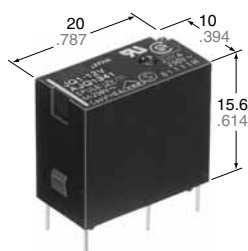


Panasonic

ideas for life

HIGH ELECTRICAL & MECHANICAL NOISE IMMUNITY RELAY

JQ RELAYS



mm inch

FEATURES

- High electrical noise immunity
- High switching capacity in a compact package
- High sensitivity: 200 mW (1a), 400 mW (1c)
- High surge voltage: 8,000 V between contacts and coil
- UL, CSA, VDE, SEMKO approved and TÜV available
- Class B coil insulation type also available.

About Cd-free contacts

We have introduced Cadmium free type products to reduce Environmental Hazardous Substances. (The suffix "F" should be added to the part number)
Please replace parts containing Cadmium with Cadmium-free products and evaluate them with your actual application before use because the life of a relay depends on the contact material and load.

Compliance with RoHS Directive

SPECIFICATIONS

Contact

				Standard type	High capacity type
Arrangement				1 Form A, 1 Form C	
Initial contact resistance, max. (By voltage drop 6 V DC 1 A)				100 mΩ	
Contact material				AgSnO ₂ type	
Rating (resistive)	Nominal switching capacity	1a		5 A 125 V AC, 2 A 250 V AC, 5 A 30 V DC	10 A 125 V AC, 5 A 250 V AC, 5 A 30 V DC
		1c	N.O.	5 A 125 V AC, 2 A 250 V AC, 3 A 30 V AC	10 A 125 V AC, 5 A 250 V AC, 5 A 30 V DC
			N.C.	2 A 125 V AC, 1 A 250 V AC, 1 A 30 V DC	3 A 125 V AC, 2 A 250 V AC, 1 A 30 V DC
	Max. switching power	1a		625 VA, 150 W	1,250 VA, 150 W
		1c	N.O.	625 VA, 90 W	1,250 V AC, 150 W
			N.C.	250 VA, 30 W	500 V AC, 30 W
	Max. switching voltage			250 V AC, 110 V DC (0.3A)	
	Max. switching current			N.O.: 5 A N.C.: 2 A	N.O.: 10 A N.C.: 3 A
	Min. switching capacity*1 (Reference value)			100 mA, 5 V DC	
Expected mechanical life (at 180 cpm)(min. operations)				10 ⁷	

Expected electrical life (min. operations)

Type	Switching capacity		No. of operations
Standard type	1a		5 A 125 V AC 3 A 125 V AC 2 A 250 V AC 5 A 30 V DC 5×10 ⁴ 2×10 ⁵ 2×10 ⁵ 10 ⁵
	1c	N.O.	5 A 125 V AC 2 A 250 V AC 3 A 30 V DC 5×10 ⁴ 2×10 ⁵ 10 ⁵
		N.C.	2 A 125 V AC 1 A 250 V AC 1 A 30 V DC 2×10 ⁵ 2×10 ⁵ 10 ⁵
High capacity type	1a		10 A 125 V AC 5 A 250 V AC 5 A 30 V DC 5×10 ⁴ 5×10 ⁴ 10 ⁵
	1c	N.O.	10 A 125 V AC 5 A 250 V AC 5 A 30 V DC 5×10 ⁴ 5×10 ⁴ 10 ⁵
		N.C.	3 A 125 V AC 2 A 250 V AC 1 A 30 V DC 2×10 ⁵ 2×10 ⁵ 10 ⁵

Coil (at 20°C 68°F)

Nominal operating power	1a: 200 mW	1c: 400 mW
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*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.

Characteristics

Max. operating speed		20 cpm
Initial insulation resistance*1		Min. 1,000 MΩ at 500 V DC
Initial breakdown voltage*2	Between open contacts	1a: 1,000 Vrms for 1 min. 1c: 750 Vrms for 1 min.
	Between contacts and coil	4,000 Vrms for 1 min.
Surge voltage between contact and coil*3		8,000 V
Operate time*4 (at nominal voltage) (at 20°C 68°F)		Max. 20 ms
Release time*4 (at nominal voltage) (without diode) (at 20°C 68°F)		Max. 10 ms
Temperature rise*5 (coil)		Max. 45°C
Shock resistance	Functional*6	294 m/s² {30 G}
	Destructive*7	980 m/s² {100 G}
Vibration resistance	Functional*8	10 to 55 Hz at double amplitude of 1.6 mm
	Destructive	10 to 55 Hz at double amplitude of 2.0 mm
Conditions for operation, transport and storage*9 (Not freezing and condensing at low temperature)		Ambient temp.*10 −40°C to +85°C −40°F to +185°F
		Humidity 5 to 85% R.H.
Unit weight		Approx. 7 g .25 oz

Remarks

* Specifications will vary with foreign standards certification ratings.

