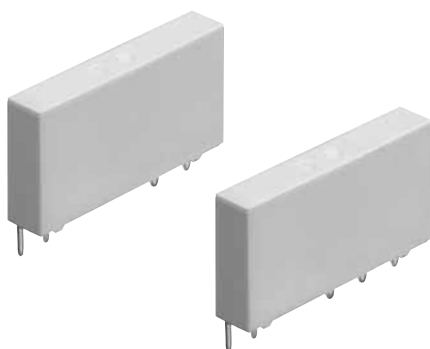




**Compliant with
European standards
1a/1c 6A Slim power relays**

PF RELAYS (APF)



RoHS compliant

Protective construction: Sealed type

FEATURES

- High density mounting with 5 mm .197 inch width**
Space saved with 5 mm .197 inch slim type with 28 mm 1.102 inch length. Allows high density mounting and use in compact devices.
- Satisfies reinforced insulation standard (EN/IEC 61810-1)**
- High switching capacity**
Supports 6A 250 V AC nominal switching capacity (resistive load) and AC15 and DC13 (inductive load).
- 1 Form A and 1 Form C contact arrangements with options for a variety of applications**
- 4,000 V high breakdown voltage and 6,000 V high surge breakdown voltage**
Controller protection against surges and noise with a breakdown voltage of 4,000 Vrms for 1 min. between contacts and coil, and 6,000 V surge breakdown voltage between contacts and coil.
- Resistance to heat and fire; EN60335-1, clause 30 (GWT) approved**

- Sealed construction allows automatic washing**
- Complies with all safety standards**
UL/C-UL, VDE certified.
- High insulation resistance**
Creepage distance between contact and coil terminal: Min. 8.0 mm .315 inch
Clearance distance between contact and coil terminal: Min. 6.0 mm .236 inch

TYPICAL APPLICATIONS

- Interface relays for programmable controllers
- Output relays for measuring equipment, timers, counters and temperature controllers
- Industrial equipment, office equipment
- Household appliances for Europe

ORDERING INFORMATION

	APF		0			
Contact arrangement						
1: 1 Form A						
3: 1 Form C						
Contact type						
0: Single contact						
Contact material						
2: AgNi type						
3: AgNi type/Au-plated						
Nominal coil voltage (DC)						
4H: 4.5 V 05: 5 V 06: 6 V 09: 9 V 12: 12 V 18: 18 V						
24: 24 V 48: 48 V 60: 60 V						

Notes: 1. AgSnO₂ type contact is available. Please contact us for details.
2. Bent pins type is available. Please contact us for details.

TYPES

Contact arrangement	Nominal coil voltage	Part No.	Contact arrangement	Nominal coil voltage	Part No.
1 Form A (AgNi type)	4.5V DC	APF1024H	1 Form C (AgNi type)	4.5V DC	APF3024H
	5V DC	APF10205		5V DC	APF30205
	6V DC	APF10206		6V DC	APF30206
	9V DC	APF10209		9V DC	APF30209
	12V DC	APF10212		12V DC	APF30212
	18V DC	APF10218		18V DC	APF30218
	24V DC	APF10224		24V DC	APF30224
	48V DC	APF10248		48V DC	APF30248
	60V DC	APF10260		60V DC	APF30260
1 Form A (AgNi type/Au-plated)	4.5V DC	APF1034H	1 Form C (AgNi type/Au-plated)	4.5V DC	APF3034H
	5V DC	APF10305		5V DC	APF30305
	6V DC	APF10306		6V DC	APF30306
	9V DC	APF10309		9V DC	APF30309
	12V DC	APF10312		12V DC	APF30312
	18V DC	APF10318		18V DC	APF30318
	24V DC	APF10324		24V DC	APF30324
	48V DC	APF10348		48V DC	APF30348
	60V DC	APF10360		60V DC	APF30360

Standard packing: Tube: 20 pcs.; Case: 1,000 pcs.

