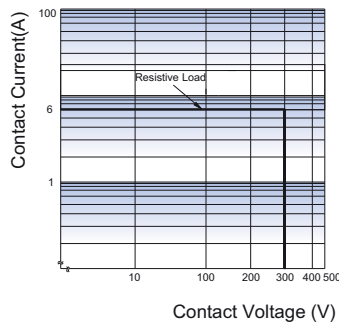


Remark: 1) \* The additional tin top is max. 1mm.

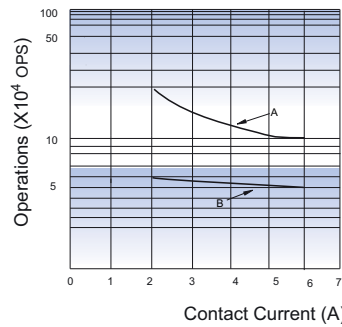
- 2) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.
- 3) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.
- 4) The width of the gridding is 2.54mm.

# CHARACTERISTIC CURVES

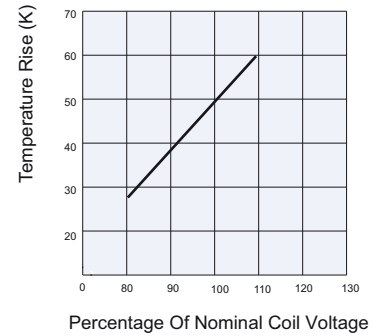
## MAXIMUM SWITCHING POWER



## ENDURANCE CURVE



## COIL TEMPERATURE RISE



### Notes:

- 1) Curve A: HF8-1CH Standard type  
Curve B: HF8-1CH Sensitive type
- 2) Test conditions:  
NO, 6A 300VAC, Resistive load,  
Flux proofed, Room temp.  
1s on 9s off
- 3) For plastic sealed type, the venting-hole should be excised in electrical endurance test.

Testing conditions: 6A at 90°C.  
Mounting distance: 25mm

## 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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# HF3FA

# SUBMINIATURE HIGH POWER RELAY



File No.: E134517



File No.: 40023708



File No.:CQC12002076529



## Features

- 15A 125VAC;10A 250VAC switching capability
- Flammability class according to UL94, V-0
- CTI 250 available
- Product in accordance to IEC 60335-1 available
- 1 Form A and 1 Form C configurations
- Subminiature, standard PCB layout
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A	1C	
		NO	NC
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)		
Contact material	AgSnO <sub>2</sub> :AgNi:AgCdO		
Contact rating (Res. load)	10A 277VAC 10A 28VDC	10A 277VAC <sup>2)</sup> 10A 28VDC <sup>2)</sup>	5A 250VAC
Max. switching voltage	277VAC/28VDC		250VAC
Max. switching current	15A	10A	5A
Max. switching power	2770VA /280W		
Mechanical endurance	1 x 10 <sup>7</sup> OPS		
Electrical endurance <sup>3)</sup>	H type:1 x 10 <sup>5</sup> OPS (10A 250VAC Resistive load, Room temp., 1s on 9s off)		
	Z type:5 x 10 <sup>4</sup> OPS (NO: 5A/NC: 5A 250VAC, Resistive load, Room temp., 3s on 3s off)		

**Notes:** 1) The data shown above are initial values.  
2) Applicable when NC is not energized with load.  
3) For plastic sealed type, the venting-hole should be opened in electrical endurance test.

## CHARACTERISTICS

Insulation resistance	100MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2500VAC 1min
	Between open contacts	750VAC 1min
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	5ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 7.2g	
Construction	Plastic sealed, Flux proofed	

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

## COIL

Coil power Approx. 360mW

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC * <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.3	3.9	25 x (1±10%)
5	3.75	0.5	6.5	70 x (1±10%)
6	4.50	0.6	7.8	100 x (1±10%)
9	6.75	0.9	11.7	225 x (1±10%)
12	9.00	1.2	15.6	400 x (1±10%)
15	11.25	1.5	19.5	625 x (1±10%)
18	13.5	1.8	23.4	900 x (1±10%)
24	18.0	2.4	31.2	1600 x (1±10%)
48	36.0	4.8	62.4	6400 x (1±10%)

**Notes:** 1) The data shown above are initial values.  
2) \*Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## SAFETY APPROVAL RATINGS

UL/CUL	1 Form A	10A 250VAC at 85°C 8A 277VAC at 85°C 6A 250VAC at 105°C 15A 125VAC TV-5 120VAC
	1 Form C	NO/NC: 5A/5A 277VAC at 85°C
VDE	1 Form A	6A 250VAC at 105°C 10A 250VAC at 85°C
	1 Form C	NO: 10A 250VAC at 85°C NO: 6A 250VAC at 105°C NO/NC: 5A/5A 250VAC at 85°C

**Notes:** 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.  
3) For sealed type, the vent-hole cover should be excised.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

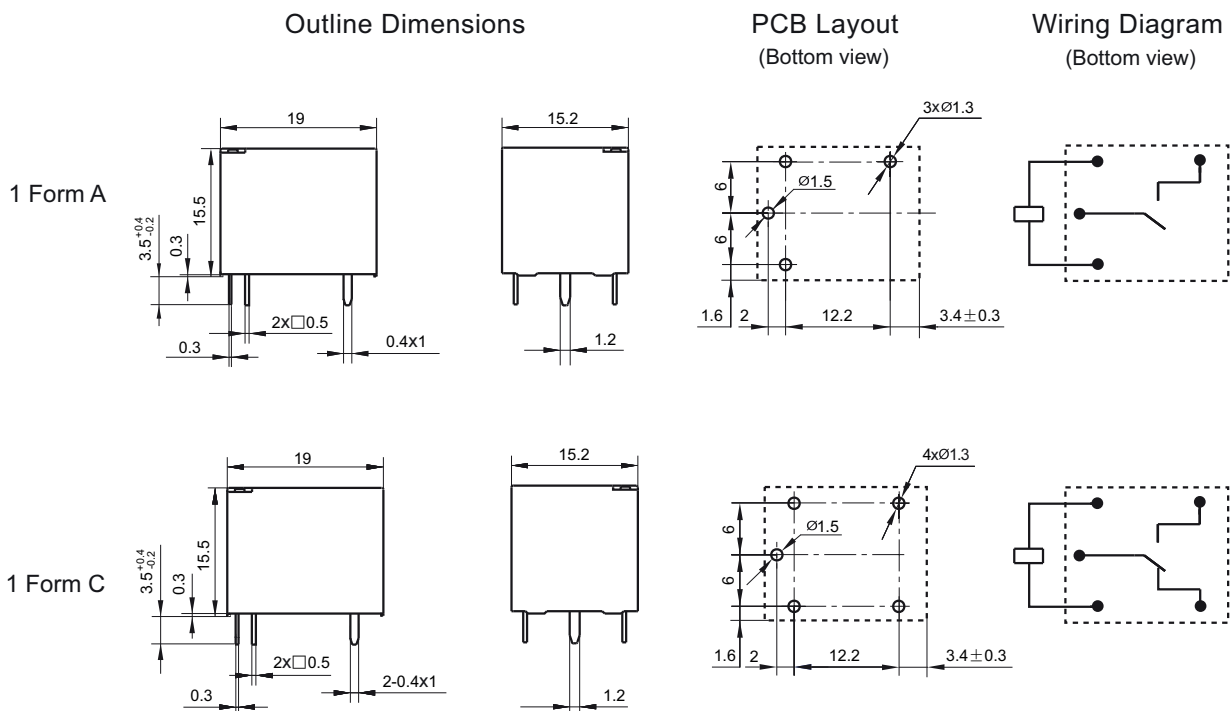
## ORDERING INFORMATION

Type	HF3FA / 012 -H S T F (XXX)					
Coil voltage	3,5,6,9,12,15,18,24,48VDC					
Contact arrangement	H: 1 Form A		Z: 1 Form C			
Construction <sup>1)</sup>	S: Plastic sealed		Nil: Flux proofed			
Contact material	T: AgSnO <sub>2</sub>		3: AgNi		Nil: AgCdO	
Insulation system	F: Class F					
Special code <sup>3)</sup>	XXX: Customer special requirement			Nil: Standard		

- Notes:**
- 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).
  - 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
  - 3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).
  - 4) Two packing methods available: paper box package, tube package, Standard tube packing length is 450mm. Any special requirement needed, please contact us for more details.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

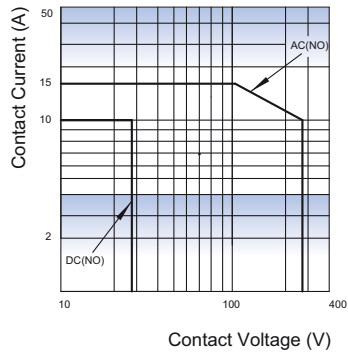


Remark: 1) \* The additional tin top is max. 1mm.

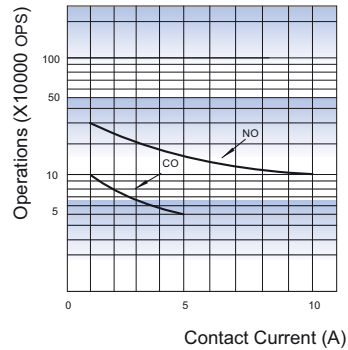
- 2) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.
- 3) The tolerance without indicating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

## CHARACTERISTIC CURVES

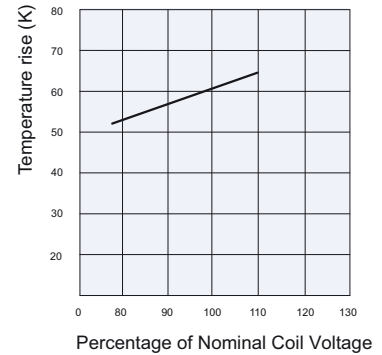
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Test conditions:**

NO: Resistive load, Flux proofed,  
Room temp., 1s on 9s off  
CO: Resistive load, Flux proofed,  
Room temp., 3s on 3s off

**Notes:** For plastic sealed type, the  
venting-hole should be opened  
in electrical endurance test.

Test conditions: at 85°C, 6A  
Mounting distance: 10mm

**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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# HF3FA-W

# SUBMINIATURE HIGH POWER RELAY



File No.: E134517



File No.: 40023708



File No.:CQC12002076529



## Features

- 10A 36VDC switching capability
- Flammability class according to UL94, V-0
- Product in accordance to IEC 60335-1 available
- Plastic sealed and flux proofed types available
- Subminiature, standard PCB layout
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1C	
	NO	NC
Contact resistance	100mΩ max.(at 1A 6VDC)	
Contact material	AgSnO <sub>2</sub>	
Contact rating (Res. load)	8A 277VAC 10A 36VDC	5A 250VAC
Max. switching voltage	277VAC/36VDC	250VAC
Max. switching current	10A	5A
Max. switching power	2770VA /360W	
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance	NO:1 x 10 <sup>5</sup> OPS ( 10A 24VDC, Resistive load, Room temp., 1s on 9s off)	

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

## CHARACTERISTICS

Insulation resistance	100MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2500VAC 1min
	Between open contacts	750VAC 1min
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	5ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 8.0g	
Construction	Plastic sealed, Flux proofed	

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

## COIL

Coil power	Approx. 800mW
------------	---------------

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>*2)</sup>	Coil Resistance Ω
12	9	0.6	15.6	180 x (1±10%)
24	18	1.2	31.2	720 x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	Z	NO:8A 277VAC at 85°C
		NO:10A 24VDC at 45°C NO:10A 36VDC at 40°C
VDE	Z	NO:8A 250VAC at 85°C
		NO:10A 24VDC at 45°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

3) For sealed type, the vent-hole cover should be excised.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.10

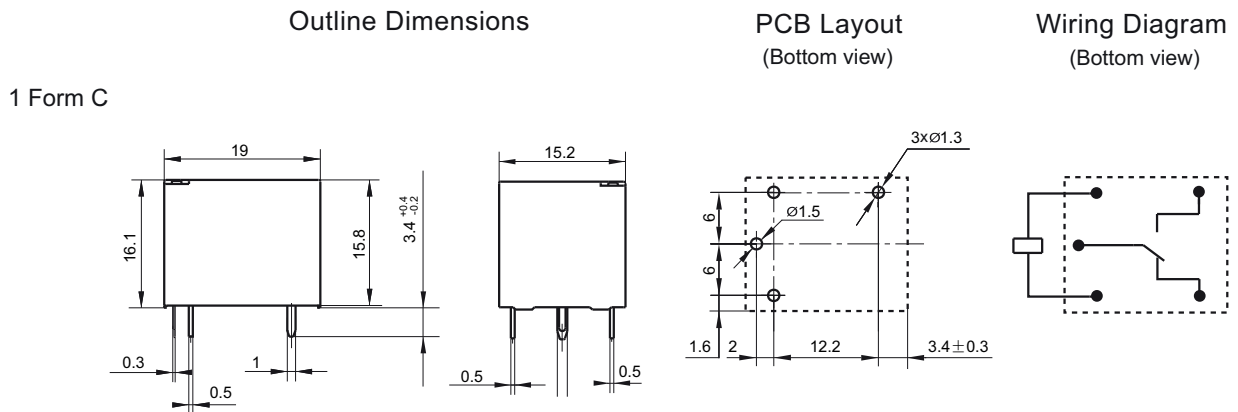
## ORDERING INFORMATION

Type		HF3FA-W/	12	Z	S	T	F	(XXX)
Coil voltage	12, 24VDC							
Contact arrangement	Z: 1 Form C							
Construction <sup>1) 2)</sup>	S: Plastic sealed		Nil: Flux proofed					
Contact material	T: AgSnO <sub>2</sub>							
Insulation system	F: Class F							
Special code <sup>3)</sup>	XXX: Customer special requirement			Nil: Standard				

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

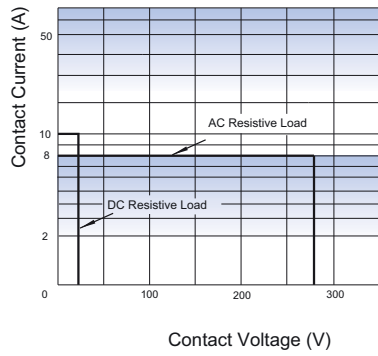
Unit: mm



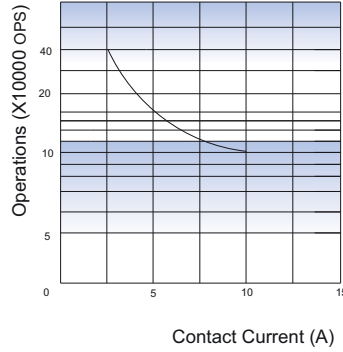
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension >1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension >5mm, tolerance should be ±0.4mm.
- 2) The tolerance without indicating for PCB layout is always ±0.1mm.

## CHARACTERISTIC CURVES

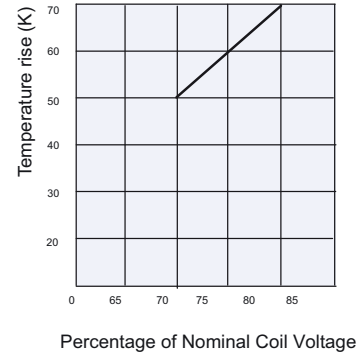
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Test conditions:**

NO: Resistive load, 36VDC, Flux proofed, Room temp., 1s on 9s off

**Test conditions:** at 85°C, 8A

**Mounting distance:** 10mm

**Driving voltage:** Coil activated with rated voltage, then reduce to 80% of rated voltage.

**Disclaimer**

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# HF3FA-T

# SUBMINIATURE HIGH POWER RELAY



File No.: TBD



File No.: TBD



File No.:CQC12002076529



## Features

- High Temperature:105°C
- 15A 125VAC switching capability
- Flame resistance rating UL94.V-0
- Product in accordance to IEC 60335-1 available
- Subminiature, standard PCB layout
- Plastic sealed and flux proofed types available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A	1C	
		NO	NC
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)		
Contact material	AgSnO <sub>2</sub>		
Contact rating (Res. load)	10A 250VAC	10A 250VAC <sup>2)</sup>	6A 250VAC
Max. switching voltage	250VAC	250VAC	250VAC
Max. switching current	15A	15A	6A
Max. switching power	2500VAC		
Mechanical endurance	1 x 10 <sup>7</sup> OPS		
Electrical endurance <sup>3)</sup>	H type: 5 x 10 <sup>4</sup> OPS (10A 250VAC Resistive load, at 105°C)		
	H type: 1 x 10 <sup>5</sup> OPS (10A 250VAC Resistive load, at 85°C)		
	Z type: 5 x 10 <sup>4</sup> OPS (NC: 6A 250VAC, Resistive load, at 105°C)		
	Z type: 5 x 10 <sup>4</sup> OPS (CO: 5A 250VAC, Resistive load, at 105°C)		

**Notes:** 1) The data shown above are initial values.  
2) Applicable when NC is not energized with load.  
3) For plastic sealed type, the venting-hole should be excised in electrical endurance test.

## CHARACTERISTICS

Insulation resistance	100MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2500VAC 1min
	Between open contacts	750VAC 1min
Surge withstand voltage	2.5kV(1.2 x 50μs)	
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	5ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 105°C	
Termination	PCB	
Unit weight	Approx. 7.0g	
Construction	Plastic sealed, Flux proofed	

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

## COIL

Coil power Approx. 360mW

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Max. Voltage VDC *	Coil Resistance Ω
3	2.25	0.3	3.9	25 x (1±10%)
5	3.75	0.5	6.5	70 x (1±10%)
6	4.50	0.6	7.8	100 x (1±10%)
9	6.75	0.9	11.7	225 x (1±10%)
12	9.00	1.2	15.6	400 x (1±10%)
15	11.25	1.5	19.5	625 x (1±10%)
18	13.5	1.8	23.4	900 x (1±10%)
24	18.0	2.4	31.2	1600 x (1±10%)
48	36.0	4.8	62.4	6400 x (1±10%)

**Notes:** \*Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## SAFETY APPROVAL RATINGS

UL/CUL	1 Form A	10A 250VAC at 85°C 10A 250VAC at 105°C 12A 250VAC at 105°C TV-5 120VAC
	1 Form C	NO: 10A 250VAC at 85°C NO: 10A 250VAC at 105°C NC: 6A 250VAC at 105°C
VDE	1 Form A	10A 250VAC at 85°C 10A 250VAC at 105°C
	1 Form C	NO: 10A 250VAC at 85°C NO: 10A 250VAC at 105°C NC: 6A 250VAC at 105°C

**Notes:** 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.  
3) For sealed type, the vent-hole cover should be excised.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

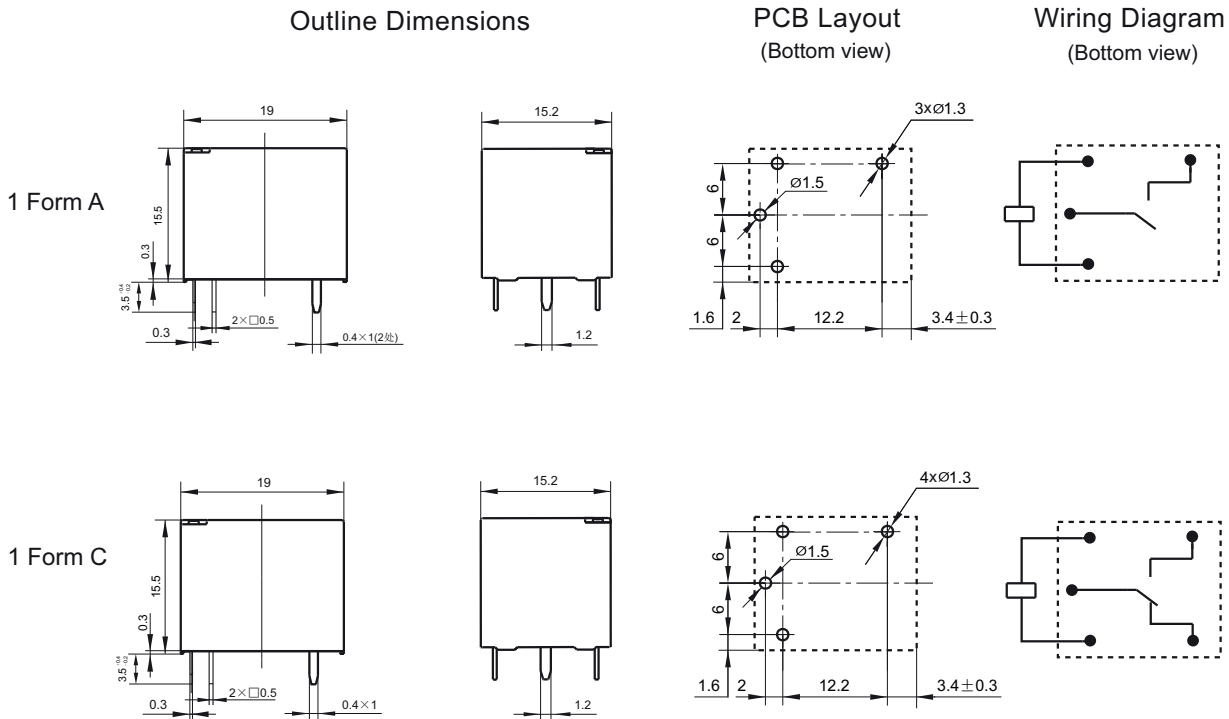
## ORDERING INFORMATION

Type		HF3FA-T/ 12 -H S T F (XXX)	
Coil voltage	3, 5, 6, 9, 12, 15, 18, 24, 48VDC		
Contact arrangement	H: 1 Form A	Z: 1 Form C	
Construction <sup>1) 2)</sup>	S: Plastic sealed	Nil: Flux proofed	
Contact material	T: AgSnO <sub>2</sub>		
Insulation system	F: Class F		
Special code <sup>3)</sup>	XXX: Customer special requirement	Nil: Standard	

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

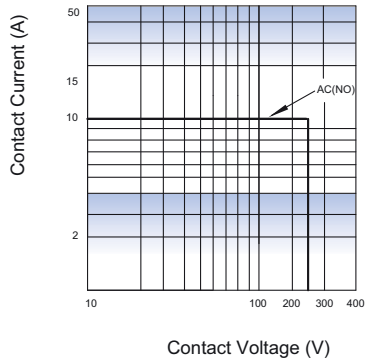
Unit: mm



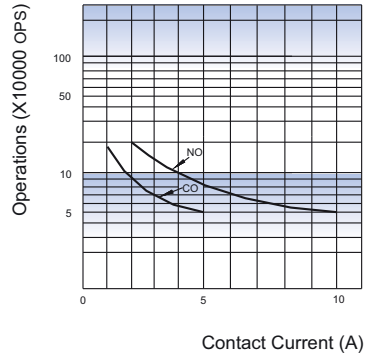
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.
- 2) The tolerance without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

## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER



ENDURANCE CURVE

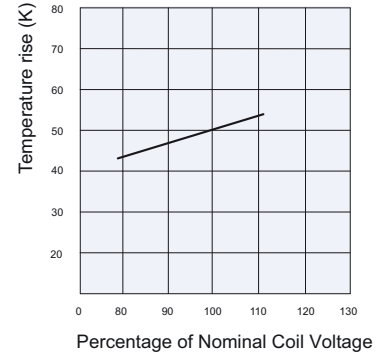


**Test conditions:**

NO: Resistive load, 250VAC, Flux proofed, 1s on 9s off

CO: Resistive load, 250VAC, Flux proofed, 3s on 3s off

COIL TEMPERATURE RISE



Percentage of Nominal Coil Voltage

Test conditions: at 105°C, 10A  
Mounting distance: 10mm

### 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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# HF3FD

# SUBMINIATURE HIGH POWER RELAY



File No.: E134517



File No.: 40014057



File No.: CQC14002114760



### Features

- 15A switching capability
- Flammability class according to UL94, V-0
- Product in accordance to IEC 60335-1 available
- 1 Form A and 1 Form C configurations
- Subminiature, standard PCB layout
- Plastic sealed and flux proofed types available

### CONTACT DATA

Contact arrangement	1A	1C
Contact resistance	100mΩ max.(at 1A 6VDC)	
Contact material	AgSnO <sub>2</sub>	
Contact rating (Res. load)	10A 250VAC	NO: 10A 250VAC/28VDC NO/NC: 5A/5A 250VAC
Max. switching voltage	277VAC/30VDC	
Max. switching current	15A	10A
Max. switching power	2770VA / 300W	
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance <sup>1)</sup>	HT type: 5 x 10 <sup>4</sup> OPS (10A 250VAC, Resistive load, at 85°C, 5s on 5s off)	

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

### CHARACTERISTICS

Insulation resistance	100MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2000VAC 1min
	Between open contacts	750VAC 1min
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	5ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 105°C	
Termination	PCB	
Unit weight	Approx. 10g	
Construction	Plastic sealed, Flux proofed	

- Notes: 1) For sealed type, the vent-hole cover should be excised.  
 2) The data shown above are initial values.  
 3) Please find coil temperature curve in the characteristic curves below.  
 4) UL insulation system: Class F, Class B.

### COIL

Coil power	Approx. 360mW
------------	---------------

### COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>*2)</sup>	Coil Resistance Ω
3	2.25	0.3	3.9	25 x (1±10%)
5	3.75	0.5	6.5	70 x (1±10%)
6	4.50	0.6	7.8	100 x (1±10%)
9	6.75	0.9	11.7	225 x (1±10%)
12	9.00	1.2	15.6	400 x (1±10%)
18	13.5	1.8	23.4	900 x (1±10%)
24	18.0	2.4	31.2	1600 x (1±10%)
48	36.0	4.8	62.4	6400 x (1±10%)

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

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

### SAFETY APPROVAL RATINGS

UL/ CUL	AgSnO <sub>2</sub>	1 Form A	10A 250VAC at 85°C
		1 Form C	NO/NC: 5A/5A 250VAC at 85°C NO: 1/2HP 125VAC NO: TV-5 120VAC
VDE	AgSnO <sub>2</sub>	1 Form A	10A 250VAC at 85°C
		1 Form C	NO/NC: 5A/5A 250VAC at 85°C NO: 10A 250VAC at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

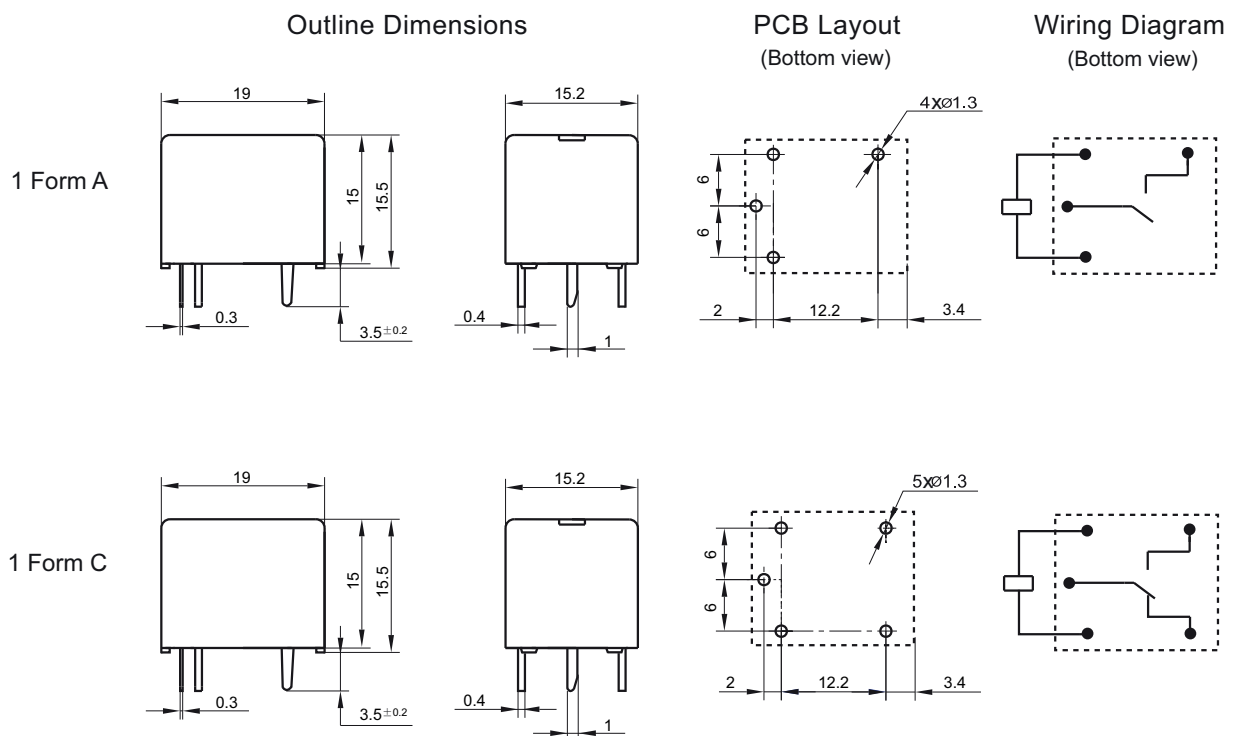
## ORDERING INFORMATION

<b>HF3FD / 012 -H S T F (XXX)</b>	
<b>Type</b>	
<b>Coil voltage</b>	3, 5, 6, 9, 12, 18, 24, 48VDC
<b>Contact arrangement</b>	<b>H:</b> 1 Form A <b>Z:</b> 1 Form C
<b>Construction<sup>1) 2)</sup></b>	<b>S:</b> Plastic sealed <b>Nil:</b> Flux proofed
<b>Contact material</b>	<b>T:</b> AgSnO <sub>2</sub>
<b>Insulation standard</b>	<b>F:</b> Class F <b>Nil:</b> Class B
<b>Special code<sup>3)</sup></b>	<b>XXX:</b> Customer special requirement <b>Nil:</b> Standard

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

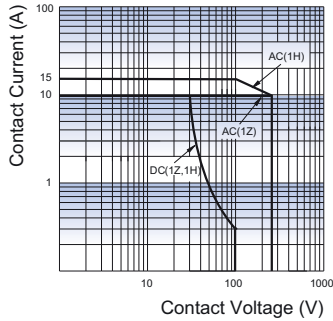


- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.
- 2) The tolerance without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

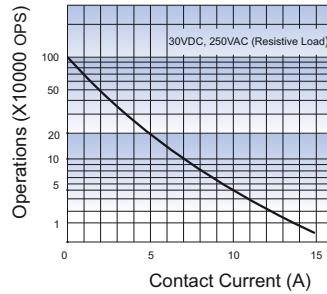


## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER

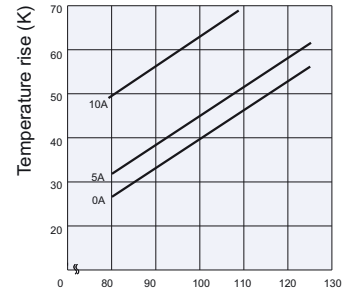


ENDURANCE CURVE



**Test conditions:**  
 NO, Flux proofed type,  
 Room temp., 1s on 9s off.

COIL TEMPERATURE RISE



Percentage of Nominal Coil Voltage  
 (Relay mounting distance should  
 be less than 10mm.)

### 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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# HF3FF

# SUBMINIATURE HIGH POWER RELAY



File No.:E134517



File No.:40025218



File No.:R50148356



File No.:CQC13002098175  
CQC16002140467



## Features

- 15A 125VAC, 10A 250VAC switching capability
- 1 Form A and 1 Form C configurations
- Subminiature, standard PCB layout
- Plastic sealed and flux proofed types available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A	1C	
		NO	NC
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)		
Contact material	AgSnO <sub>2</sub> , AgCdO		
Contact rating (Res. load)	10A 277VAC 10A 28VDC	10A 277VAC <sup>2)</sup> 10A 28VDC <sup>2)</sup>	5A 250VAC
Max. switching voltage	277VAC / 28VDC		250VAC
Max. switching current	15A	10A	5A
Max. switching power	2770VA / 280W		1250VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS		
Electrical endurance <sup>3)</sup>	1H type: 1x 10 <sup>5</sup> OPS (10A 250VAC, Resistive load, Room temp., 1s on 9s off) 1Z type: 5 x 10 <sup>4</sup> OPS (NO: 5A/NC: 5A 250VAC, Resistive load, Room temp., 5s on 5s off)		

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

2) Applicable when NC is not energized with load.

3) For plastic sealed type, the venting-hole should be opened in electrical endurance test.

## CHARACTERISTICS

Insulation resistance	100MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	1500VAC 1min
	Between open contacts	750VAC 1min
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	5ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 10g	
Construction	Plastic sealed, Flux proofed	

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

## COIL

Coil power	5VDC to 24VDC: Approx. 360mW; 48VDC: Approx. 510mW
------------	---

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC * <sup>2)</sup>	Coil Resistance Ω
5	3.80	0.5	6.5	70 x (1±10%)
6	4.50	0.6	7.8	100 x (1±10%)
9	6.80	0.9	11.7	225 x (1±10%)
12	9.00	1.2	15.6	400 x (1±10%)
18	13.5	1.8	23.4	900 x (1±10%)
24	18.0	2.4	31.2	1600 x (1±10%)
48	36.0	4.8	62.4	4500 x (1±10%)
48 <sup>1)</sup>	36.0	4.8	62.4	6400 x (1±10%)

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

2) There are 2 types for 48V-510mW and 360mW. The coil resistance for 510mW type is 4500ohm while for that for 360mW type is 6400ohm. If 360mW type is required, please add a special suffix (068) in the ordering information.

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

## SAFETY APPROVAL RATINGS

UL/CUL	1 Form A	10A 277VAC 10A 28VDC 15A 125VAC at 70°C 1/2HP 125VAC (AgSnO <sub>2</sub> )
	1 Form C	NO:10A 277VAC NO:10A 28VDC NO:10A 120VAC at 70°C NC:10A 120VAC at 70°C
VDE (only AgSnO <sub>2</sub> )	1 Form A	10A 250VAC at 70°C 12A 125VAC
	1 Form C	NO/NC:5A/5A 250VAC at 70°C NO:10A 250VAC at 70°C NO:12A 125VAC

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

3) For sealed type, the vent-hole cover should be excised.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.05

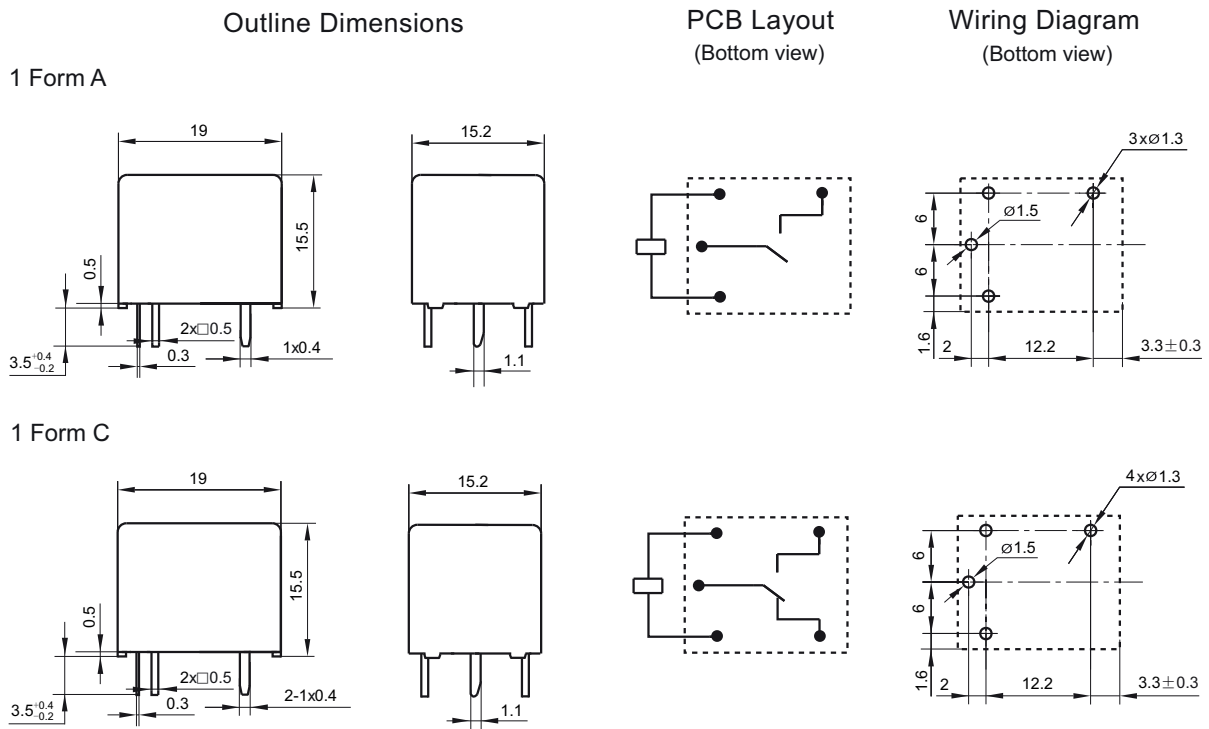
## ORDERING INFORMATION

<b>HF3FF / 012 -1H S T F (XXX)</b>			
<b>Type</b>			
<b>Coil voltage</b>	5, 6, 9, 12, 18, 24, 48VDC		
<b>Contact arrangement</b>	<b>1H:1 Form A</b>	<b>1Z:1 Form C</b>	
<b>Construction<sup>1) 2)</sup></b>	<b>S: Plastic sealed</b>	<b>Nil: Flux proofed</b>	
<b>Contact material</b>	<b>T: AgSnO<sub>2</sub></b>	<b>Nil: AgCdO</b>	
<b>Insulation standard</b>	<b>F: Class F</b>	<b>Nil: Class F</b>	
<b>Special code<sup>3)</sup></b>	<b>XXX: Customer special requirement</b>	<b>Nil: Standard</b>	

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) The customer special requirement express as special code after evaluating by Hongfa.
- 4) Two packing methods available: paper box package, tube package, Standard tube packing length is 328mm. Any special requirement needed, please contact us for more details.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

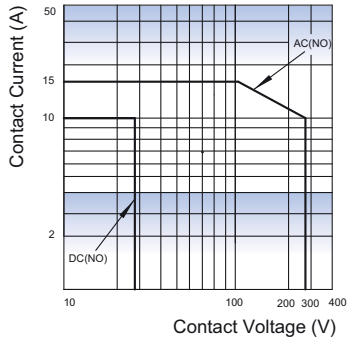
Unit: mm



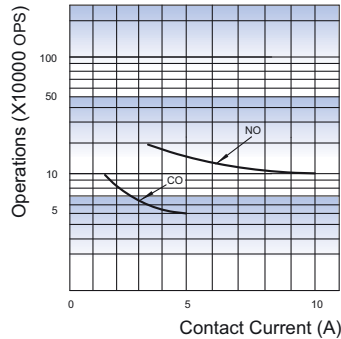
- Remark:1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.
- 2) The additional tin top is max. 1mm.
- 3) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.

## CHARACTERISTIC CURVES

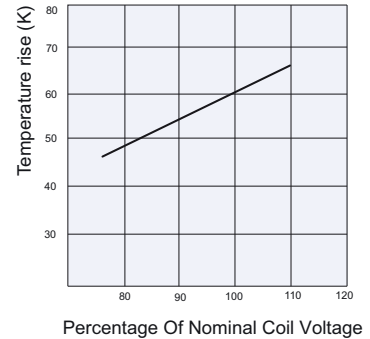
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Test conditions:**

NO, Resistive load, 277VAC/28VDC,  
Flux proofed, Room temp., 1s on 9s off  
CO, Resistive load, 250VAC,  
Flux proofed, Room temp., 5s on 5s off.

**Notes:**For plastic sealed type,the venting-hole should be opened in electrical endurance test.

**Testing conditions:**

10A at 85°C.  
Mounting distance: 10mm

**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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# HF3F-L

# SUBMINIATURE HIGH POWER LATCHING RELAY



File No.: E134517



File No.:40040757



File No.:CQC15002121475



## Features

- Subminiature high power latching relay
- Low coil power  
1 coil latching: approx. 0.4W  
2 coils latching: approx. 0.8W
- 15A switching capability
- 1 Form A and 1 Form C configurations
- Subminiature, standard PCB layout
- Plastic sealed and flux proofed types available

## CONTACT DATA

Contact arrangement	1A	1C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)	
Contact material	AgSnO <sub>2</sub>	
Contact rating (Res. load)	10A 277VAC/30VDC	
Max. switching voltage	277VAC / 30VDC	
Max. switching current	15A	10A
Max. switching power	2770VA / 300W	
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance	1HT: 6 x 10 <sup>3</sup> OPS (15A 120VAC, Incandescent lamp, at 60°C, 1s on 59s off) 1 x 10 <sup>4</sup> OPS (10A 277VAC, Resistive load, at 60°C, 1s on 9s off) 2 x 10 <sup>4</sup> OPS (12A 277VAC, General use, at 70°C, 1s on 9s off)	

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

## CHARACTERISTICS

Insulation resistance	100MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2000VAC 1min
	Between open contacts	750VAC 1min
Set time (at nomi. volt.)	8ms max.	
Reset time (at nomi. volt.)	5ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 9g	
Construction	Plastic sealed, Flux proofed	

Notes: 1) For sealed type, the vent-hole cover should be excised.  
2) The data shown above are initial values.

## COIL

Coil power	1 coil latching: Approx. 0.4W 2 coils latching: Approx. 0.8W
------------	---

## COIL DATA

at 23°C

### 1 coil latching

Nominal Voltage VDC	Set Voltage VDC max.1)	Reset Voltage VDC max.1)	Pulse Width (ms) min.	Max. Voltage VDC	Coil Resistance Ω
5	4.0	4.0	100	7.5	62.5x (1±10%)
6	4.8	4.8	100	9	90x (1±10%)
9	7.2	7.2	100	13.5	202.5x (1±10%)
12	9.6	9.6	100	18	360x (1±10%)
24	19.2	19.2	100	36	1440x (1±10%)
48	38.4	38.4	100	72	5760x (1±10%)

### 2 coils latching

Nominal Voltage VDC	Set Voltage VDC max.1)	Reset Voltage VDC max.1)	Pulse Width (ms) min.	Max. Voltage VDC	Coil Resistance Ω
5	4.0	4.0	100	7.5	31.5+31.5x (1±10%)
6	4.8	4.8	100	9	45+45x (1±10%)
9	7.2	7.2	100	13.5	101.5+101.5x (1±10%)
12	9.6	9.6	100	18	180+180x (1±10%)
24	19.2	19.2	100	36	720+720x (1±10%)
48	38.4	38.4	100	72	2880+2880x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	NO:10A 277/250/125VAC, Resistive at 60°C NO:12A 277/250/125VAC, General use at 70°C NO: Standard ballast 5.5A 277/220/120VAC at 60°C NO: Electronic ballast 5A, 120VAC at 60°C NO: Electronic ballast 5A, 277VAC at 70°C*
	NO: Tungsten (incandescent) 15A 120VAC at 60°C NO: Tungsten (incandescent) 5A 277VAC at 60°C NO: 1/6HP 240/120VAC at 85°C NO: TV-10 125VAC at 70°C
VDE	NO: 10A 250VAC, Resistive, at 85°C NO/NC: 5A 250VAC, Resistive, at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

3) \* These ratings are tested with zero crossing device.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

## ORDERING INFORMATION

<b>HF3F-L / 12 -1H S L1 T -R (XXX)</b>	
<b>Type</b>	
<b>Coil voltage</b>	5, 6, 9, 12, 24, 48VDC
<b>Contact arrangement</b>	<b>1H:1 Form A</b> <b>1Z:1 Form C</b>
<b>Construction<sup>1) 2)</sup></b>	<b>S:</b> Plastic sealed <b>Nil:</b> Flux proofed
<b>Sort</b>	<b>L1:</b> 1 coil latching <b>L2:</b> 2 coils latching
<b>Contact material</b>	<b>T:</b> AgSnO <sub>2</sub>
<b>Polarity</b>	<b>R:</b> Reverse polarity <b>Nil:</b> Standard polarity
<b>Special code<sup>3)</sup></b>	<b>XXX:</b> Customer special requirement <b>Nil:</b> Standard

**Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.) .

We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.)

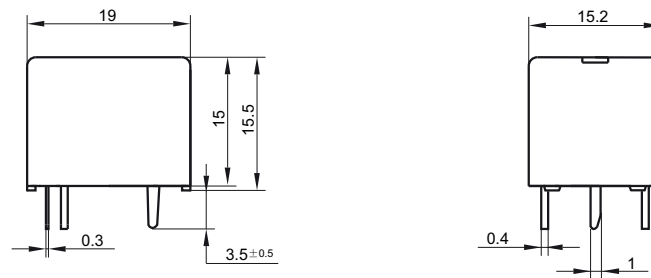
2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

3) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

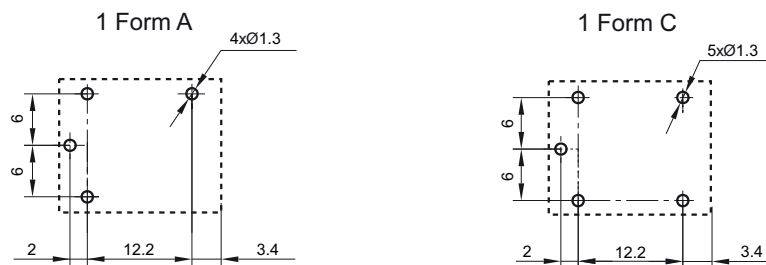
Unit: mm

### Outline Dimensions



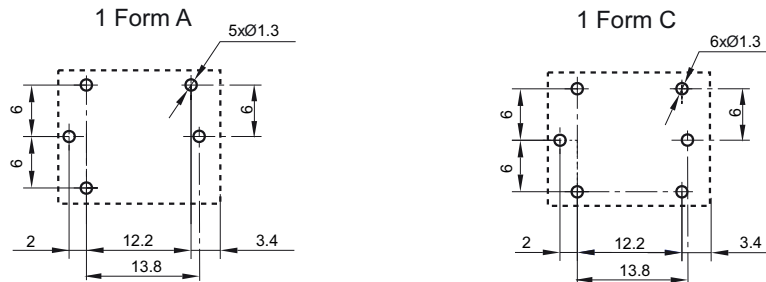
### PCB Layout (Bottom view)

1 coil latching



**PCB Layout (Bottom view)**

2 coils latching



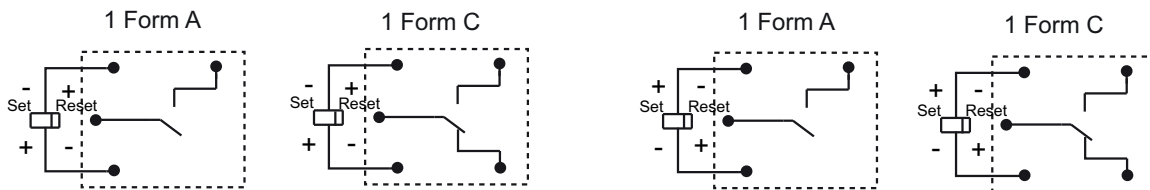
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be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

**Wiring Diagram (Bottom view)**

1 coil latching

Standard Polarity

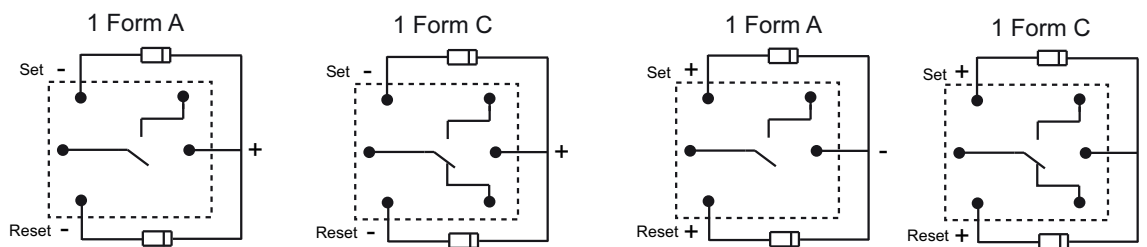
Reverse Polarity



2 coils latching

Standard Polarity

Reverse Polarity



**Notice**

- Relay is on the "reset" or "set" status when being released from stock, with the consideration of shock risen from transit and relay mounting, relay would be changed to "set" or "reset" status, therefore, when application ( connecting the power supply), please reset the relay to "set" or "reset" status on request.
- In order to maintain "set" or "reset" status, energized voltage to coil should reach the rated voltage, impulse width should be more than 100 ms. Do not energize voltage to "set" coil and "reset" coil simultaneously. And also long energized time (more than 1 min) should be avoided.
- Keep the product away from strong magnetic field during transportation, storage and application, to avoid change of set/reset voltage.

**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.

# HF3FF-M

# AUTOMOTIVE RELAY



### Typical Applications

Anti-theft lock, Central door lock

### Features

- 15A switching capability
- Subminiature, standard PCB layout
- 1 Form A & 1 Form C contact arrangement
- Plastic sealed and Flux proofed types available
- RoHS & ELV compliant

## CHARACTERISTICS

Contact arrangement	1A, 1C
Voltage drop (initial) <sup>1)</sup>	Typ: 20mV (at 10A) Max.: 250mV (at 10A)
Max. continuous current <sup>2)</sup>	10A
Max. switching current <sup>3)</sup>	15A
Max. switching voltage	30VDC
Min.contact load	1A 6VDC
Electrical endurance	See "CONTACT DATA"
Mechanical endurance	1×10 <sup>7</sup> OPS (300OPS/min)
Initial insulation resistance	100MΩ (at 500VDC)
Dielectric strength <sup>4)</sup>	Between contacts: 750VAC Between coil & contacts: 1500VAC
Operate time	Typ: 5ms Max.: 10ms (at nomi. vol.)

Release time <sup>5)</sup>	Typ: 3ms Max.: 10ms
Ambient temperature	-40°C to 85°C
Vibration resistance <sup>6)</sup>	10Hz to 55Hz 1.5mm DA
Shock resistance <sup>6)</sup>	98m/s <sup>2</sup>
Termination	PCB <sup>7)</sup>
Construction	Plastic sealed, Flux proofed
Unit weight	Approx. 10g

- 1) Equivalent to the max. initial contact resistance is 100mΩ (at 1A 6VDC).
- 2) For NO contacts, measured when applying 100% rated voltage on coil.
- 3) At 23°C, 13.5VDC (100 cycles, resistive load).
- 4) 1min, leakage current less than 1mA.
- 5) The value is measured when voltage drops suddenly from nominal voltage to 0VDC and coil is not paralleled with suppression circuit.
- 6) When energized, opening time of NO contacts shall not exceed 100μs, when non-energized, opening time of NC contacts shall not exceed 100μs, meantime, NO contacts shall not be closed.
- 7) Since it is an environmental friendly product, please select lead-free solder when welding. The recommended soldering temperature and time is (250±3)°C, (5±0.3)s.

## CONTACT DATA <sup>1)</sup>

at 23°C

Load voltage	Load type		Load current A			On/Off ratio		Electrical endurance OPS	Contact material	Load wiring diagram
			1C		1A	On s	Off s			
			NO	NC	NO					
13.5VDC	Resistive	Make	15	5	15	5	5	1×10 <sup>5</sup>	HF3FF-M/M1: AgSnO <sub>2</sub> HF3FF-M2: AgNi	
		Break	15	5	15	5	5			

1) When the load voltage is at 24VDC or higher, or the applications conditions are different from the table above, please submit the detailed application conditions to Hongfa to get more support.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00



## COIL DATA

at 23°C

Type	Nominal voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Coil resistance $\times(1\pm 10\%)\Omega$	Power consumption W	Max. allowable overdrive voltage <sup>1)</sup> VDC	
						at 23°C	at 85°C
HF3FF-M	9	6.75	0.90	180	0.45	11.7	10.8
	12	9.00	1.20	320	0.45	15.6	14.4
	24	18.00	2.40	1280	0.45	31.2	28.8
HF3FF-M1	9	5.85	0.65	126	0.64	11.3	10.3
	12	7.80	0.90	225	0.64	15.0	13.8
	24	15.6	1.80	900	0.64	30.0	27.6
HF3FF-M2	9	5.15	0.60	100	0.80	10.8	9.9
	12	6.80	0.80	180	0.80	14.4	13.2
	24	13.70	1.60	720	0.80	28.8	26.4

1) Max. allowable overdrive voltage is stated with no load applied.

## ORDERING INFORMATION

		<b>HF3FF-M /</b>		<b>012</b>	<b>-1H</b>	<b>S</b>	<b>(XXX)</b>
<b>Type</b>	HF3FF-M: 0.45W						
	HF3FF-M1: 0.64W						
	HF3FF-M2: 0.80W						
<b>Coil voltage</b>	<b>009:</b> 9VDC	<b>012:</b> 12VDC	<b>024:</b> 24VDC				
<b>Contact arrangement</b>	<b>1H:</b> 1 Form A	<b>1Z:</b> 1 Form C					
<b>Construction</b>	<b>S:</b> Plastic sealed <sup>1)</sup>	<b>Nil:</b> Flux proofed					
<b>Special code<sup>2)</sup></b>	<b>XXX:</b> Customer special requirement	<b>Nil:</b> Standard					

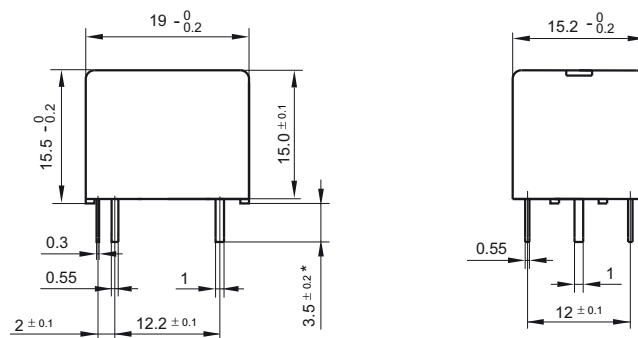
Notes: 1) If washing or surface treatment is required after the relay is assembled on PCB, please provide with the conditions in details for our confirmation or our recommendation with suitable products.

2) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

Outline Dimensions (1 Form A / 1 Form C)



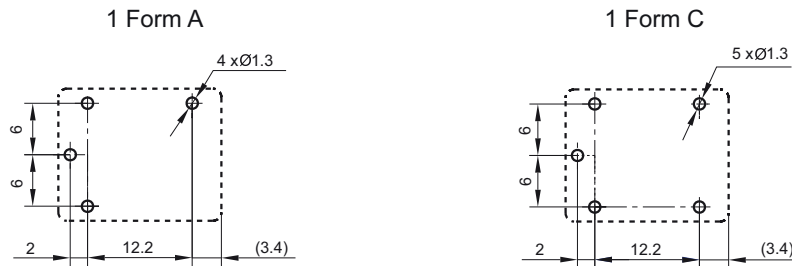
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

Wiring Diagram (Bottom view)



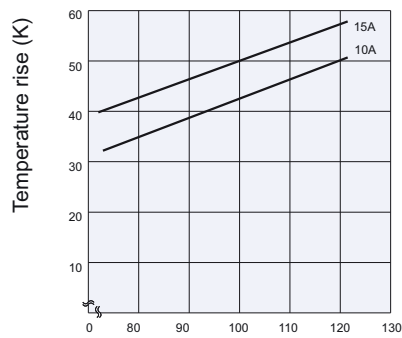
PCB Layout (Bottom view)



**Remark:** 1) \* The additional tin top is max. 1mm.  
2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.

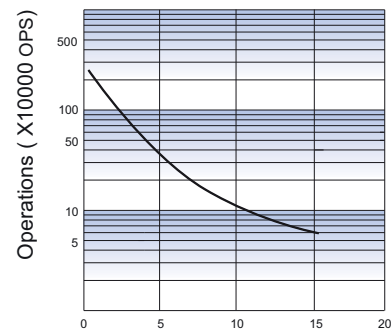
## CHARACTERISTIC CURVES

COIL TEMPERATURE RISE



Percentage of nominal coil voltage

ENDURANCE CURVE



Switching current (A)

### Disclaimer

The specification is for reference only. See to "Terminology and Guidelines" for more information. Specifications subject to change without notice. In case there is specific criterion (such as mission profile, technical specification, PPAP etc.) checked and agreed by and between customer and Hongfa, this specific criterion should be taken as standard regarding any requirement on Hongfa product.

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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# HF7FF

# SUBMINIATURE INTERMEDIATE POWER RELAY



File No.:E134517



File No.:CQC09002028260



### Features

- 10A switching capability
- 1 Form A and 1 Form C configurations
- Plastic sealed and flux proofed types available

### CONTACT DATA

Contact arrangement	1A, 1C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub> , AgCe
Contact rating (Res. load)	5A 250VAC/30VDC 10A 250VAC/28VDC
Max. switching voltage	250VAC / 30VDC
Max. switching current	10A
Max. switching power	2400VA / 280W
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance	1HT, 1ZT type: 1 x 10 <sup>4</sup> OPS (10A 250VAC, Resistive load, Room temp., 1s on 9s off) 1H, 1Z type: 1 x 10 <sup>4</sup> OPS (5A 250VAC, Resistive load, Room temp., 1s on 9s off)

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

### CHARACTERISTICS

Insulation resistance	100MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	1500VAC 1min
	Between open contacts	750VAC 1min
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	5ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 70°C	
Termination	PCB	
Unit weight	Approx. 9.5g	
Construction	Plastic sealed, Flux proofed	

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

- 2) Please find coil temperature curve in the characteristic curves below.  
3) UL insulation system: Class F, Class B, Class A.

### COIL

Coil power	5VDC to 24VDC: Approx. 360mW 48VDC: Approx. 510mW
------------	--

### COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC *2)	Coil Resistance Ω
3	2.40	0.3	3.6	25 x (1±10%)
5	4.00	0.5	6.0	70 x (1±10%)
6	4.80	0.6	7.2	100 x (1±10%)
9	7.20	0.9	10.8	225 x (1±10%)
12	9.60	1.2	14.4	400 x (1±10%)
18	14.4	1.8	21.6	900 x (1±10%)
24	19.2	2.4	28.8	1600 x (1±10%)
48	38.4	4.8	57.6	4500 x (1±10%)

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

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

### SAFETY APPROVAL RATINGS

UL/CUL (AgCe)	1 Form C	NO: 10A 277VAC NO/NC: 5A 277VAC NO: 5A 30VDC NC: 2FLA 4LRA 120VAC
	1 Form A	10A 277VAC 6A 30VDC
UL/CUL (AgSnO <sub>2</sub> )	1 Form C	12A 277VAC 12A 28VDC
	1 Form A	12A 277VAC 12A 28VDC

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

Type	HF7FF / 012 -1H T S F (XXX)					
Coil voltage	3, 5, 6, 9, 12, 18, 24, 48VDC					
Contact arrangement	1H: 1 Form A		1Z: 1 Form C			
Contact material	T: AgSnO <sub>2</sub> (10A)		Nil: AgCe (5A)			
Construction <sup>1)</sup>	S: Plastic sealed		Nil: Flux proofed			
Insulation standard	F: Class F		B: Class B		Nil: Class A	
Special code <sup>4)</sup>	XXX: Customer special requirement			Nil: Standard		

- Notes:**
- 1) Under the ambience with dangerous gas like H<sub>2</sub>S, SO<sub>2</sub> or NO<sub>2</sub>, plastic sealed type is recommended; Please test the relay in real applications.  
If the ambience allows, flux proofed type is preferentially recommended.
  - 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
  - 3) If the application belongs to inductive load, AgSnO<sub>2</sub>In<sub>2</sub>O<sub>3</sub> contact material is recommended. Please add a special suffix (325) to stand for this special contact material in the ordering information.
  - 4) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

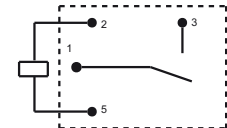
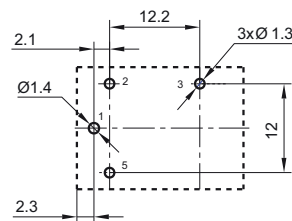
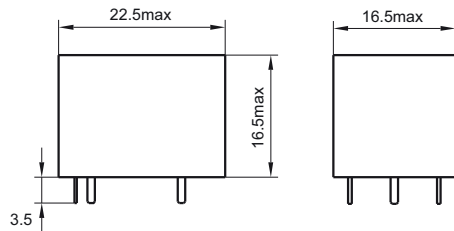
Unit: mm

### Outline Dimensions

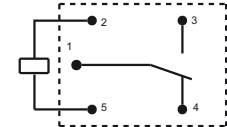
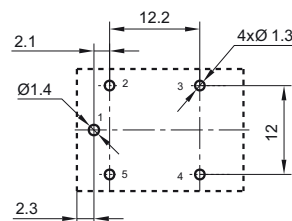
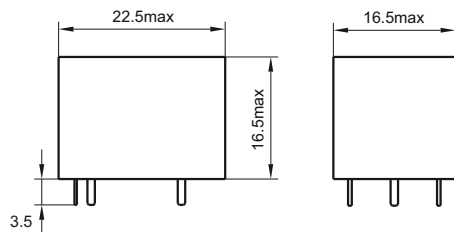
### PCB Layout (Bottom view)

### Wiring Diagram (Bottom view)

#### 1 Form A



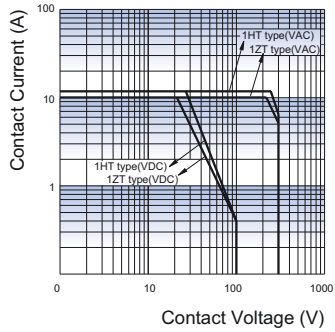
#### 1 Form C



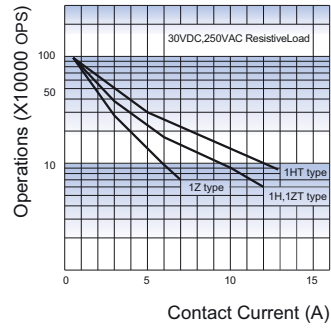
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
2) The tolerance without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

## CHARACTERISTIC CURVES

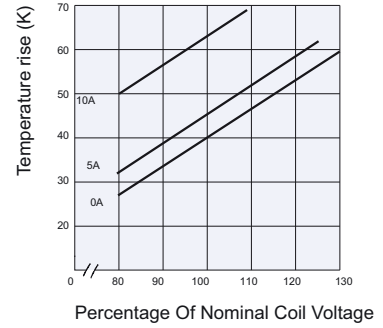
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Test conditions:**

NO, Resistive load, Flux proofed,  
Room temp., 1s on 9s off.

**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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# HF7FD

# SUBMINIATURE HIGH POWER RELAY



File No.:E134517



File No.: 40008374



File No.:CQC16002153649



## Features

- 16A switching capability
- TV-8 load capability
- 2kV dielectric strength (between coil and contacts)
- Ambient temperature meets 105°C
- Product in accordance to IEC 60335-1 available
- Double pins type available
- 1 Form A and 1 Form C configurations
- Plastic sealed and flux proofed types available
- UL insulation system:Class F

## CONTACT DATA

Contact arrangement	1H	1Z
Contact resistance <sup>1)</sup>	≤100mΩ (1A 24VDC)	
Contact material	AgSnO <sub>2</sub>	
Contact rating (Res.load)	16A 250VAC 12A 250VAC 10A 250VAC	NO: 16A 250VAC 12A 250VAC 7A 250VAC/28VDC NC: 7A 250VAC/28VDC
Max. switching voltage	250VAC / 28VDC	
Max. switching current	16A	16A
Max. switching power	4000VA / 280W	4000VA / 280W
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance (See approval reports for more details)	HF7FD	1H 85°C 16A 250VAC 5 x 10 <sup>6</sup> OPS Resistive load, 1s on 9s off 85°C 12A 250VAC 1 x 10 <sup>6</sup> OPS Resistive load, 1s on 9s off
		1Z NO:85°C 16A 250VAC 5 x 10 <sup>6</sup> OPS Resistive load, 1s on 9s off 85°C 12A 250VAC 1 x 10 <sup>6</sup> OPS Resistive load, 1s on 9s off NC:85°C 7A 277VAC 5 x 10 <sup>6</sup> OPS Resistive load, 5s on 5s off 85°C 10A 250VAC 1 x 10 <sup>6</sup> OPS Resistive load, 1s on 9s off
	HF7FD-T	1H 105°C 10A 250VAC 1 x 10 <sup>6</sup> OPS Resistive load, 1s on 9s off 85°C 16A 250VAC 5 x 10 <sup>6</sup> OPS Resistive load, 1s on 9s off
		1Z NO:105°C 10A 250VAC 1 x 10 <sup>6</sup> OPS Resistive load, 1s on 9s off 85°C 16A 250VAC 5 x 10 <sup>6</sup> OPS Resistive load, 1s on 9s off

Notes: 1) The data shown above are initial values.  
2) Open the air permeability hole when testing plastic encapsulated products.

## CHARACTERISTICS

Insulation resistance	100MΩ (at 500VDC)
Dielectric strength	Between coil & contacts 2000VAC 1min
	Between open contacts 750VAC 1min
Operate time (at nomi. volt.)	10ms max.
Release time (at nomi. volt.)	5ms max.
Humidity	5% to 85% RH
Shock resistance	Functional 98m/s <sup>2</sup>
	Destructive 980m/s <sup>2</sup>
Ambient temperature	HF7FD: -40°C to 85°C HF7FD-T: -40°C to 105°C
Vibration resistance	10Hz to 55Hz 1.5mm DA
Termination	PCB
Unit weight	Approx. 9.5g
Construction	Plastic sealed, Flux proofed

Notes: 1) The data shown above are initial values.  
2) Please find coil temperature curve in the characteristic curves below.  
3) UL insulation system: Class F, Class B.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## COIL

Coil power Approx. 360mW

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
3	≤2.25	≥0.3	3.9	25 x (1±10%)
5	≤3.75	≥0.5	6.5	70 x (1±10%)
6	≤4.50	≥0.6	7.8	100 x (1±10%)
9	≤6.75	≥0.9	11.7	225 x (1±10%)
12	≤9.00	≥1.2	15.6	400 x (1±10%)
18	≤13.5	≥1.8	23.4	900 x (1±10%)
24	≤18.0	≥2.4	31.2	1600 x (1±15%)
48	≤36.0	≥4.8	62.4	6400 x (1±15%)

Notes: 1) The data shown above are initial values.  
2) \*Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## SAFETY APPROVAL RATINGS

UL/CUL	Form	Rating
HF7FD	1 Form A	16A 250VAC(85°C) 12A 250VAC(85°C, Double pin) 12A 125VAC(85°C) 10A 277VAC/250VAC(85°C) 10A 28VDC(85°C)
	1 Form C	NO:16A 250VAC (85°C) 12A 250VAC (85°C) 12A 125VAC (85°C) 10A 277VAC/250VAC (85°C) 10A 28VDC(85°C) 7A 277VAC (85°C) 7A 28VDC (85°C) NC:12A 125VAC (85°C) 10A 250VAC (85°C) 7A 277VAC (85°C) 7A 28VDC (85°C)
HF7FD-T	1 Form A	16A 250VAC (85°C) 10A 250VAC (105°C) 8A 250VAC(105°C) 80W 120VAC Tungsten(105°C) 1/2HP 125VAC(40°C) 1/2HP 250VAC(40°C)
	1 Form C	NO:16A 250VAC(85°C) 10A 250VAC(105°C) 8A 250VAC(105°C) 80W 120VAC Tungsten(105°C) 1/2HP 125VAC(40°C) 1/2HP 250VAC(40°C) NC:12A 125VAC(85°C) 10A 277VAC/250VAC(85°C) 7A 277VAC(85°C)
VDE	1 Form A	10A 250VAC(85°C) 12A 250VAC(70°C)
	1 Form C	CO:10A 250VAC(85°C) 7A 250VAC(85°C)
	HF7FD-T 1 Form C	12A 250VAC(105°C)

Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

**HF7FD / 012 -1H P S T F (XXX)**

**Type** HF7FD: 85°C, HF7FD-T: 105°C

**Coil voltage** 3, 5, 6, 9, 12, 18, 24, 48VDC

**Contact arrangement** 1H: 1 Form A 1Z: 1 Form C

**Pin version** P: Double pins type Nil: Single pin type

**Construction**<sup>1)</sup> S: Plastic sealed Nil: Flux proofed

**Contact material** T: AgSnO<sub>2</sub>

**Insulation standard** F: Class F Nil: Class B

**Special code**<sup>1)</sup> XXX: Customer special requirement Nil: Standard

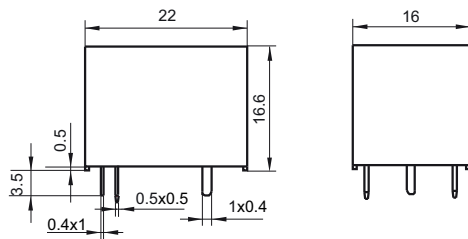
- Notes:** 1) Under the ambience with dangerous gas like H<sub>2</sub>S, SO<sub>2</sub> or NO<sub>2</sub>, plastic sealed type is recommended; Please test the relay in real applications. If the ambience allows, flux proofed type is preferentially recommended.  
 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.  
 3) If plastic sealed type is selected for cleaning purpose, the vent-hole cover should be excised after cleaning.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

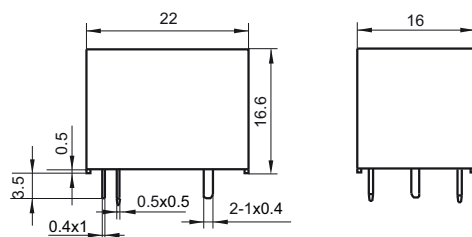
Unit: mm

### Outline Dimensions

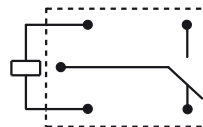
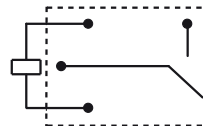
#### 1 Form A (Single pin type)



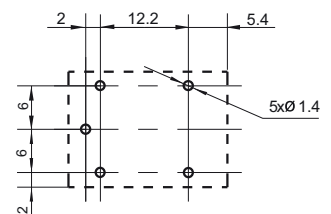
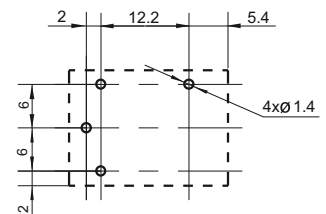
#### 1 Form C (Single pin type)



### Wiring Diagram (Bottom view)



### PCB Layout (Bottom View)



# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

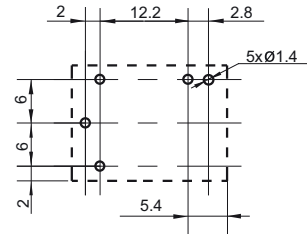
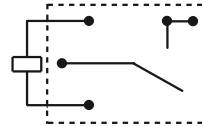
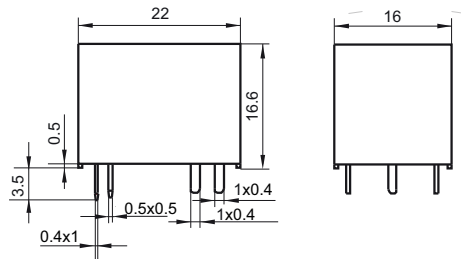
Unit: mm

## Outline Dimensions

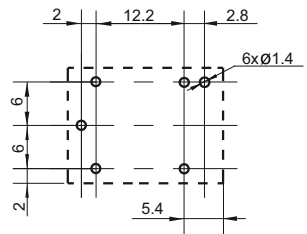
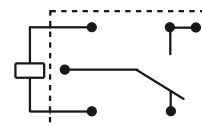
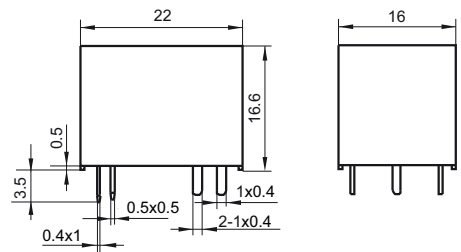
## Wiring Diagram (Bottom View)

## PCB Layout (Bottom view)

### 1 Form A (Double pins type)



### 1 Form C (Double pins type)

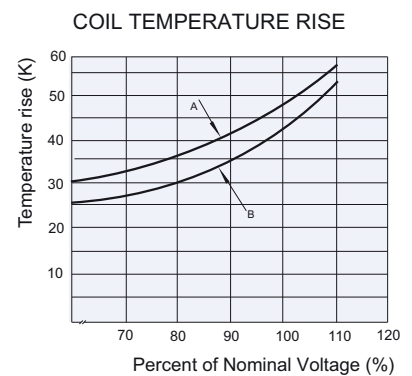
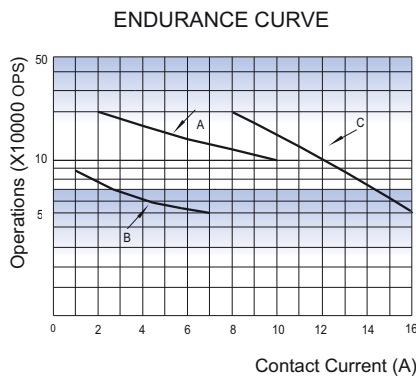
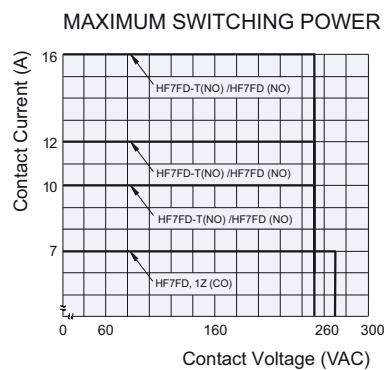


Remark:1) \* The additional tin top is max. 1mm.

2) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.

3) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.

## CHARACTERISTIC CURVES



#### Test conditions:

Curve A: NO, Resistive load, 85°C,  
flux proofed, 10A 277VAC, 1s on 9s off  
Curve B: CO, Resistive load, 85°C,  
flux proofed, 7A 277VAC, 5s on 5s off  
Curve C: NO, Resistive load, Room temp.,  
flux proofed, 16A 250VAC, 1s on 9s off

#### Test conditions::

A: 16A at 85°C.  
B: 10A at 85°C.  
Mounting distance: 25mm

### 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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# HF21FF

# SUBMINIATURE HIGH POWER RELAY



File No.:E133481



### Features

- 15A switching capability
- 1 Form A, 1 Form B and 1 Form C configurations
- Standard PCB layout
- Plastic sealed and dust protected types available

### CONTACT DATA

Contact arrangement	1A, 1B	1C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)	
Contact material	AgSnO <sub>2</sub>	
Contact rating	15A 120VAC	10A 120VAC/24VDC
Max. switching voltage	120VAC / 30VDC	
Max. switching current	15A	10A
Max. switching power	1800VA / 240W	
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance	1H type: 1 x 10 <sup>5</sup> OPS (15A 120VAC, Resistive load, Room temp., 1s on 9s off)	

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

### CHARACTERISTICS

Insulation resistance	100MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	1500VAC 1min
	Between open contacts	750VAC 1min
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	5ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Operation temperature range	-40°C to 70°C	
Termination	PCB	
Unit weight	Approx. 13g	
Construction	Plastic sealed, Dust protected	

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

2) Please find coil temperature curve in the characteristic curves below.

3) UL insulation system: Class F, Class B.

### COIL

Coil power	5VDC to 24VDC: Approx. 360mW; 48VDC: Approx. 530mW
------------	---

### COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.75	0.5	6.5	70 x (1±10%)
6	4.50	0.6	7.8	100 x (1±10%)
9	6.75	0.9	11.7	225 x (1±10%)
12	9.00	1.2	15.6	400 x (1±10%)
18	13.5	1.8	23.4	900 x (1±10%)
24	18.0	2.4	31.2	1600 x (1±15%)
48	36.0	4.8	62.4	4500 x (1±15%)

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

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

### SAFETY APPROVAL RATINGS

UL/CUL	1 Form C	10A 120VAC
	1 Form A	15A 120VAC TV-5 120VAC
	1 Form B	15A 120VAC 1800VA at 25°C, Ballast 6.5A 277VAC 1800VA at 25°C, Ballast 8.3A 120VAC 1000VA at 90°C, Ballast 3.6A 277VAC 1000VA at 90°C, Ballast

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.10

## ORDERING INFORMATION

Type	HF21FF / 012 -1H S T F (XXX)		
Coil voltage	5, 6, 9, 12, 18, 24, 48VDC		
Contact arrangement	1H: 1 Form A	1D: 1 Form B	1Z: 1 Form C
Construction <sup>1)</sup>	S: Plastic sealed	Nil: Dust protected	
Contact material	T: AgSnO <sub>2</sub>		
Insulation standard	F: Class F	Nil: Class B	
Special code <sup>3)</sup>	XXX: Customer special requirement	Nil: Standard	

**Notes:** 1) Under the ambience with dangerous gas like H<sub>2</sub>S, SO<sub>2</sub> or NO<sub>2</sub>, plastic sealed type is recommended; Please test the relay in real applications. If the ambience allows, dust protected type is preferentially recommended.

2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

3) The customer special requirement express as special code after evaluating by Hongfa.

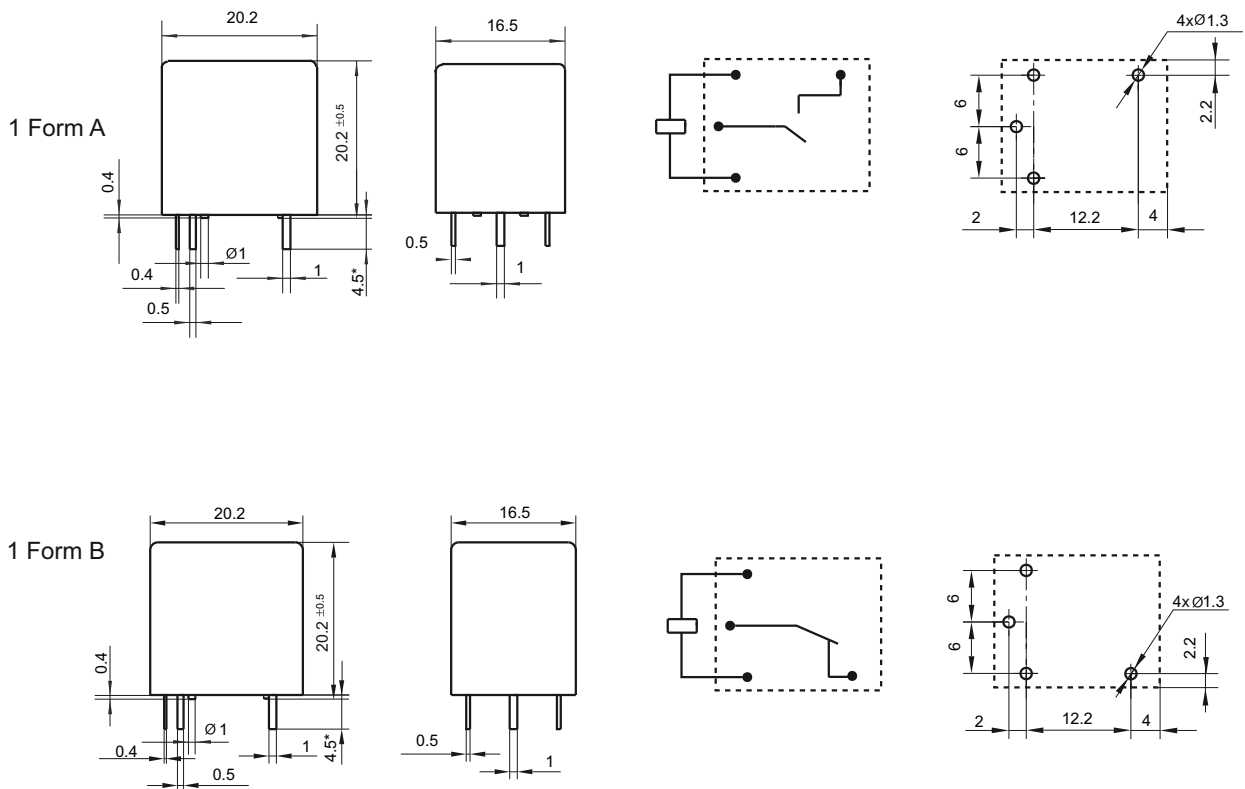
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

Outline Dimensions

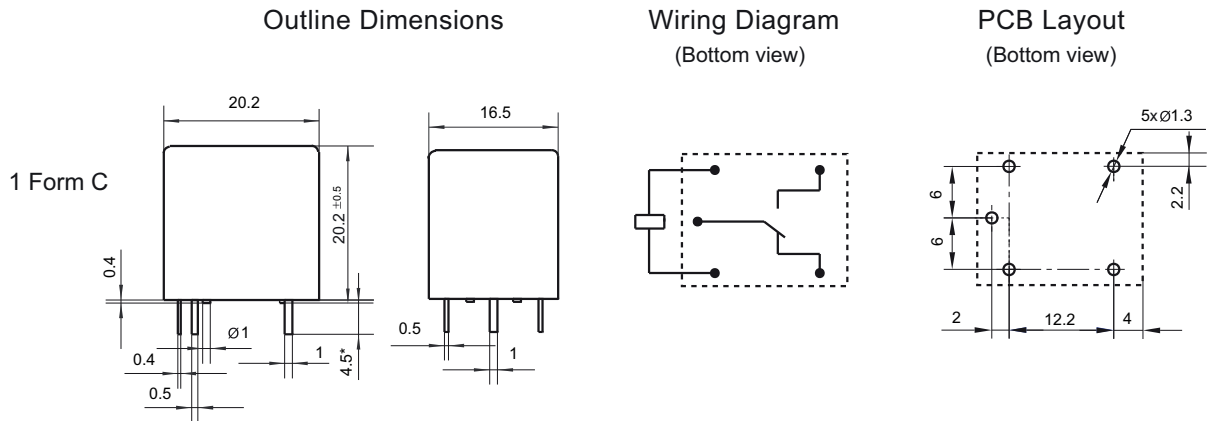
Wiring Diagram  
(Bottom view)

PCB Layout  
(Bottom view)



# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

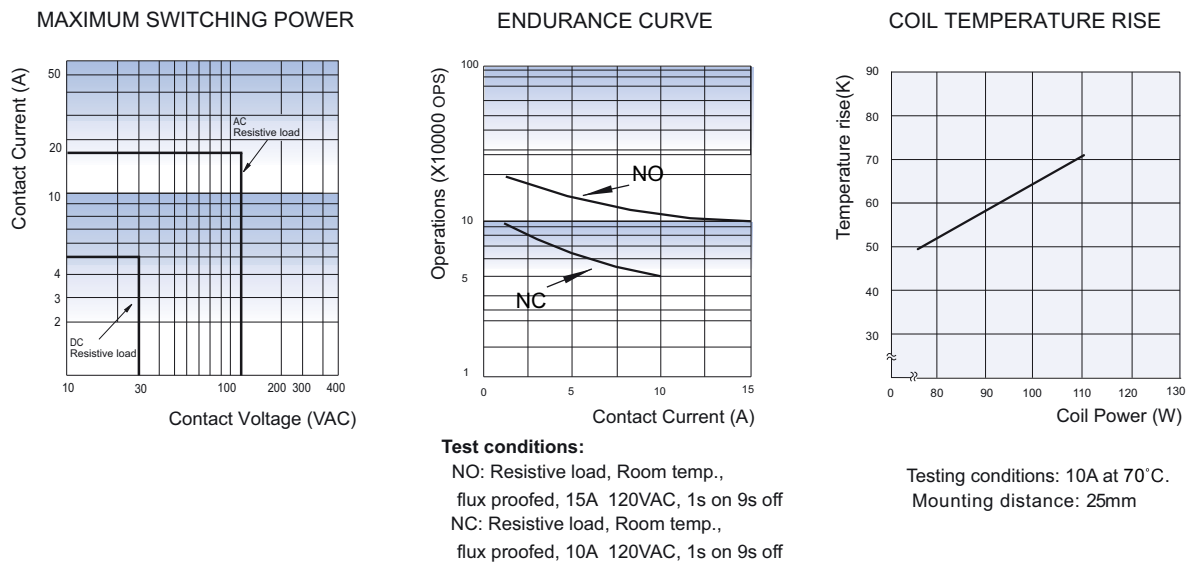
Unit: mm



Remark:1) \* The additional tin top is max. 1mm.

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

## CHARACTERISTIC CURVES



### 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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# HF152F

# SUBMINIATURE HIGH POWER RELAY



File No.: E134517



File No.: 40017837



File No.: CQC09002034520



## Features

- 20A switching capability
- TV-8 125VAC
- Surge voltage up to 6kV (between coil and contacts)
- Thermal class F: standard type (at 85°C)
- Ambient temperature meets 105°C
- Product in accordance to IEC 60335-1 available
- 1 Form C and 1 Form A configurations available
- Plastic sealed and dust protected types available

## CONTACT DATA

Contact arrangement	1A	1C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 24VDC)	
Contact material	AgSnO <sub>2</sub> , AgNi	
Contact rating (Res. load)	20A 125VAC 17A 277VAC 7A 400VAC	16A 250VAC 7A 400VAC (NO)
Max. switching voltage	400VAC	400VAC (NO)
Max. switching current	20A	16A
Max. switching power	4700VA	4000VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance	1 x 10 <sup>5</sup> OPS (16A 250VAC, Resistive load, at 85°C, 1s on 9s off)	
	5 x 10 <sup>4</sup> OPS (NO, 16A 250VAC, Resistive load, Room temp., 1s on 9s off)	
	5 x 10 <sup>4</sup> OPS (NC, 10A 250VAC, Resistive load, Room temp., 1s on 9s off)	

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

2) For plastic sealed type, the venting-hole should be opened in electrical endurance test.

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.3	3.9	25 x (1±10%)
5	3.75	0.5	6.5	70 x (1±10%)
6	4.50	0.6	7.8	100 x (1±10%)
9	6.75	0.9	11.7	225 x (1±10%)
12	9.00	1.2	15.6	400 x (1±10%)
18	13.5	1.8	23.4	900 x (1±10%)
24	18.0	2.4	31.2	1600 x (1±10%)
48	36.0	4.8	62.4	6400 x (1±10%)

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

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

## CHARACTERISTICS

Insulation resistance	100MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2500VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage(between coil & contacts)	6kV (1.2 / 50μs)	
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	5ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	HF152F: -40°C to 85°C HF152F-T: -40°C to 105°C	
Termination	PCB	
Unit weight	Approx. 14g	
Construction	Plastic sealed, Dust protected	

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

2) Please find coil temperature curve in the characteristic curves below.