*1 Measurement at same location as “Initial breakdown voltage” section

*2 Detection current: 10 mA

*3 Wave is standard shock voltage of $\pm 1.2 \times 50\mu\text{s}$ according to JEC-212-1981

*4 Excluding contact bounce time

*5 Measured conditions

Standard type	Resistance method, nominal voltage applied to the coil. Contact carrying current: 5 A, at 70°C 158°F
High capacity type	Resistance method, nominal voltage applied to the coil. Contact carrying current: 10 A, at 70°C 158°F

*6 Half-wave pulse of sine wave: 11ms; detection time: 10μs

*7 Half-wave pulse of sine wave: 6ms

*8 Detection time: 10μs

*9 Refer to 6. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT.

*10 When using relays in a high ambient temperature, consider the pick-up voltage rise due to the high temperature (a rise of approx. 0.4% V for each 1°C 33.8°F with 20°C 68°F as a reference) and use a coil impressed voltage that is within the maximum allowable voltage range.

TYPICAL APPLICATIONS

- Air conditioners
- Refrigerators
- Microwave ovens
- Heaters

ORDERING INFORMATION

Ex. JQ 1a P — B — 12 V — F

Contact arrangement	Contact capacity	Coil insulation class	Coil voltage (DC)	Contact material
1a: 1 Form A 1: 1 Form C	Nil: Standard P: High capacity	Nil: Class E coil insulation B: Class B coil insulation	5, 6, 9, 12, 18, 24, 48* V	F: AgSnO ₂ type

UL/CSA, VDE, SEMKO approved type is standard.

Notes: 1. Standard packing: Carton: 100 pcs. Case: 500 pcs.

2. *Available only for 1 Form C type

3. Please inquire about the previous products (Cadmium containing parts).

TYPES AND COIL DATA at 20°C 68°F

		Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (min.)	Drop-out voltage, V DC (min.)	Nominal operating current, mA	Nominal operating power, mW	Coil resistance, Ω (±10%)	Max. allowable voltage, V DC
1 Form A	Standard type	JQ1a-5V-F	5	3.75	0.25	40	200	125	180% of nominal voltage (at 20°C 68°F)
		JQ1a-6V-F	6	4.5	0.3	33.3		180	
		JQ1a-9V-F	9	6.75	0.45	22.2		405	
		JQ1a-12V-F	12	9	0.6	16.7		720	
		JQ1a-18V-F	18	13.5	0.9	11.1		1,620	
		JQ1a-24V-F	24	18	1.2	8.3		2,880	
	High capacity type	JQ1aP-5V-F	5	4	0.25	40	200	125	130% of nominal voltage (at 85°C 185°F)
		JQ1aP-6V-F	6	4.8	0.3	33.3		180	
		JQ1aP-9V-F	9	7.2	0.45	22.2		405	
		JQ1aP-12V-F	12	9.6	0.6	16.7		720	
		JQ1aP-18V-F	18	14.4	0.9	11.1		1,620	
		JQ1aP-24V-F	24	19.2	1.2	8.3		2,880	
1 Form C	Standard type	JQ1-5V-F	5	3.75	0.25	80	400	62.5	150% of nominal voltage (at 20°C 68°F)
		JQ1-6V-F	6	4.5	0.3	66.7		90	
		JQ1-9V-F	9	6.75	0.45	44.4		202.5	
		JQ1-12V-F	12	9	0.6	33.3		360	
		JQ1-18V-F	18	13.5	0.9	22.2		810	
		JQ1-24V-F	24	18	1.2	16.7		1,440	
		JQ1-48V-F	48	36	2.4	8.3		5,760	
	High capacity type	JQ1P-5V-F	5	4	0.25	80	400	62.5	110% of nominal voltage (at 85°C 185°F)
		JQ1P-6V-F	6	4.8	0.3	66.7		90	
		JQ1P-9V-F	9	7.2	0.45	44.4		202.5	
		JQ1P-12V-F	12	9.6	0.6	33.3		360	
		JQ1P-18V-F	18	14.4	0.9	22.2		810	
		JQ1P-24V-F	24	19.2	1.2	16.7		1,440	
		JQ1P-48V-F	48	38.4	2.4	8.3		5,760	

Note) Class B coil insulation type also available:

Ex) JQ1a-○-12V-F

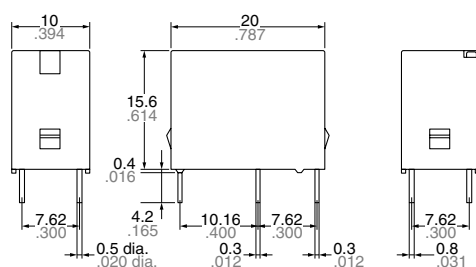
○: input the following letter, class B: B.