RATING

1. Coil data

Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current [±10%] (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Nominal operating power	Max. applied voltage (at 20°C 68°F)
4.5V DC	Max. 70%V nominal voltage (Initial)	Min. 5%V nominal voltage (Initial)	37.8mA	119Ω	170mW	120%V of nominal voltage
5V DC			34.0mA	147Ω		
6V DC			28.3mA	212Ω		
9V DC			18.9mA	476Ω		
12V DC			14.2mA	847Ω		
18V DC			9.4mA	1,906Ω		
24V DC			7.1mA	3,388Ω		
48V DC			4.5mA	10,618Ω	217mW	
60V DC			2.9mA	20,570Ω	175mW	

2. Specifications

Characteristic	Item		Specifications	
Contact	Arrangement		1 Form A	1 Form C
	Contact resistance (Initial)		Max. 100 mΩ (AgNi type), Max. 30 mΩ (AgNi type/Au-plated) (By voltage drop 6 V DC 1A)	
	Contact material		AgNi type, AgNi type/Au-plated	
Rating	Nominal switching capacity (resistive load)		6 A 250 V AC	
	Max. switching power (resistive load)		1,500 VA	
	Max. switching voltage		250V AC	
	Max. switching current		6 A (AC)	
	Min. switching capacity (Reference value)* ¹		100 mA 5 V DC (AgNi type), 1 mA 1 V DC (AgNi type/Au-plated)	
Electrical characteristics	Insulation resistance (Initial)		Min. 1,000MΩ (at 500V DC) Measurement at same location as "Breakdown voltage" section.	
	Breakdown voltage (Initial)	Between open contacts	1,000 Vrms for 1 min. (Detection current: 10 mA)	
		Between contact and coil	4,000 Vrms for 1 min. (Detection current: 10 mA)	
	Surge breakdown voltage* ² (Between contact and coil) (Initial)		6,000 V	
	Operate time (at 20°C 68°F)		Max. 8 ms (Nominal coil voltage applied to the coil, excluding contact bounce time.)	
	Release time (at 20°C 68°F)		Max. 4 ms (Nominal coil voltage applied to the coil, excluding contact bounce time.) (without diode)	
Mechanical characteristics	Shock resistance	Functional	Min. 98 m/s ² (Half-wave pulse of sine wave: 11 ms; detection time: 10μs)	Min. 49 m/s ² (Half-wave pulse of sine wave: 11 ms; detection time: 10μs)
		Destructive	Min. 980 m/s ² (Half-wave pulse of sine wave: 11 ms.)	
	Vibration resistance	Functional	10 to 55 Hz at double amplitude of 1 mm (Detection time: 10μs.)	
		Destructive	10 to 55 Hz at double amplitude of 1.5 mm	
Expected life	Mechanical		Min. 5×10 ⁶ (at 180 times/min.)	
Conditions	Conditions for operation, transport and storage* ³		Ambient temperature: -40°C to +85°C -40°F to +185°F; Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)	
Unit weight			Approx. 5 g .18 oz	

Notes: *1. This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

*2. Wave is standard shock voltage of ±1.2×50μs according to JEC-212-1981

*3. The upper operation ambient temperature limit is the maximum temperature that can satisfy the coil temperature rise value. Refer to "Usage, transport and storage conditions" in NOTES.

3. Electrical life

Condition: Resistive load, at 6 times/min.

Type		Switching capacity	No. of operations
1 Form A		6A 250V AC	min. 5×10 ⁴
1 Form C	N.O.	6A 250V AC	min. 5×10 ⁴
	N.C.		min. 3×10 ⁴

REFERENCE DATA

1. Electrical life

Tested sample: APF30224

Load type		Voltage	Current	Ambient temperature	No. of ops.
Resistive load		250V AC	6 A	85°C 185°F	30,000
Inductive load	AC15	250V AC	3 A	25°C 77°F	20,000
	DC13	24V DC	2 A	25°C 77°F	6,000

Notes: 1. Switch contacts are all on N.O. side.
2. AC15 and DC13 comply with IEC-60947-5-1 testing conditions.

