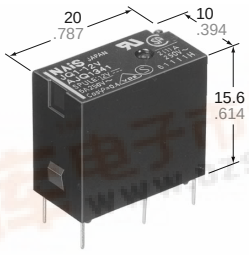
NAiS

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**

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				Silver alloy	
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
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

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)		Approx. 5 ms
Release time*4 (at nominal voltage)(without diode)		Approx. 2 ms
Temperature rise*5		Max. 45°C
Shock resistance	Functional*6	Min. 294 m/s² {30 G}
	Destructive*7	Min. 980 m/s² {100 G}
Vibration resistance	Functional*8	98 m/s² {10 G}, 10 to 55 Hz at double amplitude of 1.6 mm
	Destructive	117.6 m/s² {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	–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 ±1.2 × 50μs 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 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 24).
*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

Contact arrangement	Contact capacity	Coil insulation class	Coil voltage (DC)
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

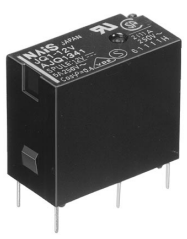
UL/CSA, VDE, SEMKO approved type is standard.
* Available only for 1 Form C type

TYPES AND COIL DATA at 20°C 68°F

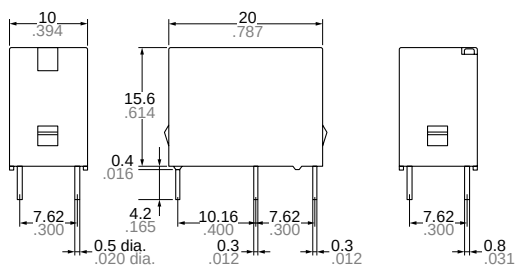
		Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (min.)	Drop-out voltage, V DC (min.)	Nominal operating current, mA	Nominal operating power, mW	Coil resistance, Ω (±10%)	Max. allowable voltage, V DC
1 Form A	Standard type	JQ1a-5V	5	3.75	0.25	40	200	125	180% of nominal voltage (at 20°C 68°F)
		JQ1a-6V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

DIMENSIONS

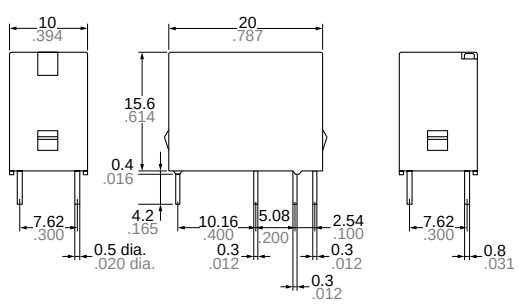
mm inch



1 Form A

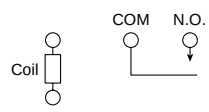


1 Form C

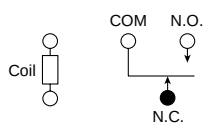


Schematic (Bottom view)

1 Form A

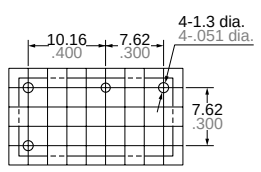


1 Form C

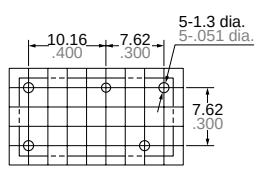


PC board pattern (Copper-side view)

1 Form A



1FormC

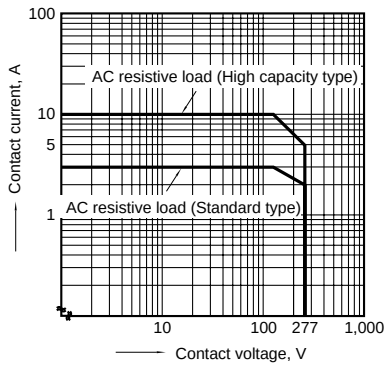


Tolerance: ±0.1 ±.004

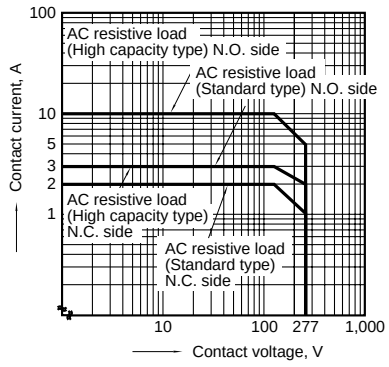
Dimension :	General tolerance
Max. 1mm .039 inch	±0.2 ±.008
1 to 5mm .039 to .118 inch	±0.3 ±.012
Min. 5mm .118 inch	±0.4 ±.016