3) UL insulation system: Class F

## COIL

Coil power Approx. 360mW

## SAFETY APPROVAL RATINGS

UL/CUL	AgNi	20A 125VAC NO/NC: 17A/15A 277VAC	
	AgSnO <sub>2</sub>	20A 125VAC TV-8 125VAC NO: 16A 250VAC at 105°C NO: 1HP 250VAC	
VDE	AgSnO <sub>2</sub>	1 Form A	16A 250VAC 7A 400VAC
		1 Form C	NO: 16A 250VAC NC: 7A 250VAC

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

	<b>HF152F</b>	<b>/</b>	<b>012</b>	<b>-1Z</b>	<b>P</b>	<b>S</b>	<b>T</b>	<b>Q</b>	<b>(XXX)</b>
<b>Type</b>	HF152F: 85°C, HF152F-T: 105°C								
<b>Coil voltage</b>	3, 5, 6, 9, 12, 18, 24, 48VDC								
<b>Contact arrangement</b>	1H: 1 Form A			1Z: 1 Form C					
<b>Pin version</b>	P: Double pins			Nil: Single pin					
<b>Construction</b> <sup>1)</sup>	S: Plastic sealed			Nil: Dust protected					
<b>Contact material</b>	T: AgSnO <sub>2</sub>			Nil: AgNi					
<b>Contact capacity</b>	Q: High capacity type 16A 250VAC, at 105°C (Only for HF152F-T)			Nil: Standard type					
<b>Special code</b> <sup>4)</sup>	XXX: Customer special requirement			Nil: Standard					

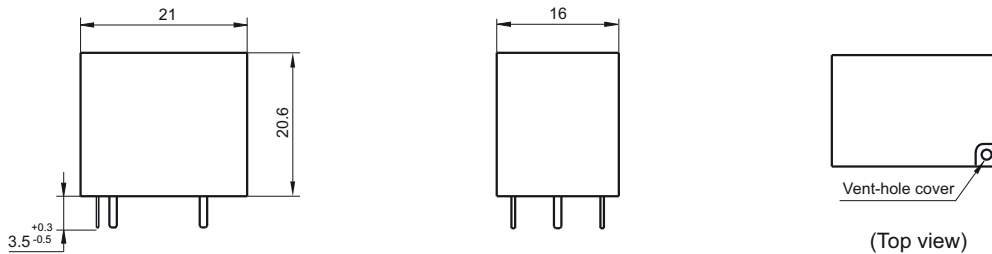
- Notes:** 1) Under the ambience with dangerous gas like H<sub>2</sub>S, SO<sub>2</sub> or NO<sub>2</sub>, plastic sealed type is recommended; Please test the relay in real applications. If the ambience allows, dust protected type is preferentially recommended.  
 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.  
 3) If plastic sealed type is selected for cleaning purpose, the vent-hole cover should be excised after cleaning.  
 4) The customer special requirement express as special code after evaluating by Hongfa.  
 5) HF152F-T is only available for AgSnO<sub>2</sub> contact.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

### Single pin version

#### Outline Dimensions



#### Wiring Diagram (Bottom view)



#### PCB Layout (Bottom view)

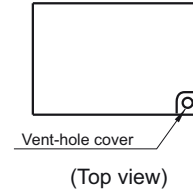
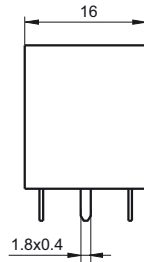
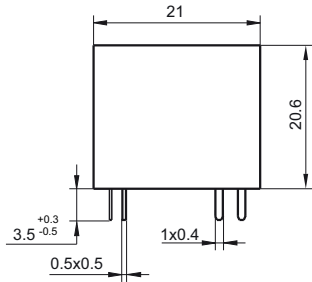


# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

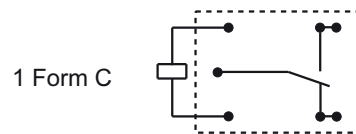
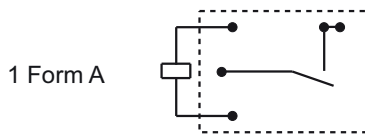
Unit: mm

## Double pin version

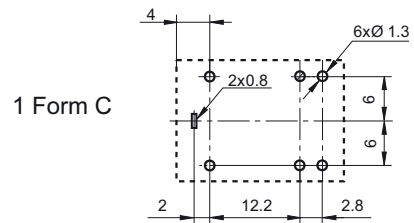
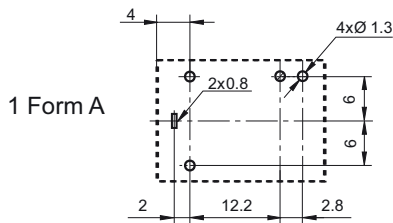
### Outline Dimensions



### Wiring Diagram (Bottom view)

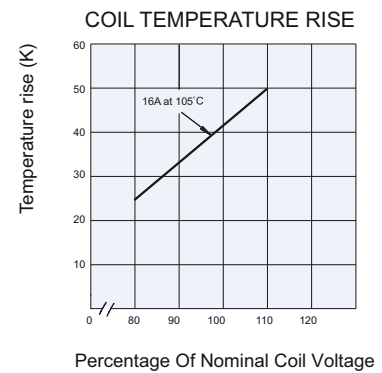
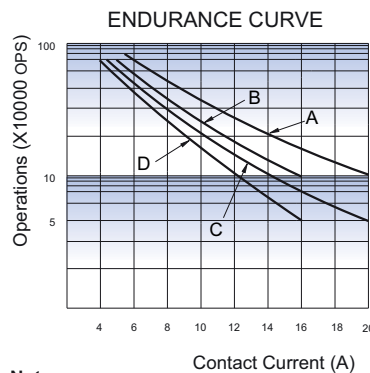
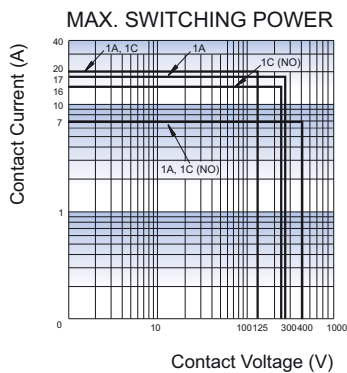


### PCB Layout (Bottom view)



Remark: 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  $> 5\text{mm}$ , 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



### Notes:

- Curve A:1H type, Curve B:1H type, Curve C:1Z type, Curve D:1Z type
- Test conditions:  
Curve A: 20A 125VAC, Resistive load, Room temp., 1s on 9s off  
Curve B: 16A 250VAC, Resistive load, at 85°C, 1s on 9s off  
Curve C: NO, 20A 125VAC, Resistive load, Room temp., 1s on 9s off  
Curve D: NO, 16A 250VAC, Resistive load, at 85°C, 1s on 9s off

### 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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# HF152FD

# SUBMINIATURE HIGH POWER RELAY



File No.: E134517



File No.: 40031203



File No.: CQC16002150629



## Features

- 20A switching capability
- Ambient temperature meets 105°C
- High temperature load: 17A 277VAC at 105°C (Long endurance type)
- 1 Form C and 1 Form A configurations available
- Double pins and Single pin terminal available, effectively reduce terminal temperature rise
- Product in accordance to EN 60335-1 available

## CONTACT DATA

Contact arrangement	1A	1C
Contact resistance <sup>1)</sup>	100mΩ max. (at 1A 24VDC)	
Contact material	AgSnO <sub>2</sub> , AgNi	
Contact rating (Res. load)	20A 125VAC 17A 277VAC(Q type) 7A 400VAC	NO:17A 277VAC(Q type) NC:10A 277VAC
Max. switching voltage	400VAC	400VAC (NO)
Max. switching current	20A	17A
Max. switching power	4700VA	4700VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance	1H type: 5 x 10 <sup>4</sup> OPS (16A 277VAC, Resistive load, AgNi, at 85°C, 1s on 9s off) 1HT type: 1 x 10 <sup>5</sup> OPS (12A 277VAC, Resistive load, AgSO <sub>2</sub> , at 105°C, 1s on 9s off)	

Notes: 1) The data shown above are initial values.  
2) For plastic sealed type, the venting-hole should be opened in electrical endurance test.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)
Dielectric strength	Between coil & contacts: 2500VAC 1min
	Between open contacts: 1000VAC 1min
Operate time (at rated. volt.)	10ms max.
Release time (at rated. volt.)	5ms max.
Shock resistance	Functional: 98m/s <sup>2</sup>
	Destructive: 980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA
Humidity	5% to 85% RH
Ambient temperature	-40°C to 105°C
Termination	PCB
Unit weight	Approx. 14g
Construction	Plastic sealed, Flux proofed

Notes: 1) The data shown above are initial values.  
2) Please find coil temperature curve in the characteristic curves below.  
3) UL insulation system: Class F, Class B.

## COIL

Coil power	Approx. 360mW
------------	---------------

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. 1)	Drop-out Voltage VDC min. 1)	Max. Voltage VDC*2)	Coil Resistance Ω
3	2.25	0.3	3.9	25 x (1±10%)
5	3.75	0.5	6.5	70 x (1±10%)
6	4.50	0.6	7.8	100 x (1±10%)
9	6.75	0.9	11.7	225 x (1±10%)
12	9.00	1.2	15.6	400 x (1±10%)
18	13.5	1.8	23.4	900 x (1±10%)
24	18.0	2.4	31.2	1600 x (1±10%)
48	36.0	4.8	62.4	6400 x (1±10%)

Notes: 1) The data shown above are initial values.  
2) \*Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## SAFETY APPROVAL RATINGS

UL/ CUL	NO, Standard Type	AgNi	20A 125VAC Resistive at 40°C
		AgSnO <sub>2</sub>	17A 125VAC Resistive at 85°C 16A 277VAC Resistive at 85°C 10A 277VAC Resistive at 105°C
NO, Q Type	AgNi	12A 277VAC General Use at 105°C 1/2HP 125VAC at 40°C 1HP 250VAC at 40°C TV-8 125VAC at 40°C	
		AgSnO <sub>2</sub>	17A 277VAC Resistive at 105°C 10A 277VAC Resistive at 105°C
NC	AgNi	20A 125VAC Resistive at 40°C 10A 277VAC Resistive at 85°C	
		AgSnO <sub>2</sub>	7A 277VAC Resistive at 105°C
		AgNi	16A 250VAC Resistive at 85°C 7A 400VAC Resistive at 105°C
1 Form A, Standard Type	AgNi	8A 250VAC COSØ=0.4 at 85°C 10(4)A 250VAC Resistive at 105°C (EN60730-1)	
		AgSnO <sub>2</sub>	17A 250VAC at 23°C 2h/ at 105°C 2h 10A 250VAC at 23°C 2h/ at 105°C 2h
1 Form C	AgNi	NO/NC:10A/7A 250VAC at 105°C	

Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

Type	HF152FD / 12 -1Z P S T F Q (XXX)						
Coil voltage	3, 5, 6, 9, 12, 18, 24, 48VDC						
Contact arrangement	1H: 1 Form A		1Z: 1 Form C				
Pin version	P: Double pins		Nil: Single pin				
Construction <sup>1)</sup>	S: Plastic sealed		Nil: Flux proofed				
Contact material	T: AgSnO <sub>2</sub>		Nil: AgNi				
Insulation standard	F: Class F		Nil: Class B				
Contact endurance	Q: Long endurance type (Only for AgNi type)		Nil: Standard type				
Special code <sup>4)</sup>	XXX: Customer special requirement		Nil: Standard				

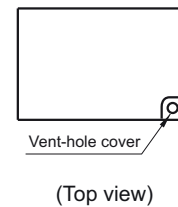
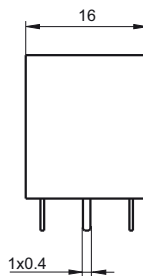
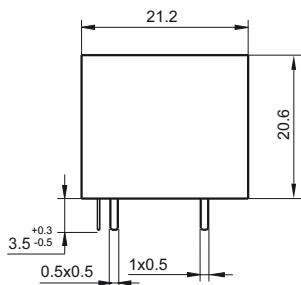
- Notes:** 1) Under the ambience with dangerous gas like H<sub>2</sub>S, SO<sub>2</sub> or NO<sub>2</sub>, plastic sealed type is recommended; Please test the relay in real applications. If the ambience allows, flux proofed type is preferentially recommended.  
 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.  
 3) If plastic sealed type is selected for cleaning purpose, the vent-hole cover should be excised after cleaning.  
 4) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

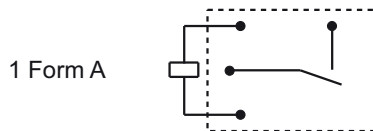
Unit: mm

### Single pin version

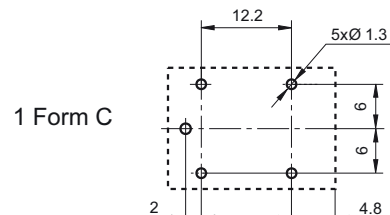
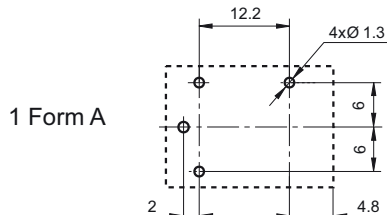
#### Outline Dimensions



#### Wiring Diagram (Bottom view)



#### PCB Layout (Bottom view)



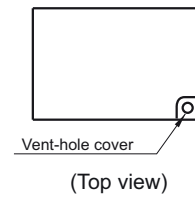
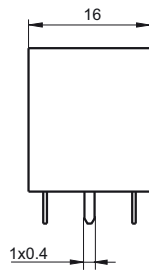
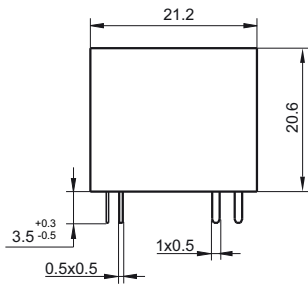


# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

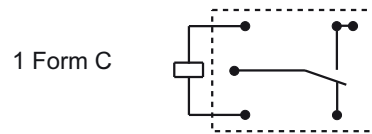
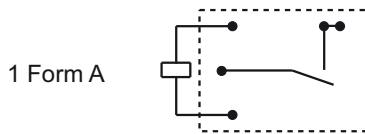
Unit: mm

## Double pin version

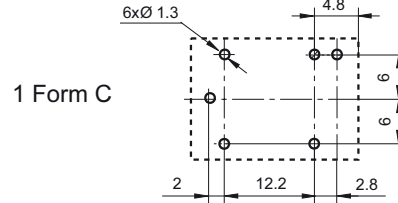
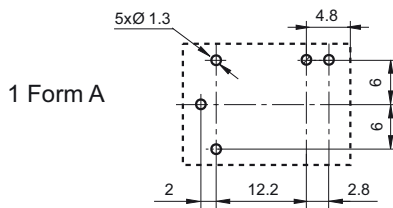
### Outline Dimensions



### Wiring Diagram (Bottom view)

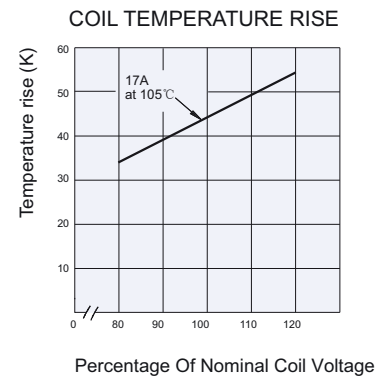
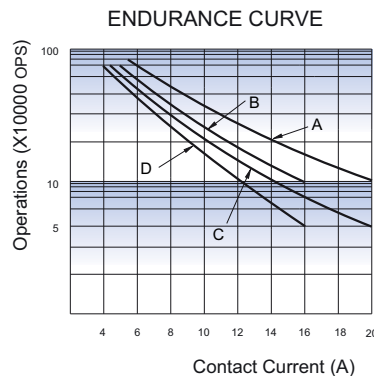
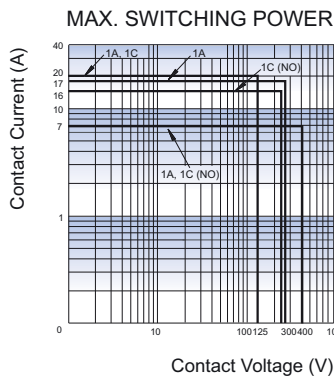


### PCB Layout (Bottom view)



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

## CHARACTERISTIC CURVES



### Notes:

- Curve A:1H type, Curve B:1H type, Curve C:1Z type, Curve D:1Z type
- Test conditions:  
Curve A: 20A 125VAC, Resistive load, Room temp., 1s on 9s off  
Curve B: 16A 250VAC, Resistive load, at 85°C, 1s on 9s off  
Curve C: NO, 20A 125VAC, Resistive load, Room temp., 1s on 9s off  
Curve D: NO, 16A 250VAC, Resistive load, at 85°C, 1s on 9s off

### 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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# HF7520

# SUBMINIATURE POWER RELAY



File No.: E133481



File No.: R50351269



File No.: CQC09002034524



## Features

- High rating: 16A,
- TV-5 load capability
- High sensitive: 200mW
- Low height, flat construction
- PCB & QC layouts available
- Plastic sealed and flux proofed types (with vent-hole cover) available
- UL insulation system: Class F
- Product in accordance to EN 60335-1 available

## CONTACT DATA

Arrangement	1C	1A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)	
Contact material	See ordering info.	
Contact rating (Res. load)	NO: 10A 125/250VAC	Standard type: TV-5 10A 30VDC 10A 125/250VAC
	NC: 6A 125/250VAC	High capacity type: TV-5 16A 30VDC 16A 125/250VAC 8A 250VAC(cosφ=0.4)
Max.switching voltage	250VAC	250VAC/30VDC
Max.switching current	NO:10A NC: 6A	16A
Max.switching power	NO: 2500VA NC: 1500VA	4000VA/480W
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance	HP type: 5 x 10 <sup>4</sup> OPS (16A 250VAC, Resistive load, Room temp., 1s on 9s off)	
	H type: 5 x 10 <sup>4</sup> OPS (10A 250VAC, Resistive load, Room temp., 1s on 9s off)	
	Z type: 5 x 10 <sup>4</sup> OPS (NO, 10A 250VAC, Resistive load, Room temp., 1s on 9s off)	
	Z type: 5 x 10 <sup>4</sup> OPS (NC, 6A 250VAC, Resistive load, Room temp., 1s on 9s off)	

Notes:1) The data shown above are initial values.  
2) For plastic sealed type, the venting-hole should be opened in electrical endurance test.

## COIL

Coil power	1 Form A: Approx. 200mW; 1 Form C: Approx. 400mW
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## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2500VAC 1 min
	Between open contacts	1000VAC 1 min
Operate time (at rated.volt)	15ms max.	
Release time (at rated.volt)	5ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient operating temperature	-40°C to 105°C	
Termination	1C: PCB	
	1A: PCB & QC	
Unit weight	PCB: Approx.9g QC: Approx.10.5g	
Construction	Plastic sealed, Flux proofed	

Notes: 1) The data shown above are initial values.  
2) Please find coil temperature curve in the characteristic curves below.

## SAFETY APPROVAL RATINGS

UL/CUL	1 Form A	TV-5 125VAC 16A 125VAC at 85°C 10A 250VAC at 85°C 16A 30VDC at 85°C 0.3A 110VDC at 85°C 13A 125VAC at 105°C 10A 250VAC at 105°C
	1 Form C	NO: 10A 250VAC NC: 6A 250VAC
TÜV	1 Form A	16A 250VAC 10A 30VDC 8A 250VAC (COSφ=0.4)

Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## COIL DATA

at 23°C

### 1 Form C type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>+2)</sup>	Coil Resistance Ω
5	4.0	0.5	6.5	62.5 x (1±10%)
6	4.8	0.6	7.8	90 x (1±10%)
9	7.2	0.9	11.7	202.5 x (1±10%)
12	9.6	1.2	15.6	360 x (1±10%)
18	14.4	1.8	23.4	810 x (1±10%)
24	19.2	2.4	31.2	1440 x (1±10%)
48	38.4	4.8	62.4	5760 x (1±10%)

### 1 Form A type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>+2)</sup>	Coil Resistance Ω
5	4.0	0.5	6.5	125 x (1±10%)
6	4.8	0.6	7.8	180 x (1±10%)
9	7.2	0.9	11.7	405 x (1±10%)
12	9.6	1.2	15.6	720 x (1±10%)
18	14.4	1.8	23.4	1620 x (1±10%)
24	19.2	2.4	31.2	2880 x (1±10%)
48	38.4	4.8	62.4	11520 x (1±10%)

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

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

## ORDERING INFORMATION

Type	HF7520 / 012 -H S T P Q (XXX)
Coil voltage	5, 6, 9,12, 18, 24, 48VDC
Contact arrangement	H: 1 Form A Z: 1 Form C
Construction <sup>1)</sup>	S: Plastic sealed Nil: Flux proofed
Contact material	T: AgSnO <sub>2</sub> Nil: AgCdO (Only for 1 Form A) AgNi (Only for 1 Form C)
Contact capacity	P: High Capacity type (Only for 1 Form A) Nil: Standard type
Terminal type	Q: QC (Only for 1 Form A and high capacity type) Nil: PCB
Special code <sup>4)</sup>	XXX: Customer special requirement Nil: Standard

Notes: 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

3) When the ambient temperature reaches 105°C degree or more, please select flux proofed and high capacity type. Besides, please indicate the exact ambient temperature when ordering.

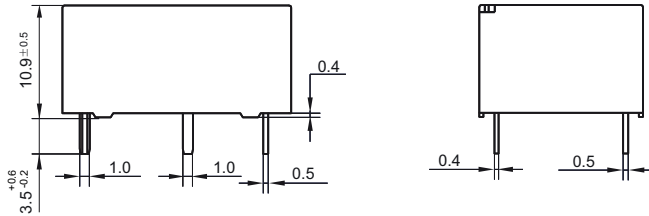
4) The customer special requirement express as special code after evaluating by Hongfa.

# OUTLINE DIMENSIONS , WIRING DIAGRAM AND PC BOARD LAYOUT

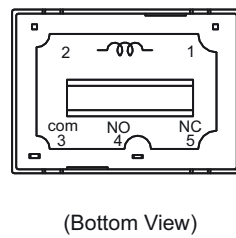
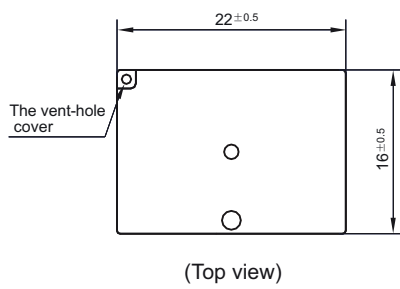
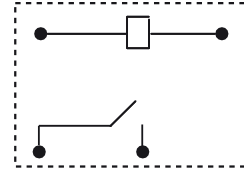
Unit: mm

## 1 Form A (PCB)

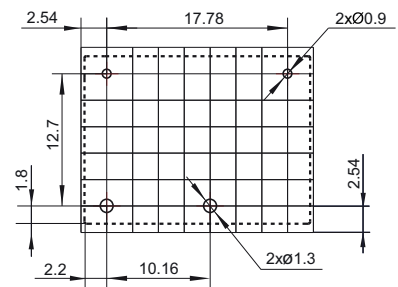
### Outline Dimensions



### Wiring Diagram (Bottom View)

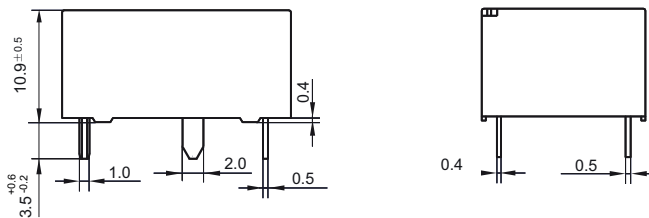


### PCB Layout (Bottom view)

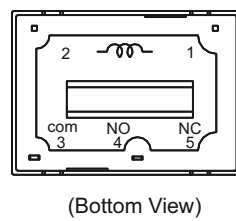
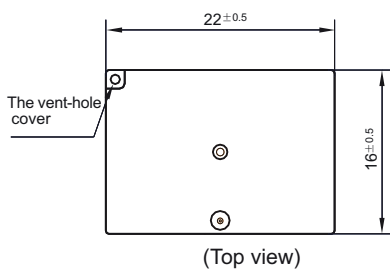
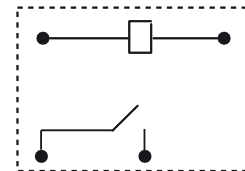


## 1 Form A (Wide terminal)

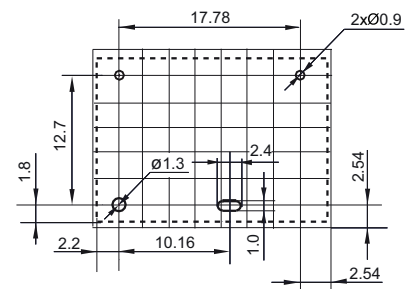
### Outline Dimensions



### Wiring Diagram



### PCB Layout (Bottom view)

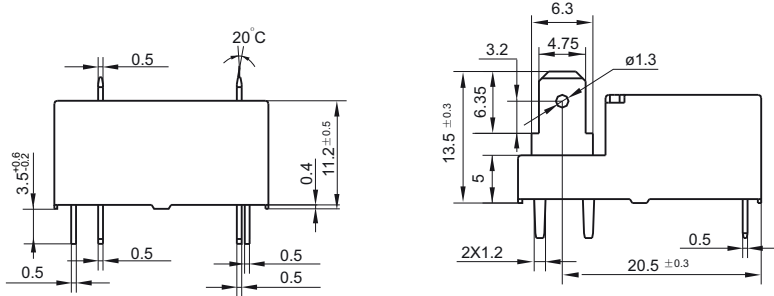


# OUTLINE DIMENSIONS , WIRING DIAGRAM AND PC BOARD LAYOUT

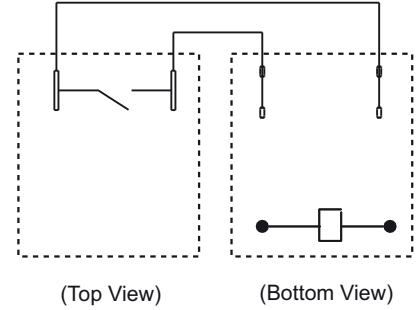
Unit: mm

1 Form A (QC)

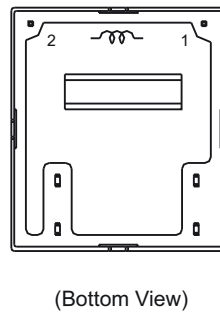
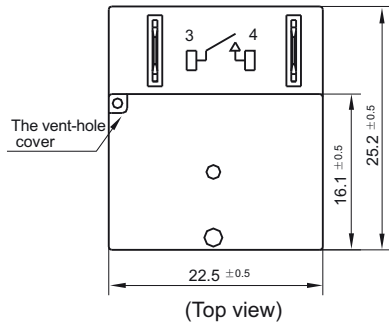
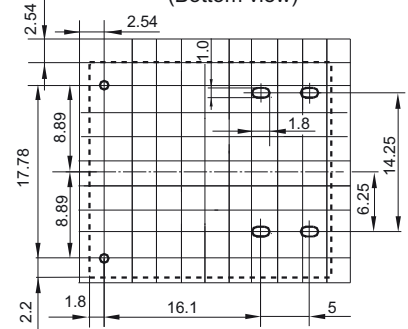
## Outline Dimensions



## Wiring Diagram

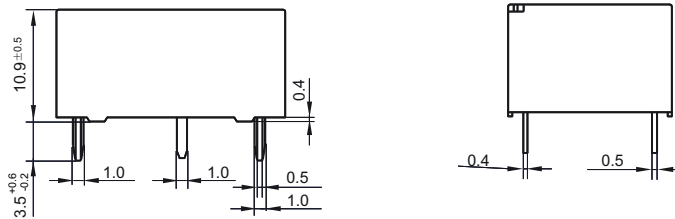


## PCB Layout (Bottom view)

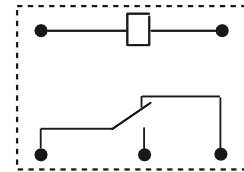


## Outline Dimensions

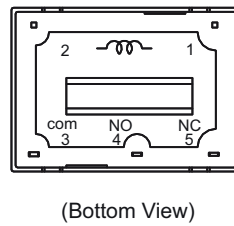
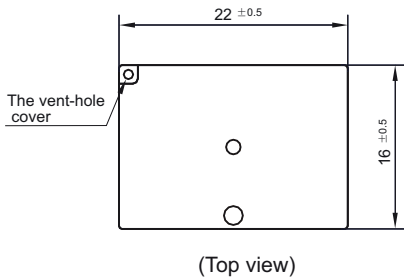
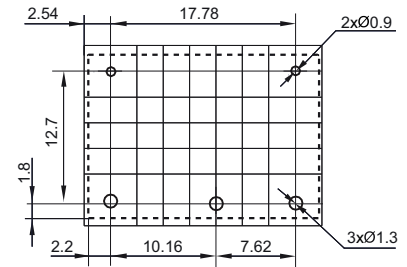
1 Form C (PCB)



## Wiring Diagram (Bottom View)



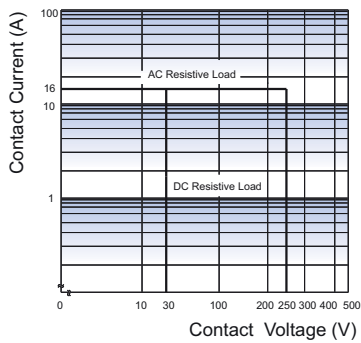
## PCB Layout (Bottom view)



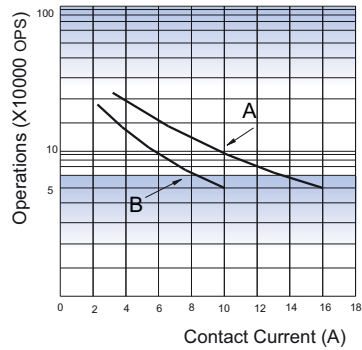
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
2) The tolerance without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

## CHARACTERISTIC CURVES

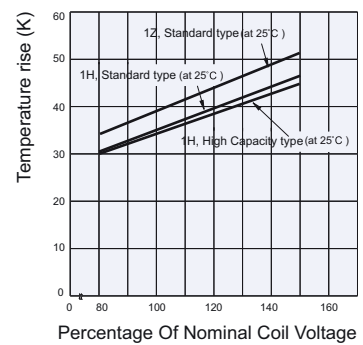
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Notes:**

- (1) Curve A: HP type  
Curve B: H type
- (2) Test conditions:  
Curve A: 16A 250VAC, Resistive load,  
Room temp., 1s on 9s off  
Curve B: 10A 250VAC, Resistive load,  
Room temp., 1s on 9s off

**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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# HF163F-L SUBMINIATURE INTERMEDIATE POWER LATCHING RELAY



File No.: E134517



File No.: 40039460



## Features

- Latching relay
- High sensitive
- Breakdown voltage (between contact and coil): 5,000 V
- High switching capacity: 8A 250VAC
- Surge breakdown voltage (between contact and coil): 12,000 V
- Reflow soldering available
- 1 Form A configuration

## CONTACT DATA

Contact arrangement	1A
Contact resistance	100mΩ max. (at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating (Res. load)	8A 250VAC 5A 30VDC
Max. switching voltage	250VAC / 30VDC
Max. switching current	10A
Max. switching power	2500VA/150W
Mechanical endurance	1 x 10 <sup>6</sup> OPS
Electrical endurance	5 x 10 <sup>4</sup> OPS(8A 250VAC, Resistive load, at 85°C, 1s on 9s off)

## CHARACTERISTICS

Insulation resistance		1000MΩ (at 500VDC)
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Set time		15ms max.
Reset time		15ms max.
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance		10Hz to 55Hz 2.0mm DA
Humidity		5% to 85% RH
Ambient temperature		-40°C to 85°C
Termination		PCB
Unit weight		Approx. 8g
Construction		Flux proofed

Notes: The data shown above are initial values.

## COIL

Coil power	1 coil latching	Approx. 200mW
	2 coils latching	Approx. 400mW

## COIL DATA

at 23°C

### 1 coil latching (200mW)

Nominal Voltage VDC	Set Voltage VDC max.	Reset Voltage VDC max.	Coil Resistance x (1±10%) Ω
3	2.4	2.4	45
5	4.0	4.0	125
6	4.8	4.8	180
9	7.2	7.2	405
12	9.6	9.6	720
24	19.2	19.2	2880

### 2 coils latching (400mW)

Nominal Voltage VDC	Set Voltage VDC max.	Reset Voltage VDC max.	Coil Resistance x (1±10%) Ω
3	2.4	2.4	22.5
5	4.0	4.0	62.5
6	4.8	4.8	90
9	7.2	7.2	202.5
12	9.6	9.6	360
24	19.2	19.2	1440

## SAFETY APPROVAL RATINGS

UL/CUL	8A 250VAC at 85°C 5A 30VDC at 85°C 10A 250VAC at 40°C TV-3 125VAC at 40°C 800W 277VAC Tungsten at 40°C 4A 277VAC Standard Ballast at 40°C
	8A 250VAC at 85°C 5A 30VDC at 85°C

- Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

	HF163F-L/	12	-H	L2	T	(XXX)
Type						
Coil voltage	3, 5, 6, 9, 12, 24VDC					
Contact form	H: 1 Form A					
Sort	L1: 1 coil latching		L2: 2 coils latching			
Contact material	T: AgSnO <sub>2</sub>					

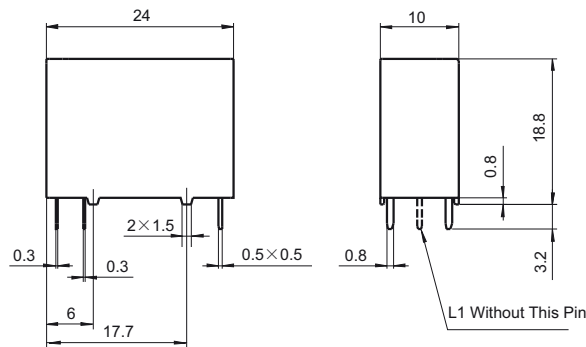
**Special code<sup>4)</sup>**      **XXX:** Customer special requirement      **Nil:** Standard

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).  
 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.  
 3) For gold plated type, the min. switching current and min. switching voltage is 10mA 5VDC.  
 4) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT); e.g.(470) stands for product which is suitable for reflow soldering.

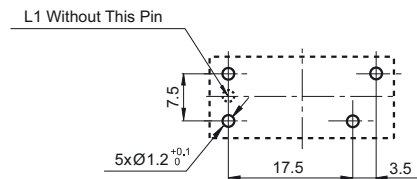
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

Outline Dimensions



PCB Layout  
(Bottom view)

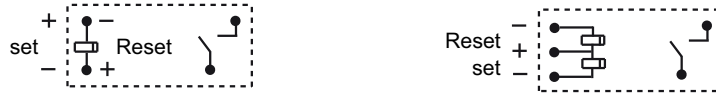


- Remark:** 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .  
 3) The width of the gridding is 2.54mm.



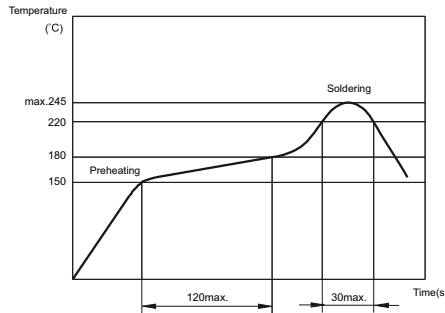
Wiring Diagram  
(Bottom view)

Reset Status



RECOMMENDED SOLDERING CONDITIONS

Temperature/Time profile of Reflow Soldering see below:



- Notes:** 1) Temperature profile shows Printed Circuit Board surface temperature on the relay terminal portion.  
2) Please check the actual soldering condition to use other method except above mentioned temperature profiles.

**Notice**

- Relay is on the "reset" or "set" status when being released from stock, with the consideration of shock risen from transit and relay mounting, relay would be changed to "set" or "reset" status, therefore, when application ( connecting the power supply), please reset the relay to "set" or "reset" status on request.
- In order to maintain "set" or "reset" status, energized voltage to coil should reach the rated voltage, impulse width should be 5 times more than "set" or "reset" time. Do not energize voltage to "set" coil and "reset" coil simultaneously. And also long energized time (more than 1 min) should be avoided.
- Keep the product away from strong magnetic field during transportation, storage and application, to avoid change of set/reset voltage.

**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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# HFE7

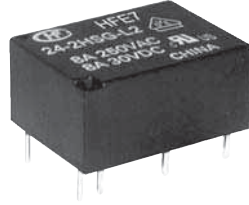
# SUBMINIATURE INTERMEDIATE POWER RELAY



File No.:E134517



File No.:40027342



## Features

- High switching capacity  
1A, 1B: 10A 250VAC/30VDC;  
2A, 2B, 1A + 1B: 8A 250VAC/30VDC
- High sensitive
- 4kV dielectric strength (between coil & contacts)
- Single side stable and latching types available
- 1 Form A, 1 Form B, 2 Form A, 2 Form B and 1A + 1B contact arrangement

## CONTACT DATA

Contact arrangement	1A, 1B	2A, 2B, 1A + 1B
Contact resistance	AgNi +Au plated: 30mΩ max.(at 1A 6VDC) AgNi: 50mΩ max.(at 1A 6VDC) AgSnO <sub>2</sub> +Au plated: 60mΩ max.(at 1A 6VDC) AgSnO <sub>2</sub> : 80mΩ max.(at 1A 6VDC)	
Contact material	AgSnO <sub>2</sub> , AgNi	
Contact rating (Res. load)	10A 250VAC/30VDC	8A 250VAC/30VDC
Max. switching Voltage	277VAC	
Max. switching current	10A	8A
Max. switching power	2500VA	2000VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance	1A, 1B type: 1 x 10 <sup>5</sup> OPS (10A 250VAC, Resistive load., at 70°C, 1.5s on 1.5s off) 1A + 1B, 2A, 2B type: 3 x 10 <sup>4</sup> OPS (8A 250VAC, Resistive load., at 70°C, 1.5s on 1.5s off)	

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric Strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at rated. volt.)	10ms max.	
Release (Reset) time (at nomi. volt.)	10ms max.	
Max. operate frequency (under rated load)	20 cycles /min	
Temperature rise (at rated. volt.)	50 K max.	
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Shock resistance	98m/s <sup>2</sup>	
Humidity	5% to 85% RH	
Ambient temperature	-40 °C to 70 °C	
Termination	PCB	
Unit weight	Approx. 6g	
Construction	Plastic sealed, Flux proofed	

Notes: The data shown above are initial values.

## COIL

Type	Coil power		
		Sensitive	High sensitive
Single side stable	1A,1A+1B	Approx. 420mW	Approx. 200mW
	2A		Approx. 280mW
Single coils latching		Approx. 300mW	Approx. 200mW
Double coils latching		Approx. 420mW	Approx. 280mW

## COIL DATA

at 23°C

### Single side stable

Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Coil Resistance x (±10%)Ω		
			200mW	280mW	420mW
3	2.1	0.3	45	32.1	21.4
5	3.5	0.5	125	89.3	59.5
6	4.2	0.6	180	129	85.7
9	6.3	0.9	405	289	192.9
12	8.4	1.2	720	514	342.9
24	16.8	2.4	2880	2056	1371.4

### Single coil latching

Nominal Voltage VDC	Set /Reset Voltage VDC max.	Pulse Duration ms min.	Coil Resistance x (±10%)Ω	
			300mW	200mW
3	2.1	50	30	45
5	3.5	50	83.3	125
6	4.2	50	120	180
9	6.3	50	270	405
12	8.4	50	480	720
24	16.8	50	1920	2880



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## COIL DATA

at 23°C

### Double coils latching

Nominal Voltage VDC	Set / Reset Voltage VDC max.	Pulse Duration ms min.	Coil Resistance x (1±10%) Ω	
			420mW	280mW
3	2.1	50	21.4+21.4	32.1+32.1
5	3.5	50	59.5+59.5	89.3+89.3
6	4.2	50	85.7+85.7	129+129
9	6.3	50	192.9+192.9	289+289
12	8.4	50	342.9+342.9	514+514
24	16.8	50	1371.4+1371.4	2056+2056

## SAFETY APPROVAL RATINGS

UL/CUL	1 Form A	AgNi	10A 250VAC 8A 30VDC 1/4HP 125VAC 1/3HP 250VAC
		AgSnO <sub>2</sub>	10A 30VDC B300, R300 10A 250VAC 1/4 HP 125VAC 1/3 HP 250VAC
	2 Form A	AgSnO <sub>2</sub> , AgNi	8A 250VAC/30VDC 1/4HP 125VAC 1/3HP 250VAC
		AgSnO <sub>2</sub>	600W 125VAC B300, R300
	1 Form A+1 Form B	AgSnO <sub>2</sub> , AgNi	8A 250VAC/30VDC 1/4HP 125VAC 1/3HP 250VAC
		AgSnO <sub>2</sub>	B300, R300
VDE (No UL approval on Single side stable version)	1 Form A	AgNi	10A 250VAC (cosφ=1) 5A 250VAC (cosφ=0.4)
	2 Form A	AgNi	8A 250VAC (cosφ=1) 3.5A 250VAC (cosφ=0.4)
	1 Form A+1 Form B	AgNi	8A 250VAC (cosφ=1) 3.5A 250VAC (cosφ=0.4)

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

Type	HFE7 / 12 -1H S T G -L2 -R (412)(XXX)						
Coil voltage	3, 5, 6, 9, 12, 24VDC						
Contact form <sup>1)</sup>	1H: 1 Form A 1D: 1 Form B 2H: 2 Form A 2D: 2 Form B 1HD: 1A+1B						
Construction <sup>2)</sup>	S: Plastic sealed Nil: Flux proofed						
Contact material <sup>3)</sup>	T: AgSnO <sub>2</sub> Nil: AgNi						
Contact plating	G: Gold plated Nil: No gold plated						
Sort	L1: 1 coil latching L2: 2 coils latching Nil: Single side stable						
Polarity	R: Negative polarity Nil: Positive polarity						
Customer special code (Coil power) <sup>4)</sup>	(412): Sensitive Nil: High sensitive						
Special code <sup>5)</sup>	XXX: Customer special requirement Nil: Standard						

Notes: 1) 1H, 2H means that relay is on the "reset" status when delivery; 1D, 2D means that relay is on the "set" status when delivery. There are no UL approval on 1D, 2D version.

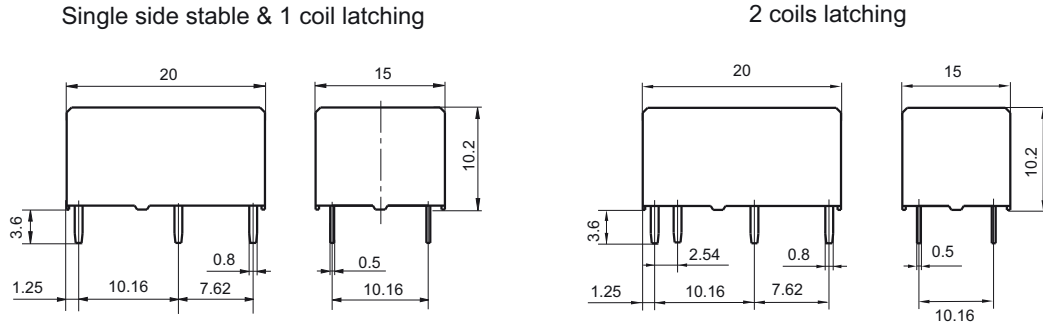
2) Under the ambience with dangerous gas like H<sub>2</sub>S, SO<sub>2</sub> or NO<sub>2</sub>, plastic sealed type is recommended; Please test the relay in real applications. If the ambience allows, flux proofed type is preferentially recommended. Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

3) For the application with inrush current conditions, such as lamp load, motor load, capacitance load, coil load, etc., we suggest use the flux proof and no golden plated AgSnO<sub>2</sub> contact version.

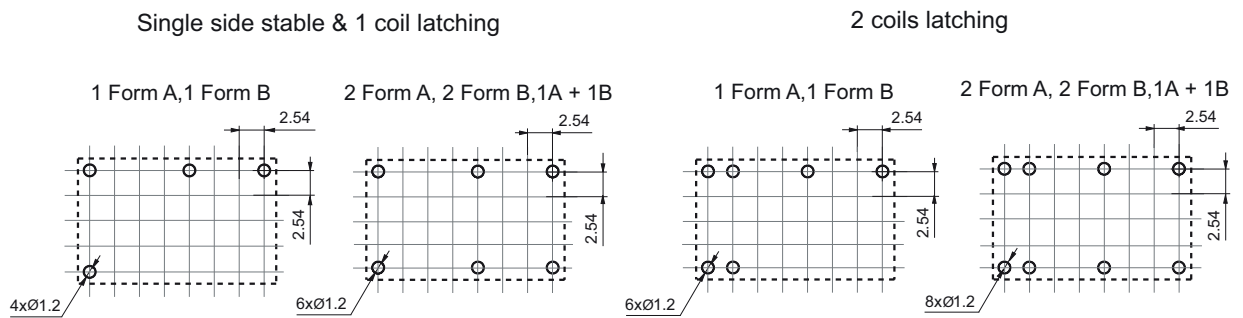
4) We recommend to choose the sensitive version (same part number, but with special suffix (412)) if the higher coil activation is allowable; Please choose the sensitive version (same part number, but with special suffix (412)) if the relay to be used in the extreme environment or welded by wave soldering; Please check with HF's engineer before designing the relay to your application if there are some requirements' outside the specification we provided.

5) The customer special requirement express as special code after evaluating by Hongfa. e.g. (359) stands for Lamp load.

Outline Dimensions



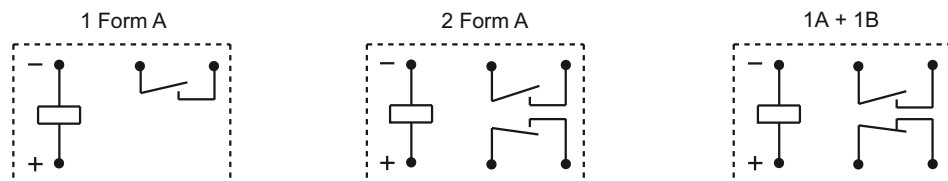
PCB Layout (Bottom view)



- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.  
 3) The width of the gridding is 2.54mm.

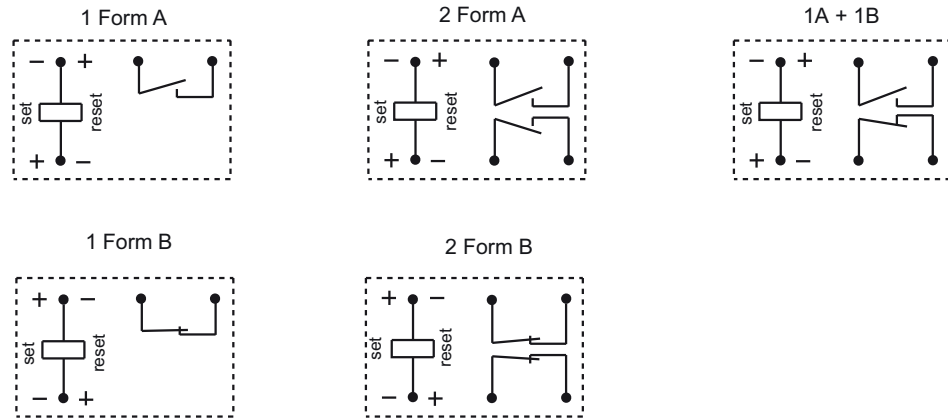
Wiring Diagram (Bottom view)

Single side stable (Standard polarity)

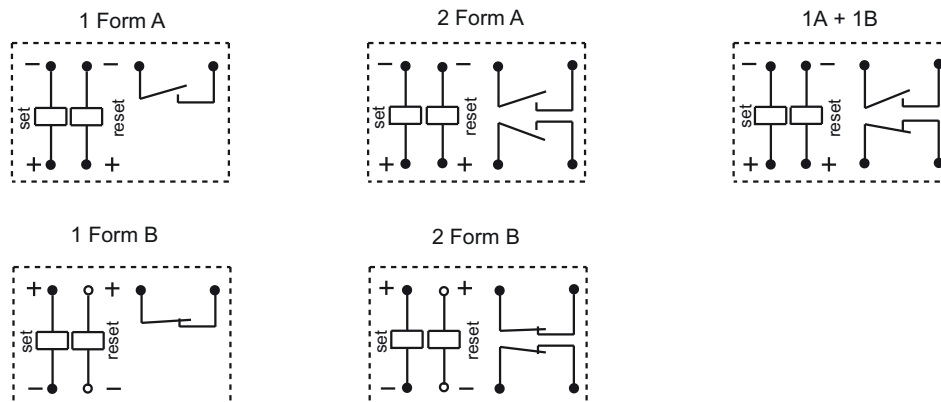


Wiring Diagram (Bottom view)

1 coil latching (Standard polarity)



2 coils latching (Standard polarity)



Remark: The coil polarity of Reverse polarity and Standard polarity is opposite.

Notice

1. Relay is on the "reset" or "set" status when being released from stock, with the consideration of shock risen from transit and relay mounting, relay would be changed to "set" or "reset" status, therefore, when application ( connecting the power supply), please reset the relay to "set" or "reset" status on request.
2. In order to maintain "set" or "reset" status, energized voltage to coil should reach the rated voltage, impulse width should be 5 times more than "set" or "reset" time. Do not energize voltage to "set" coil and "reset" coil simultaneously. And also long energized time (more than 1 min) should be avoided.
3. As the relay component part's will shrink and deformed due to the high temperature impact, our products are forbidden to be used at the temperature outside our suggested working temperature range (-40°C to 70°C) for long time ; If the wave soldering will be used, the operating parameters we will suggest are: Up limit of the pre-heating time: 120s; Up limit of the pre-heating temperature:120°C; Soldering temperatuer: 260°C±5°C; Soldering time (10±3) s; Besides our suggested parameters, please try to shorten the pre-heating time and the soldering time and try to lower the temperature for pre-heating and the soldering as you can; the manual soldering for such relay is more recommended.

Disclaimer

This datasheet is for the customers' reference. All the specifications are 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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# HF118F

# MINIATURE HIGH POWER RELAY



File No.: E134517



File No.: 40010480



File No.: CQC09002035071  
CQC18002206322



## Features

- 10A switching capability
- 5kV dielectric strength (between coil and contacts)
- Low height: 12.5 mm
- Creepage distance >8mm
- Meeting VDE 0700, 0631 reinforce insulation
- Product in accordance to IEC 60335-1 available
- UL insulation system: Class F
- Sockets available
- Plastic sealed and flux proofed types available

## CONTACT DATA

Contact arrangement	1A, 1B, 1C
Contact material	See ordering info.
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact rating (Res. load)	10A 250VAC/30VDC
Max. switching voltage	440VAC / 125VDC
Max. switching current	10A
Max. switching power	2500VA / 300W
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance	1H type: 1 x 10 <sup>5</sup> OPS (AgNi, 8A 250VAC, Resistive load, at 85°C, 5s on 5s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 / 50μs)	
Operate time (at rated. vot.)	10ms max.	
Release time (at rated. vot.)	5ms max.	
Temperature rise (at rated. Volt.)	55K max.	
Shock resistance *	Functional	NC: 49m/s <sup>2</sup> NO: 98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	NC (no coil voltage)	10Hz to 55Hz 0.8mm DA
	NO	10Hz to 55Hz 1.65mm DA
Ambient temperature	-40°C to 85°C	
Humidity	5% to 85% RH	
Termination	PCB	
Unit weight	Approx. 8g	
Construction	Plastic sealed, Flux proofed	

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

2) \* Index is not in relay length direction.

## COIL

Coil power	Approx. 220mW to 290mW
------------	------------------------

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max.1)	Drop-out Voltage VDC min.1)	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.50	0.5	7.5	113 x (1±10%)
6	4.20	0.6	9.0	164 x (1±10%)
9	6.30	0.9	13.5	360 x (1±10%)
12	8.40	1.2	18.0	620 x (1±10%)
18	12.60	1.8	27.0	1295 x (1±10%)
24	16.80	2.4	36.0	2350 x (1±15%)
48 <sup>2)</sup>	33.60	4.8	72.0	8000 x (1±15%)
60 <sup>2)</sup>	42.00	6.0	90.0	12500 x (1±15%)

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

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

3) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## SAFETY APPROVAL RATINGS

<b>UL/CUL</b> (AgNi, AgSnO <sub>2</sub> )	version 1,3,5,6	10A 250VAC
		10A 30VDC B300 R300 1/2HP 240VAC (NO only) AgSnO <sub>2</sub> : 1/3HP 120VAC (NO only)
<b>VDE</b> (AgNi, AgNi+Au)	1H (;S) (1;3;5) (-;G)	8A 250VAC at 85°C
	1D (;S) (1;3;6) (-;G)	8A 250VAC at 85°C
	1Z (-;S) (1;3) (-;G)	8A 250VAC at 85°C
<b>VDE</b> (AgSnO <sub>2</sub> , AgSnO <sub>2</sub> +Au)	1H (-;S) (1;3;5), T.(-;G)	8A 250VAC at 85°C
	1D (-;S) (1;3;6), T.(-;G)	8A 250VAC at 85°C
	1Z (-;S) (1;3), T.(-;G)	8A 250VAC at 85°C
	1H (-;S) (1;3;5), T.(-;G)	AC-15 (Make: 30A 250VAC COS Ø=0.7 at 85°C Break: 3A 250VAC COS Ø=0.4 at 85°C)
	1Z (-;S) (1;3), T.(-;G)	NO: AC-15 (Make: 30A 250VAC COS Ø=0.7 at 85°C Break: 3A 250VAC COS Ø=0.4 at 85°C)

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

<b>Type</b>	HF118F / 012 -1H S 1 G (XXX)
<b>Coil voltage</b>	5, 6, 9, 12, 18, 24, 48, 60VDC
<b>Contact arrangement</b>	1H: 1 Form A 1D: 1 Form B 1Z: 1 Form C
<b>Construction</b> <sup>1)2)</sup>	S: Plastic sealed Nil: Flux proofed
<b>Version</b> (See Wiring Diagram below)	1: 3.2mm 1 pole 8A 3: 3.2mm 1 pole 10A, double pinning 5: 5mm 8A, only 1 Form A 6: 5mm 8A, only 1 Form B
<b>Contact material</b> <sup>3)</sup>	T: AgSnO <sub>2</sub> G: AgNi+Au plated TG: AgSnO <sub>2</sub> +Au plated Nil: AgNi
<b>Special code</b> <sup>4)</sup>	XXX: Customer special requirement Nil: Standard

Notes: 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

3) For gold plated type, the min. switching current and min. switching voltage is 10mA 5VDC.

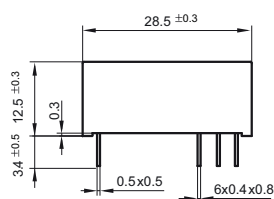
4) The customer special requirement express as special code after evaluating by Hongfa. e.g. (335) stands for product in accordance to IEC 60335-1 (GWT); e.g.(253) stands for Reflow soldering version.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

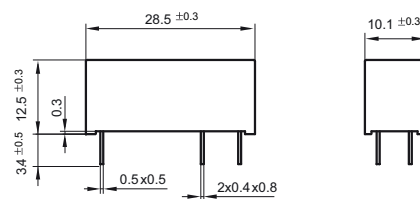
Unit: mm

### Outline Dimensions

#### 3.2mm pinning



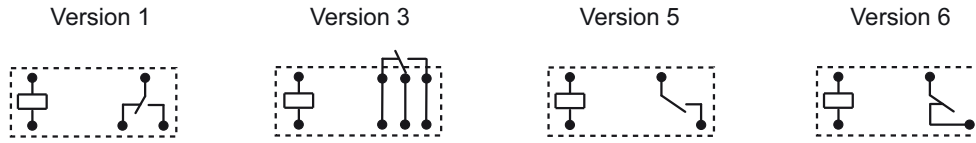
#### 5mm pinning



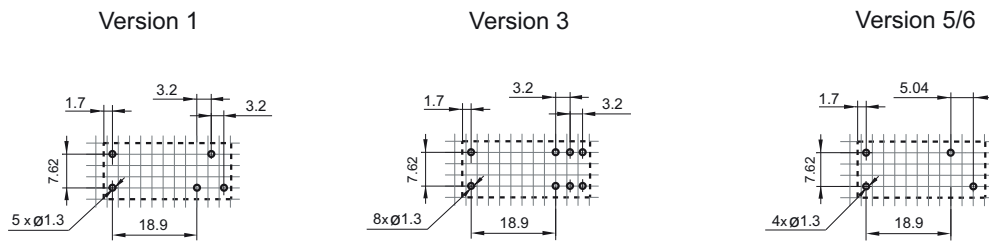
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

### Wiring Diagram (Bottom view)



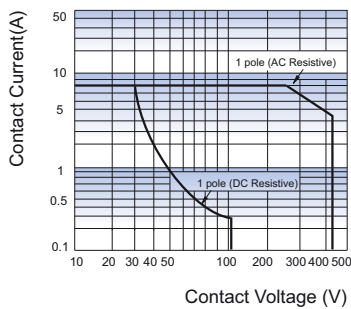
### PCB Layout (Bottom view)



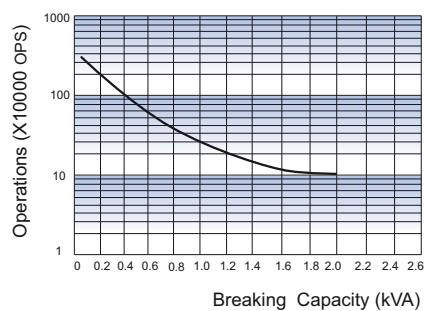
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .  
 3) The width of the gridding is 2.54mm.

## CHARACTERISTIC CURVES

### MAXIMUM SWITCHING POWER



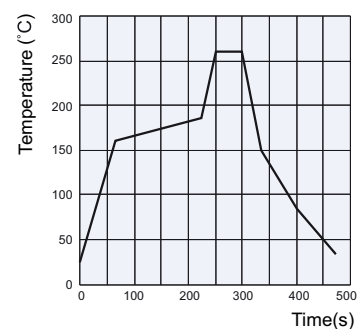
### ENDURANCE CURVE



#### Notes:

- 1) Curve: 1Z1 type
- 2) Test conditions:  
 NO, Resistive load, 250VAC  
 Flux proofed, Room temp., 1s on 9s off.

### REFLOW WELDING TEMPERATURE (Reflow soldering version)



### 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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# HF115F

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:116934



File No.:CQC17002168381



## Features

- Low height: 15.7 mm
- 16A switching capability
- 5kV dielectric strength (between coil and contacts)
- Creepage distance: 10mm
- Meeting VDE 0700, 0631 reinforce insulation
- Product in accordance to IEC 60335-1 available
- Sockets available
- Plastic sealed and flux proofed types available

## CONTACT DATA

Contact arrangement	1A, 1B, 1C	2A, 2B, 2C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)	
Contact material	See ordering info.	
Contact rating (Res. load)	12A/16A 250VAC	8A 250VAC
Max. switching voltage	440VAC / 300VDC	
Max. switching current	12A / 16A	8A
Max. switching power	3000VA / 4000VA	2000VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance	1H3B type: 1 x 10 <sup>6</sup> OPS (16A 250VAC, Resistive load, AgNi, Room temp., 1s on 9s off) 2H4B type: 5 x 10 <sup>4</sup> OPS (8A 250VAC, Resistive load, AgNi, Room temp., 1s on 9s off)	

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
	Between contact sets	2500VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 / 50μs)	
Operate time (at rated. volt.)	15ms max.	
Release time (at rated. volt.)	8ms max.	
Temperature rise (at rated. volt.)	55K max.	
Shock resistance *	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	10Hz to 150Hz 10g/5g	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 13.5g	
Construction	Plastic sealed, Flux proofed	

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

2) \* Index is not in relay length direction.

3) UL insulation system: Class F, Class B.

## COIL

Coil power	Approx. 400mW
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## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.50	0.5	7.5	62 x (1±10%)
6	4.20	0.6	9.0	90 x (1±10%)
9	6.30	0.9	13.5	202 x (1±10%)
12	8.40	1.2	18	360 x (1±10%)
18	12.60	1.8	27	810 x (1±10%)
24	16.80	2.4	36	1440 x (1±10%)
48 <sup>2)</sup>	33.60	4.8	72	5760 x (1±15%)
60 <sup>2)</sup>	42.00	6.0	90	7500 x (1±15%)
110 <sup>2)</sup>	77.00	11.0	165	25200 x (1±15%)

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

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

3) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## SAFETY APPROVAL RATINGS

### VDE

Contact material	Specifications	Ratings	Ambient Temperature
AgCdO	HF115F....2(H;Z)(S)4(G)(F)	8A 250VAC	at 70°C
	HF115F....1H(S)(1;2)(G)(F)	12A 250VAC	at 70°C
		10A 250VAC	at 70°C
	HF115F....1Z(S)(1;2)(G)(F)	12A 250VAC	at 70°C
	HF115F....1H(S)3(G)(F)	16A 250VAC	at 70°C
		10A 250VAC	at 70°C
		9A 250VAC COS $\phi$ =0.4	at 70°C
HF115F....1Z(S)3(G)(F)	16A 250VAC	at 70°C	
	9A 250VAC COS $\phi$ =0.4 (NO only)	at 70°C	
AgNi	HF115F....2(H;Z)(S)4B(G)(F)	5A 400VAC	at 85°C
		8A 250VAC	at 85°C
	HF115F....1H(S)(1;2)B(G)(F)	12A 250VAC	at 85°C
	HF115F....1Z(S)(1;2)B(G)(F)	12A 250VAC	at 85°C
	HF115F....1H(S)3B(G)(F)	16A 250VAC	at 85°C
		9A 250VAC COS $\phi$ =0.4	at 70°C
	HF115F....1Z(S)3B(G)(F)	16A 250VAC (NO only)	at 85°C
		12A 250VAC	at 85°C
		9A 250VAC COS $\phi$ =0.4 (NO only)	at 70°C
10(4)A 250VAC (NO only)		at 65°C	
	12(2)A 250VAC (NO only)	at 65°C	
AgSnO <sub>2</sub>	HF115F....2(H;Z)(S)4A(G)(F)	8A 250VAC	at 85°C
	HF115F....1(H;Z)(S)(1;2)A(G)(F)	12A 250VAC	at 85°C
	HF115F....1H(S)3A(G)(F)	16A 250VAC	at 85°C
		9A 250VAC COS $\phi$ =0.4	at 70°C
	HF115F....1Z(S)3A(G)(F)	16A 250VAC (NO only)	at 85°C
		9A 250VAC COS $\phi$ =0.4 (NO only)	at 70°C

### UL/CUL

Version 1 or 2 (AgCdO)	12A 277VAC	Version 3 (AgSnO <sub>2</sub> )	16A 277 VAC
	1/2HP 250VAC		1/3HP 125VAC
	1/3HP 125VAC		1/2HP 250VAC
Version 1 or 2 (AgSnO <sub>2</sub> )	12A / 277VAC	Version 3 (AgNi)	B300
	B300		R300
	R300		16A 277VAC
Version 1 or 2 (AgNi)	12A 277VAC	Version 4 (AgCdO)	5FLA, 30LRA 250VAC
			10A 250VAC
Version 3 (AgCdO)	16A 277 VAC	Version 4 (AgSnO <sub>2</sub> )	8A 277VAC
	9A 250VAC at 105°C		1/2HP 250VAC
	1HP 250VAC		1/4HP 125VAC
	1/2HP 125VAC		
	TV-5 125VAC		8A 277VAC
		Version 4 (AgNi)	8A 277VAC

**Notes:** 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

Type	HF115F / 012 -1H S 1 A F (XXX)						
Coil voltage	5, 6, 9, 12, 18, 24, 48, 60, 110VDC						
Contact arrangement	1H: 1 Form A 2H: 2 Form A		1D: 1 Form B 2D: 2 Form B		1Z: 1 Form C 2Z: 2 Form C		
Construction <sup>1)2)</sup>	S: Plastic sealed			Nil: Flux proofed			
Version	1: 3.5mm 1 pole 12A 3: 5.0mm 1 pole 16A		2: 5.0mm 1 pole 12A 4: 5.0mm 2 pole 8A				
Contact material <sup>3)</sup>	A: AgSnO <sub>2</sub> AG: AgSnO <sub>2</sub> + Au plated		B: AgNi		Nil: AgCdO BG: AgNi+ Au plated		G: AgCdO+ Au plated
Insulation standard	F: Class F		Nil: Class B				
Special code <sup>4)</sup>	XXX: Customer special requirement			Nil: Standard			

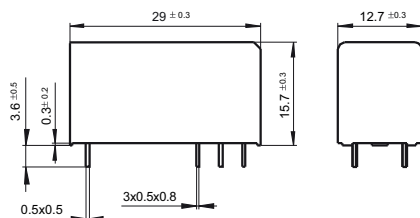
- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).
- 2) Contact is recommend for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB
- 3) For gold plated type, the min. switching current and min. switching voltage is 10mA 5VDC.
- 4) The customer special requirement express as special code after evaluating by Hongfa. e.g. (335) stands for product in accordance to IEC 60335-1 (GWT); e.g. (253) stands for Reflow soldering version, for 1 pole type.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

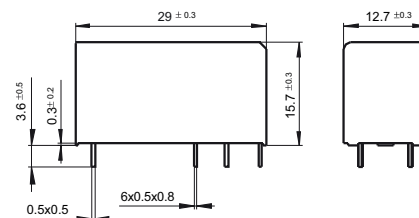
Unit: mm

### Outline Dimensions

3.5mm Pinning (HF115F/ □□□ -□□ -□ -1 -□□ )

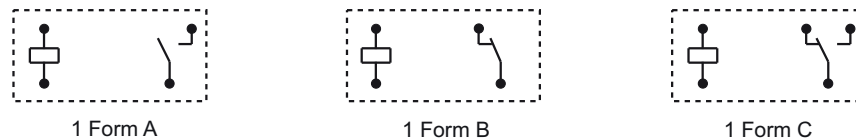


5mm Pinning (HF115F/ □□□ -□□ -□ -2/3/4 -□□ )

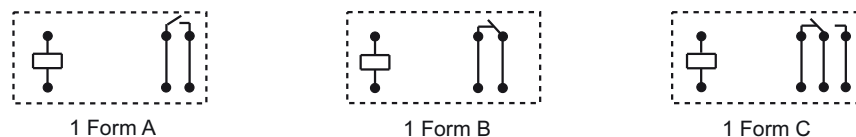


### Wiring Diagram (Bottom view)

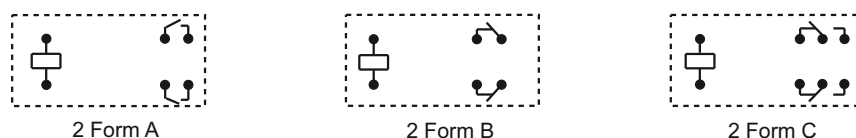
3.5/5mm Pinning, 1 Pole, 12A, HF115F/ □□□ -1 □ -□ -1/2 -□□



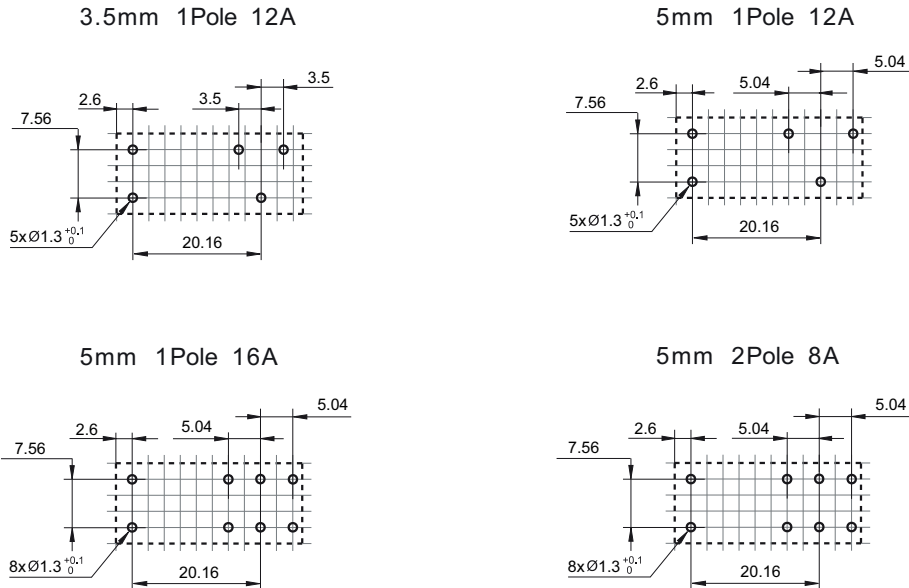
5mm Pinning, 1 Pole, 16A, HF115F/ □□□ -1 □ -□ -3 -□□



5mm Pinning, 2 Pole, 8A, HF115F/ □□□ -2 □ -□ -4 -□□

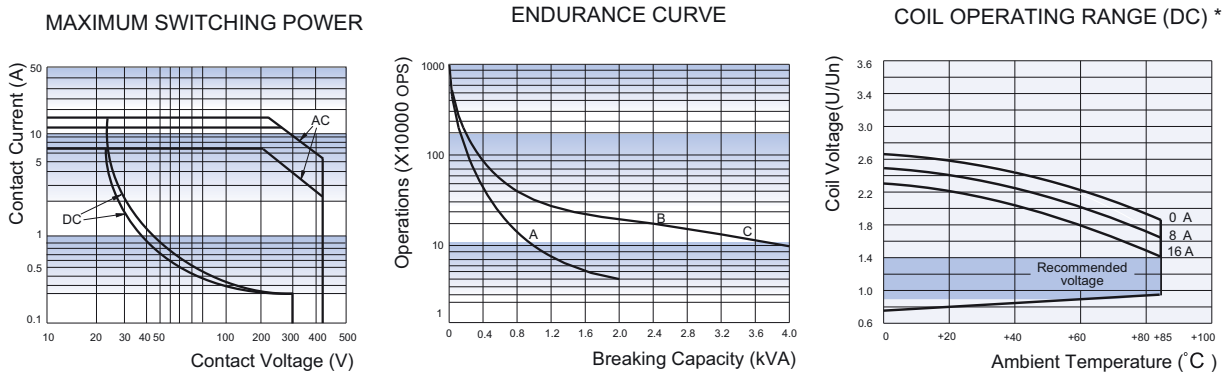


PCB Layout (Bottom view)



Remark: 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  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .  
 3) The width of the gridding is 2.52mm.

CHARACTERISTIC CURVES



**Remark:**

- Curve A: 2H4B type  
Curve B: 1H1B type(or 1H2B type)  
Curve C: 1H3B type
- Test conditions:  
NO, Resistive load, 250VAC,  
Flux proofed, Room temp., 1s on 9s off.

**Notes:** \* The use of a relay with an energising voltage other than the rated coil voltage may lead to reduced electrical life.  
 An energising voltage over the abover range may damage the insulation of relay coil.

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.

# HF115F-A

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:116934



File No.: CQC17002176311



## Features

- AC voltage coil type
- 16A switching capability
- 1 & 2 pole configurations
- 5kV dielectric strength (between coil and contacts)
- Low height: 15.7 mm
- Creepage distance: 10mm
- Meeting VDE 0700, 0631 reinforce insulation
- Product in accordance to IEC 60335-1 available
- Sockets available
- Plastic sealed and flux proofed types available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A, 1B, 1C	2A, 2B, 2C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)	
Contact material	See ordering info.	
Contact rating (Res. load)	12A/16A 250VAC	8A 250VAC
Max. switching voltage	440VAC / 300VDC	
Max. switching current	12A / 16A	8A
Max. switching power	3000VA / 4000VA	2000VA
Mechanical endurance	1 x 10 <sup>6</sup> OPS	
Electrical endurance	1H3B type: 5 x 10 <sup>4</sup> OPS (16A 250VAC, Resistive load, Room temp., 1s on 9s off) 2H4B type: 5 x 10 <sup>4</sup> OPS (8A 250VAC, Resistive load, Room temp., 1s on 9s off)	

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
	Between contact sets	2500VAC 1min
Temperature rise (at rated. volt.)	85K max.	
Shock resistance *	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	10Hz to 150Hz 10g/5g	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 70°C	
Termination	PCB	
Unit weight	Approx. 13.5g	
Construction	Plastic sealed, Flux proofed	

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

2) \* Index is not that of relay length direction.

## COIL

Coil power	Approx. 0.75VA
------------	----------------

## COIL DATA (at 50Hz) at 23°C

Nominal Voltage VAC	Pick-up Voltage VAC max. <sup>1)</sup>	Drop-out Voltage VAC min. <sup>1)</sup>	Coil Current mA	Coil DC Resistance Ω
24	18.00	3.60	31.6	350 x (1±10%)
115	86.30	17.30	6.6	8100 x (1±15%)
230	172.50	34.50	3.2	32500 x (1±15%)

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

## SAFETY APPROVAL RATINGS

UL/CUL	12A 250VAC
	16A 250VAC
	8A 250VAC
VDE (AgNi, AgNi+Au)	12A 250VAC at 70°C
	16A 250VAC at 70°C
	8A 250VAC at 70°C
VDE (AgSnO <sub>2</sub> , AgSnO <sub>2</sub> +Au)	12A 250VAC at 70°C
	8A 250VAC at 70°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

Type	HF115F-A / 024 -1H S 1 A F (XXX)						
Coil voltage	24, 115, 230VAC						
Contact arrangement	1H: 1 Form A 1D: 1 Form B 1Z: 1 Form C 2H: 2 Form A 2D: 2 Form B 2Z: 2 Form C						
Construction <sup>1) 2)</sup>	S: Plastic sealed Nil: Flux proofed						
Version	1: 3.5mm 1 pole 12A 2: 5.0mm 1 pole 12A 3: 5.0mm 1 pole 16A 4: 5.0mm 2 pole 8A						
Contact material <sup>3)</sup>	A: AgSnO <sub>2</sub> B: AgNi Nil: AgCdO G: AgCdO+Au plated AG: AgSnO <sub>2</sub> +Au plated BG: AgNi+Au plated						
Insulation standard	F: Class F						
Special code <sup>4)</sup>	XXX: Customer special requirement Nil: Standard						

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).  
2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.  
3) For gold plated type, the min. switching current and min. switching voltage is 10mA 5VDC.  
4) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

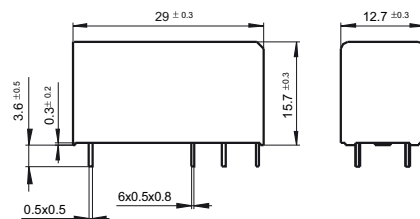
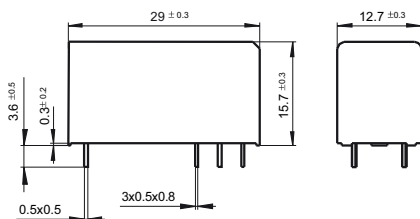
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

### Outline Dimensions

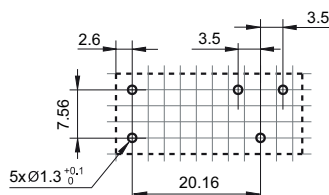
3.5mm Pinning (HF115F-A/ □□□ -□□ -□ -1 -□ □)

5mm Pinning (HF115F-A/ □□□ -□□ -□ -2/3/4 -□□)

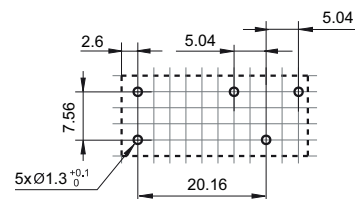


### PCB Layout (Bottom view)

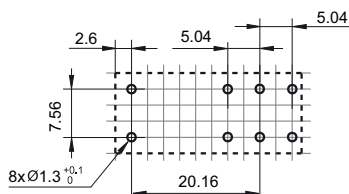
3.5mm 1Pole 12A



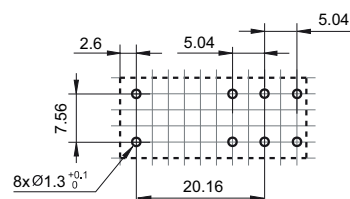
5mm 1Pole 12A



5mm 1Pole 16A



5mm 2Pole 8A



Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension >1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension >5mm, tolerance should be ±0.4mm.

2) The tolerance without indicating for PCB layout is always ±0.1mm.

3) The width of the gridding is 2.52mm.

# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

## Wiring Diagram (Bottom view)

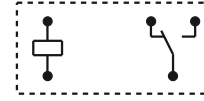
HF115F-A/ □□□ -□□ -□-1/2 -□□, 3.5/5mm Pinning, 1 Pole, 12A



1 Form A



1 Form B



1 Form C

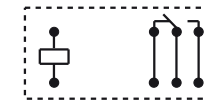
HF115F-A/ □□□ -□□ -□-3 -□□, 5mm Pinning, 1 Pole, 16A



1 Form A



1 Form B



1 Form C

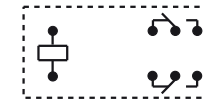
HF115F-A/ □□□ -□□ -□-4 -□□, 5mm Pinning, 2 Pole, 8A



2 Form A



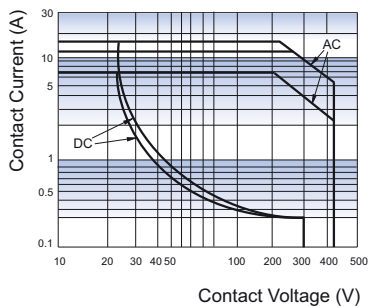
2 Form B



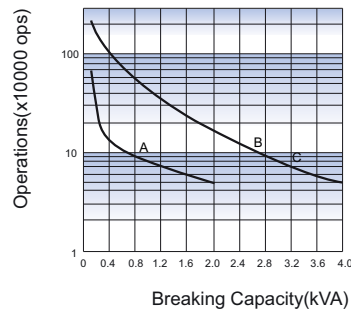
2 Form C

## CHARACTERISTIC CURVES

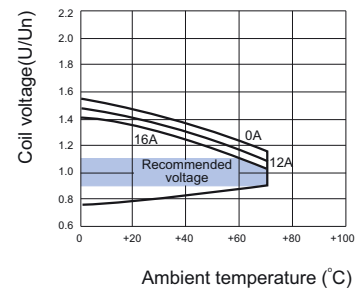
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL OPERATING RANGE (AC) \*



**Notes:**

- 1) Curve A: 2H4B type  
Curve B: 1H1B type (or 1H2B type)  
Curve C: 1H3B type
- 2) Test conditions:  
NO, Resistive load, 250VAC,  
Flux proofed, Room temp., 1s on 9s off.

**Notes:** \* The use of a relay with an energising voltage other than the rated coil voltage may lead to reduced electrical life.

An energising voltage over the abover range may damage the insulation of relay coil.

**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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# HF115F-T/TH

# MINIATURE HIGH POWER RELAY



File No.: E134517



File No.:116934



File No.:CQC17002168381



## Features

- High Temperature: 105°C
- Low height 15.7 mm
- 5kV dielectric strength (between coil and contacts)
- Creepage distance: 10mm
- Meeting VDE 0700, 0631 reinforce insulation
- Product in accordance to IEC 60335-1 available
- UL insulation system: Class F
- Sockets available
- Plastic sealed and flux proofed types available

## CONTACT DATA

Contact arrangement	1A, 1C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	See ordering info.
Contact rating (Res. load)	HF115F-TH: 10A 250VAC HF115F-T: 16A 250VAC
Max. switching voltage	440VAC / 300VDC
Max. switching current	HF115F-TH:10A HF115F-T:16A
Max. switching power	HF115F-TH: 2500VA HF115F-T: 4000VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance	HF115F-T 1H3B type: 5 x 10 <sup>4</sup> OPS (16A 250VAC, Resistive load, at 105°C, 5s on 5s off) HF115F-TH 1H3B type: 5 x 10 <sup>4</sup> OPS (10A 250VAC, Resistive load, at 105°C, 5s on 5s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 / 50μs)	
Operate time (at rated. volt.)	15ms max.	
Release time (at rated. volt.)	8ms max.	
Temperature rise (at rated. volt.)	55K max.	
Shock resistance *	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	10Hz to 150Hz 10g/5g	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 105°C	
Termination	PCB	
Unit weight	Approx. 13.5g	
Construction	Plastic sealed, Flux proofed	

Notes: 1) The data shown above are initial values.  
2) \* Index is not that of relay length direction.

## COIL

Coil power	HF115F-TH: Approx. 250mW; HF115F-T: Approx. 400mW
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## COIL DATA

at 23°C

### Standard type (HF115F-T)

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.50	0.5	6.5	62 x (1±10%)
6	4.20	0.6	7.8	90 x (1±10%)
9	6.30	0.9	11.7	202 x (1±10%)
12	8.40	1.2	15.6	360 x (1±10%)
18	12.6	1.8	23.4	810 x (1±10%)
24	16.8	2.4	31.2	1440 x (1±10%)
48 <sup>3)</sup>	33.6	4.8	62.4	5760 x (1±15%)
60 <sup>3)</sup>	42.0	6.0	78	7500 x (1±15%)

### Sensitive type (HF115F-TH)

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.75	0.5	6.5	100 x (1±10%)
6	4.50	0.6	7.8	144 x (1±10%)
9	6.75	0.9	11.7	324 x (1±10%)
12	9.00	1.2	15.6	576 x (1±10%)
18	13.50	1.8	23.4	1296 x (1±10%)
24	18.00	2.4	31.2	2304 x (1±10%)
48 <sup>3)</sup>	36.00	4.8	62.4	9216 x (1±15%)
60 <sup>3)</sup>	45.00	6.0	78	12857 x (1±15%)

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

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

3) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00



## SAFETY APPROVAL RATINGS

VDE	HF115F-T-1H(S)3A	18.4A 250VAC at 105°C
	HF115F-TH -1H(S)3	10A 250VAC at 105°C 6A 400VAC at 105°C
	HF115F-T-1H(S)3B	16A 250VAC at 105°C
	HF115F-TH -1H(S)3B	10A 250VAC at 105°C
	HF115F-T-1Z(S)3B	NO: 16A 250VAC at 105°C NC: 5A 250VAC at 105°C
UL/CUL	HF115F-TH -1H(S)3B	10A 277VAC
	HF115F-TH -1H(S)3A	10A 277VAC
	HF115F-T-1H(S)3B	16A 277VAC
	HF115F-T-1H(S)3A	16A 250VAC

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

<b>HF115F-T/TH 012 -1H S 3 A (XXX)</b>	
Type	HF115F-T: Standard HF115F-TH: High Sensitive
Coil voltage	5, 6, 9, 12, 18, 24, 48, 60VDC
Contact arrangement	1H: 1 Form A      1Z: 1 Form C
Construction <sup>1)2)</sup>	S: Plastic sealed      Nil: Flux proofed
Version	3: 5.0mm
Contact material	A: AgSnO <sub>2</sub> B: AgNi      Nil: AgCdO
Special code <sup>3)</sup>	XXX: Customer special requirement      Nil: Standard

Notes: 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

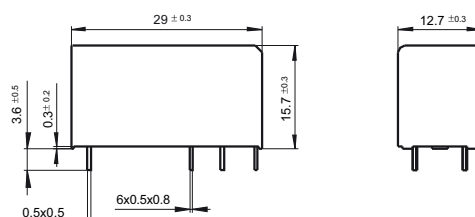
2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

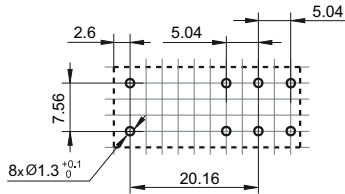
### Outline Dimensions



## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

PCB Layout  
(Bottom view)



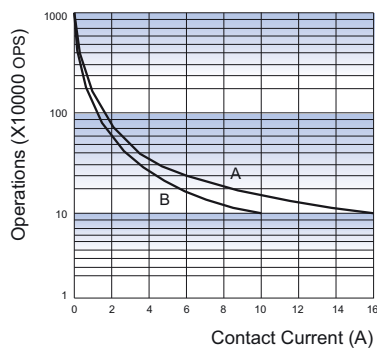
Wiring Diagram  
(Bottom view)



- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.  
 3) The width of the gridding is 2.52mm.

## CHARACTERISTIC CURVES

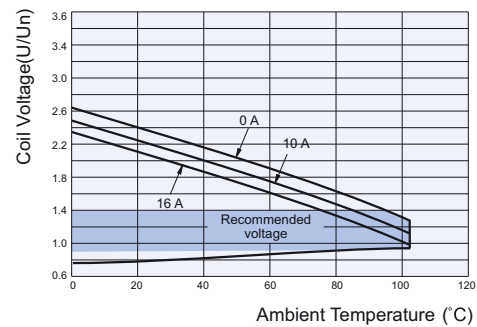
ENDURANCE CURVE



**Notes:**

- Curve A: HF115F-T 1H3B type  
Curve B: HF115F-TH 1H3B type
- Test conditions:  
NO, Resistive load, 250VAC, Flux proofed,  
Room temp., 1s on 9s off

COIL OPERATING RANGE (DC) \*



- Notes:** \* The use of a relay with an energising voltage other than the rated coil voltage may lead to reduced electrical life.  
 An energising voltage over the above range may damage the insulation of relay coil.

### 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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# HF115F-H

# MINIATURE HIGH POWER RELAY



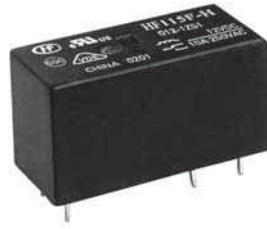
File No.:E134517



File No.:116934



File No.:CQC17002168381



## Features

- High sensitive: 0.25W
- Low height: 15.7 mm
- 5kV dielectric strength (between coil and contacts)
- Creepage distance: 10mm
- Meeting VDE 0700, 0631 reinforce insulation
- Product in accordance to IEC 60335-1 available
- Sockets available
- Plastic sealed and flux proofed types available

## CONTACT DATA

Contact arrangement	1A, 1B, 1C
Contact resistance	100mΩ max.(at 1A 6VDC)
Contact material	See ordering info.
Contact rating (Sensitive coil)	10A 250VAC
Max. switching voltage	440VAC / 300VDC
Max. switching current	10A
Max. switching power	2500VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance	1H3 type: 1 x 10 <sup>5</sup> OPS (10A 250VAC, Resistive load, at 85°C, 5s on 5s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 / 50μs)	
Operate time (at nomi. volt.)	15ms max.	
Release time (at nomi. volt.)	8ms max.	
Temperature rise (at nomi. volt.)	55K max.	
Shock resistance *	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	10Hz to 150Hz 10g/5g	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 13.5g	
Construction	Plastic sealed, Flux proofed	

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

2) \* Index is not that of relay length direction.

3) UL insulation system: Class F, Class B.

## COIL

Coil power	Approx. 250mW
------------	---------------

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. 1)	Drop-out Voltage VDC min. 1)	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.75	0.5	7.5	100 x (1±10%)
6	4.50	0.6	9.0	144 x (1±10%)
12	9.00	1.2	18	576 x (1±10%)
18	13.50	1.8	27	1296 x (1±10%)
24	18.00	2.4	36	2304 x (1±10%)
48 <sup>3)</sup>	36.00	4.8	72	9216 x (1±15%)
60 <sup>3)</sup>	45.00	6.0	90	12857 x (1±15%)

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

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

3) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## SAFETY APPROVAL RATINGS

### VDE

Contact Material	Specifications	Ratings
AgSnO <sub>2</sub>	HF115F-H....1(H;Z)(S)(1;2;3)A(G)(F)	10A 250VAC at 85°C
AgCdO	HF115F-H....1(H;Z)(S)(1;2;3)(G)(F)	10A 250VAC at 85°C 6A 400VAC at 85°C

### UL/CUL

Contact Material	Specifications	Ratings
AgCdO	HF115F-H....1(H;Z)(S)(1;2;3)(G)(F)	10A 250VAC

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

Type	HF115F-H / 012 -1H S 3 A F (XXX)
Coil voltage	5, 6, 12, 18, 24, 48, 60VDC
Contact arrangement	1H:1 Form A 1D:1 Form B 1Z:1 Form C
Construction <sup>1) 2)</sup>	S: Plastic sealed Nil: Flux proofed
Version	1: 3.5mm 1 pole 2: 5.0mm 1 pole 3: 5.0mm 1 pole
Contact materia <sup>3)</sup>	A: AgSnO <sub>2</sub> B: AgNi Nil: AgCdO G: AgCdO+Au plated AG: AgSnO <sub>2</sub> +Au plated BG: AgNi+Au plated
Insulation standard	F: Class F Nil: Class B
Special code <sup>4)</sup>	XXX: Customer special requirement Nil: Standard

Notes: 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

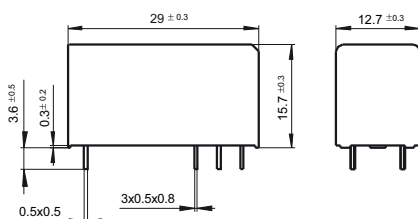
- Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- For gold plated type, the min. switching current and min. switching voltage is 10mA 5VDC.
- The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

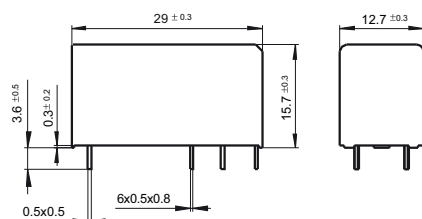
Unit: mm

### Outline Dimensions

3.5mm Pinning (HF115F-H/ □□□ -□□ -1-□)



5mm Pinning (HF115F-H/ □□□ -□□-2/3-□)

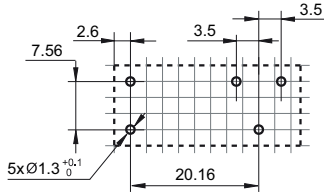


# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

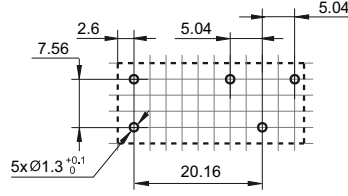
Unit: mm

## PCB Layout (Bottom view)

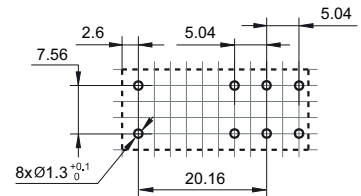
3.5mm Pinning, 1 Pole



5mm Pinning, 1 Pole



5mm Pinning, 1 Pole



## Wiring Diagram (Bottom view)

3.5/5mm Pinning, 1 Pole, 10A, HF115F-H/ □□□ -□□ -□ -1/2 -□



1 Form A



1 Form B



1 Form C

5mm Pinning, 1 Pole, 10A, HF115F-H/ □□□ -□□ -□ -3 -□



1 Form A



1 Form B

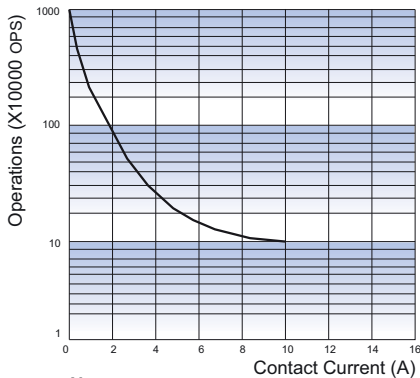


1 Form C

- Remark: 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  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .  
 3) The width of the gridding is 2.52mm.

# CHARACTERISTIC CURVES

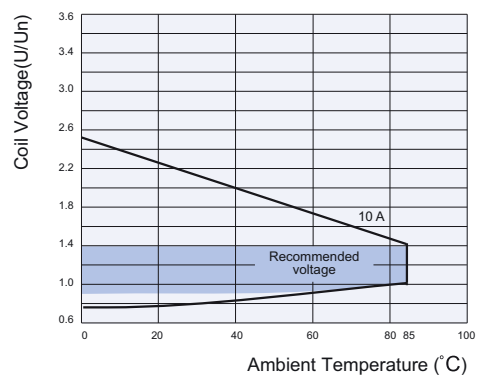
ENDURANCE CURVE



**Notes:**

- 1) Curve : 1H3 type
- 2) Test conditions:  
NO, 250VAC, Resistive load,  
Flux proofed, at 85°C, 5s on 5s off.

COIL OPERATING RANGE (DC) \*



- Notes:** \* The use of a relay with an energising voltage other than the rated coil voltage may lead to reduced electrical life. An energising voltage over the abver range may damage the insulation of relay coil.