DIMENSIONS

mm inch

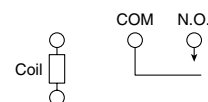


1 Form A

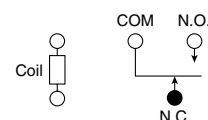


Schematic (Bottom view)

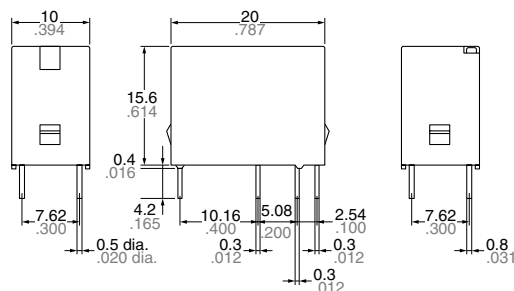
1 Form A



1 Form C

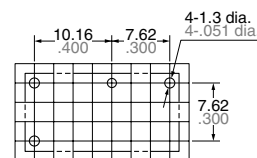


1 Form C

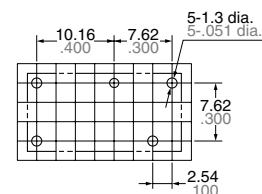


PC board pattern (Bottom view)

1 Form A



1FormC



Tolerance: $\pm 0.1 \pm 0.004$

Dimension :

Max. 1mm .039 inch $\pm 0.2 \pm 0.008$

1 to 5mm .039 to .118 inch $\pm 0.3 \pm 0.12$

Min. 5mm .118 inch $\pm 0.4 \pm 0.16$

General tolerance

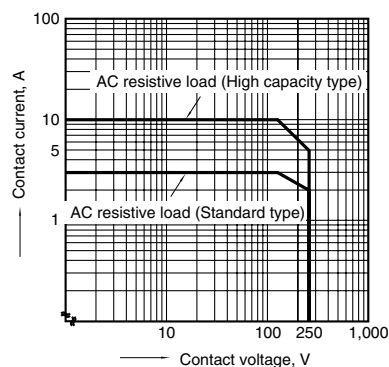
$\pm 0.2 \pm 0.008$

$\pm 0.3 \pm 0.12$

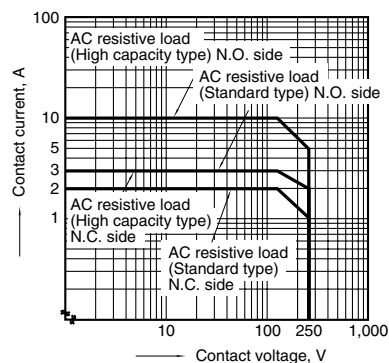
$\pm 0.4 \pm 0.16$

REFERENCE DATA

Max. switching capacity (1 Form A type)



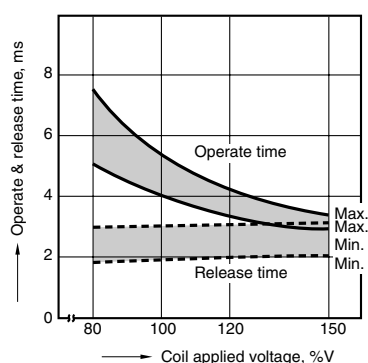
Max. switching capacity (1 Form C type)



Standard type

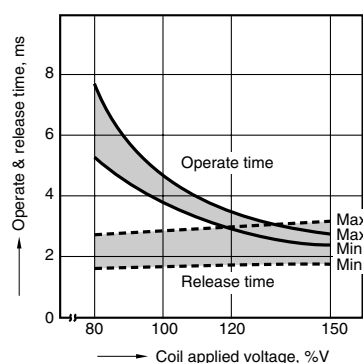
1-(1). Operate & release time (1 Form A type)

Tested sample: JQ1a-12V-F, 25 pcs.