2. Max. switching capacity

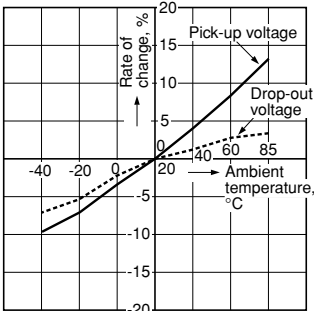
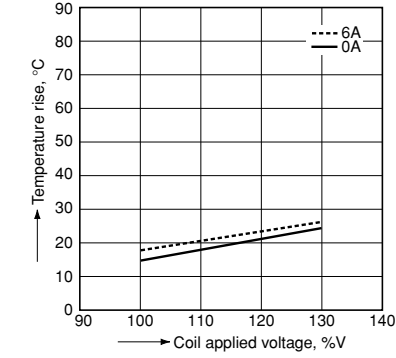
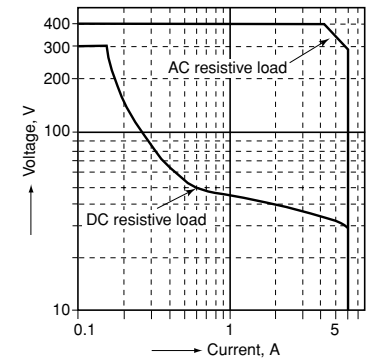
Tested sample: APF30224

3. Coil temperature rise

Tested sample: APF30224
Measured portion: Inside the coil
Ambient temperature: 28°C 82°F

4. Ambient temperature characteristics

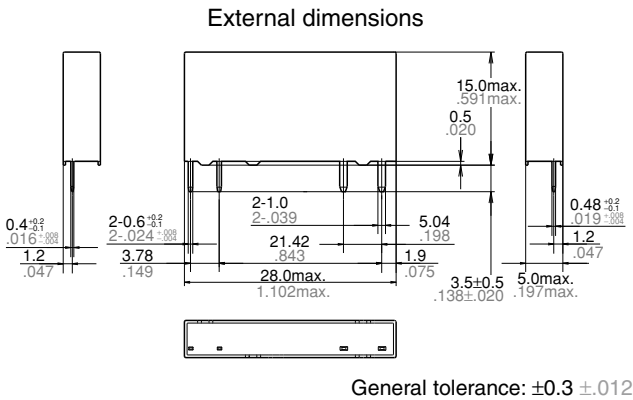
Tested sample: APF30224, 6 pcs.



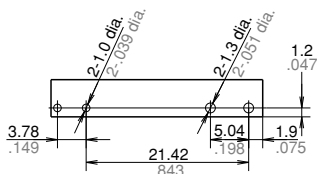
DIMENSIONS (mm inch)

1. 1 Form A type

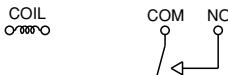
CAD Data



PC board pattern (Bottom view)

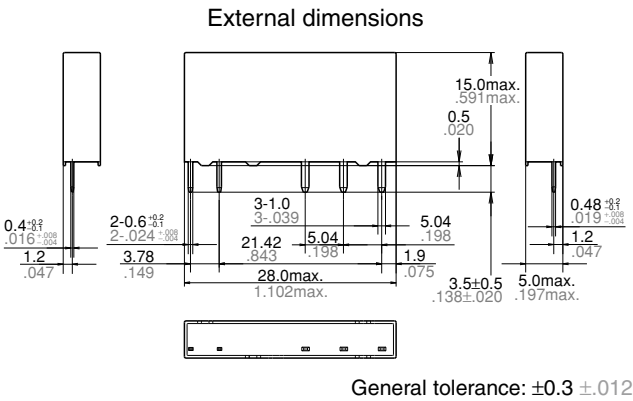


Schematic (Bottom view)