## 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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# HF115F-I

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:116934



File No.:CQC17002168381



## Features

- Max high inrush:120A 20ms
- Low height: 15.7 mm
- 5kV dielectric strength (between coil and contacts)
- Creepage distance: 10mm
- Meeting VDE 0700, 0631 reinforce insulation
- Product in accordance to IEC 60335-1 available
- Sockets available
- Plastic sealed and flux proofed types available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A, 1C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating	16A 250VAC
Inrush rating (120VAC)	NO: TV-5 80A 120A / 20ms
Max. switching voltage	440VAC / 300VDC
Max. switching current	16A
Max. switching power	4000VA
Mechanical endurance	1 x 10 <sup>7</sup> ops
Electrical endurance	1H3A type: 7.5 x 10 <sup>4</sup> ops (16A 250VAC, General use, Room temp., 1s on 9s off) 1H3A type: 2.5 x 10 <sup>4</sup> ops (TV-5 120VAC, Room temp., 1s on 59s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 / 50μs)	
Operate time (at nomi. volt.)	15ms max.	
Release time (at nomi. volt.)	8ms max.	
Temperature rise (at nomi. volt.)	55K max.	
Shock resistance *	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	10Hz to 150Hz 20g/5g	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 13.5g	
Construction	Plastic sealed, Flux proofed	

Notes: 1) The data shown above are initial values.  
2) \* Index is not that of relay length direction.

## COIL

Coil power	Approx. 400mW
------------	---------------

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.50	0.5	7.5	62 x (1±10%)
6	4.20	0.6	9.0	90 x (1±10%)
9	6.30	0.9	13.5	202 x (1±10%)
12	8.40	1.2	18	360 x (1±10%)
18	12.6	1.8	27	810 x (1±10%)
24	16.8	2.4	36	1440 x (1±10%)
48 <sup>3)</sup>	33.6	4.8	72	5760 x (1±15%)
60 <sup>3)</sup>	42.0	6.0	90	7500 x (1±15%)
110 <sup>3)</sup>	77.0	11.0	165	25200 x (1±15%)

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

Notes: 2) Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

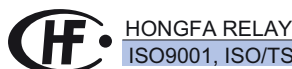
3) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).

## SAFETY APPROVAL RATINGS

UL/CUL	HF115F-I....1Z(S)3A	NO: 16A 250VAC at 85°C
	HF115F-I....1H(S)3A	16A 250VAC TV-5,120VAC
VDE	HF115F-I....1H(S)3A	16A 250VAC at 85°C
	HF115F-I....1Z(S)3A	NO: 16A 250VAC at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

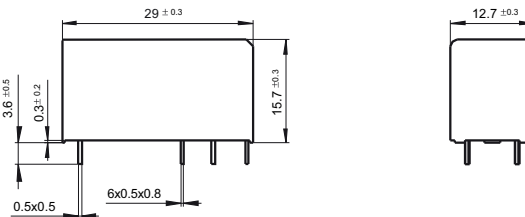
Type	HF115F-I / 012 -1H S 3 A (XXX)					
Coil voltage	5, 6, 9, 12, 18, 24, 48, 60, 110VDC					
Contact arrangement	1H: 1 Form A		1Z: 1 Form C			
Construction <sup>1)2)</sup>	S: Plastic sealed		Nil: Flux proofed			
Version	3: 5.0mm					
Contact material	A: AgSnO <sub>2</sub>					
Special code <sup>3)</sup>	XXX: Customer special requirement			Nil: Standard		

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

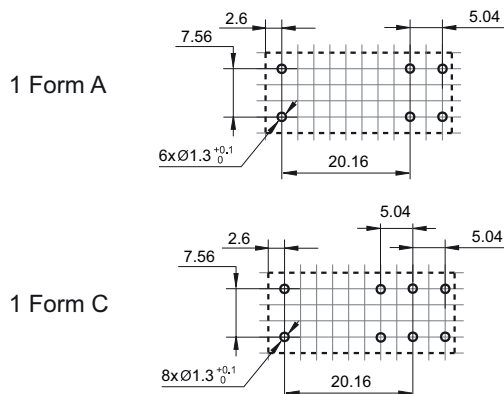
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

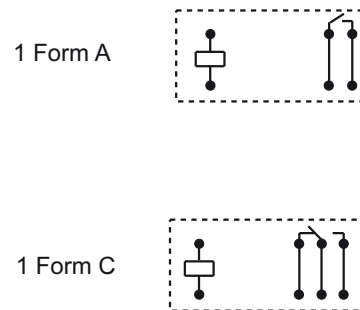
### Outline Dimensions



### PCB Layout (Bottom view)



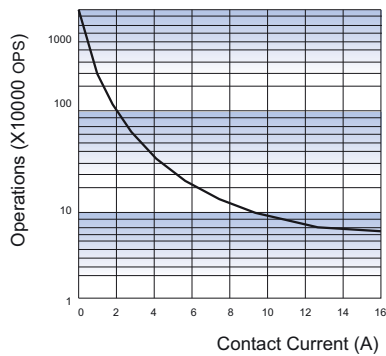
### Wiring Diagram (Bottom view)



- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.
- 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.
- 3) The width of the gridding is 2.52mm.

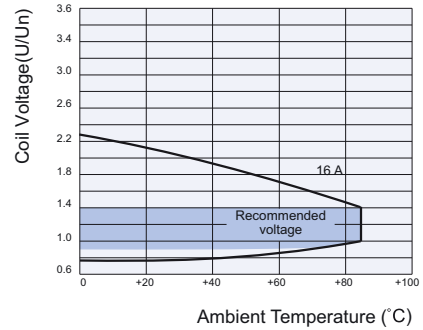
## CHARACTERISTIC CURVES

ENDURANCE CURVE



**Test conditions:**  
 NO, 250VAC, Resistance Load,  
 Flux proofed, Room temp., 1s on 9s off

COIL OPERATING RANGE (DC) \*



**Notes:** \* The use of a relay with an energising voltage other than the rated coil voltage may lead to reduced electrical life.  
 An energising voltage over the above range may damage the insulation of relay coil.

### 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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# HF115F-Q

# MINIATURE HIGH POWER RELAY



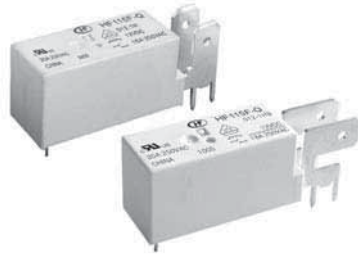
File No.: E134517



File No.: 116934



File No.: CQC17002168381



## Features

- Ambient temperature up to 125 °C
- 5kV dielectric strength (between coil and contacts)
- Low height: 15.7mm
- Creepage distance >8mm
- Meeting VDE 0700, 0631 reinforce insulation
- UL94, V-0 flammability class
- Product in accordance to IEC 60335-1 available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A, 1B
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub> , AgNi
Contact rating	20A 250VAC
Max. switching voltage	440VAC / 300VDC
Max. switching current	20A
Max. switching power	5000VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance	1H type: 3 x 10 <sup>4</sup> OPS (20A 277VAC, Resistive load, Room temp., 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 / 50μs)	
Operate time (at nomi. volt.)	15ms max.	
Release time (at nomi. volt.)	8ms max.	
Temperature rise (at nomi. volt.)	55K max.	
Shock resistance *	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	1A: 10Hz to150Hz 10g	
	1B: 10Hz to150Hz 5g	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 125°C	
Termination	PCB & QC	
Unit weight	Approx. 16g	
Construction	Flux proofed	

Notes: 1) The data shown above are initial values.  
2) \* Index is not that of relay length direction.

## COIL

Coil power	Approx. 400mW
------------	---------------

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.50	0.5	7.5	62 x (1±10%)
6	4.20	0.6	9.0	90 x (1±10%)
9	6.30	0.9	13.5	202 x (1±10%)
12	8.40	1.2	18.0	360 x (1±10%)
18	12.6	1.8	27.0	810 x (1±10%)
24	16.8	2.4	36.0	1440 x (1±10%)
48 <sup>3)</sup>	33.6	4.8	72.0	5760 x (1±15%)
60 <sup>3)</sup>	42.0	6.0	90.0	7500 x (1±15%)

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

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

3) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).

## SAFETY APPROVAL RATINGS

VDE	AgNi	1 Form A	18A 250VAC at 105°C 16A 250VAC at 125°C 12A 400VAC at 105°C
		1 Form B	16A 250VAC at 125°C 12A 400VAC at 105°C
UL/CUL	AgNi	1 Form A 1 Form B	20A 277VAC

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

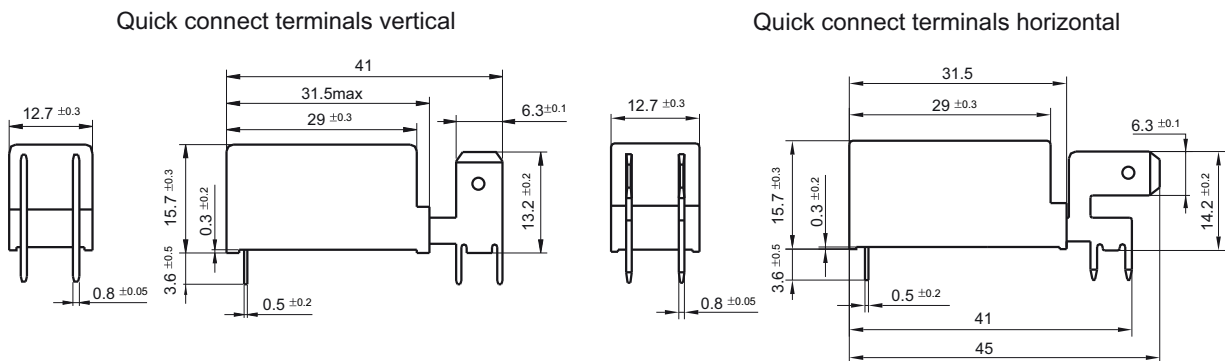
Type	HF115F-Q / 012 -1H 3 T (XXX)				
Coil voltage	5, 6, 9, 12, 18, 24, 48, 60VDC				
Contact arrangement	1H: 1 Form A	1D: 1 Form B			
Terminals	3: Quick connect terminals horizontal		Nil: Quick connect terminals vertical		
Contact material	T: AgSnO <sub>2</sub>	Nil: AgNi			
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard		

- Notes: 1) Flux-proofed relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.  
 2) Water cleaning or surface process is not suggested after the flux-proofed relays are assembled on PCB.  
 3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

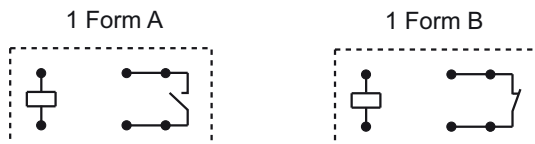
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

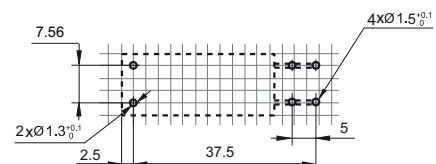
### Outline Dimensions



### Wiring Diagram (Bottom view)



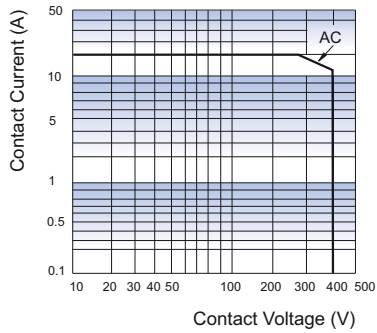
### PCB Layout (Bottom view)



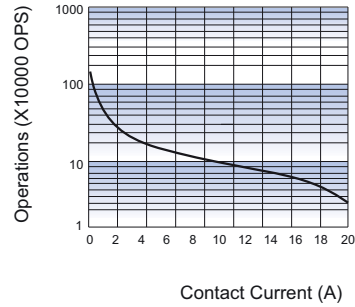
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension > 1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension > 5mm, tolerance should be ±0.4mm.  
 2) The tolerance without indicating for PCB layout is always ±0.1mm.  
 3) The width of the gridding is 2.52mm.

## CHARACTERISTIC CURVES

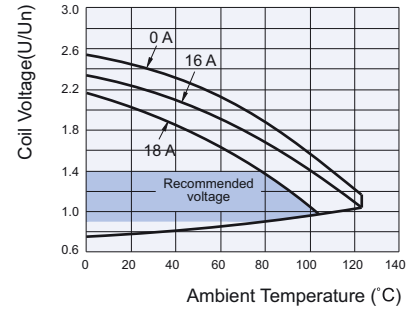
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL OPERATING RANGE (DC) \*



**Notes:**

- 1) Curve: 1H type
- 2) Test conditions:  
NO, 250VAC, Resistive load, Flux proofed,  
Room temp., 1s on 9s off.

- Notes:** \* The use of a relay with an energising voltage other than the rated coil voltage may lead to reduced electrical life. An energising voltage over the abover range may damage the insulation of relay coil.

**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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# HF115F-S

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:116934



File No.:CQC17002168381



## Features

- Special contact struction
- Incandescent lamp load: 3000W 230VAC
- 5kV dielectric strength (between coil and contacts)
- Creepage distance: 11mm
- Low height: 15.7 mm
- Meeting reinforce insulation
- Product in accordance to IEC 60335-1 available
- Plastic sealed and flux proofed types available

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	W+AgSnO <sub>2</sub>
Contact rating	Resistive:16A 250VAC Incandescent Lamp: 3000W 230VAC Inrush current: 165A / 20ms LED(Electronic ballast): 492A/1.5ms
Max. switching voltage	440VAC
Max. switching current	16A
Max. switching power	4000VA
Mechanical endurance	5 x 10 <sup>6</sup> OPS
Electrical endurance	1.2 x 10 <sup>4</sup> OPS (3000W 230VAC, Incand escentlamp load, Room temp., 1s on 11s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1250VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 / 50μs)	
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	5ms max.	
Temperature rise (at rated. volt.)	55K max.	
Shock resistance *	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	10Hz to 150Hz 10g	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 13.5g	
Construction	Plastic sealed, Flux proofed	

Notes:1) This contact resistance value is tested under the nominal voltage.

- \* Index is not that of relay length direction.
- The data shown above are initial values.
- UL insulation system: Class F, Class B.

## COIL

Coil power	Approx. 400mW
------------	---------------

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.50	0.5	7.5	62 x (1±10%)
6	4.20	0.6	9.0	90 x (1±10%)
9	6.30	0.9	13.5	202 x (1±10%)
12	8.40	1.2	18	360 x (1±10%)
18	12.6	1.8	27	810 x (1±10%)
24	16.8	2.4	36	1440 x (1±10%)
48 <sup>3)</sup>	33.6	4.8	72	5760 x (1±15%)
60 <sup>3)</sup>	42.0	6.0	90	7500 x (1±15%)
110 <sup>3)</sup>	77.0	11.0	165	25200 x (1±15%)

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

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

3) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).

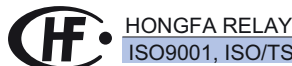
## SAFETY APPROVAL RATINGS

VDE	16A 250VAC at 85°C
UL/CUL	16A 250VAC at 85°C Incandescent lamp 3000W 230VAC TV-8 120VAC Incandescent lamp 1200W 120VAC at 50°C Incandescent lamp 1200W 277VAC at 50°C Standard ballast 2.2A 277VAC at 50°C Electronic ballast 16A 277/120VAC 85°C Electronic ballast 12A 277/120VAC 85°C Electronic ballast 8A 277/347VAC 85°C Electronic ballast 15A 120VAC 85°C <sup>3)</sup> Electronic ballast 8A 277/347VAC 85°C <sup>3)</sup>

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

3) Zero crossing control cooperative.



ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

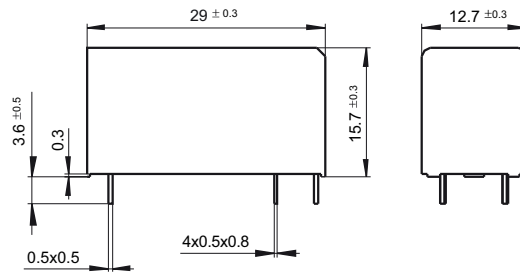
Type	HF115F-S /	12	-H	S	F	(XXX)
Coil voltage	5, 6, 9, 12, 18, 24, 48, 60, 110VDC					
Contact arrangement	H: 1 Form A					
Construction <sup>1) 2)</sup>	S: Plastic sealed		Nil: Flux proofed			
Insulation Standard	F: Class F		Nil: Class B			
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard			

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

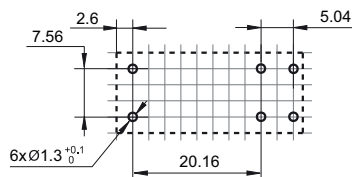
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

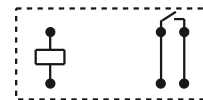
### Outline Dimensions



### PCB Layout (Bottom view)



### Wiring Diagram (Bottom view)



- Remark:** 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.
- 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.
- 3) The width of the gridding is 2.52mm.

### 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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# HF115F-L 1 pole

# MINIATURE HIGH POWER LATCHING RELAY



File No.:E134517



File No.:116934



File No.:CQC17002176310



## Features

- Latching relay
- Low height: 15.7 mm
- 20A switching capability
- 5kV dielectric strength (between coil and contacts)
- Creepage distance: 11mm-NO/10mm-CO version
- Meeting VDE 0700, 0631 reinforce insulation
- Product in accordance to IEC 60335-1 available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A, 1C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating (Res. load)	16A 250VAC
Typ. applicable load	Incandescent lamp:1500W 277VAC Standard ballast:8A 277VAC Electronic ballast: 5A 120VAC
Max. switching voltage	440VAC / 300VDC
Max. switching current	20A
Max. switching power	4000VA
Mechanical endurance	2 x 10 <sup>6</sup> OPS
Electrical endurance	5 x 10 <sup>4</sup> OPS (NO: 16A 250VAC, Resistive load, at 85°C, 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)
Dielectric strength	Between coil & contacts 5000VAC 1min
	Between open contacts 1000VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 / 50μs)
Set time (at nomi. volt.)	10ms max.
Reset time (at nomi. volt.)	10ms max.
Shock resistance *	Functional 98m/s <sup>2</sup>
	Destructive 980m/s <sup>2</sup>
Vibration resistance *	10Hz to 150Hz 10g/5g
Humidity	5% to 85% RH
Ambient temperature	-40°C to 85°C
Termination	PCB
Unit weight	Approx. 13.5g
Construction	Plastic sealed, Flux proofed

Notes: 1) The data shown above are initial values.  
2) \* Index is not in relay length direction.

## COIL

Coil power	1 coil latching: Approx. 400mW 2 coils latching: Approx. 600mW
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## COIL DATA

at 23°C

### 1 coil latching

Nominal Voltage VDC	Set Voltage VDC max.1)	Pulse Width (ms)		Reset Voltage VDC max.1)	Max. Voltage VDC	Coil Resistance Ω
		Typical	Min.			
5	3.5	≥50	30	3.5	6	62x (1±10%)
6	4.2	≥50	30	4.2	7.2	90x (1±10%)
9	6.3	≥50	30	6.3	10.8	202x (1±10%)
12	8.4	≥50	30	8.4	14.4	360x (1±10%)
24	16.8	≥50	30	16.8	28.8	1440x (1±10%)

### 2 coils latching

Nominal Voltage VDC	Set Voltage VDC max.1)	Pulse Width (ms)		Reset Voltage VDC max.1)	Max. Voltage VDC	Coil Resistance Ω
		Typical	Min.			
5	3.5	≥50	30	3.5	7.5	42x (1±10%)
6	4.2	≥50	30	4.2	9	55x (1±10%)
9	6.3	≥50	30	6.3	13.5	135x (1±10%)
12	8.4	≥50	30	8.4	18	240x (1±10%)
24	16.8	≥50	30	16.8	36	886x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	16A/20A 250VAC at 85°C 1HP 240VAC TV-12 120VAC(1 Form A) Tungsten 360W 125VAC(1 Form A) Tungsten 1920W 8A 240VAC at 40°C Tungsten 12A 120VAC Standard ballast 16A 120VAC Standard ballast 8A 277VAC Standard ballast 5A 347VAC/480VAC Electronic ballast 5A 120VAC TV-8 240VAC
	16A 250VAC at 85°C AC-15 240VAC at 85°C
VDE	16A 250VAC at 85°C AC-15 240VAC at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

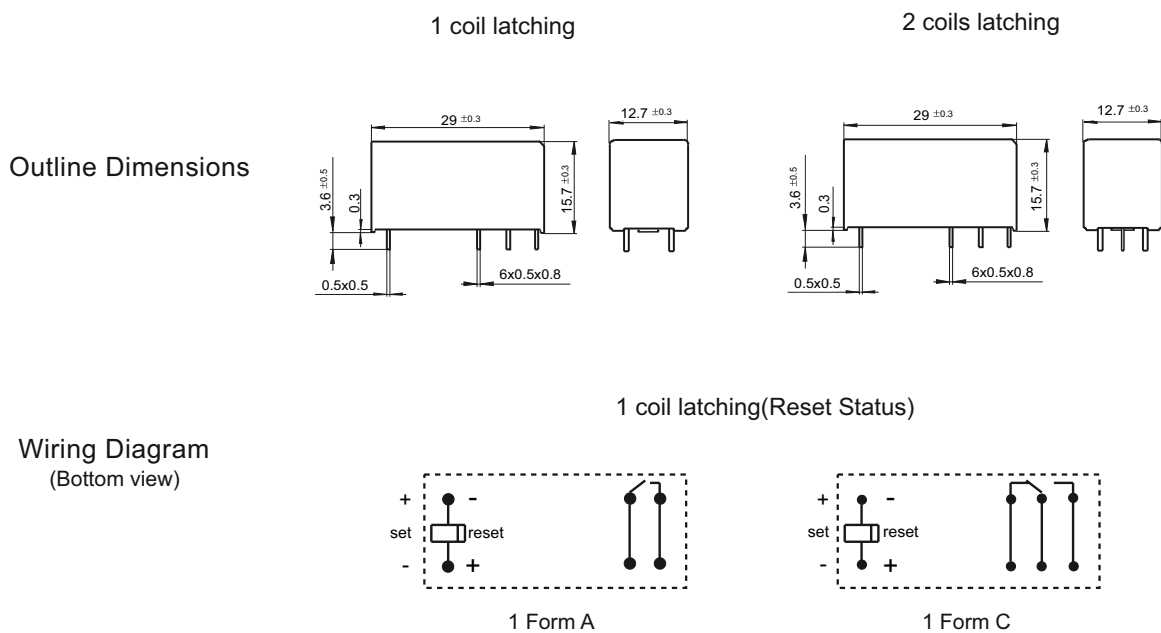
## ORDERING INFORMATION

Type	HF115F-L / 12 -Z S 3 L1 T F (XXX)
Coil voltage	5, 6, 9, 12, 24VDC
Contact arrangement	H: 1 Form A Z: 1 Form C
Construction <sup>1) 2)</sup>	S: Plastic sealed Nil: Flux proofed
Version	3: 5.0mm 1 pole 16A
Sort	L1: 1 coil latching L2: 2 coils latching
Contact material	T: AgSnO <sub>2</sub>
Insulation standard	F: Class F
Special code <sup>4)</sup>	XXX: Customer special requirement Nil: Standard

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

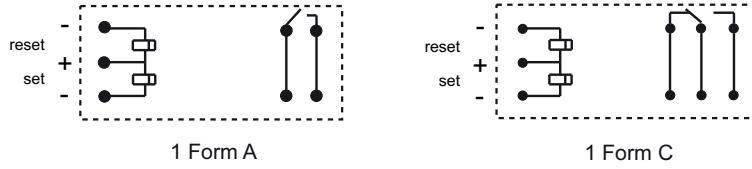
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

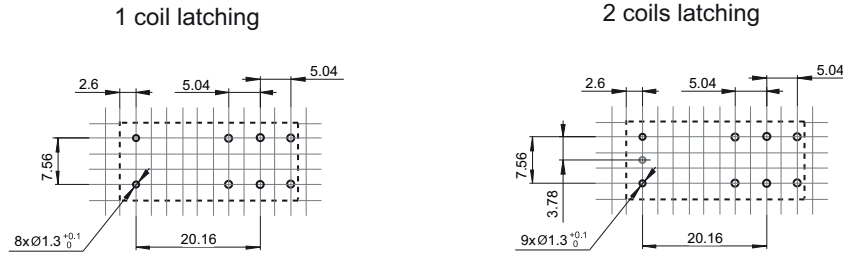


2 coils latching(Reset Status)

Wiring Diagram  
(Bottom view)



PCB Layout  
(Bottom view)



- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.  
 3) The width of the gridding is 2.52mm.

Notice

- Relay is on the "reset" status when being released from stock, with the consideration of shock risen from transit and relay mounting, relay would be changed to "set" status, therefore, when application ( connecting the power supply), please reset the relay to "set" or "reset" status on request.
- In order to maintain "set" or "reset" status, energized voltage to coil should reach the rated voltage. Do not energize voltage to "set" coil and "reset" coil simultaneously. And also long energized time (more than 1 min) should be avoided.
- Keep the product away from strong magnetic field during transportation, storage and application, to avoid change of set/reset voltage.

Disclaimer

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# HF115F-L 2 pole

# MINIATURE HIGH POWER LATCHING RELAY



File No.:E134517



File No.:116934



File No.:CQC17002176310



## Features

- Latching relay
- Low height: 15.7 mm
- 10A switching capability
- 5kV dielectric strength (between coil and contacts)
- Creepage distance: 11mm-NO/10mm-CO version
- Meeting VDE 0700, 0631 reinforce insulation
- Product in accordance to IEC 60335-1 available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	2A, 2C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating(Res. load)	8A 250VAC
Typ. applicable load	Lamp: Tungsten 3A 277VAC Standard ballast: 3A 277VAC
Max. switching voltage	440VAC / 300VDC
Max. switching current	10A
Max. switching power	2000VA
Mechanical endurance	2 x 10 <sup>6</sup> OPS
Electrical endurance	2H type: 5 x 10 <sup>4</sup> OPS (8A 250VAC, General use, at 85°C, 5s on 5s off) 2Z type: 1 x 10 <sup>4</sup> OPS (8A 250VAC, General use, at 85°C, 5s on 5s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
	Between contact sets	2500VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 / 50μs)	
Set time (at rated. volt.)	10ms max.	
Reset time (at rated. volt.)	10ms max.	
Shock resistance *	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	10Hz to 150Hz 10g/5g	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 13.5g	
Construction	Plastic sealed, Flux proofed	

Notes: 1) The data shown above are initial values.  
2) \* Index is not in relay length direction.

## COIL

Coil power	1 coil latching: Approx. 400mW 2 coils latching: Approx. 600mW
------------	---

## COIL DATA

at 23°C

### 1 coil latching

Nominal Voltage VDC	Set Voltage VDC max.1)	Pulse Width (ms)		Reset Voltage VDC max.1)	Max. Voltage VDC	Coil Resistance Ω
		Typical	Min.			
5	3.5	≥50	30	3.5	6	62x (1±10%)
6	4.2	≥50	30	4.2	7.2	90x (1±10%)
9	6.3	≥50	30	6.3	10.8	202x (1±10%)
12	8.4	≥50	30	8.4	14.4	360x (1±10%)
24	16.8	≥50	30	16.8	28.8	1440x (1±10%)

### 2 coils latching

Nominal Voltage VDC	Set Voltage VDC max.1)	Pulse Width (ms)		Reset Voltage VDC max.1)	Max. Voltage VDC	Coil Resistance Ω
		Typical	Min.			
5	3.5	≥50	30	3.5	7.5	42x (1±10%)
6	4.2	≥50	30	4.2	9	55x (1±10%)
9	6.3	≥50	30	6.3	13.5	135x (1±10%)
12	8.4	≥50	30	8.4	18	240x (1±10%)
24	16.8	≥50	30	16.8	36	886x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	10A/8A 250/277VAC General use at 85°C 1/2 HP 240VAC at 40°C Standard ballast 3A 277VAC at 40°C Tungsten Lamp 3A 277VAC at 40°C
VDE	8A 250VAC at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

## ORDERING INFORMATION

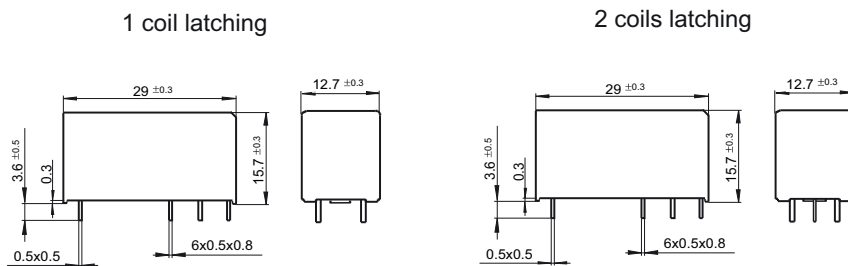
Type	HF115F-L / 12 -2Z S 4 L1 T F (XXX)								
Coil voltage	5, 6, 9, 12, 24VDC								
Contact arrangement	2H: 2 Form A 2Z: 2 Form C								
Construction <sup>1)2)</sup>	S: Plastic sealed Nil: Flux proofed								
Version	4: 5.0mm 2 pole 8A								
Sort	L1: 1 coil latching L2: 2 coils latching								
Contact material	T: AgSnO <sub>2</sub>								
Insulation standard	F: Class F								
Special code <sup>3)</sup>	XXX: Customer special requirement Nil: Standard								

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclear environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) The customer special requirement express as special code after evaluating by Hongfa. e.g. (335) stands for product in accordance to IEC 60335-1 (GWT).

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

### Outline Dimensions



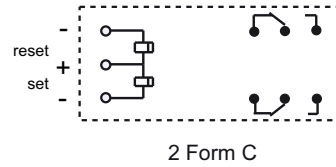
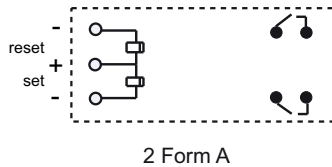
### Wiring Diagram (Bottom view)

#### 1 coil latching(Reset Status)



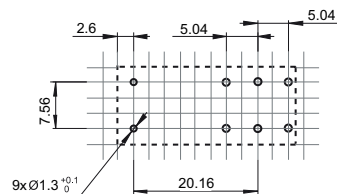
Wiring Diagram  
(Bottom view)

2 coils latching(Reset Status)

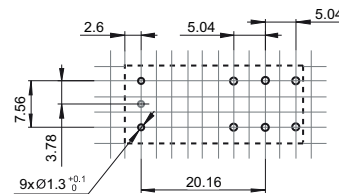


PCB Layout  
(Bottom view)

1 coil latching



2 coils latching



- Remark: 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  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .  
 3) The width of the gridding is 2.52mm.

Notice

- Relay is on the "reset" status when being released from stock, with the consideration of shock risen from transit and relay mounting, relay would be changed to "set" status, therefore, when application ( connecting the power supply), please reset the relay to "set" or "reset" status on request.
- In order to maintain "set" or "reset" status, energized voltage to coil should reach the rated voltage. Do not energize voltage to "set" coil and "reset" coil simultaneously. And also long energized time (more than 1 min) should be avoided.
- Keep the product away from strong magnetic field during transportation, storage and application, to avoid change of set/reset voltage.

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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# HF115F-LS

# MINIATURE HIGH POWER LATCHING RELAY



File No.:E134517



File No.:116934



File No.:CQC14002104529

CQC17002176310



## Features

- Latching relay
- Special contact struction
- Incandescent lamp load: 3500W 277VAC
- 5kV dielectric strength (between coil and contacts)
- Creepage distance: 11mm
- Low height: 15.7 mm
- Meeting reinforce insulation
- Product in accordance to EN60669-1 available
- Product in accordance to IEC 60335-1 available
- Plastic sealed and flux proofed types available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	W+AgSnO <sub>2</sub>
Contact rating	Resistive:16A 250VAC
	Incandescent Lamp: 3500W 277VAC
	Inrush current: 165A / 20ms
	LED(Electronic ballast): 492A/1.5ms
Max. switching voltage	440VAC
Max. switching current	16A
Max. switching power	4000VA
Mechanical endurance	2 x 10 <sup>6</sup> OPS
Electrical endurance	1.2 x 10 <sup>4</sup> OPS (3500W 277VAC, Tungsten lamp, at 40°C, 1s on 59s off)
	6 x 10 <sup>3</sup> OPS(16A 250VAC, Resistive load, at 85°C, 5s on 5s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)
Dielectric strength	Between coil & contacts 5000VAC 1min
	Between open contacts 1250VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 / 50μs)
Set time (at rated. volt.)	10ms max.
Reset time (at rated. volt.)	10ms max.
Temperature rise (at rated. volt.)	55K max.
Shock resistance *	Functional 98m/s <sup>2</sup>
	Destructive 980m/s <sup>2</sup>
Vibration resistance *	10Hz to 150Hz 10g
Humidity	5% to 85% RH
Ambient temperature	-40°C to 85°C
Termination	PCB
Unit weight	Approx. 13.5g
Construction	Plastic sealed, Flux proofed

Notes:1) This contact resistance value is tested under the nominal voltage.

- 2) \* Index is not that of relay length direction.  
 3) The data shown above are initial values.  
 4) UL insulation system: Class F.

## COIL

Coil power	1 coil latching: Approx. 400mW
	2 coils latching: Approx. 600mW

## COIL DATA

at 23°C

### 1 coil latching

Nominal Voltage VDC	Set Voltage VDC max.1)	Pulse Width (ms)		Reset Voltage VDC max.1)	Max. Voltage VDC	Coil Resistance Ω
		Typical	Min.			
5	3.5	≥50	30	3.5	6	62x (1±10%)
6	4.2	≥50	30	4.2	7.2	90x (1±10%)
9	6.3	≥50	30	6.3	10.8	202x (1±10%)
12	8.4	≥50	30	8.4	14.4	360x (1±10%)
24	16.8	≥50	30	16.8	28.8	1440x (1±10%)

### 2 coils latching

Nominal Voltage VDC	Set Voltage VDC max.1)	Pulse Width (ms)		Reset Voltage VDC max.1)	Max. Voltage VDC	Coil Resistance x (1±10%)Ω
		Typical	Min.			
5	3.5	≥50	30	3.5	7.5	42x (1±10%)
6	4.2	≥50	30	4.2	9	55x (1±10%)
9	6.3	≥50	30	6.3	13.5	135x (1±10%)
12	8.4	≥50	30	8.4	18	240x (1±10%)
24	16.8	≥50	30	16.8	36	886x (1±10%)

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

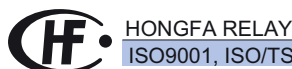
- 2) \*Maximun voltage refers to the maximun voltage which relay coil could endure in a short period of time.

## SAFETY APPROVAL RATINGS

UL/CUL	16A 250VAC General use at 85°C Standard ballast 5A 277VAC at 40°C Electronic ballast 16A 120VAC at 40°C Electronic ballast 16A 277VAC at 40°C 3500W 277VAC Tungsten Lamp at 40°C TV-15 120VAC 40°C Tungsten 15A 120VAC 40°C
	16A 250VAC Resistive at 85°C EN60669: 16A 250VAC COSØ =0.6 16A 250VAC 140μF

Notes: 1) All values unspecified are at room temperature.

- 2) Only typical loads are listed above. Other load specifications can be available upon request.



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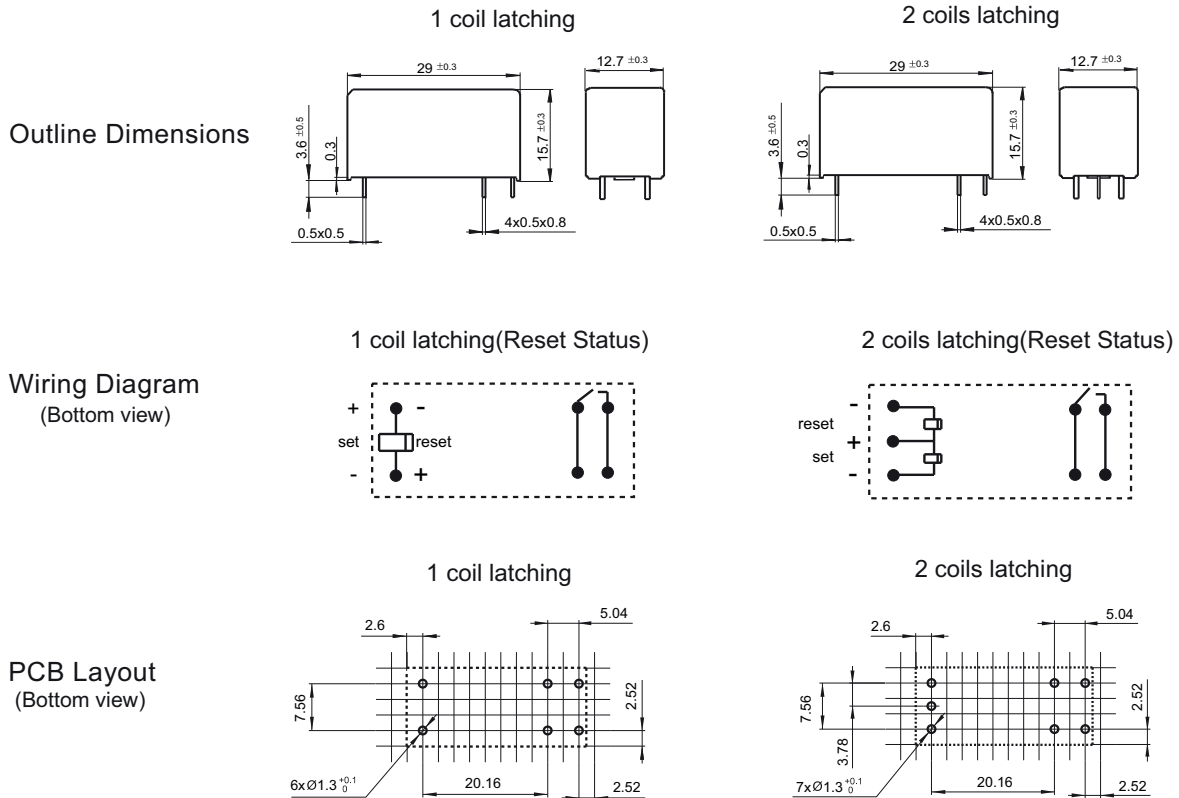
## ORDERING INFORMATION

Type	HF115F-LS / 12 -H S L1 F (XXX)						
Coil voltage	5, 6, 9, 12, 24VDC						
Contact arrangement	H: 1 Form A						
Construction <sup>1)2)</sup>	S: Plastic sealed		Nil: Flux proofed				
Sort	L1: 1 coil latching		L2: 2 coils latching				
Insulation Standard	F: Class F						
Special code <sup>3)</sup>	XXX: Customer special requirement			Nil: Standard			

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) The customer special requirement express as special code after evaluating by Hongfa. e.g. (335) stands for product in accordance to IEC 60335-1 (GWT).

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm



- Remark:** 1) In case of no tolerance shown in outline dimension: outline dimension ≤1mm, tolerance should be ±0.2mm; outline dimension >1mm and ≤5mm, tolerance should be ±0.3mm; outline dimension >5mm, tolerance should be ±0.4mm.
- 2) The tolerance without indicating for PCB layout is always ±0.1mm.
- 3) The width of the gridding is 2.52mm.

### Notice

1. Relay is on the "reset" status when being released from stock, with the consideration of shock risen from transit and relay mounting, relay would be changed to "set" status, therefore, when application ( connecting the power supply), please reset the relay to "set" or "reset" status on request.
2. In order to maintain "set" or "reset" status, energized voltage to coil should reach the rated voltage. Do not energize voltage to "set" coil and "reset" coil simultaneously. And also long energized time (more than 1 min) should be avoided.
3. Keep the product away from strong magnetic field during transportation, storage and application, to avoid change of set/reset voltage.

### 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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# HF115FP

# MINIATURE POWER RELAY



File No.: E133481



File No.: 116934



## Features

- 1 pole 16A, 2 pole 8A , 1 CO & 2 CO contacts
- 5kV dielectric, Creepage distance 8 mm (coil to contacts)
- Meeting VDE 0700, 0631 reinforce insulation
- DC/AC coil type relay , Coil power 400mW / 0.75VA
- Manual test device
- Type with mechanical indicator / electrical indicator
- Sockets available

## CONTACT DATA

Contact arrangement	1C	2C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)	
Contact material	AgNi	
Contact rating (Res. load)	16A 250VAC	8A 250VAC
Max. switching voltage	440VAC	
Max. switching current	16A	8A
Max. switching power	4000VA	2000VA
Mechanical endurance	DC type: 5 x 10 <sup>6</sup> OPS AC type: 1 x 10 <sup>6</sup> OPS	
Electrical endurance	1Z3B type: 3x 10 <sup>4</sup> OPS (NO: 16A 250VAC, Resistive load, at 70°C, 1s on 9s off) 2Z4B type: 5 x 10 <sup>4</sup> OPS (NO: 8A 250VAC, Resistive load, at 70°C, 1s on 9s off)	

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
	Between contact sets	2500VAC 1min
Operate time (at rated. volt.)	DC type: 15ms max.	
Release time (at rated. volt.)	DC type: 8ms max.	
Temperature rise (at rated. volt.)	DC type: 60K max. AC type: 85K max.	
Shock resistance*	Function	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance*	NO	10Hz to 150Hz 10g
	NC	length direction: 10Hz to 150Hz 2g other direction: 10Hz to 150Hz 5g
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 70°C	
Termination	PCB	
Unit weight	Approx. 16g	
Mounting distance	5mm, packing of sockets	

Notes: 1) The data shown above are initial values.  
2) \* Index is not that of relay length direction.  
3) UL insulation system: Class A

## COIL

Coil power	DC type: Approx. 400mW;
	AC type: Approx. 0.75VA

Notes: The data shown above don't include the power of electronic indicating circuit when the relay picks-up.

## COIL DATA

at 23°C

### DC type

Nominal Voltage VDC	Pick-up Voltage VDC max.1)	Drop-out Voltage VDC min.1)	Max. Voltage VDC 2)	Coil Resistance Ω
12	8.4	1.2	18	360 x (1±10%)
24	16.8	2.4	36	1440 x (1±10%)
48 <sup>3)</sup>	33.6	4.8	72	5760 x (1±15%)
110 <sup>3)</sup>	77.0	11.0	165	25200 x (1±15%)

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

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

3) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).

### AC type(50Hz)

Nominal Voltage VAC	Pick-up Voltage VAC max.1)	Drop-out Voltage VAC min.1)	Coil Current mA	Coil DC Resistance Ω
24	18.0	3.6	31.6	350 x (1±10%)
115	86.3	17.25	6.6	8100 x (1±15%)
230	172.5	34.5	3.2	32500 x (1±15%)

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

## SAFETY APPROVAL RATINGS

UL/CUL	1 Form C	16A 250VAC at 70°C
	2 Form C	8A 250VAC at 70°C
VDE	1 Form C	16A 250VAC at 70°C
	2 Form C	8A 250VAC at 70°C

Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

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## ORDERING INFORMATION

Type	HF115FP /	024	-1Z	3	B	(XXX)
Coil voltage	012 to 110: 12, 24, 48, 110 VDC A24 to A230: 24, 115, 230 VAC					
Contact arrangement	1Z: 1 Form C		2Z: 2 Form C			
Version	3: 5.0mm 1 pole 16A		4: 5.0mm 2 pole 8A			
Contact material	B: AgNi					
Special code <sup>2)</sup>	XXX: Customer special requirement		Nil: Standard			

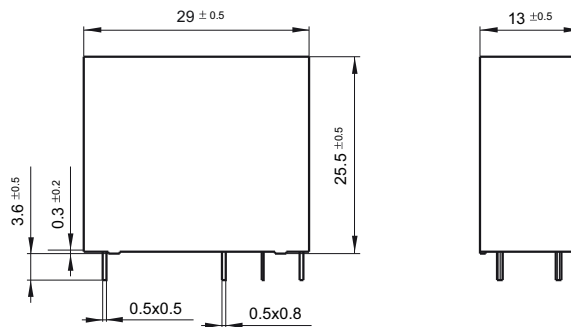
Notes: 1) Flux-proofed relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.

2) The customer special requirement express as special code after evaluating by Hongfa.

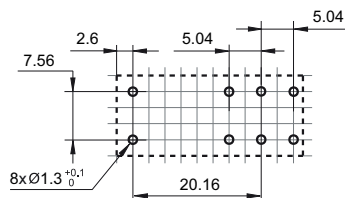
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

### Outline Dimensions



PCB Layout (Bottom view)



DIN rail Socket



Solder Socket



Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.

2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.

3) The width of the gridding is 2.52mm.

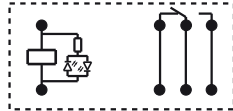


# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

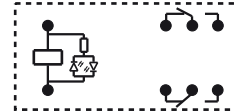
Unit: mm

## Wiring Diagram (Bottom view)

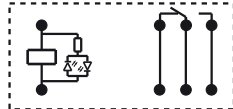
HF115FP/ □□□ -1Z3□



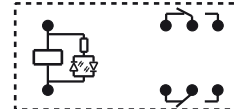
HF115FP/ □□□ -2Z4□



HF115FP/A □□□ -1Z3□



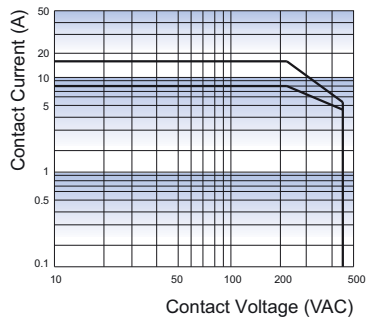
HF115FP/A □□□ -2Z4□



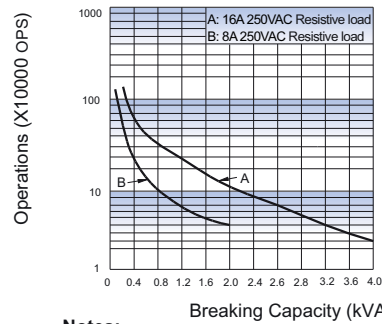
Remark: DC coil with a parallel diode is available but the coil terminal is different in positive or cathode.

## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER



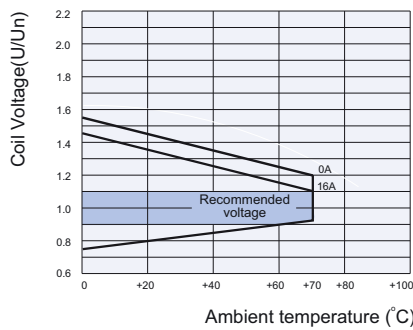
ENDURANCE CURVE



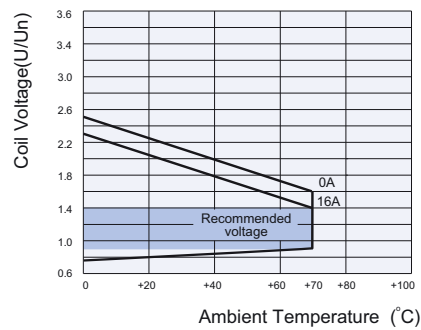
**Notes:**

- Curve A: 1Z3B type  
Curve B: 2Z4B type
- Test conditions:  
NO, Flux proofed, Room temp., 1s on 9s off

COIL OPERATING RANGE (AC) \*



COIL OPERATING RANGE (DC) \*



**Notes:** \* The use of a relay with an energising voltage other than the rated coil voltage may lead to reduced electrical life. An energising voltage over the abver range may damage the insulation of relay coil.

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# HF115FK

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:116934



File No.:CQC17002176308



## Features

- Low height: 15.7 mm
- 16A switching capability
- 5kV dielectric strength (between coil and contacts)
- Creepage distance: 10mm
- Meeting reinforce insulation
- Flux proofed type
- Product in accordance to IEC 60335-1 available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A, 1C	2A, 2C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)	
Contact material	AgSnO <sub>2</sub>	
Contact rating (Res. load)	12A/16A 250VAC	8A 250VAC
Max. switching voltage	400VAC	
Max. switching current	12A / 16A	10A
Max. switching power	3000VA / 4000VA	2000VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance	H3(P)T type: 1 x 10 <sup>5</sup> OPS (NO: 16A 277VAC, Resistive Load at 40°C, 1s on 9s off) Z3(P)T type: 5 x 10 <sup>4</sup> OPS (NO: 16A 250VAC, Resistive Load at 85°C, 1s on 9s off) 2Z4(P)T type: 5 x 10 <sup>4</sup> OPS (NO: 8A 250VAC, Resistive Load at 85°C, 1s on 9s off) Z33 type: 1 x 10 <sup>5</sup> OPS (NO: 16A 277VAC, Resistive Load at 40°C, 1s on 9s off) 2Z43 type: 5 x 10 <sup>4</sup> OPS (NO: 8A 277VAC, Resistive Load at 40°C, 1s on 9s off)	

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
	Between contact sets	2500VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 x 50μs)	
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	5ms max.	
Shock resistance *	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	10Hz to 150Hz 10g/5g	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 13g	
Construction	Flux proofed	

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

2) \* Index is not in relay length direction.

## COIL

Coil power	Approx. 400mW(Standard type)
	Approx. 530mW(high power consumption type)

## COIL DATA

at 23°C

### Standard type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC * <sup>2)</sup>	Coil Resistance Ω
5	3.50	0.5	7.5	62 x (1±10%)
6	4.20	0.6	9.0	90 x (1±10%)
9	6.30	0.9	13.5	202 x (1±10%)
12	8.40	1.2	18	360 x (1±10%)
18	12.60	1.8	27	810 x (1±10%)
24	16.80	2.4	36	1440 x (1±10%)
48	33.60	4.8	72	5760 x (1±15%)

## COIL DATA

at 23°C

### high power consumption type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC * <sup>2)</sup>	Coil Resistance Ω
5	≤3.50	≥0.5	7.5	47 x (1±10%)
6	≤4.20	≥0.6	9.0	68 x (1±10%)
9	≤6.30	≥0.9	13.5	153 x (1±10%)
12	≤8.40	≥1.2	18	271 x (1±10%)
18	≤12.60	≥1.8	27	611 x (1±10%)
24	≤16.80	≥2.4	36	1086 x (1±10%)
48	≤33.60	≥4.8	72	4347 x (1±15%)

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

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



HONGFA RELAY

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## SAFETY APPROVAL RATINGS

### Standard type

UL/CUL	AgSnO <sub>2</sub>	Z1T: 12A 250VAC at 85°C Z2T: 12A 250VAC at 85°C Z3T: 16A 250VAC at 85°C Z24T: 8A 250VAC at 85°C
	AgNi	Z13: 12A 250VAC at 40°C Z23: 12A 250VAC at 40°C Z33: 16A 250VAC at 40°C Z243: 8A 250VAC at 40°C
VDE	AgSnO <sub>2</sub>	Z1T: 12A 250VAC at 85°C Z2T: 12A 250VAC at 85°C Z3T: 16A 250VAC at 85°C Z24T: 8A 250VAC at 85°C
	AgNi	Z13: 12A 250VAC at 85°C Z23: 12A 250VAC at 85°C Z33: 16A 250VAC at 85°C Z243: 8A 250VAC at 85°C

Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.

## SAFETY APPROVAL RATINGS

### high power consumption type

UL/CUL	Z1PT: 12A 277VAC 85°C 16A 277VAC room temperature TV8 NO room temperature Z2PT: 12A 277VAC 85°C 6A 277VAC room temperature TV8 NO room temperature Z3PT: 16A 277VAC 85°C TV8 NO room temperature Z24PT: 8A 250VAC 85°C
	Z1PT: 12A 277VAC 85°C Z2PT: 12A 277VAC 85°C Z3PT: 16A 277VAC 85°C Z24PT: 8A 250VAC 85°C

## ORDERING INFORMATION

Type	HF115FK / 12 -H 3 P T (XXX)
Coil voltage	5, 6, 9, 12, 18, 24, 48 VDC
Contact arrangement	H: 1 Form A Z: 1 Form C 2H: 2 Form A 2Z: 2 Form C
Version	1: 3.5mm 1 pole 12A 2: 5.0mm 1 pole 12A 3: 5.0mm 1 pole 16A 4: 5.0mm 2 pole 8A
Coil type	P: high power consumption type Nil: Standard
Contact material <sup>1)</sup>	T: AgSnO <sub>2</sub> 3: AgNi (Standard)
Special code <sup>3)</sup>	XXX: Customer special requirement Nil: Standard

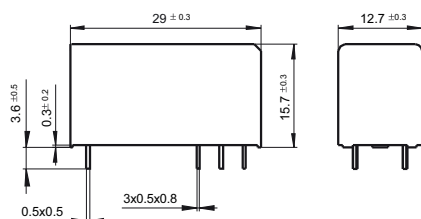
Notes: 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).  
2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.  
3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

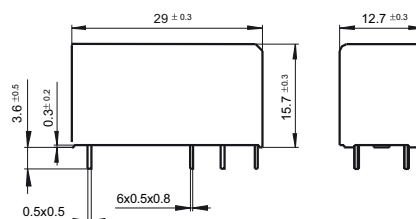
Unit: mm

### Outline Dimensions

3.5mm Pinning (HF115FK/□□□-1-□)



5mm Pinning (HF115FK/□□□-□-2/3/4-□)



Wiring Diagram (Bottom view)

3.5/5mm Pinning, 1 Pole, 12A, HF115FK/ □□□ -1/2-□



1 Form A

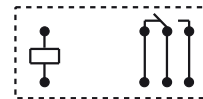


1 Form C

5mm Pinning, 1 Pole, 16A, HF115FK/ □□□ -3-□

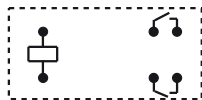


1 Form A



1 Form C

5mm Pinning, 2 Pole, 8A, HF115FK/ □□□ -2□ -4-□



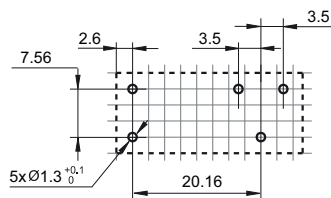
2 Form A



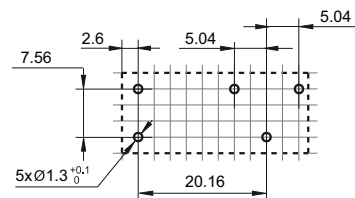
2 Form C

PCB Layout (Bottom view)

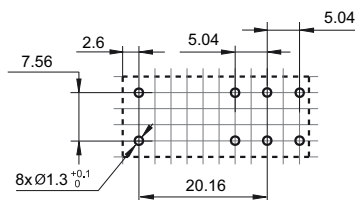
3.5mm 1Pole 12A



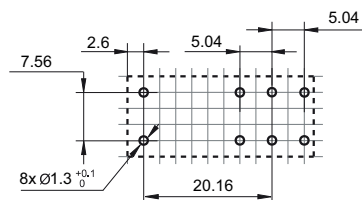
5mm 1Pole 12A



5mm 1Pole 16A



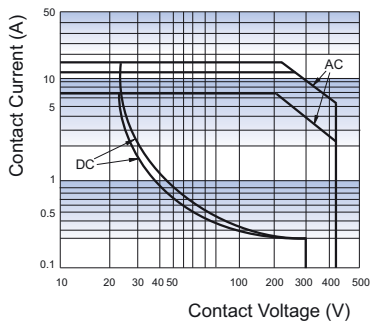
5mm 2Pole 8A



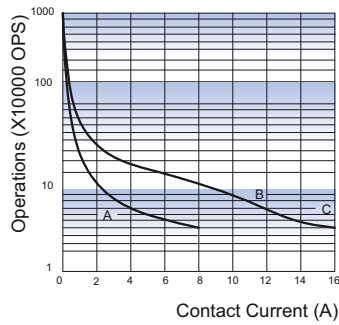
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.  
 3) The width of the gridding is 2.52mm.

## CHARACTERISTIC CURVES

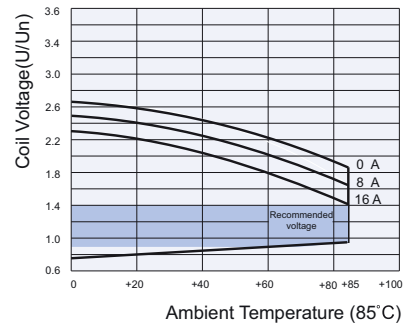
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL OPERATING RANGE (DC) \*



**Test conditions:**

- 1) Curve A: Z24T type  
Curve B: Z2T type (or Z2T type)  
Curve C: Z3T type
- 2) Test conditions:  
NO, resistive load, 250VAC, flux proofed,  
at 85°C, 1s on 9s off

**Notes:** \* The use of a relay with an energising voltage other than the rated coil voltage may lead to reduced electrical life. An energising voltage over the above range may damage the insulation of relay coil.

**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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# HF115FK-T

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:116934



File No.: CQC17002176308



## Features

- \* High temperature: 105 °C
- \* Low height: 15.7 mm
- \* 16A switching capability
- \* 5kV dielectric strength (between coil and contacts)
- \* Creepage distance: 10mm
- \* Meeting reinforce insulation
- \* Product in accordance to IEC 60335-1 available
- \* Sockets available
- \* UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A, 1C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating (Res. load)	16A 250VAC
Max. switching voltage	400VAC
Max. switching current	16A
Max. switching power	4000VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance	H3T type: 3 x 10 <sup>4</sup> OPS (16A 250VAC, Resistive Load, at 105*, 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 x 50μs)	
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	5ms max.	
Shock resistance *	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	10Hz to 150Hz 10g/5g	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 105°C	
Termination	PCB	
Unit weight	Approx. 13g	
Construction	Flux proofed	

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

2) \* Index is not in relay length direction.

## COIL

Coil power	Approx. 400mW
------------	---------------

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.50	0.5	7.5	62 x (1±10%)
6	4.20	0.6	9.0	90 x (1±10%)
9	6.30	0.9	13.5	202 x (1±10%)
12	8.40	1.2	18	360 x (1±10%)
18	12.60	1.8	27	810 x (1±10%)
24	16.80	2.4	36	1440 x (1±10%)
48	33.60	4.8	72	5760 x (1±15%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	16A 250VAC at 105°C
VDE	16A 250VAC at 105°C 10A 250VAC at 105°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

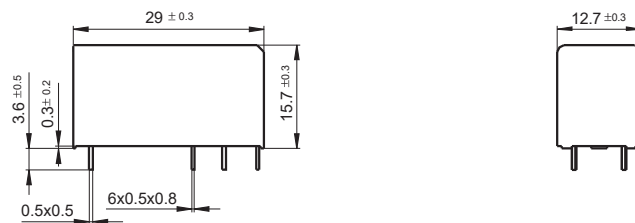
Type	HF115FK-T/	12	-H	3	T	(XXX)
Coil voltage	5, 6, 9, 12, 18, 24, 48VDC					
Contact arrangement	H: 1 Form A Z: 1 Form C					
Version	3: 5.0mm 1 pole 16A					
Contact material <sup>1)</sup>	T: AgSnO <sub>2</sub>					
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard			

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).  
 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.  
 3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

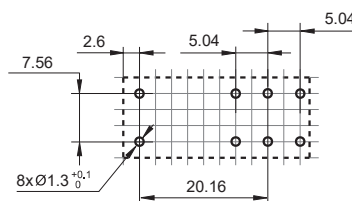
### Outline Dimensions



### Wiring Diagram (Bottom view)

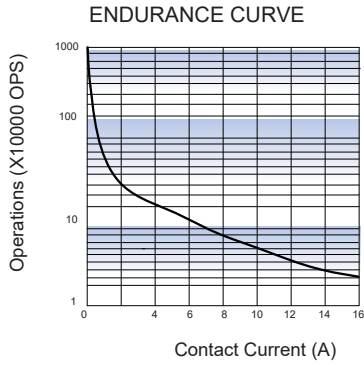


### PCB Layout (Bottom view)

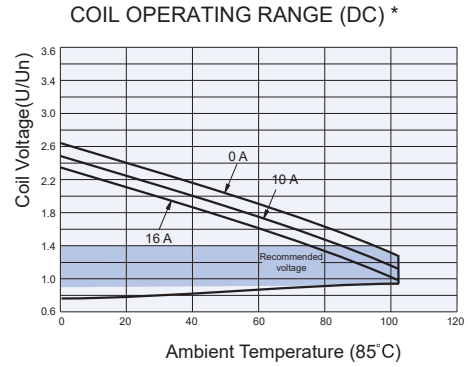


- Remark:** 1) In case of no tolerance shown in outline dimension: outline dimension \*1mm, tolerance should be  $\pm 0.2$ mm; outline dimension \*1mm and \*5mm, tolerance should be  $\pm 0.3$ mm; outline dimension \*5mm, tolerance should be  $\pm 0.4$ mm.  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.  
 3) The width of the gridding is 2.52mm.

## CHARACTERISTIC CURVES



**Test conditions:**  
 NO, resistive load, 250VAC, flux proofed,  
 at 105°C, 1s on 9s off



**Notes:** \* The use of a relay with an energising voltage other than the rated coil voltage may lead to reduced electrical life. An energising voltage over the abover range may damage the insulation of relay coil.

### Disclaimer

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# HF158F

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:40032833



File No.:CQC17002176312



## Features

- 20A switching capability
- Low height: 15.7 mm
- 5kV dielectric strength (between coil and contacts)
- Creepage distance: 10mm, meet reinforce insulation
- UL insulation system: Class F
- Product in accordance to IEC 60335-1 available
- Sockets available
- Plastic sealed and flux proofed types available

## CONTACT DATA

Contact arrangement	1A, 1C
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgNi, AgSnO <sub>2</sub>
Contact rating	16A 250VAC
Max. switching voltage	440VAC
Max. switching current	20A
Max. switching power	5000VA
Mechanical endurance	2 x 10 <sup>7</sup> OPS
Electrical endurance	H33 type: 1 x 10 <sup>5</sup> OPS (16A 277VAC, Resistive load, Room temp., 1s on 9s off) H3T type: 1 x 10 <sup>5</sup> OPS (16A 277VAC, Resistive load, Room temp., 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 / 50μs)	
Operate time (at rated. volt.)	15ms max.	
Release time (at rated. volt.)	8ms max.	
Temperature rise (at rated. volt.)	60K max.	
Shock resistance *	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	10Hz to 150Hz 10g/5g	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 11.5g	
Construction	Plastic sealed, Flux proofed	

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

2) \* Index is not that of relay length direction.

## COIL

Coil power	Approx. 400mW
------------	---------------

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.50	0.5	9.0	62 x (1±10%)
6	4.20	0.6	10.8	90 x (1±10%)
9	6.30	0.9	16.2	202 x (1±10%)
12	8.40	1.2	21.6	360 x (1±10%)
18	12.6	1.8	32.4	810 x (1±10%)
24	16.8	2.4	43.2	1440 x (1±10%)
48 <sup>3)</sup>	33.6	4.8	86.4	5760 x (1±15%)

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

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

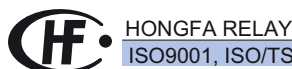
3) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).

## SAFETY APPROVAL RATINGS

UL/CUL	AgNi	16A 277VAC 16A 24VDC 10A 400VAC at 85°C 10A 250VAC at 105°C 20A 250VAC at 85°C
	AgSnO <sub>2</sub>	1HP 240VAC B300/R300 at 85°C TV-5 120VAC 16A 277VAC 16A 24VDC 10A 400VAC at 85°C 10A 250VAC at 105°C 20A 250VAC at 85°C
VDE	AgNi	13A 250VAC at 70°C 16A 250VAC at 85°C NO: 10A 250VAC at 25°C / at 105°C (Only for (217) type)
	AgSnO <sub>2</sub>	16A 250VAC at 85°C 8A 250VAC cosφ=0.4 at 85°C
UL/CUL (HF158F-T)	16A 277VAC at 105°C	
VDE (HF158F-T)	NO: 20A 250VAC at Room temp. / 105°C NO: 16A 250VAC at Room temp. / 105°C	

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

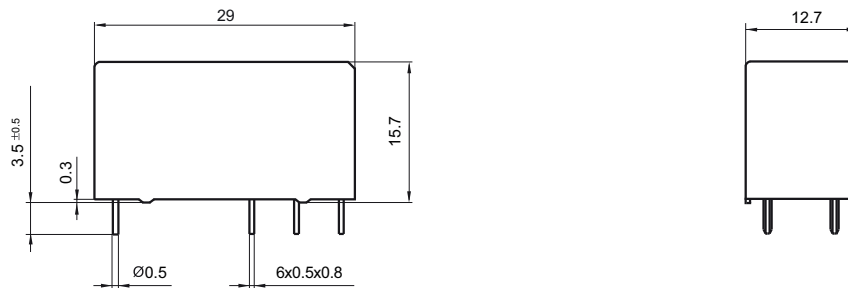
Type	HF158F /	12	-Z	S	3	3	(XXX)
	HF158F: Standard HF158F-T: High temperature						
Coil voltage	5, 6, 9, 12, 18, 24, 48VDC						
Contact arrangement	H: 1 Form A		Z: 1 Form C				
Construction <sup>1) 2)</sup>	S: Plastic sealed		Nil: Flux proofed				
Version	3: 5.0mm						
Contact material	3: AgNi		T: AgSnO <sub>2</sub>				
Special code <sup>3)</sup>	XXX: Customer special requirement			Nil: Standard			

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) The customer special requirement express as special code after evaluating by Hongfa. e.g. (217) stands for product with the electrical endurance of  $3 \times 10^5$  OPS at 10A load.

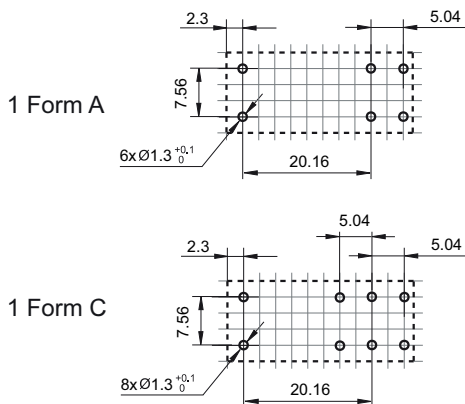
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

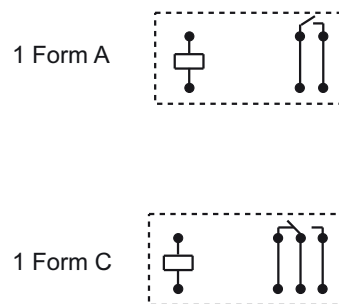
### Outline Dimensions



### PCB Layout (Bottom view)



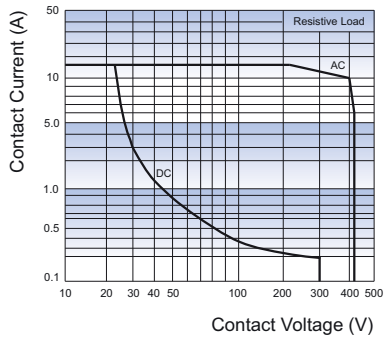
### Wiring Diagram (Bottom view)



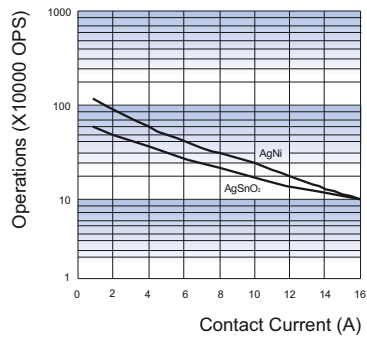
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.
- 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.
- 3) The width of the gridding is 2.52mm.

## CHARACTERISTIC CURVES

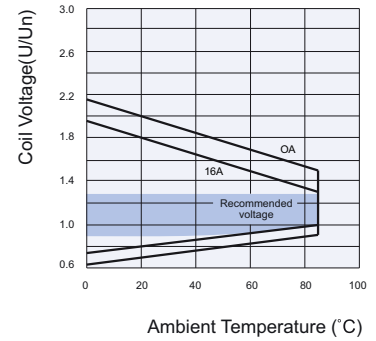
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL OPERATING RANGE (DC) \*



**Test conditions:**

NO, 250VAC, Resistive load,  
Flux proofed, Room temp., 1s on 9s off.

**Notes:** \* The use of a relay with an energising voltage

other than the rated coil voltage may lead to reduced electrical life.

An energising voltage over the above range may damage the insulation of relay coil.

**Disclaimer**

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# HF158F-V 1 pole

# MINIATURE HIGH POWER RELAY



File No.: 40032833



File No.:E134517



File No.:CQC17002176312



## Features

- 10A 300VDC high-voltage switching capability
- 5kV dielectric strength(between coil and contacts)
- Creepage distance:10mm
- Meet Reinforce insulation
- Product in accordance to IEC60335-1 available
- Class F insulation system

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating	10A 300VDC 12A 277VAC
Max. switching voltage	420VDC / 300VAC
Max. switching current	16A
Max. switching power	3000W / 3324VA
Mechanical endurance	2 x 10 <sup>6</sup> ops
Electrical endurance	1 x 10 <sup>4</sup> ops (10A 300VDC, Resistive load, at 85 °C, 1s on 9s off) 1 x 10 <sup>4</sup> ops (12A 277VAC, Resistive load, at 85 °C, 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1500VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 / 50μs)	
Operate time (at rated. volt.)	10ms max.	
Release time (at rated. volt.)	5ms max.	
Shock resistance *	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance *	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 15g	
Construction	Flux proofed	

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

2) \* Index is not that of relay length direction.

## COIL

Coil power	Approx. 400mW
------------	---------------

## COIL DATA

at 23°C

Coil Code	Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Coil Resistance Ω
5	5	≤3.75	≥0.5	62 x (1±10%)
6	6	≤4.50	≥0.6	90 x (1±10%)
9	9	≤6.75	≥0.9	200 x (1±10%)
12	12	≤9.00	≥1.2	360 x (1±10%)
18	18	≤13.50	≥1.8	810 x (1±10%)
24	24	≤18.00	≥2.4	1440 x (1±10%)

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

## SAFETY APPROVAL RATINGS

UL/CUL/VDE	4A 420VDC at 85°C
	10A 300VDC at 85°C
	16A 180VDC at 85°C
	12A 277VAC at 85°C
	13A 180VAC at 85°C
	14.5A 160VAC at 85°C

Notes: 1) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

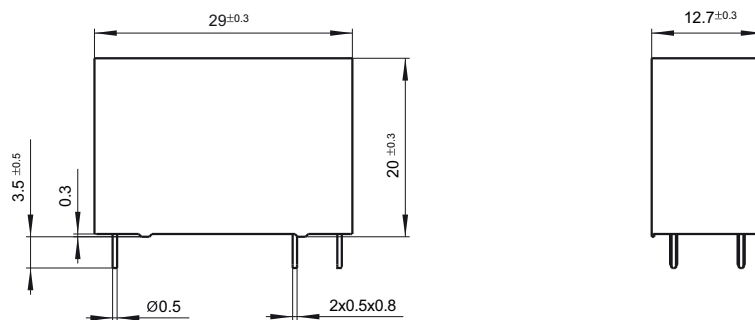
Type	HF158F-V /	12	-H	2	T	(XXX)
Coil voltage	5, 6, 9, 12, 18, 24VDC					
Contact arrangement	H: 1 Form A					
Version	2: 5.0mm 1 pole					
Contact material	T: AgSnO <sub>2</sub>					
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard			

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.);  
 2) Storage, transportation and installation can not have a strong magnetic field around;  
 3) The customer special requirement express as special code after evaluating by Hongfa;  
 4) Product contains magnet, so there will be mutual exclusion or attraction between products. During the installation, please consider the installation mounting distance.

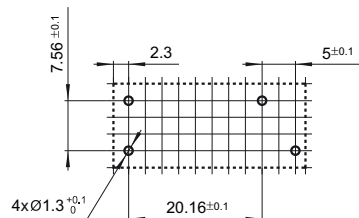
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

### Outline Dimensions



### PCB Layout (Bottom view)



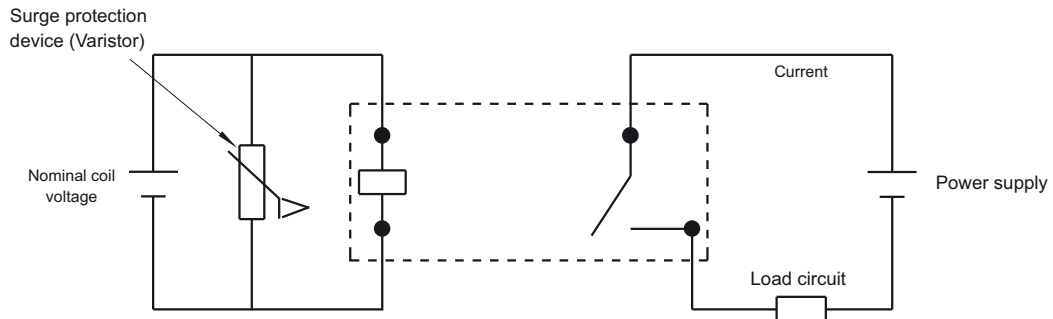
### Wiring Diagram (Bottom view)



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

## CIRCUIT

Load circuit and input circuit (Bottom view)



### Notes:

- 1) The output contact terminals and the input coil terminal are no polarity to distinguish.
- 2) Please use varistor as surge protection device. If varistor will not be used, the electrical life need to be derated.
- 3) Varistor surge protection device should be connect parallel to coils. Suitable voltage of varistor is 3 times the coil voltage.
- 4) Avoid using relay under the strong magnetic field, which will decrease the blast function and magnetic, thus cause the arc can not be interrupted and relay damaged.
- 5) To avoid using relays under strong magnetic field because it will change the parameters of relay such as pull-in and drop-out voltage.
- 6) There is magnetic element inside, the magnetism would make the relays stick to each other, in order to avoid the sticking that may lead to deformation or parameter change inside the relay, gap is needed between the relay units.
- 7) There is magnetic element inside, the magnetism would make the relays repel each other. When more than one relay need in board layout, there should be gap between each units, in order to avoid the repel and soldering issue.

### 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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# HF175F

# MINIATURE HIGH POWER RELAY



File No.: E133481



File No.: R50412801



File No.: CQC18002196447

CQC18002202622



## Features

- 2 From A and 2 From C configurations
- Low height, only 15.7mm
- 5kV dielectric strength (between coil and contacts)
- Creepage/clearance distance > 10mm, Meets reinforce insulation
- Product in accordance to IEC 60335-1 available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	2H,2Z
Contact resistance	≤ 100mΩ max(1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating(Res.load)	16A 277VAC
Max. switching voltage	277VAC
Max. switching current	16A
Max. switching power	4432VA
Mechanical endurance	5 x 10 <sup>6</sup> OPS
Electrical endurance	5 x 10 <sup>4</sup> OPS (2NO:16A 277VAC, General load 85°C, 1s on 9s off)

## CHARACTERISTICS

Insulation resistance	1000MΩ (500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
	Between contacts sets	2500VAC 1min
Surge voltage (Between coil & contacts)	10kV (1.2 / 50μs)	
Operate time (at rated. volt.)	≤ 10ms	
Release time (at rated. volt.)	≤ 5ms	
Shock resistance	Functional*	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	NO	10Hz to 55 Hz 1.5mm DA
	NC*	10Hz to 55 Hz 1.5mm DA
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 16.5g	
Construction	Flux proofed	

Notes: 1) The data shown above are initial values.  
(2)\* means Non length index

## COIL

Coil power	Approx. 800mW
Holding voltage	45% to 110%U <sub>N</sub> (at 23°C) 55% to 100%U <sub>N</sub> (at 85°C)

Notes: 1) The coil holding voltage is the voltage applied to coil 100ms after the rated voltage.

2) To avoid overheating and burning, the coil can not be consistently applied to with voltage larger than maximum holding voltage.

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Max.* Voltage VDC	Coil Resistance Ω
5	≤ 3.50	≥ 0.5	7.5	31.3 x (1±10%)
6	≤ 4.20	≥ 0.6	9.0	45 x (1±10%)
9	≤ 6.30	≥ 0.9	13.5	101.3 x (1±10%)
12	≤ 8.40	≥ 1.2	18	180 x (1±10%)
24	≤ 16.80	≥ 2.4	36	720 x (1±10%)
48	≤ 33.60	≥ 4.8	72	2880 x (1±15%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	2H	16A 277VAC General use 85°C TV-8 120VAC 50°C 1HP 240VAC 40°C Electronic ballast 5A 120VAC 50°C
	2Z	16A 277VAC General use 85°C NO: TV-8 120VAC 50°C NO: 1HP 240VAC 40°C NO: Electronic ballast 5A 120VAC 50°C

Notes: 1) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

## ORDERING INFORMATION

Type	HF175F /	12	-2H	T	F	(XXX)
Coil voltage	5, 6, 9, 12, 18, 24, 48VDC					
Contact arrangement	2H: 2 Form A		2Z: 2 Form C			
Contact material	T: AgSnO <sub>2</sub>					
Insulation standard	F: Class F					
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard			

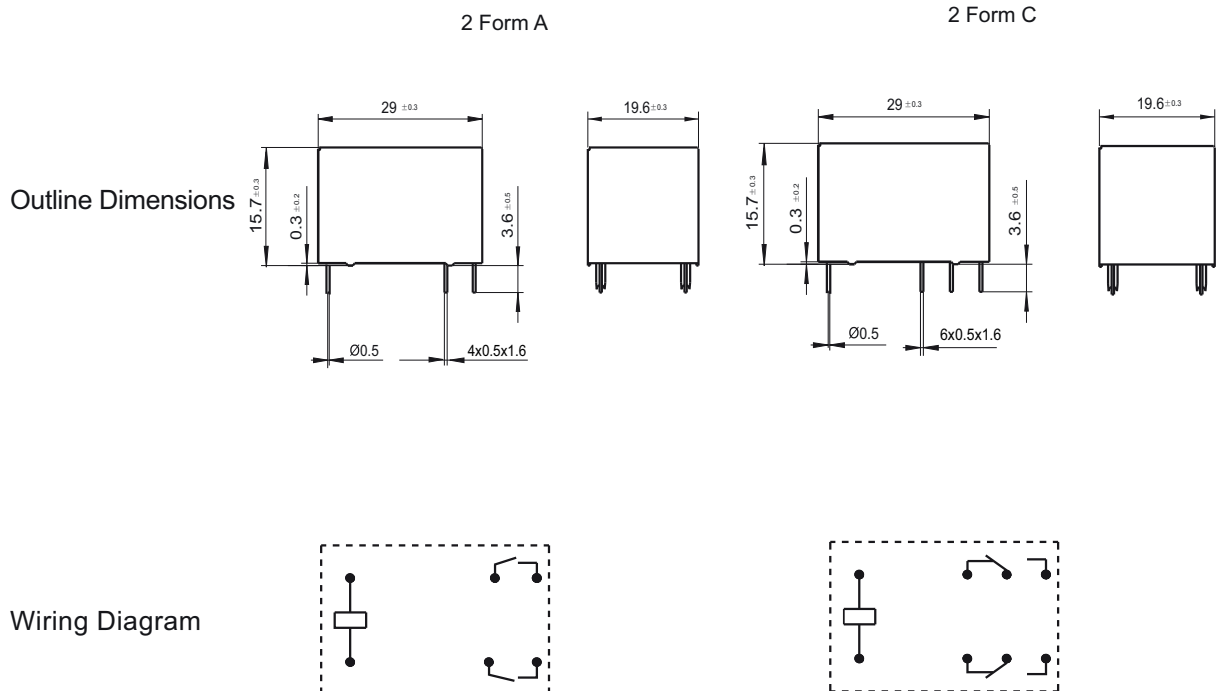
Notes: 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.)

2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

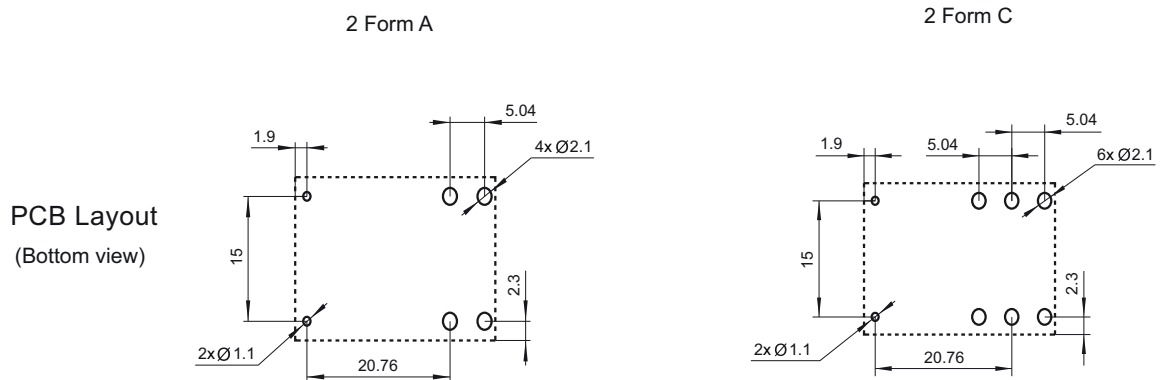
3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm







- Remark: 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  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .
- 2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .

### Disclaimer

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# HF14FF

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:R50140759



File No.:CQC10002046169



## Features

- 10A switching capability
- 5kV dielectric strength (between coil and contacts)
- Sockets available
- Plastic sealed and flux proofed types available
- UL insulation system: Class F available
- Environmental friendly product (RoHS compliant)
- Outline Dimensions: 29.0mm x 13.0mm x 26.0mm

## CONTACT DATA

Contact arrangement	1A, 1C
Contact resistance <sup>2)</sup>	50mΩ max.(at 1A 24VDC)
Contact material	AgSnO <sub>2</sub> , AgNi, AgCdO
Contact rating	Resistive: 10A 277VAC/30VDC TV-5 120VAC
Max. switching voltage	277VAC / 30VDC
Max. switching current	10A
Max. switching power	2770VA / 300W
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance	1 x 10 <sup>5</sup> OPS (10A 277VAC, Resistive load, Room temp., 1s on 9s off) 1 x 10 <sup>5</sup> OPS (10A 30VDC, Resistive load, Room temp., 1s on 9s off)

**Notes:** 1) For plastic sealed type, the venting-hole should be excised in electrical endurance test.

2) The data shown above are initial values.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at nomi. volt.)	15ms max.	
Release time (at nomi. volt.)	5ms max.	
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 70°C	
Termination	PCB	
Unit weight	Approx. 18g	
Construction	Plastic sealed, Flux proofed	

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

2) Please find coil temperature curve in the characteristic curves below.

3) UL insulation system: Class F, Class B.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## COIL

Coil power	Approx. 530mW
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## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>2)</sup>	Drop-out Voltage VDC min. <sup>2)</sup>	Max. Voltage VDC * <sup>3)</sup>	Coil Resistance Ω
3	2.25	0.3	4.2	17 x (1±10%)
5	3.75	0.5	7.0	47 x (1±10%)
6	4.50	0.6	8.4	68 x (1±10%)
9	6.75	0.9	12.6	160 x (1±10%)
12	9.00	1.2	16.8	275 x (1±10%)
18	13.5	1.8	25.2	620 x (1±10%)
24	18.0	2.4	33.6	1100 x (1±10%)
48	36.0	4.8	67.2	4170 x (1±10%)
60	45.0	6.0	84.0	7000 x (1±10%)

**Notes:** 1) When requiring pick-up voltage < 75% of nominal voltage, special order allowed.

2) The data shown above are initial values.

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

4) Under ambient temperature, applying more than 80% of rating voltage to coil, relay will take action accordingly. But in order to meet the stated product performance, please apply rated voltage to coil.

## SAFETY APPROVAL RATINGS

UL/CUL	AgCdO	1 Form A	TV-5 120VAC 10A 277VAC General purpose 10A 30VDC Resistive 1/3HP 250VAC 1/4HP 125VAC
		1 Form C	TV-5 120VAC 10A 277VAC General purpose 10A 30VDC Resistive 1/3HP 250VAC NO:1/4HP 125VAC
	AgSnO <sub>2</sub> AgNi		10A 277VAC General purpose 10A 30VDC Resistive 1/3HP 250VAC 1/4HP 125VAC TV-5 120VAC
	TÜV	AgCdO AgSnO <sub>2</sub>	10A 250VAC 10A 30VDC

**Notes:** 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

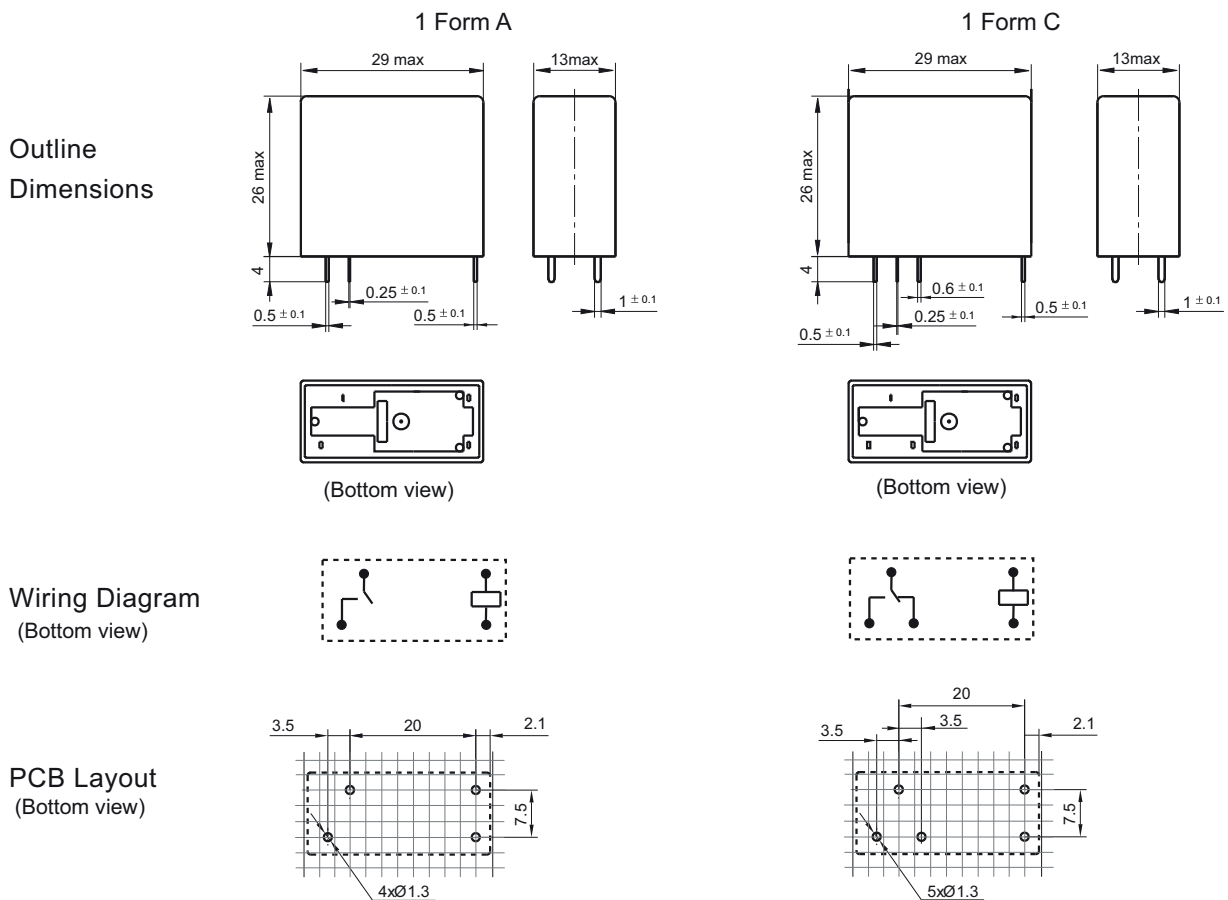
## ORDERING INFORMATION

Type	HF14FF / 012 -1H S T F (XXX)					
Coil voltage	3, 5, 6, 9, 12, 18, 24, 48, 60VDC					
Contact arrangement	1H: 1 Form A		1Z: 1 Form C			
Construction <sup>1)</sup>	S: Plastic sealed(No smoky-gray cover) Nil: Flux proofed					
Contact material	T: AgSnO <sub>2</sub>	3: AgNi	Nil: AgCdO			
Insulation standard	F: Class F		Nil: Class B			
Special code <sup>4)</sup>	XXX: Customer special requirement			Nil: Standard		

- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) The standard type is made of black cover. If smoke cover is required, please add a special suffix (611) when ordering. Please take note that smoke cover is only available for flux proofed type.
- 4) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

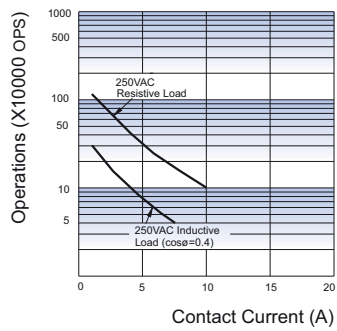
Unit: mm



- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤ 1mm, tolerance should be ±0.2mm; outline dimension > 1mm and ≤ 5mm, tolerance should be ±0.3mm; outline dimension > 5mm, tolerance should be ±0.4mm.
- 2) The tolerance without indicating for PCB layout is always ±0.1mm.
- 3) The width of the gridding is 2.5mm.

## CHARACTERISTIC CURVES

ENDURANCE CURVE

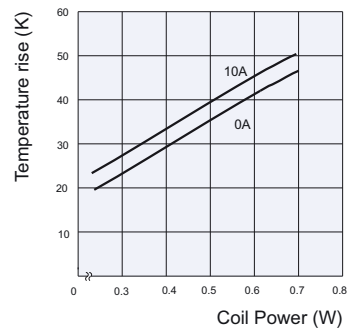


**Test conditions:**

No contact, Resistive load,

Flux proofed, Room temp., 1s on 9s off.