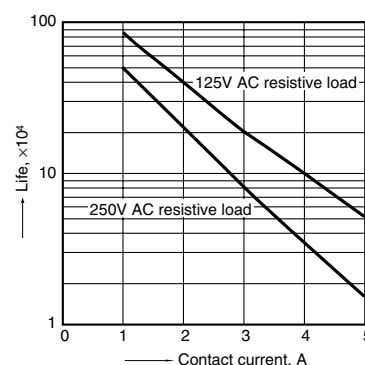
1-(2). Operate & release time (1 Form C type)

Tested sample: JQ1-24V-F, 25 pcs.



2. Life curve

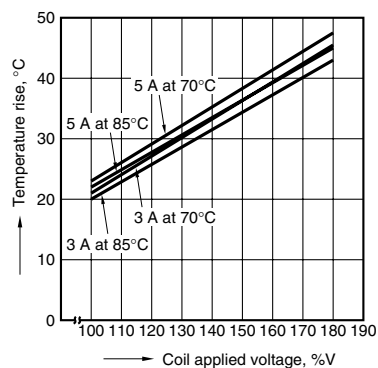
Ambient temperature: room temperature



3-(1). Coil temperature rise (1 Form A type)

Contact carrying current: 3 A, 5 A

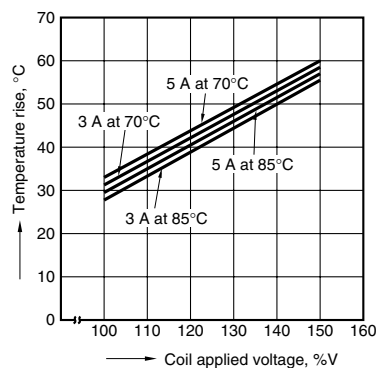
Measured portion: Inside the coil



3-(2). Coil temperature rise (1 Form C type)

Contact carrying current: 3 A, 5 A

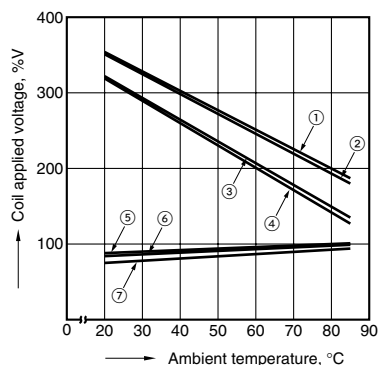
Measured portion: Inside the coil



4-(1). Ambient temperature characteristics (1 Form A type)

Tested sample: JQ1a-24V-F

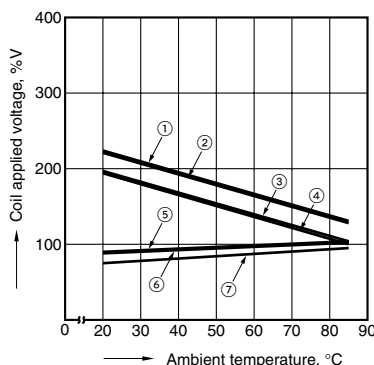
Contact carrying current: 3 A, 5 A



4-(2). Ambient temperature characteristics (1 Form C type)

Tested sample: JQ1-24V-F

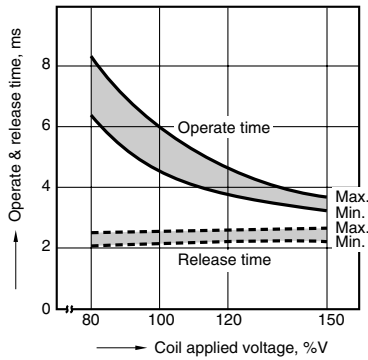
Contact carrying current: 3 A, 5 A



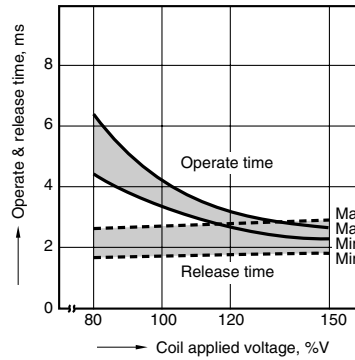
- ① Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 130°C 266°F) (Carrying current: 3 A)
- ② Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 130°C 266°F) (Carrying current: 5 A)
- ③ Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 115°C 239°F) (Carrying current: 3 A)
- ④ Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 115°C 239°F) (Carrying current: 5 A)
- ⑤ Pick-up voltage with a hot-start condition of 100%V on the coil (Carrying current: 5 A)
- ⑥ Pick-up voltage with a hot-start condition of 100%V on the coil (Carrying current: 3 A)
- ⑦ Pick-up voltage

High capacity type**1-(1). Operate & release time (1 Form A type)**

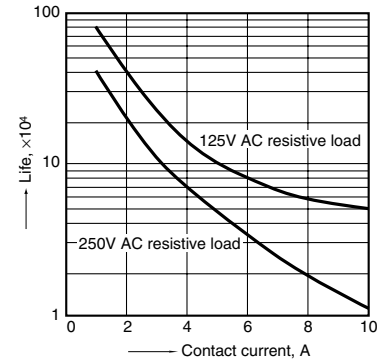
Tested sample: JQ1aP-12V-F, 25 pcs.