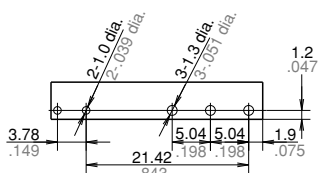


2. 1 Form C type

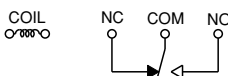
CAD Data



PC board pattern (Bottom view)



Schematic (Bottom view)



SAFETY STANDARDS

Types	UL/C-UL (Recognized)* ¹				VDE (Certified)* ²				
	File No.	Contact rating	Tempreture	Cycles	File No.	Contact rating	Tempreture	Cycles	
1 Form A, 1 Form C	E120782	6A 277V AC General use	85°C 185°F	6×10 ³	40027672 (IEC/EN61810-1)	6A 250V AC (cosφ=1.0) (N.O.)	25°C 77°F	8×10 ⁴	
		8A 277V AC General use (N.O.)	—	6×10 ³		6A 250V AC (cosφ=1.0) (N.C.)	25°C 77°F	5×10 ⁴	
		4A 277V AC General use	—	3×10 ⁴		6A 250V AC (cosφ=1.0) (N.O.)	85°C 185°F	4×10 ⁴	
		6A 24V DC General use (N.O.)	85°C 185°F	6×10 ³		6A 250V AC (cosφ=1.0) (N.C.)	85°C 185°F	3×10 ⁴	
		B300 (Pilot Duty) (N.O.)	—	—		8A 250V AC (cosφ=1.0) (N.O.)	25°C 77°F	2.5×10 ⁴	
		R300 (Pilot Duty)	—	—		—	—	—	
		Class I Division2 Groups A,B,C,D Hazardous Location (ANSI/ISA 12.12.01)				—	—	—	

*1. CSA standard: Certified by C-UL

*2. Insulation: Reinforced insulation between contact and coil. Resistance to heat and fire; EN60335-1, clause 30 (GWT) approved.

EN/IEC VDE Certified INSULATION CHARACTERISTICS (IEC61810-1)

Item	Characteristics
Clearance/Creepage distance (IEC61810-1)	Min. 6.0/8.0mm
Category of protection (IEC61810-1)	RT III
Tracking resistance (IEC60112)	PTI 175
Insulation material group	III a
Over voltage category	III
Rated voltage	250V
Pollution degree	2
Type of insulation (Between contact and coil)	Reinforced insulation
Type of insulation (Between open contacts)	Micro disconnection

NOTES

1. For cautions for use, please read “GENERAL APPLICATION GUIDELINES”.

2. Usage, transport and storage conditions

1) Temperature:

–40 to +85°C –40 to +185°F

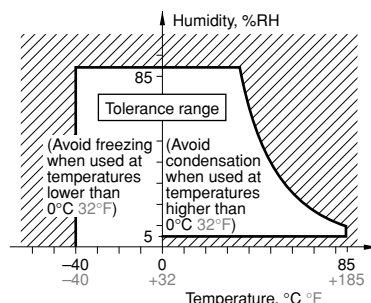
2) Humidity: 5 to 85% RH

(Avoid freezing and condensation.)

The humidity range varies with the temperature. Use within the range indicated in the graph below.

3) Atmospheric pressure: 86 to 106 kPa

Temperature and humidity range for usage, transport, and storage



4) Condensation

Condensation forms when there is a sudden change in temperature under high temperature and high humidity conditions. Condensation will cause deterioration of the relay insulation.

5) Freezing

Condensation or other moisture may freeze on the relay when the temperatures is lower than 0°C 32°F. This causes problems such as sticking of movable parts or operational time lags.

6) Low temperature, low humidity environments

The plastic becomes brittle if the relay is exposed to a low temperature, low humidity environment for long periods of time.

Please contact

Panasonic Corporation

Electromechanical Control Business Division

■ 1006, Oaza Kadoma, Kadoma-shi, Osaka 571-8506, Japan
industrial.panasonic.com/ac/e/

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