COIL TEMPERATURE RISE



**Disclaimer**

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# HF14FW

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:40023508



File No.:CQC10002046170



## Features

- 20A switching capability
- 4kV dielectric strength (between coil and contacts)
- Meeting VDE 0700, 0631 reinforce insulation
- 1 Form A, 1 Form B and 1 Form C configurations
- Sockets available
- Plastic sealed and flux proofed types available

## CONTACT DATA

Contact arrangement	1A, 1B, 1C
Contact resistance <sup>2)</sup>	50mΩ max.(at 1A 24VDC)
Contact material	AgSnO <sub>2</sub> , AgCdO
Contact rating	Resistive: 16A 240VAC/24VDC 1HP 240VAC TV-8 125VAC (NO contact)
Max. switching voltage	277VAC / 30VDC
Max. switching current	20A
Max. switching power	5540VA / 480W
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance	1 x 10 <sup>5</sup> OPS (NO or NC, 16A 240VAC, Resistive load, Room temp., 1s on 9s off) 5 x 10 <sup>4</sup> OPS (NO or NC, 16A 24VDC, Resistive load, Room temp., 1s on 9s off)

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

2) For plastic sealed type, the venting-hole should be excised in electrical endurance test.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at rated. volt.)	15ms max.	
Release time (at rated. volt.)	5ms max.	
Ambient temperature	-40°C to 85°C	
Humidity	5% to 85% RH	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Termination	PCB	
Unit weight	Approx. 18.5g	
Construction	Plastic sealed, Flux proofed	

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

2) Please find coil temperature curve in the characteristic curves below.

3) UL insulation system: Class F, Class B.

## COIL

Coil power	Standard: Approx.720mW Sensitive: Approx.530mW
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## COIL DATA

at 23°C

### Standard type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>3)</sup>	Drop-out Voltage VDC min. <sup>3)</sup>	Max. Voltage VDC <sup>4)</sup>	Coil Resistance Ω
5	3.6	0.5	5.5	36 x (1±10%)
6	4.3	0.6	6.6	50 x (1±10%)
9	6.5	0.9	9.9	115 x (1±10%)
12	8.6	1.2	13.2	200 x (1±10%)
18	13.0	1.8	19.8	460 x (1±10%)
24	17.3	2.4	26.4	820 x (1±10%)
48	34.6	4.8	52.8	3300 x (1±10%)
60	43.2	6.0	66.0	5100 x (1±10%)

### Sensitive type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>3)</sup>	Drop-out Voltage VDC min. <sup>3)</sup>	Max. Voltage VDC <sup>4)</sup>	Coil Resistance Ω
5	3.60	0.5	7.0	47 x (1±10%)
6	4.30	0.6	8.4	68 x (1±10%)
9	6.50	0.9	12.6	160 x (1±10%)
12	8.60	1.2	16.8	275 x (1±10%)
18	13.0	1.8	25.2	620 x (1±10%)
24	17.3	2.4	33.6	1100 x (1±10%)
48	34.6	4.8	67.2	4170 x (1±10%)
60	43.2	6.0	84.0	7000 x (1±10%)

Notes: 1) When requiring pick-up voltage < 72% of nominal voltage, special order allowed.

2) Suggesting to use the sensitive type.

3) The data shown above are initial values.

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

5) Under ambient temperature, applying more than 80% of rating voltage to coil, relay will take action accordingly. But in order to meet the stated product performance, please apply rated voltage to coil.



HONGFA RELAY

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## SAFETY APPROVAL RATINGS

UL/CUL	Standard, Sensitive	AgSnO <sub>2</sub>	20A/16A/12A 277VAC Resistive 1HP (8 FLA) 240VAC TV-8 125VAC 16A 240VAC General Use 20A/16A/12A 24VDC 10FLA 60LRA 250VAC
		AgCdO	20A/16A/12A 277VAC Resistive 1HP (8 FLA) 240VAC 16A 240VAC General Use 20A/16A/12A 24VDC 20A 125VAC General Use
	(136)	AgSnO <sub>2</sub>	20A 125VAC Resistive 20A 277VAC/250VAC/125VAC General Use 16A 277VAC/250VAC/125VAC Resistive 20A 30VDC Resistive 1/2HP 250VAC/125VAC TV-10 125VAC 10FLA 60LRA 250VAC
VDE (Coil power is 530mW)	AgSnO <sub>2</sub>	1 Form A	20A 250VAC at 70°C 16A 30VDC at 70°C
		1 Form C	16A 250VAC at 70°C 16A 30VDC at 70°C NO:20A 250VAC at 70°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

Type	HF14FW / 012 -H S P T F (XXX)
Coil voltage	5, 6, 9, 12, 18, 24, 48, 60VDC
Contact arrangement	H: 1Form A D: 1 Form B Z: 1 Form C
Construction <sup>1)</sup>	S: Plastic sealed(No smoky-gray cover) Nil: Flux proofed
Coil power	P: Standard Nil: Sensitive
Contact material	T: AgSnO <sub>2</sub> Nil: AgCdO
Insulation standard	F: Class F Nil: Class B
Special code <sup>4)</sup>	XXX: Customer special requirement Nil: Standard

Notes: 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

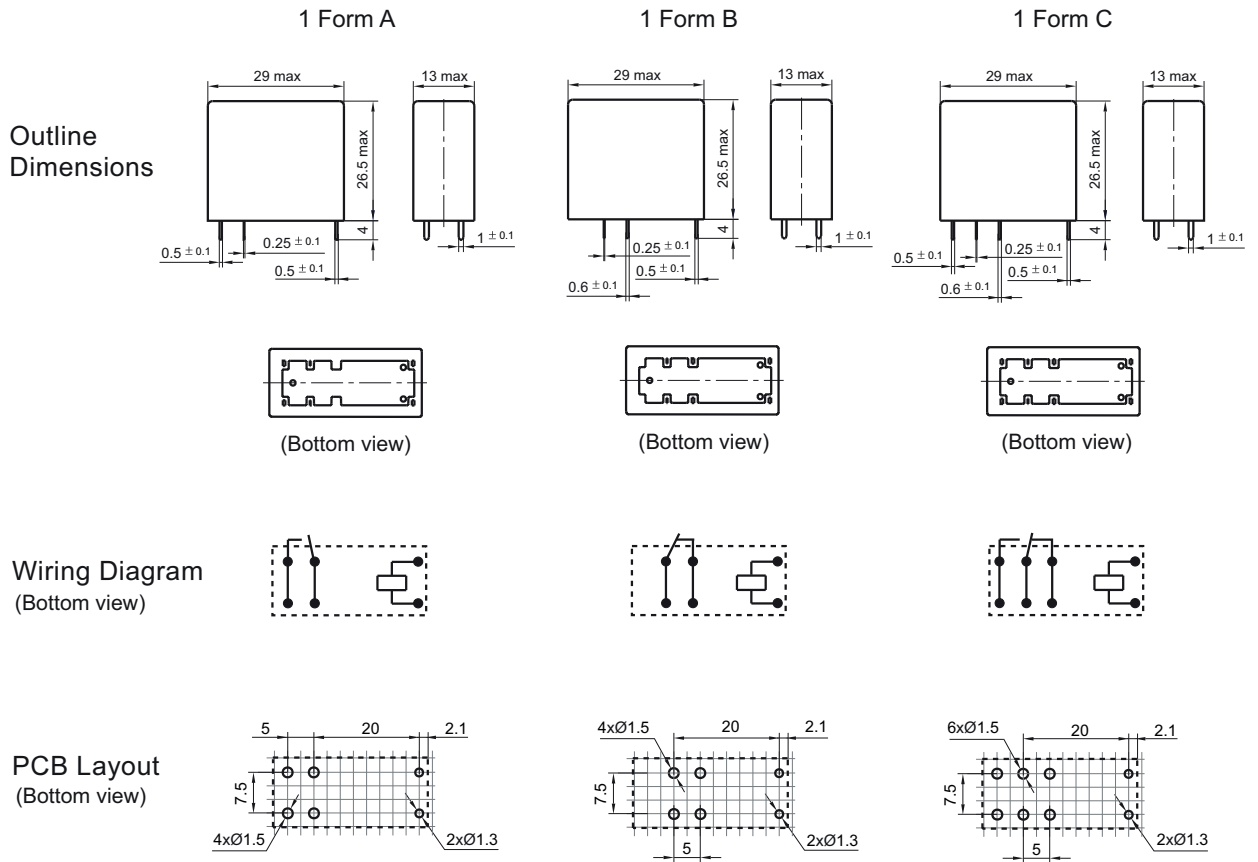
We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).

2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

3) The standard type is made of black cover. If smoky-gray cover is required, please add a special suffix (611) when ordering. Please take note that smoky-gray cover is only available for flux proofed.

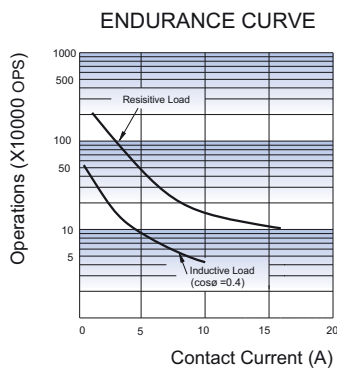
4) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT



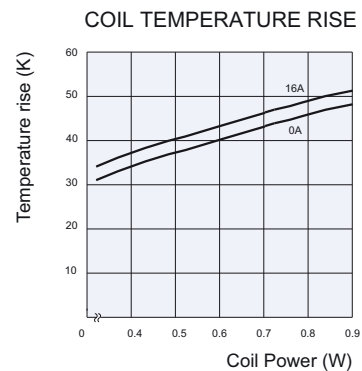
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .
- 2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .
- 3) The width of the gridding is  $2.5\text{mm}$ .

## CHARACTERISTIC CURVES



**Test conditions:**

No contact, Resistive load,  
Flux proofed, Room temp., 1s on 9s off.



### Disclaimer

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# HF140FF

## MINIATURE INTERMEDIATE POWER RELAY



File No.:E134517



File No.:R50149131



File No.:CQC10002046173



### Features

- 10A switching capability
- 5kV dielectric strength (between coil and contacts)
- 2.0mm contact gap available
- Sockets available
- Plastic sealed and flux proofed types available

### CONTACT DATA

Contact arrangement	2H, 2Z
Contact resistance <sup>1)</sup>	50mΩ max.(at 1A 24VDC)
Contact material	AgSnO <sub>2</sub> , AgNi, AgCdO
Contact rating (Res. load)	10A 250VAC 8A 30VDC
Max. switching voltage	250VAC / 30VDC
Max. switching current	10A
Max. switching power	2500VA / 240W
Mechanical endurance	Standard: 1 x 10 <sup>7</sup> OPS W type(1.5mm): 5 x 10 <sup>5</sup> OPS W type(2.0mm): 3 x 10 <sup>5</sup> OPS
Electrical endurance	1 x 10 <sup>5</sup> OPS (NO or NC, 10A 250VAC, Resistive load, Room temp., 1s on 9s off) 1 x 10 <sup>5</sup> OPS (NO or NC, 8A 30VDC, Resistive load, Room temp., 1s on 9s off)

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

2) For plastic sealed type, the venting-hole should be excised in electrical endurance test.

### CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between contacts sets	3000VAC 1min
	Between open contacts	Standard:1000VAC 1min W type(1.5mm):2000VAC 1min W type(2.0mm):2500VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2/50 μs)	
Operate time (at nomi. volt.)	15ms max.	
Release time (at nomi. volt.)	5ms max.	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mmDA	
Termination	PCB	
Unit weight	Approx. 18g	
Construction	Plastic sealed, Flux proofed	

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

2) Please find coil temperature curve in the characteristic curves below.

3) UL insulation system: Class F, Class B.

### COIL

Coil power	Standard: Approx. 530mW
	W type(1.5mm): Approx. 800mW
	W type(2.0mm): Approx. 1.4W

### COIL DATA

at 23°C

#### Standard type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>2)</sup>	Drop-out Voltage VDC min. <sup>2)</sup>	Max. Voltage VDC <sup>3)</sup>	Coil Resistance Ω
3	2.40	0.3	3.9	17 x (1±10%)
5	4.00	0.5	6.5	47 x (1±10%)
6	4.80	0.6	7.8	68 x (1±10%)
9	7.20	0.9	11.7	160 x (1±10%)
12	9.60	1.2	15.6	275 x (1±10%)
18	14.40	1.8	23.4	620 x (1±10%)
24	19.20	2.4	31.2	1100 x (1±10%)
48	38.40	4.8	62.4	4170 x (1±10%)
60	48.00	6.0	78.0	7000 x (1±10%)



ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00



## COIL DATA

at 23°C

### W Type (1.5mm)

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>2)</sup>	Drop-out Voltage VDC min. <sup>2)</sup>	Max. Allowable Voltage VDC <sup>*3)</sup>	Coil Resistance Ω
3	2.25	0.3	3.3	11.3 x (1±10%)
5	3.75	0.5	5.5	31 x (1±10%)
6	4.50	0.6	6.6	45 x (1±10%)
9	6.75	0.9	9.9	101 x (1±10%)
12	9.00	1.2	13.2	180 x (1±10%)
18	13.5	1.8	19.8	405 x (1±10%)
24	18.0	2.4	26.4	720 x (1±10%)
48	36.0	4.8	52.8	2880 x (1±10%)
60	45.0	6.0	66.0	4500 x (1±10%)

### W Type (2.0mm)

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>2)</sup>	Drop-out Voltage VDC min. <sup>2)</sup>	Max. Allowable Voltage VDC <sup>*3)</sup>	Coil Resistance Ω
5	3.75	0.5	5.5	18 x (1±10%)
6	4.50	0.6	6.6	26 x (1±10%)
9	6.75	0.9	9.9	58 x (1±10%)
12	9.00	1.2	13.2	102 x (1±10%)
24	18.0	2.4	26.4	410 x (1±10%)
48	36.0	4.8	52.8	1650 x (1±10%)

**Notes:** 1) When require pick-up voltage < 75% of nominal voltage, special order allowed.

2) The data shown above are initial values.

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

4) Under ambient temperature, applying more than 80% of rating voltage to coil, relay will take action accordingly. But in order to meet the stated product performance, please apply rated voltage to coil.

5) For the CO version whose contact gap is 1.5 mm, the operation voltage ≤ 85% of rated voltage.

## SAFETY APPROVAL RATINGS

UL/CUL	Standard	AgCdO	2H 2Z	TV-3 125VAC 10A 250VAC 10A 30VDC 1/4HP 240VAC 1/8HP 120VAC
		AgNi	2H3 2Z3	10A 250VAC 10A 30VDC 12A 277VAC/250VAC Resistive at 70°C 1/3HP 125VAC at 40°C
		AgSnO <sub>2</sub>	2HT	10A 250VAC 10A 30VDC 12A 277VAC/250VAC Resistive at 70°C 1/3HP 125VAC at 40°C 3/4HP 250VAC at 40°C
			2ZT	10A 250VAC 10A 30VDC 12A 277VAC/250VAC Resistive at 70°C 1/3HP 125VAC at 40°C 3/4HP 250VAC at 40°C
	W type	AgCdO	2H	TV-3 125VAC 10A 250VAC
		AgSnO <sub>2</sub>	2HT	12A 277VAC/250VAC Resistive at 70°C 1/3HP 125VAC at 40°C 3/4HP 250VAC at 40°C
TÜV		AgCdO	2H 2Z	10A 250VAC 10A 30VDC
		AgNi	2H3	12A 250VAC
			2Z3	10A 250VAC
AgSnO <sub>2</sub>	2HT	12A 250VAC		

**Notes:** 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

Type		HF140FF/ 012 -2H S W T G F (XXX)	
Coil voltage	3, 5, 6, 9, 12, 18, 24, 48, 60VDC		
Contact arrangement	2H: 2 Form A 2Z: 2 Form C		
Construction <sup>1)2)</sup>	S: Plastic sealed(No smoky-gray cover) Nil: Flux proofed		
Contact Gap	W: Large contact gap(Only for 2 Form A) <sup>3)</sup> Nil: Standard		
Contact material	T: AgSnO <sub>2</sub> 3: AgNi Nil: AgCdO		
Contact plating	G: Gold plated Nil: No gold plated		
Insulation standard	F: Class F Nil: Class B		
Special code <sup>5)</sup>	XXX: Customer special requirement Nil: Standard		

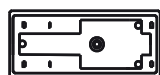
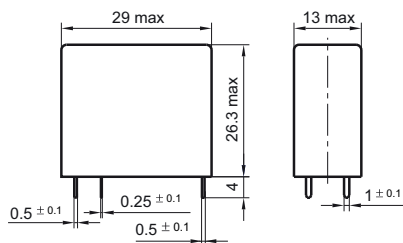
- Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) There are two specifications to W type: 1.5mm contact gap and 2.0mm contact gap. The default W type is 1.5mm. So please add the special code "(456)" when releasing order, if 2.0mm (only for 2A type) contact gap is required.
- 4) The standard type is made of black cover. If smoke cover is required, please add a special suffix (611) when ordering. Please take note that smoke cover is only available for flux proofed type.
- 5) The customer special requirement express as special code after evaluating by Hongfa. e.g.(456) means contact gap can reach 2.0mm.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

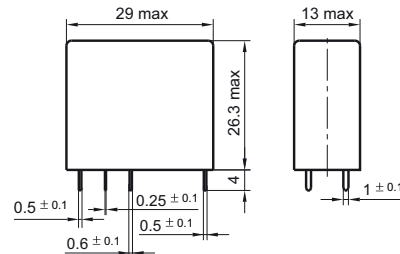
### Outline Dimensions

2 Form A



(Bottom view)

2 Form C

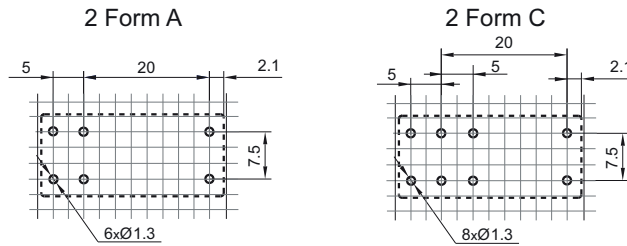


(Bottom view)

Wiring Diagram (Bottom view)



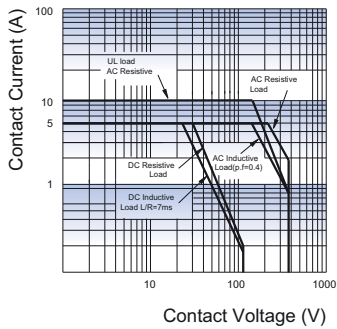
PCB Layout (Bottom view)



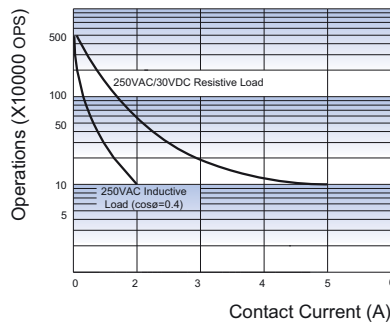
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1$ mm.  
 3) The width of the gridding is 2.5mm.

CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER

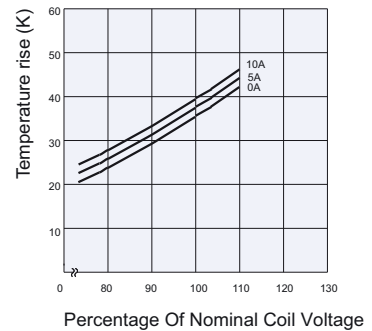


ENDURANCE CURVE



**Test conditions:**  
 No, Resistive load, Flux proofed,  
 Room temp., 1s on 9s off.

COIL TEMPERATURE RISE



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.

# HF25F

# SUBMINIATURE HIGH POWER RELAY



File No.:E134517



File No.:40026917



File No.:R50207576



File No.:CQC09002028692



## Features

- Small and for microwave oven
- 20A switching capability
- 1.5HP 250VAC approved by UL standard
- 5kV impulse withstand voltage (between coil and contacts)
- PCB & QC layouts
- Flux proofed types available

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating	Resistive: 20A 250VAC 1.5HP 250VAC
Max. switching voltage	250VAC / 30VDC
Max. switching current	20A
Max. switching power	5000VA / 480W
Mechanical endurance	2 x 10 <sup>6</sup> ops
Electrical endurance	1 x 10 <sup>5</sup> ops (20A 250VAC, Resistive load, Room temp., 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at rated. volt.)	15ms max.	
Release time (at rated. volt.)	5ms max.	
Humidity	5% to 85% RH	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Ambient temperature	-40°C to 85°C	
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Termination	PCB & QC	
Unit weight	Approx. 16.5g	
Construction	Flux proofed	

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

2) Please find coil temperature curve in the characteristic curves below.

3) UL insulation system: Class F

## COIL

Coil power	Approx. 500mW
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## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>2)</sup>	Drop-out Voltage VDC min. <sup>2)</sup>	Max. Voltage VDC <sup>3)</sup>	Coil Resistance Ω
5	3.75	0.25	6.50	50 x (1±10%)
6	4.50	0.30	7.80	72 x (1±10%)
9	6.75	0.45	11.7	162 x (1±10%)
12	9.00	0.60	15.6	288 x (1±10%)
18	13.5	0.90	23.4	648 x (1±10%)
24	18.0	1.20	31.2	1152 x (1±10%)

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

2) When requiring pick-up voltage <75% of nominal voltage, special order allowed.

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

## SAFETY APPROVAL RATINGS

UL/CUL	20A 250VAC
	16A 30VDC 1.5HP 250VAC
VDE	20A 250VAC
	16A 30VDC
TÜV	20A 250VAC
	16A 30VDC

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

Type	HF25F /	012	-H	1	(XXX)
Coil voltage	5, 6, 9, 12, 18, 24VDC				
Contact arrangement	H: 1 Form A				
Version	1: 1 type    2: 2 type    3: 3 type    4: 4 type    Nil: Standard type				
Special code <sup>2)</sup>	XXX: Customer special requirement		Nil: Standard		

**Notes:** 1) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

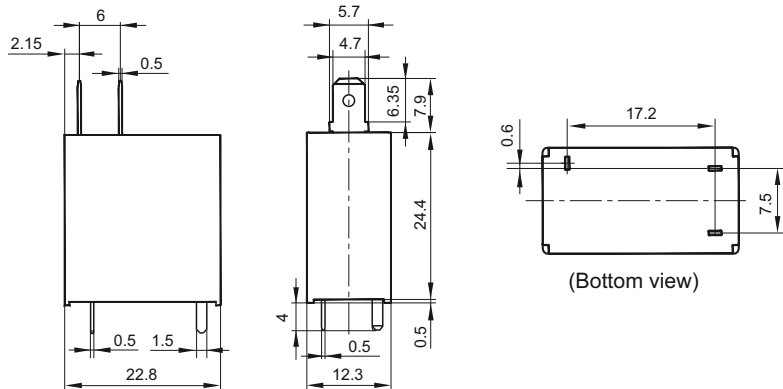
2) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

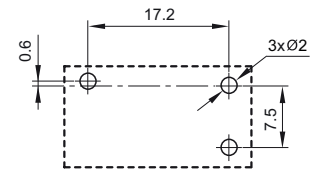
Unit: mm

Standard:

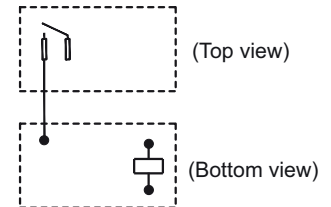
Outline Dimensions



PCB Layout (Bottom view)

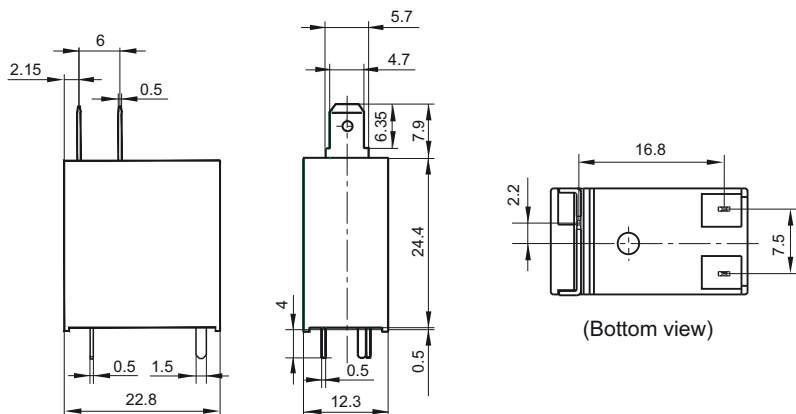


Wiring Diagram

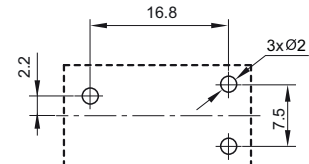


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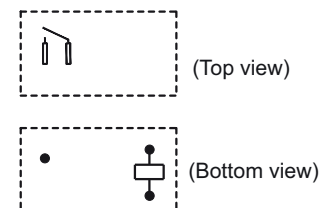
Outline Dimensions



PCB Layout (Bottom view)

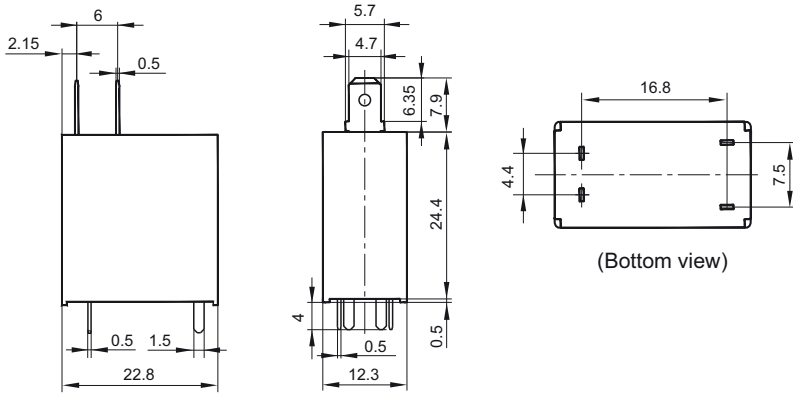


Wiring Diagram

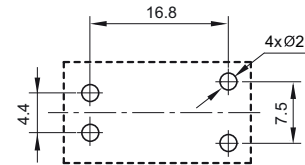


2 type:

**Outline Dimensions**



**PCB Layout (Bottom view)**



**Wiring Diagram**



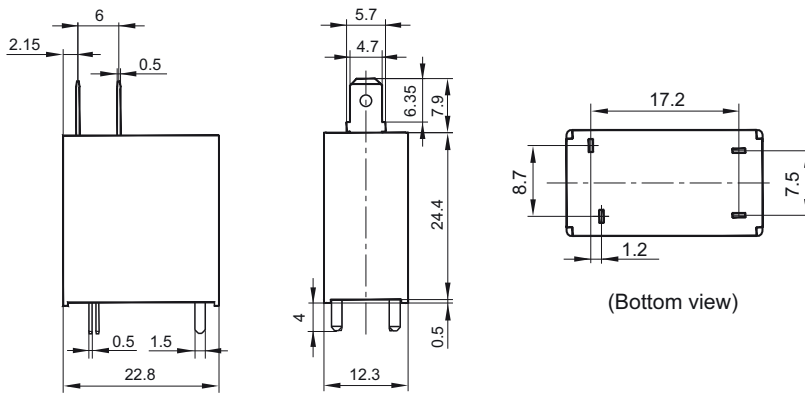
(Top view)



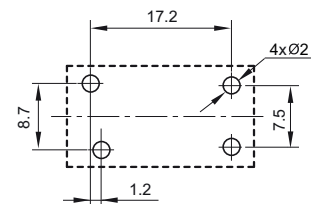
(Bottom view)

3 type:

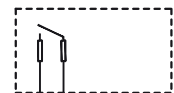
**Outline Dimensions**



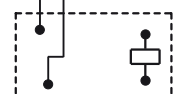
**PCB Layout (Bottom view)**



**Wiring Diagram**



(Top view)



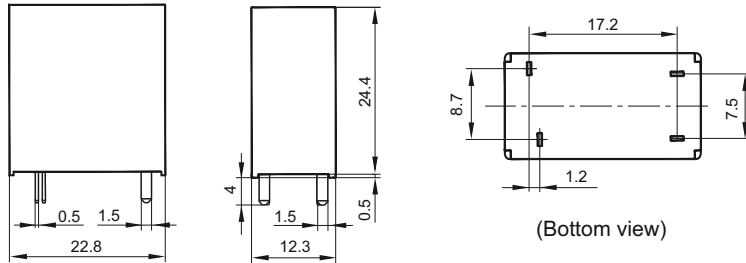
(Bottom view)

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

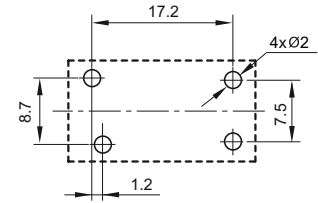
Unit: mm

4 type:

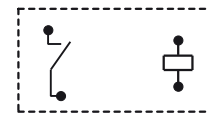
Outline Dimensions



PCB Layout (Bottom view)



Wiring Diagram

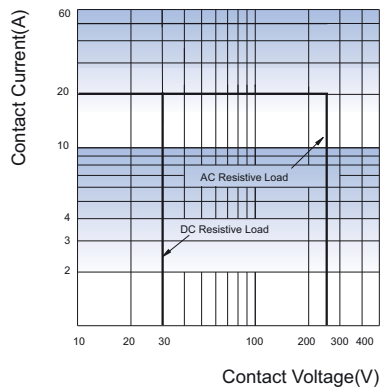


(Bottom view)

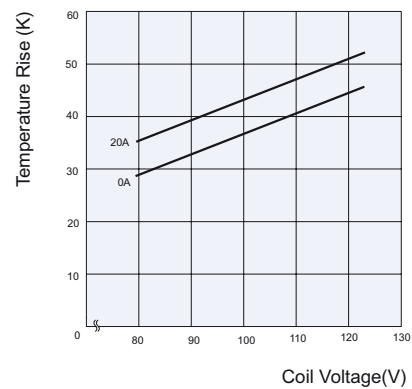
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should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

## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER



COIL TEMPERATURE RISE



### 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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# HF62F

# MINIATURE HIGH POWER RELAY



File No.:E133481



File No.:R50147086



File No.:CQC09002028470



## Features

- 20A switching capability
- 5kV dielectric strength (between coil and contacts)
- 10kV impulse withstand voltage (between coil and contacts)
- creepage distance: 8mm
- PCB & QC layouts available

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	50mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating (Res. load)	16A 250VAC 16A 30VDC
Max. switching voltage	277VAC / 30VDC
Max. switching current	20A
Max. switching power	4000VAC / 480W
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance	1 x 10 <sup>5</sup> OPS (16A 250VAC, Resistive load, Room temp., 1s on 1s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at rated. volt.)	20ms max.	
Release time (at rated. volt.)	10ms max.	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Termination	T type: PCB Standard: PCB & QC	
Unit weight	Approx.15g	
Construction	Flux proofed	

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

2) Please find coil temperature curve in the characteristic curves below.

3) UL insulation system: Class F, Class B.

## COIL

Coil power	Approx. 540mW
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## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	4.0	0.5	6.50	47 x (1±10%)
6	4.8	0.6	7.80	68 x (1±10%)
9	7.2	0.9	11.7	155 x (1±10%)
12	9.6	1.2	15.6	270 x (1±10%)
18	14.4	1.8	23.4	620 x (1±10%)
24	19.2	2.4	31.2	1100 x (1±10%)
48	38.4	4.8	62.4	4400 x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	16A 250VAC
	16A 30VDC
	20A 125VAC
TÜV	16A 250VAC COSØ =1
	16A 30VDC COSØ =1

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.02



## ORDERING INFORMATION

Type	HF62F / 012 -1H T F (XXX)		
Coil voltage	5, 6, 9, 12, 18, 24, 48VDC		
Contact arrangement	1H: 1 Form A		
Termination	T: PCB	Nil: PCB & QC	
Insulation Standard	F: Class F	Nil: Class B	
Special code <sup>1)</sup>	XXX: Customer special requirement	Nil: Standard	

Notes: 1) The customer special requirement express as special code after evaluating by Hongfa.

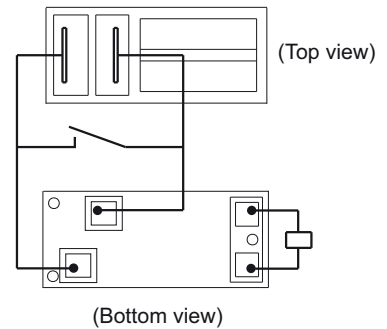
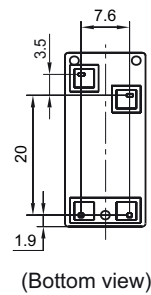
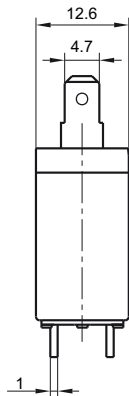
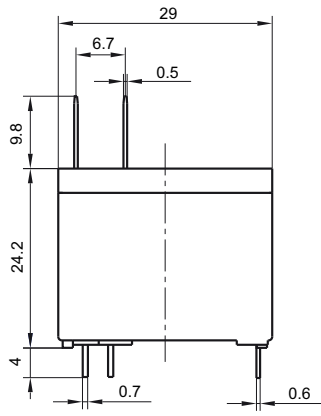
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

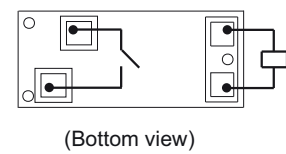
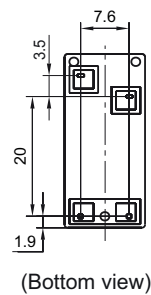
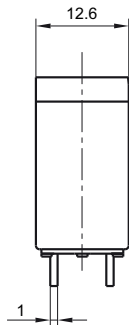
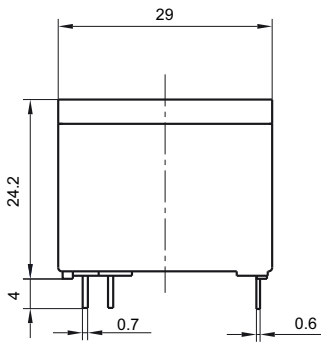
Outline Dimensions

Wiring Diagram

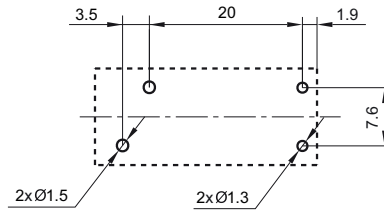
Standard



T type



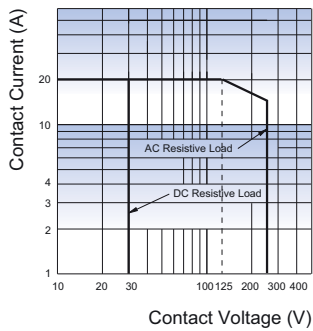
PCB Layout  
(Bottom view)



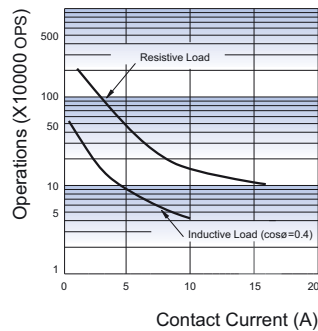
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
 2) The tolerance without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

CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER

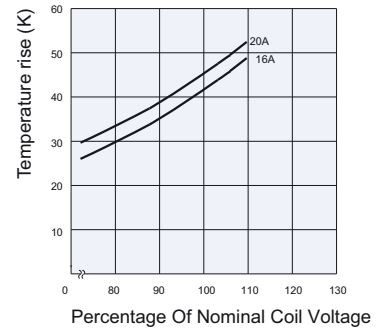


ENDURANCE CURVE



Test conditions:  
Room temp., 1s on 1s off

COIL TEMPERATURE RISE



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.

# HF102F

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:40024142



File No.:CQC13002098165



## Features

- 4.5kV dielectric strength (between coil and contacts)
- Heavy load up to 5000VA
- Ideal for motor switching
- PCB & QC layouts available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub> , AgCdO
Contact rating	Resistive: 20A 250VAC Motor: 2HP 240VAC
Max. switching voltage	250VAC
Max. switching current	Resistive: 25A
Max. switching power	6250VA
Mechanical endurance	2 x 10 <sup>6</sup> ops
Electrical endurance	1 x 10 <sup>5</sup> ops (20A 250VAC, Resistive load, at 85°C, 1.5s on 1.5s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4500VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at rated. volt.)	20ms max.	
Release time (at rated. volt.)	10ms max.	
Temperature rise (at rated. volt.)	60K max.	
Shock resistance	Functional	196m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Ambient temperature	-25°C to 85°C	
Humidity	5% to 85% RH	
Termination	HF102F: PCB & QC HF102F-P: PCB	
Unit weight	Approx. 23g	
Construction	Dust protected	

Notes: The data shown above are initial values.

## COIL

Coil power	Approx. 900mW
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## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.5	0.5	6.0	27.8 x (1±10%)
12	8.4	1.2	14.4	160 x (1±10%)
24	16.8	2.4	28.8	640 x (1±10%)
48	33.6	4.8	57.6	2560 x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	25A 250VAC
	20A 250VAC
	1HP 120VAC
	2HP 240VAC
VDE	25A 250VAC at 55°C
	20A 250VAC at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

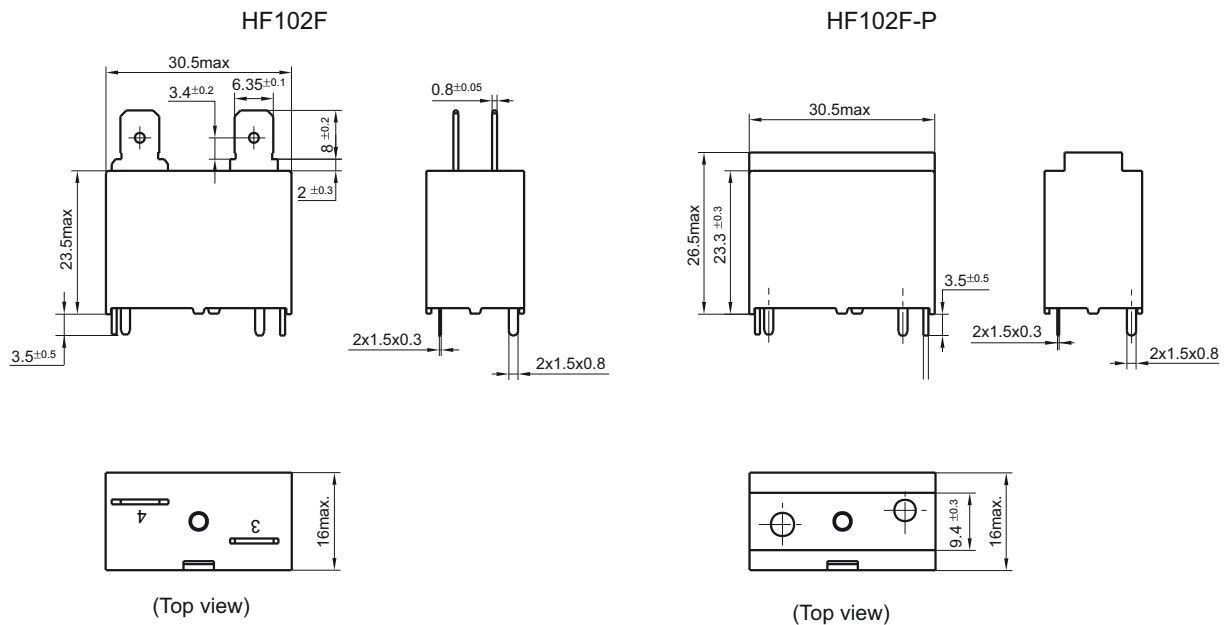
	<b>HF102F /</b>	<b>T</b>	<b>12VDC</b>	<b>(XXX)</b>
<b>Type</b>	HF102F-P: PCB HF102F: PCB & QC			
<b>Contact material</b>	<b>T:</b> AgSnO <sub>2</sub>	<b>Nil:</b> AgCdO		
<b>Coil voltage</b>	5, 12, 24, 48VDC			
<b>Special code<sup>2)</sup></b>	<b>XXX:</b> Customer special requirement	<b>Nil:</b> Standard		

**Notes:** 1) HF102F is dust protected version which cannot be washed.  
2) The customer special requirement express as special code after evaluating by Hongfa.

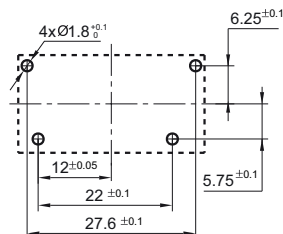
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

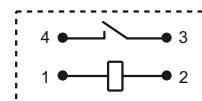
### Outline Dimensions



### PCB Layout (Bottom view)



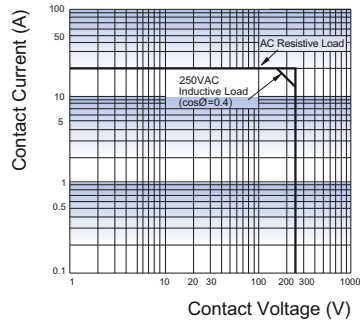
### Wiring Diagram



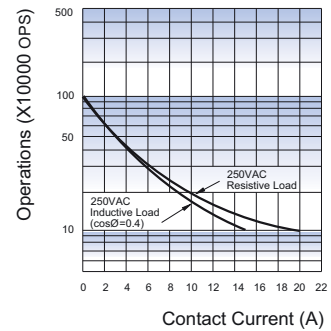
**Remark:** 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
2) The tolerance without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

## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER



ENDURANCE CURVE



**Test conditions:**

Room temp. 1s on 9s off

### Disclaimer

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# HF161F

# MINIATURE HIGH POWER RELAY



File No.: E134517



File No.: 40031410



File No.: CQC10002050943  
CQC18002203499



## Features

- 4.5kV dielectric strength (between coil and contacts)
- Heavy load up to 6250VA
- Ideal for motor switching
- PCB layouts available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub> , AgCdO
Contact rating	Resistive: 20A 250VAC Motor: 2HP 250VAC
Max. switching voltage	250VAC
Max. switching current	Resistive: 25A
Max. switching power	6250VA
Mechanical endurance	2 x 10 <sup>6</sup> OPS
Electrical endurance	HT type: 1 x 10 <sup>5</sup> OPS (20A 250VAC, Resistive load, Room temp., 1.5s on 1.5s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4500VAC 1min
	Between open contacts	1000VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2 / 50μs)	
Operate time (at rated. volt.)	20ms max.	
Release time (at rated. volt.)	10ms max.	
Temperature rise (at rated. volt.)	60K max.	
Shock resistance	Functional	196m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Ambient temperature	-40°C to 85°C	
Humidity	5% to 85% RH	
Termination	PCB	
Unit weight	Approx. 21g	
Construction	Flux proofed	

Notes: The data shown above are initial values.

## COIL

Coil power	Approx. 900mW
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## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC* <sup>2)</sup>	Coil Resistance Ω
5	3.5	0.5	6.0	27.8 x (1±10%)
12	8.4	1.2	14.4	160 x (1±10%)
24	16.8	2.4	28.8	640 x (1±10%)
48	33.6	4.8	57.6	2560 x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	25A 250VAC at 85°C
	20A 250VAC at 85°C
	2HP 250VAC at 85°C
VDE	25A 250VAC at 85°C
	20A 250VAC at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

Type	HF161F /	12	-H	T	(XXX)
Coil voltage	5, 12, 24, 48VDC				
Contact arrangement	H: 1 Form A				
Contact material	T: AgSnO <sub>2</sub>		Nil: AgCdO		
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard		

Notes: 1) Water cleaning or surface process is not suggested after the flux-proofed relays are assembled on PCB.

2) Flux-proofed relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.

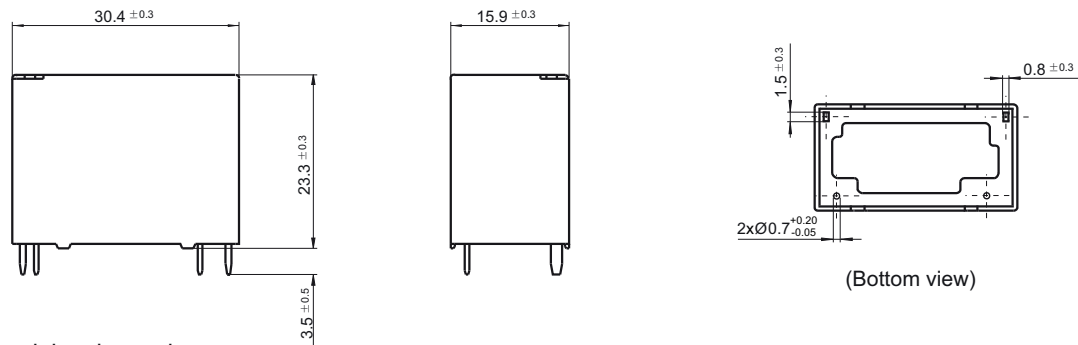
3) The customer special requirement express as special code after evaluating by Hongfa. e.g. (414) stands for product with coil terminal of 1.4X0.4.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

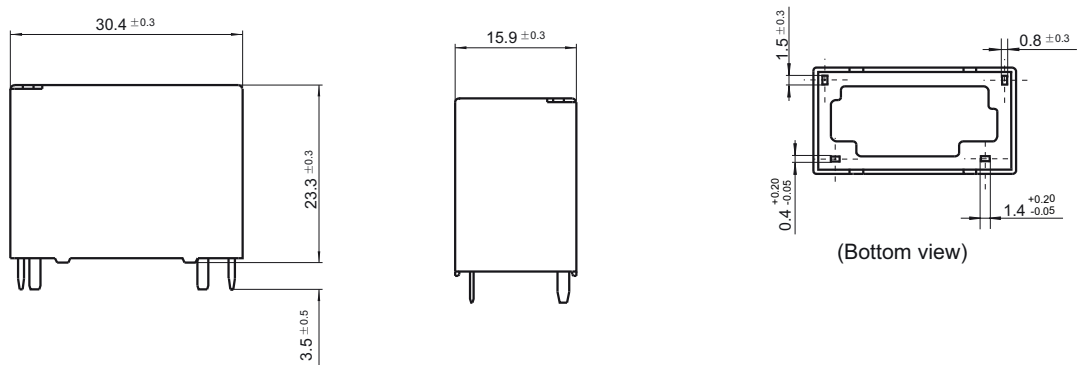
Unit: mm

### Outline Dimensions

Standard type

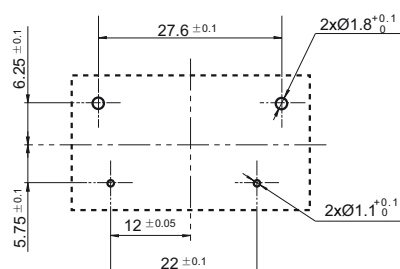


(414) special code version

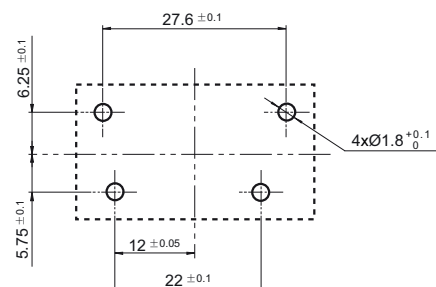


### PCB Layout (Bottom view)

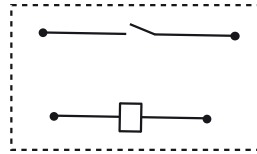
Standard type



(414) special code version



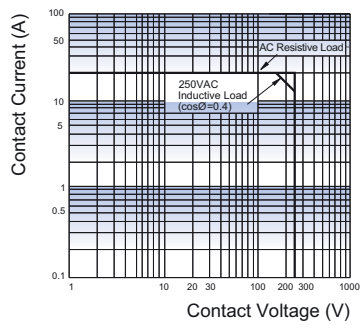
Wiring Diagram



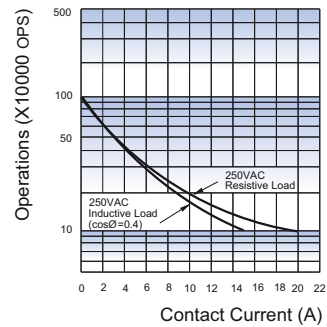
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be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

CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER



ENDURANCE CURVE



**Test conditions:**

Room temp., 1s on 9s off.

Disclaimer

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# HF161F-W

# SOLAR RELAY



File No.:E134517



File No.:40031410



File No.:CQC10002050943  
CQC18002203499



## Features

- 31A switching capacity
- Applicable to inverter used for photovoltaic power generation systems
- Ideal for UPS
- 1.5mm contact gap (compliant to European Photovoltaic Standard VDE0126)
- 1.8mm contact gap (compliant to IEC 62109-2-2011)
- The clearance distance between contact and coil is bigger than 6.4mm, the creepage distance is bigger than 8mm. (special code 477:7.5mm)
- Low coil holding voltage contributes to saving energy of equipment.
- UL insulation system: Class F

## CONTACT DATA

Contact gap	1.5mm	1.8mm
Contact arrangement	1A	
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)	
Contact material	AgSnO <sub>2</sub>	
Contact rating	Resistive: 26A 250VAC Inductive: 31A 250VAC (cosφ=0.8) 0.1s:10s	Resistive: 26A 250VAC Inductive: 33A 250VAC (cosφ=0.8) 0.1s:10s
Max. switching voltage	277VAC	
Max. switching current	31A	33A
Max. switching power	7750VA	8250VA
Mechanical endurance	1 x 10 <sup>6</sup> OPS	1 x 10 <sup>5</sup> OPS
Electrical endurance	HT type: 3 x 10 <sup>4</sup> ops (26A 250VAC, Resistive load, at 75°C, 1.5s on 1.5s off)	

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4500VAC 1min
	Between open contacts	2500VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2/50μs)	
Operate time (at rated. volt.)	20ms max.	
Release time (at rated. volt.)	10ms max.	
Temperature rise (at rated. volt.)	95K max. (Contact load current 31A, rated voltage excitation, at 60°C)	
	70K max. (Contact load current 31A, 80% of rated voltage excitation, at 85°C)	
Shock resistance	Functional	196m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Ambient temperature	-40°C to 85°C (Apply holding voltage to coil, which is 45% to 80% that of rated voltage)	
Humidity	5% to 85% RH	
Termination	PCB	
Unit weight	Approx. 21g	
Construction	Flux proofed	

Notes: The data shown above are initial values.

## COIL

Coil power	Approx. 1.4W
Holding voltage	35% to 120%U <sub>N</sub> (at 23°C)
	45% to 80%U <sub>N</sub> (at 85°C)

Notes: 1)The coil holding voltage is the voltage of coil after being applied rated voltage for 100ms  
2)The relay coil does not allow applied more than maximum of holding voltage values for a long time (Eg: 120% U<sub>N</sub> at 23°C; 80% U<sub>N</sub> at 85°C), prevent overheating burned.

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max.1)	Drop-out Voltage VDC min.1)	Max. Voltage VDC *2)	Coil Resistance Ω
9	6.3	0.9	10.8	58 x (1±10%)
12	8.4	1.2	14.4	103 x (1±10%)
18	12.6	1.8	21.6	230 x (1±10%)
24	16.8	2.4	28.8	410 x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	AgSnO <sub>2</sub>	26A 277VAC at 75°C
		22A 277VAC at 85°C
VDE	AgSnO <sub>2</sub>	26A 277VAC at 75°C
		22A 277VAC at 85°C
		31A 250VAC cosφ=0.8 0.1s:10s 33A 250VAC cosφ=0.8 0.1s:10s (477)

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

Type	HF161F-W /	12	-H	T	(XXX)
Coil voltage	9, 12, 18, 24VDC				
Contact arrangement	H: 1 Form A				
Contact material	T: AgSnO <sub>2</sub>				
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard		

Notes: 1) Water cleaning or surface process is not suggested after the flux-proofed relays are assembled on PCB.

2) Flux-proofed relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.

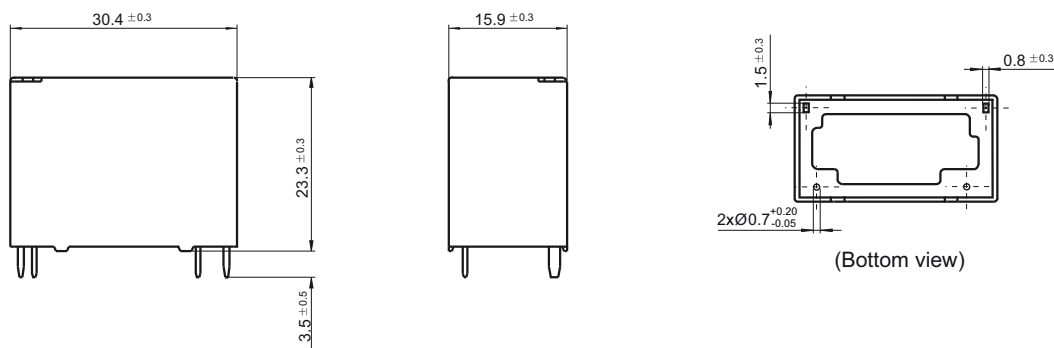
3) The customer special requirement express as special code after evaluating by Hongfa. e.g. (414) stands for product with coil terminal of 1.4X0.4; e.g. (477) stands for Contact gap: 1.8mm.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

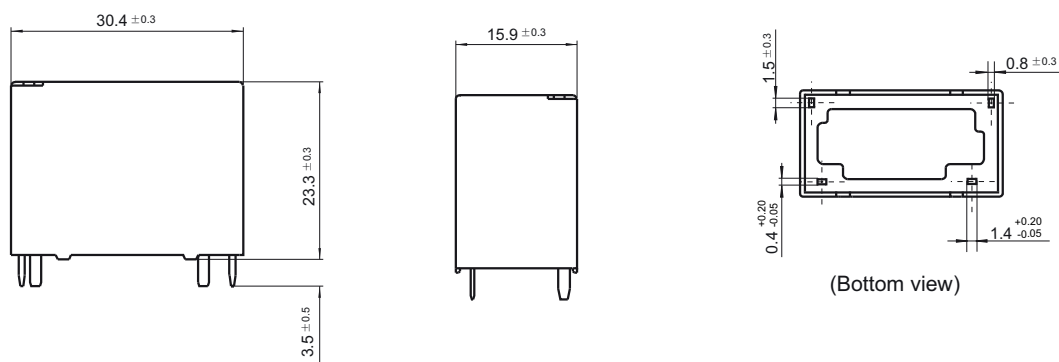
Unit: mm

### Outline Dimensions

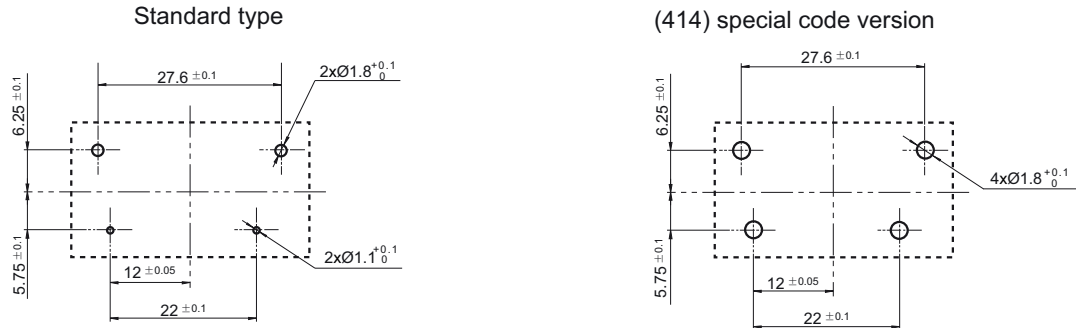
Standard type



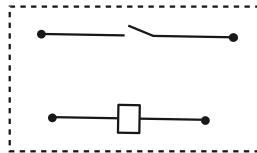
(414) special code version



**PCB Layout (Bottom view)**



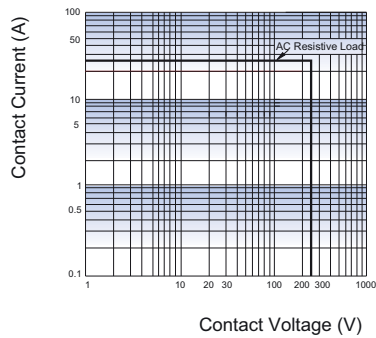
**Wiring Diagram**



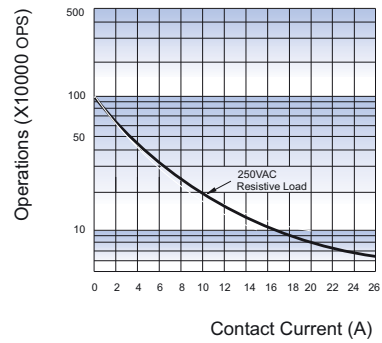
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be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

**CHARACTERISTIC CURVES**

**MAXIMUM SWITCHING POWER**



**ENDURANCE CURVE**



**Test conditions:**  
 at 75°C, 1.5s on 1.5s off.

**Disclaimer**

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# HF160F

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.: 40024142



File No.: CQC12002072207  
CQC18002206453



## Features

- 4.5kV dielectric strength (between coil and contacts)
- Heavy load up to 6250VA
- Ideal for motor switching
- PCB & QC layouts
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub> , AgCdO
Contact rating	Resistive: 20A 250VAC Motor: 2HP 240VAC
Max. switching voltage	Resistive: 250VAC
Max. switching current	25A
Max. switching power	6250VA
Mechanical endurance	2 x 10 <sup>6</sup> OPS
Electrical endurance	H, HT type: 1 x 10 <sup>5</sup> OPS (20A 250VAC, Resistive load, at 60°C, 1.5s on 1.5s off)

Notes: The data shown above are initial values.

## COIL

Coil power	Approx. 900mW
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## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max.1)	Drop-out Voltage VDC min.1)	Max. Voltage VDC *2)	Coil Resistance Ω
5	3.5	0.5	6.0	27.8 x (1±10%)
12	8.4	1.2	14.4	160 x (1±10%)
24	16.8	2.4	28.8	640 x (1±10%)
48	33.6	4.8	57.6	2560 x (1±10%)

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

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)
Dielectric strength	Between coil & contacts 4500VAC 1min
	Between open contacts 1000VAC 1min
Operate time (at rated. volt.)	20ms max.
Release time (at rated. volt.)	10ms max.
Temperature rise (at rated. volt.)	60K max.
Shock resistance	Functional 196m/s <sup>2</sup>
	Destructive 980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA
Ambient temperature	-40°C to 85°C
Humidity	5% to 85% RH
Termination	PCB & QC
Unit weight	Approx. 26g
Construction	Flux proofed

Notes: The data shown above are initial values.

## SAFETY APPROVAL RATINGS

UL/CUL	25A 277VAC
	20A 250VAC
	1HP 120VAC
	2HP 240VAC
VDE	25A 250VAC at 55°C
	20A 250VAC at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

Type	HF160F / 12 -H 5 T (XXX)		
Coil voltage	5, 12, 24, 48VDC		
Contact arrangement	H: 1 Form A		
Termination	5: PCB & QC		
Contact material	T: AgSnO <sub>2</sub>	Nil: AgCdO	
Special code <sup>3)</sup>	XXX: Customer special requirement	Nil: Standard	

Notes: 1) Water cleaning or surface process is not suggested after the flux-proofed relays are assembled on PCB.

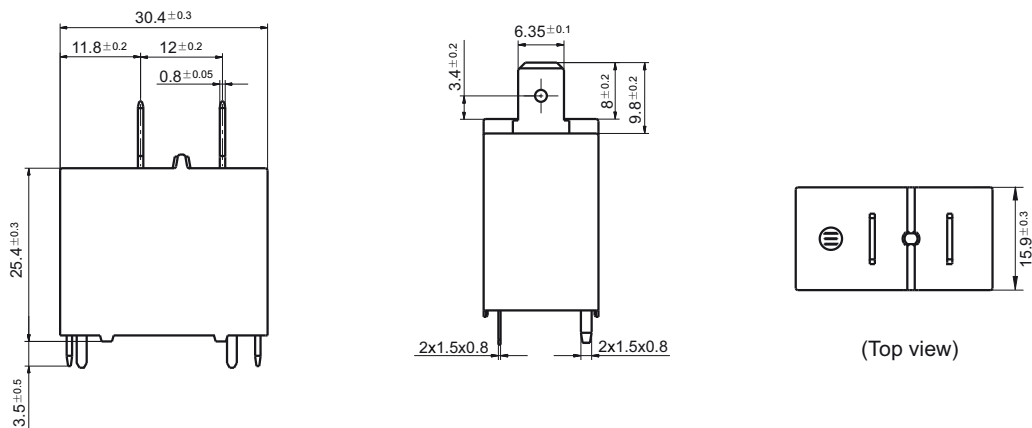
2) Flux-proofed relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.

3) The customer special requirement express as special code after evaluating by Hongfa.

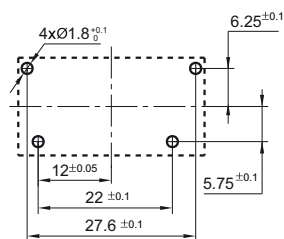
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

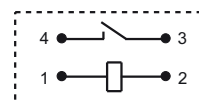
### Outline Dimensions



### PCB Layout (Bottom view)



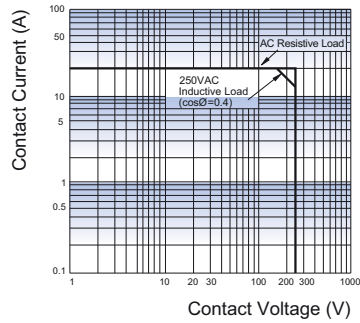
### Wiring Diagram



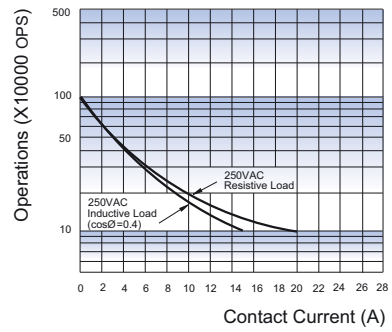
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
2) The tolerance without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

## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER



ENDURANCE CURVE



**Test conditions:**

Room temp., 1s on 9s off.

**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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# HF166F

# MINIATURE HIGH POWER LATCHING RELAY



File No.:E133481



File No.:R50280244



## Features

- Latching relay
- 4mm contact gap available
- 25A switching capability
- 5kV dielectric strength(between coil and contacts)
- Creepage distance between coil and contacts:10mm
- Product in accordance to IEC 60335-1 available
- UL insulation system: Class F
- 1A + 1B configuration for power switching
- Flux proofed type available

## CONTACT DATA

Contact arrangement	1A+1B
contact gap	4mm min.
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating (Res. load)	25A 277VAC
Max. switching voltage	277VAC
Max. switching current	25A
Max. switching power	6925VA
Mechanical endurance	6 x 10 <sup>5</sup> OPS
Electrical endurance	3 x 10 <sup>4</sup> OPS ( NO or NC, 25A 277VAC, Resistive load, at 85°C, 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	2000VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2/50μs)	
Set time (at rated. volt.)	25ms max.	
Reset time (at rated. volt.)	25ms max.	
Shock resistance	Functional	100m/s <sup>2</sup>
	Destructive	1000m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 2mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 45g	
Construction	Flux proofed	

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

## COIL

Coil power	1 coil latching: 1.2W 2 coils latching: 2.4W
------------	---

## COIL DATA

at 23°C

### 1 coil latching

Nominal Voltage VDC	Set Voltage VDC max. <sup>1)</sup>	Pulse width (ms) min. <sup>1)</sup>	Reset Voltage VDC max. <sup>1)</sup>	Coil Resistance Ω
5	4	150	4	20.8x (1±10%)
6	4.8	150	4.8	30x (1±10%)
12	9.6	150	9.6	120x (1±10%)
24	19.2	150	19.2	480x (1±10%)
48	38.4	150	38.4	1920x (1±10%)

### 2 coils latching

Nominal Voltage VDC	Set Voltage VDC max. <sup>1)</sup>	Pulse width (ms) min. <sup>1)</sup>	Reset Voltage VDC max. <sup>1)</sup>	Coil Resistance Ω
5	4	150	4	10.4x (1±10%)
6	4.8	150	4.8	15x (1±10%)
12	9.6	150	9.6	60x (1±10%)
24	19.2	150	19.2	240x (1±10%)
48	38.4	150	38.4	960x (1±10%)

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

## SAFETY APPROVAL RATINGS

UL/CUL	25A 277VAC/250VAC/125VAC at 85°C 25A 60VDC at 85°C 0.5A 240VDC at 85°C
TÜV	25A 400VDC, at 85°C, ON:5S, OFF:5S, Contacts break without load 70A 72VDC, at 85°C, ON:0.3S, OFF:9S, Contacts break without load NO:25A 277VAC/250VAC/125VAC at 85°C 25A 60VDC at 85°C 0.5A 240VDC at 85°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

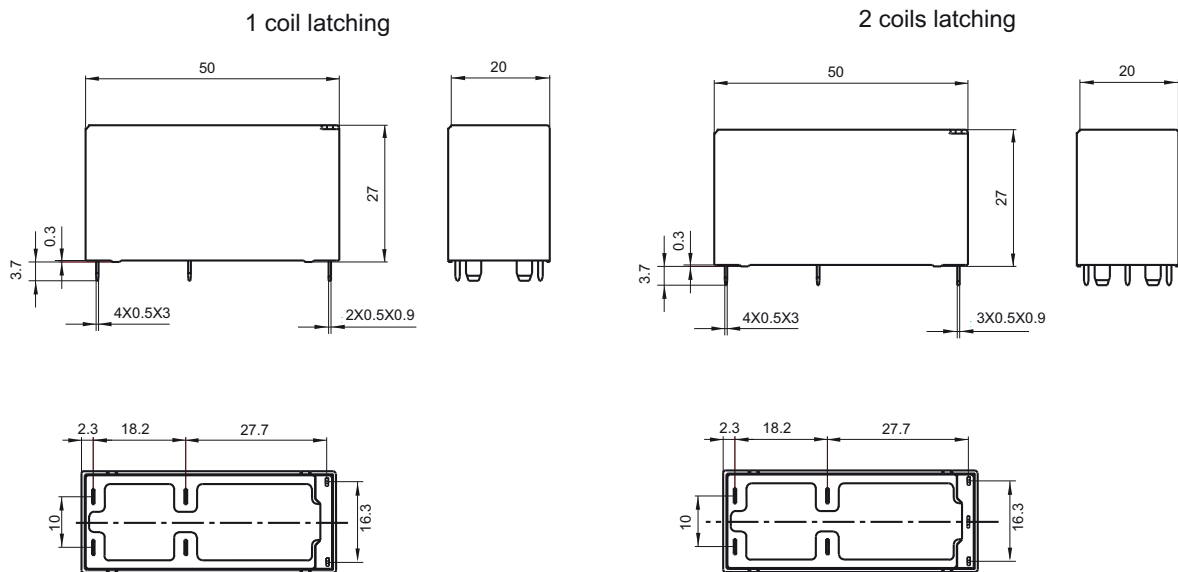
Type	HF166F /	12	-1HD	L2	T	(XXX)
Coil voltage	5, 6, 12, 24, 48VDC					
Contact arrangement	1HD: 1A + 1B					
Sort	L1: 1 coil latching		L2: 2 coils latching			
Contact material	T: AgSnO <sub>2</sub>					
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard			

- Notes: 1) Flux-proofed relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.  
 2) Water cleaning or surface process is not suggested after the flux-proofed relays are assembled on PCB.  
 3) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

### Outline Dimensions

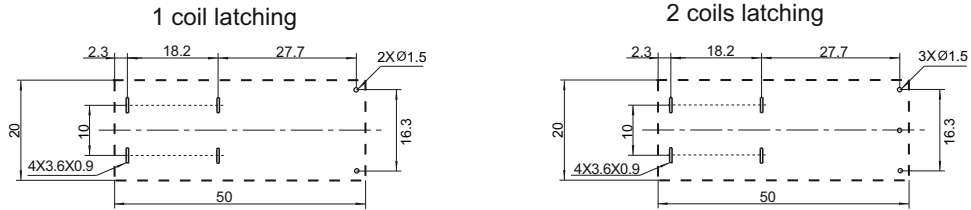


### Wiring Diagram(Bottom view)





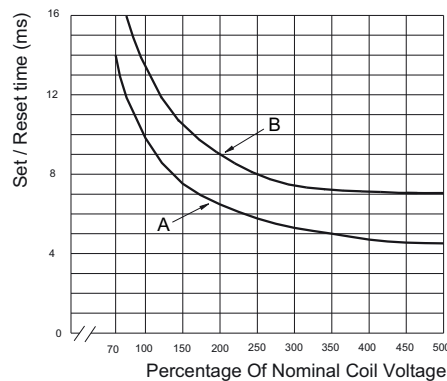
PCB Layout  
(Bottom view)



- Remark: 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  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .  
 3) The width of the gridding is 2.52mm.

CHARACTERISTIC CURVES

SET \ RESET TIME AND VOLTAGE CURVE



- Notes:**  
 Curve B: max value  
 Curve A: typical value

**Notice**

- Relay is on the "reset" or "set" status when being released from stock, with the consideration of shock risen from transit and relay mounting, relay would be changed to "set" or "reset" status, therefore, when application ( connecting the power supply), please reset the relay to "set" or "reset" status on request.
- In order to maintain "set" or "reset" status, energized voltage to coil should reach the rated voltage, impulse width should be more than 150 ms. Do not energize voltage to "set" coil and "reset" coil simultaneously. And also long energized time (more than 1 min) should be avoided.
- Keep the product away from strong magnetic field during transportation, storage and application, to avoid change of set/reset voltage.

**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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# HF37F

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:40025378



File No.:CQC13002102287



## Features

- 30A switching capability
- 70A withstands inrush current
- TV-15 (at 120VAC) available
- 1 Form A configuration

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub> , AgCdO
Contact rating (Res. load)	30A 250VAC
Max. switching voltage	277VAC
Max. switching current	30A
Max. switching power	7500VA
Mechanical endurance	5 x 10 <sup>6</sup> OPS
Electrical endurance	1HT, 1H type: 6 x 10 <sup>3</sup> OPS (30A 250VAC, Resistive load, at 40°C, 1s on 9s off) 1H type: 5 x 10 <sup>4</sup> OPS (23A cosφ=1 250VAC, Resistive load, at 70°C, 1.5s on 1.5s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1200VAC 1min
Operate time (at rated. volt.)	20ms max.	
Release time (at rated. volt.)	5ms max.	
Shock resistance	Functional	196m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Ambient temperature	-40°C to 70°C	
Humidity	5% to 85% RH	
Termination	QC	
Unit weight	Approx. 55g	
Construction	Dust protected	

- Notes: 1) The data shown above are initial values.  
2) Please find coil temperature curve in the characteristic curves below.  
3) UL insulation system: Class A

## COIL

Coil power	Approx. 1.2W
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## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max.1)	Drop-out Voltage VDC min.1)	Max. Voltage VDC *2)	Coil Resistance Ω
5	3.50	0.50	6.0	20.8 x (1±10%)
6	4.20	0.60	7.2	30 x (1±10%)
9	6.30	0.90	10.8	67.5 x (1±10%)
12	8.40	1.20	14.4	120 x (1±10%)
24	16.8	2.40	28.8	480 x (1±10%)
48	33.6	4.80	57.6	1920 x (1±10%)
60	42.0	6.00	72.0	3000 x (1±10%)

- Notes: 1) The data shown above are initial values.  
2)\*Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## SAFETY APPROVAL RATINGS

UL/CUL	AgSnO <sub>2</sub>	30A 250VAC 2HP 125VAC/250VAC TV-15 120VAC
	AgCdO	30A 250VAC 2HP 125VAC/250VAC TV-15 120VAC
VDE	AgCdO	23A 250VAC at 70°C

- Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

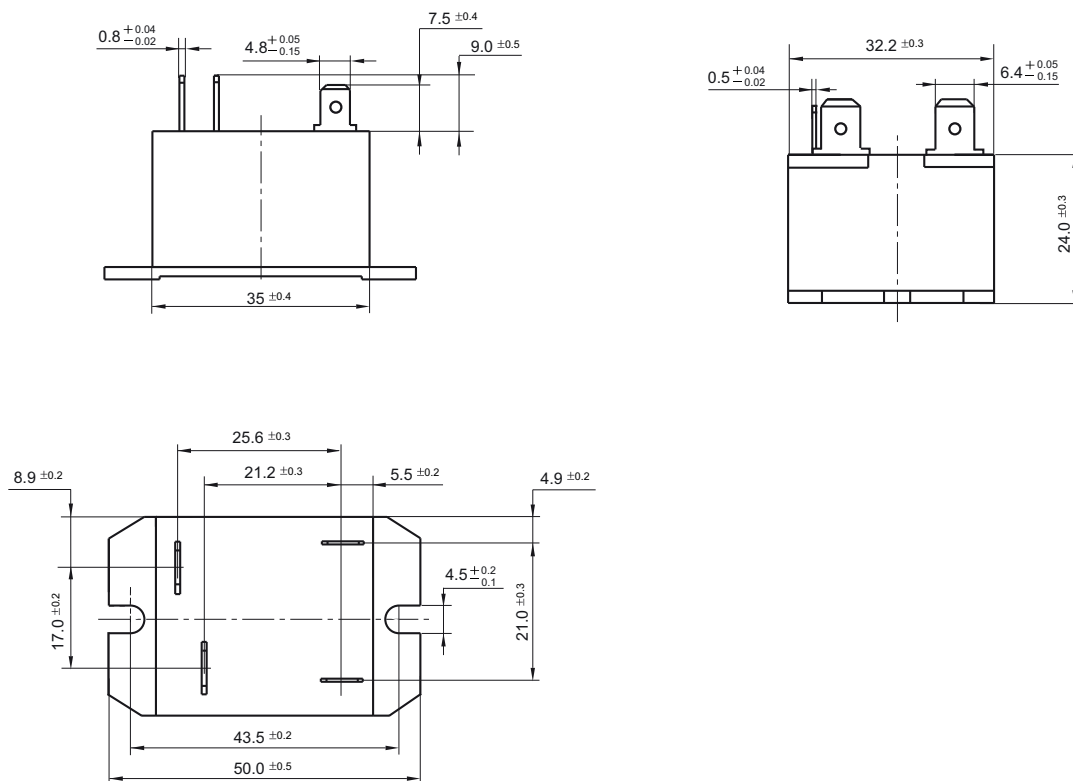
Type	HF37F / 012 -1H T (XXX)		
Coil voltage	5, 6, 9, 12, 24, 48, 60VDC		
Contact arrangement	1H: 1 Form A		
Contact material	T: AgSnO <sub>2</sub> Nil: AgCdO		
Special code <sup>2)</sup>	XXX: Customer special requirement	Nil: Standard	

Notes: 1) The terminal for HF37F is QC type. Please don't weld directly on terminal.  
 2) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

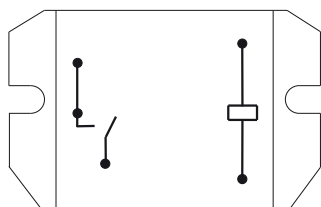
### Outline Dimensions



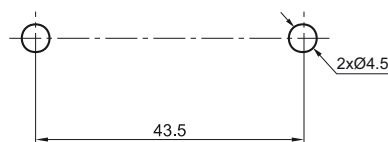
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

Wiring Diagram (Top view)



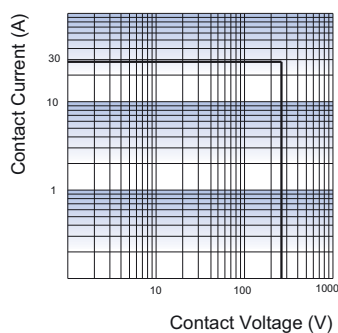
Mounting holes



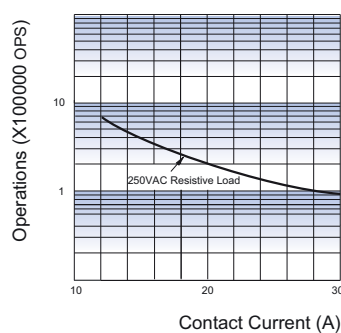
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be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

## CHARACTERISTIC CURVES

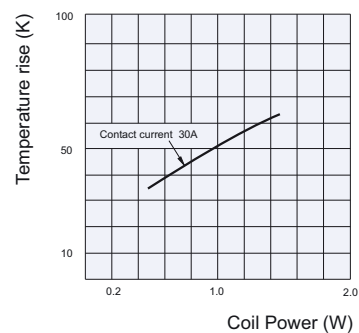
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Notes:**

- 1) Curve: 1HT type (or 1H type)
- 2) Test conditions: at  $70^{\circ}\text{C}$ , 1s on 9s off.

**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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# HF165FD

# MINIATURE HIGH POWER RELAY



File No.: E134517



File No.: 40043143



File No.: CQC15002130956  
CQC18002199524



## Features

- 30A switching capability
- Breakdown voltage (between contact and coil): 4kV
- Creepage distance: 5.5mm(high voltage)
- Plastic sealed and flux proofed types available
- Product in accordance to IEC 60335-1 available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A	1B	1C	
Contact resistance <sup>1)</sup>	100mΩ max. (at 1A 6VDC)			
Contact material	AgSnO <sub>2</sub>			
Contact rating (Res. load)	30A 277VAC	15A 277VAC	20A 277VAC	10A 277VAC
Max. switching voltage	277VAC			
Max. switching current	30A	30A	30A	15A
Max. switching power	8310VA	8310VA	8310VA	4155VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS			
Electrical endurance <sup>2)</sup>	1 x 10 <sup>5</sup> OPS (NO: 30A 277VAC, Resistive load, Room temp., 1s on 9s off)			

Notes: 1) The data shown above are initial values.  
2) For plastic sealed type, the venting-hole should be opened in electrical endurance test.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between open contacts	1500VAC 1min
	Between coil & contacts	2500VAC 1min(Standard) 4000VAC 1min(V Type)
Surge voltage	6kV (1.2/50μs)	
Operate time (at rated. volt.)	15ms max.	
Release time (at rated. volt.)	10ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 25g	
Construction	Plastic sealed Flux proofed	

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

## COIL

Coil power Approx. 900mW

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max <sup>1)</sup>	Drop-out Voltage VDC min <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.75	0.5	6.5	27 x (1±10%)
6	4.50	0.6	7.8	40 x (1±10%)
9	6.75	0.9	11.7	97 x (1±10%)
12	9.00	1.2	15.6	155 x (1±10%)
15	11.25	1.5	19.5	256 x (1±10%)
18	13.50	1.8	23.4	380 x (1±10%)
24	18.00	2.4	31.2	660 x (1±10%)
48 <sup>3)</sup>	36.00	4.8	62.4	2560 x (1±10%)
70 <sup>3)</sup>	52.50	7.0	91.0	5500 x (1±10%)
110 <sup>3)</sup>	82.50	11.0	143.0	13450 x (1±10%)

Notes: 1) The data shown above are initial values.  
2) Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.  
3) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).

## SAFETY APPROVAL RATINGS

UL/CUL	NO	30A 277VAC at 85°C 20A 277VAC at 105°C 2HP 240VAC/1HP 120VAC at 40°C 96LRA 30FLA 277VAC at 40°C TV-8 125VAC at 40°C
		NC
VDE	NO	30A 250VAC at 60°C 20A 250VAC at 85°C
	NC	15A 250VAC at 85°C
	CO	20A/10A 250VAC at 85°C

Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001、ISO/TS16949、ISO14001、OHSAS18001、IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

<b>HF165FD</b>		<b>/12</b>	<b>-H</b>	<b>Y1</b>	<b>S</b>	<b>T</b>	<b>F</b>	<b>V</b>	<b>(XXX)</b>
<b>Type</b>									
<b>Coil voltage</b>	5, 6, 9, 12, 15, 18, 24, 48, 70, 110								
<b>Contact arrangement</b>	H: 1 Form A D: 1 Form B Z: 1 Form C								
<b>Termination</b>	Y1: Without Pin NO.6			Y2: With Pin NO.6					
<b>Construction<sup>1)</sup></b>	S: Plastic sealed				Nil: Flux proofed				
<b>Contact material</b>	T: AgSnO <sub>2</sub>								
<b>Insulation standard</b>	F: Class F								
<b>Dielectric strength standard</b>	Nil: Standard product(2500VAC Between coil & contacts) V : High Dielectric strength(Only for Y1 Termination) (4000VAC Between coil & contacts)								
<b>Special code<sup>2)</sup></b>	XXX: Customer special requirement				Nil: Standard				

**Notes:** 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).  
2) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

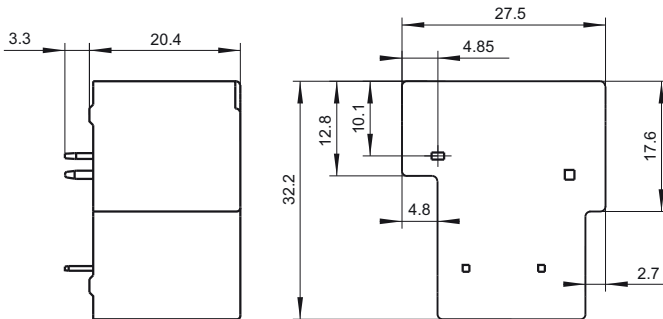
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

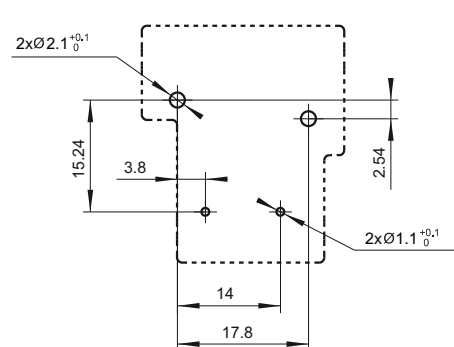
Outline Dimensions

PCB Layout (Bottom view)

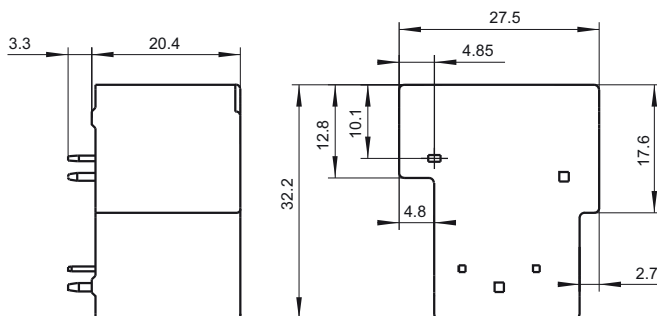
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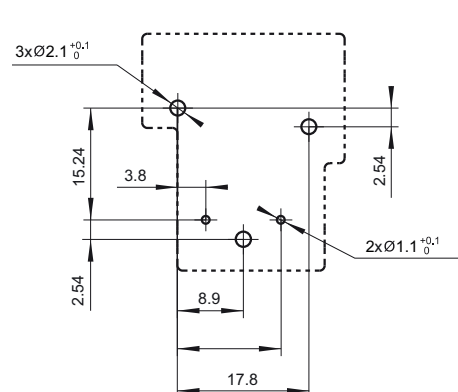
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HF165FD/□□-HY2□□□□



HF165FD/□□-HY2□□□□

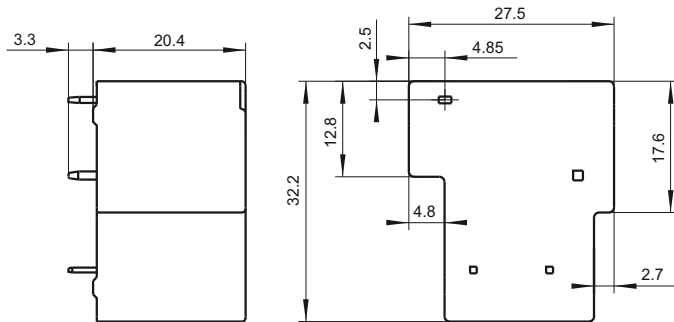


# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

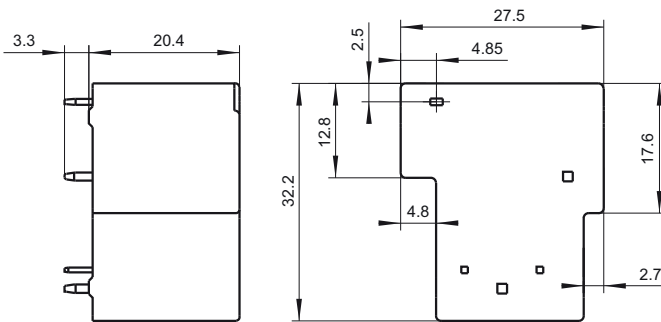
Unit: mm

## Outline Dimensions

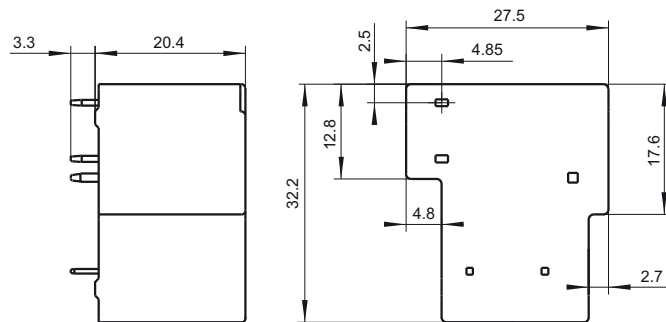
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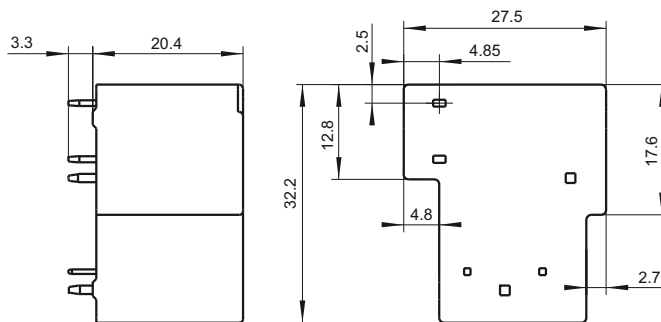
HF165FD/□□-DY2□□□□



HF165FD/□□-ZY1□□□□

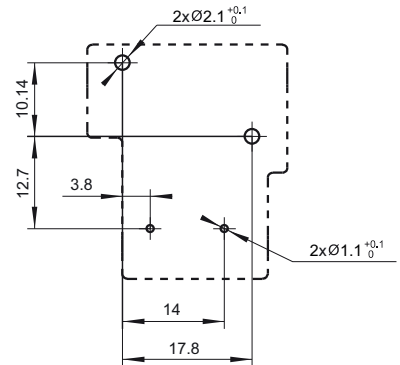


HF165FD/□□-ZY2□□□□

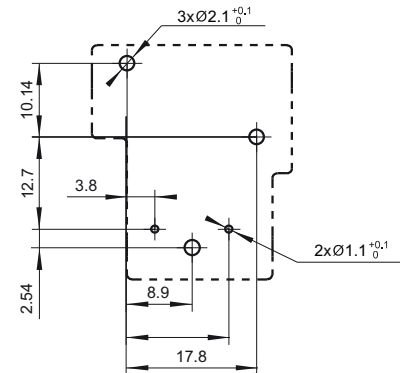


## PCB Layout (Bottom view)

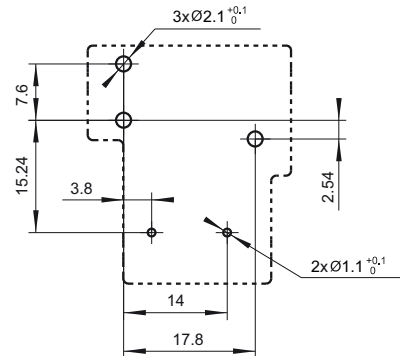
HF165FD/□□-DY1□□□□



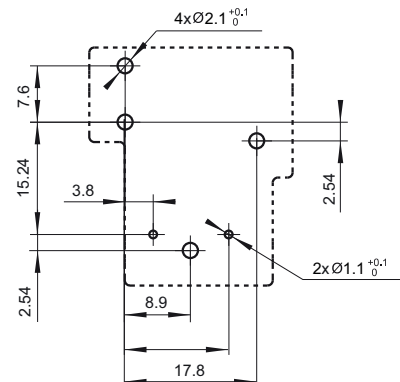
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HF165FD/□□-ZY1□□□□

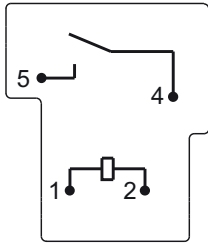


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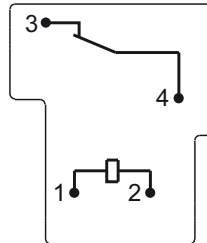


**Wiring Diagram (Bottom view)**

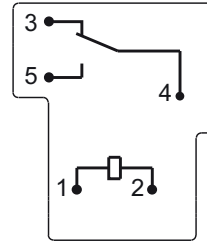
HF165FD/□□-HY1□□□□



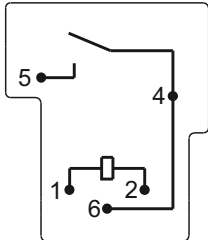
HF165FD/□□-DY1□□□□



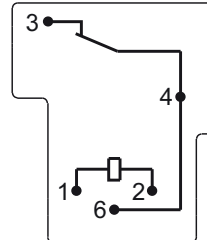
HF165FD/□□-ZY1□□□□



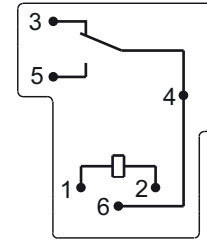
HF165FD/□□-HY2□□□□



HF165FD/□□-DY2□□□□



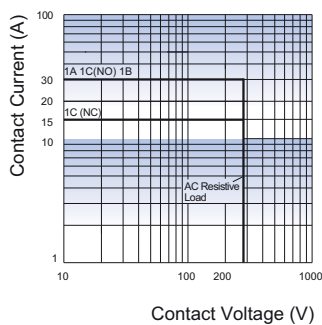
HF165FD/□□-ZY2□□□□



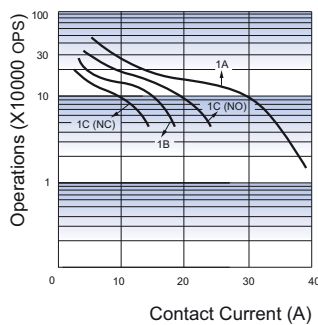
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .  
 3) The width of the gridding is 2.5mm.