**1-(2). Operate & release time (1 Form C type)**

Tested sample: JQ1P-12V-F, 25 pcs.

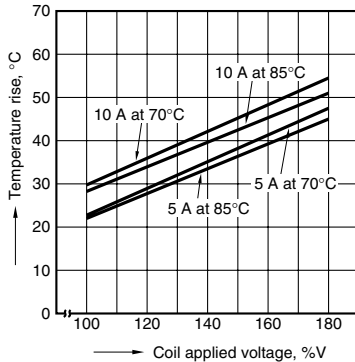
**2. Life curve**

Ambient temperature: room temperature

**3-(1). Coil temperature rise (1 Form A type)**

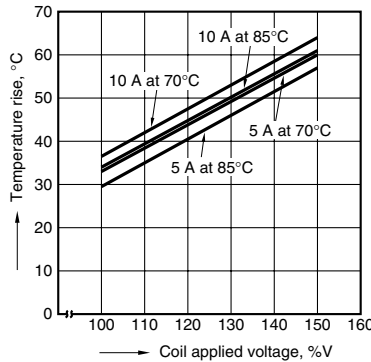
Contact carrying current: 5 A, 10 A

Measured portion: Inside the coil

**3-(2). Coil temperature rise (1 Form C type)**

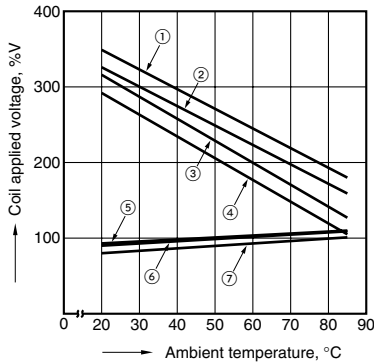
Contact carrying current: 5 A, 10 A

Measured portion: Inside the coil

**4-(1). Ambient temperature characteristics (1 Form A type)**

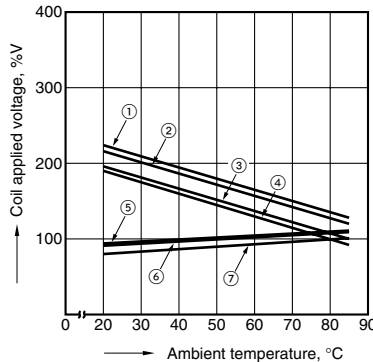
Tested sample: JQ1aP-24V-F

Contact carrying current: 5 A, 10 A

**4-(2). Ambient temperature characteristics (1 Form C type)**

Tested sample: JQ1P-24V-F

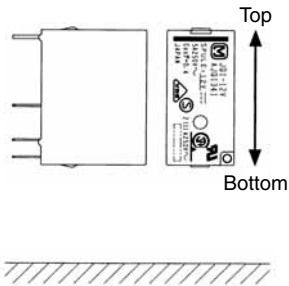
Contact carrying current: 5 A, 10 A



- ① Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 130 $^{\circ}\text{C}$ 266 $^{\circ}\text{F}$) (Carrying current: 5 A)
- ② Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 130 $^{\circ}\text{C}$ 266 $^{\circ}\text{F}$) (Carrying current: 10 A)
- ③ Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 115 $^{\circ}\text{C}$ 239 $^{\circ}\text{F}$) (Carrying current: 5 A)
- ④ Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 115 $^{\circ}\text{C}$ 239 $^{\circ}\text{F}$) (Carrying current: 10 A)
- ⑤ Pick-up voltage with a hot-start condition of 100%V on the coil (Carrying current: 10 A)
- ⑥ Pick-up voltage with a hot-start condition of 100%V on the coil (Carrying current: 5 A)
- ⑦ Pick-up voltage

NOTES

Note about relay installation orientation



When installing with the relay terminals parallel to the ground, the contact terminals at the bottom and the coil terminals at the top, component friction will occur after numerous switching actions or due to vibration in the non-excitation state. Since this may cause the relay to stop functioning when the pick-up voltage increases even if the nominal voltage is applied, please do not install using this orientation.

For Cautions for Use, see Relay Technical Information.