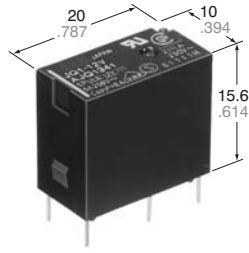


## HIGH ELECTRICAL & MECHANICAL NOISE IMMUNITY RELAY

# 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, TÜV, SEMKO approved
- Class B coil insulation type available

### About Cd-free contacts

We have introduced cadmium-free type products to reduce environmentally hazardous substances. Please replace parts that contain cadmium with Cd-free products. Evaluate them with your actual application before use because the life of a relay depends on the contact material and load.

## 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 <sub>2</sub> 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
	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	
		1c	N.O.	625 VA, 90 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		
Min. switching capacity <sup>#1</sup>		100 mA, 5 V DC		
Expected mechanical life (at 180 cpm)(min. operations)		10 <sup>7</sup>		

### Expected electrical life (min. operations)

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

### 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)		Max. 20 ms
Release time*4 (at nominal voltage)(without diode)		Max. 10 ms
Temperature rise*5		Max. 45°C
Shock resistance	Functional*6	Min. 294 m/s <sup>2</sup> {30 G}
	Destructive*7	Min. 980 m/s <sup>2</sup> {100 G}
Vibration resistance	Functional*8	98 m/s <sup>2</sup> {10 G}, 10 to 55 Hz at double amplitude of 1.6 mm
	Destructive	117.6 m/s <sup>2</sup> {12 G}, 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
		Humidity
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	Resistive, nominal voltage applied to the coil. Contact carrying current: 5 A, at 70°C 158°F
High capacity type	Resistive, 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. Usage, Storage and Transport Conditions" in [AMBIENT ENVIRONMENT section in Relay Technical Information](#).

\*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 <sub>2</sub> type

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

\* Available only for 1 Form C type

**TYPES AND COIL DATA at 20°C 68°F**

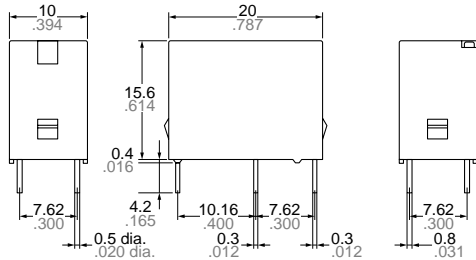
	Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (min.)	Drop-out voltage, V DC (min.)	Nominal operating current, mA	Nominal operating power, mW	Coil resistance, Ω (±10%)	Max. allowable voltage, V DC		
1 Form A	Standard type		JQ1a-5V-F	5	3.75	0.25	40	200	125	180% of nominal voltage (at 20°C 68°F)
			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	
1 Form A	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	
	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			

**DIMENSIONS**

mm inch

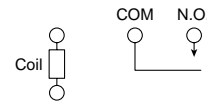


1 Form A

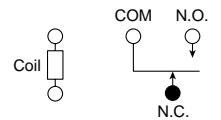


Schematic (Bottom view)

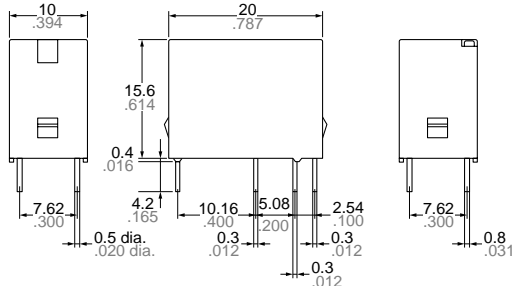
1 Form A



1 Form C

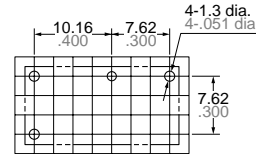


1 Form C

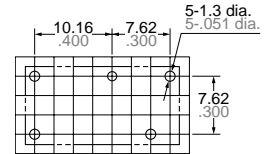


PC board pattern (Bottom view)

1 Form A



1FormC



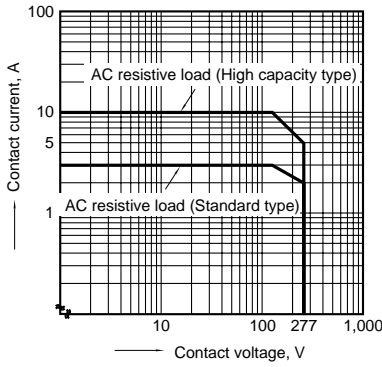
Tolerance: ±0.1 ±.004

**Dimension :**  
 Max. 1mm .039 inch  
 1 to 5mm .039 to .118 inch  
 Min. 5mm .118 inch

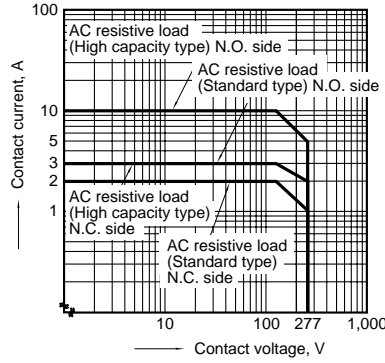
**General tolerance**  
 ±0.2 ±.008  
 ±0.3 ±.012  
 ±0.4 ±.016