**CHARACTERISTIC CURVES**

**MAXIMUM SWITCHING POWER**

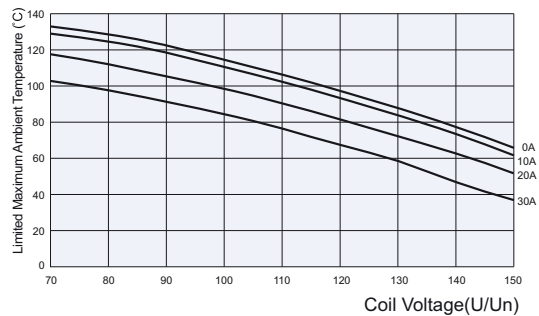


**ENDURANCE CURVE**



**Test conditions:**  
 Flux proofed, Room temp.,  
 1s on 9s off.

**COIL OPERATING RANGE (AC)**



**Disclaimer**

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# HF165FD-G

# MINIATURE HIGH POWER RELAY



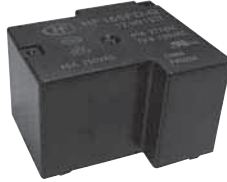
File No.: E134517



File No.: 40043143



File No.: CQC15002130956  
CQC18002199524



## Features

- 40A switching capability
- Breakdown voltage (between contact and coil): 4kV
- Creepage distance: 5.5mm(high voltage)
- Plastic sealed and flux proofed types available
- Product in accordance to IEC 60335-1 available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	100mΩ max. (at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating (Res. load)	40A 277VAC
Max. switching voltage	277VAC
Max. switching current	40A
Max. continuous current <sup>2)</sup>	30A
Max. switching power	11080VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS
Electrical endurance <sup>3)</sup>	1 x 10 <sup>4</sup> OPS (NO: 40A 277VAC, Resistive load, Room temp., 1s on 9s off, Flux proofed)

**Notes:** 1) The data shown above are initial values.  
2) Long time current-carrying under 40A condition is prohibited.  
3) For plastic sealed type, the venting-hole should be opened in electrical endurance test.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)
Dielectric strength	Between open contacts 1500VAC 1min
	Between coil & contacts 2500VAC 1min(Standard) 4000VAC 1min(V Type)
Surge voltage	6kV (1.2/50μs)
Operate time (at nomi. volt.)	15ms max.
Release time (at nomi. volt.)	10ms max.
Shock resistance	Functional 98m/s <sup>2</sup>
	Destructive 980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA
Humidity	5% to 85% RH
Ambient temperature	-40℃ to 85℃
Termination	PCB
Unit weight	Approx. 25g
Construction	Plastic sealed
	Flux proofed

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

## COIL

Coil power Approx. 900mW

## COIL DATA

at 23℃

Nominal Voltage VDC	Pick-up Voltage VDC max <sup>1)</sup>	Drop-out Voltage VDC min <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.75	0.5	6.5	27 x (1±10%)
6	4.50	0.6	7.8	40 x (1±10%)
9	6.75	0.9	11.7	97 x (1±10%)
12	9.00	1.2	15.6	155 x (1±10%)
15	11.25	1.5	19.5	256 x (1±10%)
18	13.50	1.8	23.4	380 x (1±10%)
24	18.00	2.4	31.2	660 x (1±10%)
48 <sup>3)</sup>	36.00	4.8	62.4	2560 x (1±10%)
70 <sup>3)</sup>	52.50	7.0	91.0	5500 x (1±10%)
110 <sup>3)</sup>	82.50	11.0	143.0	13450 x (1±10%)

**Notes:** 1) The data shown above are initial values.  
2) Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.  
3) For products with rated voltage ≥ 48V, measures should be taken to prevent coil overvoltage in order to protect coil in test and application (eg. Connect diodes in parallel).

## SAFETY APPROVAL RATINGS

UL/CUL	NO	40A 277VAC 40℃
		30A 277VAC 85℃
VDE	NO	2HP 240VAC/1HP 120VAC 40℃
		96LRA, 30FLA 40℃
		TV-8 125VAC 40℃
		40A 250VAC

**Notes:** 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001、ISO/TS16949、ISO14001、OHSAS18001、IECQC QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

Type	HF165FD-G /12 -H Y1 S T F V (XXX)						
Coil voltage	5, 6, 9, 12, 15, 18, 24, 48, 70, 110						
Contact arrangement	H: 1 Form A						
Termination	Y1: Without Pin NO.6		Y2: With Pin NO.6				
Construction <sup>1)</sup>	S: Plastic sealed			Nil: Flux proofed			
Contact material	T: AgSnO <sub>2</sub>						
Insulation standard	F: Class F						
Dielectric strength standard	Nil: Standard product(2500VAC Between coil & contacts)						
	V : High Dielectric strength(Only for Y1 Termination) (4000VAC Between coil & contacts)						
Special code <sup>2)</sup>	XXX: Customer special requirement			Nil: Standard			

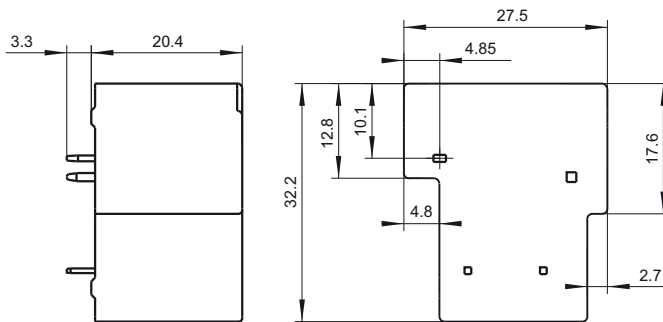
Notes: 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).  
2) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PCB BOARD LAYOUT

Unit: mm

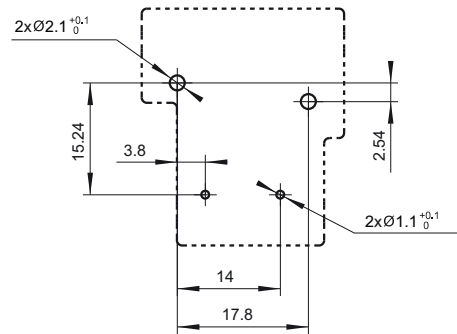
### Outline Dimensions

HF165FD-G/□□-HY1□□□□

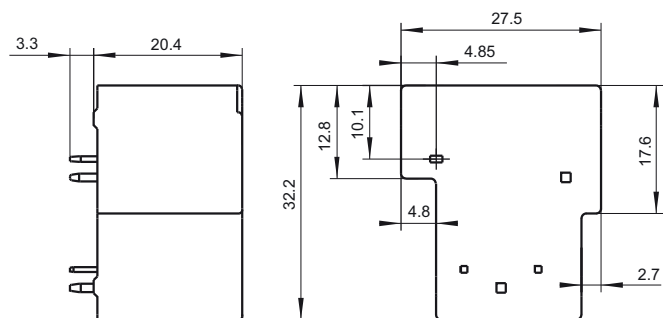


### PCB Layout (Bottom view)

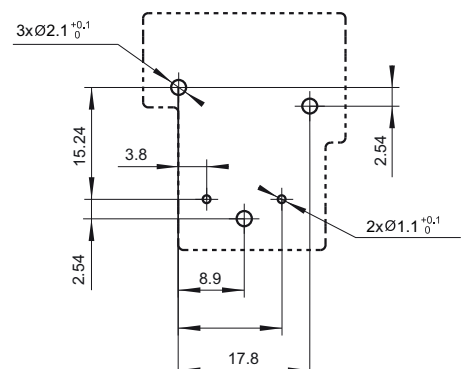
HF165FD-G/□□-HY1□□□□



HF165FD-G/□□-HY2□□□□

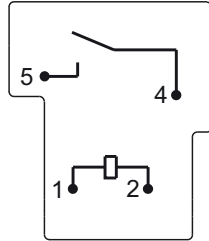


HF165FD-G/□□-HY2□□□□

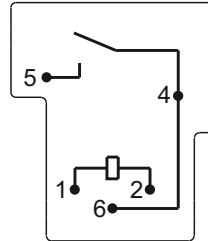


Wiring Diagram (Bottom view)

HF165FD-G/□□-HY1□□□□



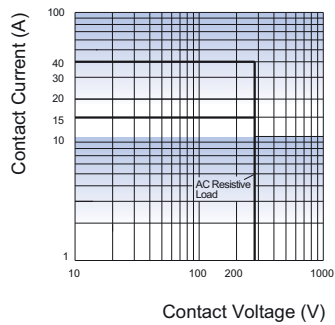
HF165FD-G/□□-HY2□□□□



- Remark: 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  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .  
 2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .  
 3) The width of the gridding is 2.5mm.

**CHARACTERISTIC CURVES**

MAXIMUM SWITCHING POWER



**Disclaimer**

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# HF165F

# SOLAR RELAY



File No:E134517



File No:40037289



File No: CQC18002189685  
CQC18002202621



## Features

- 35A switching capitable.
- Applicable to inverter used for photovoltaic power generation systems.
- Ideal for UPS.
- 1.8mm contact gap(compliant to European Photovoltaic Standard VDE0126).
- Product in accordance to IEC 60335 available.
- Low coil holding voltage contributes to saving energy of equipment.
- UL insulation system: class F.

## CONTACT DATA

Contact arrangement	1A
Voltage drop	Typ.: 15mV(at 10A) Max.: 100mV(at 10A)
Contact material	AgSnO <sub>2</sub>
Contact rating (Res. load)	Resistive: 35A 250VAC Inductive: 35A 277VAC (cosφ=0.8) 1s:9s
Max. switching voltage	277VAC
Max. switching current <sup>1)</sup>	35A
Max. switching power	9695VA
Mechanical endurance	1 x 10 <sup>6</sup> OPS
Electrical endurance	3 x 10 <sup>4</sup> OPS (35A 250VAC, Resistive load, at 85°C, 1s on 9s off)

**Notes:** 1)The relay connections and wiring have to be designed with an adequate cross sections to ensure the current flow and heat dissipation.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)
Dielectric strength	Between coil & contacts 4000VAC 1min
	Between open contacts 2500VAC 1min
Surge voltage (between coil & contacts)	6kV (1.2/50μs)
Operate time (at rated. volt.)	15ms max.
Release time (at rated. volt.)	10ms max.
Temperature rise (at rated. volt.)	70K max.(Contact load current 35A, 50% of rated voltage excitation, at 85°C)
Shock resistance	Functional 98m/s <sup>2</sup>
	Destructive 980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA
Ambient temperature	-40°C to 85°C (Apply holding voltage to coil)
Humidity	5% to 85% RH
Termination	PCB
Unit weight	Approx.36g
Construction	Flux proofed

**Notes:** The data shown above are initial values.

## COIL

Coil power	Approx.2.25W
Holding voltage	40% to 110%U <sub>N</sub> (at 23°C) 50% to 70%U <sub>N</sub> (at 85°C)

**Notes:** 1)The coil holding voltage is the voltage applied to coil 100ms after the rated voltage.  
2)To avoid overheating and burning, the coil can not be consistently applied to with voltage larger than maximum holding voltage.

## COIL DATA

at 23°C

Nominal Voltage VDC <sup>1)</sup>	Pick-up Voltage VDC max <sup>1)</sup>	Drop-out Voltage VDC min <sup>1)</sup>	Max. Voltage VDC *2)	Coil Resistance Ω
5	3.75	0.35	5.5	11.1 x (1±10%)
12	9	0.84	13.2	64 x (1±10%)
24	18	1.68	26.4	256 x (1±10%)
48	36	3.36	52.8	1024 x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	35A 277VAC/250VAC general use 3 x 10 <sup>4</sup> OPS at 85°C
VDE	35A 250VAC 3 x 10 <sup>4</sup> OPS at 85°C
CQC	40A 277VAC/250VAC 60°C

**Notes:** 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001、ISO/TS16949、ISO14001、OHSAS18001、IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

Type	HF165F /	12	-H	T	(XXX)
Coil voltage	5, 12, 24, 48VDC				
Contact arrangement	H:1 Form A				
Contact material	T: AgSnO <sub>2</sub>				
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard		

Notes: 1) Water cleaning or surface process is not suggested after the flux-proofed relays are assembled on PCB.

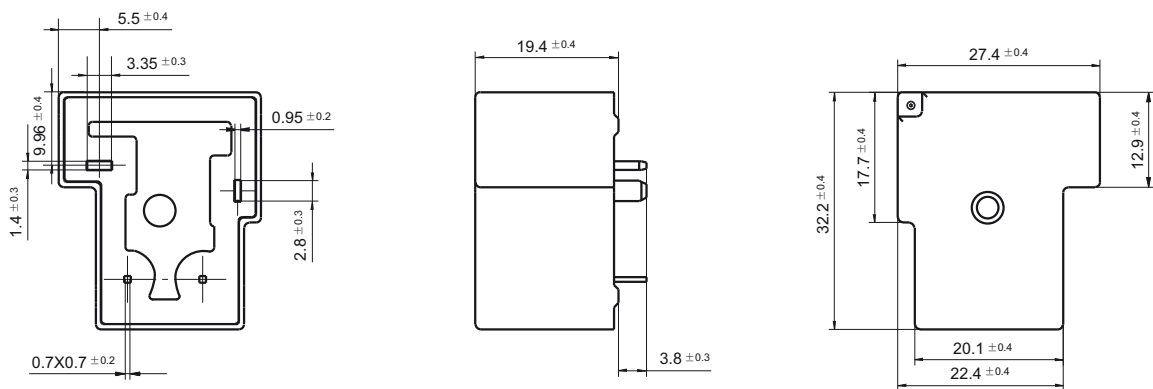
2) Flux-proofed relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.

3) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

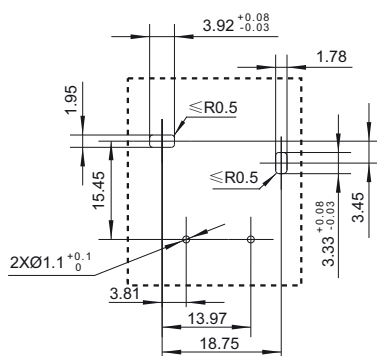
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

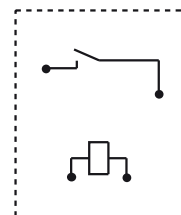
### Outline Dimensions



### PCB Layout (Bottom view)



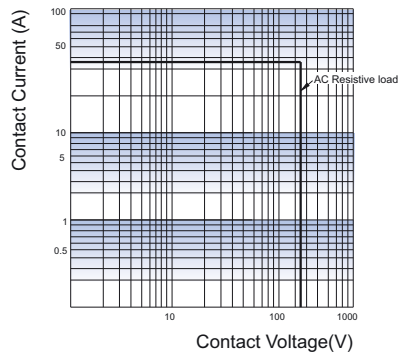
### Wiring Diagram



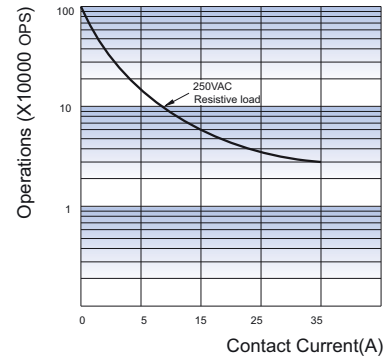
- Notes: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
2) The tolerance without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

## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER



ENDURANCE CURVE



**Test conditions:**

Resistive load, 250VAC,  
Flux proofed, at 85°C, 1s on 9s off

**Disclaimer**

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# HF170F

# SOLAR RELAY



File No.: E133481



File No.: R 50384178



File No.: CQC17002175164  
: CQC18002198581



## Features

- 35A switching capability
- Applicable to solar photovoltaic inverter
- 3.6 mm contact gap
- Low coil holding voltage contributes to saving energy of equipment
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	2A
Contact resistance(initial)	10mΩ max.( 6VDC 20A)
Contact material	AgSnO <sub>2</sub> , AgNi
Contact rating (Res. load)	35A 277VAC
Max. switching voltage	277VAC
Max. switching current	35A
Max. switching power	9695VA
Mechanical endurance	1 x 10 <sup>6</sup> OPS
Electrical endurance	3 x 10 <sup>4</sup> OPS (NO: 35A 277VAC, Resistive load, at 85°C, 1s on 9s off)

## COIL

Coil power	Approx. 1.88W
Holding voltage	30% to 110% U <sub>N</sub> (at 25°C) 40% to 60%U <sub>N</sub> (at 85°C)

**Notes:** 1)The coil holding voltage is the voltage applied to coil 100ms after the rated voltage.  
2)To avoid overheating and burning, the coil can not be consistently applied to with voltage larger than maximum holding voltage.

## SAFETY APPROVAL RATINGS

UL/CUL	AgNi	35A 277VAC Resistive at 85°C
	AgSnO <sub>2</sub>	
TÜV	AgNi	35A 250VAC cos φ =0.8 85°C
	AgSnO <sub>2</sub>	
CQC	AgNi	35A 277VAC Resistive at 85°C
	AgSnO <sub>2</sub>	

**Notes:** 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between open contacts	2000VAC 1min
	Between coil & contacts	5000VAC 1min
	Between contact sets	2000VAC 1min
Surge Voltage	10kV (1.2/50μs)	
Operate time (at rated. volt.)	30ms max.	
Release time (at rated. volt.)	10ms max.	
Temperature rise	70K max. (Contact load current 35A, rated voltage excitation60%, at 85°C)	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.0mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB	
Unit weight	Approx. 66g	
Construction	Flux proofed	

**Notes:** The data shown above are initial values.

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max	Drop-out Voltage VDC min	Max. Voltage VDC *	Coil Resistance Ω
6	4.5	0.3	6.6	19.1 x (1±10%)
9	6.75	0.45	9.9	43.1 x (1±10%)
12	9	0.6	13.2	76.6 x (1±10%)
24	18	1.2	26.4	306.4 x (1±10%)
48	36	2.4	52.8	1225.5 x (1±10%)

**Notes:** 1) The data shown above are initial values.  
2) \*Maximun voltage refers to the maximum voltage which relay coil could endure in a short period of time.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

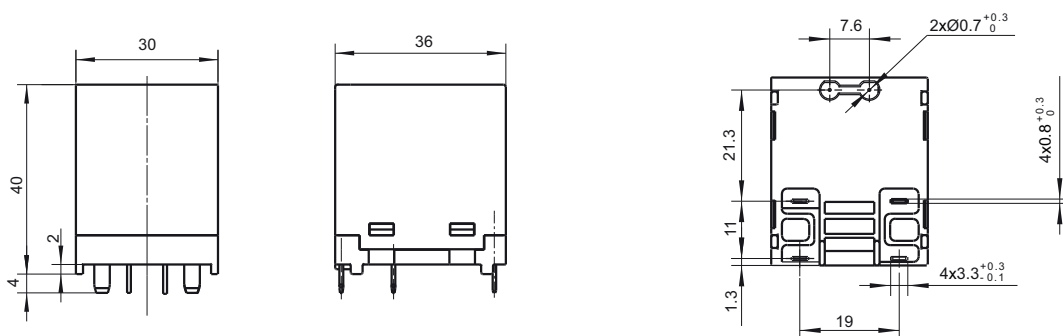
Type	HF170F/	12	-2H	T	F	(XXX)
Coil voltage	6, 9, 12, 24,48VDC					
Contact arrangement	2H: 2 Form A					
Contact material	T: AgSnO <sub>2</sub>		Nil: AgNi			
Insulation standard	F: Class F					
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard			

Notes: 1) Flux-proofed relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.  
 2) Water clearing or surface process is not suggested after the flux-proofed relays are assembled on PCB.  
 3) The customer special requirement express as special code after evaluating by Hongfa.

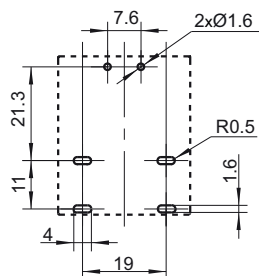
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

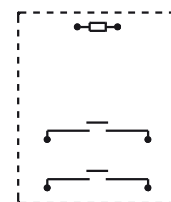
### Outline Dimensions



### PCB Layout (Bottom view)



### Wiring Diagram (Bottom view)



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

### Disclaimer

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# HF105F-1

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:40025518 (DC Type)



File No.:CQC12002071130(DC Type)  
CQC10002049165(DC Type)  
CQC16002140270(DC Type)



## Features

- 40A switching capability
- 4kV dielectric strength (between coil and contacts)
- Heavy load up to 7200VA
- PCB coil terminals, ideal for heavy duty load
- Unenclosed, Plastic sealed and dust protected types available

## CONTACT DATA

Contact arrangement	1A	1B	1C (NO)	1C (NC)
Contact resistance <sup>1)</sup>	50mΩ max. (at 1A 24VDC)			
Contact material	AgSnO <sub>2</sub> , AgCdO			
Max. switching capacity	11080VA 1200W	4155VA 450W	5540VA 600W	2770VA 300W
Max. switching voltage	277VAC / 28VDC			
Max. switching current	40A <sup>2)</sup>	15A	20A	10A
HF105F-1 rating	30A 240VAC 20A 28VDC	15A 240VAC 10A 28VDC	20A 240VAC 20A 28VDC	10A 240VAC 10A 28VDC
HF105F-1L rating	25A 240VAC 20A 28VDC	15A 240VAC 10A 28VDC	20A 240VAC 20A 28VDC	10A 240VAC 10A 28VDC
Mechanical endurance	1 x 10 <sup>7</sup> OPS			
Electrical endurance	1H type(Non-plastic sealed): 1 x 10 <sup>5</sup> OPS (28A 277VAC, Resistive load, AgCdO, Room temp., 1s on 9s off)			

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

2) Long time current-carrying under 40A condition is prohibited.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2500VAC/4000VAC 1min
	Between open contacts	1500VAC 1min
Operate time (at rated. volt.)	DC type: 15ms max.	
Release time (at rated. volt.)	DC type: 10ms max.	
Ambient temperature	DC: -55°C to 85°C AC: -55°C to 60°C	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Termination	PCB	
Unit weight	Approx.36g	
Construction	Unenclosed (Only for DC coil), Plastic sealed, Dust protected	

Notes: 1) For plastic sealed type, the venting-hole should be opened in test.

2) The data shown above are initial values.

3) Please find coil temperature curve in the characteristic curves below.

4) UL insulation system: Class F, Class B.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## COIL

Coil power	DC type: Approx. 900mW; AC type: Approx. 2VA
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## SAFETY APPROVAL RATINGS

UL/ CUL	1 Form A	AgSnO <sub>2</sub>	30A 277VAC 40A 277VAC 2HP 250VAC 1HP 125VAC
		AgCdO	30A 28VDC 28A 277VAC 277VAC(FLA=20)(LRA=60)
	1 Form B	AgCdO	15A 277VAC 10A 28VDC 1/2HP 250VAC 1/4HP 125VAC 277VAC(FLA=10)(LRA=33)
		NO	30A 277VAC 2HP 250VAC 1HP 125VAC
	1 Form C	AgCdO	20A 277VAC 20A 28VDC 277VAC(FLA=20)(LRA=60)
		NC	20A 277VAC 1/2HP 250VAC 1/4HP 125VAC
		AgCdO	10A 277VAC 10A 28VDC 277VAC(FLA=10)(LRA=33)

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## COIL DATA

at 23°C

### DC type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>3)</sup>	Drop-out Voltage VDC min. <sup>3)</sup>	Max. Voltage VDC * <sup>4)</sup>	Coil Resistance Ω
5	3.75	0.5	6.5	27 x (1±10%)
6	4.50	0.6	7.8	40 x (1±10%)
9	6.75	0.9	11.7	97 x (1±10%)
12	9.00	1.2	15.6	155 x (1±10%)
15	11.25	1.5	19.5	256 x (1±10%)
18	13.50	1.8	23.4	380 x (1±10%)
24	18.00	2.4	31.2	660 x (1±10%)
48	36.00	4.8	62.4	2560 x (1±10%)
70	52.50	7.0	91	5500 x (1±10%)
110	82.50	11	143	13450 x (1±10%)

### AC type

Nominal Voltage VAC	Pick-up Voltage VAC max. <sup>3)</sup>	Drop-out Voltage VAC min. <sup>3)</sup>	Max. Voltage VDC * <sup>4)</sup>	Coil Resistance Ω
12	9.6	2.4	15.6	25 x (1±10%)
24	19.2	4.8	31.2	100 x (1±10%)
120	96.0	24.0	156	2500 x (1±10%)
208	166.4	41	270.4	11000 x (1±10%)
220	176	44	286	13490 x (1±10%)
240	192	48	286	13490 x (1±10%)
277	220	54	360.1	15000 x (1±10%)

- Notes:** 1) When requiring pick-up voltage < 80% of nominal voltage, special order allowed.  
 2) The data shown above are initial values at 50Hz. When requiring 60Hz, special order allowed.  
 3) The data shown above are initial values.  
 4) \*Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## ORDERING INFORMATION

<b>Type</b>	HF105F-1 / 018 D T -1H S T F (XXX)	
	HF105-1: 30A (Unenclosed, only for DC coil) HF105-1L: 25A (Unenclosed, only for DC coil) HF105F-1: 30A HF105F-1L: 25A	
<b>Coil voltage</b>	<b>DC:</b> 5VDC to 110VDC <b>AC:</b> 12VAC to 277VAC	
<b>Coil voltage form</b>	<b>D:</b> DC <b>A:</b> AC	
<b>Termination</b>	<b>6:</b> With Pin NO.6, Dielectric Strength Between Coil and Contact: 2500VAC <b>T:</b> Without Pin NO.6, Dielectric Strength Between Coil and Contact: 4000VAC <b>Nil:</b> Without Pin NO.6, Dielectric Strength Between Coil and Contact: 2500VAC	
<b>Contact arrangement</b>	<b>1H:</b> 1 Form A <b>1D:</b> 1 Form B <b>1Z:</b> 1 Form C	
<b>Construction</b> <sup>1)2)</sup>	<b>S:</b> Plastic sealed <b>Nil:</b> Dust protected (For HF105F-1, HF105F-1L) Unenclosed (For HF105-1, HF105-1L)	
<b>Contact material</b>	<b>T:</b> AgSnO <sub>2</sub> <b>Nil:</b> AgCdO	
<b>Insulation standard</b>	<b>F:</b> Class F <b>Nil:</b> Class B	
<b>Special code</b> <sup>3)</sup>	<b>XXX:</b> Customer special requirement <b>Nil:</b> Standard	

**Notes:** 1) We recommend dust protected types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

3) The customer special requirement express as special code after evaluating by Hongfa.

# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

HF105F-1

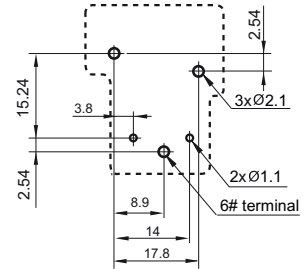
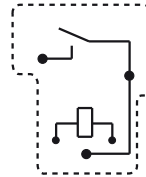
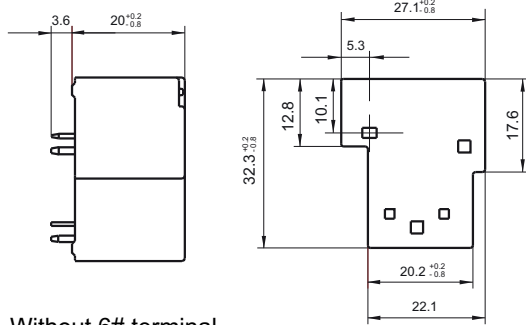
1 Form A

Outline Dimensions

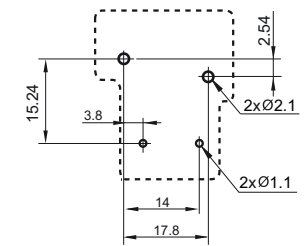
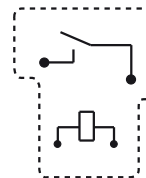
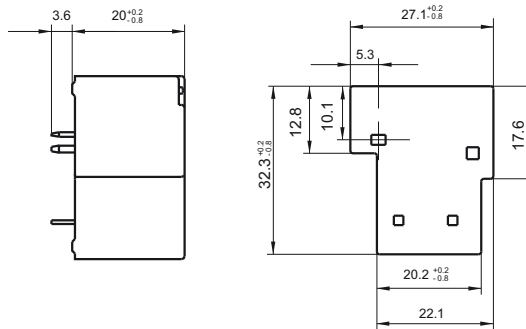
Wiring Diagram  
(Bottom view)

PCB Layout  
(Bottom view)

With 6# terminal

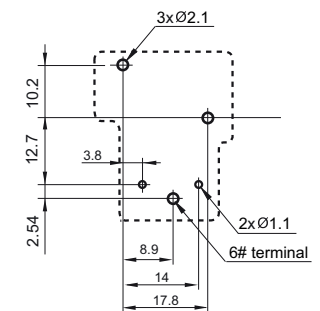
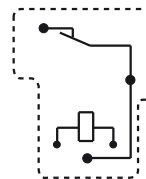
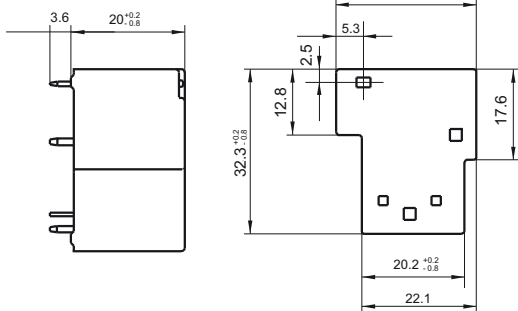


Without 6# terminal

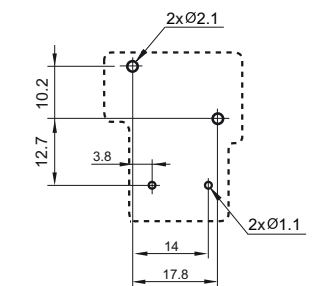
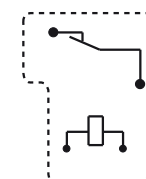
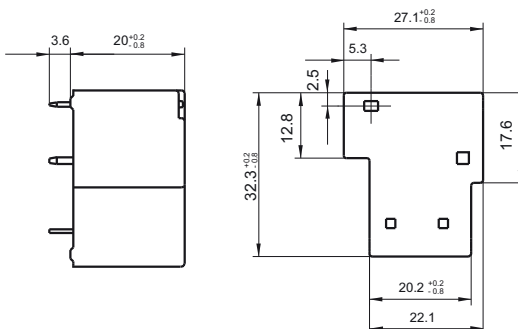


1 Form B

With 6# terminal



Without 6# terminal



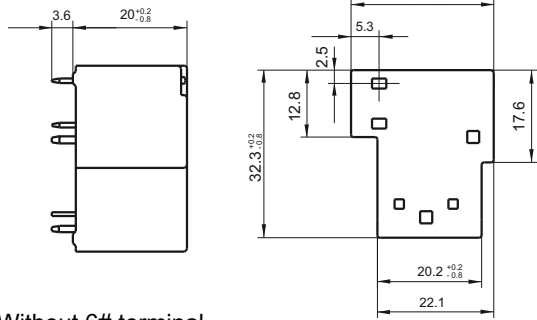
# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

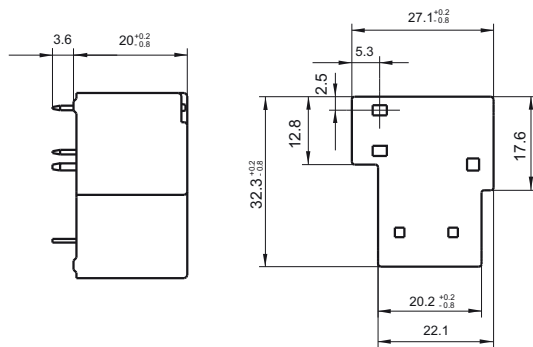
## 1 Form C

### Outline Dimensions

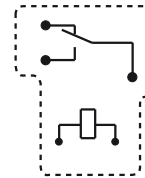
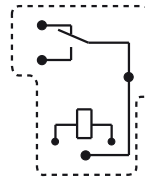
With 6# terminal



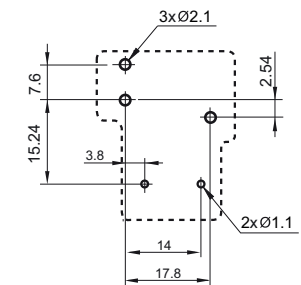
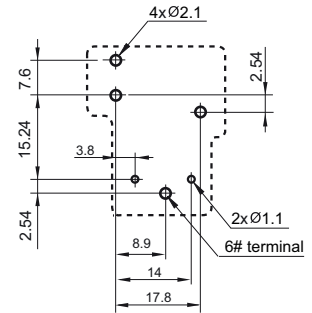
Without 6# terminal



### Wiring Diagram (Bottom view)



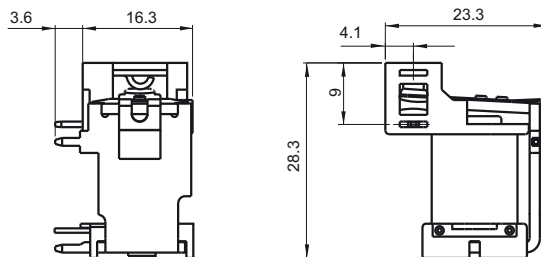
### PCB Layout (Bottom view)



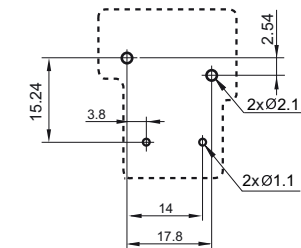
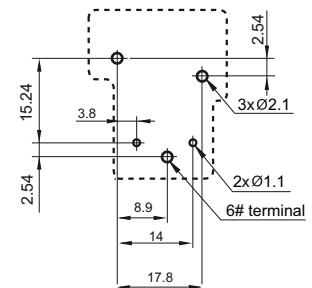
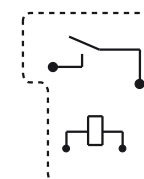
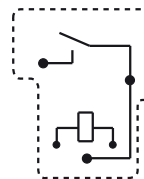
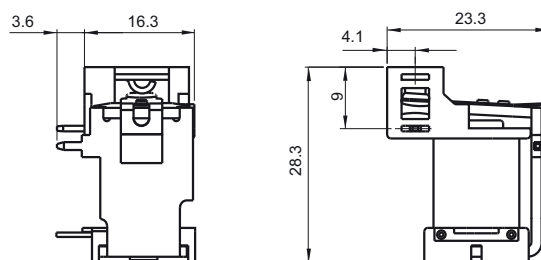
## HF105-1

## 1 Form A

With 6# terminal



Without 6# terminal



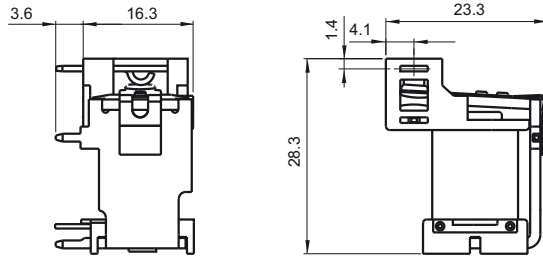
# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

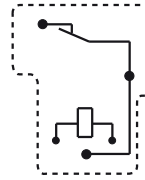
## 1 Form B

### Outline Dimensions

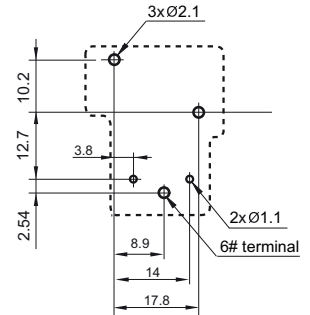
With 6# terminal



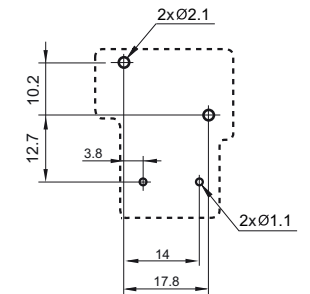
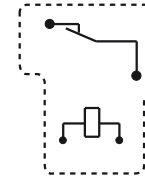
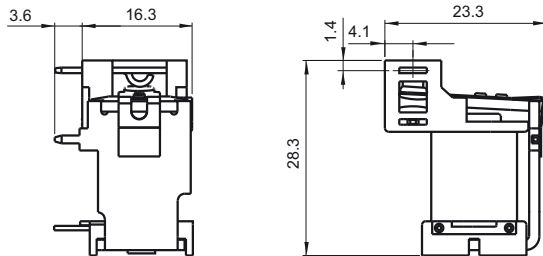
### Wiring Diagram (Bottom view)



### PCB Layout (Bottom view)

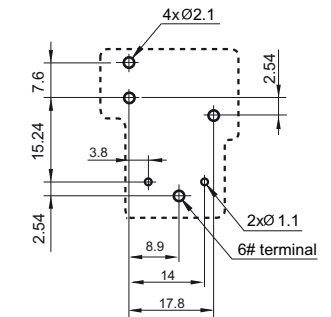
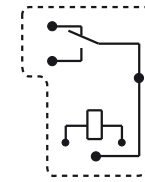
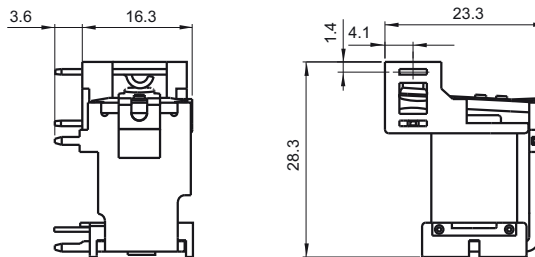


Without 6# terminal

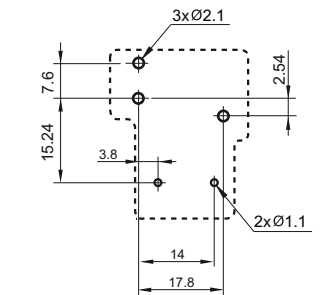
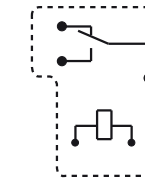
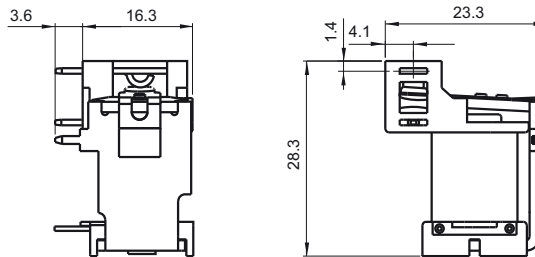


## 1 Form C

With 6# terminal



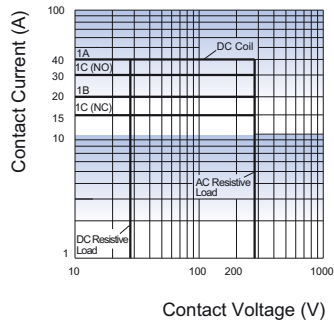
Without 6# terminal



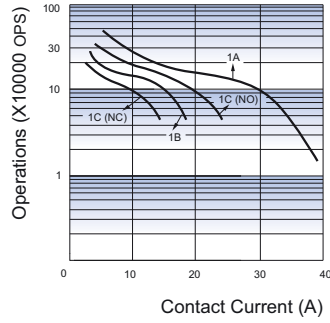
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
2) The tolerance without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

## CHARACTERISTIC CURVES

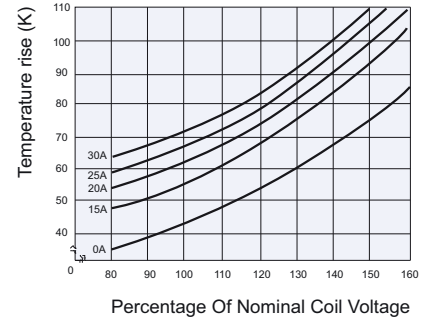
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Test conditions:**

Resistive load, Dust protected,  
AgCdO, Room temp., 1s on 9s off.

**Disclaimer**

The specification is for reference only. See "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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# HF105F-2

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:40025518 (DC type)



File No.: CQC10002049165(DC type)  
CQC16002140270(DC type)



## Features

- 40A switching capability
- Heavy load up to 7200VA
- PCB coil terminals, ideal for heavy duty load
- Plastic sealed and dust protected types available

## CONTACT DATA

Contact arrangement	1A	1B	1C (NO)	1C (NC)
Contact resistance <sup>1)</sup>	50mΩ max.(at 1A 24VDC)			
Contact material	AgSnO <sub>2</sub> , AgCdO			
Max. switching capacity	7200VA/560W	3600VA/280W	4800VA/560W	2400VA/280W
Max. switching voltage	277VAC/28VDC			
Max. switching current	40A <sup>2)</sup>	15A	20A	10A
Max.continuous current	When PCB terminals carry current≤30A			
	When PCB terminals do not carry current (only QC terminals carry current)≤25A			
HF105F-2 rating	30A 240VAC 20A 28VDC	15A 240VAC 10A 28VDC	20A 240VAC 20A 28VDC	10A 240VAC 10A 28VDC
HF105F-2L rating	25A 240VAC 20A 28VDC	15A 240VAC 10A 28VDC	20A 240VAC 20A 28VDC	10A 240VAC 10A 28VDC
Mechanical endurance	1 x 10 <sup>7</sup> OPS			
Electrical endurance	1H type(Non-plastic sealed): 1 x 10 <sup>5</sup> OPS (28A 277VAC, Resistive load, AgCdO, Room temp., 1s on 9s off)			

Notes:1) The data shown above are initial values.  
2) Long time current-carrying under 40A condition is prohibited.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2500VAC 1min
	Between open contacts	1500VAC 1min
Operate time (at rated. volt.)	DC type: 15ms max.	
Release time (at rated. volt.)	DC type: 10ms max.	
Ambient temperature	DC: -55°C to 85°C AC: -55°C to 60°C	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Termination	PCB & QC	
Unit weight	Approx. 36g	
Construction	Plastic sealed, Dust protected	

Notes: 1) For plastic sealed type, the venting-hole should be opened in test.  
2) The data shown above are initial values.  
3) Please find coil temperature curve in the characteristic curves below.  
4) UL insulation system: Class F, Class B.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.02

## COIL

Coil power	DC type: Approx. 900mW; AC type: Approx. 2VA
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## SAFETY APPROVAL RATINGS

UL/ CUL	1 Form A	AgSnO <sub>2</sub>	30A 277VAC 40A 277VAC 2HP 250VAC 1HP 125VAC
		AgCdO	30A 28VDC 28A 277VAC 277VAC(FLA=20)(LRA=60)
	1 Form B	AgCdO	15A 277VAC 10A 28VDC 1/2HP 250VAC 1/4HP 125VAC 277VAC(FLA=10)(LRA=33)
		NO	30A 277VAC 2HP 250VAC 1HP 125VAC
	1 Form C	AgCdO	20A 277VAC 20A 28VDC 277VAC(FLA=20)(LRA=60)
		NC	20A 277VAC 1/2HP 250VAC 1/4HP 125VAC 10A 277VAC 10A 28VDC 277VAC(FLA=10)(LRA=33)

Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.

## COIL DATA

at 23°C

### DC type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>3)</sup>	Drop-out Voltage VDC min. <sup>3)</sup>	Max. Voltage VDC * <sup>4)</sup>	Coil Resistance Ω
5	3.75	0.5	6.5	27 x (1±10%)
6	4.50	0.6	7.8	40 x (1±10%)
9	6.75	0.9	11.7	97 x (1±10%)
12	9.00	1.2	15.6	155 x (1±10%)
15	11.25	1.5	19.5	256 x (1±10%)
18	13.50	1.8	23.4	380 x (1±10%)
24	18.00	2.4	31.2	660 x (1±10%)
48	36.00	4.8	62.4	2560 x (1±10%)
70	52.50	7.0	91	5500 x (1±10%)
110	82.50	11	143	13450 x (1±10%)

### AC type

Nominal Voltage VAC	Pick-up Voltage VAC max. <sup>3)</sup>	Drop-out Voltage VAC min. <sup>3)</sup>	Max. Voltage VDC * <sup>4)</sup>	Coil Resistance Ω
12	9.6	2.4	15.6	25 x (1±10%)
24	19.2	4.8	31.2	100 x (1±10%)
120	96.0	24.0	156	2500 x (1±10%)
208	166.4	41	270.4	11000 x (1±10%)
220	176	44	286	13490 x (1±10%)
240	192	48	286	13490 x (1±10%)
277	220	54	360.1	15000 x (1±10%)

- Notes:** 1) When requiring pick-up voltage < 80% of nominal voltage, special order allowed.  
 2) The data shown above are initial values at 50Hz. When requiring 60Hz, special order allowed.  
 3) The data shown above are initial values.  
 4) \*Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## ORDERING INFORMATION

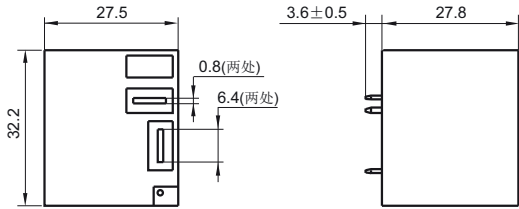
<b>Type</b>		HF105F-2 / 018		<b>D</b>	<b>-1H</b>	<b>S</b>	<b>T</b>	<b>F</b>	<b>(XXX)</b>
		HF105F-2: 30A HF105F-2L: 25A							
<b>Coil voltage</b>		DC: 5VDC to 110VDC AC: 12VAC to 277VAC							
<b>Coil voltage form</b>		D: DC      A: AC							
<b>Contact arrangement</b>		1H:1 Form A    1D:1 Form B    1Z:1 Form C							
<b>Construction</b> <sup>1)</sup>		S: Plastic sealed    Nil: Dust protected							
<b>Contact material</b>		T: AgSnO <sub>2</sub> Nil: AgCdO							
<b>Insulation standard</b>		F: Class F      Nil: Class B							
<b>Special code</b> <sup>3)</sup>		XXX: Customer special requirement      Nil: Standard							

- Notes:** 1) We recommend dust protected types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).  
 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.  
 3) The customer special requirement express as special code after evaluating by Hongfa.

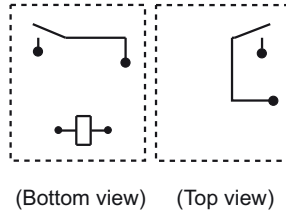


1 Form A

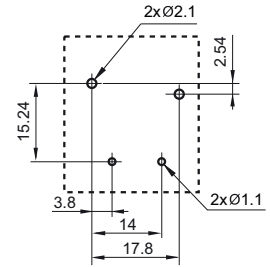
Outline Dimensions



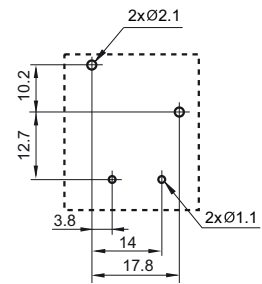
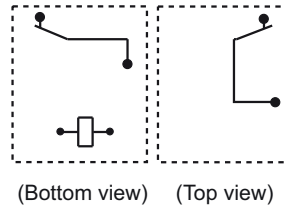
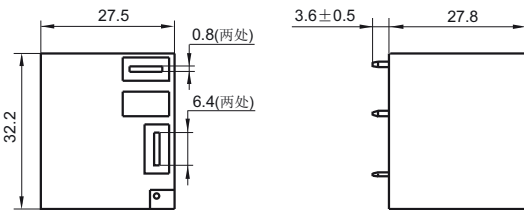
Wiring Diagram



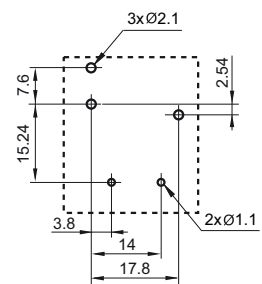
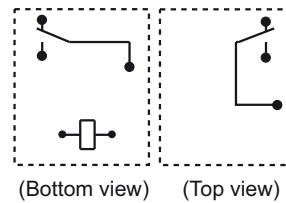
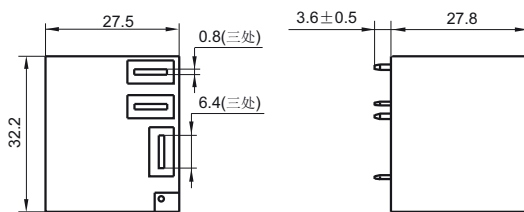
PCB Layout  
(Bottom view)



1 Form B



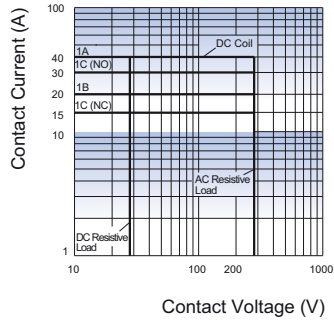
1 Form C



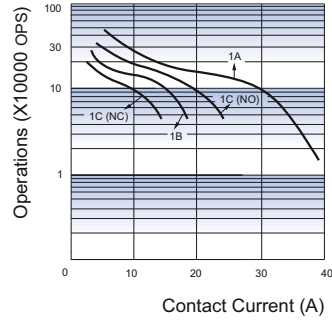
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be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

## CHARACTERISTIC CURVES

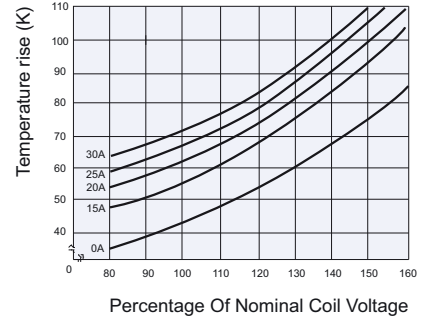
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Test conditions:**  
Resistive load, Dust protected,  
AgCdO, Room temp., 1s on 9s off.

### 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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# HF105F-4

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:40025518 (DC type)



File No.:CQC09002031229(DC type)  
CQC10002049165(DC type)



## Features

- 40A switching capability
- 2.5kV dielectric strength (between coil and contacts)
- Heavy load up to 7200VA

## CONTACT DATA

Contact arrangement	1A	1B	1C (NO)	1C (NC)
Contact resistance <sup>1)</sup>	50mΩ max.(at 1A 24VDC)			
Contact material	AgSnO <sub>2</sub> , AgCdO			
Max. switching capacity	7200VA/560W	3600VA/280W	4800VA/560W	2400VA/280W
Max. switching voltage	277VAC/28VDC			
Max. switching current	40A <sup>2)</sup>	15A	20A	10A
Max.continuous current	≤25A			
HF105F-4 rating	30A 240VAC 20A 28VDC	15A 240VAC 10A 28VDC	20A 240VAC 20A 28VDC	10A 240VAC 10A 28VDC
HF105F-4L rating	25A 240VAC 20A 28VDC	15A 240VAC 10A 28VDC	20A 240VAC 20A 28VDC	10A 240VAC 10A 28VDC
Mechanical endurance	1 x 10 <sup>7</sup> OPS			
Electrical endurance	1H type(Non-plastic sealed): 1 x 10 <sup>5</sup> OPS (28A 277VAC, Resistive load, AgCdO, Room temp., 1s on 9s off)			

Notes:1) The data shown above are initial values.  
2) Long time current-carrying under 40A condition is prohibited.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2500VAC 1min
	Between open contacts	1500VAC 1min
Operate time (at rated. volt.)	DC type: 15ms max.	
Release time (at rated. volt.)	DC type: 10ms max.	
Ambient temperature	DC: -55°C to 85°C AC: -55°C to 60°C	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Termination	QC	
Unit weight	Approx. 36g	
Construction	Plastic sealed, Dust protected	

Notes: 1) For plastic sealed type, the venting-hole should be opened in test.  
2) The data shown above are initial values.  
3) Please find coil temperature curve in the characteristic curves below.  
4) UL insulation system: Class F, Class B.

## COIL

Coil power	DC type: Approx. 900mW; AC type: Approx. 2VA
------------	---

## SAFETY APPROVAL RATINGS

UL/ CUL	Form	Material	UL/ CUL		
			1 Form A	1 Form B	
	1 Form A	AgSnO <sub>2</sub> AgCdO	30A 277VAC 40A 277VAC 2HP 250VAC 1HP 125VAC	30A 28VDC 28A 277VAC 277VAC(FLA=20)(LRA=60)	
		AgCdO	30A 28VDC 28A 277VAC 277VAC(FLA=20)(LRA=60)	15A 277VAC 10A 28VDC 1/2HP 250VAC 1/4HP 125VAC 277VAC(FLA=10)(LRA=33)	
	1 Form C	NO	AgSnO <sub>2</sub> AgCdO	30A 277VAC 2HP 250VAC 1HP 125VAC	20A 277VAC 20A 28VDC 277VAC(FLA=20)(LRA=60)
			AgCdO	20A 277VAC 20A 28VDC 277VAC(FLA=20)(LRA=60)	20A 277VAC 1/2HP 250VAC 1/4HP 125VAC
		NC	AgSnO <sub>2</sub> AgCdO	20A 277VAC 1/2HP 250VAC 1/4HP 125VAC	10A 277VAC 10A 28VDC 277VAC(FLA=10)(LRA=33)
			AgCdO	10A 277VAC 10A 28VDC 277VAC(FLA=10)(LRA=33)	

Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## COIL DATA

at 23°C

### DC type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>3)</sup>	Drop-out Voltage VDC min. <sup>3)</sup>	Max. Voltage VDC <sup>*4)</sup>	Coil Resistance Ω
5	3.75	0.5	6.5	27 x (1±10%)
6	4.50	0.6	7.8	40 x (1±10%)
9	6.75	0.9	11.7	97 x (1±10%)
12	9.00	1.2	15.6	155 x (1±10%)
15	11.25	1.5	19.5	256 x (1±10%)
18	13.50	1.8	23.4	380 x (1±10%)
24	18.00	2.4	31.2	660 x (1±10%)
48	36.00	4.8	62.4	2560 x (1±10%)
70	52.50	7.0	91	5500 x (1±10%)
110	82.50	11	143	13450 x (1±10%)

### AC type

Nominal Voltage VAC	Pick-up Voltage VAC max. <sup>3)</sup>	Drop-out Voltage VAC min. <sup>3)</sup>	Max. Voltage VDC <sup>*4)</sup>	Coil Resistance Ω
12	9.6	2.4	15.6	25 x (1±10%)
24	19.2	4.8	31.2	100 x (1±10%)
120	96.0	24.0	156	2500 x (1±10%)
208	166.4	41	270.4	11000 x (1±10%)
220	176	44	286	13490 x (1±10%)
240	192	48	286	13490 x (1±10%)
277	220	54	360.1	15000 x (1±10%)

- Notes:**
- 1) When requiring pick-up voltage < 80% of nominal voltage, special order allowed.
  - 2) The data shown above are initial values at 50Hz. When requiring 60Hz, special order allowed.
  - 3) The data shown above are initial values.
  - 4) \*Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## ORDERING INFORMATION

Type		HF105F-4: 30A HF105F-4L: 25A		HF105F-4 / 018 D K -1H S T F (XXX)	
Coil voltage		DC: 5VDC to 110VDC AC: 12VAC to 277VAC			
Coil voltage form		D: DC A: AC			
Coil terminal width		K: 4.8mm Nil: 2.8mm			
Contact arrangement		1H:1 Form A 1D:1 Form B 1Z:1 Form C			
Construction <sup>1)</sup>		S: Plastic sealed Nil: Dust protected			
Contact material		T: AgSnO <sub>2</sub> Nil: AgCdO			
Insulation standard		F: Class F Nil: Class B			
Special code <sup>3)</sup>		XXX: Customer special requirement Nil: Standard			

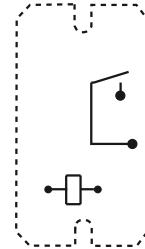
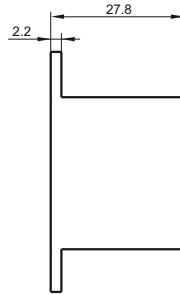
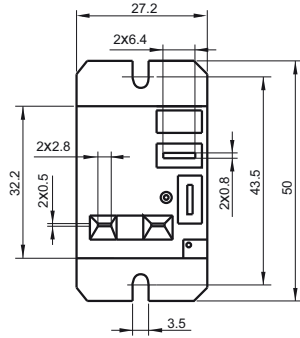
- Notes:**
- 1) We recommend dust protected types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).
  - 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
  - 3) The customer special requirement express as special code after evaluating by Hongfa.

**1 Form A**

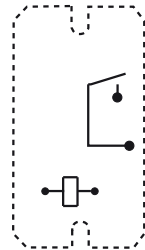
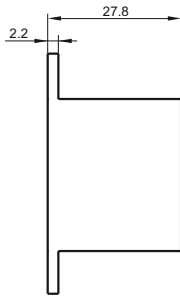
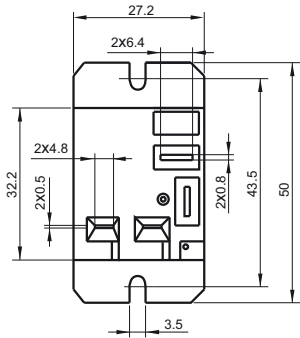
**Outline Dimensions**

**Wiring Diagram  
(Top view)**

2.8mm Terminal width

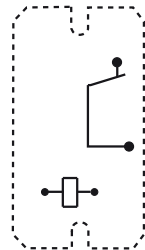
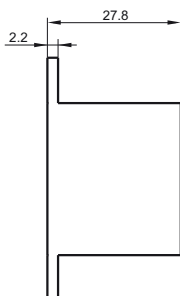
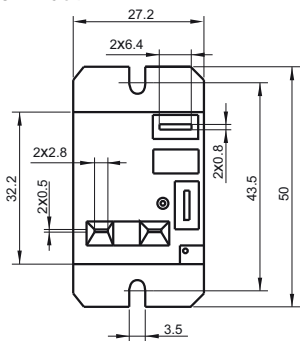


4.8mm Terminal width

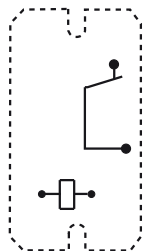
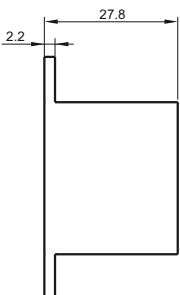
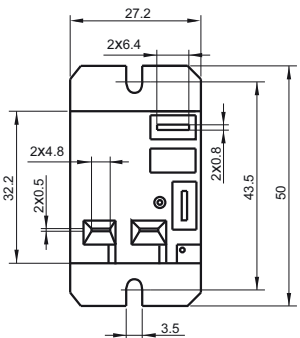


**1 Form B**

2.8mm Terminal width



4.8mm Terminal width



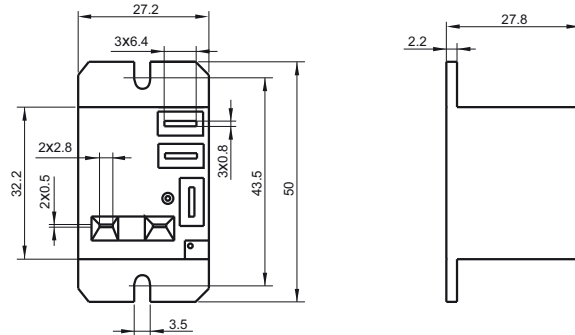
# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

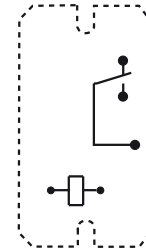
## 1 Form C

### Outline Dimensions

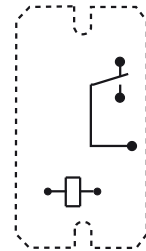
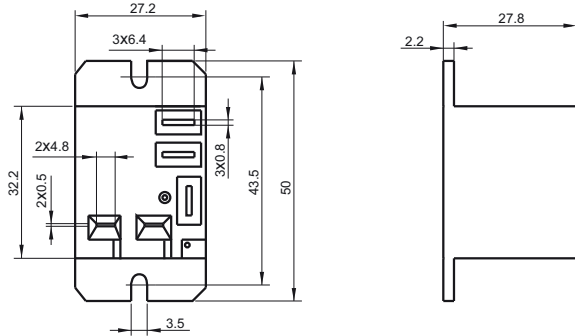
#### 2.8mm Terminal width



### Wiring Diagram (Top view)



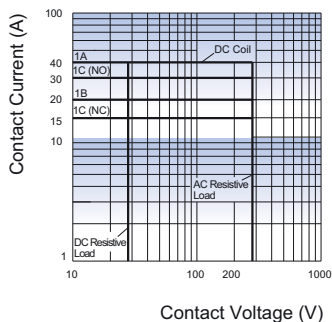
#### 4.8mm Terminal width



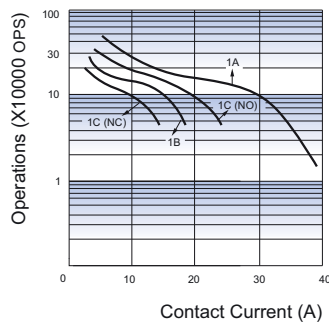
Remark: In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .

## CHARACTERISTIC CURVES

### MAXIMUM SWITCHING POWER

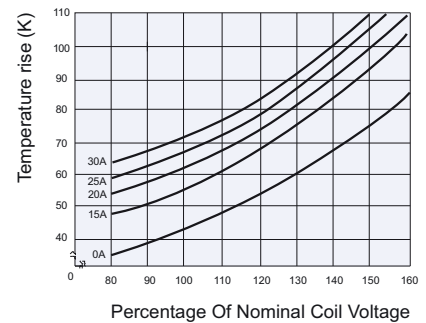


### ENDURANCE CURVE



**Test conditions:**  
Resistive load, Dust protected,  
AgCdO, Room temp., 1s on 9s off.

### COIL TEMPERATURE RISE



### 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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# HF105F-5

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:40025518 (DC type)



File No.: CQC10002049165(DC type)  
CQC16002140270(DC type)



## Features

- 40A switching capability
- Heavy load up to 7200VA
- PCB coil terminals, ideal for heavy duty load
- Plastic sealed and dust protected types available
- 4kV dielectric strength (between coil and contacts)

## CONTACT DATA

Contact arrangement	1A	1B	1C (NO)	1C (NC)
Contact resistance <sup>1)</sup>	50mΩ max.(at 1A 24VDC)			
Contact material	AgSnO <sub>2</sub> , AgCdO			
Max. switching capacity	7200VA/560W	3600VA/280W	4800VA/560W	2400VA/280W
Max. switching voltage	277VAC / 28VDC			
Max. switching current	40A <sup>2)</sup>	15A	20A	10A
Max.continuous current	When PCB terminals carry current ≤30A When PCB terminals do not carry current (only QC terminals carry current) ≤25A			
HF105F-5 rating	30A 240VAC 20A 28VDC	15A 240VAC 10A 28VDC	20A 240VAC 20A 28VDC	10A 240VAC 10A 28VDC
HF105F-5L rating	25A 240VAC 20A 28VDC	15A 240VAC 10A 28VDC	20A 240VAC 20A 28VDC	10A 240VAC 10A 28VDC
Mechanical endurance	1 x 10 <sup>7</sup> OPS			
Electrical endurance	1H type(Non-plastic sealed): 1 x 10 <sup>5</sup> OPS (28A 277VAC, Resistive load, AgCdO, Room temp., 1s on 9s off)			

Notes:1) The data shown above are initial values.  
2) Long time current-carrying under 40A condition is prohibited.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2500VAC/4000VAC 1min
	Between open contacts	1500VAC 1min
Operate time (at rated. volt.)	DC type: 15ms max.	
Release time (at rated. volt.)	DC type: 10ms max.	
Ambient temperature	DC: -55°C to 85°C AC: -55°C to 60°C	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Termination	PCB & QC	
Unit weight	Approx. 36g	
Construction	Plastic sealed, Dust protected	

Notes: 1) For plastic sealed type, the venting-hole should be opened in test.  
2) The data shown above are initial values.  
3) Please find coil temperature curve in the characteristic curves below.  
4) UL insulation system: Class F, Class B.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.02

## COIL

Coil power	DC type: Approx. 900mW; AC type: Approx. 2VA
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## SAFETY APPROVAL RATINGS

UL/ CUL	1 Form A	AgSnO <sub>2</sub>	30A 277VAC 40A 277VAC 2HP 250VAC 1HP 125VAC
		AgCdO	30A 28VDC 28A 277VAC 277VAC(FLA=20)(LRA=60)
	1 Form B	AgCdO	15A 277VAC 10A 28VDC 1/2HP 250VAC 1/4HP 125VAC 277VAC(FLA=10)(LRA=33)
		NO	30A 277VAC 2HP 250VAC 1HP 125VAC
	1 Form C	AgCdO	20A 277VAC 20A 28VDC 277VAC(FLA=20)(LRA=60)
		NC	AgSnO <sub>2</sub> AgCdO
		AgCdO	10A 277VAC 10A 28VDC 277VAC(FLA=10)(LRA=33)

Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.

## COIL DATA

at 23°C

### DC type

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>3)</sup>	Drop-out Voltage VDC min. <sup>3)</sup>	Max. Voltage VDC <sup>4)</sup>	Coil Resistance Ω
5	3.75	0.5	6.5	27 x (1±10%)
6	4.50	0.6	7.8	40 x (1±10%)
9	6.75	0.9	11.7	97 x (1±10%)
12	9.00	1.2	15.6	155 x (1±10%)
15	11.25	1.5	19.5	256 x (1±10%)
18	13.50	1.8	23.4	380 x (1±10%)
24	18.00	2.4	31.2	660 x (1±10%)
48	36.00	4.8	62.4	2560 x (1±10%)
70	52.50	7.0	91	5500 x (1±10%)
110	82.50	11	143	13450 x (1±10%)

### AC type

Nominal Voltage VAC	Pick-up Voltage VAC max. <sup>3)</sup>	Drop-out Voltage VAC min. <sup>3)</sup>	Max. Voltage VDC <sup>4)</sup>	Coil Resistance Ω
12	9.6	2.4	15.6	25 x (1±10%)
24	19.2	4.8	31.2	100 x (1±10%)
120	96.0	24.0	156	2500 x (1±10%)
208	166.4	41	270.4	11000 x (1±10%)
220	176	44	286	13490 x (1±10%)
240	192	48	286	13490 x (1±10%)
277	220	54	360.1	15000 x (1±10%)

- Notes:** 1) When requiring pick-up voltage < 80% of nominal voltage, special order allowed.  
 2) The data shown above are initial values at 50Hz. When requiring 60Hz, special order allowed.  
 3) The data shown above are initial values.  
 4) \*Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## ORDERING INFORMATION

<b>HF105F-5 / 018 D T -1H S T F (XXX)</b>	
<b>Type</b>	HF105F-5: 30A HF105F-5L: 25A
<b>Coil voltage</b>	<b>DC:</b> 5VDC to 110VDC <b>AC:</b> 12VAC to 277VAC
<b>Coil voltage form</b>	<b>D:</b> DC <b>A:</b> AC
<b>Dielectric strength</b> (between coil & contacts)	<b>T:</b> 4000VAC <b>Nil:</b> 2500VAC
<b>Contact arrangement</b>	<b>1H:</b> 1 Form A <b>1D:</b> 1 Form B <b>1Z:</b> 1 Form C
<b>Construction</b> <sup>1)</sup>	<b>S:</b> Plastic sealed <b>Nil:</b> Dust protected
<b>Contact material</b>	<b>T:</b> AgSnO <sub>2</sub> <b>Nil:</b> AgCdO
<b>Insulation standard</b>	<b>F:</b> Class F <b>Nil:</b> Class B
<b>Special code</b> <sup>3)</sup>	<b>XXX:</b> Customer special requirement <b>Nil:</b> Standard

**Notes:** 1) We recommend dust protected types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

3) The customer special requirement express as special code after evaluating by Hongfa.

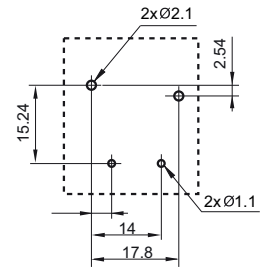
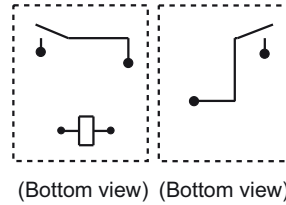
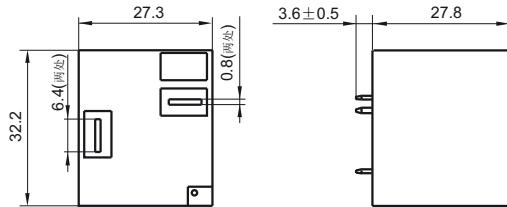


Outline Dimensions

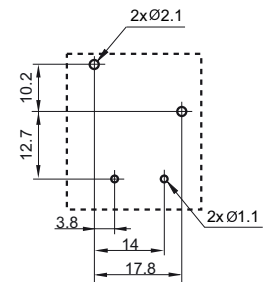
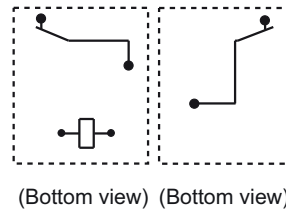
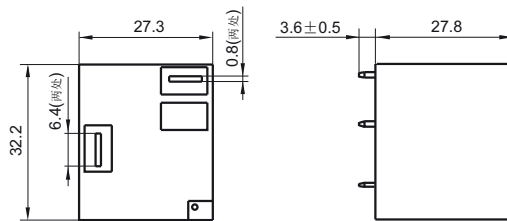
Wiring Diagram

PCB Layout  
(Bottom view)

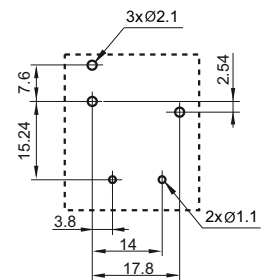
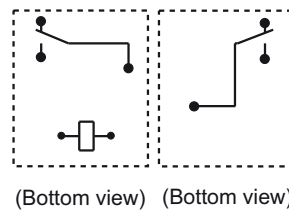
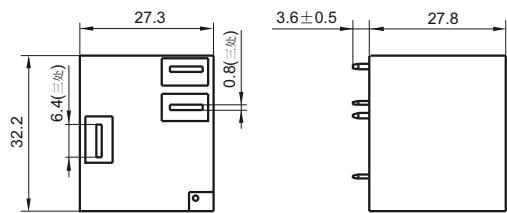
1 Form A



1 Form B



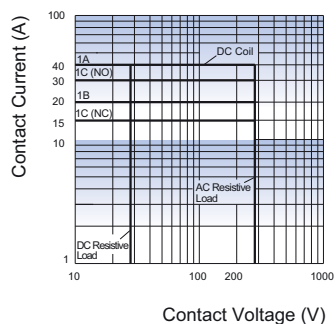
1 Form C



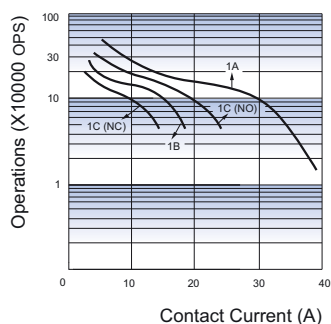
- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
2) The tolerance without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

## CHARACTERISTIC CURVES

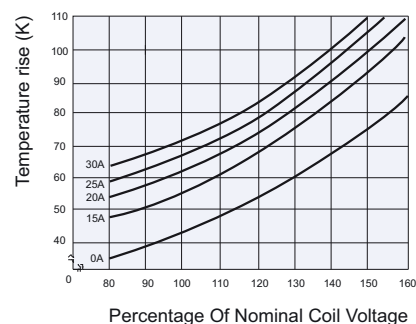
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Test conditions:**  
Resistive load, Dust protected,  
AgCdO, Room temp., 1s on 9s off.

### 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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# HF2100

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:R50153835



File No.:CQC10002049166



## Features

- 30A switching capability
- PCB coil terminals, ideal for heavy duty load
- 2.5kV dielectric strength (between coil and contacts)
- Plastic sealed and Dust protected types available
- UL insulation system: Class F available

## CONTACT DATA

Contact arrangement	1A	1B	1C (NO)	1C (NC)
Contact resistance <sup>1)</sup>	50mΩ max.(at 1A 24VDC)			
Contact material	AgSnO <sub>2</sub> , AgCdO			
Contact rating (Res. load)	30A 240VAC 20A 30VDC	15A 240VAC 10A 30VDC	20A 240VAC 20A 30VDC	10A240VAC 10A 30VDC
Max. switching power	11080VA 1200W	4155VA 450W	5540VA 600W	2770VA 300W
Max. switching voltage	277VAC / 30VDC			
Max. switching current	40A <sup>2)</sup>	15A	20A	10A
Max.continuous current	When PCB terminals carry current ≤30A When PCB terminals do not carry current (only QC terminals carry current) ≤25A			
Mechanical endurance	1 x 10 <sup>7</sup> ops			
Electrical endurance	1A type(Non-plastic sealed): 1 x 10 <sup>5</sup> ops (30A 240VAC, Resistive load, AgCdO, Room temp., 1s on 9s off)			

Notes:1) The data shown above are initial values.  
2) Long time current-carrying under 40A condition is prohibited.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)
Dielectric strength	Between coil & contacts 2500VAC 1min
	Between open contacts 1500VAC 1min
Operate time (at rated. volt.)	15ms max.
Release time (at rated. volt.)	10ms max.
Ambient temperature	-55°C to 85°C
Shock resistance	Functional 98m/s <sup>2</sup>
	Destructive 980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA
Humidity	5% to 85% RH
Termination	PCB & QC
Unit weight	Approx. 35g
Construction	Plastic sealed, Dust protected

Notes: 1) For plastic sealed type, the venting-hole should be opened in test.  
2) The data shown above are initial values.  
3) Please find coil temperature curve in the characteristic curves below.  
4) UL insulation system: Class F, Class B.  
5) It is recommended that the terminal of the process QC cannot pass through more than 25A current for a long period of time .

## COIL

Coil power Approx. 900mW

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.75	0.5	6.5	27 x (1±10%)
6	4.50	0.6	7.8	40 x (1±10%)
9	6.75	0.9	11.7	97 x (1±10%)
12	9.00	1.2	15.6	155 x (1±10%)
15	11.25	1.5	19.5	256 x (1±10%)
18	13.50	1.8	23.4	380 x (1±10%)
24	18.00	2.4	31.2	660 x (1±10%)
48	36.00	4.8	62.4	2560 x (1±10%)
70	52.50	7.0	91.0	5500 x (1±10%)
110	82.50	11.0	143.0	13450 x (1±10%)

Notes:1)The data shown above are initial values.  
2)\*Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## SAFETY APPROVAL RATINGS

### UL/CUL

Contact material	Load type	Volts	1 Form A	1 Form B	1 Form C (NO)	1 Form C (NC)
AgCdO	General purpose	125/240VAC	30A	15A	30A	15A
		277VAC	30A	30A	30A	30A
	Resistive	125/240VAC	30A	15A	--	--
		30VDC	20A	10A	20A	10A
		277VAC	20A	--	--	--
		240VAC	15A	--	--	--
		250VAC	40A		40A	
	Ballast	125/240/277VAC	6A	3A	6A	3A
	Pilot duty	125VAC	800VA	290VA	800VA	290VA
		125VAC	690VA	--	690VA	--
		125VAC	800VA	--	800VA	--
		240VAC	1152VA	768VA	1152VA	768VA
		277VAC	764VA	--	764VA	--
	Motor load	125VAC	1HP	1/4HP	1HP	1/4HP
		240VAC	2HP	1HP	2HP	1HP
		125VAC	1HP	--	1HP	--
		125/277VAC	3/4HP	--	3/4HP	--
	Definite purpose (LRA-loaded rotor) (FLA-full load)	120VAC	82.8LRA, 13.8FLA	--	82.8LRA, 13.8FLA	--
		125VAC	96LRA, 30FLA	33LRA, 10FLA	60LRA, 20FLA	33LRA, 10FLA
		125VAC	60LRA, 20FLA	30LRA, 12FLA	60LRA, 20FLA	30LRA, 12FLA
		125VAC	82.8LRA, 27FLA	--	82.8LRA, 27FLA	--
		240VAC	80LRA, 30FLA	33LRA, 10FLA	60LRA, 20FLA	33LRA, 10FLA
		240VAC	41.4LRA, 6.9FLA	--	41.4LRA, 6.9FLA	--
		277VAC	60LRA, 20FLA	--	60LRA, 20FLA	--
	Tungsten	125VAC	15A	--	15A	--
		240VAC	5A	--	5A	3A
		120VAC	--	3A	--	--
		240VAC	--	3A	--	--
AgSnO <sub>2</sub>	General purpose	125/240VAC	30A	--	--	--
	Resistive	250VAC	40A	--	--	--
	General purpose	240VAC	--	15A	--	--

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

Type	HF2100		-1A	-12D	E	T	F	(XXX)
Contact arrangement	1A: 1 Form A 1B: 1 Form B 1C: 1 Form C							
Coil voltage	5, 6, 9, 12, 15, 18, 24, 48, 70, 110VDC							
Construction <sup>1)</sup>	E: Plastic sealed		Nil: Dust protected					
Contact material	T: AgSnO <sub>2</sub>		Nil: AgCdO					
Insulation standard	F: Class F		Nil: Class B					
Special code <sup>3)</sup>	XXX: Customer special requirement			Nil: Standard				

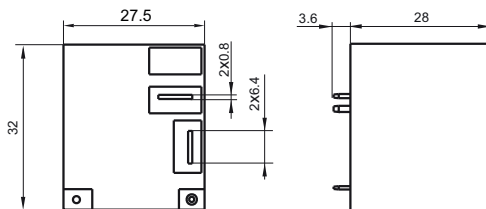
- Notes:** 1) We recommend dust protected types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).  
We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

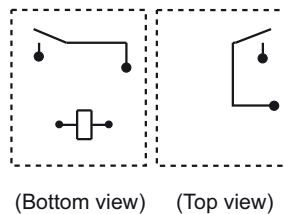
Unit: mm

### 1 Form A

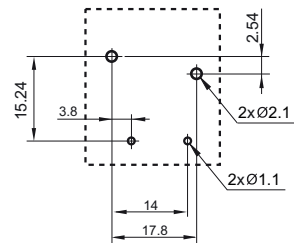
Outline Dimensions



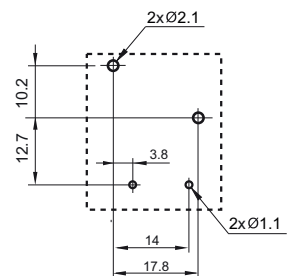
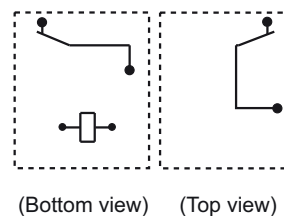
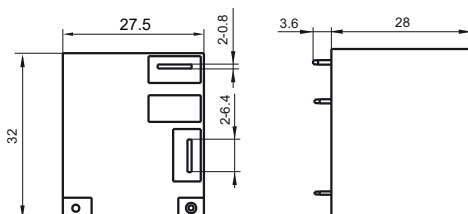
Wiring Diagram



PCB Layout  
(Bottom view)



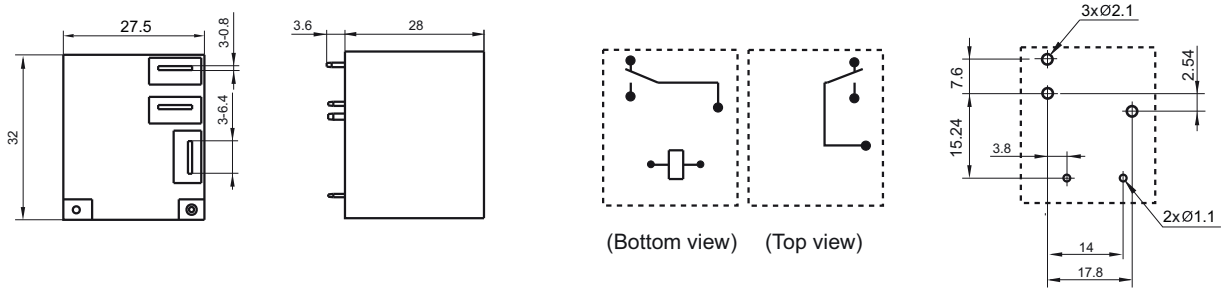
### 1 Form B



# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

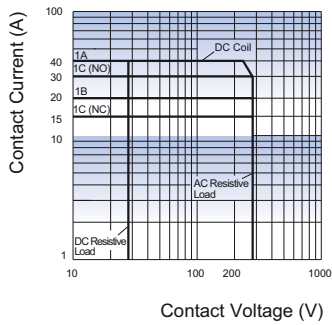
## 1 Form C



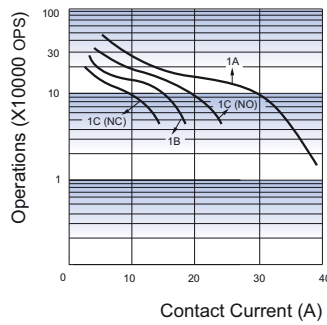
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be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

## CHARACTERISTIC CURVES

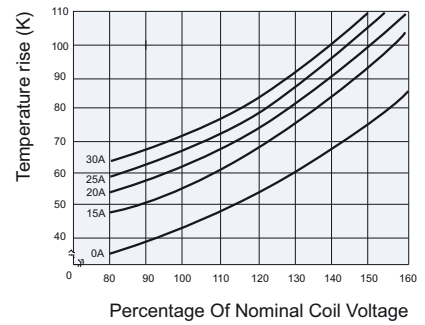
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Test conditions:**

Resistive load, AgCdO, Dust protected,  
 Room temp., 1s on 9s off.

**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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# HF2110/HF2120

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:CQC10002049166



### Features

- 30A switching capability
- PCB coil terminals, ideal for heavy duty load
- 2.5kV dielectric strength (between coil and contacts)
- Unenclosed type available

### CONTACT DATA

Contact arrangement	1A	1B	1C(NO)	1C(NC)
Contact resistance <sup>1)</sup>	50mΩ max.(at 1A 24VDC)			
Contact material	AgSnO <sub>2</sub> , AgCdO			
Contact rating (Res. load)	30A 240VAC 20A 30VDC	15A 240VAC 10A 30VDC	20A 240VAC 20A 30VDC	10A 240VAC 10A 30VDC
Max. switching power	11080VA 1200W	4511VA 450W	5540VA 600W	2770VA 300W
Max. switching voltage	277VAC / 30VDC			
Max. switching current	40A	15A	20A	10A
Mechanical endurance	1 x 10 <sup>7</sup> OPS			
Electrical endurance	1A type: 1 x 10 <sup>5</sup> OPS (30A 240VAC, Resistive load, AgCdO, Room temp., 1s on 9s off)			

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

### CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	HF2110/HF2120: 2500VAC 1min HF2111/HF2121: 2000VAC 1min
	Between open contacts	1500VAC 1min
Operate time (at rated. volt.)	15ms max.	
Release time (at rated. volt.)	10ms max.	
Ambient temperature	-55°C to 85°C	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1mm DA	
Humidity	5% to 85% RH	
Termination	HF2110/2111: PCB HF2120/2121: PCB & QC	
Unit weight	Approx. 25g	
Construction	Unenclosed	

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

2) Please find coil temperature curve in the characteristic curves below.

3) UL insulation system: Class F, Class B.

### COIL

Coil power	Approx. 900mW
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### COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max.1)	Drop-out Voltage VDC min.1)	Max. Voltage VDC*2)	Coil Resistance Ω
5	3.75	0.5	6.5	27 x (1±10%)
6	4.50	0.6	7.8	40 x (1±10%)
9	6.75	0.9	11.7	97 x (1±10%)
12	9.00	1.2	15.6	155 x (1±10%)
15	11.25	1.5	19.5	256 x (1±10%)
18	13.50	1.8	23.4	380 x (1±10%)
24	18.00	2.4	31.2	660 x (1±10%)
48	36.00	4.8	62.4	2560 x (1±10%)
70	52.50	7.0	91.0	5500 x (1±10%)
110	82.50	11.0	143.0	13450 x (1±10%)

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

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



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## SAFETY APPROVAL RATINGS

### UL/CUL

Load type	Volts	1 Form A	1 Form B	1 Form C (NO)	1 Form C (NC)
General purpose	125/240VAC	30A	15A	30A	15A
	277VAC	30A	30A	30A	30A
Resistive	125/240VAC	30A	15A	--	--
	30VDC	20A	10A	20A	10A
	277VAC	20A	--	--	--
	240VAC	15A	--	--	--
	250VAC	40A	--	40A	--
Ballast	125/240/277VAC	6A	3A	6A	3A
Pilot duty	125VAC	800VA	290VA	800VA	290VA
	125VAC	690VA	--	690VA	--
	125VAC	800VA	--	800VA	--
	240VAC	1152VA	768VA	1152VA	768VA
	277VAC	764VA	--	764VA	--
Motor load	125VAC	1HP	1/4HP	1HP	1/4HP
	240VAC	2HP	1HP	2HP	1HP
	125VAC	1HP	--	1HP	--
	125/277VAC	3/4HP	--	3/4HP	--
Definite purpose (LRA-loaded rotor) (FLA-full load)	120VAC	82.8LRA, 13.8FLA	--	82.8LRA, 13.8FLA	--
	125VAC	96LRA, 30FLA	33LRA, 10FLA	60LRA, 20FLA	33LRA, 10FLA
	125VAC	60LRA, 20FLA	30LRA, 12FLA	60LRA, 20FLA	30LRA, 12FLA
	125VAC	82.8LRA, 27FLA	--	82.8LRA, 27FLA	--
	240VAC	80LRA, 30FLA	33LRA, 10FLA	60LRA, 20FLA	33LRA, 10FLA
	240VAC	41.4LRA, 6.9FLA	--	41.4LRA, 6.9FLA	--
Tungsten	277VAC	60LRA, 20FLA	--	60LRA, 20FLA	--
	125VAC	15A	--	15A	--
	240VAC	5A	--	5A	3A
	120VAC	--	3A	--	--
	240VAC	--	3A	--	--

**Notes:** 1) All values unspecified are at room temperature.  
 2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

	<b>HF2110</b>	<b>-1A</b>	<b>-12D</b>	<b>T</b>	<b>F</b>	<b>(XXX)</b>
<b>Type</b>	<b>HF2120</b>					
<b>Contact arrangement</b>	1A: 1 Form A 1B: 1 Form B 1C: 1 Form C					
<b>Coil voltage</b>	5, 6, 9, 12, 15, 18, 24, 48, 70, 110VDC					
<b>Contact material</b>	T: AgSnO <sub>2</sub>		Nil: AgCdO			
<b>Insulation standard</b>	F: Class F		Nil: Class B			
<b>Special code</b> <sup>5)</sup>	XXX: Customer special requirement		Nil: Standard			

**Notes:** 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) Relays may be damaged because of falling or when shocking conditions exceed the requirement.  
 3) About preferable condition of operation, storage and transportation, please refer to "Explanation to terminology and guidelines of relay".  
 4) For unenclosed type, because there is no cover protection, the products may be contaminated by particles during transportation assembly or usage, which may cause relay failure, so the products should be effectively protected at customer side, Hongfa suggest to use HF2150/HF2160 type, if no other special requirement.  
 5) The customer special requirement express as special code after evaluating by Hongfa.