REFERENCE DATA

Max. switching capacity (1 Form A type)



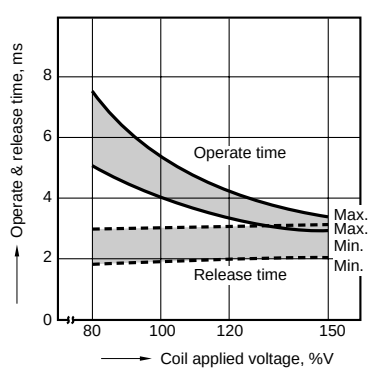
Max. switching capacity (1 Form C type)



Standard type

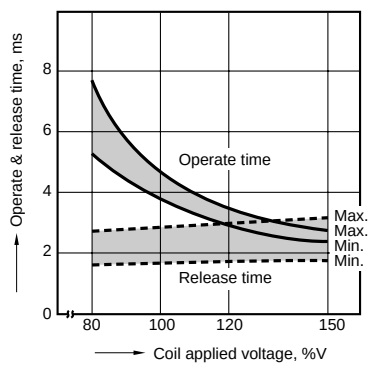
1-(1). Operate & release time
(1 Form A type)

Tested sample: JQ1a-12V, 25 pcs.



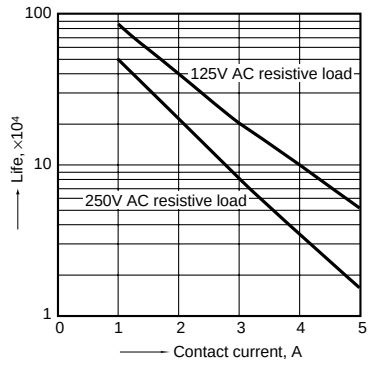
1-(2). Operate & release time
(1 Form C type)

Tested sample: JQ1-24V, 25 pcs.



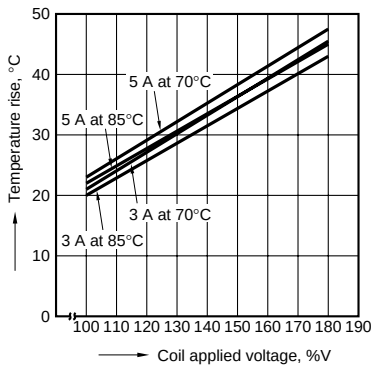
2. Life curve

Ambient temperature: room temperature

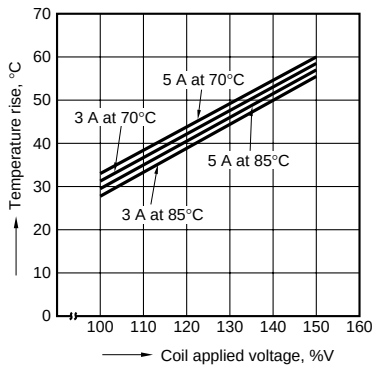


JQ

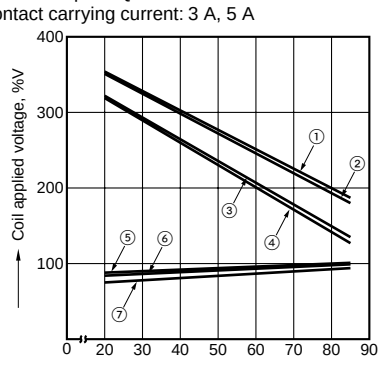
3-(1). Coil temperature rise
(1 Form A type)
Contact carrying current: 3 A, 5 A
Measured portion: Inside the coil



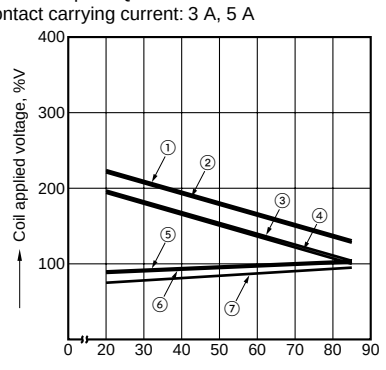
3-(2). Coil temperature rise
(1 Form C type)
Contact carrying current: 3 A, 5 A
Measured portion: Inside the coil