# REFERENCE DATA

Max. switching capacity (1 Form A type)

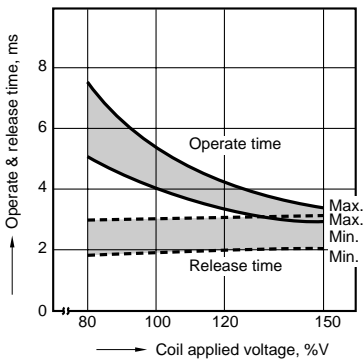


Max. switching capacity (1 Form C type)

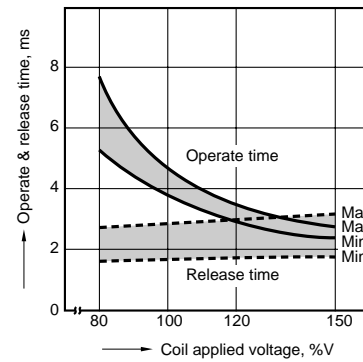


## Standard type

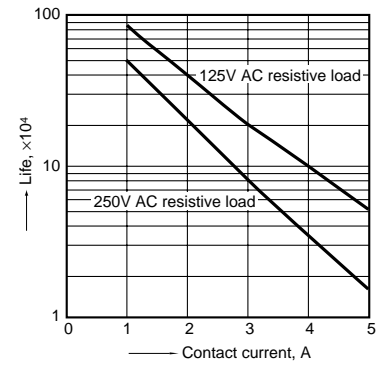
1-(1). Operate & release time (1 Form A type)  
Tested sample: JQ1a-12V-F, 25 pcs.



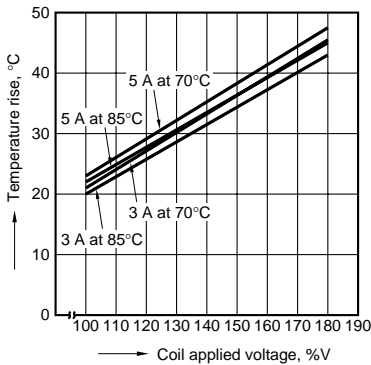
1-(2). Operate & release time (1 Form C type)  
Tested sample: JQ1-24V-F, 25 pcs.



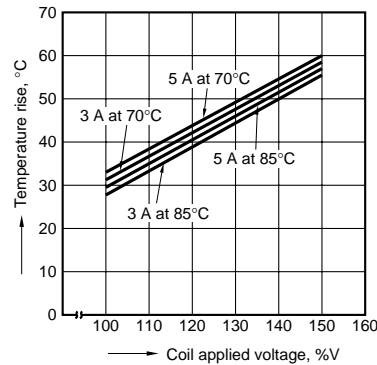
2. Life curve  
Ambient temperature: room temperature



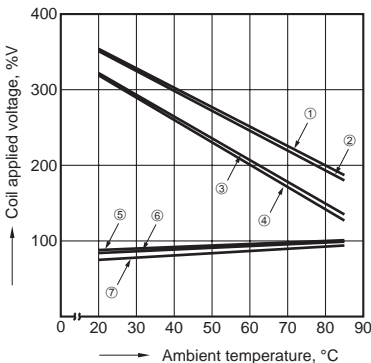
3-(1). Coil temperature rise (1 Form A type)  
Contact carrying current: 3 A, 5 A  
Measured portion: Inside the coil



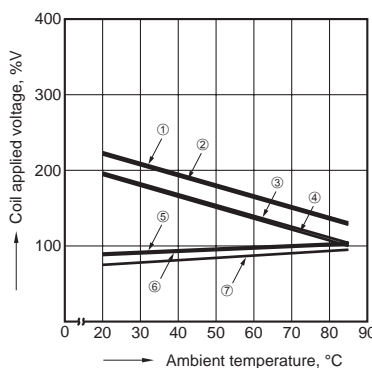
3-(2). Coil temperature rise (1 Form C type)  
Contact carrying current: 3 A, 5 A  
Measured portion: Inside the coil