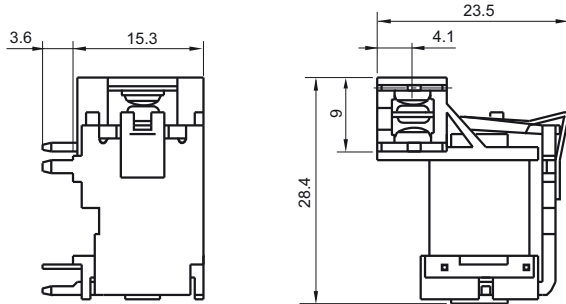


# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

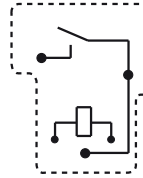
Unit: mm

## 1 Form A

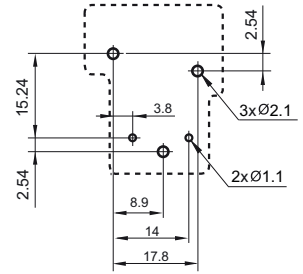
HF2111 Outline Dimensions



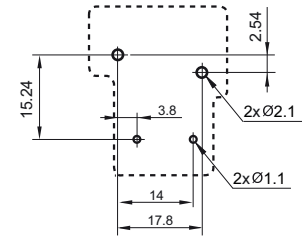
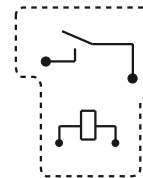
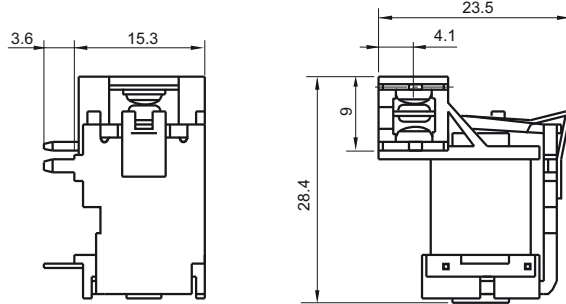
Wiring Diagram (Bottom view)



PCB Layout (Bottom view)

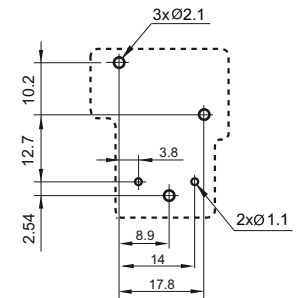
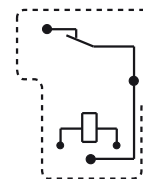
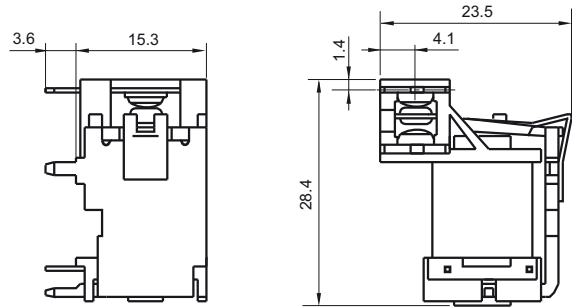


HF2110

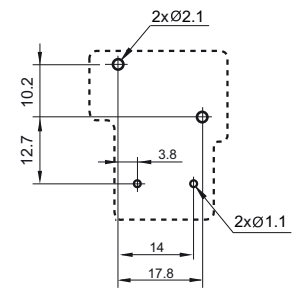
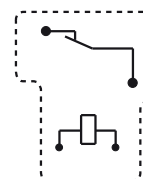
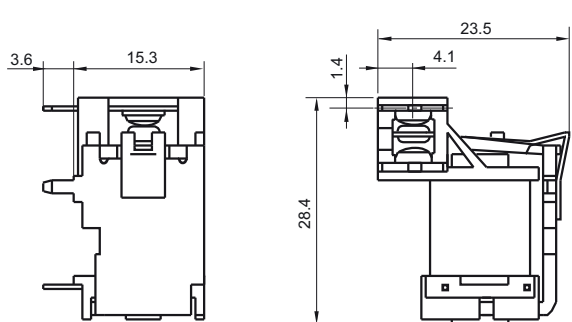


## 1 Form B

HF2111



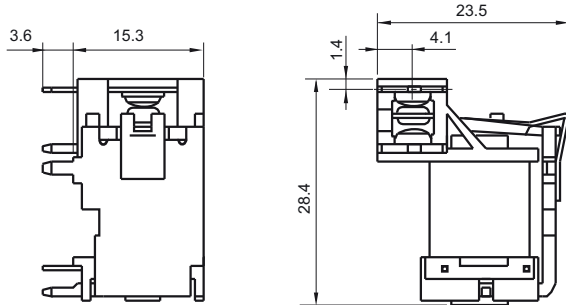
HF2110



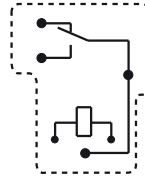
1 Form C

Outline Dimensions

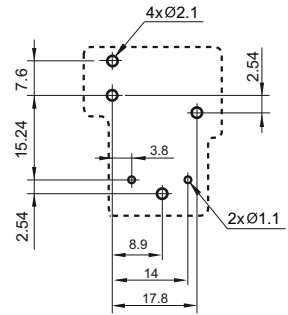
HF2111



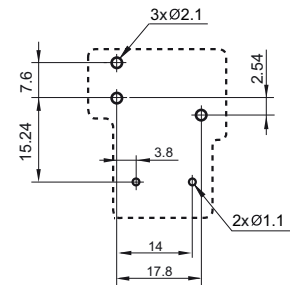
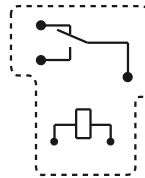
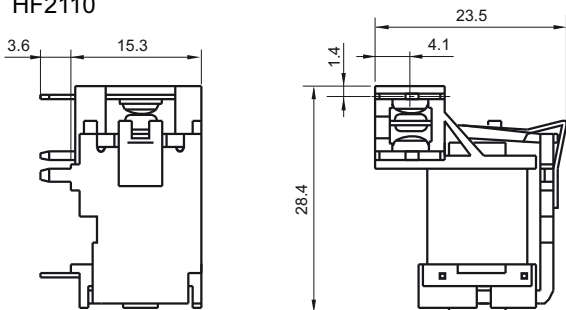
Wiring Diagram  
(Bottom view)



PCB Layout  
(Bottom view)

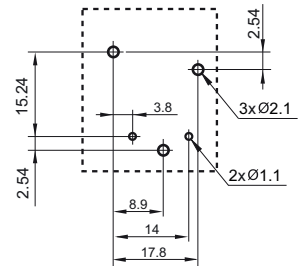
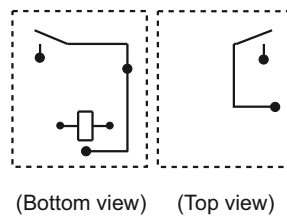
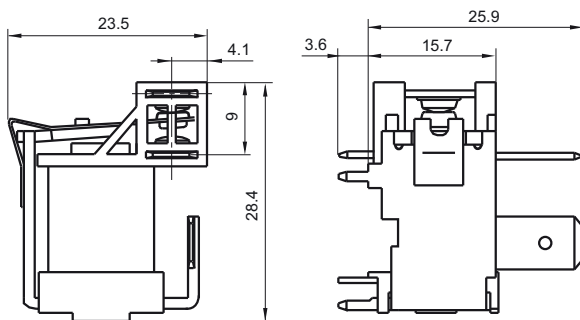


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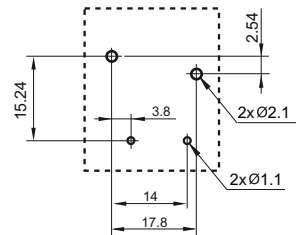
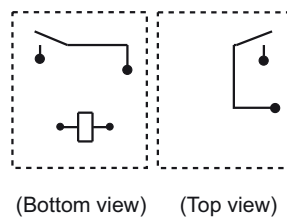
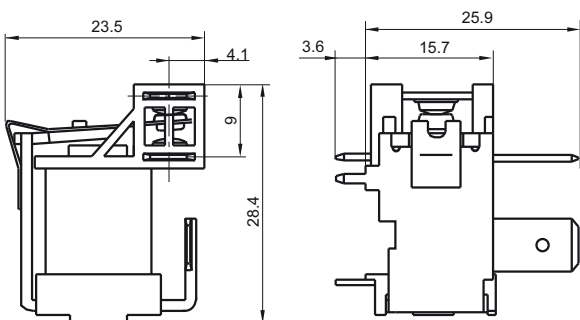


1 Form A

HF2121



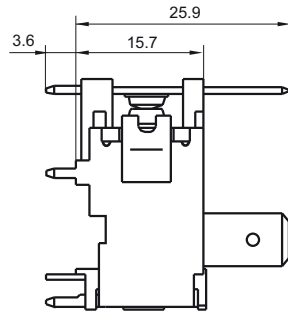
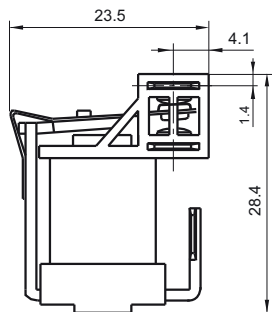
HF2120



1 Form B

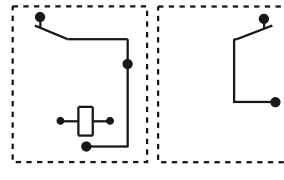
Outline Dimensions

HF2121



Wiring Diagram

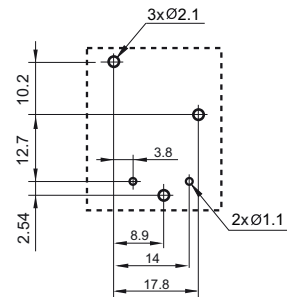
(Bottom view)



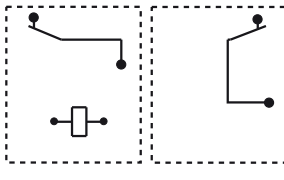
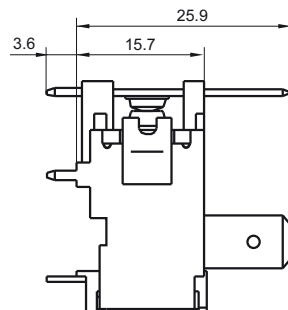
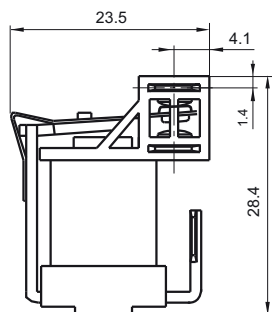
(Top view)

PCB Layout

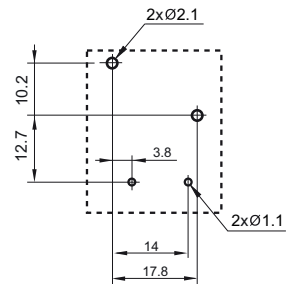
(Bottom view)



HF2120

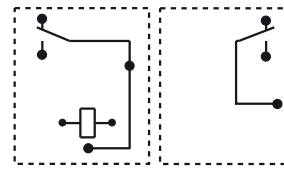
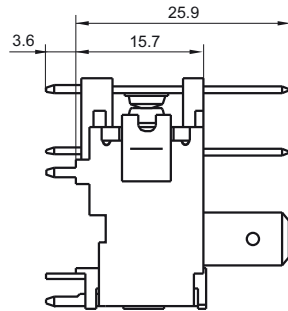
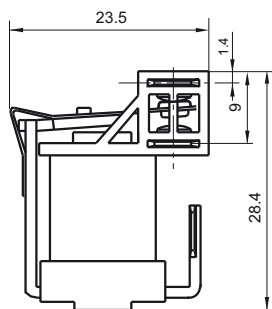


(Top view)

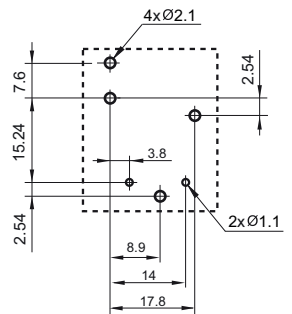


1 Form C

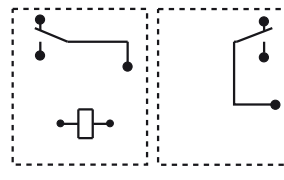
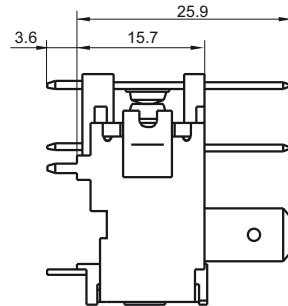
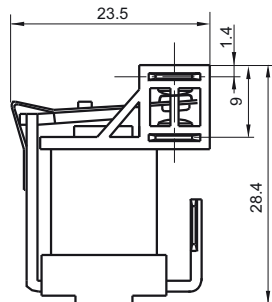
HF2121



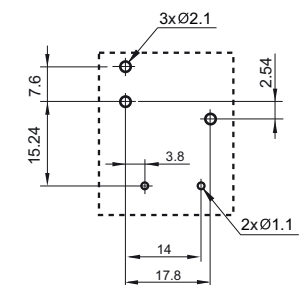
(Top view)



HF2120



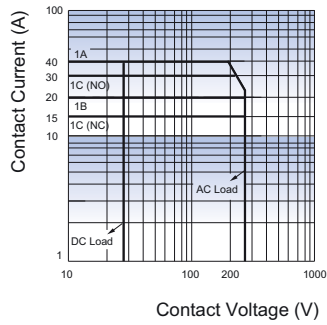
(Top view)



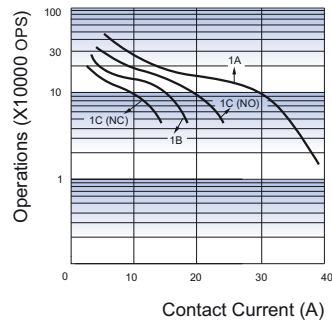
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be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

## CHARACTERISTIC CURVES

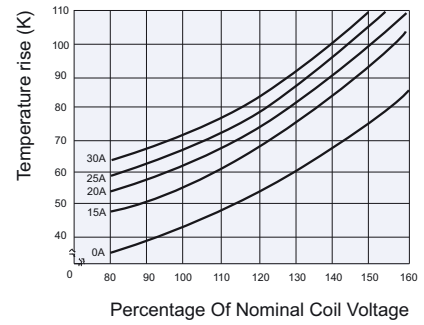
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Test conditions:**

Resistive load, AgCdO, Room temp.,  
1s on 9s off.

**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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# HF2150/HF2151

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.: R50153835



File No.:CQC10002049166  
CQC16002139675



## Features

- 30A switching capability
- PCB coil terminals, ideal for heavyduty load
- Heavy load up to 7200VA
- Plastic sealed and Dust protected type available

## CONTACT DATA

Contact arrangement	1A	1B	1C(NO)	1C(NC)
Contact resistance <sup>1)</sup>	50mΩ max.(at 1A 24VDC)			
Contact material	AgSnO <sub>2</sub> , AgCdO			
Contact rating (Res. load)	30A 240VAC 20A 30VDC	15A 240VAC 10A 30VDC	20A 240VAC 20A 30VDC	10A 240VAC 10A 30VDC
Max. switching power	11080VA 1200W	4155VA 450W	5540VA 600W	2770VA 300W
Max. switching voltage	277VAC / 30VDC			
Max. switching current	40A <sup>2)</sup>	15A	20A	10A
Mechanical endurance	1 x 10 <sup>7</sup> OPS			
Electrical endurance	1A type(Non-plastic sealed): 1 x 10 <sup>5</sup> OPS (30A 240VAC, Resistive load, AgCdO, Room temp., 1s on 9s off)			

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

2) Long time current-carrying under 40A condition is prohibited.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	HF2150: 2500VAC 1min HF2151: 2000VAC 1min
	Between open contacts	1500VAC 1min
Operate time (at rated. volt.)	15ms max.	
Release time (at rated. volt.)	10ms max.	
Ambient temperature	-55°C to 85°C	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Termination	PCB	
Unit weight	Approx. 30g	
Construction	Plastic sealed, Dust protected	

Notes: 1) For plastic sealed type, the venting-hole should be opened in test.

2) The data shown above are initial values.

3) Please find coil temperature curve in the characteristic curves below.

4) UL insulation system: Class F, Class B.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## COIL

Coil power Approx. 900mW

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
5	3.75	0.5	6.5	27 x (1±10%)
6	4.50	0.6	7.8	40 x (1±10%)
9	6.75	0.9	11.7	97 x (1±10%)
12	9.00	1.2	15.6	155 x (1±10%)
15	11.25	1.5	19.5	256 x (1±10%)
18	13.50	1.8	23.4	380 x (1±10%)
24	18.00	2.4	31.2	660 x (1±10%)
48	36.00	4.8	62.4	2560 x (1±10%)
70	52.50	7.0	91.0	5500 x (1±10%)
110	82.50	11.0	143.0	13450 x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

### UL/CUL

Contact material	Load type	Volts	1 Form A	1 Form B	1 Form C (NO)	1 Form C (NC)	
AgCdO	General purpose	125/240VAC	30A	15A	30A	15A	
		277VAC	30A	30A	30A	30A	
	Resistive	125/240VAC	30A	15A	--	--	
		30VDC	20A	10A	20A	10A	
		277VAC	20A	--	--	--	
		240VAC	15A	--	--	--	
		250VAC	40A			40A	
	Ballast	125/240/277VAC	6A	3A	6A	3A	
	Pilot duty	125VAC	800VA	290VA	800VA	290VA	
		125VAC	690VA	--	690VA	--	
		125VAC	800VA	--	800VA	--	
		240VAC	1152VA	768VA	1152VA	768VA	
		277VAC	764VA	--	764VA	--	
	Motor load	125VAC	1HP	1/4HP	1HP	1/4HP	
		240VAC	2HP	1HP	2HP	1HP	
		125VAC	1HP	--	1HP	--	
		125/277VAC	3/4HP	--	3/4HP	--	
	Definite purpose (LRA-loaded rotor) (FLA-full load)	120VAC	82.8LRA, 13.8FLA	--	82.8LRA, 13.8FLA	--	
		125VAC	96LRA, 30FLA	33LRA, 10FLA	60LRA, 20FLA	33LRA, 10FLA	
		125VAC	60LRA, 20FLA	30LRA, 12FLA	60LRA, 20FLA	30LRA, 12FLA	
		125VAC	82.8LRA, 27FLA	--	82.8LRA, 27FLA	--	
		240VAC	80LRA, 30FLA	33LRA, 10FLA	60LRA, 20FLA	33LRA, 10FLA	
		240VAC	41.4LRA, 6.9FLA	--	41.4LRA, 6.9FLA	--	
		277VAC	60LRA, 20FLA	--	60LRA, 20FLA	--	
	Tungsten	125VAC	15A	--	15A	--	
		240VAC	5A	--	5A	3A	
		120VAC	--	3A	--	--	
		240VAC	--	3A	--	--	
	AgSnO <sub>2</sub>	General purpose	125/240VAC	30A	--	--	--
		Resistive	250VAC	40A	--	--	--
General purpose		240VAC	--	15A	--	--	

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

Type	HF2150 HF2151	-1A	-12D	E	T	F	(XXX)
Contact arrangement	1A: 1 Form A 1B: 1 Form B 1C: 1 Form C						
Coil voltage	5, 6, 9, 12, 15, 18, 24, 48, 70, 110VDC						
Construction <sup>1)</sup>	E: Plastic sealed		Nil: Dust protected				
Contact material	T: AgSnO <sub>2</sub>		Nil: AgCdO				
Insulation standard	F: Class F		Nil: Class B				
Special code <sup>3)</sup>	XXX: Customer special requirement			Nil: Standard			

Notes: 1) We recommend dust protected types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.

3) The customer special requirement express as special code after evaluating by Hongfa.

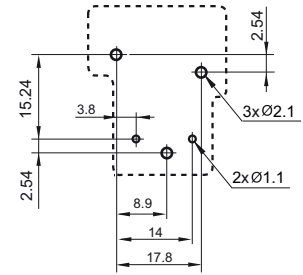
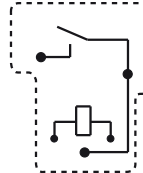
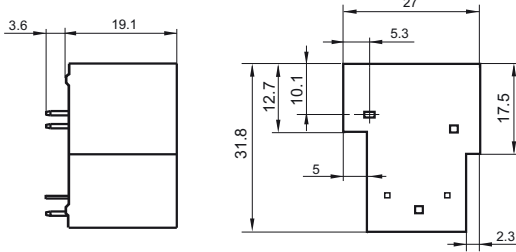
1 Form A

Outline Dimensions

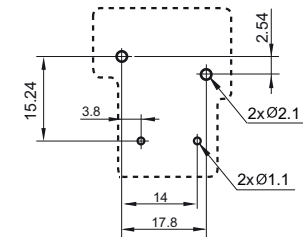
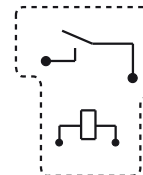
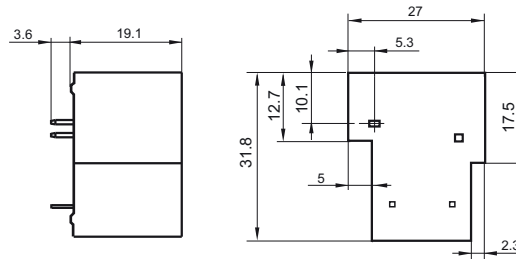
Wiring Diagram  
(Bottom view)

PCB Layout  
(Bottom view)

HF2151

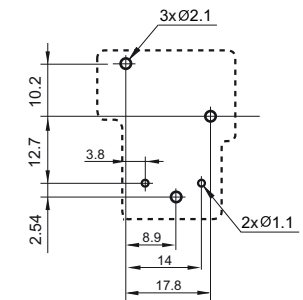
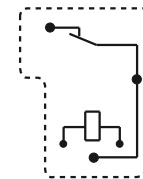
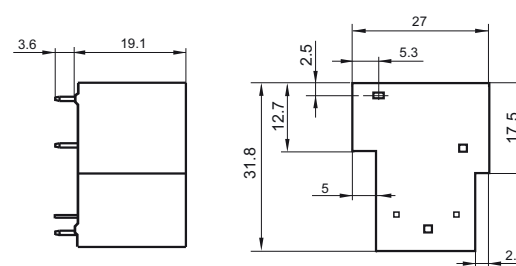


HF2150

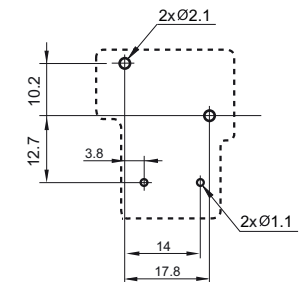
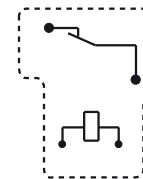
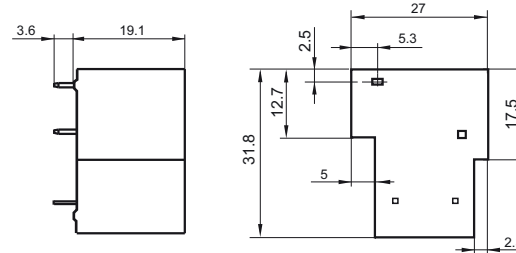


1 Form B

HF2151



HF2150



# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

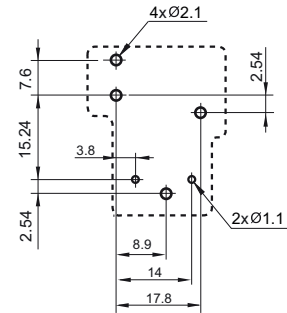
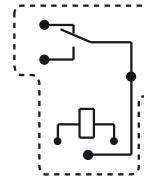
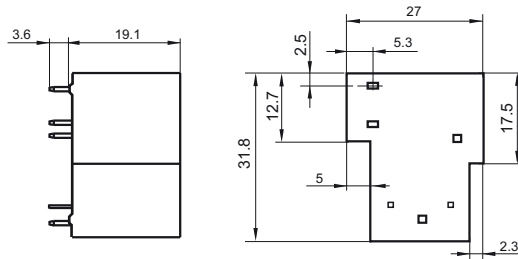
## 1 Form C

### Outline Dimensions

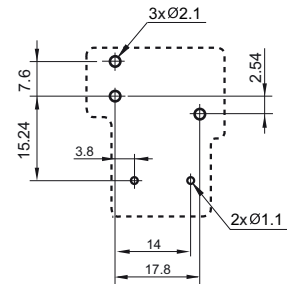
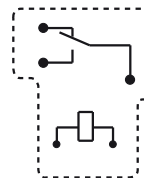
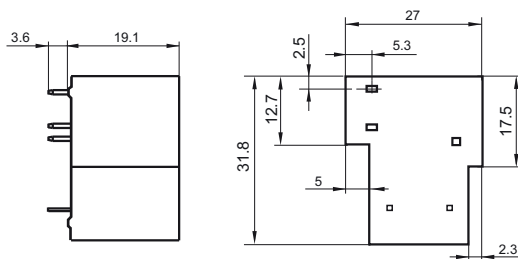
### Wiring Diagram (Bottom view)

### PCB Layout (Bottom view)

HF2151



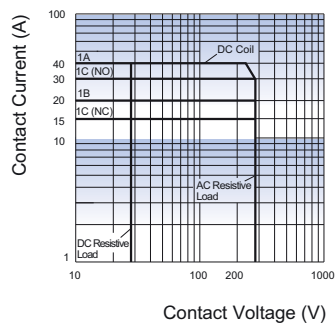
HF2150



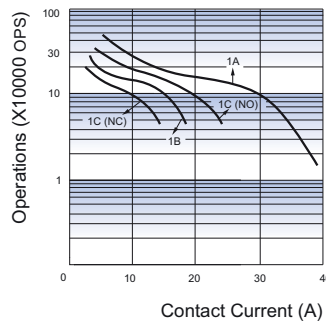
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be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

## CHARACTERISTIC CURVES

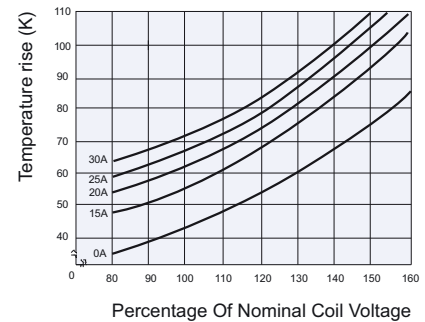
### MAXIMUM SWITCHING POWER



### ENDURANCE CURVE



### COIL TEMPERATURE RISE



#### Test conditions:

Resistive load, AgCdO, Dust protected,  
Room temp., 1s on 9s off.

### 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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# HF2160

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.: R50153835



File No.:CQC10002049166

CQC16002139675



## Features

- 30A switching capability
- PCB coil terminals, ideal for heavy duty load
- 2.5kV dielectric strength  
(between coil and contacts)
- Plastic sealed and Dust protected types available

## CONTACT DATA

Contact arrangement	1A	1B	1C (NO)	1C (NC)
Contact resistance <sup>1)</sup>	50mΩ max.(at 1A 24VDC)			
Contact material	AgSnO <sub>2</sub> , AgCdO			
Contact rating (Res. load)	30A 240VAC 20A 30VDC	15A 240VAC 10A 30VDC	20A 240VAC 20A 30VDC	10A 240VAC 10A 30VDC
Max. switching power	11080VA 1200W	4155VA 450W	5540VA 600W	2770VA 300W
Max. switching voltage	277VAC / 30VDC			
Max. switching current	40A <sup>2)</sup>	15A	20A	10A
Max.continuous current	When PCB terminals carry current ≤30A When PCB terminals do not carry current (only QC terminals carry current) ≤25A			
Mechanical endurance	1 x 10 <sup>7</sup> ops			
Electrical endurance	1A type(Non-plastic sealed): 1 x 10 <sup>5</sup> ops (30A 240VAC, Resistive load, AgCdO, Room temp., 1s on 9s off) 1B type(Non-plastic sealed): 1 x 10 <sup>5</sup> ops (15A 240VAC, Resistive load, AgCdO, Room temp., 1s on 9s off)			

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

2) Long time current-carrying under 40A condition is prohibited.

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2500VAC 1min
	Between open contacts	1500VAC 1min
Operate time (at rated. volt.)	15ms max.	
Release time (at rated. volt.)	10ms max.	
Ambient temperature	-55°C to 85°C	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Termination	PCB & QC	
Unit weight	Approx. 30g	
Construction	Plastic sealed, Dust protected	

Notes: 1) For plastic sealed type, the venting-hole should be opened in test.

2) The data shown above are initial values.

3) Please find coil temperature curve in the characteristic curves below.

4) UL insulation system: Class F, Class B.

5) It is recommended that the terminal of the process QC cannot pass through more than 25a current for a long period of time .



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## COIL

Coil power	Approx. 900mW
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## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max.1)	Drop-out Voltage VDC min.1)	Max. Voltage VDC*2)	Coil Resistance Ω
5	3.75	0.5	6.5	27 x (1±10%)
6	4.50	0.6	7.8	40 x (1±10%)
9	6.75	0.9	11.7	97 x (1±10%)
12	9.00	1.2	15.6	155 x (1±10%)
15	11.25	1.5	19.5	256 x (1±10%)
18	13.50	1.8	23.4	380 x (1±10%)
24	18.00	2.4	31.2	660 x (1±10%)
48	36.00	4.8	62.4	2560 x (1±10%)
70	52.50	7.0	91.0	5500 x (1±10%)
110	82.50	11.0	143.0	13450 x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

### UL/CUL

Contact material	Load type	Volts	1 Form A	1 Form B	1 Form C (NO)	1 Form C (NC)
AgCdO	General purpose	125/240VAC	30A	15A	30A	15A
		277VAC	30A	30A	30A	30A
	Resistive	125/240VAC	30A	15A	--	--
		30VDC	20A	10A	20A	10A
		277VAC	20A	--	--	--
		240VAC	15A	--	--	--
		250VAC	40A		40A	
	Ballast	125/240/277VAC	6A	3A	6A	3A
	Pilot duty	125VAC	800VA	290VA	800VA	290VA
		125VAC	690VA	--	690VA	--
		125VAC	800VA	--	800VA	--
		240VAC	1152VA	768VA	1152VA	768VA
		277VAC	764VA	--	764VA	--
	Motor load	125VAC	1HP	1/4HP	1HP	1/4HP
		240VAC	2HP	1HP	2HP	1HP
		125VAC	1HP	--	1HP	--
		125/277VAC	3/4HP	--	3/4HP	--
	Definite purpose (LRA-loaded rotor) (FLA-full load)	120VAC	82.8LRA, 13.8FLA	--	82.8LRA, 13.8FLA	--
		125VAC	96LRA, 30FLA	33LRA, 10FLA	60LRA, 20FLA	33LRA, 10FLA
		125VAC	60LRA, 20FLA	30LRA, 12FLA	60LRA, 20FLA	30LRA, 12FLA
		125VAC	82.8LRA, 27FLA	--	82.8LRA, 27FLA	--
		240VAC	80LRA, 30FLA	33LRA, 10FLA	60LRA, 20FLA	33LRA, 10FLA
		240VAC	41.4LRA, 6.9FLA	--	41.4LRA, 6.9FLA	--
		277VAC	60LRA, 20FLA	--	60LRA, 20FLA	--
	Tungsten	125VAC	15A	--	15A	--
		240VAC	5A	--	5A	3A
		120VAC	--	3A	--	--
		240VAC	--	3A	--	--
AgSnO <sub>2</sub>	General purpose	125/240VAC	30A	--	--	--
	Resistive	250VAC	40A	--	--	--
	General purpose	240VAC	--	15A	--	--

**Notes:** 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

Type	HF2160	-1A	-12D	E	T	F	(XXX)
Contact arrangement	1A: 1 Form A 1B: 1 Form B 1C: 1 Form C						
Coil voltage	5, 6, 9, 12, 15, 18, 24, 48, 70, 110VDC						
Construction <sup>1)2)</sup>	E: Plastic sealed		Nil: Dust protected				
Contact material	T: AgSnO <sub>2</sub>		Nil: AgCdO				
Insulation standard	F: Class F		Nil: Class B				
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard				

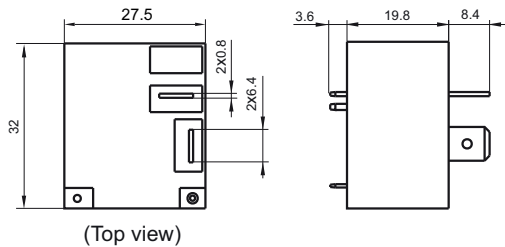
- Notes:** 1) We recommend dust protected types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

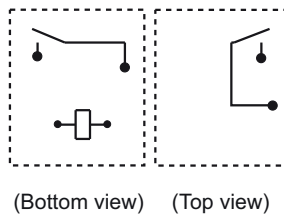
Unit: mm

### 1 Form A

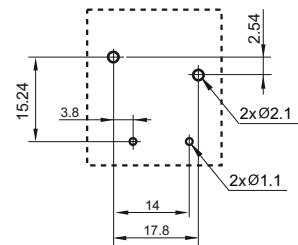
Outline Dimensions



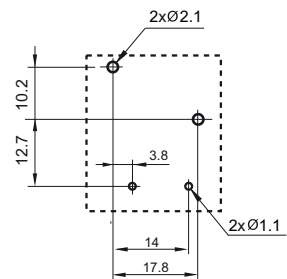
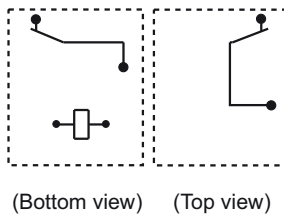
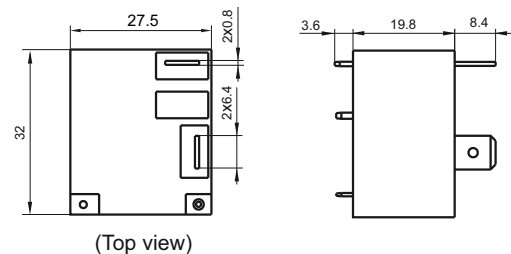
Wiring Diagram



PCB Layout  
(Bottom view)



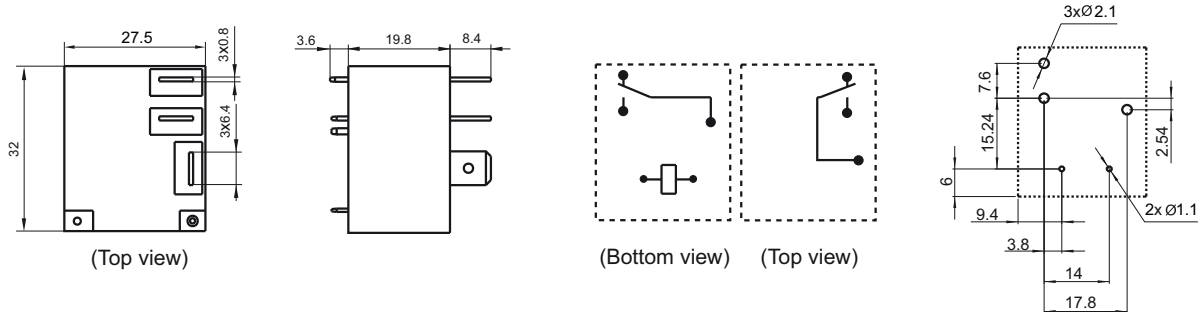
### 1 Form B



# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

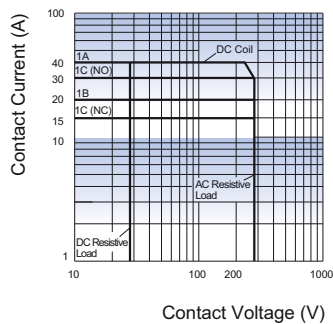
## 1 Form C



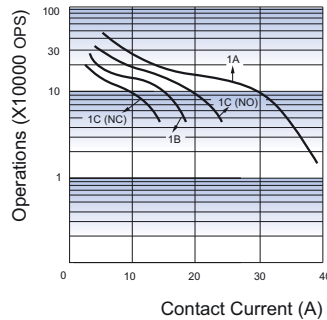
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1\text{mm}$ , tolerance should be  $\pm 0.2\text{mm}$ ; outline dimension  $> 1\text{mm}$  and  $\leq 5\text{mm}$ , tolerance should be  $\pm 0.3\text{mm}$ ; outline dimension  $> 5\text{mm}$ , tolerance should be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

# CHARACTERISTIC CURVES

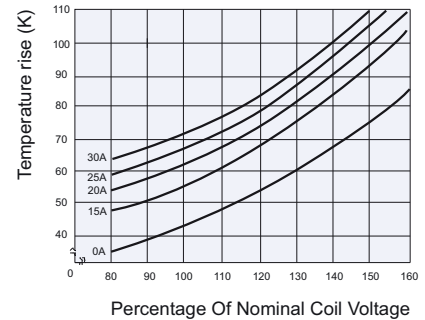
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Test conditions:**  
 Resistive load, AgCdO, Dust protected,  
 Room temp., 1s on 9s off.

### Disclaimer

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# HF172F-100

# SOLAR RELAY



File No.: E133481



File No.: R50393829



### Features

- 100A switching capability
- Applicable to solar photovoltaic inverter
- 4.0 mm contact gap
- Low coil holding voltage contributes to saving energy of equipment
- UL insulation system: Class F

### CONTACT DATA

Contact arrangement	1A
Contact resistance(initial)	6mΩ max.(6VDC 20A)
Contact material	AgNi
Contact rating (Res. load)	Making 30A, carrying 100A breaking 30A, 690VAC at 85°C
Max. switching voltage	800VAC
Max. switching current	100A
Max. switching power	24000VA
Mechanical endurance	1 x 10 <sup>6</sup> OPS
Electrical endurance	3 x 10 <sup>4</sup> OPS (Making 30A, carrying 100A breaking 30A, at 85°C 1s on 9s off)

### COIL

Coil power	Approx. 2.5W
Holding voltage	40% to 100% U <sub>N</sub> (at 25°C) 50% to 60%U <sub>N</sub> (at 85°C)

- Notes:** 1) The coil holding voltage is the voltage applied to coil 100ms after the rated voltage.  
2) To avoid overheating and burning, the coil can not be consistently applied to with voltage larger than maximum holding voltage.

### SAFETY APPROVAL RATINGS

UL/CUL (pending)	Making 60A, carrying 100A breaking 60A, 277VAC at 85°C
	Making 30A, carrying 100A breaking 30A, 800VAC at 85°C
TÜV (pending)	Making 60A, carrying 100A breaking 60A, 277VAC at 85°C
	Making 30A, carrying 100A breaking 30A, 800VAC at 85°C

- Notes:** 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.

### CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between open contacts	2000VAC 1min
	Between coil & contacts	5000VAC 1min
Surge Voltage	10kV(1.2 / 50μs)	
Operate time (at rated. volt.)	30ms max.	
Release time (at rated. volt.)	10ms max.	
Temperature rise	70K max. (Contact load current 100A, 50% to 60% rated voltage excitation, at 85°C)	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C (Apply holding voltage to coil)	
Termination	PCB	
Unit weight	Approx. 125g	
Construction	Flux proofed	

**Notes:** The data shown above are initial values.

### COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Max. Voltage VDC *	Coil Resistance Ω
6	4.5	0.3	6.6	14.4 x (1±10%)
9	6.75	0.45	9.9	32.4 x (1±10%)
12	9	0.6	13.2	57.6 x (1±10%)
24	18	1.2	26.4	230.4 x (1±10%)

**Notes:** \*Maximun voltage refers to the maximum voltage which relay coil could endure in a short period of time.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

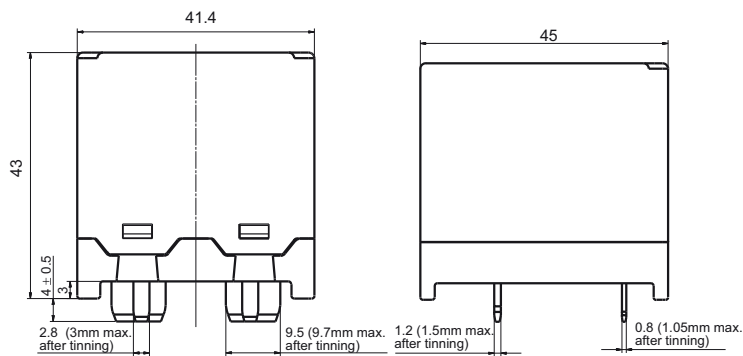
Type	HF172F-100/	12	-H	F	(XXX)
Coil voltage	6, 9, 12, 24VDC				
Contact arrangement	H:1 Form A				
Insulation standard	F: Class F				
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard		

- Notes:** 1) Flux-proofed relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.  
 2) Water clearing or surface process is not suggested after the flux-proofed relays are assembled on PCB.  
 3) The customer special requirement express as special code after evaluating by Hongfa.

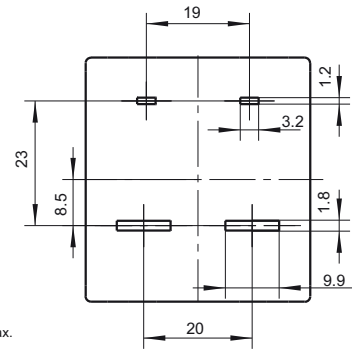
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

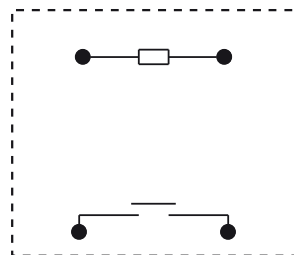
Outline Dimensions



PCB Layout  
(Bottom view)



Wiring Diagram  
(Bottom view)



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

### Disclaimer

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# HF172F-140

# SOLAR RELAY



File No.: E133481



File No.: R50393829



### Features

- 140A switching capability
- Applicable to solar photovoltaic inverter
- 3.0 mm contact gap
- Low coil holding voltage contributes to saving energy of equipment
- UL insulation system: Class F

### CONTACT DATA

Contact arrangement	1A
Contact resistance(initial)	6mΩ max.(6VDC 20A)
Contact material	AgNi
Contact rating (Res. load)	Making 40A, carrying 140A breaking 40A, 400VAC at 85°C
Max. switching voltage	800VAC
Max. switching current	140A
Max. switching power	24000VA
Mechanical endurance	1 x 10 <sup>6</sup> OPS
Electrical endurance	3 x 10 <sup>4</sup> OPS (Making 40A, carrying 140A breaking 40A, at 85°C 1s on 9s off)

### COIL

Coil power	Approx. 2.5W
Holding voltage	40% to 100% U <sub>N</sub> (at 25°C) 50% to 60% U <sub>N</sub> (at 85°C)

**Notes:** 1) The coil holding voltage is the voltage applied to coil 100ms after the rated voltage.  
2) To avoid overheating and burning, the coil can not be consistently applied to with voltage larger than maximum holding voltage.

### SAFETY APPROVAL RATINGS

UL/CUL	Making 60A, carrying 140A breaking 60A, 277VAC at 85°C
	Making 40A, carrying 140A breaking 40A, 400VAC at 85°C
	Making 30A, carrying 140A breaking 30A, 800VAC at 85°C
TÜV	Making 60A, carrying 140A breaking 60A, 277VAC at 85°C
	Making 40A, carrying 140A breaking 40A, 400VAC at 85°C
	Making 30A, carrying 140A breaking 30A, 800VAC at 85°C

**Notes:** 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.

### CHARACTERISTICS

Insulation resistance		1000MΩ (at 500VDC)
Dielectric strength	Between open contacts	2000VAC 1min
	Between coil & contacts	5000VAC 1min
Surge Voltage		10kV(1.2 / 50μs)
Operate time (at rated. volt.)		30ms max.
Release time (at rated. volt.)		10ms max.
Temperature rise		70K max. (Contact load current 140A, 50% to 60% rated voltage excitation, at 85°C)
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance		10Hz to 55Hz 1.5mm DA
Humidity		5% to 85% RH
Ambient temperature		-40°C to 85°C (Apply holding voltage to coil)
Termination		PCB
Unit weight		Approx. 135g
Construction		Flux proofed

**Notes:** The data shown above are initial values.

### COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max.	Drop-out Voltage VDC min.	Max. Voltage VDC *	Coil Resistance Ω
6	4.5	0.3	6.6	14.4 x (1±10%)
9	6.75	0.45	9.9	32.4 x (1±10%)
12	9	0.6	13.2	57.6 x (1±10%)
24	18	1.2	26.4	230.4 x (1±10%)

**Notes:** \*Maximun voltage refers to the maximun voltage which relay coil could endure in a short period of time.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

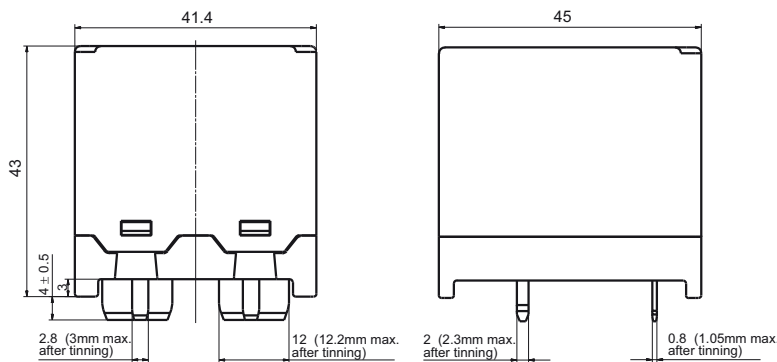
Type	HF172F-140/	12	-H	F	(XXX)
Coil voltage	6, 9, 12, 24VDC				
Contact arrangement	H:1 Form A				
Insulation standard	F: Class F				
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard		

**Notes:** 1) Flux-proofed relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.  
 2) Water clearing or surface process is not suggested after the flux-proofed relays are assembled on PCB.  
 3) The customer special requirement express as special code after evaluating by Hongfa.

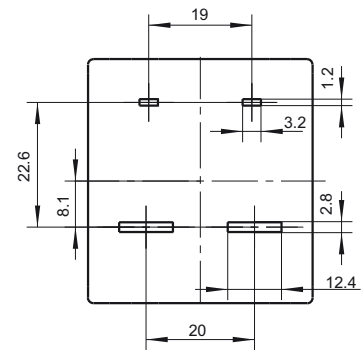
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PCB BOARD LAYOUT

Unit: mm

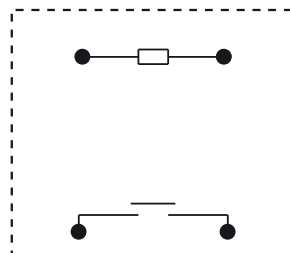
Outline Dimensions



PCB Layout  
(Bottom view)



Wiring Diagram  
(Bottom view)



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

### 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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# HF116F-1

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:R 50154722



File No.:CQC09002031231  
CQC18002206328



## Features

- 30A switching capability
- 4kV dielectric strength (between coil and contacts)
- 3mm contact gap available

## CONTACT DATA

Contact arrangement	1A	2A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 24VDC)	
Contact material	AgSnO <sub>2</sub> , AgCdO	
Contact rating (Res. load)	30A 240VAC 30A 277VAC	25A 240VAC 25A 277VAC
Max. switching voltage	277VAC	
Max. switching current	30A	25A
Max. switching power	8310VA	6925VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance	1H,1HT type: 1 x 10 <sup>5</sup> OPS (30A 240VAC, Resistive load, Room temp., 1s on 9s off) 2H,2HT type: 1 x 10 <sup>5</sup> OPS (25A 240VAC, Resistive load, Room temp., 1s on 9s off)	

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	2000VAC 1min
Operate time (at nomi. volt.)	30ms max.(DC type)	
Release time (at nomi. volt.)	30ms max.(DC type)	
Shock resistance	Functional	Standard:98m/s <sup>2</sup> Pulse width 11ms W type:98m/s <sup>2</sup> Pulse width 6ms
	Destructive	980m/s <sup>2</sup> Pulse width 6ms
Vibration resistance	Standard:10H to 55Hz 1.5mm DA W type:10H to 55Hz 1.0mm DA	
Ambient temperature	-55°C to 70°C	
Humidity	5% to 85% RH	
Termination	PCB, QC, Screw	
Unit weight	Approx. 120g	
Construction	Dust protected	

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

2) Please find coil temperature curve in the characteristic curves below.

3) UL insulation system: Class F, Class B.

## COIL

Coil power	DC type: Approx. 1.9W; AC type: Approx. 2.7VA
------------	--

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max <sup>1)</sup>	Drop-out Voltage VDC min <sup>1)</sup>	Max. Voltage VDC *2)	Coil Resistance Ω
3	2.25	0.3	3.3	4.7 x (1±10%)
6	4.50	0.6	6.6	18.8 x (1±10%)
12	9.00	1.2	13.2	75 x (1±10%)
24	18.0	2.4	26.4	300 x (1±10%)
48	36.0	4.8	52.8	1200 x (1±10%)
100	75.0	10.0	110	5200 x (1±10%)
110	82.5	11.0	121	6300 x (1±10%)
200	150	20.0	220	21000 x (1±10%)

Nominal Voltage VAC	Pick-up Voltage VAC <sup>1)</sup>	Drop-out Voltage VAC <sup>1)</sup>	Max. Voltage VAC *2)	Coil Resistance Ω
6	4.80	0.90	6.6	18.8 x (1±10%)
12	9.60	1.80	13.2	75 x (1±10%)
24	19.2	3.60	26.4	300 x (1±10%)
48	38.4	7.20	52.8	1200 x (1±10%)
120	96.0	18.0	132	5200 x (1±10%)
220/240	176	33.0	242	20800 x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	AgSnO <sub>2</sub>	30A 277VAC 1.5HP 120VAC 3HP 240VAC 10A 120VAC Tungsten
	AgCdO	30A 277VAC 1.5HP 120VAC 3HP 240VAC 10A 120VAC Tungsten TV-10 120VAC
TÜV		27A 240VAC COSφ=0.8 25A 240VAC COSφ=0.4 25A 240VAC COSφ=1

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

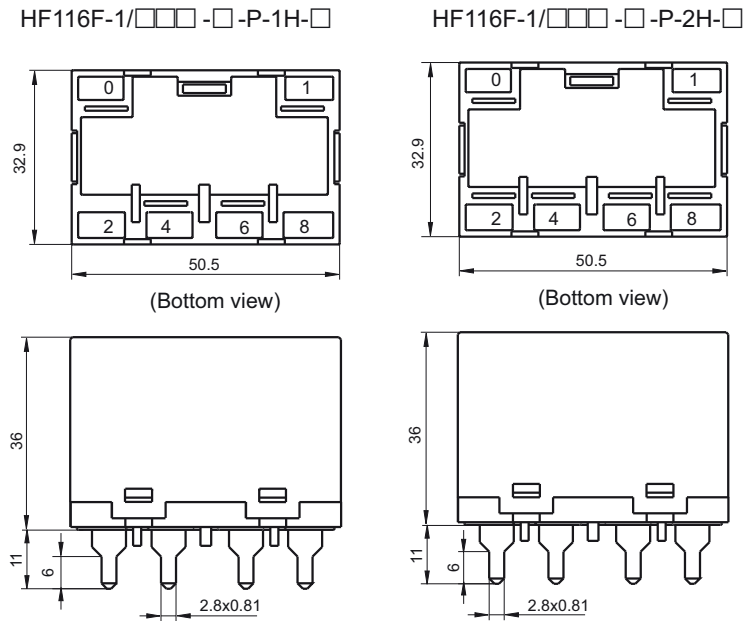
HF116F-1 / 012 D A -1H T F W C (XXX)	
Type	
Coil voltage	DC: 3VDC to 200VDC AC: 6VAC to 220VAC
Coil voltage form	D: DC      A: AC
Mounting	A: Mount    P: PCB      F: Flanged
Contact arrangement	1H: 1 Form A    2H: 2 Form A
Contact material	T: AgSnO <sub>2</sub> Nil: AgCdO
Insulation standard	F: Class F      Nil: Class B
Contact Gap	W: 3.0mm      Nil: Standard
Capacitor	C: With Capacitor(Only for AC)    Nil: Without Capacitor
Special code <sup>3)</sup>	XXX: Customer special requirement    Nil: Standard

**Notes:** 1) Water cleaning or surface process is not suggested after the dust-protected relays are assembled on PCB.  
 2) Dust-protected relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.  
 3) The customer special requirement express as special code after evaluating by Hongfa.

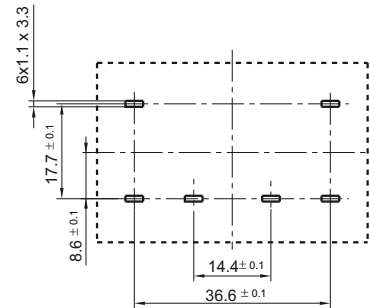
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

### Outline Dimensions

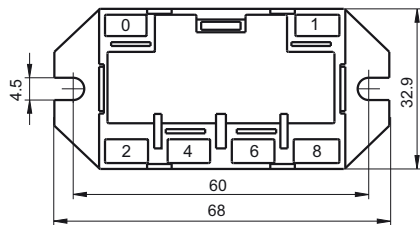


### PCB Layout (Bottom view)

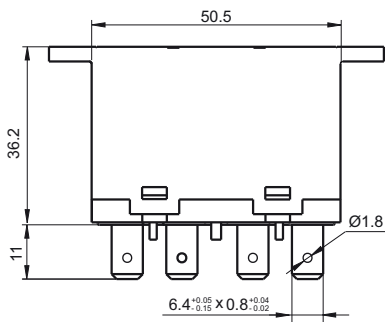


Outline Dimensions

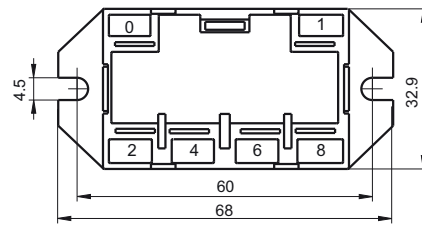
HF116F-1/□□□□-□-F-1H-□



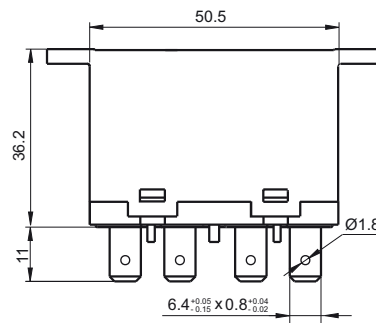
(Bottom view)



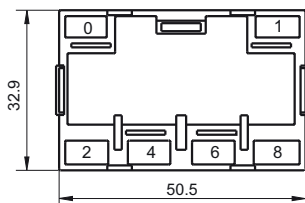
HF116F-1/□□□□-□-F-2H-□



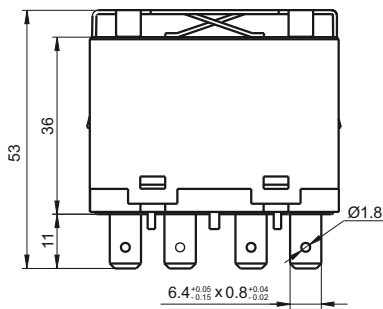
(Bottom view)



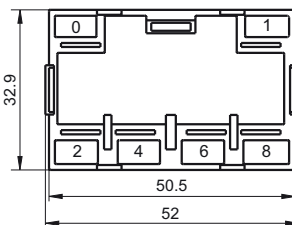
HF116F-1/□□□□-□-A-1H-□



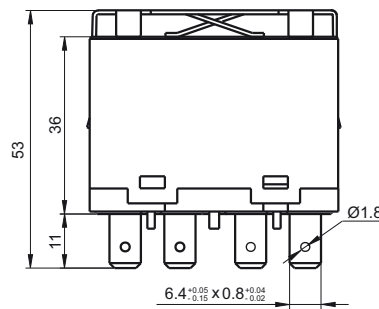
(Bottom view)



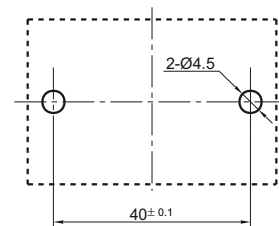
HF116F-1/□□□□-□-A-2H-□



(Bottom view)

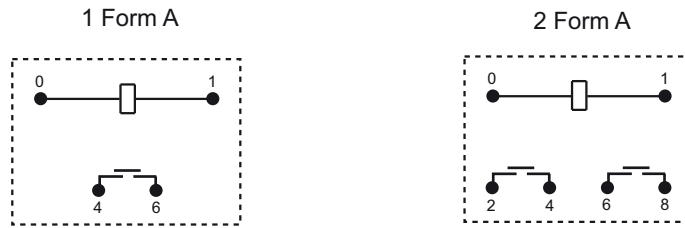


Mounting Holes

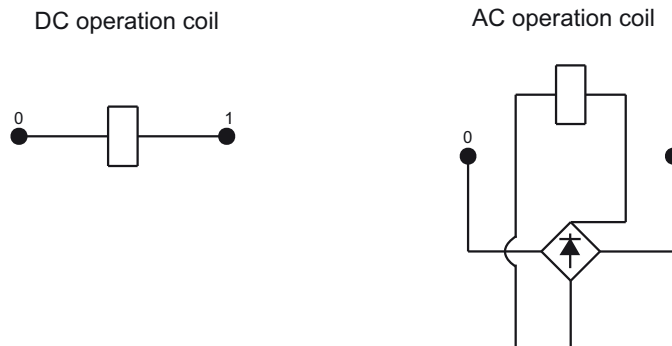


- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
 2) The tolerance without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

**Wiring Diagram**  
(Bottom view)

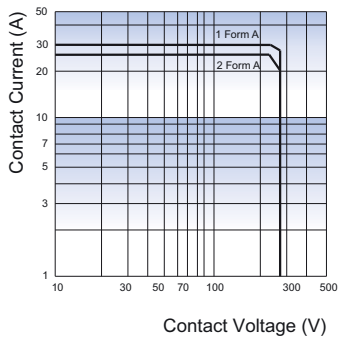


**Coil Inner Circuit**

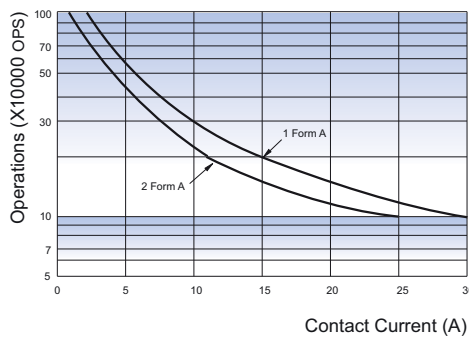


**CHARACTERISTIC CURVES**

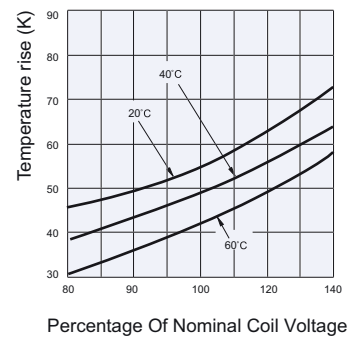
**MAXIMUM SWITCHING POWER**



**ENDURANCE CURVE**



**COIL TEMPERATURE RISE**



**Test conditions:**  
250VAC, Resistive load, Room temp.,  
1s on 9s off

**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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# HF116F-2

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:R 50154722



File No.:CQC09002031231  
CQC18002206328



## Features

- 30A switching capability
- 4kV dielectric strength (between coil and contacts)
- 3mm contact gap available

## CONTACT DATA

Contact arrangement	1A	2A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 24VDC)	
Contact material	AgSnO <sub>2</sub> , AgCdO	
Contact rating (Res. load)	30A 240VAC 30A 277VAC	25A 240VAC 25A 277VAC
Max. switching voltage	277VAC	
Max. switching current	30A	25A
Max. switching power	8310VA	6925VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance	1H,1HT type: 1 x 10 <sup>5</sup> OPS (30A 240VAC, Resistive load, Room temp., 1s on 9s off) 2H,2HT type: 1 x 10 <sup>5</sup> OPS (25A 240VAC, Resistive load, Room temp., 1s on 9s off)	

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	2000VAC 1min
Operate time (at nomi. vot.)	30ms max.(DC type)	
Release time (at nomi. vot.)	30ms max.(DC type)	
Shock resistance	Functional	Standard:98m/s <sup>2</sup> Pulse width 11ms W type:98m/s <sup>2</sup> Pulse width 6ms
	Destructive	980m/s <sup>2</sup> Pulse width 6ms
Vibration resistance	Standard:10H to 55Hz 1.5mm DA W type:10H to 55Hz 1.0mm DA	
Ambient temperature	-55°C to 70°C	
Humidity	5% to 85% RH	
Termination	PCB, QC, Screw	
Unit weight	Approx.120g	
Construction	Plastic sealed, Flux proofed	

- Notes: 1) The data shown above are initial values.  
2) Please find coil temperature curve in the characteristic curves below.  
3) For the plastic sealed type, please open two vent holes after installing relay (or cleansing PCB board) in order to increase the relay reliability.  
4) UL insulation system: Class F, Class B.

## COIL

Coil power	DC type: Approx. 1.9W; AC type: Approx. 2.7VA
------------	--

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max <sup>1)</sup>	Drop-out Voltage VDC min <sup>1)</sup>	Max. Voltage VDC* <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.3	3.3	4.7 x (1±10%)
6	4.50	0.6	6.6	18.8 x (1±10%)
12	9.00	1.2	13.2	75 x (1±10%)
24	18.0	2.4	26.4	300 x (1±10%)
48	36.0	4.8	52.8	1200 x (1±10%)
100	75.0	10.0	110	5200 x (1±10%)
110	82.5	11.0	121	6300 x (1±10%)
200	150	20.0	220	21000 x (1±10%)

Nominal Voltage VAC	Pick-up Voltage VAC max. <sup>1)</sup>	Drop-out Voltage VAC min. <sup>1)</sup>	Max. Voltage VAC* <sup>2)</sup>	Coil Resistance Ω
6	4.80	0.90	6.6	18.8 x (1±10%)
12	9.60	1.80	13.2	75 x (1±10%)
24	19.2	3.60	26.4	300 x (1±10%)
48	38.4	7.20	52.8	1200 x (1±10%)
120	96.0	18.0	132	5200 x (1±10%)
220/240	176	33.0	242	20800 x (1±10%)

- Notes: 1) The data shown above are initial values.  
2) \* Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## SAFETY APPROVAL RATINGS

UL/CUL	AgSnO <sub>2</sub>	30A 277VAC 1.5HP 120VAC 3HP 240VAC 10A 120VAC Tungsten
	AgCdO	30A 277VAC 1.5HP 120VAC 3HP 240VAC 10A 120VAC Tungsten TV-10 120VAC
TÜV		27A 240VAC COSØ=0.8
		25A 240VAC COSØ=0.4
		25A 240VAC COSØ=1

- Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

HF116F-2 / 012 D L -1H S T F W (XXX)		
Type		
Coil voltage	DC: 3VDC to 200VDC AC: 6VAC to 220VAC	
Coil input	D: DC	A: AC
Mounting	P: PCB	L: Screw
Contact arrangement	1H: 1 Form A	2H: 2 Form A
Construction <sup>1)2)</sup>	S: Plastic sealed	Nil: Flux proofed
Contact material <sup>3)</sup>	T: AgSnO <sub>2</sub>	Nil: AgCdO
Insulation standard	F: Class F	Nil: Class B
Contact Gap	W: 3.0mm	Nil: Standard
Special code <sup>4)</sup>	XXX: Customer special requirement	Nil: Standard

- Notes: 1) We recommend flux proofed types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.). We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc).
- 2) Contact is recommended for suitable condition and specifications if water cleaning or surface process is involved in assembling relays on PCB.
- 3) For the applications of motor load, capacitive load and high inrush current, AgSnO<sub>2</sub> contact material is recommended. For the applications of resistive load or low inductive load, AgCdO contact material is recommended.
- 4) The customer special requirement express as special code after evaluating by Hongfa.

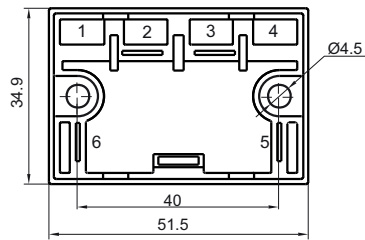
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

### Outline Dimensions

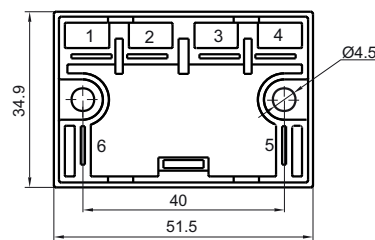
### Mounting Holes

HF116F-2/□□□□-□-L-1H-□

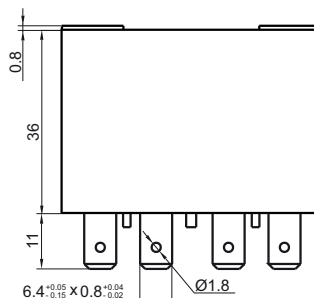
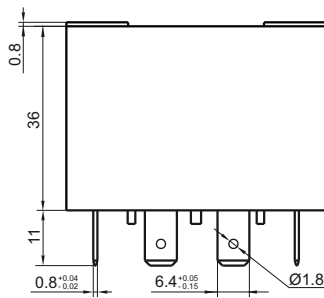
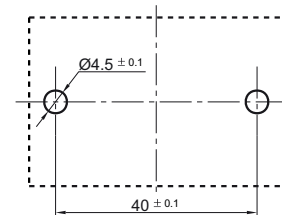


(Bottom view)

HF116F-2/□□□□-□-L-2H-□



(Bottom view)



# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

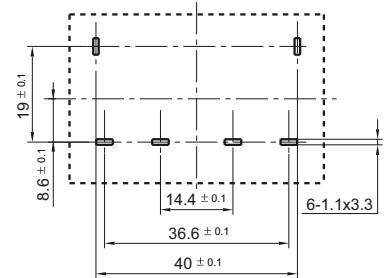
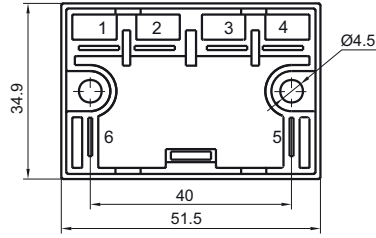
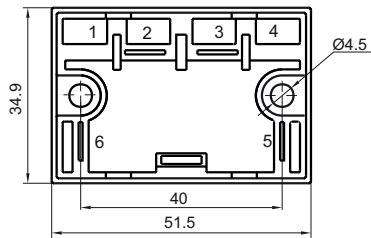
Unit: mm

## Outline Dimensions

## PCB Layout (Bottom view)

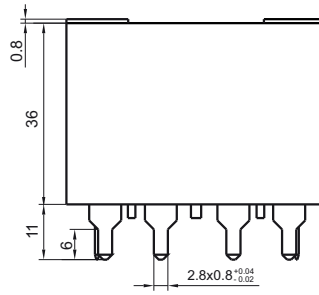
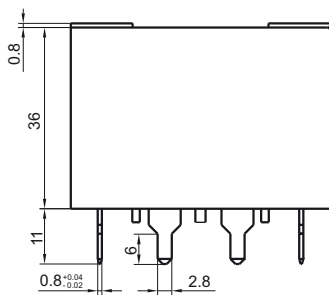
HF116F-2/□□□□-□-P-1H-□

HF116F-2/□□□□-□-P-2H-□



(Bottom view)

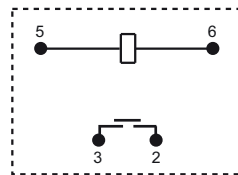
(Bottom view)



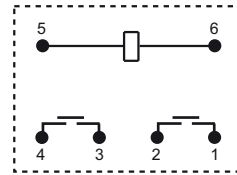
Remark: 1) In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.  
2) The tolerance without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

## Wiring Diagram (Bottom view)

1 Form A

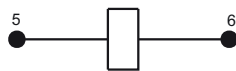


2 Form A

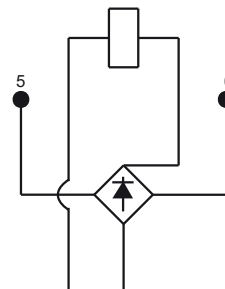


## Coil Inner Circuit

DC operation coil

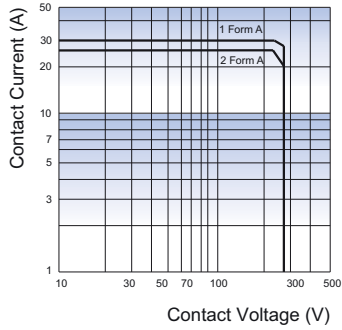


AC operation coil

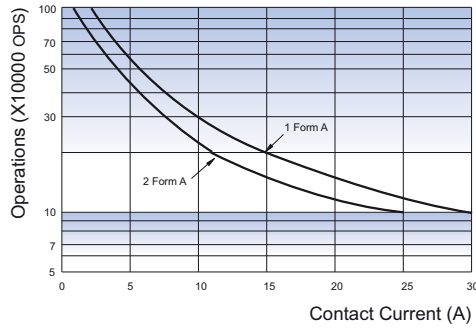


## CHARACTERISTIC CURVES

MAXIMUM SWITCHING POWER

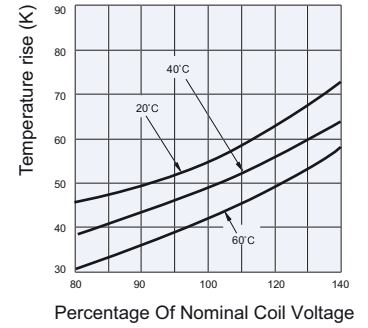


ENDURANCE CURVE



**Test conditions:**  
250VAC, Resistive load, Flux proofed,  
Room temp., 1s on 9s off

COIL TEMPERATURE RISE



### 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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# HF116F-3

# MINIATURE HIGH POWER RELAY



File No.:E134517



File No.:R 50154722



File No.:CQC09002031231  
CQC18002206328



## Features

- 30A switching capability
- 4kV dielectric strength (between coil and contacts)
- 3mm contact gap available

## CONTACT DATA

Contact arrangement	1A	2A
Contact resistance <sup>1)</sup>	100mΩ max.(at 1A 24VDC)	
Contact material	AgSnO <sub>2</sub> , AgCdO	
Contact rating (Res. load)	30A 240VAC 30A 277VAC	25A 240VAC 25A 277VAC
Max. switching voltage	277VAC	
Max. switching current	30A	25A
Max. switching power	8310VA	6925VA
Mechanical endurance	1 x 10 <sup>7</sup> OPS	
Electrical endurance	1H, 1HT type: 1 x 10 <sup>5</sup> OPS (30A 240VAC, Resistive load, Room temp., 1s on 9s off) 2H, 2HT type: 1 x 10 <sup>5</sup> OPS (25A 240VAC, Resistive load, Room temp., 1s on 9s off)	

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	2000VAC 1min
Operate time (at nomi. volt.)	30ms max.(DC type)	
Release time (at nomi. volt.)	30ms max.(DC type)	
Shock resistance	Functional	Standard:98m/s <sup>2</sup> Pulse width 11ms W type:98m/s <sup>2</sup> Pulse width 6ms
	Destructive	980m/s <sup>2</sup> Pulse width 6ms
Vibration resistance	Standard:10H to 55Hz 1.5mm DA W type:10H to 55Hz 1.0mm DA	
Ambient temperature	-55°C to 70°C	
Humidity	5% to 85% RH	
Termination	PCB, QC, Screw	
Unit weight	Approx.120g	
Construction	Dust protected	

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

2) Please find coil temperature curve in the characteristic curves below.

3) UL insulation system: Class F, Class B.

## COIL

Coil power	DC type: Approx. 1.9W; AC type: Approx. 2.7VA
------------	--

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max <sup>1)</sup>	Drop-out Voltage VDC min <sup>1)</sup>	Max. Voltage VDC *2)	Coil Resistance Ω
3	2.25	0.3	3.3	4.7 x (1±10%)
6	4.50	0.6	6.6	18.8 x (1±10%)
12	9.00	1.2	13.2	75 x (1±10%)
24	18.0	2.4	26.4	300 x (1±10%)
48	36.0	4.8	52.8	1200 x (1±10%)
100	75.0	10.0	110	5200 x (1±10%)
110	82.5	11.0	121	6300 x (1±10%)
200	150	20.0	220	21000 x (1±10%)

Nominal Voltage VAC	Pick-up Voltage VAC max. <sup>1)</sup>	Drop-out Voltage VAC min. <sup>1)</sup>	Max. Voltage VAC *2)	Coil Resistance Ω
6	4.80	0.90	6.6	18.8 x (1±10%)
12	9.60	1.80	13.2	75 x (1±10%)
24	19.2	3.60	26.4	300 x (1±10%)
48	38.4	7.20	52.8	1200 x (1±10%)
120	96.0	18.0	132	5200 x (1±10%)
220/240	176	33.0	242	20800 x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL	AgSnO <sub>2</sub>	30A 277VAC 1.5HP 120VAC, 3HP 240VAC 10A 120VAC Tungsten
	AgCdO	30A 277VAC 1.5HP 120VAC, 3HP 240VAC 10A 120VAC Tungsten
TÜV		TV-10 120VAC
		27A 240VAC COSØ = 0.8
		25A 240VAC COSØ = 0.4 25A 240VAC COSØ = 1

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

Type	HF116F-3 / 012 D F -1H T F W C (XXX)	
Coil voltage	DC: 3VDC to 200VDC AC: 6VAC to 240VAC	
Coil voltage form	D: DC	A: AC
Mouting	A: Mount	F: Flanged
Contact arrangement	1H: 1 Form A	2H: 2 Form A
Contact material	T: AgSnO <sub>2</sub>	Nil: AgCdO
Insulation standard	F: Class F	Nil: Class B
Contact Gap	W: 3.0mm	Nil: Standard
Capacitor	C: With Capacitor(Only for AC)	Nil: Without Capacitor
Special code <sup>3)</sup>	XXX: Customer special requirement	Nil: Standard

Notes: 1) Water cleaning or surface process is not suggested after the dust-protected relays are assembled on PCB.

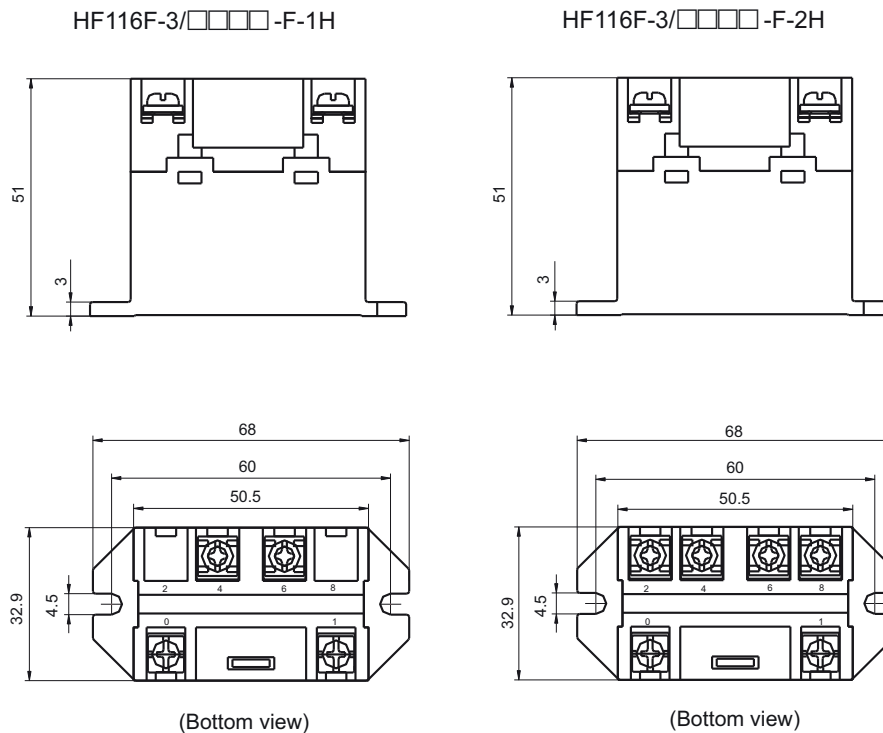
2) dust-protected relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.

3) The customer special requirement express as special code after evaluating by Hongfa.

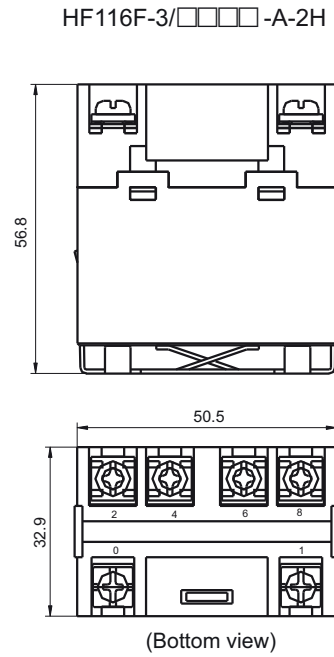
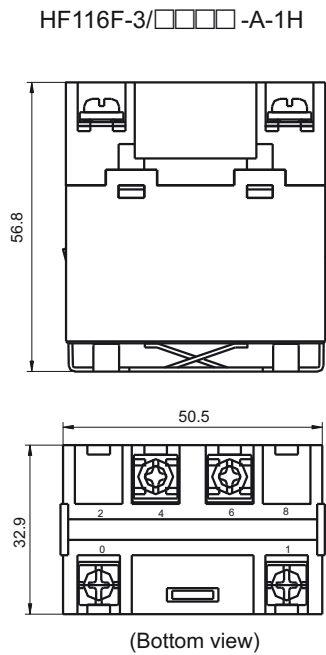
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

### Outline Dimensions

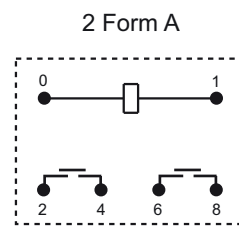
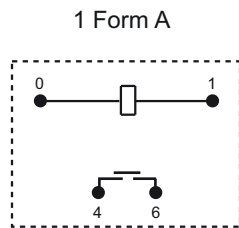


Outline Dimensions

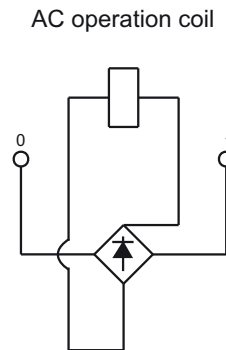
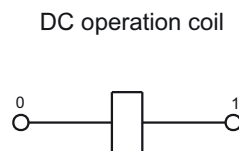


Remark: In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.

Wiring Diagram  
(Bottom view)

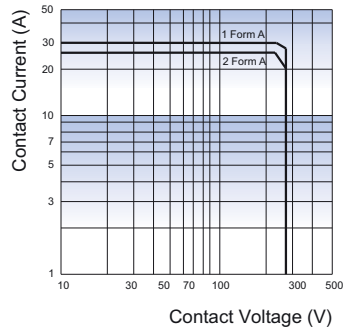


Coil Inner Circuit

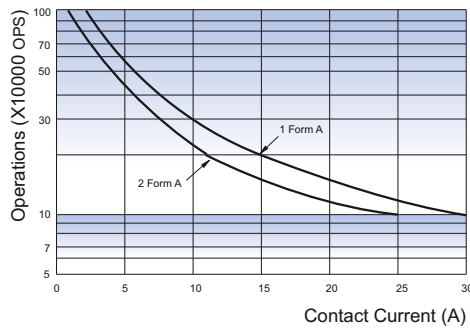


## CHARACTERISTIC CURVES

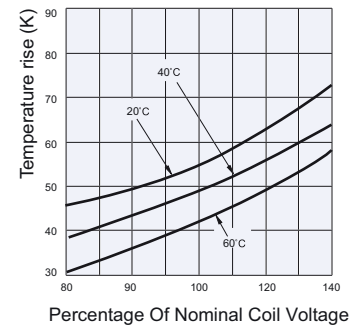
MAXIMUM SWITCHING POWER



ENDURANCE CURVE



COIL TEMPERATURE RISE



**Test conditions:**

250VAC, Resistive load,  
Room temp., 1s on 9s off

**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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# HF116F-G

# SOLAR RELAY



File No.:E134517



File No.:R 50154722



File No.: CQC09002031231  
CQC18002206328



## Features

- 50A switching capability
- Applicable to inverter used for photovoltaic power generation systems
- 4kV dielectric strength(between coil and contacts)
- 3mm contact gap  
(compliant to European Photovoltaic Standard VDE0126, compliant to IEC 62109-2-2011)
- 1A and 2A configuration available
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A, 2A
Contact resistance <sup>1)</sup>	10mΩ max(at 10A 13.5VDC)
Contact material	AgSnO <sub>2</sub> , AgNi
Contact rating (Res. load)	50A 277VAC
Max. switching voltage	277VAC
Max. switching current	55A
Max. switching power	15235VA
Mechanical endurance	1 x 10 <sup>6</sup> OPS
Electrical endurance	3 x 10 <sup>4</sup> OPS (50A 277VAC, at room temp, 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between open contacts	2000VAC 1min
	Between coil & contacts	4000VAC 1min
	Between contact sets	2000VAC 1min
Surge Voltage	6kV (1.2/50μs)	
Operate time (at nomi. volt.)	30ms max	
Release time (at nomi. volt.)	30ms max	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance*	Functional	10Hz to 55Hz 1.5mm DA
	Destructive	10Hz to 55Hz 1.5mm DA
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination <sup>2)</sup>	PCB	
Unit weight	Approx. 120g	
Construction	G1: Dust protected; G2, G3: Flux proofed	

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

2) It does not allow using quick-connect terminations.

3)\*Index is not in relay width direction.

## COIL

Coil power	Approx. 3.2W
Holding voltage	60%~120%U <sub>N</sub> (at 23°C) 70%~95%U <sub>N</sub> (at 85°C)

Notes: 1)The coil holding voltage is the voltage applied to coil 200ms after the rated voltage.

2)To avoid overheating and burning, the coil can not be consistently applied to with voltage larger than maximum holding voltage.

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max <sup>1)</sup>	Drop-out Voltage VDC min <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
3	2.25	0.3	3.3	2.8 x (1±10%)
6	4.50	0.6	6.6	11.3 x (1±10%)
9	6.75	0.9	9.9	25 x (1±10%)
12	9.00	1.2	13.2	45 x (1±10%)
24	18.0	2.4	26.4	180 x (1±10%)
48	36.0	4.8	52.8	720 x (1±10%)

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

2) \*Maximun voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## SAFETY APPROVAL RATINGS

UL/CUL	AgSnO <sub>2</sub>	277VAC 50A
TÜV	AgSnO <sub>2</sub>	250VAC 50A
	AgNi	250VAC 55A

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

<b>HF116F-G1/</b>		<b>12</b>	<b>-1H</b>	<b>T</b>	<b>F</b>	<b>(XXX)</b>
<b>Type</b>	<b>G1:</b> Type 1 <b>G2:</b> Type 2 <b>G3:</b> Type 3					
<b>Coil voltage</b>	3, 6, 9, 12, 24, 48VDC					
<b>Contact arrangement</b>	<b>1H:</b> 1 Form A <b>2H:</b> 2 Form A					
<b>Contact material</b>	<b>T:</b> AgSnO <sub>2</sub> <b>Nil:</b> AgNi					
<b>Insulation standard</b>	<b>F:</b> Class F					
<b>Special code</b> <sup>1)</sup>	<b>XXX:</b> Customer special requirement		<b>Nil:</b> Standard			

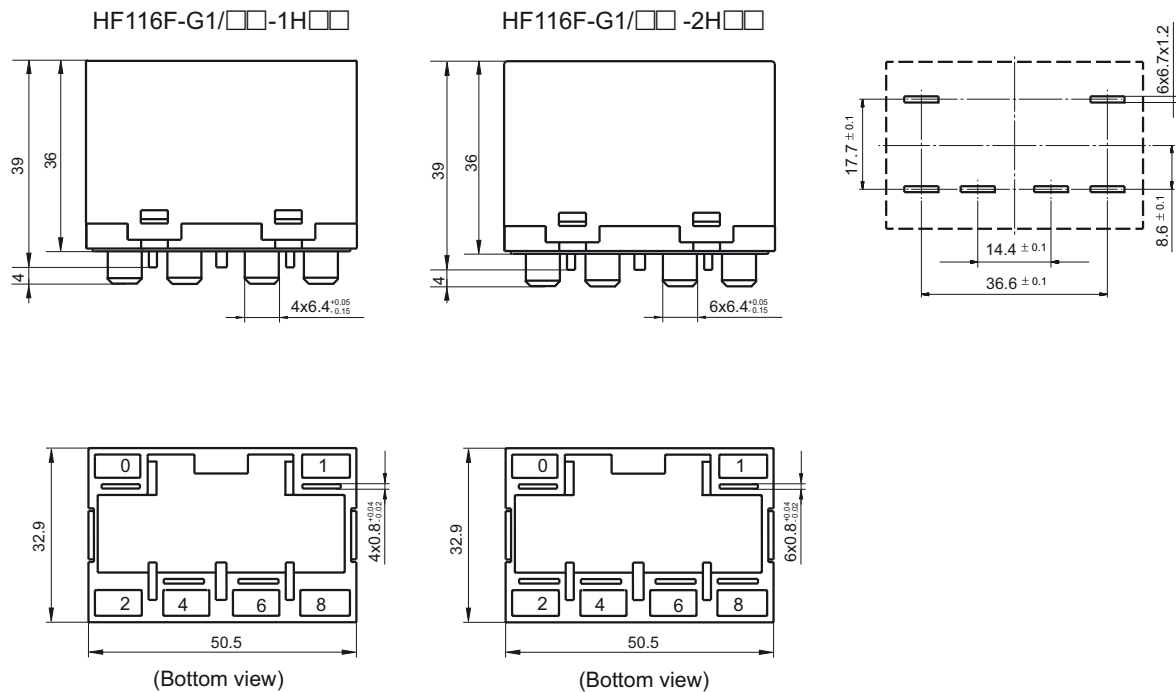
**Notes:** 1) The customer special requirement express as special code after evaluating by Hongfa.

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

### Outline Dimensions

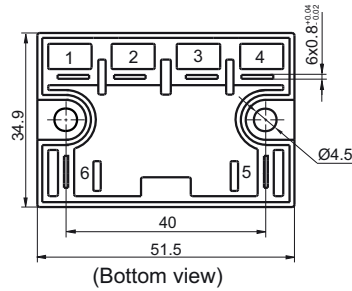
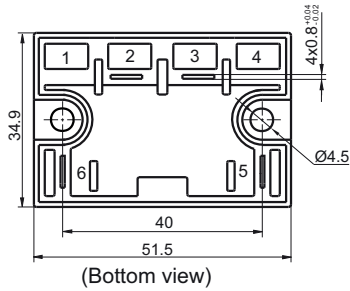
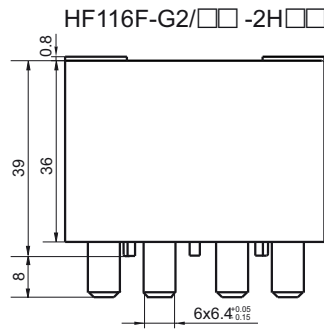
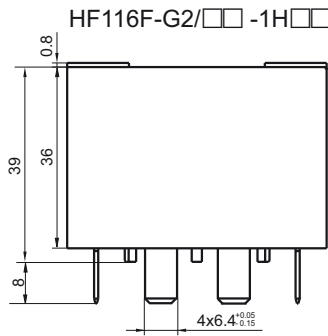
### PCB Layout (Bottom view)



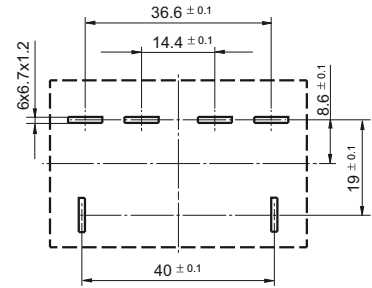
# OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

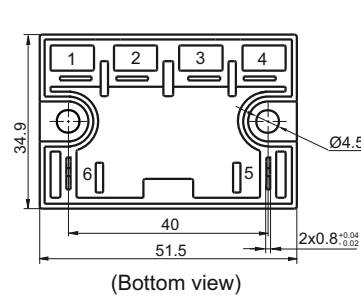
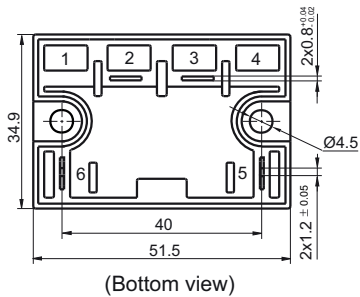
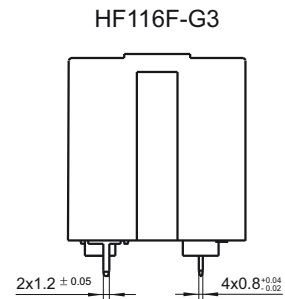
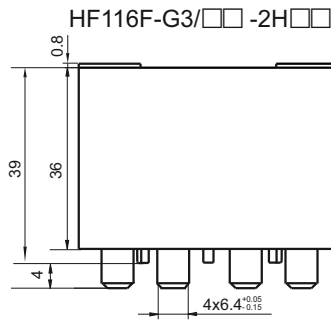
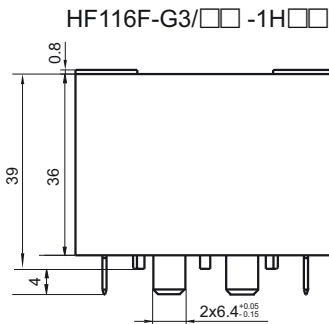
## Outline Dimensions



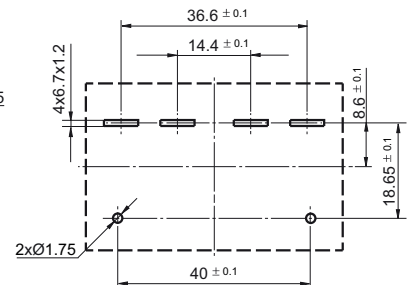
## PCB Layout (Bottom view)



## Outline Dimensions



## PCB Layout (Bottom view)

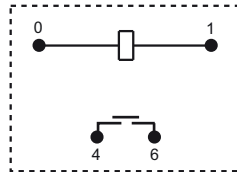


- Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤ 1mm, tolerance should be ±0.2mm; outline dimension > 1mm and ≤ 5mm, tolerance should be ±0.3mm; outline dimension > 5mm, tolerance should be ±0.4mm.  
 2) The tolerance without indicating for PCB layout is always ±0.1mm.