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



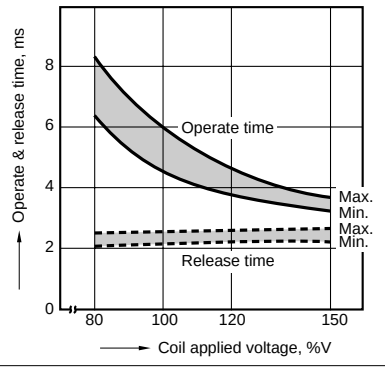
4-(2). Ambient temperature characteristics
(1 Form C type)
Tested sample: JQ1-24V
Contact carrying current: 3 A, 5 A



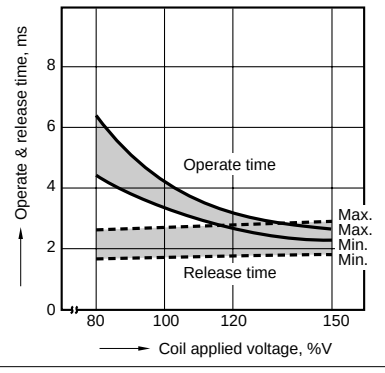
① Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 130°C 266°F) (Carrying current: 3 A)
② Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 130°C 266°F) (Carrying current: 5 A)
③ Allowable ambient temperature against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

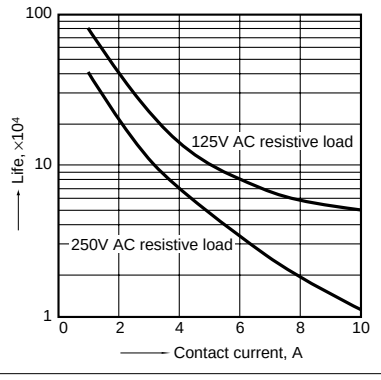
1-(1). Operate & release time
(1 Form A type)
Tested sample: JQ1aP-12V, 25 pcs.



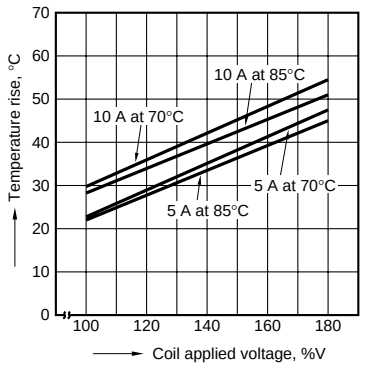
1-(2). Operate & release time
(1 Form C type)
Tested sample: JQ1P-12V, 25 pcs.



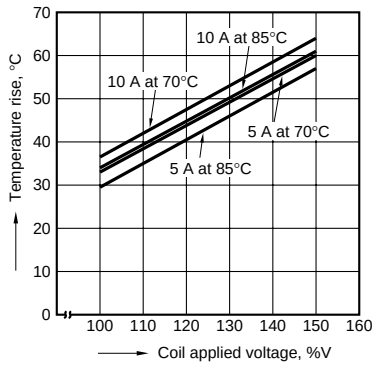
2. Life curve
Ambient temperature: room temperature



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

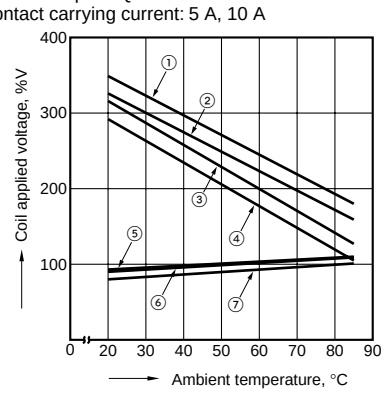


3-(2). Coil temperature rise
(1 Form C type)
Contact carrying current: 5 A, 10 A
Measured portion: Inside the coil



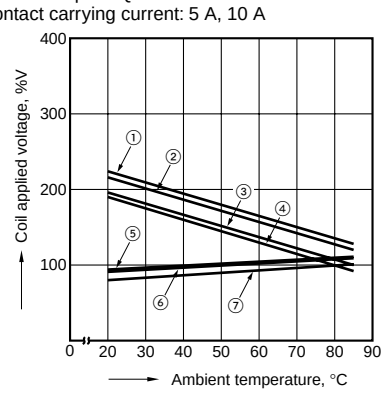
4-(1). Ambient temperature characteristics
(1 Form A type)

Tested sample: JQ1aP-24V
Contact carrying current: 5 A, 10 A



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

Tested sample: JQ1P-24V
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 (Page 11 to 39).

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