4-(1). Ambient temperature characteristics (1 Form A type)  
Tested sample: JQ1a-24V-F  
Contact carrying current: 3 A, 5 A



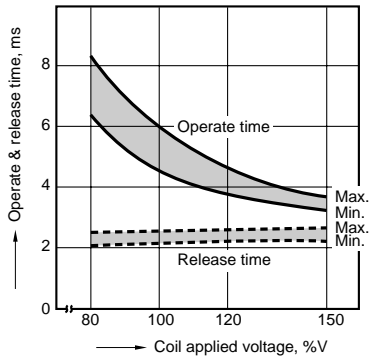
4-(2). Ambient temperature characteristics (1 Form C type)  
Tested sample: JQ1-24V-F  
Contact carrying current: 3 A, 5 A



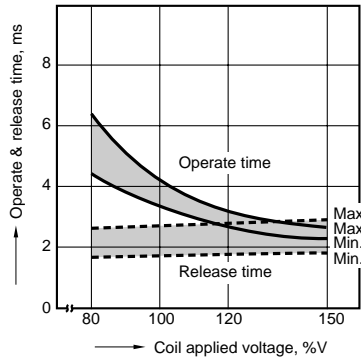
- ① Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 130°C 266°F) (Carrying current: 3 A)
- ② Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 130°C 266°F) (Carrying current: 5 A)
- ③ Allowable ambient temperature 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.

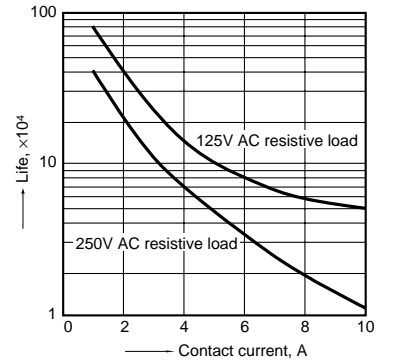


1-(2). Operate & release time (1 Form C type)  
 Tested sample: JQ1P-12V-F, 25 pcs.

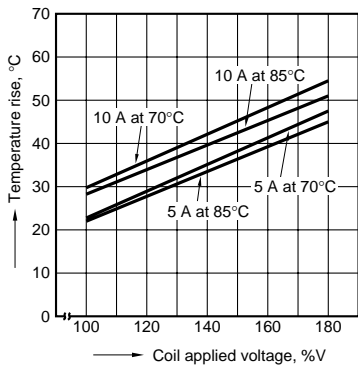


**2. Life curve**

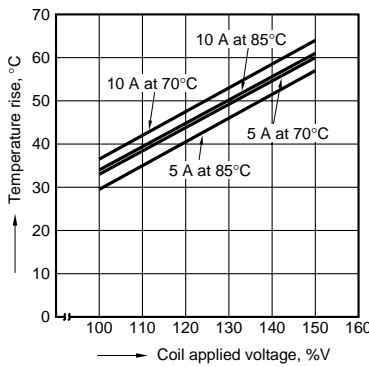
Ambient temperature: room temperature



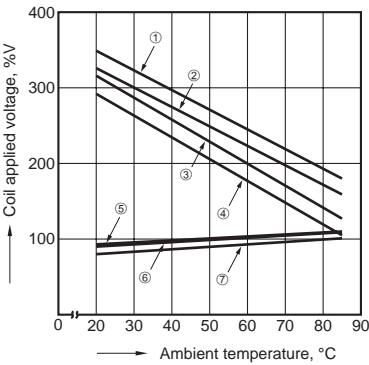
3-(1). Coil temperature rise (1 Form A type)  
 Contact carrying current: 5 A, 10 A  
 Measured portion: Inside the coil



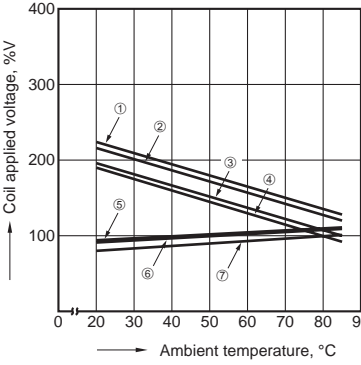
3-(2). Coil temperature rise (1 Form C type)  
 Contact carrying current: 5 A, 10 A  
 Measured portion: Inside the coil



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°C 266°F) (Carrying current: 5 A)
- ② Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 130°C 266°F) (Carrying current: 10 A)
- ③ Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 115°C 239°F) (Carrying current: 5 A)
- ④ Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 115°C 239°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

**For Cautions for Use, see [Relay Technical Information](#).**