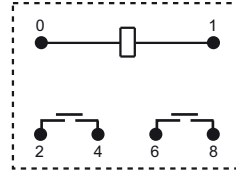
Wiring Diagram  
(Bottom View)

G1 Type

1 Form A

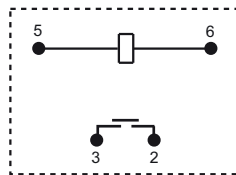


2 Form A

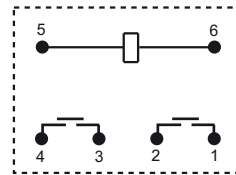


G2, G3 Type

1 Form A



2 Form A



Disclaimer

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# HF116F-80

# HIGH POWER RELAY



File No.:E134517



File No.:R 50154722



File No.: CQC09002031231  
CQC18002206328



## Features

- 80A switching capability
- Applicable to solar photovoltaic inverter
- Applicable to UPS
- 3mm contact gap  
(compliant to European Photovoltaic Standard VDE0126, compliant to IEC 62109-2-2011)
- 4kV dielectric strength(between coil and contacts)
- UL insulation system: Class F

## CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	10mΩ max(at 10A 13.5VDC)
Contact material	AgSnO <sub>2</sub> , AgNi
Contact rating (Res. load)	80A 60VDC/80A 250VAC
Max. switching voltage	277VAC/60VDC
Max. switching current	90A
Max. load current	100A 15min at room temp.
Max. switching power	24930VA
Mechanical endurance	1 x 10 <sup>6</sup> OPS 6 x 10 <sup>3</sup> OPS
Electrical endurance	(80A 250VAC, at 85°C, 1s on 9s off) 6 x 10 <sup>3</sup> OPS (80A 60VDC, at 85°C, 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between open contacts	2000VAC 1min
	Between coil & contacts	4000VAC 1min
Surge Voltage	6kV (1.2/50μs)	
Operate time (at nomi. volt.)	30ms max	
Release time (at nomi. volt.)	30ms max	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance*	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination <sup>2)</sup>	PCB	
Unit weight	Approx. 90g	
Construction	Dust protected	

- Notes: 1) The data shown above are initial values;  
2) It does not allow using quick-connect terminations.  
3)\*Index is not in relay width direction.

## COIL

Coil power	Approx. 3.2W
Holding voltage	60%~120%U <sub>N</sub> (at 23°C) 70%~95%U <sub>N</sub> (at 85°C)

- Notes: 1)The coil holding voltage is the voltage applied to coil 200ms after the rated voltage.  
2)To avoid overheating and burning, the coil can not be consistently applied to with voltage larger than maximum holding voltage.

## COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max <sup>1)</sup>	Drop-out Voltage VDC min <sup>1)</sup>	Max. Voltage VDC *2)	Coil Resistance Ω
3	2.25	0.3	3.3	2.8 x (1±10%)
6	4.50	0.6	6.6	11.3 x (1±10%)
9	6.75	0.9	9.9	25 x (1±10%)
12	9.00	1.2	13.2	45 x (1±10%)
24	18.0	2.4	26.4	180 x (1±10%)
48	36.0	4.8	52.8	720 x (1±10%)

- Notes: 1) The data shown above are initial values;  
2) \*Maximum voltage refers to the maximum voltage which relay coil could endure in a short period of time.

## SAFETY APPROVAL RATINGS

UL/CUL	AgSnO <sub>2</sub>	277VAC 80A 60VDC 80A
	AgNi	277VAC 90A 277VAC 80A
TÜV	AgSnO <sub>2</sub>	Making 35A 100ms 250VAC,loading 90A 800ms 250VAC,Breaking 35A 100ms 250VAC
	AgNi	Making 35A 100ms 250VAC,loading 90A 800ms 250VAC,Breaking 35A 100ms 250VAC

- Notes: 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.01

## ORDERING INFORMATION

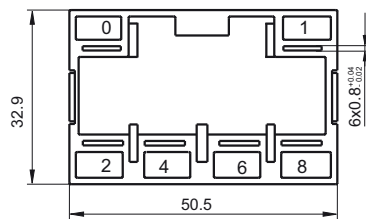
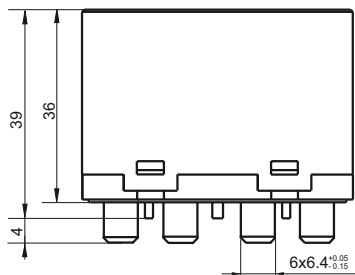
Type	HF116F-80/ 12 -1H T F (XXX)			
Coil voltage	3, 6, 9, 12, 24, 48VDC			
Contact arrangement	1H:1 Form A			
Contact material	T: AgSnO <sub>2</sub>	Nil: AgNi		
Insulation standard	F: Class F			
Special code <sup>1)</sup>	XXX: Customer special requirement	Nil: Standard		

Notes: 1) The customer special requirement express as special code after evaluating by Hongfa. e.g.(335) stands for product in accordance to IEC 60335-1 (GWT).

## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

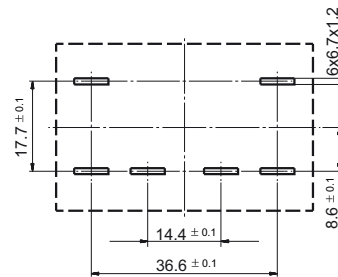
Unit: mm

Outline Dimensions

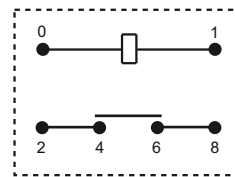


(Bottom view)

PCB Layout  
(Bottom view)



Wiring Diagram  
(Bottom view)



- Remark: 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  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .  
2) The tolerance without indicating for PCB layout is always  $\pm 0.1\text{mm}$ .

### Disclaimer

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# HF176F

# SOLAR RELAY



File No.:E133481



File No.: R50411032



## Features

- 65A swithing capitable.
- Applicable to solar photovoltaic inverter
- 3mm contact gap
- Low coil holding voltage contributes to saving energy of equipment.
- UL insulation system: class F.

## CONTACT DATA

Contact arrangement	1H
Contact resistance (Initial)	≤10mΩ max( 6VDC 2A)
Contact material	AgSnO <sub>2</sub> , AgNi
Contact rating	Making 20A, Carrying 65A, (Res. load) Breaking 20A, 277VAC 85°C
Max. switching voltage	400VAC
Max. switching current	65A
Max. switching power	18005VA
Mechanical endurance	1 x 10 <sup>6</sup> OPS
Electrical endurance	3 x 10 <sup>4</sup> OPS (Making 20A, Carrying 65A, Breaking 20A, Resistive load, at 85°C, 1s on 9s off)

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	5000VAC 1min
	Between open contacts	2000VAC 1min
Surge voltage (between coil & contacts)	10kV(1.2 / 50μs)	
Operate time (at nomi. volt.)	30ms max.	
Release time (at nomi. volt.)	10ms max.	
Temperature rise (at nomi. volt.)	70K max.(Contact load current 65A, 50% to 60% of rated voltage excitation, at 85°C)	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C (Apply holding voltage to coil)	
Termination	PCB	
Unit weight	Approx.100g	
Construction	Flux proofed	

Notes: The data shown above are initial values.

## COIL

Coil power	Approx.1.92W
Holding voltage	40% to 100%U <sub>N</sub> (at 25°C) 50% to 60%U <sub>N</sub> (at 85°C)

Notes: 1)The coil holding voltage is the voltage applied to coil 100ms after the rated voltage.  
2)To avoid overheating and burning, the coil can not be consistently applied to with voltage larger than maximum holding voltage.

## COIL DATA

at 23°C

Nominal Voltage VDC <sup>1)</sup>	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage <sup>2)</sup> VDC	Coil Resistance Ω
6	≤4.2	≥0.6	6.6	18.8 x (1±10%)
9	≤6.3	≥0.9	9.9	42.2 x (1±10%)
12	≤8.4	≥1.2	13.2	75 x (1±10%)
24	≤16.8	≥2.4	26.4	300 x (1±10%)

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

2)\*Maximun voltage refers to the maximun voltage which relay coil could endure in a short period of time.

## SAFETY APPROVAL RATINGS

UL/CUL	AgNi	Making 20A, Carrying 65A, Breaking 20A, 400VAC Resistive at 85°C 48A 277VAC General use at 85°C 60A 277VAC General use at 85°C
	AgSnO <sub>2</sub>	Making 20A, Carrying 65A, Breaking 20A, 400VAC Resistive at 85°C 65A 277VAC Resistive at 85°C 65A 30VDC Resistive at 85°C 65A 60VDC Resistive at 85°C
TÜV	AgNi	Making 20A, Carrying 65A, Breaking 20A, 400VAC Resistive at 85°C 48A 277VAC 85°C, cos φ =0.8 60A 277VAC 85°C, cos φ =0.8
	AgSnO <sub>2</sub>	Making 20A, Carrying 65A, Breaking 20A, 400VAC Resistive at 85°C 65A 277VAC 85°C, cos φ =0.8 65A 30VDC 85°C, L/R=0 65A 60VDC 85°C, L/R=0

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

2019 Rev. 1.00

## ORDERING INFORMATION

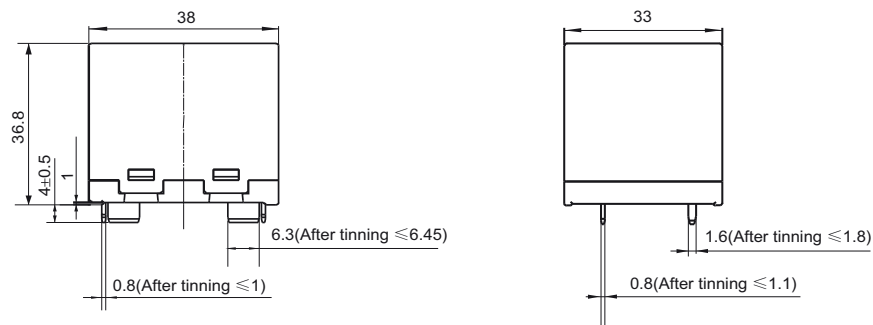
Type	HF176F/	12	-H	3	F	(XXX)
Coil voltage	6, 9, 12, 24VDC					
Contact arrangement	H:1 Form A					
Contact material	3: AgNi    T: AgSnO <sub>2</sub>					
Insulation standard	F: Class F					
Special code	XXX: Customer special requirement			Nil: Standard		

- Notes:** 1) Water cleaning or surface process is not suggested after the flux-proofed relays are assembled on PCB.  
 2) Flux-proofed relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.  
 3) The customer special requirement express as special code after evaluating by Hongfa.

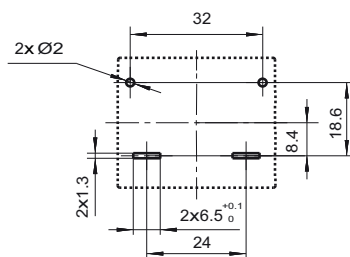
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

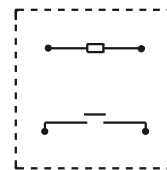
### Outline Dimensions



### PCB Layout (Bottom view)



### Wiring Diagram (Bottom view)



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

### Disclaimer

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File No.: E133481



File No.: R50360703



File No.: CQC17002164558



### Features

- 90A switching capability
- Applicable to solar photovoltaic inverter
- 3.0 mm contact gap
- Low coil holding voltage contributes to saving energy of equipment
- UL insulation system: Class F

### CONTACT DATA

Contact arrangement	1A
Contact resistance(initial)	10mΩ max.( 6VDC 20A)
Contact material	AgSnO <sub>2</sub> , AgNi
Contact rating (Res. load)	90A 320VAC
Max. switching voltage	400VAC
Max. switching current	90A
Max. switching power	25920VA
Mechanical endurance	1 x 10 <sup>6</sup> OPS
Electrical endurance	1 x 10 <sup>3</sup> OPS (NO: 90A 320VAC, Resistive load, at 85°C, 1s on 9s off)
	3 x 10 <sup>4</sup> OPS (NO: Making 30A, carrying 100A, breaking 30A, 400VAC, Resistive load, at 85°C, 1s on 9s off)

### COIL

Coil power	Approx. 1.92W
Holding voltage	40% to 100% U <sub>N</sub> (at 23°C) 50% to 60%U <sub>N</sub> (at 85°C)

**Notes:** 1)The coil holding voltage is the voltage applied to coil 200ms after the rated voltage.  
2)To avoid overheating and burning, the coil can not be consistently applied to with voltage larger than maximum holding voltage.

### SAFETY APPROVAL RATINGS

UL/CUL	AgNi	90A 320VAC at 85°C General use 60A 320VAC at 85°C General use
	AgSnO <sub>2</sub>	90A 320VAC at 85°C General use TV-15 120VAC at 85°C
TÜV	AgNi	90A 320VAC at 85°C Resistive Making 30A, carrying 100A, breaking 30A, 400VAC, at 85°C Resistive
CQC	AgNi	90A 320VAC 85°C Resistive Making 30A, carrying 100A, breaking 30A, 400VAC, at 85°C Resistive
	AgSnO <sub>2</sub>	90A 320VAC 85°C Resistive Making 30A, carrying 100A, breaking 30A, 400VAC, at 85°C Resistive

**Notes:** 1) All values unspecified are at room temperature.  
2) Only typical loads are listed above. Other load specifications can be available upon request.

### CHARACTERISTICS

Insulation resistance		1000MΩ (at 500VDC)
Dielectric strength	Between open contacts	2000VAC 1min
	Between coil & contacts	5000VAC 1min
Surge Voltage		10kV (1.2/50μs)
Operate time (at rated. volt.)		30ms max.
Release time (at rated. volt.)		10ms max.
Temperature rise		70K max. (Contact load current 90A, 50% to 60% rated voltage excitation, at 85°C)
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance*		10Hz to 55Hz 1.0mm DA
Humidity		5% to 85% RH
Ambient temperature		-40°C to 85°C (Apply holding voltage to coil)
Termination <sup>2)</sup>		PCB
Unit weight		Approx. 100g
Construction		Flux proofed

**Notes:** The data shown above are initial values.

### COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
6	4.2	0.6	6.6	18.8 x (1±10%)
9	6.3	0.9	9.9	42.2 x (1±10%)
12	8.4	1.2	13.2	75 x (1±10%)
24	16.8	2.4	26.4	300 x (1±10%)

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

2)\*Maximun voltage refers to the maximum voltage which relay coil could endure in a short period of time.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

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## ORDERING INFORMATION

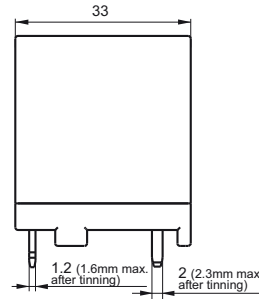
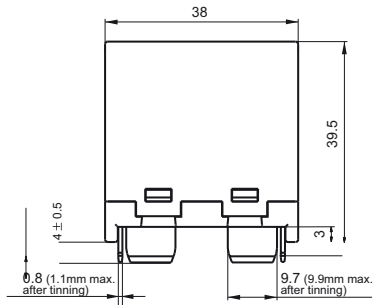
Type	HF167F/	12	-H	T	F	(XXX)
Coil voltage	6, 9, 12, 24VDC					
Contact arrangement	H:1 Form A					
Contact material	T: AgSnO <sub>2</sub>		Nil: AgNi			
Insulation standard	F: Class F					
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard			

**Notes:** 1) Flux-proofed relays can not be used in the environment with pollutants like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.  
 2) Water clearing or surface process is not suggested after the flux-proofed relays are assembled on PCB.  
 3) The customer special requirement express as special code after evaluating by Hongfa.

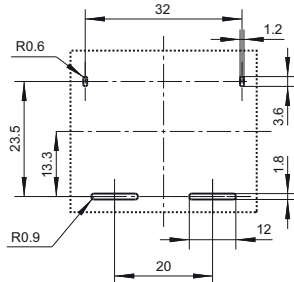
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

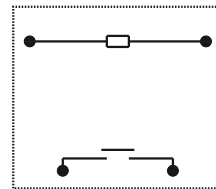
### Outline Dimensions



### PCB Layout (Bottom view)



### Wiring Diagram (Bottom view)



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

### Disclaimer

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# HF92F

# MINIATURE INTERMEDIATE POWER RELAY



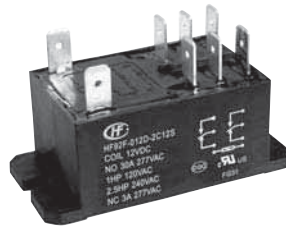
File No.:E134517



File No.:40016109



File No.:CQC09002037814 (DC type) CQC18002202752 (DC type)  
CQC14002114447 (AC type) CQC18002202751 (AC type)



## Features

- 30A switching capability
- Creepage distance: 8mm
- 4kV dielectric strength (between coil and contacts)
- UL insulation system: Class F
- Plastic sealed and dust protected types available
- PCB & QC layouts available

## CONTACT DATA

Contact arrangement	2A, 2C
Contact resistance <sup>1)</sup>	50mΩ max.(at 1A 24VDC)
Contact material	AgSnO <sub>2</sub> , AgCdO
Contact rating (Res. load)	NO: 30A 250VAC; 30A 277VAC NC: 3A 250VAC; 3A 277VAC
Max. switching voltage	277VAC
Max. switching current	30A
Max. switching power	8310VA
Mechanical endurance	5 x 10 <sup>6</sup> OPS
Electrical endurance	1 x 10 <sup>5</sup> OPS (NO: 30A 277VAC, Resistive load, Room temp., 1s on 9s off) 1 x 10 <sup>5</sup> OPS (NC: 3A 277VAC, Resistive load, Room temp., 1s on 9s off)

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

## CHARACTERISTICS

Insulation resistance	1000MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1500VAC 1min
	Between contact poles	2000VAC 1min
Surge voltage (between coil & contacts)	10kV (1.2/50μs)	
Operate time (at rated. volt.)	DC type: 25ms max.	
Release time (at rated. volt.)	DC type: 25ms max.	
Temperature rise (at rated. volt.)	AC type:90K max. DC type:70K max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.65mm DA	
Humidity	5% to 85% RH	
Ambient temperature	AC: -40°C to 65°C DC: -40°C to 85°C	
Termination	PCB, QC	
Unit weight	Approx. 86g	
Construction	Plastic sealed, Flux proofed	

Notes: The data shown above are initial values.

## COIL

Coil power	DC type: Approx. 1.7W; AC type: Approx. 4.0VA
------------	--

## COIL DATA

at 23°C

### DC type

Coil Code	Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>*2)</sup>	Coil Resistance Ω
005D	5	3.8	0.5	8.0	15.3x (1±10%)
006D	6	4.5	0.6	9.6	22x (1±10%)
012D	12	9	1.2	19.2	86x (1±10%)
024D	24	18	2.4	38.4	350x (1±10%)
048D	48	36	4.8	76.8	1390x (1±10%)
110D	110	82.5	11	176	7255x (1±10%)

### AC type (at 50Hz)

Coil Code	Nominal Voltage VAC	Pick-up Voltage VAC max. <sup>1)</sup>	Drop-out Voltage VAC min. <sup>1)</sup>	Max. Voltage VAC <sup>*2)</sup>	Coil Resistance Ω
024A5	24	19.2	4.8	26.4	45x (1±10%)
120A5	120	96	24	132	1125x (1±10%)
208A5	208	166.4	41.6	229	3278x (1±10%)
220A5	220	176	44	242	3800x (1±10%)
240A5	240	192	48	264	4500x (1±10%)
277A5	277	221.6	55.4	305	5960x (1±10%)

### AC type (at 60Hz)

Coil Code	Nominal Voltage VAC	Pick-up Voltage VAC max. <sup>1)</sup>	Drop-out Voltage VAC min. <sup>1)</sup>	Max. Voltage VAC <sup>*2)</sup>	Coil Resistance Ω
024A6	24	19.2	4.8	26.4	35.7x (1±10%)
120A6	120	96	24	132	830x (1±10%)
208A6	208	166.4	41.6	229	2600x (1±10%)
220A6	220	176	44	242	2870x (1±10%)
240A6	240	192	48	264	3800x (1±10%)
277A6	277	221.6	55.4	305	4700x (1±10%)



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## COIL DATA

at 23°C

AC type (at 50Hz/60Hz)

Coil Code	Nominal Voltage VAC	Pick-up Voltage VAC max. <sup>1)</sup>		Drop-out Voltage VAC min. <sup>1)</sup>		Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
		50Hz	60Hz	50Hz	60Hz		
120A	120	88	96	22	24	132	950 x (1±10%)
208A	208	160	166.4	40	41.6	229	2841 x (1±10%)
240A	240	176	192	44	48	264	3800 x (1±10%)
277A	277	200	221.6	50	55.4	305	5485 x (1±10%)

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

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

## SAFETY APPROVAL RATINGS

UL/CUL <sup>1)</sup>	NO	30A 277VAC 1HP 120VAC 2.5HP 240VAC 110 LRA/25.3 FLA 240VAC (DC type)
	NC	3A 277VAC
VDE <sup>1)</sup> (AgSnO <sub>2</sub> )	NO	30A 250VAC 20A 250VAC
	NC	3A 250VAC

Notes: 1) UL certified loads are tested at 40°C. VDE certified loads are tested at 85°C (DC products) or 50°C (AC products).

2) Only typical loads are listed above. Other load specifications can be available upon request.

## ORDERING INFORMATION

Type	HF92F	-012D	-2C	2	2	F	(XXX)
Coil Code	<b>XXX D:</b> DC type(5,6,12,24,48,110VDC) <b>XXX A5:</b> AC type 50Hz(24,120,208,220,240,277VAC) <b>XXX A6:</b> AC type 60Hz(24,120,208,220,240,277VAC) <b>XXX A:</b> AC type 50Hz/60Hz(120,208,240,277VAC)						
Contact arrangement	2A: 2 Form A	2C: 2 Form C					
Termination <sup>1)</sup>	1: PCB	2, 3: QC					
Contact material	1: AgSnO <sub>2</sub>	2: AgCdO					
Construction <sup>2)</sup>	S: Plastic sealed	F: Flux proofed					
Special code <sup>3)</sup>	XXX: Customer special requirement		Nil: Standard				

Notes: 1) For QC terminals, no soldering or washing is allowed. For PCB terminals, please refer to us for soldering condition and part specification for necessary washing or surface processing after it is soldered to PCB.

2) We recommend dust protected types for a clean environment (free from contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

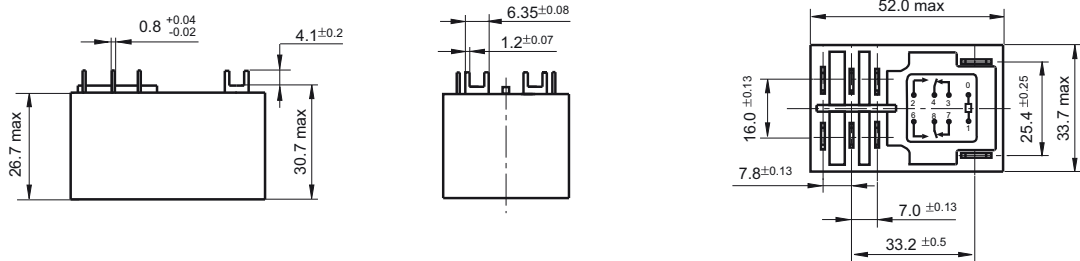
We suggest to choose plastic sealed types and validate it in real application for an unclean environment (with contaminations like H<sub>2</sub>S, SO<sub>2</sub>, NO<sub>2</sub>, dust, etc.).

3) The customer special requirement express as special code after evaluating by Hongfa.

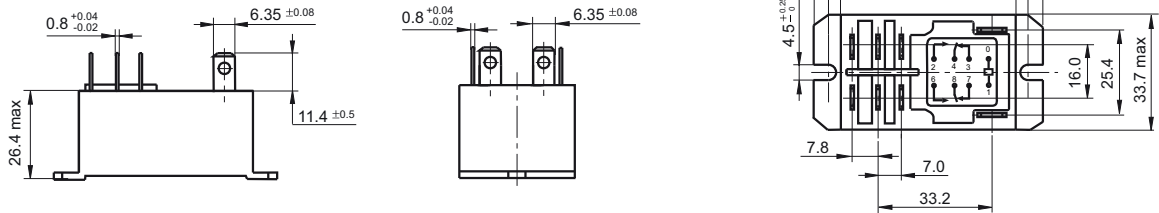


Outline Dimensions

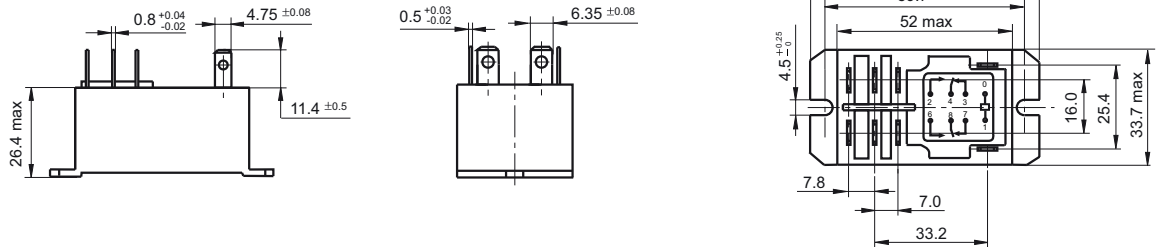
1 Type (PCB)



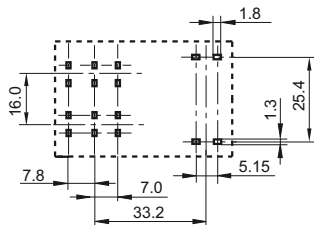
2 Type (QC)



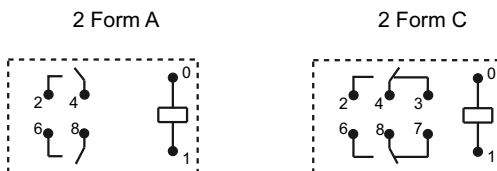
3 Type (QC)



PCB Layout (Bottom view)

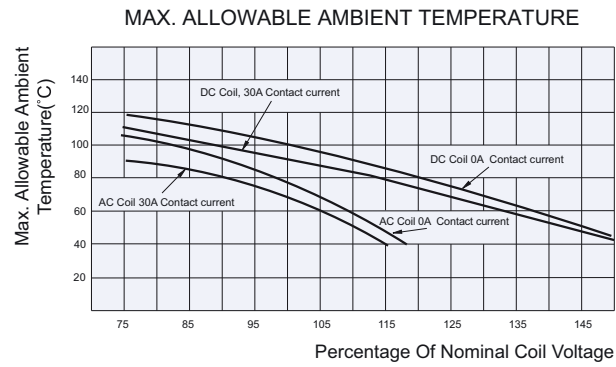


Wiring Diagram (Bottom view)



Remark: 1) In case of no tolerance shown in outline dimension: outline dimension ≤ 1mm, tolerance should be ±0.2mm; outline dimension > 1mm and ≤ 5mm, tolerance should be ±0.3mm; outline dimension > 5mm, tolerance should be ±0.4mm.  
 2) The tolerance without indicating for PCB layout is always ±0.1mm.

## CHARACTERISTIC CURVES



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# HF78F

# MINIATURE HIGH POWER RELAY



File No.: E133481



File No.: R50375929



File No.: CQC17002171481



### Features

- Small and for microwave oven
- 20A switching capability
- 4.0kV dielectric strength (between coil and contacts)
- Low height: 28.5 mm

### CONTACT DATA

Contact arrangement	1A
Contact resistance <sup>1)</sup>	50mΩ max.(at 1A 6VDC)
Contact material	AgSnO <sub>2</sub>
Contact rating	16A 250VAC/24VDC 16A 30VDC
Max. switching voltage	277VAC / 32VDC
Max. switching current	20A
Max. switching power	4432VA / 512W
Mechanical endurance	1 x 10 <sup>7</sup> OPS

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

### CHARACTERISTICS

Insulation resistance	1200MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	4000VAC 1min
	Between open contacts	1500VAC 1min
Operate time (at rated. volt.)	15ms max.	
Release time (at rated. volt.)	5ms max.	
Shock resistance	Functional	98m/s <sup>2</sup>
	Destructive	980m/s <sup>2</sup>
Vibration resistance	10Hz to 55Hz 1.5mm DA	
Humidity	5% to 85% RH	
Ambient temperature	-40°C to 85°C	
Termination	PCB & QC	
Unit weight	Approx. 16g	
Construction	Flux proofed	

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

2) Please find coil temperature curve in the characteristic curves below.

### COIL

Coil power	540mW
------------	-------

### COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC <sup>2)</sup>	Coil Resistance Ω
3	2.40	0.3	3.9	17.2 x (1±10%)
5	4.00	0.5	6.5	47.7x (1±10%)
6	4.80	0.6	7.8	68.8x (1±10%)
12	9.60	1.2	15.6	270 x (1±10%)
24	19.2	2.4	31.2	1100 x (1±10%)
36	28.8	3.6	46.8	2475x (1±15%)

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

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

### SAFETY APPROVAL RATINGS

UL/CUL	16A 250VAC/30VDC
	20A 125VAC
TÜV	16A 250VAC/30VDC
	20A 125VAC

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

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## ORDERING INFORMATION

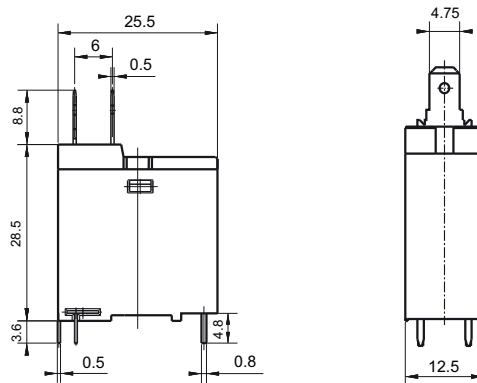
Type	HF78F / 12 -H 3 T F (XXX)					
Coil voltage	3, 5, 6, 12, 24, 36VDC					
Contact arrangement	1H: 1 Form A					
Termination	S: Plastic sealed		Nil: Dust protected			
Contact material	T: AgSnO <sub>2</sub>					
Insulation standard	F: Class F					
Special code <sup>1)</sup>	XXX: Customer special requirement		Nil: Standard			

Notes: 1) The customer special requirement express as special code after evaluating by Hongfa.

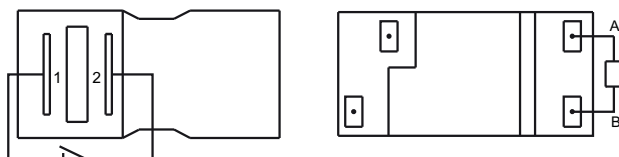
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

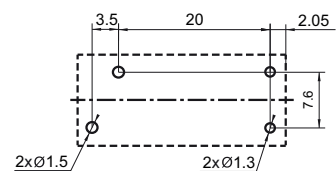
### Outline Dimensions



### Wiring Diagram (Bottom view)

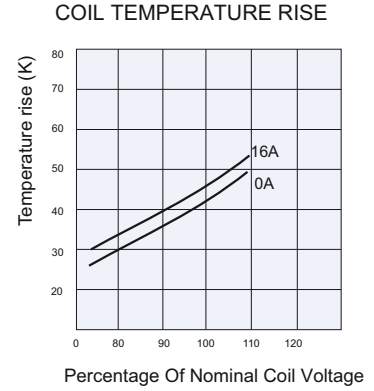
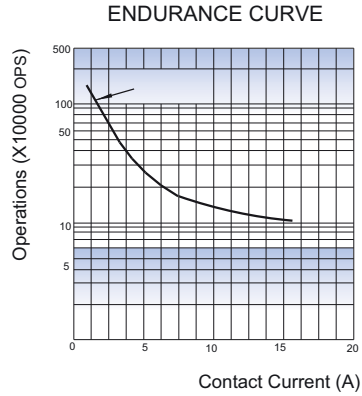
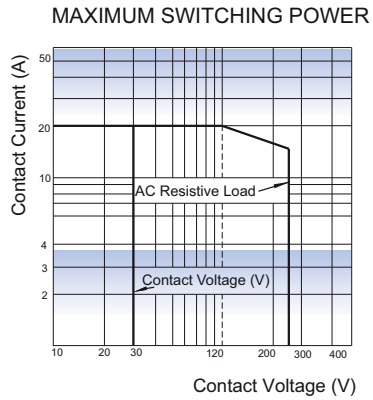


### PCB Layout (Bottom view)



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

## CHARACTERISTIC CURVES



### Disclaimer

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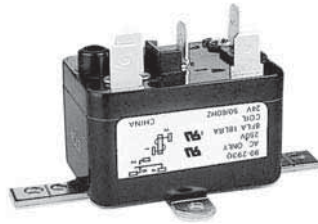
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# HF84F

# HIGH POWER RELAY



File No.:E134517 (AC type)



### Features

- 16A switching capability
- 2.5kV dielectric strength (between coil and contacts)
- Panel mount types available

### CONTACT DATA

Contact arrangement	1A, 1B, 1C	
Contact resistance <sup>1)</sup>	50mΩ max.(at 1A 24VDC)	
Contact material	AgCe	
Contact rating (Res.load)	1A, 1C	1B
	16A 250VAC, Resistive load	8A 250VAC, General load
Max. switching voltage	250VAC	
Max. switching current	16A	
Max. switching power	4000VAC	
Mechanical endurance	1 x 10 <sup>6</sup> OPS	
Electrical endurance	7 type: 3 x 10 <sup>4</sup> OPS (8A 250VAC, General use, at 40°C, 1s on 9s off) 1, 4 type: 1 x 10 <sup>5</sup> OPS (16A 250VAC, Resistive load, at 65°C, 1s on 9s off)	

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

### CHARACTERISTICS

Insulation resistance	500MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2500VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at rated. volt.)	DC type: 25ms max.	
Release time (at rated. volt.)	DC type: 25ms max.	
Temperature rise (at rated. volt.)	90K max.	
Shock resistance (Functional)	147m/s <sup>2</sup> 11ms	
Vibration resistance	10Hz to 55Hz 2.54mm DA	
Ambient temperature	-40°C to 65°C	
Humidity	5% to 85% RH	
Termination	QC	
Unit weight	Approx. 75g	
Construction	Dust protected	

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

2) UL insulation system: Class A.

### COIL

Coil power	DC type: 2.1W ; AC type: 3.5VA
------------	-----------------------------------

### COIL DATA

at 23°C

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC * <sup>2)</sup>	Coil Resistance Ω
6	4.50	0.6	6.6	17.5 x (1±10%)
9	6.75	0.9	9.9	40 x (1±10%)
12	9.00	1.2	13.2	70 x (1±10%)
24	18.0	2.4	26.4	280 x (1±10%)
48	36.0	4.8	52.8	1120 x (1±10%)
120	90.0	12.0	132	7000 x (1±10%)

Nominal Voltage VAC	Pick-up Voltage VAC max. <sup>1)</sup>	Drop-out Voltage VAC min. <sup>1)</sup>	Max. Voltage VAC * <sup>2)</sup>	Coil Resistance Ω
6	5.1	1.2	6.6	4.8 x (1±10%)
12	10.2	2.4	13.2	19 x (1±10%)
24	20.4	4.8	26.4	90 x (1±10%)
48	40.6	9.6	52.8	300 x (1±10%)
120	102	24	132	2000 x (1±10%)
240	204	48	264	7200 x (1±10%)
277	235	55.4	304.7	11000 x (1±10%)

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

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

### SAFETY APPROVAL RATINGS

UL/CUL (AC type)	Model	Rating
UL/CUL (AC type)	HF84F-1	8FLA, 25LRA 250VAC at 40°C 16A 250VAC Resistive at 65°C 8A 250VAC General use at 40°C
	HF84F-4	8FLA, 25LRA 250VAC at 40°C 16A 250VAC Resistive at 65°C 8A 250VAC General use at 40°C
	HF84F-7	8FLA, 25LRA 250VAC at 40°C 8A 250VAC General use at 40°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED

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## ORDERING INFORMATION

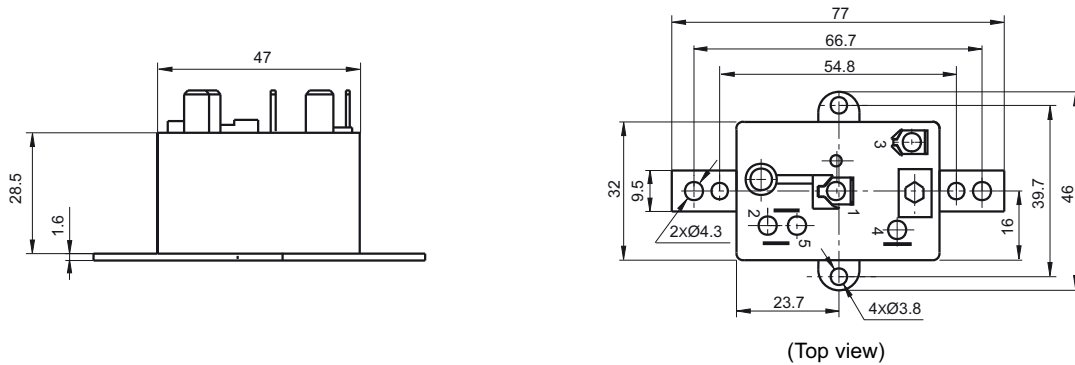
Type	HF84F	-1	A	24	(XXX)
Contact arrangement	1: 1 Form C 4: 1 Form A 7: 1 Form B				
Coil voltage form	D: DC A: AC				
Coil voltage	AC: 6VAC to 277VAC DC: 6VDC to 120VDC (No UL approved)				
Special code <sup>1)</sup>	XXX: Customer special requirement		Nil: Standard		

Notes: 1) The customer special requirement express as special code after evaluating by Hongfa.

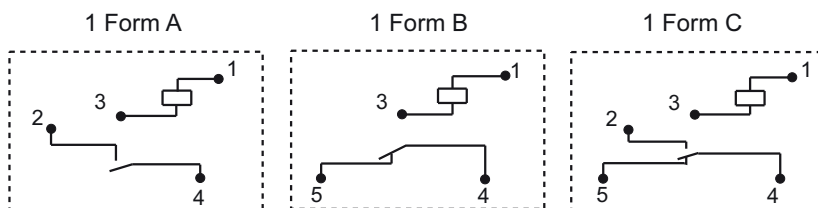
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

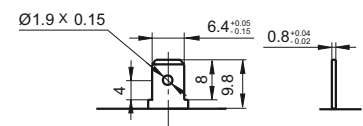
### Outline Dimensions



### Wiring Diagram (Top view)



### Terminals type



Remark: In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.

### 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.

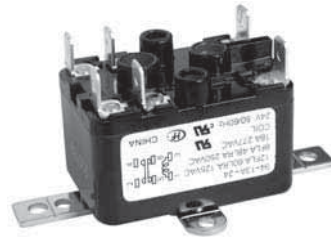
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# HF94F

# HIGH POWER RELAY



File No.:E134517 (AC type)



### Features

- 25A switching capability
- 2kV dielectric strength (between coil and contacts)
- Panel mount, various terminal types
- UL insulation system: Class F

### CONTACT DATA

Contact arrangement	1A, 1B, 1C, 1A + 1B
Contact resistance <sup>1)</sup>	200mΩ max.(at 1A 24VDC)
Contact material	AgCe, AgCdO
Contact rating (Res.load)	18A 277VAC
Max. switching voltage	277VAC
Max. switching current	18A
Max. switching power	4986VA
Mechanical endurance	1 x 10 <sup>6</sup> OPS
Electrical endurance	5 x 10 <sup>4</sup> OPS (25A 277VAC, Resistive load, AgCdO, at 65°C, 1s on 9s off) 3 x 10 <sup>4</sup> OPS (3A 277VAC, General load, AgCe, at 65°C, 1s on 9s off)

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

### CHARACTERISTICS

Insulation resistance	500MΩ (at 500VDC)	
Dielectric strength	Between coil & contacts	2000VAC 1min
	Between open contacts	1000VAC 1min
Operate time (at rated. volt.)	DC type: 25ms max.	
Release time (at rated. volt.)	DC type: 25ms max.	
Temperature rise (at rated. volt.)	90K max.	
Shock resistance (Functional)	98m/s <sup>2</sup>	
Vibration resistance	10Hz to 55Hz 0.5mm DA	
Ambient temperature	-40°C to 65°C	
Humidity	5% to 85% RH	
Termination	QC	
Unit weight	Approx. 85g	
Construction	Dust protected	

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

### COIL

Coil power	DC type: Approx. 2.4W; AC type: Approx. 4.0VA
------------	--

### COIL DATA

Nominal Voltage VDC	Pick-up Voltage VDC max. <sup>1)</sup>	Drop-out Voltage VDC min. <sup>1)</sup>	Max. Voltage VDC *2)	Coil Resistance Ω
6	4.50	0.6	6.6	17.5 x (1±10%)
9	6.75	0.9	9.9	40 x (1±10%)
12	9.00	1.2	13.2	70 x (1±10%)
24	18.0	2.4	26.4	280 x (1±10%)
48	36.0	4.8	52.8	1120 x (1±10%)
120	90.0	12.0	132	7000 x (1±10%)

Nominal Voltage VAC	Pick-up Voltage VAC max. <sup>1)</sup>	Drop-out Voltage VAC min. <sup>1)</sup>	Max. Voltage VAC *2)	Coil Resistance Ω
6	5.1	1.2	6.6	4.8 x (1±10%)
12	10.2	2.4	13.2	19 x (1±10%)
24	20.4	4.8	26.4	77 x (1±10%)
48	40.8	9.6	52.8	280 x (1±10%)
120	102	24	132	2000 x (1±10%)
240	204	48	264	7250 x (1±10%)
277	235	55.4	304.7	11000 x (1±10%)

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

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



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## SAFETY APPROVAL RATINGS

UL/CUL	HF94F-10	NO	AgCdO	12FLA,60LRA,120VAC at 65°C 8FLA,48LRA,250VAC at 65°C 8FLA,48LRA,277VAC at 65°C 7FLA,42LRA,277VAC at 65°C 25A,277VAC,Resistive at 65°C
			AgCe	3A,277VAC,Gen Use at 65°C 277VAC pilot duty,10A inrush,1A break at 65°C
	HF94F-11	NC	AgCdO	14FLA,84LRA,125VAC at 40°C 8FLA,48LRA,250VAC at 65°C 8FLA,48LRA,277VAC at 65°C 7FLA,42LRA,277VAC at 65°C 25A,277VAC,Resistive at 65°C
			AgCe	3A,277VAC,Gen Use at 65°C 277VAC pilot duty,10A inrush,1A break at 65°C
	HF94F-12	NO/NC	AgCdO	14FLA,84LRA,125VAC at 40°C 8FLA,48LRA,250VAC at 65°C 8FLA,48LRA,277VAC at 65°C 7FLA,42LRA,277VAC at 65°C 25A,277VAC,Resistive at 65°C
			AgCe	3A,277VAC,Gen Use at 65°C 277VAC pilot duty,10A inrush,1A break at 65°C
	HF94F-13	NO/NC	AgCdO	12FLA,60LRA,120VAC at 65°C 8FLA,48LRA,250VAC at 65°C 8FLA,48LRA,277VAC at 65°C 7FLA,42LRA,277VAC at 65°C 18A,277VAC,Resistive at 65°C 25A,277VAC,Resistive at 65°C
			AgCe	3A,277VAC,Gen Use at 65°C 277VAC pilot duty,10A inrush,1A break at 65°C

Notes: 1) All values unspecified are at room temperature.

2) Only typical loads are listed above. Other load specifications can be available upon request.

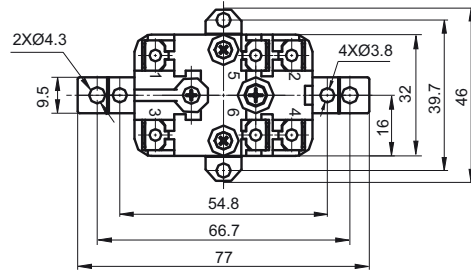
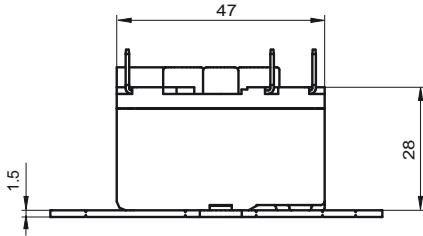
## ORDERING INFORMATION

Type	HF94F	-10	A	24	E	-1	(XXX)
Contact arrangement	10: 1 Form A 11: 1 Form B 12: 1 Form C 13: 1 Form A+1 Form B						
Coil voltage form	A: AC D: DC						
Coil voltage	AC: 6VAC to 277VAC DC: 6VDC to 120 VDC (No UL approved)						
Contact material	E: AgCe Nil: AgCdO						
Mounting	1: Flang, Mounting Distance 54.8mm. diameter Ø3.8mm 2: Flang, Mounting Distance 66.7mm. diameter Ø4.8mm Nil: Metal Bracket						
Special code <sup>1)</sup>	XXX: Customer special requirement Nil: Standard						

Notes: 1) The customer special requirement express as special code after evaluating by Hongfa.

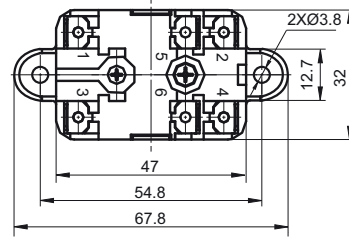
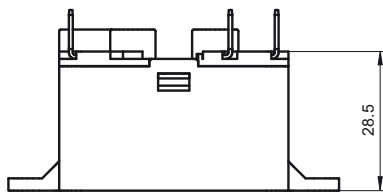
Outline Dimensions

Metal Bracket



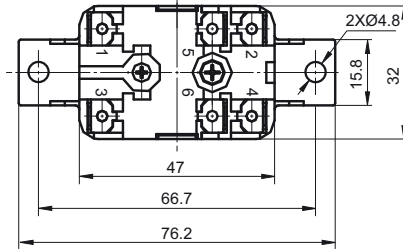
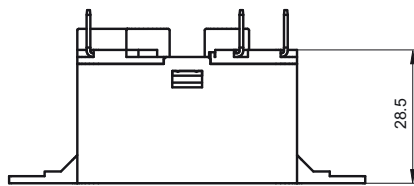
(Top view)

Flang, Mounting Distance 54.8mm



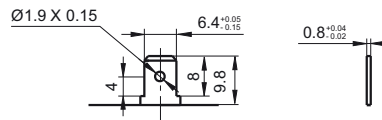
(Top view)

Flang, Mounting Distance 66.7mm



(Top view)

Terminals type

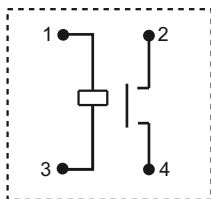


Remark: In case of no tolerance shown in outline dimension: outline dimension  $\leq 1$ mm, tolerance should be  $\pm 0.2$ mm; outline dimension  $> 1$ mm and  $\leq 5$ mm, tolerance should be  $\pm 0.3$ mm; outline dimension  $> 5$ mm, tolerance should be  $\pm 0.4$ mm.

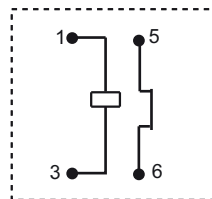
Wiring Diagram

(Top view)

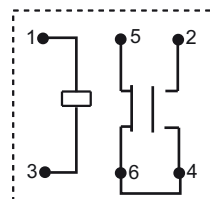
1 Form A



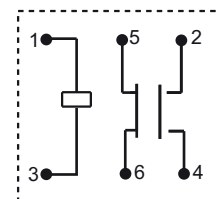
1 Form B



1 Form C



1A+1B



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# HF8565

# MOTOR START POTENTIAL RELAY



File No.:SA13318



### Features

- 50A switching capability
- 1 Form B configuration available
- 250" quick connect termination
- UL insulation system: Class F
- Various of mounting positions

### CONTACT DATA

Contact arrangement	1B
Contact resistance	100mΩ max.(at 1A 24VDC)
Contact material	Silver alloy
Contact rating (Res. load)	16A(make and break) 400VAC COS Ø=0.85 35A(break only) 400VAC COS Ø=0.85 50A(break only) 400VAC COS Ø=0.85
Mechanical endurance	7.5 x 10 <sup>5</sup> OPS
Electrical endurance	SPST-NC: 5 x 10 <sup>5</sup> OPS (16A on and off 400VAC cosØ=0.7-0.8 at 25°C 1s on 9s off) SPST-NC: 2 x 10 <sup>5</sup> OPS (35A only off 400VAC cosØ=0.7-0.8 at 25°C 1s on 9s off) SPST-NC: 1 x 10 <sup>5</sup> OPS (50A only off 400VAC cosØ=0.7-0.8 at 25°C 1s on 9s off)

### CHARACTERISTICS

Weight	Approx. 110g
Termination	QC
Construction	Dust protected

Notes: The data shown above are initial values.

### COIL

Coil power	Approx. 5VA
Coil voltage	See table below
Coil resistance	See table below
Insulation system	Class B

### OPERATING CHARACTERISTICS at 50Hz

Coil number	2		3		4		5		6		7		8		9		
Vmax at 40°C (V)	299		338		378		356		452		151		530		228		
Resistance (1±10%) Ω at 25°C	5600		7500		10700		10000		13800		1500		19500		3900		
	H.P.U.	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.
A	120-130											111-124	20-45			111-124	35-77
B	130-140											120-134	20-45			120-134	35-77
C	150-160	140-153	40-90									130-144	20-45			130-144	35-77
D	160-170	150-163	40-90	150-163	40-90							140-153	20-45			140-153	35-77
E	170-180	162-175	40-90	162-175	40-90											149-163	35-77
F	180-190	171-184	40-90	171-184	40-90			180-195	40-105							157-172	35-77
G	190-200	180-193	40-90	180-195	40-105	180-195	40-105	189-205	40-105							168-182	35-77
H	200-220	186-215	40-90	190-215	40-105	195-224	50-110	186-214	60-133							178-192	35-77
I	220-240	205-234	40-105	208-239	50-110	204-233	50-110	204-233	60-133							183-213	35-77
L	240-260	224-252	40-105	224-252	50-110	223-259	50-110	223-252	60-133	223-252	60-130					203-231	35-77
M	260-280	243-271	40-105	239-270	50-110	242-272	50-110	242-272	60-133	239-268	60-135			239-268	75-170		
N	280-300			260-289	50-110	262-290	60-121	262-290	60-133	258-287	60-135			258-287	75-170		
O	300-320					280-310	60-121	280-310	60-133	277-305	60-135			277-305	75-170		
P	320-340					300-328	60-121	300-328	60-154	295-324	60-135			295-324	75-170		
Q	340-360					318-347	60-121			314-342	60-135			314-342	75-180		
R	350-370													323-352	75-180		
S	360-380													332-361	75-180		

Notes: H.P.U.means Approximate pick-up value at 90°C , P.U. means pick-up value at 25°C, D.O.means drop out value at 25°C.



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## OPERATING CHARACTERISTICS at 60Hz

Coil number	2		3		4		5		6		7		8		9		
V <sub>max</sub> at 40°C (V)	332		375		420		395		502		168		588		253		
Resistance (1 ± 10%) Ω at 25°C	5600		7500		10700		10000		13800		1500		19500		3900		
	H.P.U.	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.	P.U.	D.O.
AA	120-130											111-124	20-45			111-124	35-77
AB	130-140											120-134	20-45			120-134	35-77
AC	150-160											130-144	20-45			130-144	35-77
AD	160-170	150-163	40-90									140-153	20-45			140-153	35-77
AE	170-180	162-175	40-90									149-163	20-45			149-163	35-77
AF	180-190	171-184	40-90					180-195	40-105							157-172	35-77
AG	190-200	180-193	40-90	180-195	40-105			189-205	40-105							168-182	35-77
AH	200-220	186-215	40-90	190-215	40-105	195-224	60-121	186-214	60-130							178-192	35-77
AI	220-240	205-234	40-90	208-239	50-110	204-233	60-121	204-233	60-130							183-213	35-77
AL	240-260	224-252	40-105	224-252	50-110	223-259	60-121	223-252	60-130							203-231	35-77
AM	260-280	243-271	40-105	239-270	50-110	242-272	60-121	242-272	60-140	239-268	60-135					221-250	35-77
AN	280-300			260-289	50-110	262-290	60-121	262-290	60-140	258-287	60-135			258-287	75-170		
AO	300-320					280-310	60-121	280-310	60-140	277-305	60-135			277-305	75-170		
AP	320-340					300-328	60-121	300-328	60-140	295-324	60-135			295-324	75-170		
AQ	340-360					318-347	60-121			314-342	60-135			314-342	75-180		
AR	350-370													323-352	75-180		
AS	360-380													332-361	75-180		

**Notes:** H.P.U.means Approximate pick-up value at 90°C , P.U. means pick-up value at 25°C, D.O.means drop out value at 25°C.

## OPERATING POSITION

	1	2	3	4	5	6
PLASTIC TAB MOUNT						
PANEL MOUNT						
METAL TAB MOUNT						

## TERMINAL CONFIGURATION

		3 dual QC (#1, 2, 5)
PLASTIC TAB MOUNT		D
PANEL MOUNT		P
METAL TAB MOUNT		Z

## ORDERING INFORMATION

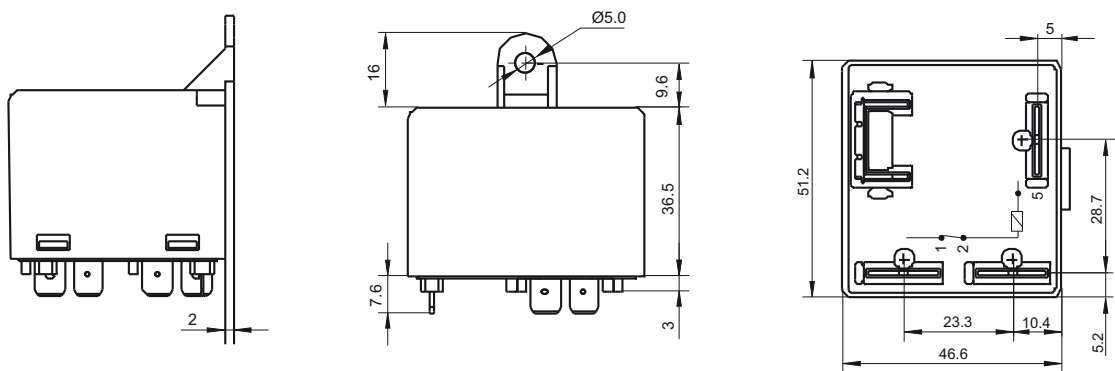
Type	HF8565 /	D	6	A	1 (XXX)
Terminal configuration	D、P、Z (See table for terminal configuration)				
Coil number	2、3、4、5、6、7、8、9				
Operation characteristics	AA to AS (See table for operating characteristics)				
Operation position	1、2、3、4、5、6				
Special code <sup>1)</sup>	XXX: Customer special requirement	Nil: Standard			

Notes: 1) The customer special requirement express as special code after evaluating by Hongfa.

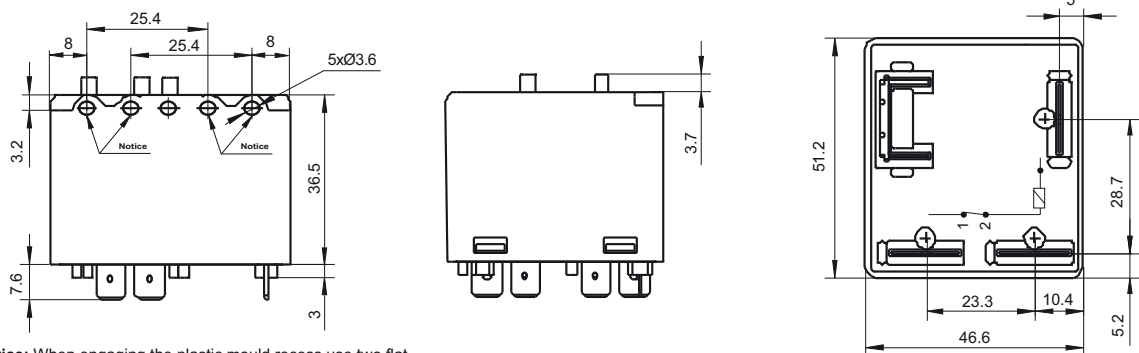
## OUTLINE DIMENSIONS, WIRING DIAGRAM AND PC BOARD LAYOUT

Unit: mm

### Plastic Tab Mount

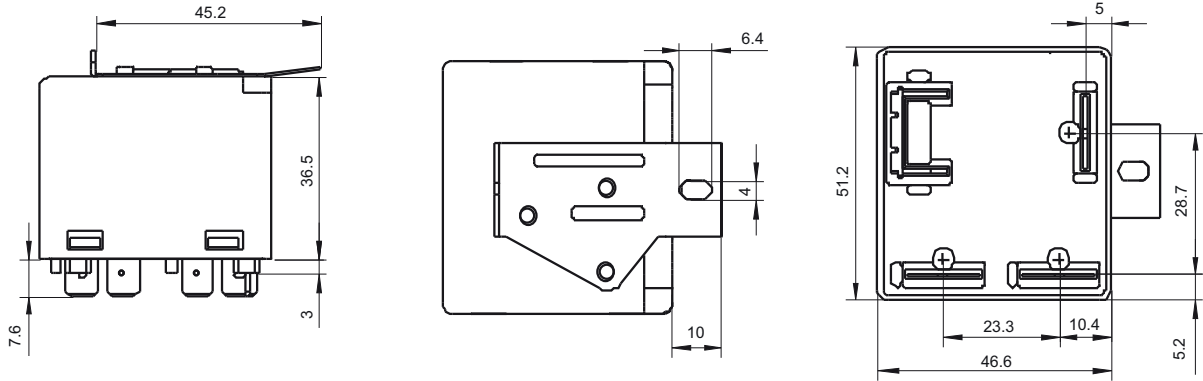


### Panel Mount



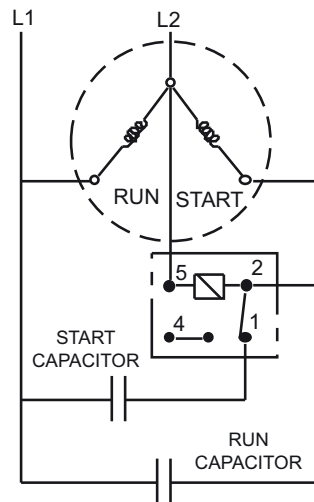
Notice: When engaging the plastic mould recess, use two flat head, self tapping screw, size 4.2mm, 9.5mm long.

Metal Tab Mount



Remark: 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  $> 5\text{mm}$ , tolerance should be  $\pm 0.4\text{mm}$ .

Wiring Diagram



Disclaimer

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## COMPARATIVE LIST BETWEEN THE OLD AND NEW ORDERING TYPE

New Ordering Type	Old Ordering Type	New Ordering Type	Old Ordering Type
<b>Signal Relay</b>		HF32FV	---
HFD16	---	HF32FV-16	---
HFD17	---	HF32FV-T	---
HFD2	---	HF32FV-G	---
HFD3	---	HF33F	JZC-33F
HFD3-I	---	HF36F	JZC-36F
HFD3-V	---	HF36FD	---
HFD4	---	HF37F	JQX-37F
HFD4-V	---	HF41F	---
HFD23	JRC-23F	HF42F	JZC-42F
HFD27	JRC-27F	HF46F	---
HFD31	---	HF46FB	---
HFD42	---	HF46F-G	---
<b>Power Relay</b>		HF49FD	---
HF3F-L	---	HF62F	JQX-62F
HF3FA	---	HF78F	JQX-78F
HF3FA-W	---	HF84F	8400
HF3FA-T	---	HF92F	692
HF3FD	---	HF94F	9400
HF3FF	JQC-3FF	HF102F	JQX-102F
HF3FF-M	---	HF105F-1	JQX-105F-1
HF7FD	JQC-7FD	HF105F-2	JQX-105F-2
HF7FF	JZC-7FF	HF105F-4	JQX-105F-4
HF8	---	HF105F-5	JQX-105F-5
HF14FF	JQX-14FF	HF115F	JQX-115F
HF14FW	JQX-14FW	HF115F-A	---
HF21FF	JQC-21FF	HF115F-H	JQX-115F-H
HF25F	JQC-25F	HF115F-I	JQX-115F-I
HF32F	JZC-32F	HF115F-L 1 Pole	---
HF32F-G	---	HF115F-L 2 Pole	---
HF32FA	JZC-32FA	HF115F-LS	---
HF32FA-T	JZC-32FA-T	HF115F-Q	JQX-115F-Q
HF32FA-G	---	HF115F-S	---

## COMPARATIVE LIST BETWEEN THE OLD AND NEW ORDERING TYPE

New Ordering Type	Old Ordering Type	New Ordering Type	Old Ordering Type
HF115F-T/TH	JQX-115F-T/TH	HF175F	---
HF115FP	---	HF176F	---
HF115FK	---	HF2100	---
HF115FK-T	---	HF2110/HF2120	---
HF116F-1	JQX-116F-1	HF2150/HF2151	---
HF116F-2	JQX-116F-2	HF2160	---
HF116F-3	JQX-116F-3	HF7520	---
HF116F-80	---	HF8565	---
HF116F-G	---	HFE7	JE7
HF118F	JQX-118F		
HF140FF	JZX-140FF		
HF152F	---		
HF152FD	---		
HF158F	---		
HF158F-V 1 Pole	---		
HF160F	---		
HF161F	---		
HF161F-W	---		
HF162F	---		
HF163F-L	---		
HF165F	---		
HF165FD	---		
HF165FD-G	---		
HF166F	---		
HF167F	---		
HF170F	---		
HF171F	---		
HF172F-100	---		
HF172F-140	---		

**Notes:** Now we have finished switching to be the head of "HF" as new ordering type, we strongly recommend that you should use the new ordering type for your orders.



HONGFA RELAY

ISO9001, ISO/TS16949, ISO14001, OHSAS18001, IECQ QC 080000 CERTIFIED



## CROSS REFERENCE GUIDE

### Power Relay

HONGFA	OMRON	PANASONIC	TE			NEC
			OEG	P&B	SCHRACK	
HF3FA	G5LA	JS			T7S	
HF3FA-T	G5LA					
HF3FD	G5LB	JS			T7S	
HF3FF	G5LC/G5LE	JS	PCE/ORWH	T72	T7N	
HF3FF-M						
HF7FD	G5LE-VD	JSM	PCE	T7N	T7N-WG	KB
HF7FF	G5LC/G5LE	JSM	PCE	T7N	T7N	
HF8			OU DH	T73	41891/UB	
HF14FF	G2R	JR1/JR1A	OMI	RKA/RKS	409/cardE/RPII1	CH
HF14FW	G2R	JR1AF	OMI-H/OZ	RKA/RKS		
HF21FF	G5L		SRUDH/SRUUH	T7C	LN/41896	
HF25F	G5G	LE				
HF32F			OJ/OJE	T77		CS
HF32F-G			OJ/OJE	T77		
HF32FA/HF32FA-T			OJ/OJE	T77		
HF32FA-G			OJ/OJE	T77		
HF32FV			OJ/OJE	T77		CS
HF32FV-G			OJ/OJE	T77		
HF32FV-16			OJT			
HF33F	G5SB/G5Q	JQ/PQ	PCH	T77	RE/REL	
HF36F/HF36FD	G5PA-1	LK	SDT			CK
HF37F						
HF41F		PF			V23092/SNR	
HF42F	G5PA-2	LA	OSA/PCI	T74		CN
HF46F/HF46F-G	G5NB/G5T	LD				CU
HF46FB						
HF49FD	G6DN	PAN			PCN	
HF62F	G5J	JR1AF-TMP	OMIF			
HF78F						

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## CROSS REFERENCE GUIDE

(To be continued)

### Power Relay

HONGFA	FUJITSU	FEME	FINDER	SONGCHUAN
HF3FA				899
HF3FA-T				833H
HF3FD				899
HF3FF		VTA/H	36.11	833H
HF3FF-M				
HF7FD	FBR160			812BH
HF7FF	CS			812
HF8	LZ	EM-EMH		843
HF14FF	VS	MZPA-001	40.31	845-1P
HF14FW	FBR610	MZPA-001	40.61	793P
HF21FF				801H
HF25F				
HF32F	JV			835/835NL
HF32F-G	JV			835/835NL
HF32FA/32FA-T	JV			835/835NL
HF32FA-G	JV			835/835NL
HF32FV	JV			835/835NL
HF32FV-G	JV			
HF32FV-16				
HF33F	JY	JF		892
HF36F/HF36FD	FTR-H2/F2	MXH		
HF37F	VF			
HF41F	FTR-LY		34,51	
HF42F				401
HF46F/HF46F-G	FTR-F4			202/202H
HF46FB	FTR-F3			
HF49FD	MY/NY			
HF62F				302
HF78F	VR	CS/CF30		302

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## CROSS REFERENCE GUIDE

### Power Relay

HONGFA	OMRON	PANASONIC	TE			NEC
			OEG	P&B	SCHRACK	
HF92F				T92	T92	
HF102F	G4A	LF	PCFN			
HF105F-1	G8P	JTN/JTV	ORU	T9A/T90	T9A	CT
HF105F-2	G7G/G8P	JT	ORU	491/T9A		
HF105F-4	G7G/G8P	JT	ORU		42903/42903A/ RT1 inrush/RX1	
HF105F-5	G7G/G8P	JTN	ORU			
HF115F	G2RL	LZ			RT/42900/RT1/RT2	TH
HF115-A	G5RL-AC			T9A	RT1/RT2/RX1/RX2	
HF115F-H				T90/T9A	RT1 sensitive	
HF115F-I				RT		
HF115F-L		DJ			RT1 bistable	
HF115F-LS				RT	RTX/RTS3T	
HF115F-Q				RT	RF/41063 125°C	
HF115F-T/TH					RTH105 16A	
HF115FP					XT	
HF115FK	G2RL	LZ			RZ	
HF115FK-T				RT	RZ	
HF158F	G2RL	LZ			RT	
HF116F-1	G7L	HE				
HF116F-2	G7L	HE		RT		
HF116F-3	G7L	HE				
HF116F-80		HE				
HF116F-G		HE				
HF118F	G6RN				RYII	
HF140FF	G2R/G2RG	JR2/JR2A	OMI		409/RPII2/SR2M	TP
HF141FF	G2R	JW	OMI			TP
HF152F/HF152FD	G5LE-VD	JSM				
HF160F	G4A	JM	PCF	RKA/RKS	PCJ	CU
HF161F	G4A	LF	PCFN			

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HONGFA RELAY

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## CROSS REFERENCE GUIDE

(To be continued)

### Power Relay

HONGFA	FUJITSU	FEME	FINDER	SONGCHUAN
HF92F				
HF102F				
HF105F-1				832
HF105F-2				832
HF105F-4				832
HF105F-5				832
HF115F	FTR-K1			881/888
HF115-A				881
HF115F-H	FTR-K1		41series	881/845N
HF115F-I	FTR-H1	M25		881/888
HF115F-L	FTR-K1L			
HF115F-LS				
HF115F-Q				881WP
HF115F-T/TH	FTR-K1			881
HF115FP				
HF115FK	FTR-K1			
HF115FK-T	FTR-K1			
HF158F	FTR-K1			
HF116F-1				841
HF116F-2			41series	841
HF116F-3				841
HF116F-80				511E
HF116F-G				510H
HF118F	JS			
HF140FF	FTR-F1/VS			845-2P
HF141FF	FTR-F1/VS			845-H
HF152F		M15E	40.52	875
HF160F	VH/FTR-K3	MZPA-002	40.31	821
HF161F				

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## CROSS REFERENCE GUIDE

### Power Relay

(To be continued)

HONGFA	OMRON	PANASONIC	TE			NEC
			OEG	P&B	SCHRACK	
HF161F-W		LF-G	PCFN SOLAR			
HF162F	G5PF	LK-F				
HF163F-L		DW				
HF165FD	G8P	JTN/JTV	ORU	T9A/T90	T9A	CT
HF165FD-G						
HF165F				T9S SOLAR		
HF167F		HE				
HF170F		HES				
HF172F-100						
HF172F-140						
HF176F		HE				
HF2100	G7G	JT		491/T9A		CT
HF2110/HF2120	G7G	JT		491/T90	T9A	CT
HF2150/HF2151	G7G	JTN/JTV		T9A/T90		CT
HF2160		JT		T9A/T90		CQ
HF7520	G5CA	JV/JVN		PCD		
HFE7	G6C	DK				

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## CROSS REFERENCE GUIDE

### Power Relay

(To be continued)

HONGFA	FUJITSU	FEME	FINDER	SONGCHUAN
HF161F-W				
HF162F				
HF163F-L				
HF165FD				832
HF165FD-G				832HA
HF165F				
HF167F				
HF170F				
HF172F-100				511HP1
HF172F-140				511EP
HF176F				
HF2100		CGQ		
HF2110/HF2120		CGQ		832A
HF2150/HF2151				832
HF2160				852
HF7520				201
HFE7				

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# CROSS REFERENCE GUIDE

## Signal Relay

(To be continued)

HONGFA	OMRON	PANASONIC	TE				NEC
			TYCO	AXICOM	OEG	P&B	
HFD16							
HFD17				V23101			
HFD23	G5V-1	HY	V23111		TSC		TY
HFD27	G5V-2	DS2Y		D2N (V23105)	OVR/ORZ	T82/T85/190	MR62
HFD2	G6A	DS2Y	V23042	MT2			MR82
HFD3	G6S	TX		P2 (V23079)			EC2/ED2
HFD3-I		TX-TH					
HFD3-V				FT			
HFD31	G6H	TQ		FP2			EA2
HFD4	G6K	AGQ		IM			UC2/UD2
HFD42	G6J	AGN		IM			

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HONGFA RELAY

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## CROSS REFERENCE GUIDE

### Signal Relay

(To be continued)

HONGFA	FUJITSU	FEME	FINDER	SONGCHUAN
HFD16				
HFD17	MZ			
HFD23	SY	EZ-EZH		
HFD27	FBR244/ FTR-C2/RV	ZFH-002	30.22	876
HFD2	RA	TF/TFL2		502
HFD3	BA/NA			902
HFD3-I				
HFD3-V	FTR-C1			
HFD31	A			
HFD4	FTR-B3			
HFD42	FTR-B4			

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## PACKING LIST

Type	Packing Method	Tube Size L x W x H cm	Carton Size L x W x H cm	QTY/CTN PCS	Approx. N.W. kg	Approx. G.W. kg	Stacking Layers Limit n	
HF3FA	100pcs/box	-	36.2 x 22.6 x 14.5	1000	7.2	8.1	5	
HF3FA-T	25pcs/tube	42x 2.14x2.24	45.5x19x13.2	1000	7.2	9.5	5	
HF3FA-W								
HF3FD	35pcs/tube	57.6x2x2.1	62x20x14.7	1400	11.2	14.6	6	
	100pcs/box	-	35 x23x 16	1000	8	9.9	6	
HF3FF	100pcs/box	-	34 x 22 x 14.5	1000	10	11.7	5	
	20pcs/tube	32.8x2.14x2.24	35.8 x 23.8 x 15.5	1000	10	11.1	5	
HF3F-L	100pcs/box	-	33.5 x 27.5 x 20.5	1000	4.8	5.9	7	
	50pcs/tube	57.6 x 2.14 x 2.24	62.5x20.5x15	1400	11.2	14.5	7	
HF7FD	100pcs/box	-	44.7x29.1x20.8	1000	9.5	11.1	5	
	20pcs/tube	34.5 x 2.42 x 2.29	37.5x 27.6 x 17.6	1000	9.5	11.6	5	
HF7FF	100pcs/box	-	39.5x 26.5 x 17.2	1000	9.5	10.5	8	
	20pcs/tube	34.6 x 2.43 x 2.37	37.5 x 27.5 x 15.5	1000	9.5	10.5	9	
HF8	20pcs/tube	34.5 x 2.34 x 2.24	37.5 x 27.6 x 21	1000	11	13.4	5	
HF14FF	50pcs/reel	-	35 x 29 x 19	500	8.3	10.3	6	
HF14FW	50pcs/reel	-	35 x 29 x 19	500	8.7	10.6	6	
HF21FF	15pcs/tube	26.8 x 2.21 x 2.74	33.5 x 28.5 x 18	1000	13	15.5	5	
HF25F	50pcs/reel	-	35 x 29 x 19	500	7.5	9.1	6	
HF32F/HF32FV	100pcs/box	-	32x 26 x 19	1000	6	7.2	5	
HF32FV-T/-G								
HF32F-G	50pcs/tube	55.3 x 2.22 x 2.35	59.5 x 15.6 x 13.8	1000	6	8	5	
HF32FV-16	50pcs/tube	55.3 x 2.22 x 2.35	59.5 x 15.6 x 13.8	1000	6	8	5	
HF32FA	100pcs/box	-	33.5X27.5X20.5	1000	4.8	5.9	7	
HF32FA-T								
HF32FA-G	50pcs/tube	53.5x2.12x1.99	58x 17 x 15	1500	7.1	9.2	7	
HF33F	100pcs/box	-	32 x 26 x 19	1000	7	8.3	5	
	50pcs/tube	55.3x2.43x2.31	58.1x15x12.5	1000	7	9.4	5	
HF36F/HF36FD	50pcs/box	-	37.5 x 29.5 x 27	1000	5.9	4.7	7	
HF37F	25pcs/reel	-	33.5x27.5x22.5	100	5.5	7	7	
HF41F	100pcs/tube	55 x 2.46 x 3.01	59.5 x 18.5 x 14.5	2000	6	7.5	7	
HF42F	50pcs/box	-	38.5 x 33.5 x 24	1000	5.9	4.7	7	
HF46F	160pcs/reel	-	40 x 27 x 20	1600	6	7.5	7	
	HF46F-G	150pcs/box	-	33.5 x 27.5 x 20.5	1500	5.9	4.7	7
		75pcs/tube	56 x 2.44 x 2.34	65 x 18 x 14	3000	6	7.5	7
HF46FB	140pcs/reel	-	40 x 27 x 20	1400	6	7.5	7	

**Notes:** This above list is the typical packing specification. Specifications and dimensions in this catalog are subject to change without notice.

## PACKING LIST

Type	Packing Method	Tube Size L x W x H cm	Carton Size L x W x H cm	QTY/CTN PCS	Approx. N.W. kg	Approx. G.W. kg	Stacking Layers Limit n
HF49FD	100pcs/tube	54.6 x 2.31 x 1.96	59.5 x 18 x 18.5	3000	6	7.5	7
HF62F	50pcs/reel	-	35 x 29 x 19	500	7.5	9.1	6
HF78F	105pcs/box	-	49.4 x 34 x 19.4	840	14.5	17.7	6
HF84F/HF94F	1pcs/box	-	34.2 x 34.2 x 20.3	100	5.5	7.5	7
	25pcs/reel	-	34.2 x 34.2 x 20.3	100	5.5	7.5	7
HF92F	20pcs/reel	-	35 x 29 x 24	100	6	7.5	7
HF102F	50pcs/box	-	38.5 x 25.5 x 16	400	9.2	9.7	6
	35pcs/tube	59.6 x 3.18 x 4.02	64 x 21 x 16.2	525	12.1	14.09	6
HF105F-1	40pcs/reel	-	34.5 x 26.5 x 20	400	10.4	11.6	6
HF105F-2	40pcs/reel	-	34.5 x 26.5 x 20	400	10.4	11.6	6
HF105F-3	40pcs/reel	-	34.5 x 26.5 x 20	400	10.4	11.6	6
HF105F-4	40pcs/reel	-	34.5 x 26.5 x 20	400	10.4	11.6	6
HF115F/-A/-H/-I/ -T/TH/-L/-S/-LS	50pcs/reel	-	40 x 27 x 20	500	6	7.5	7
	20pcs/tube	61.6 x 1.45 x 2.23	65 x 18 x 14	1000	6	7.5	7
HF115FD	50pcs/reel	-	40 x 27 x 20	500	6	7.5	7
	20pcs/tube	61.6 x 1.45 x 2.23	65 x 18 x 14	1000	6	7.5	7
HF115FK/-T	50pcs/reel	-	40 x 27 x 20	500	6	7.5	7
	20pcs/tube	61.6 x 1.45 x 2.23	65 x 18 x 14	1000	6	7.5	7
HF115F-Q	40pcs/reel	-	40 x 27 x 20	400	6	7.5	7
	12pcs/tube	53.0 x 1.45 x 2.23	57.5 x 19 x 15.5	600	6	7.5	7
HF115FP	50pcs/reel	-	35 x 29 x 24	500	7.6	10	7
HF116F-1/-2	16pcs/reel	-	35 x 29 x 24	80	6	7.5	7
HF116F-3 A型	5pcs/box	-	31.5 x 16.5 x 19	50	5.9	4.7	7
HF116F-3 F型	5pcs/box	-	32.5 x 18.5 x 19	50	5.9	4.7	7
HF116F-G/-80	16pcs/reel	-	35 x 29 x 24	80	6	7.5	7
HF118F	50pcs/tube	60 x 1.22 x 1.88	63.5 x 17 x 15	1000	9.1	11.3	6
HF140FF	50pcs/reel	-	35 x 29 x 19	500	8.7	10.6	6
HF141FF	50pcs/box	-	35 x 29 x 22	500	8.5	10.5	6
HF152F	50pcs/box	-	44x 29.2x 21.5	1000	13.5	14.8	6
HF152FD	25pcs/tube	45.5x2.22x2.78	47.5 x 20 x 16.5	1000	13.5	16.3	6
HF158F	50pcs/reel	-	40 x 27 x 20	500	6	7.5	7
	20pcs/tube	61.6 x 1.45 x 2.23	65 x 18 x 14	1000	6	7.5	7

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## PACKING LIST

Type	Packing Method	Tube Size L x W x H cm	Carton Size L x W x H cm	QTY/CTN PCS	Approx. N.W. kg	Approx. G.W. kg	Stacking Layers Limit n
HF160F	50pcs/reel	-	40 x 27 x 17.5	400	6	7.5	7
	35pcs/tube	59.6 x 3.26 x 4.26	64.5 x 18 x 18	420	6	7.5	7
HF161F/-W	17pcs/tube	59.2 x 1.94 x 3.12	59.5 x 18.5 x 14.5	340	6	7.5	7
	50pcs/reel	-	40 x 27 x 17.5	400	6	7.5	7
HF162F	50pcs/box	-	40 x 34 x 27.5	1000	10.7	12	7
HF163F-L	40pcs/tube	44.4 x 2.5 x 2.5	48.5 x 17 x 18.5	1000	7	9.3	8
HF165F	35pcs/reel	-	40 x 27 x 20	280	7.9	9.19	8
HF165FD/-G	40pcs/reel	-	40 x 27 x 20	400	6	7.5	7
HF166F	30pcs/reel	-	40 x 27 x 20	240	6	7.5	7
HF167F	20pcs/reel	-	40 x 27 x 20	120	6	7.5	7
HF170F	20pcs/reel	-	40 x 27 x 20	120	6	7.5	7
HF171F	110pcs/reel	-	40 x 27 x 20	1100	6	7.5	7
HF172F-100	15pcs/reel	-	40 x 27 x 20	90	6	7.5	7
HF172F-140	15pcs/reel	-	40 x 27 x 20	90	6	7.5	7
HF175F	40pcs/reel	-	40 x 27 x 20	400	6	7.5	7
HF176F	20pcs/reel	-	40 x 27 x 20	120	6	7.5	7
HF2100	40pcs/reel	-	33.5 x 27.5 x 22.5	240	7.2	9	7
HF2110	50pcs/reel	-	33.5 x 27.5 x 22.5	350	8.8	10.5	7
HF2120	40pcs/reel	-	33.5 x 27.5 x 20.0	200	5.1	6.7	7
HF2150/HF2151	40pcs/reel	-	34.5 x 26.5 x 20	400	10.4	11.6	6
HF2160	35pcs/reel	-	34.5 x 26.5 x 20	350	10.5	11.9	6
HF7520	50pcs/box	-	43.6 x 31.1 x 16	1000	8.8	10.3	5
HF8565	10pcs/box	-	38.2 x 28.5 x 20	90	9.5	11.5	7
HFE7	30pcs/tube	20 x 15 x 10.2	54 x 20 x 14	1200	7.2	10.2	8
	100pcs/box	-	36 x 26 x 25	1000	6	7.1	6
HFD16	25pcs/tube	40.9 x 1.31 x 1.81	47 x 21 x 23	2000	7	11	6
HFD17	25pcs/tube	40.9 x 1.31 x 1.81	47 x 21 x 23	2000	7	11	6
HFD2	25pcs/tube	52.7 x 1.25 x 1.85	58 x 29 x 24	4000	18	24	4
HFD3(SMT type)	400pcs/box	-	35 x 35 x 18	2000	4.5	8	8
HFD3	40pcs/tube	62.4 x 1.25 x 1.64	68 x 19 x 23	4000	8.8	13	6
HFD4(SMT type)	900pcs/box	-	37 x 37 x 22	3600	2.9	6	6

**Notes:** This above list is the typical packing specification. Specifications and dimensions in this catalog are subject to change without notice.

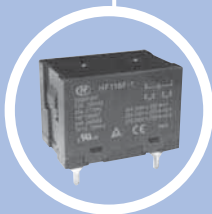
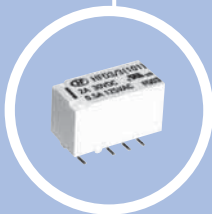
## PACKING LIST

Type	Packing Method	Tube Size L x W x H cm	Carton Size L x W x H cm	QTY/CTN PCS	Approx. N.W. kg	Approx. G.W. kg	Stacking Layers Limit n
HFD4	50pcs/tube	52x 1.15 x 1.18	58 x 18 x 16	4000	3.2	6	8
HFD23	20pcs/tube	26.5 x 1.2 x 1.7	35 x 29 x 24	4000	8.8	12.9	6
HFD27	25pcs/tube	52.7 x 1.25 x 1.85	58 x 29 x 24	4000	20	26	3
HFD31	40pcs/tube	58 x 1.06 x 1.28	64 x 22 x 20	4000	6.4	10.4	6
HFD31(SMT type)	550pcs/tray	-	37 x 37 x 22	2200	3.8	6.5	7
HFD3-I(SMT type)	400pcs/tray	62.4 x 1.25 x 1.64	35 x 35 x 18	2000	4.5	8	6
HFD3-I	40pcs/tube	-	68 x 19 x 23	4000	8.8	13	6
HFD3-V(SMT type)	400pcs/tray	-	35 x 35 x 18	2000	4.5	8	8
HFD3-V	40pcs/tube	62.4 x 1.25 x 1.64	68 x 19 x 23	4000	8.8	13	6
HFD4-V(SMT type)	900pcs/tray	52 x 1.15 x 1.26	37 x 37 x 22	3600	2.9	6	7
HFD4-V	50pcs/tube	-	58 x 18 x 16	4000	3.2	6	7
HFD42(SMT type)	500pcs/tray	-	37 x 37 x 22	2000	2.2	5	6
HFD42	50pcs/tube	55.5 x 1.1 x 1.65	62 x 17 x 18	4000	4	7	6
HFD16	25pcs/tube	40.9 x 1.31 x 1.81	47 x 21 x 23	2000	7	11	6

**Notes:** This above list is the typical packing specification. Specifications and dimensions in this catalog are subject to change without notice.

# Explanation To Terminology And Guidelines

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## PREFACE

### 1. Principles

HF and its affiliates have made every effort to guarantee the accuracy of instructions and specifications. Still, errors may occur. Therefore, HF and its affiliates reserve the right to make any modification to the instructions and specifications.

HF and its affiliates claim only the responsibility of the clearly confirmed experiment clauses and condition of sale as well as the application condition and test results stated in particular specifications. We disclaim any assumptions or implications of any of our specifications and instructions.

Given the impossibility of defining all the requirements of all the relays in every application, users shall select relays accordingly and re-check through careful evaluation, or turn to HF and its affiliates for technic support if necessary. Users shall take full responsibility for relay selection.

### 2. Definition and Classification

Relay is a kind of component by which when the input is reached to a certain value, one or more outputs will produce the scheduled changes.

For electromagnetic relay, SSR and combined relay, it can be simply understood as the following way: it is a switch by which in the input end the speculated electrical signals are applied, the output end makes or breaks the controlled circuit.

There are many kinds of classifications about relay, we take the following classifications shown as table 1.

Table 1

Classifications		Application Fields	Advantages
Electromagnetic Relay	Signal relay	Generally for telecom and signal control	<ul style="list-style-type: none"> <li>● Without leakage current in the open output end</li> <li>● In the large load, it is unnecessary to add the radiators</li> </ul>
	Power relay	Generally for home application	
	Industrial relay	Generally for industrial application	
	Latching relay	Generally for power control	
	Automotive relay	For automotive fields	
	Hermetically sealed relay	For the fields where the environment is bad and the high reliability is required	
SSR & Power Module		For the fields where the environment is bad, low noise and high reliability are required.	<ul style="list-style-type: none"> <li>● With long electrical endurance</li> <li>● Without noise</li> <li>● Good shock and vibration capability</li> </ul>
Combined Relay		For the fields where the certain control functions are required.	<ul style="list-style-type: none"> <li>● With certain control logic</li> </ul>



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According to the classifications of relay, our catalogue can be divided into general relay fascicule, automotive relay & module fascicule, industrial relay fascicule, latching relay fascicule and hermetically sealed relay fascicule. In general relay fascicule, power relay and signal relay are included; and in automotive relay & module fascicule, plug-in relay, PCB relay and automotive module are included. We also provide the sockets which match to the relays.

This article states the basic information about the electromagnetic relay, lists the selecting principles and cautions of applications.

Generally the parameters of the instructions in the catalogue are the measured initial values under the standard, which are as following, unless otherwise stated.

- 1) temperature: 15°C to 35°C
- 2) relative humidity: 25% to 75%
- 3) air pressure: 86kPa to 106kPa

Generally the drawing stated in the catalogue is the first quadrant projection way as shown in figure 1, unless otherwise stated.

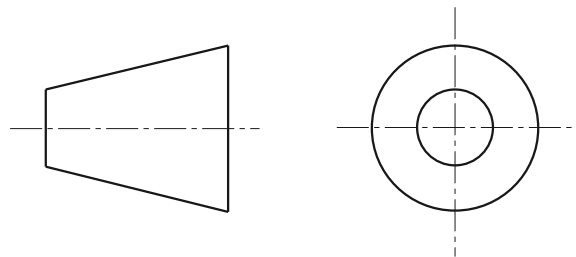


Figure 1

## CHAPTER 1 THE BASIC TERMINOLOGY OF THE RELAYS

### 1. Contact Parameters

1.1 **Contact forms** are the arrangements of relay contacts. The basic contact arrangements are shown in Table 2, the multi-contact arrangements can be ratiocinated.

Table 2

Name	Symbol	Alphabet Letter	
		China	Others
Normally Open Contacts		H	A ( or NO)
Normally Closed Contacts		D	B (or NC)
Change-Over Contacts		Z	C (or CO)



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- 1.2 Contact resistance** is the total resistance between the contacts, the terminals and spring jointed with contacts, generally shown in  $m\Omega$ .  
Unless otherwise stated in the catalogue, generally for the relay with contact load below 2A, its contact resistance is measured in 6Vd.c., 0.1A; for the relay with contact load above 2A, its contact resistance is measured in 6Vd.c., 1A. contact resistance should be tested with the max applicable voltage and current according to the corresponding load type in IEC61810-7.
- 1.3 Contact voltage drop** generally is, in the load circuit, the total voltage drop between contacts, springs jointed with contact and the terminals. It is generally described as the voltage drop value under the regulated current, for example 50mV (measured in 10A).
- 1.4 Contact material** is the material used in contacts and generally shown in chemistry formula, for example, AgNi represents silver-nickel alloy contacts. The material used in the relay, its characteristics and its application environment can be seen in 1.2 'Contact material' in chapter 2 'the principles for selecting relays'.
- 1.5 Contact rated load** generally refers to the load of which the contacts can switch reliably under the certain regulated conditions. Generally it is shown as the combination of the voltage and the current. The loads listed in the catalogue are resistive loads, unless otherwise stated.
- 1.6 Max. switching voltage** is the maximum load voltage of which the contacts can switch. In general application, this voltage value shall not be surpassed, or the relay endurance will be reduced.
- 1.7 Max. switching current** is the maximum load current of which relay contacts can switch. In general application, this voltage value shall not be surpassed, or the relay endurance will be reduced.
- 1.8 Max. switching power** is the maximum load power of which relay contacts can switch reliably. Generally for AC it is shown in VA while for DC it is shown in W.
- 1.9 Mechanical endurance** refers to the operations that the relays without load or with load do not lead to failure under the rated voltage, normally switch in the specified, generally it is shown in operations.
- 1.10 Electrical endurance** generally refers to the operations that the relay can normally switch when the specified load is applied on the contacts and the rated voltage is applied to the coil under the conditions that the relay is placed in the certain speculated environment. Generally it is shown in operations.
- 1.11 Surge current** generally refers to the maximum transient current of which relay can endure in the specified load.
- 1.12 Min. applicable load** generally is reference value of minimum load that the relay can switch. Please perform the confirmation test with actual load before production since reference value may change according to switching frequency, environmental condition and expected contact resistance and reliability.

## 2. Characteristics Parameters

- 2.1 Insulation resistance** is the impedance when the conductors insulated with insulating material are applied to voltage and it is generally shown in " $M\Omega$ ". The speculated voltage described above are general 500Vd.c.(or 250 Vd.c.).
- 2.2 Dielectric strength** is the voltage value when, within the speculated time, the conductors insulated with insulated material are applied to the voltage and the leakage current is less than the speculated current. The certain voltage above generally is the effective value of AC voltage and unless otherwise stated, the leakage current is generally less 1mA.
- 2.3 Operation time** refers to, with the relay in the released state, the elapsed time from the initial application of power to the coil, till the closure of the normal open contacts. It does not include any bounce time, and expressed in "ms".  
For the latching relays, operation time refers to, with the relay in the reset state, the elapsed time from the initial application of power to the coil, till the closure of the normal open contacts. Seen in figure 2.



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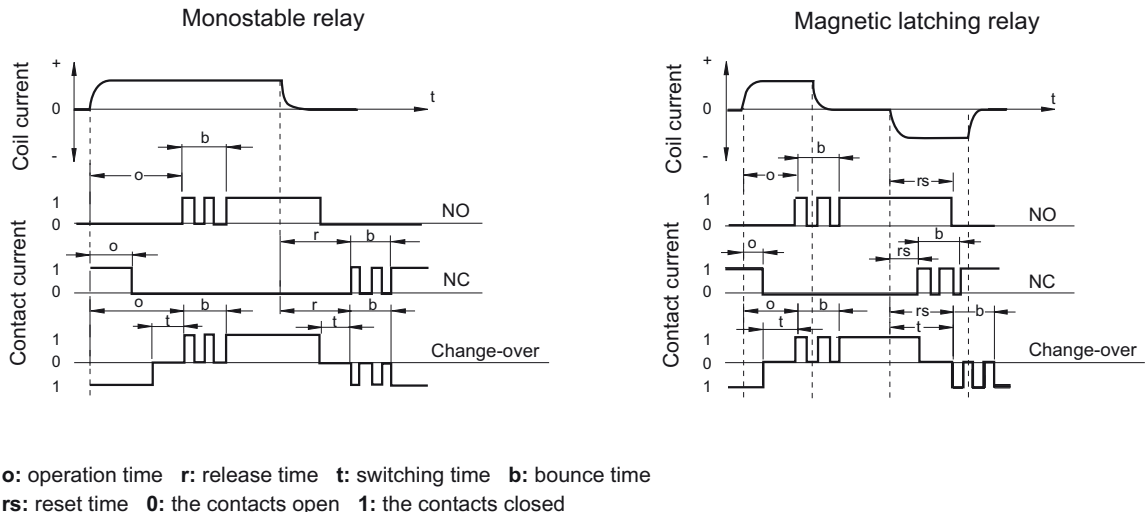


## GUIDELINES OF RELAY

**2.4 Release time** refers to, with the relay in the operation state, the elapsed time from the initial removal of coil power till the re-close of the normal closed contacts. It does not include bounce time and expressed in "ms". Seen in figure 2.

**2.5 Reset time** (only for the latching relays) refers to, with the relay in the operation state, the time from the first application of power to the reset coil till the re-close of the normally closed contacts. Seen in figure 2.

**2.6 Bounce time** generally refers to the time from the initial close of the contacts till the complete close and generally expressed in "ms". Seen in figure 2.



**Figure 2**

**2.7 Switching frequency** refers to the cycling times of the operation and release in united time.

**2.8 Ambient temperature** refers to the temperature in which the relay can normally be applied and it is generally expressed in the range of temperature.

**2.9 Coil temperature rise** refers to the temperature that the coil rises by after the temperature becomes stable and under the conditions that in the suitable maximum ambient environment the rated voltage is impressed on the coil and the rated load is impressed on the contacts. Generally it refers to the maximum value, expressed

**2.10 Shock** is divided into shock functional and survival.

Shock functional refers to the acceleration the relay can suffer the shock value under the condition of the NC contact open time and open contact closing time at specified time. Usually it is expressed in the combination of the acceleration value "g" and the duration "ms".

Shock survival refers to the shock value that can not damage the relay construction, Usually it is expressed in the combination of the acceleration value "g" ( $1g=9.8m/s^2$ ) and the duration "ms".

**2.11 Vibration resistance** is divided into Vibration function and survival.

Vibration function refers to the vibration the relay can suffer without causing the closed contacts to open for more than the specified time and the open contacts to close for more than the specified time. It is usually expressed in the combination of the vibration "mm" and the vibration frequency "Hz".

Vibration survival refers to the vibration the relay can suffer without damaging their construction. It is usually expressed in the combination of the vibration "mm" and the vibration frequency "Hz".



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**2.12 Humidity** refers to the required humidity in which the relay can reliably work and generally expressed in relative humidity "%RH".

### 2.13 Model Of The Terminals

The terminals model of the relays also shows the applicable fields. Generally speaking, the models of terminals are PCB, THT, SMT, plug-in, QC and others.

**2.14 Weight** : the weight of the relay.

**2.15 Enclosure type** refers to the protection mode for the relay body. It is divided into enclosed, dust protected, flux proofed, plastic sealed and hermetically sealed. Seen in 3.1 'mode of encapsulation' in chapter 2 'the principles of selecting the relays'

## 3. Coil Parameters

**3.1 The rated coil power** refers to the power consumed by the coil when the coil are applied to the rated voltage. Generally for the DC relay, it is expressed in W while for the AC relay in VA.

**3.2 Rated voltage** is the voltage applied to the coil that can make relay work normally. It is expressed in "V". For the polarized relay, the direction in which the voltage is impressed should be notified.

**3.3 Operate voltage** is the voltage which closes the NO contacts when the relay is in the releasing state (for the latching relay in the reset state) and the coil voltage is increased gradually. Usually it is expressed in "V". It is usually the maximum value listed in the instructions, which is about 80% of rated voltage.

**3.4 Release voltage** is the voltage which closes the NC contacts when the relay is in the operation state and the coil voltage is gradually reduced from the rated voltage. It is usually expressed in "V". The minimum value is listed in the instructions, which is about 10% of the rated voltage.

**3.5 Reset voltage** is the voltage which closes the NC contacts when the latching relay is in the operation state and the reset coil voltage is increased. It is expressed in "V". The maximum value is listed in the catalogue, which is about 80% of the rated voltage.

**3.6 Coil resistance** generally refers to the DC resistance and is expressed in " $\Omega$ ". In the catalogue the combination of the nominal value and tolerance is given.

**3.7 Maximum voltage** refers to the maximum voltage which relay coil could endure in a short period of time. It is expressed in V.

## 4. Safety Approval

### 4.1 UL Approval

UL, the abbreviation of Underwriter Laboratories Inc, is a non-profitable organization founded in 1984. The electrical products authorized by this organization can be freely sold in American market, while the electrical products not authorized by this organization will be limited when they are sold in most of the states of America. Due to the authority of UL, the products approved by UL are accepted by many countries.

### 4.2 CSA Approval

CSA, the abbreviation of Canadian Standards Association, is the authorized approval institution. The electrical products approved by this institution can be freely sold in Canadian market. The products approved by the CSA can be only sold in Canadian market and if these products want to enter into the American market, they should get the American approval of UL.

### 4.3 UL&CUR

UL&CUR is the approval which simultaneously meets the American standard and the Canadian standard and can be used in North America.



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## 4.4 VDE Approval

VDE, the abbreviation of Verband Deutscher Elektrotechniker, is one of Germany authorized organizations in electrical component and other equipment. The electric products approved by this institution will be admitted in Germany law.

## 4.5 TÜV Approval

TÜV, the abbreviation of Technischer überwachungsverein, has the same authority as VDE. TÜV is one of the authorized institution in electric equipments. The electric products approved by this institution will be admitted in Germany law.

## 4.6 CQC Approval

CQC, the abbreviation of China Quality Certification, is the most authorized approval institution in China. The products not listed in the catalogue of 3C approval can make CQC approval in China Quality Certification Center.

## 5. Ordering Code

Ordering code is a code which is used to ensure the type and the specifications of the relay, which includes the basic information of relay, such as the type of the products, coil voltage, contacts arrangement, enclosure type etc.. The ordering code of HONGFA brand relay can be seen in Chapter 5 "the ordering code".

## 6. Outline Dimensions, Wiring Diagram And The Size Drawing Of The Mounting Holes

Ordering mark is a mark which is used to ensure the type and the specifications of the relay, which includes the basic information of the relays, such as the type of the products, the coil voltage, contacts arrangement, the mode of encapsulation etc.. The ordering marks of HONGFA brand relay can be seen in Chapter 5 "the ordering marks".

**6.1 Outline dimensions** describes the drawing of the relay outline size and the mounting space needed by relay.










**6.2 Wiring diagram** describes the wiring way of the input and output terminals respondent to the terminals of the relays.

**6.3 The size drawing of the mounting holes** describes the position of the relay terminals and the size of their mounting holes.

### 6.4 Examples

The examples of the common components can be seen in table 3.

**Table 3**

Coil	Polarized Coil	Contact	Resistance	Capacitance	Diode	Zener Diode	LED	Varistor
								

## 7. Characteristic Curves

**7.1 Max. switching power curves** represent the loads the relay can support.

**7.2 Electrical Endurance Curve:** The electrical endurance curve indicates the typical endurance under rated load. The data of all the electrical endurance do not guarantee a minimum value.

- 1) The data of all the electrical endurance are only valid for stated contact materials, special contact materials excluded. No deductions should be made from the data.
- 2) No deductions should be made from the data, especially to the situation when the current is below 0.5A as contact wear is not the dominant failure mode.



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7.3 **Coil temperature rise** curve shows the measured temperature rise value of the coil when the relay is energized with different voltage and loads under the speculated ambient temperature.

## 8. Monostable, Latching And Polarized Relays

### 8.1 Monostable Relay:

For this relay, the contacts operate when the coil is energized while the contacts will reset when the coil is deenergized.

### 8.2 Latching Relay:

For this relay, the contacts operate when the coil is energized while the contacts will keep the state when the coil is deenergized. To reset the contacts, the counter-energization will be applied to the single-coil coil or the energization is applied to the double-coil reset coil .

### 8.3 Polarized Relay:

The switch of the contact state is dependent on the polarity of the energized voltage in the terminals of the coil. Part of the monostable relays and all the magnetic latching relays belong to polarized relays.

The basic circuit and operating wave of the several common relays can be seen in table 4.

Table 4

Type	The Basic Circuit And Operating Waveform		
Non-Polarized Monostable			
Polarized Monostable			
Single-coil Latching			
Two-coil Latching			

**Notes:** the voltage with the correct polarity is required to impress on the coil of polarized relays or the relays will not work, as shown in the shaded area in the figures above.



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**CHAPTER 2 THE PRINCIPLES OF SELECTING THE RELAYS**

In order to correctly select relays, customers need know the characteristics of the relays to ensure whether these characteristics meet with the practical requirements. It will be more reliable if these characteristics can be tested in the practical environment. The principles of selecting relays can be seen in table 5. In table 5, in the column "must be confirmed" the item with mark  $\checkmark$  is confirmed and a type of relay can be selected. If there is further requirement, the correspondent items with the mark  $\checkmark$  are required to be further confirmed.

Table 5

Item		The considered points	Confirmed	Reference	Influence factors
Contact	Contact load	AC, DC, size and types (inductive or resistive)	$\checkmark$		<ul style="list-style-type: none"> <li>the ambient temperature</li> <li>as for AC load, is the operation and the load synchronous or not</li> <li>Does the contact material match the load?</li> </ul>
	Contact arrangement	NO or NC or switching? how many pairs of the contacts?	$\checkmark$		
	Electrical endurance	The frequency and the expected operation times?	$\checkmark$		
	Contact material	Which material?		$\checkmark$	
	Contact resistance	How much and the testing conditions?		$\checkmark$	
Coil	Rated voltage	How much, direction, AC, DC?	$\checkmark$		<ul style="list-style-type: none"> <li>the ambient temperature</li> <li>the power fluctuation</li> <li>the voltage drop driven by semi-conductor</li> </ul>
	Coil resistance	How much? The input power consumption?	$\checkmark$		
	Operate voltage	How much? The influence of the power wave?		$\checkmark$	
	Release voltage	How much? The influence of the power fluctuation?		$\checkmark$	
	Max. allowable voltage	How much? How long?		$\checkmark$	
	Coil temperature rise	How much? Insulation level?		$\checkmark$	
Performance	Enclosure type	Unenclosed type, dust protected, flux proofed, or plastic sealed?	$\checkmark$		<ul style="list-style-type: none"> <li>the ambient atmosphere</li> <li>the safety requirements</li> </ul>
	Dielectric strength	How much? where?	$\checkmark$		
	Insulation resistance	How much where?		$\checkmark$	
	Vibration resistance	How much? Functional or destructive?		$\checkmark$	
	Shock resistance	How much? Functional or strength?		$\checkmark$	
Practical Environment	Ambient temperature	High or low? How long?	$\checkmark$		<ul style="list-style-type: none"> <li>insulation level</li> <li>method of encapsulation</li> <li>the life</li> </ul>
	Atmosphere	Humidity? Harmful gases ?		$\checkmark$	
Outline And Mounting	Outline	Size and dimension	$\checkmark$		<ul style="list-style-type: none"> <li>the required mounting size</li> <li>mounting method</li> </ul>
	Type Of Terminals	PCB, QC, plug-in or screw fixed model?	$\checkmark$		
	Welding mode	Manual solder, wave solder, reflow solder ? Is cleaning needed or not?		$\checkmark$	
	Mounting gap	Cling or with gap?		$\checkmark$	
Others	Safety approval	UL、VDE、TUV、CQC etc ?		$\checkmark$	<ul style="list-style-type: none"> <li>zone</li> <li>the customers' requirements</li> </ul>
	Special requirements and conditions	The requirements of the customers		$\checkmark$	

The following will give the further explanation about the items in the table above.

1. Contact Parameters

1.1 Contact Load

Before ensuring whether the load the relay can carry in order to meet with the application, we should confirm the type of the real load except for confirming the load value for different loads have different steady state value and inrush value. Seen in table 6. The load given in the instructions are generally the resistive load, unless otherwise stated.

Table 6

The Type Of Load	Inrush Current
Resistive Load	once steady state current
Motor Load	5-10 times steady state current
Capacitive Load	20-40 times steady state current
Transformer Load	5--15 times steady state current
Solenoid Load	10--20 times steady state current
Incandescent Lamp Load	10-15 times steady state current
Mercury Lamp Load	3 times steady state current
Sodium Vapor Lamp Load	1-3 times steady state current

Figure 3 shows the relations between the representative load and the inrush current. In addition, according to the characteristics that the polarity of different moving and stationary contacts will influence the electrical endurance. Please check in the practical application or consult the technician of HONGFA company.

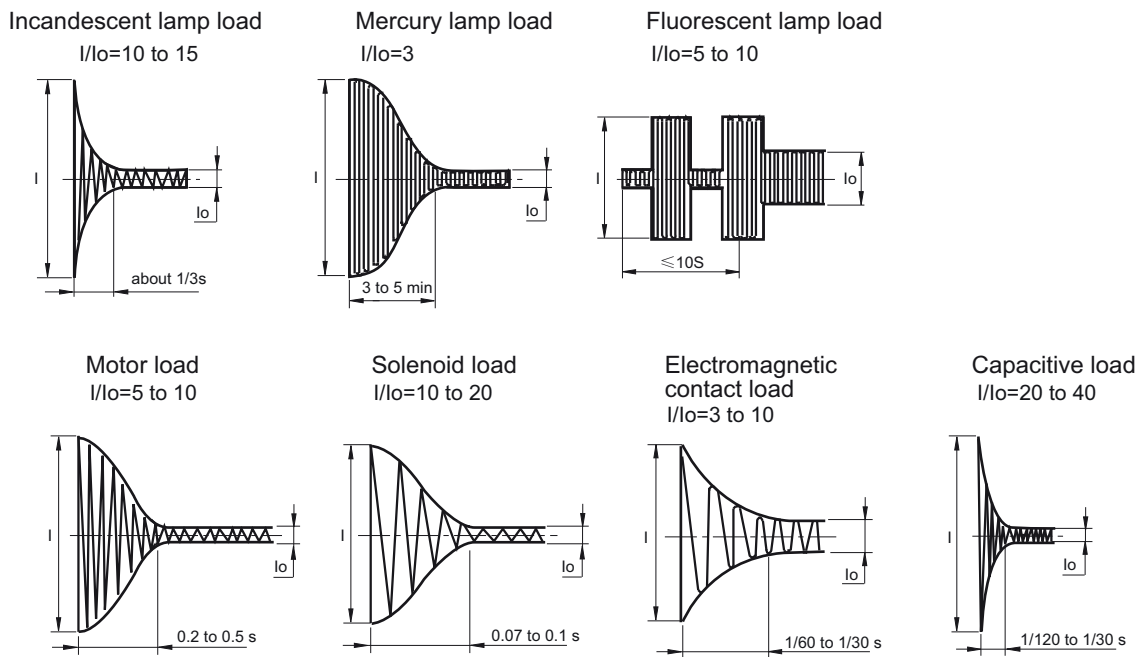


Figure 3

1.2 Contact Material

For the same type of relay, different contact materials are applicable to different load types or ranges. Seen in table 7.



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Table 7

Material	Feature	Typical Application
AgNi+ Au (gold plating)	<ul style="list-style-type: none"> <li>● gold plating with good resistance to erode in the air</li> <li>● by contrast to other material, lower contact resistance and better consistency in low load</li> <li>● high electrical conductivity and thermal conductivity</li> </ul>	<ul style="list-style-type: none"> <li>● Small load: gold plating almost not eroded, from 10mW(5V, 2mA) to1.5W (24V, 62.5mA) (resistive load)</li> <li>● Middle load: gold plating is eroded after seve operations and AgNi functions mainly, from 2.4W (24V, 100mA) to 60W (30V, 2A) (resistive load)</li> </ul> <p>Note: Break the low load, the typical value is 1mW (0.1V 1mA) (eg. in the testing devices); Suggest to use two pairs of the contacts in parallel.</p>
AgPd	<ul style="list-style-type: none"> <li>● good resistance to erode and sulfur in room temperature</li> <li>● low contact resistance and good consistency</li> <li>● expensive</li> </ul>	<ul style="list-style-type: none"> <li>● the same as the above</li> </ul>
AgNi	<ul style="list-style-type: none"> <li>● the standard material of most contact material</li> <li>● high electrical conductivity and thermal conductivity</li> <li>● high resistance to burn</li> <li>● average resistance to solder</li> <li>● easily produce the sulfured film in the atmosphere with sulfid.</li> </ul>	<ul style="list-style-type: none"> <li>● resistive load and low inductive load</li> <li>● rated current below 12A</li> <li>● surge current below 25A</li> </ul>
AgCdO	<ul style="list-style-type: none"> <li>● high AC load</li> <li>● high electrical conductivity and thermal conductivity</li> <li>● good resistance to burn</li> <li>● great resistance to welding</li> <li>● easily produce the sulfured film in the atmosphere with sulfid</li> </ul>	<ul style="list-style-type: none"> <li>● resistive load, motor load and inductive load</li> <li>● rated current below 30A</li> <li>● surge current below 30A</li> </ul>
AgSnO <sub>2</sub>	<ul style="list-style-type: none"> <li>● great resistance to welding</li> <li>● the materials transferred less than those above3 in DC load</li> <li>● easily produce the sulfured film in the atmosphere with sulfid.</li> </ul>	<ul style="list-style-type: none"> <li>● lamp load, inductive load and capacitive load</li> <li>● excessively high surge current load (up to 120A )</li> </ul>
AgSnO <sub>2</sub> (with other oxide matter)	<ul style="list-style-type: none"> <li>● the same as the above</li> </ul>	<ul style="list-style-type: none"> <li>● lamp load, inductive load and capacitive load</li> <li>● excessively high surge current load (up to 120A )</li> <li>● with different oxide matter, the different applicable load</li> </ul>

**Notes:**

- 1) Consider the maximum current value specified in different relays.
- 2) It would be better to be checked and tested in application when the conditions are catalogue allowable.  
Gold plating of the contacts shows good performance for the low loads. However, for the high load, it can only keep the initial contact performance of the contacts before the relays are used.



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## 1.3 Electrical Endurance

Unless otherwise specified, the electrical endurance in the instruction refers to the standard value under rated load in the circumstance that:

- a) standard condition
- b) NO contact
- c) 50Hz for AC load
- d) Make-break rate 1:9
- e) Resistive load
- f) Flux-proof
- g) Downwards PCB terminals
- h) Separated installation
- i) Failure and malfunction criteria and final dielectric test comply with the relevant regulation of IEC61810-1:2015
- j) See IEC61810-1:2015 for unstated information

Considering the flux-proof and the dust-proof types have longer electrical endurance than the sealed type of the same relay, it is preferred to select the flux-proof and the dust-proof types if possible.

## 1.4 Mechanical Endurance

Unless otherwise specified, the mechanical endurance in the instruction refers to the standard value under rated load in the circumstance that:

- a) no contact load
- b) Rated frequency of operation, duty factor 50%
- c) Downwards PCB terminals
- d) 50Hz for AC load
- e) See IEC 61810-7 for failure modes

## 2. Coil

### 2.1 Voltage

To make the relay work reliably, be sure that work circuit can supply the rated voltage to the coil.

In the case of transistor drive circuit, that the voltage on the coil is less than the normal voltage of the transistor drive circuit because of the voltage drop on the transistor, it is recommended to use 4.5V type relay which in 5V transistor circuit and 2.4V type relay in 3V transistor circuit.

Sometimes to shorten the operating time, the coil can be applied to maximum allowable voltage to the coil in the short time. However it should be ensured that the relay will not overheat or even be damaged.

For polarized relays, please check the polarity of the coil voltage.

### 2.2 Coil Resistance

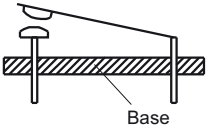
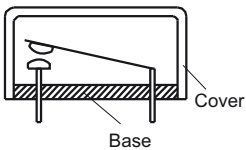
To make the relay work reliably, be sure that work circuit supplies the nominal coil power consumption to the relay. Therefore please select the suitable coil resistance.

## 3. Performances

### 3.1 Enclosure Type

To ensure the reliability of the relay, different ways of encapsulation will require different post-processing(table 8).

Table 8

Type	Construction	Features	Auto- matic Solder	Auto- matic Clean- ing	Dust Resis- tance	Liquid Proof	Harmful Gas Resis- tance
Un- enclosed		Without the protective case	X	X	X	X	X
Dust Protected		With the dust protective case; the case and the base are fitted together and their joint is close to PCB.	X	X	√	Δ	X



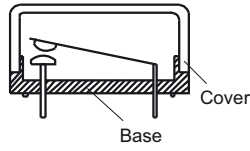
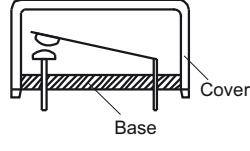
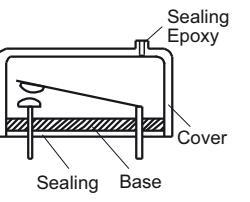
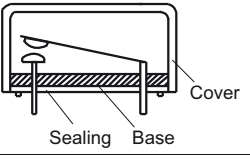
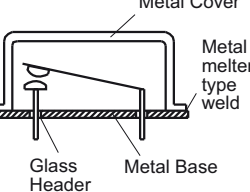
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# GUIDELINES OF RELAY

To be continued

Type	Construction	Features	Auto matic solder	Auto matic clean ing	Dust resist ance	Liquid proof	Harmful Gas Resis tance
Flux Proofed		<p>With the dust protective case; the case and the base are fitted together and their joint is close to PCB.</p> <p>The terminals are plastically sealed on the base or the base and the terminals are fitted with sealing epoxy; the fitted joint is far from PCB.</p> <p>Without exceeding the scheduled position, the flux will not penetrate the relay.</p>	√	X	√	Δ	X
		<p>Without exceeding the scheduled position, the flux will not penetrate the relay.</p>					
		<p>Base, terminals and case are fitted with sealing epoxy; there is ventilating hole far from PCB.</p> <p>Without exceeding the scheduled position, the flux will not penetrate the relay.</p>	√	X	Δ	Δ	X
Plastic Sealed *		<p>Base, terminals and case are fitted with sealing epoxy; The internal of the relay is sealed in the case and base. Washable in limited condition.</p>	√	√	√	√	√
Sealed or Hermetically		<p>Metal case and metal base are sealed; terminals and base are sealed with glass.</p> <p>The leakage rate of the air in the internal of the relay meet with the requirements.</p>	√	√	√	√	√

## Notes:

- 1) "√" means good; "x" means not good; "Δ" means to notify.
- 2) Because the plastic has the certain leakage, please use hermetic relays in the conditions that there are harmful gases or the explosive proof is required.
- 3) \* Hongfa recommends to implement washing-free soldering process to avoid washing on relay, ultrasonic cleaning is prohibited. If water cleaning is required after the relay is assembled on PCB, it is a must that you should get contact with hongfa and specify detailed washing method, we'll help you to choose suitable product.

## 3.2 Dielectric Strength And Insulation Resistance

Please confirm that these two parameters can meet the application requirement and will not lead to such conditions as the breakdown of the circuit, short circuit.

## 3.3 Vibration Resistance And Shock Resistance

Please confirm that these two parameters can meet the application requirement and will not lead to the failure of the relay in the course of the application.

## 4. Temperature

### 4.1 Ambient Temperature

Generally speaking, when the temperature does not exceed temperature range speculated in the catalogue, the relay can normally work. When the temperature in application is higher than the temperature speculated in the instructions, please contact Hongfa to ensure whether the relay can be normally used according to the loads.

### 4.2 Atmosphere



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In the atmosphere with high humidity, moisture, even freezing dew and much dust, recommend to use sealed relays. Under high humidity, it would easily accelerate the rust of the relay parts and the dust easily result in the failure of the relay contacts.

In the atmosphere with organic silicon, unsealed relays shall not be used for the organic silicon will accelerate the failure of the contacts. In the atmosphere with moisture and harmful gases as H<sub>2</sub>S、SO<sub>2</sub>、NO<sub>2</sub> etc., the flux proofed and dust protected products can not be applied while the plastic sealed products can be used and tested in application.

In application, if the ambient atmosphere is better, recommend to use the dust protected and flux proofed relays for they can get the longer electric endurance than plastic sealed relays.

## 5. Outline And Mounting

### 5.1 Outline And Mounting Gap

The outline sizes of the relays usually have a certain tolerance. Therefore when the circuit and the mounting gap are designed, the design is suggested to be done according to the maximum size in the instructions.

### 5.2 Welding Methods

Since July 1st, 2006, the terminals of the relays produced have been lead-free. The suggested welding temperature and time are respectively 240°C to 260 °C, 2s to 5s.

If reflow solder is required, it should be confirmed the relay can be reflow soldered according to the instructions.

If you have questions, please contact Hongfa.

### 5.3 The Model Of The Terminals

Select the suitable shapes of the terminals and mounting methods according to the real conditions.

Table 9





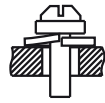
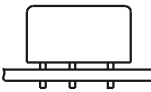

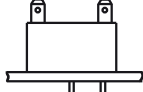
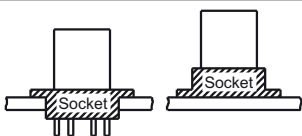
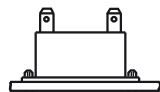
Classification	PCB (THT)	(SMT)	(Plug-in)	(QC)	(Screw)
Terminals type					
Representative products	HFD27 HF115F HFKC	HFD3	HF13F HF18FF	HF105F HFV7 HF3501	HF116F-3

Table 10

Classification	PCB Mounting			Plug-in Mounting	Screwing Mounting
	THT	SMT	THT and QC		
Mounting type					
Representative products	HFD27 HF115F HFKC	HFD3	HF102F HF105F-4 HF2160	HF13F HFV7 HF18FF HF3501	HF105F-4 HF92F HF116F

## 6. Others

### 6.1 Safety Approval

Generally UL/CUR approvals are applicable in North America and VDE&TÜV approvals are applicable in Europe. However, due to the international authority of these approvals, most of countries also accept them. If you have questions, please contact Hongfa.

### 6.2 Special Requirements

Except for normal products, we accept the customer's order for the products with special specifications. Please contact Hongfa when required.



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## CHAPTER 3 PRECAUTIONS FOR APPLYING THE RELAY

To properly use the relay, when the relay is selected and its characteristics are learnt, the precautions for using are required to be known and ensure the reliable operation of the relay.

The following precautions will be considered in application:

- 1) The relays are used within the range of the parameters listed in the catalogue, to the extent that it is possible.
- 2) The rated load and the life are the referent values, which will be different due to the different environments, load features and types. Therefore they should be tested in the practical or stimulated application.
- 3) DC relays are controlled by rectangle wave to the extent that it is possible while the AC relays are controlled by sine wave.
- 4) To maintain the performances of relays, please do not make the relay drop or be shocked strongly. Suggest that the relays dropped not be used.
- 5) Relays are used in the ambient temperature and normal humidity and in the atmosphere with less dust and harmful gas. The harmful gases include gases with sulfur, silicon and nitrogen oxide etc.
- 6) For the latching relays, please set them in the operate or reset state before they are used. Please pay attention to polarity and pulse width when energizing on the coil
- 7) For polarized relay, please notify the polarity (+, - ) of the coil voltage.
- 8) Except for the above there are other precautions. In the following they will be described one by one in the order listed in table 2.

### 1. Precautions For The Contacts

Contacts are the most important elements of relay construction. Contact life is influenced by contact material, voltage and current value applied to the contacts (especially the voltage and current waveforms at the time of application and release), the type of load, switching frequency, ambient atmosphere, form of contact and the contact bouncing etc. The material transfer, welding, abnormal usage and the increase in contact resistance bring about the failure of the contacts. Please pay attention to them in application.

In order to better apply the relay, please refer to the following precautions of the contacts.

#### 1.1 The Load

The resistive load value is usually listed in the catalogue, however, which is not enough. It should be checked and tested in the practical contact circuit.

The minimum load described in the instructions is not the standard lower limit value the relay can switch reliably. The reliability of this load value is different due to differences of the ON-OFF frequency, the environment, the change of the required CR and absolute values.

##### 1.1.1 Voltage

When the inductive circuit is switched off, there are the reverse voltage which is higher than the electrical circuit. The higher this voltage is the more the energy is. Correspondently the contact wear and material transfer also increase. Therefore notify the load type and load value the contacts of the relay control.

In the same current, DC voltage value the relay can switch reliably is much less than AC voltage value for AC current exists zero point (the point when the current is zero) and the electrical arc produced easily extinguishes. However for DC current, the electrical arc extinguishes when the contact gap is up to the certain value. Therefore the duration of the arc is longer than that in AC current and the contact wear and material transfer increases.

##### 1.1.2 Current

When the contacts are on or off, the inrush currents will greatly influence the contacts. For example, when the load is motor load or lamp load, the higher the inrush current when the contact is on, the more the contact wear and the material transfer increase, and the more easily lead to the contact weld and not to separate. Please check in practical application.

### 1.2 Precautions For The Application

#### 1.2.1 Avoiding Switching Both The Large Load And The Micro Load In The Same Relay

When switching the high load, the scattered contact material is produced, which will attach to the contacts with the low load and lead to the failure of the contacts. Therefore, please avoid the same relay switching both the high load and the low load. If it is the only choice to do against this, when mounting please place the contacts switching the little load over the contacts switching the large load. However the reliability will be influenced.



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### 1.2.2 Precautions For The Two Pairs Of Contacts Connected In Parallel

When the two poles of contacts are connected in parallel, the reliability will be improved but the load capacity could not, for the two poles of contacts could not be opened or closed at the same time.

### 1.2.3 The Problems About Phase Synchronism Of contact Operation And AC Load

If the operation of the relay contacts is synchronized with the phase of the AC power and the contacts always make or break in the high load voltage, seen in figure 4, the contact weld or material transfer will increase to lead the relay to prematurely fail. Please check whether the random phase are used in actual application. When the relay is driven by timer, micro computer etc., it will appear the power phase synchronism.

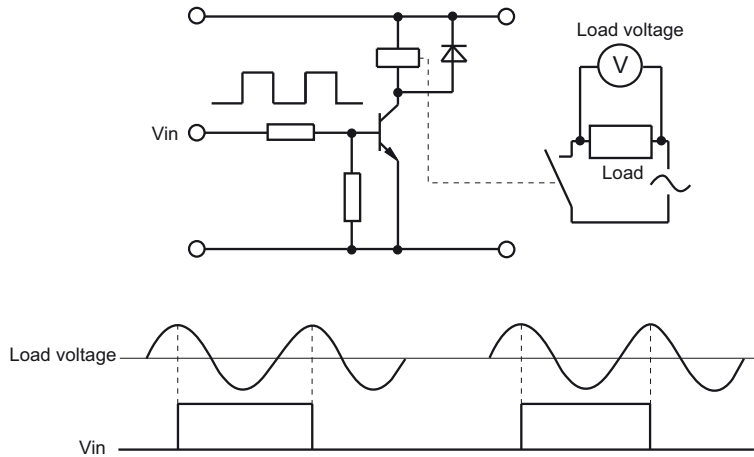


Figure 4

### 1.2.4 Electrical Endurance In The High Temperature

Electrical endurance of the relay will be lower in the high temperature than that in the low temperature. Please check while it is operating in the actual application.

### 1.2.5 Connection Of Multiple Pairs Of Contacts And The Load

Multi-contacts are arranged in the same polarity of the supply power to the extent that it is possible and the passive polarity in the other polarity of the supply power, as shown in figure 5 (a). Thus, the short circuits between the contacts, due to voltage differences between the contacts, can be possibly avoided. The wiring as shown in figure 5 (b) can be avoided.

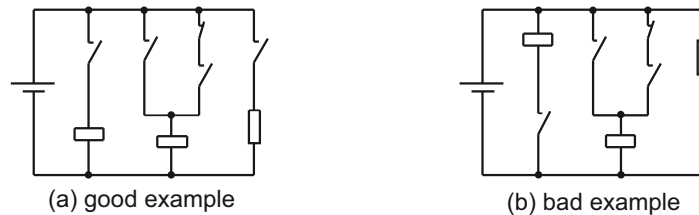


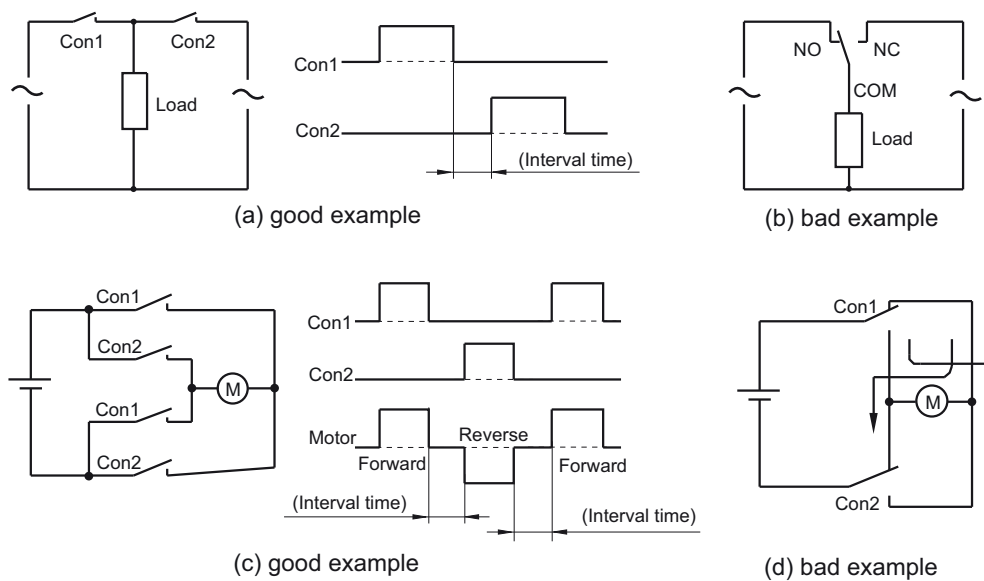
Figure 5

### 1.2.6 Avoid Short Circuit Caused By Contacts Weld And Electrical Arc

In the electrical circuit, the following points should be considered (seen in the figure 6)

- 1) Generally the gap between the contacts are small. The reason can probably be that the electrical arc between the contacts results in the short circuit. Please do not adopt the circuit shown in figure 6(b). The circuit shown in figure 6(a) is suggested to use and the certain interval can be set in the operation between Con1 and Con2.
- 2) It should be considered that the overcurrent should not be generated to make the circuit overload or burn when short circuit is caused by contact welding and error operation.
- 3) Care should be taken that the two pairs of switching contacts are not used to build the forward circuit and the reverse circuit, as shown in figure 6(d). Suggest that the circuit shown in Figure in 6(c) is applied and the certain interval is set in the operation between Con1 and Con2.





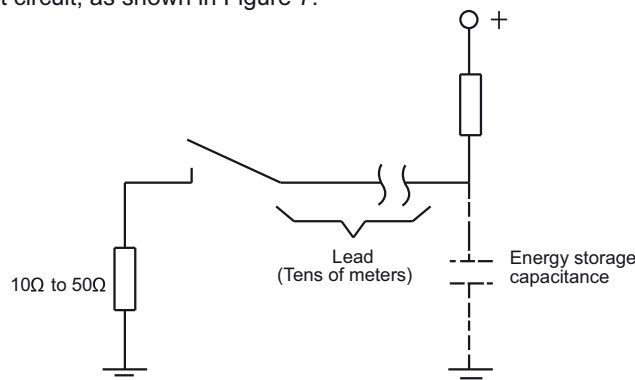
**Figure 6**

### 1.2.7 Avoid Short Circuit Between Contacts

The miniaturization of the electrical control equipments makes the control components tend to miniaturization, so the relay with multiple poles of contacts are used, care is taken of the differences of the voltage between the poles of contacts and load types. Suggest that large differences of the voltage among the contacts do not exist in order to avoid short circuit between poles of contacts.

### 1.2.8 Precautions For Using The Long Lead Wire

In the contact circuit of the relay, when the lead wire with more than 10m length is used, the inrush current will be generated due to the capacitance in the lead wire. Please connect in series the resistance (about 10 to 50) in the contact circuit, as shown in Figure 7.



**Figure 7**

### 1.2.9 Precautions for the contacts of the magnetic latching relays

Generally the latching relays are shipped from the factory in the reset states. However during shipping or mounting relays the shock of the relay may change the operate state. Therefore suggest that in application it be set in the required state.

## 1.3 Contact Protection

### 1.3.1 Inrush Current And The Reverse Voltage

When the motor, capacitance, solenoid and lamp load make, the inrush current is generated, which is several multiple steady state currents.



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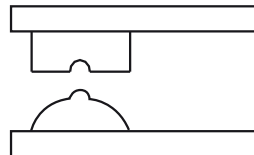
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When the inductive load such as solenoid, the motor, contactor, the reverse voltage which are from hundreds of to thousands of volts. Generally in the normal temperature and atmospheric pressure the critical insulation destruction voltage of the air is 200 to 300V. Therefore if the reverse voltage exceeds this value, the discharge phenomena between contacts will happen.

Both inrush current and the reverse voltage will greatly damage the contacts and obviously shorten the relay life. Therefore the proper use of the contact protection circuit may increase the life of the relay.

### 1.3.2 Material Transfer Of Contacts

Material transfer of contacts refers to the transfer of the contact material from one contact to the other. When material transfer becomes serious, the accidented contact surface can be seen by eyes. As shown in figure 8, the accidented surface easily causes contact welding.



**Figure 8**

Generally, material transfer of contacts is caused by the one-way flowing of the large current or the inrush current of the capacitive load and often happens in DC circuit. Generally it shows the protruding shape in the passive polarity and the concave shape in the positive polarity. Therefore the proper use of the contact protection circuit or the use of AgSnO contact which has better resistance against material transfer may reduce the material transfer of contacts. The AC load with large capacity should be checked in actual application in the test.

### 1.3.3 The Protective Circuit Of The Contacts

Generally speaking, in contrast to resistive load, inductive load more easily damages the contacts. The use of properly protective circuit may make the influence of inductive load on the contacts equal to the influence of resistive load on the contacts. Care is taken that the incorrect use will generate the counter effect. Table 11 shows the typical examples of the contact protective circuit.

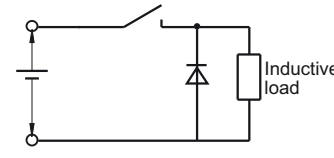
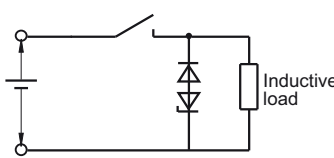
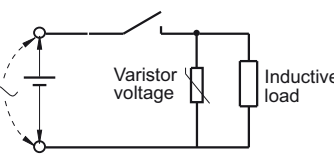
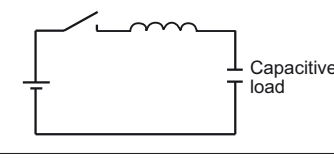
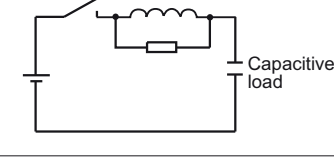
**Table 11**

Circuits Example	Application		Features	Device Selection
	AC	DC		
<p style="text-align: center;">CR Circuit</p>	Δ	√	<ul style="list-style-type: none"> <li>The supply voltage is usu. 24 to 48V.</li> <li>The load is a timer or a contactor, the release time lengthens</li> <li>If the load is a time, leakage current flows through the CR circuit causing faulty operation.</li> <li>If used with AC voltage, be sure the impedance of the load is sufficiently smaller than that of the CR circuit.</li> </ul>	<p><b>A:</b> As a guide in selecting C and R</p> <p><b>C:</b> 0.5 to 1μF per 1A contact current</p> <p><b>R:</b> 0.5 to 1Ω per 1V contact voltage</p> <p>Values vary depending on the properties of the load and variations in relay characteristics; Please check by test.</p> <p>Capacitor C acts to suppress the discharge the moment the contacts open.</p>
	√	√	<ul style="list-style-type: none"> <li>Applicable to the supply voltage of 100 to 200V</li> <li>If the load is a relay or a contactor, the release time lengthens.</li> </ul>	<p>The dielectric strength of the capacitor C is usu. 200 to 300V or more than two times the load voltage.</p> <p>Please use AC capacitor (non polaried) in AC circuit.</p>



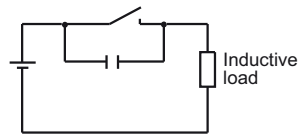
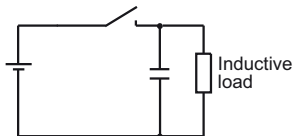
# GUIDELINES OF RELAY

To be continued

Circuits Example	Application		Features	Device Selection
	AC	DC		
Diode Circuit 	X	√	<ul style="list-style-type: none"> <li>At the terminals of the inductive load the diode is connected in parallel, which can reduce the reverse voltage.</li> <li>The release time is longer than that in CR circuit.</li> </ul>	Select a diode with the reverse breakdown voltage at least 10 times the circuit voltage and a forward current at least as large as the load current. In electric circuits where the circuit voltages are not high, a diode can be used with a reverse breakdown voltage of about 2 to 3 times the supply voltage.
Diode And Zener Diode Circuit 	X	√	<ul style="list-style-type: none"> <li>If the zener diode is added in the diode circuit the release time is reduced.</li> </ul>	Use a zener diode with a zener voltage about the same as the supply voltage.
Piezo Resistance Circuit 	√	√	<ul style="list-style-type: none"> <li>Reduce the excessive high voltage between the contacts</li> <li>If the load is a timer and a contactor, the release time lengthens</li> </ul>	Use the piezo resistance with control voltage Vc 1.5 times the supply voltage peak value. If the control voltage is excessively high, the effect of the reverse control is not good. Please check in application.
Inductance Circuit 	√	√	<ul style="list-style-type: none"> <li>Effective when piezo resistance is connected to both contacts if the supply voltage is 24V or 48V.</li> <li>Effective when piezo resistance is connected to the load if the supply voltage is 100V or 200V.</li> </ul>	
Inductance And Resistance Circuit 	√	√	<ul style="list-style-type: none"> <li>Reduce the excessively high voltage between the contacts</li> </ul>	

**Notes:** the mark "√" means good, the mark "X" means bad, the mark "" means notice. Please avoid using the following circuit as table 12.

**Table 12**

	
When the contacts are OFF, the effect on controlling the electric arc is good. However in this case the capacitor C stores the energy, so the energy in the capacitor C will release to the contacts, when the contacts are ON, will result in the easy welding of the contacts.	When the contacts are OFF, the effect on controlling the electric arc is good. However the contacts are easily welding due to the large charge current of the capacitor C when the contacts are ON.



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### 1.3.4 Precaution For mounting Protective Elements

When the protective elements such as diode, C-R, piezo resistance are mounted, they must be mounted beside the load or the contacts. If the distance is far, the protective effect will not be good. Suggest to be mounted within 50cm.

## 2. Precautions For The Coil

The application of rated voltage to the coil is the basis for a relay to work normally. Only applied the voltage beyond the operate voltage, the relay can work, but the rated voltage must be applied to the coil for the changes caused by the temperature and the variation of the power voltage will influence the normal operation of the relay.

### 2.1 Types

#### 2.1.1 AC Operation Type (AC type)

Generally the work voltage of the relay is always a commercial frequency (50Hz or 60Hz). Suggest that the products with standard voltage specifications listed in the instructions be selected to the extent that it is possible. If the products with other specifications are required, Please contact the technicians in HONGFA company.

For AC relays, due to the factors such as eddy current loss, hysteresis loss and lower coil efficiency, the temperature rise is greater than that for DC type. When voltage exceeds  $\pm 10\%$  of rated voltage, the buzz is easily produced. Please notify the variation of the power voltage.

For AC relays, when the coil breaks, there should not remain any DC voltage in the circuit; otherwise the relays can not release normally.

#### 2.1.2 DC Operation Type (DC type)

Generally the DC relays mostly are voltage drive type. Suggest that to the extent that it is impossible, the products with the standard voltages listed in the instructions should be selected. If the products with other specifications are required, Please contact the technicians.

Please check the voltage polarities of the relay coils in the instructions. If the diode for the control or the elements for displaying are added, once the opposite connection of the voltage will lead to the abnormal operation of the relays or the abnormal operation of the added elements or even short circuit. When the coil is paralled with diode or LED, the release time will be prolonged which may reduce the electrical endurance. Please note that.

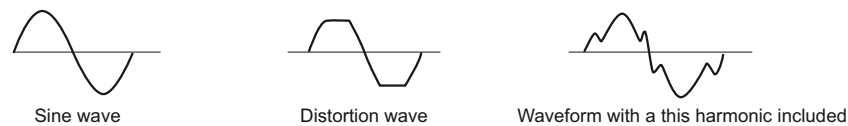
In addition, for polarized relay, the polarity of the voltage applied to the coil is opposite to that in the instruction, the relay will not work.

### 2.2 Input Power Of The Coil

#### 2.2.1 Input Power For AC Coil

To make the relay work reliably, please apply rated voltage to the coil. If the voltage, which does not make the relay completely operate, is continuously applied to the coil, the coil will abnormally heat to make the coil abnormal wear.

The supply voltage of AC relay would better be sine curve. The AC coil can better control the buzz. If the waveform distorts or deforms, the control function can not be displayed better. Figure 9 shows several examples of common waveforms.



**Figure 9**

If the parts such as the motor, solenoid and transformer are connected in the drive circuit of the relay, when the parts work the coil voltage of the relay will reduce and then the relay contacts will shake to cause the contact welding, abnormal wear or non-conduction. The alike phenomena of the reduction of the coil voltage will happen when the miniature transformer are used, no transformer with rich capacity can be used as the power source and the wiring is long, the wiring used in the house or the shop etc. is thin. If the similar failure happens, Please use the synchro oscilloscope to check and properly adjust.

If using the loads with large variation such as the motor, Please separate the drive circuit of the coil from the power circuit according to the usage.

If the AC relay could not work reliably, switch AC to DC and then select the proper DC relay.

#### 2.2.2 Input Power For DC Coil

In order to work steadily, the voltage applied to the two terminals of the coil of the DC relay is suggested to use



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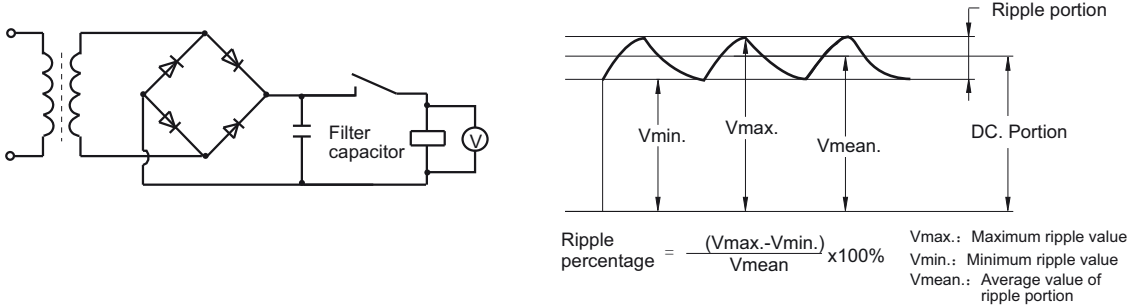
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# GUIDELINES OF RELAY

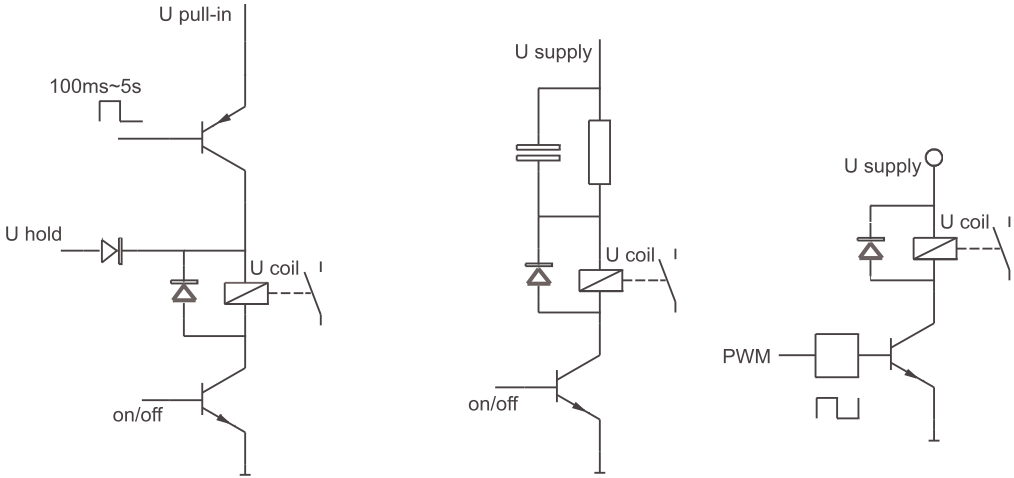
the coil rated voltage under  $\pm 5\%$  or the relay could not work steadily, to cause the contact welding or abnormal wear, especially when such parts as the motor, solenoid or transformer etc. are connected in the drive circuit of the relay, the case will be more obvious

As the power source of DC relay, there are the accumulator, the full(as shown in 10-1) or half wave rectifier circuit of smoothing capacitor, which will influence the operating characteristics of the relays. Please check in the practical application.



**Figure 10-1**

By reducing the holding voltage of the coil, the power consumption can be reduced. The common method to reduce the power consumption of the coil is that inputting the rated voltage pulse of the coil and then reducing the coil voltage or using PWM pulse width modulation. Please take the following Figure 10-2 for reference.



**Figure 10-2**

- Please note the following items when PWM is used:
- 1) the coil must be energized by 1-1.5 times of rated voltage for more than 100ms;
  - 2) frequency 10-25khz is recommended;
  - 3) the duty cycle is recommended by 50%-70%. If the duty cycle is less than 50%, Hongfa should be informed for special control;
  - 4) both ends of the coil must be connected in parallel with the continuous current diode.

## 2.3 Maximum Voltage Of The Coil

Except for the limits from the coil temperature rise and the heat-resistant temperature of insulation material of the coil electro-magnetic wire (once beyond the heat-resistant temperature, short circuit will locally happen in the coil and even the coil burns), the maximum voltage of the coil will be influenced by heat distortion and the aging of the insulation materials. Especially it can not destroy other machines, hurt the human body or cause the fire, so it must be limited with the certain range. Therefore please do not make it beyond the regulated value in the instructions.

Maximum voltage is the maximum value of the voltage which can be applied to the coil of the relay in short time rather than the value of the voltage allowed to be continuously applied with.

## 2.4 The Coil Temperature Rise

### 2.4.1 Temperature Rise

In the course of the relay operation, the coil temperature will be increased. When a pulse voltage with ON time of less than 2 minutes is used, the coil temperature rise value is related to the ON time and the ratio of ON time to OFF time. The various relays are essentially the same in this aspect.( table 13)

**Table 13**

(Current Passage Time) For Continuous Passage	( % ) Temperature Rise Value Is 100%
ON:OFF = 3:1	about 80%
ON:OFF = 1:1	about 50%
ON:OFF = 1:3	about 35%

### 2.4.2 Pick-up Voltage Change Due To Coil Temperature Rise

The temperature rise causes the increase of the coil resistance and correspondently the pick-up voltage will increase. the resistance temperature coefficient of the copper wire is about 0.4% per 1°C . with this ratio, the coil resistance increases. Pick-up, release and reset voltages in the instructions are all the values in 23°C .

When the coil temperature is beyond 23°C ,pick-up voltage surpasses sometimes the speculated value in the catalogue. Please check in the practical application.

## 2.5 Leakage Current

When designing the circuit, please avoid the leakage current flowing through the relay when the relay does not work.

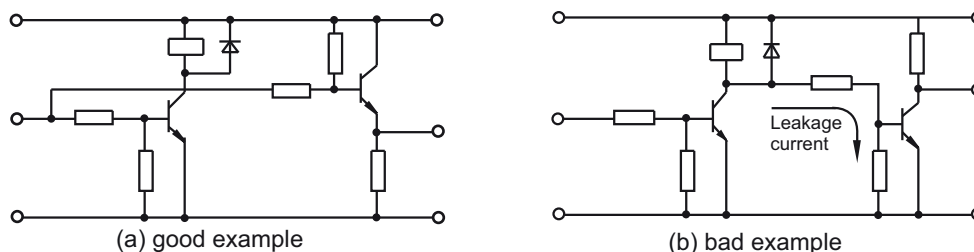


Figure 11



## 2.6 Energized Voltage Of The Coil And Operation Time

In the case of AC operation, there is extensive variation in operate time according to the difference of the phase when the coil is applied with the voltage.

In the case of the DC operation, although the voltage applied to the coil increases and operate time of the relay will properly become rapid, the contact bounce time when the contacts closes is extended to cause the reduction of the life or the contacts welding when they work in the rated load or in the large inrush current.

## 2.7 The Application Of The Relays Connected In Parallel And In Series.

Several relays connected in parallel, please take care of the wrong operation for the bypass current and leakage current shown as figure 12.

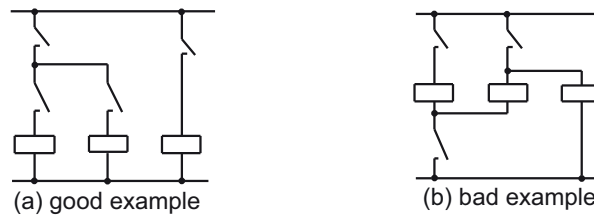


Figure 12

## 2.8 Avoid Gradual Increase Of Coil Impressed Voltage

In the course of the operation, the relay experiences such phases as contact pressure changing, contact bounce and the unstable condition of the contacts. When gradual increase of coil impressed voltage happens, the time of the unstable phase becomes longer to affect the life of the relay.

In order to reduce the influence on the relay, please impress bypass voltage to the coil, to the extent that it is possible.

## 2.9 Precaution For The Long Power Wire

If the power wire is longer, please select the relay according to the principles of impressing the rated voltage after testing the coil voltage of the relay.

If paralleled with the power line and long distance, when the supply power of the coil is switched, the voltage at the terminals of the coil will be generated due to the capacitance stored in the wire and then result in the release worse. In this case, Please connect the bypass resistor at the two ends of the coil.

## 2.10 Long Term Current Carrying

If the coil is continuously applied the power to for a long term, the self heating of the coil promotes the aging of the insulation materials of the coil and the worse characteristics, so in this case please use the latching relay. If the monostable relay must be used, please use the hermetic relay which is not easily influenced by the external environments and also use the suitably protective circuit to prevent the loss due to the contact failure or the break of the coil wire.

## 2.11 Low ON-OFF Frequency

When the ON-OFF frequency is below once per month, please periodically check the states of the contacts. If the contacts keep the non ON-OFF state for a long time, the organic film will be formed on the surface of the contacts and result in the contact failure.

## 2.12 Electrolytic Corrosion Of Coils

When the relays are placed in high temperature and high humidity atmospheres or with continuous passage of current, that the coil is grounded will make the coil electrolytic erosion to cause the break of the electro-magnetic wires. Therefore please do not make the coil grounded to the extent that it is possible. In the case where unavoidably the coil is grounded, please set the control switch of the relay coil in the positive side of the coil.



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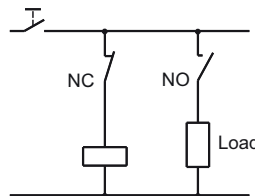
## 2.13 Precaution For The Coil Of The Magnetic Latching Relays

### 2.13.1 The Coil Voltage

Please check whether the direction of coil impressed voltage is correct or not, or the relay may not work. Due to the characteristics of the magnetic latching relays, to prevent the relay against overheating and then burning, the long-term impressed voltage on the coil are not allowable.

### 2.13.2 Self-locking Of The Relays

Please avoid using the NC contacts of the relay itself to switch off its own coil. Otherwise the failure will happen



**Figure 13**

### 2.13.3 Precautions For Using The Relays Connected In Parallel

When the coil of the latching relay is connected in parallel with the coil and the solenoid of other relays, please add diode to prevent the reverse voltage from influencing the normal work of the relay.

### 2.13.4 Width Of Minimum Impulse In Operating And Resetting

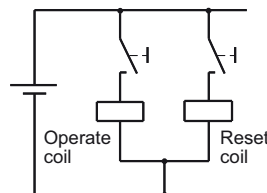
In order to make the latching relay operate or reset, please impress the rectangle rated voltage for more than 5 times at the operate time or the reset time on the coil and then operate it. If the impulse width can not meet the requirements above, please check in the actual application.

Please avoid using in the conditions that the power source has many surges.

### 2.13.5 Precautions For The Double-Coil Relay

Do not impress the voltage on the set coil and reset coil at the same time, or the relay will abnormally heat, abnormally operate and even abnormally wear.

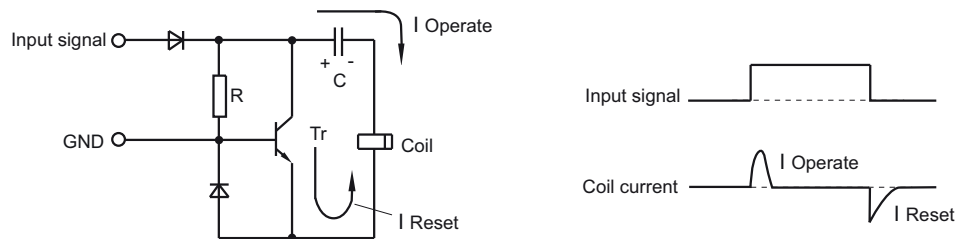
As shown in figure 14, when the terminals of either of operate coil and reset coil in the circuit are required to connect and the other terminals are connected to the same polarity of the power source, Please directly connect the terminals to connect (short circuit) and then connect to the power source. Thus the insulation between the coils can be maintained well.



**Figure 14**

### 2.13.6 The Drive Circuit Of The Latching Single-Coil Relay

As shown in figure 15, it is one of the drive circuits of the latching single-coil relay. When the signals are input, the current charges the capacitance C and in turn charges the coil and then make the relay operate; when the signals are removed, the electric power stored in the capacitance C will discharge through trinode Tr and the coil and make the relay reset.



**Figure 15**



## 3. Performance

### 3.1 Precautions For Plastic Sealed Relays

Hermetic relays can resist under bad surrounding. However, please pay attention to the following precautions in application to avoid the failure.

#### 3.1.1. Regarding Practical Environment

Plastic sealed relays are not suitable for using in the environment which has the special requirement for the air seal. Please avoid using them in the pressure exceeding 86kPa to 106kPa.

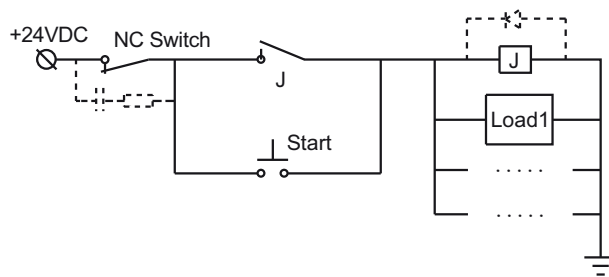
#### 3.1.2. Regarding washing

When washing PC board after the terminals soldered on PC board, suggest that the washing can be done by washing solvent of alcohol series.

Please avoid supersonic washing for supersonic washing may cause the break of the coil wire and the light contact welding.

### 3.2 Vibration And Shock

The transient break of the contacts when the relays are shocked strongly, will lead to the false operation. Therefore, when the relays are mounted on the same board with other parts (such as electromagnetic switch, air switch et.) which can produce the shock, the measures of reducing the influence of the shock on the relay should be taken. For example, make the direction of the shock and direction of relay contacts make/break at the right angles to the moving direction of armature, or to mount these components on different boards, or using a buffer tablet, or to take some measures in the application circuit to reduce the impact of false operation of relay contacts (as illustrated by figure 16):



**Figure 16**

Remarks: in the above figure, a RC is parallel connected to NC switch, and a FWD is parallel connected to relay coil. This measure can avoid the abnormal cut-off of the circuit caused by the abrupt break of NC switch under strong shock and vibration.

In addition, for the relay in the vibration atmosphere in the long term (such as electrical car), please avoid combining with the socket in application. Suggest that the relay be directly soldered on the PC board.

### 3.3 The Influence Of External Magnetic Fields

If there is the strong magnetic fields around the relay, if the relay is mounted beside the large relay, transformer or the speaker, the characteristics will produce the false operation with the variation of the external magnetic fields, especially for polarized relays. Because the operation of the relay is dependent on the internal permanent magnet, it is easily influenced by the external magnetic fields. Please pay attention to the mounting position in practical application and check.

### 3.4 Vibration, Shock And Weight During Shipping

During shipping the relay or the equipment with the relay installed, the large vibration, shock and weight will cause the failure of the relay functions. Please use the cushion package to control the vibration and shock within the allowable range.



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## 4. Environments

### 4.1 Regarding Ambient Temperature And Atmosphere

Care is taken that the ambient temperature at the installation does not exceed the value listed in the instructions. In addition, the contact surface will form sulfured film, oxide film or attached dust in an atmosphere with dust, moisture and sulfur gases (SO<sub>2</sub>, H<sub>2</sub>S etc.) or organic gases to cause the unstable contact and the failure of the contacts. Therefore please select sealed relays. If the plastic sealed relay is selected, it is required to check in application.

### 4.2 The Harmful Gases To The Relay

Please do not use the relay in the atmosphere with the following gases. In these atmospheres, plastic sealed relays can not avoid the influence of gases on the contacts. Please use the hermetic relays.

#### 4.2.1 Silicon Atmosphere

Silicon-based substances (silicon rubber, silicon oil, silicon-based coating material and silicon caulking compound etc.) around the relay will emit volatile silicon gas, which may cause the silicon to adhere to the contacts and may result in contact failure.

#### 4.2.2 Sulfureted Gas

Sulfured gases easily sulfur the contacts and result in the contact failure or non-conduction.

#### 4.2.3 NO<sub>x</sub> Gas

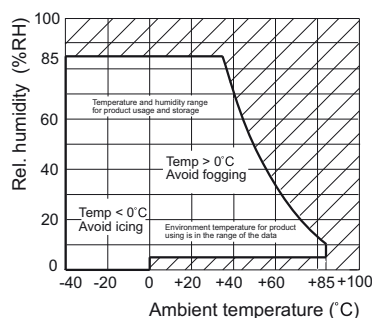
When a relay is used in an atmosphere high in humidity to switch a load which easily produces an arc, the NO<sub>x</sub> created by the arc and the water absorbed from outside the relay combine to produce nitric acid. This corrodes the internal metal parts and adversely affects operation. Please do not use the relay in the atmosphere where the humidity is beyond 85%RH (at 20°C).

### 4.3 The Circumstance With Water, Leechdom, Solvent And Oil

Do not use and store the relays in the atmosphere where the relays may be attached to by water, leechdom, solvent and oil etc. for water and leechdom may make the parts rusted, the plastics aging and also result in leakage current which damages the relays or the circuit and solvent and oil may make the marks disappearing or the parts aging. For covers made from PC materials, please prevent from contamination by some organic solvents; otherwise it is likely to lead to bulging or crack.

### 4.4 Atmosphere Of Usage, Storage And Transport

During usage, storage and transportation, avoid locations subject to direct sunlight and maintain normal temperature, humidity and pressure conditions. The allowable range of the temperature and humidity suitable for usage, storage and transportation are shown in the unshaded part in figure 17. The allowable temperature may differ with the types of the relays. In case that the condition in real application is different from that of IEC 61810-1, UL508, UL60947-4-1, GB/T21711.1, etc. the electrical endurance of the relay must be confirmed by tests.



**Figure 17**

The suggested ranges of the temperature and humidity during usage, transportation and storage are as follows.

- 1) temperature: 0°C to 40°C
- 2) humidity: 5%RH to 85%RH
- 3) air pressure: 86kPa to 106kPa.



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## 4.4.1 The Atmosphere High In Humidity

In the atmosphere high in humidity, when the temperature around sharply changes, the dew will be formed in the internal of the relay and result in the cracking of the insulation material, the break of the coil wire and the rust. The typical examples will happen on the ship transporting on the sea.

Dewing is a phenomena that the vapor freezes water drops in the atmosphere high in temperature when the temperature sharply reduces from the high temperature to the low temperature or the relay is moved in the high temperature from the low temperature

## 4.4.2 Low Temperature (under 0°C ) Environment

Please note the icing phenomena in the environment with low temperature (under 0°C ). Icing may result in the welding of the movable parts, the delay of the operation or preventing the operation etc.

Icing refer to the phenomena that water attached to the relay will freeze ice when the temperature reducing below freezing point.

## 4.4.3 Low Temperature , Low Humidity Environment

Note that the plastics may embrittle in low temperature, low humidity environment.

## 4.4.4 High Temperature, High Humidity Environment

Note that if the relay is in high temperature, high humidity environment for a long time the contact surface easily forms the oxidized film and then results in the unstable contact and the failure of the contacts. Other metal parts also are easily oxidized or rusted to result in the failure of the functions

## 4.4.5 SMT Environment

The relay of SMT type is sensitive to the humidity so they are packed with humidity proof package. The following points should be considered during storage.

- 1) Please use the humidity proof packing bags as soon as possible after they are unsealed.
- 2) If the humidity proof packing bags need long term storage after they are unsealed, it is suggested that the desiccator with humidity control be used to store them.

## 5. Outline And Mounting

### 5.1 Top View And Bottom View

Generally the bottom view is the projection whose projection plane is terminal side. Otherwise, the top view is the projection whose projection plane is cover side. Please take care of it when using the instructions or mounting the relays.

### 5.2 Mounting Direction

Unless otherwise stated, mounting direction of the relays is arbitrary. In order that the relay can work more stable and reliable, mounting direction need cosidering.

#### 5.2.1 Vibration Resistance And Shock Resistance

It is ideal to mount the relay so that the movement of the contacts and movable parts is perpendicular to the direction of vibration or shock. Especially when the coil is not excited, the vibration or shock resistance of NC contacts is weak. If mounting direction is proper, their functions can be ensured.(figure 18)

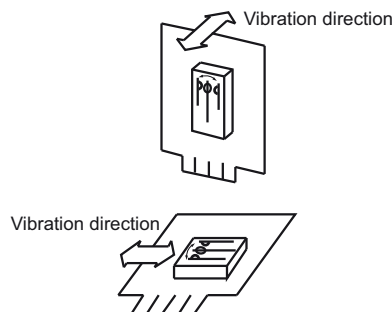


Figure 18



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## 5.2.2 Contact Reliability

Mounting the relay so the surfaces of its contacts are vertical prevents dirt and dust as well as scattered contact material and powdered metal from adhering to them when the arc is generated.

## 5.3 Adjacent Mounting

When many relays are mounted close together, abnormally high temperatures may result from the combined heat generated. To prevent the heat buildup, please mount relays with sufficient spacing between them. When many boards mounted with relays are installed in a card rack, please be sure that the ambient temperature of the relay does not exceed the value listed in the instructions.

## 5.4 Shroud Mounting

Use the gaskets when mounting to prevent from the damages and deforms. Keep the screwing moment in the range of  $0.49$  to  $0.686\text{N} \cdot \text{m}$  (5 to 7kgf·cm). To prevent from loosening, please use the spring gasket.

## 5.5 Mounting The Plug-In Terminals

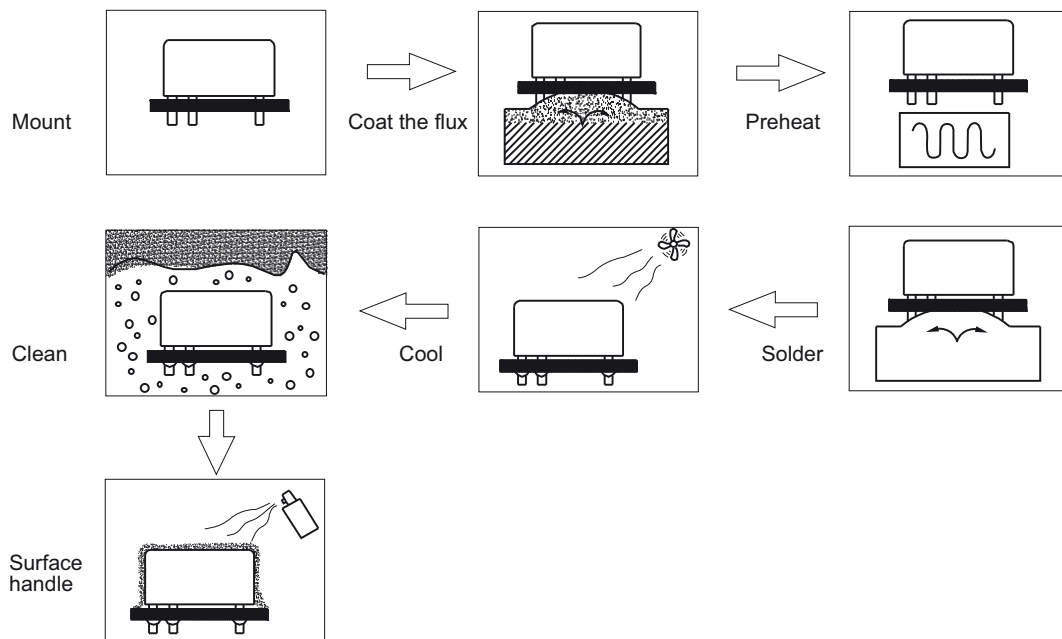
When mounting the relay with plug-in terminals, the plug-in strength is based on 40N to 70N (4kgf to 7kgf).

## 5.6 Supersonic Cleaning

Do not clean the relay by the way supersonic cleaning, for the supersonic will result in the contact welding and the break of the coil wire.

## 5.7 Mounting And Soldering Of THT Relays

The mounting and soldering of the THT relay can be divided into the following steps.(figure 19)



**Figure 19**

In the following the considered points are described when THT relay is soldered on the PC board. Please refer to them in application.

Note that if the solder entered the relay due to the carelessness, the functions of relay will be destroyed. There will be such problems as the relay not be suitable for the automatic soldering or cleaning due to the different protective constructions. Please see the details in the constructions and characteristics in 3.1 pattern of encapsulation in Chapter 2.



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## 5.7.1 Mounting

Do not bend the terminals of the relay (figure 20) for it may destroy the initial performances of the relay. Please correctly process the PC board according to the mounting hole drawing in the instructions. Please maintain the balance of the relay. Please note that the set force of the hook for mounting is too much large to result in the internal failure of the relay.

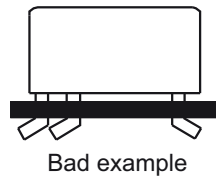


Figure 20

## 5.7.2 Coating Flux

Please use the rosin flux which is not corrosive and the alcohol solvent which is less chemistry. Please use the thin and even coating flux to prevent from penetrating the relay. As for the dipping coating, please keep the surface of the flux stable. Please adjust the places to ensure that the flux will not overflow through the surface of PCB. Please do not make the flux attached to the parts of the relay except for the terminals. Otherwise the insulation of the relays will be reduced. For the dust protected relays and flux proofed relays, do not use the coating method of pushing deeply PCB from the above into the sponge absorbing the flux, as shown in figure 21. This will make the flux penetrating the relay, especially for the dust protective type.

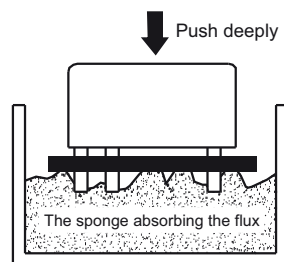


Figure 21

## 5.7.3 Preheating

In order to improve the soldering performance, please preheat without failure. Please preheat under 100°C (the soldered surface of the PC board) within 1 minute. Do not use the relays which are placed in the high temperature for a long time due to the set failure for their initial performance may have changed.

## 5.7.4 Soldering

Precautions for soldering seen in table 14.

Table 14

Automatic Soldering	Manual Soldering
<ul style="list-style-type: none"> <li>To maintain the soldering stable, the suggested soldering method is wave solder.</li> <li>Adjust the height of flux liquid level to make them not overflow the PCB.</li> <li>Please do it according to following suggested conditions. Soldering temperature: about 260°C ± 5°C (Applicable to Power relays) Soldering temperature: about 250°C ± 5°C (Applicable to Signal relays) Soldering time: within about 5s.</li> </ul>	<ul style="list-style-type: none"> <li>Please sufficiently clean the head of searing-iron with fluxing to make the surface of it smooth.</li> <li>Please do it according to the following suggested conditions. Searing-iron: 30W or 60W The temperature of the head of searing-iron: about 280°C or 300°C Soldering time: within about 3s Use the solder with rosin fluxing.</li> </ul>



- Remarks:
1. The preheating and soldering temperature and time for automatic soldering should be reduced as low as possible to avoid any change in relay performance due to excessively high temperature or too long time preheating or soldering.
  2. It is normal if some relay covers become slightly bulging under right soldering conditions.
  3. In the process of manual soldering it is prohibited to press or pull the relay terminals because such doing will lead to changes in product performance or even relay failures.

### 5.7.5 Cooling

After automatic soldering, please ventilate and cool them to avoid the aging of the relay or its parts caused by the heat generated when the relay soldered.  
Although the sealed relay can be cleaned, it is not cleaned for the sudden connection with the cool solvent may damage the hermetic characteristics of the relay.

### 5.7.6 Cleaning

Please select the cleaning method in table 15 when cleaning.

**Table 15**

Dust Protected Type	Flux Proofed Type	Plastic Sealed Type
<ul style="list-style-type: none"> <li>● Hot cleaning or soap cleaning not allowable</li> <li>● Scrub the welding surface of PCB</li> </ul>		<ul style="list-style-type: none"> <li>● Washable in limited condition.</li> <li>● Use the alcohol solvent or water.</li> <li>● The temperature for cleaning is under 40°C.</li> <li>● Do not do supersonic cleaning or truncate the terminals of the relays, or the break of the coil wire and the contact welding will happen.</li> </ul>

Due to different soldering condition, sealed relays can be impaired when mounting on PCB. If cleaning is necessary after soldering, it is recommended to solder under the condition provided by HF and to select special sealed relays (customer code: 310).

Avoid cleaning with Freon, Trichloroethane, diluent or gasoline.

### 5.7.7 Surface Handling

In order to prevent the insulation of PCB from worsening, Please note the following precautions when surface handling.

The dust protected type and the flux proofed type result in the failure due to the surface handling agents penetrating the relay. Therefore please do not do the surface handling or mount the relay after surface handling.

Due to the bad influence of the surface handling agents on the relay eg. melting the cover, please select carefully and check and test in application.

Spraying and brushing processes are recommended for surface treatment, and dip-coating is prohibited. Surface treatment agent should best be room-temperature liquid agent, which should be sprayed when the relay is cooled down to room-temperature. The agent can be dried naturally or under constant temperature which should not exceed 60°C. Meanwhile, the drying temperature is not allowed to be decreased when the agent is not completely dried, otherwise the agent could be absorbed into the relay and thus lead to relay failure.

Please contact us when special surface treatments processes are used so that we can provide you a suitable product.

There are the following suggestions on the coat, as shown in table 16.

**Table 16**

Type Of The Coat	Plastic Sealed Relay
Epoxy resin	Allowable
Polyurethane	Allowable
Silicon	Not allowable
Fluorin	Allowable

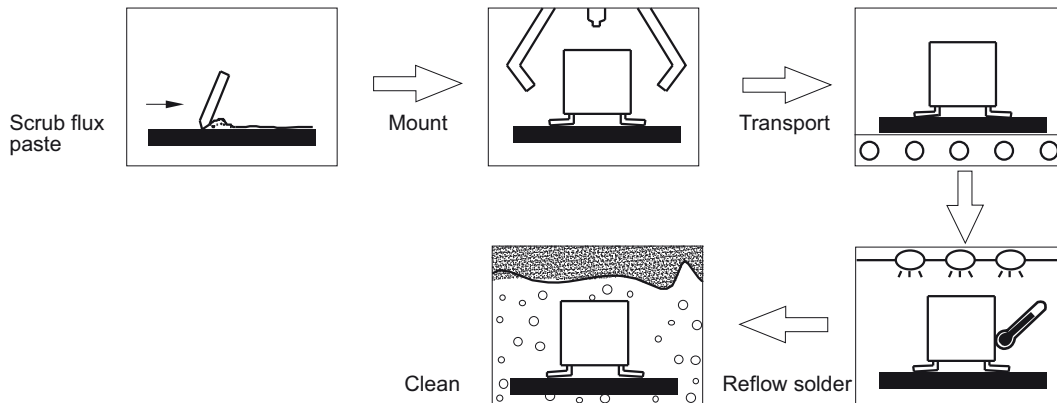


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## 5.8 Mounting And Soldering Of SMT Relays.

The mounting and soldering of SMT relays have the following steps, as shown in figure 22. In the following the considered points are listed when the SMT relays are soldered on PCB.



**Figure 22**

Please refer to these in application. Note that the relays are not damaged in processing.

### 5.8.1 Scrub Flux Paste

Please use the rosin and chlorine-free flux paste for chlorine may erode the terminals and circuit panel. Flux paste should be coated evenly and the thickness is 0.15mm or 0.2mm.

### 5.8.2 Mounting

When mounting the relays, do not set the conservative force of the finger within the range specified in table 17, unless otherwise stated in the catalogue.

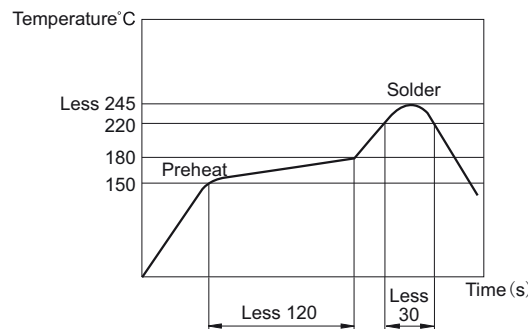
Direction	Maintaining Force	
Birection A	Below 1.96N	
Birection B	Below 4.9N	
Birection C	Below 1.96N	

### 5.8.3 Transportation

During the transport, the relays will not fall off due to the factors such as the shock and vibration to avoid the bad soldering produced thereby.

### 5.8.4 Reflow Solder

Figure 23 shows the temperature curve of the PCB surface when the infrared ray are used to reflow solder. Please consult the specification of the relays due to the different characteristics of the different relays. If there is no statement in the instructions, Please use the temperature curve as shown in the following figure.



**Figure 23**



When just finishing soldering, please do not clean the relay immediately, for the connection with the cool solvent may damage the hermetic characteristics of the internal parts.  
Do not dip the relay in the flux groove for it will deform the plastics and then result in the failure of the relays.  
Please see the soldered state in figure 24.

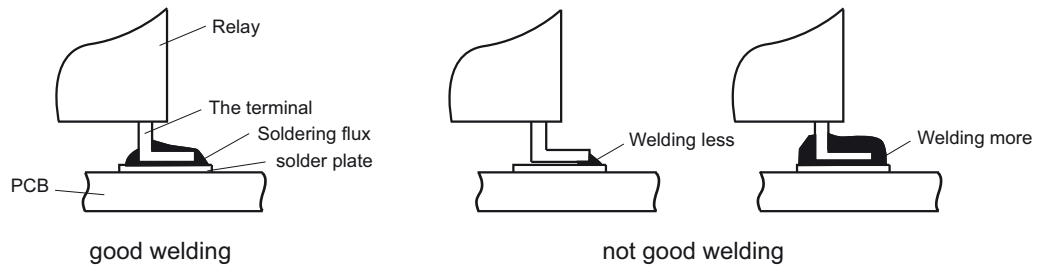


Figure 24

### 5.8.5 Cleaning

Hot cleaning or soap cleaning can be used and the cleaning temperature should be controlled under 40°C.  
Please use the alcohol solvent or water to clean and do not use Freon, thinner or gasoline to clean.  
Do not use supersonic to clean, or the break of the coil wire and the contact welding will be resulted in.  
Improper welding will decrease the relay sealing, so please do not clean the relay or do the surface treating (soaking prtector).

## 6. Other Precautions

### 6.1 Precautions For The Safety

When the relay works, do not touch the relay with hands for there is the danger of getting the electric shock.  
Please switch off the power when mounting, maintaining and handling the relays (including the connecting parts such as terminals and sockets ).  
When connecting the terminals, firstly refer to the wiring diagram in the instructions, and then make correct connection. The false connection may result in the unexpected false operation, abnormal heating or fire.  
If the contact welding, the failure of the contact or the break of the coil wire happens, other properties or lives will be threatened. Please use the double mounting sets.

### 6.2 Tube Packaging

When packing the relay by the tube, do not shake the tube to shock the relays, for which will result in the failure of the relays. If the package uses the stop plug, be sure to slide the stopper plug to hold the remaining relays firmly together so they would not move in the tube.

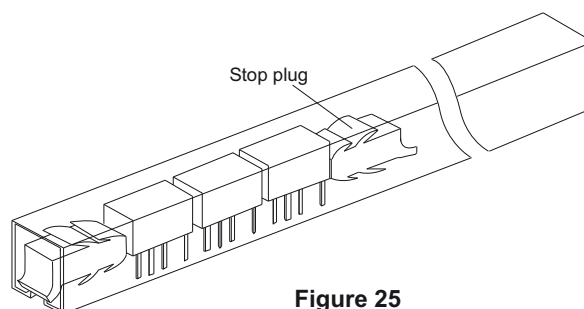


Figure 25



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### CHAPTER 4 QUICK ZOOM TABLE FOR REASONS FOR FAILURE

Some common failure phenomena, failure modes, and the reasons. See table 18:

**Table 18**

Failure Phenomena	Failure Mode	Failure Reason
Non-operation	No current at the terminals of the coil	<ul style="list-style-type: none"> <li>● Breaking circuit</li> <li>● Worse connected or short circuit</li> <li>● Terminal welded worse</li> </ul>
	Insufficient voltage in the circuit	<ul style="list-style-type: none"> <li>● Insufficient voltage supply</li> <li>● Power circuit too long</li> <li>● the voltage of the chosen relay too high</li> </ul>
	Circuit unconnected	<ul style="list-style-type: none"> <li>● Welded worse</li> <li>● Coil breaking</li> </ul>
	Relay failure	<ul style="list-style-type: none"> <li>● Drop, bumped badly</li> <li>● Contact failure</li> </ul>
	Voltage polarity of the polarized relay is wrong	<ul style="list-style-type: none"> <li>● Bumped during the transportation</li> <li>● circuit connected badly</li> </ul>
No Release	Surplus voltage too high	<ul style="list-style-type: none"> <li>● Energy storage component's influence</li> <li>● Leakage current or bypass current</li> <li>● Surplus voltage of the semiconductor too high</li> </ul>
	Relay failure	<ul style="list-style-type: none"> <li>● Drop, bumped badly</li> <li>● contact failure</li> </ul>
Unsteady Operation	Unsteady power	<ul style="list-style-type: none"> <li>● PARD(periodic and random deviation)</li> <li>● Insufficient voltage</li> <li>● Resistor beyond the tolerance</li> </ul>
	Unsteady parameter	<ul style="list-style-type: none"> <li>● Drop or bumped badly</li> <li>● Short form among the coils</li> </ul>
	False operation of the relay	<ul style="list-style-type: none"> <li>● Something wrong with the control procedure</li> <li>● The vibration excessively strong in application</li> </ul>
NC/NO Contact Welding	Current excessively high	<ul style="list-style-type: none"> <li>● Load excessively high</li> <li>● Surge current too high</li> </ul>
	Contact Moving abnormally	<ul style="list-style-type: none"> <li>● External vibration excessively strong</li> <li>● AC relay's unstable operation; with buzz</li> <li>● Unstable operation</li> </ul>
NC/NO Contact Welding	Operation frequency excessively high	
	Ambient temperature excessively high	
	Use beyond the life	
NC/NO Contact Not Closed	Contact resistance too high	<ul style="list-style-type: none"> <li>● Weld worse</li> <li>● Contamination in the contact</li> <li>● Bad using environment, contact oxidizing or sulphidizing</li> </ul>
	No current in the contacts surface	<ul style="list-style-type: none"> <li>● Load circuit break</li> <li>● Circuit connected worse or short circuit</li> <li>● Terminal welded worse</li> </ul>
	Use beyond the life	

**Notes:** when failure happens, if there's any question, please contact us.



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**CHAPTER 5 ORDERING EXAMPLE**

Ordering code contains the basic information of the relays. Table 19 is an ordering example of a typical Hongfa product. Please refer to the datasheet of each product for part no. selection.

	HF161F / <sup>1)</sup>	12	-H	T	<b>Table 19</b> (XXX)
<b>Type</b>					
<b>Coil voltage</b>	5, 12, 24, 48VDC				
<b>Contact arrangement</b>	H: 1 Form A				
<b>Contact material</b>	T: AgSnO <sub>2</sub>		Nil: AgCdO		
<b>Special code<sup>2)</sup></b>	XXX: Customer special requirement		Nil: Standard		

- Notes:** 1) The symbol "/" used in the product code of Hongfa relay, which is only for separating the product type code and specification code, and there is no other actual meaning.
- 2) The customer special requirement express as special code after evaluating by Hongfa. e.g. (414) stands for product with coil terminal of 1.4X0.4.
- 3) For products that should satisfy the explosion-proof requirements of "IEC 60079 series" should remark [Ex] at the specification column while placing orders. Since not all of the products have explosion-proof certification, please contact us if you need any support to choose the suitable product.





For more information, please access our web site:

**[www.hongfa.com](http://www.hongfa.com)**







### **Xiamen Hongfa Electroacoustic Co.,Ltd.**

**ADD.:** No.91-101, Sunban S.Rd., Jimei North Ind. Dist., Xiamen, China  
**Tel.:** + 86 - 592 - 6106688    **Fax:** + 86 - 592 - 6106678

## **Marketing & Sales Network**

### **Head Quarter's Marketing & Sales Center**

**ADD:** No.560-578, Donglin Rd., Jimei North Ind. Dist., Xiamen, China  
**TEL:** 400-600-1502    **FAX:** +86-592-6686063  
**E-mail:** marketing@hongfa.com

### **Hongfa America, INC.**

**ADD:** 20381 Hermana Circle, Lake Forest, CA92630, USA  
**TEL:** +1-714-669-2888  
**E-mail:** sales@hongfaamerica.com

### **Hongfa Europe GmbH**

**ADD:** Marie-Curie-Ring 26, D-63477 Maintal, Germany  
**TEL:** +49-6181-4306-0  
**E-mail:** info@hongfa-europe.com

### **Hongfa Italy Srl**

**ADD:** C/O Regus Business Center, Via Senigallia 18/2 Torre A, 20161 Milan, Italy  
**TEL:** +39-02-64672-325  
**E-mail:** marco.fuccillo@hongfa-europe.com

### **Hongfa Electroacoustic (Hongkong) Co.,Ltd**

**ADD:** Rm 1810-12, 18/F., Shatin Galleria, 18-24 Shan Mei St., Fotan, N.T, HongKong  
**TEL:** +852-2947-7889  
**E-mail:** hongkong@hongfa.com

### **Shanghai Hongfa**

#### **Electroacoustic Co., Ltd.**

**ADD:** NO.51.341, Jiuting Rd., Jiuting Town, Songjiang Dist., Shanghai  
**TEL:** +86-21-37693111  
**E-mail:** shanghai@hongfa.com

### **Beijing Hongfa**

#### **Electroacoustic Relay Co., Ltd.**

**ADD:** 111Bldg, Phase IV Westside of Lian-dong U Valley, Tongzhou Dist., Beijing  
**TEL:** +86-10-56495556  
**E-mail:** beijing@hongfa.com

### **Sichuan Hongfa Relay Co., Ltd.**

**ADD:** 1 Bldg, 3Unit, 1002-1004 Room, Jingtianguoji, No.288, Taisheng S.Rd., Qingyang Dist., Chengdu  
**TEL:** +86-28-86627550  
**E-mail:** sichuan@hongfa.com

### **Hongfa India Branch**

**ADD:** #1001 Archana Mansion, 3rd Main, B.S.K 3rd Stage, Hoskerekhalli, Bangalore-560 085, India  
**TEL:** +91-80-26422678/+91-98453 47993  
**E-mail:** amarnath@hongfa.com

### **Hongfa Taiwan Branch**

**TEL:** +886-2-22428621, 975192582  
**E-mail:** taiwan@hongfa.com

### **Hongfa Korea Branch**

**TEL:** +82-10-5355-4899 / +82-10-8704-4706  
**E-mail:** korea@hongfa.com / khlee@hongfa.com

### **Hongfa Brazil Branch**

**TEL:** +55-11-949697906  
**E-mail:** mauro-loyola@hongfa.com

### **Hongfa Philippine Branch**

**TEL:** +639177189352 / +639175780846  
**E-mail:** nia-videna@hongfa.com

### **Hongfa Turkey Branch**

**TEL:** +90-535-0221881  
**E-mail:** info-turkey@hongfa.com



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