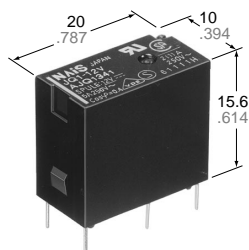


# NAIS

## 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
- VDE, TÜV, SEMKO also approved

## 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 <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>
		2 A 250 V AC	2×10 <sup>5</sup>
		5 A 30 V DC	10 <sup>5</sup>
	1c	N.O.	5×10 <sup>4</sup>
		N.C.	2×10 <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>
		5 A 30 V DC	10 <sup>5</sup>
	1c	N.O.	5×10 <sup>4</sup>
		N.C.	2×10 <sup>5</sup>
	1c	N.O.	5×10 <sup>4</sup>
		N.C.	2×10 <sup>5</sup>

### Coil (at 20°C 68°F)

Nominal operating power	1a: 200 mW	1c: 400 mW
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### Characteristics

Max. operating speed		20 cpm
Initial insulation resistance* <sup>1</sup>		Min. 1,000 MΩ at 500 V DC
Initial breakdown voltage* <sup>2</sup>	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* <sup>3</sup>		8,000 V
Operate time* <sup>4</sup> (at nominal voltage)		Approx. 5 ms
Release time* <sup>4</sup> (at nominal voltage)(without diode)		Approx. 2 ms
Temperature rise* <sup>5</sup>		Max. 45°C
Shock resistance	Functional* <sup>6</sup>	Min. 294 m/s <sup>2</sup> {30 G}
	Destructive* <sup>7</sup>	Min. 980 m/s <sup>2</sup> {100 G}
Vibration resistance	Functional* <sup>8</sup>	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* <sup>9</sup> (Not freezing and condensing at low temperature)		Ambient temp. -40°C to +70°C -40°F to +158°F
		Humidity 5 to 85% R.H.
Unit weight		Approx. 7 g .25 oz

### Remarks

- \* Specifications will vary with foreign standards certification ratings.
- \*<sup>1</sup> Measurement at same location as "Initial breakdown voltage" section
- \*<sup>2</sup> Detection current: 10 mA
- \*<sup>3</sup> Wave is standard shock voltage of  $\pm 1.2 \times 50\mu s$  according to JEC-212-1981
- \*<sup>4</sup> Excluding contact bounce time
- \*<sup>5</sup> 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

\*<sup>6</sup> Half-wave pulse of sine wave: 11ms; detection time: 10μs

\*<sup>7</sup> Half-wave pulse of sine wave: 6ms

\*<sup>8</sup> Detection time: 10μs

\*<sup>9</sup> Refer to 5. Conditions for operation, transport and storage mentioned in AMBIENT ENVIRONMENT (Page 24).

## TYPICAL APPLICATIONS

- Air conditioners
- Refrigerators
- Microwave ovens
- Heaters

## ORDERING INFORMATION

Ex. JQ 1a P — 12 V

Contact arrangement	Contact capacity	Coil voltage (DC)
1a: 1 Form A 1: 1 Form C	Nil: Standard P: High capacity	5, 6, 9, 12, 18, 24, 48* V

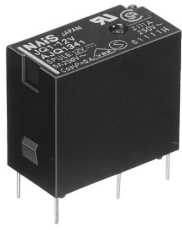
UL/CSA, VDE, SEMKO approved type is standard.

\* Available only for 1 Form C type

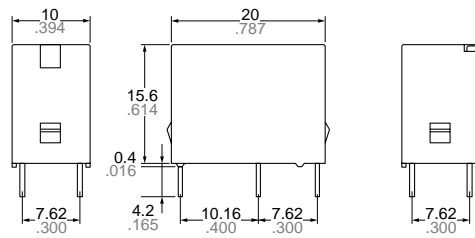
## TYPES AND COIL DATA at 20°C 68°F

	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, $\Omega$ ( $\pm 10\%$ )	Max. allowable voltage, V DC
1 Form A	Standard type	JQ1a-5V	5	3.75	40	200	125	180% of nominal voltage (at 20°C 68°F)
		JQ1a-6V	6	4.5	33.3		180	
		JQ1a-9V	9	6.75	22.2		405	
		JQ1a-12V	12	9	16.7		720	
		JQ1a-18V	18	13.5	11.1		1,620	
		JQ1a-24V	24	18	8.3		2,880	
	High capacity type	JQ1aP-5V	5	4	40	200	125	130% of nominal voltage (at 70°C 158°F)
		JQ1aP-6V	6	4.8	33.3		180	
		JQ1aP-9V	9	7.2	22.2		405	
		JQ1aP-12V	12	9.6	16.7		720	
		JQ1aP-18V	18	14.4	11.1		1,620	
		JQ1aP-24V	24	19.2	8.3		2,880	
1 Form C	Standard type	JQ1-5V	5	3.75	80	400	62.5	150% of nominal voltage (at 20°C 68°F)
		JQ1-6V	6	4.5	66.7		90	
		JQ1-9V	9	6.75	44.4		202.5	
		JQ1-12V	12	9	33.3		360	
		JQ1-18V	18	13.5	22.2		810	
		JQ1-24V	24	18	16.7		1,440	
		JQ1-48V	48	36	8.3		5,760	
	High capacity type	JQ1P-5V	5	4	80	400	62.5	110% of nominal voltage (at 70°C 158°F)
		JQ1P-6V	6	4.8	66.7		90	
		JQ1P-9V	9	7.2	44.4		202.5	
		JQ1P-12V	12	9.6	33.3		360	
		JQ1P-18V	18	14.4	22.2		810	
		JQ1P-24V	24	19.2	16.7		1,440	
		JQ1P-48V	48	38.4	8.3		5,760	

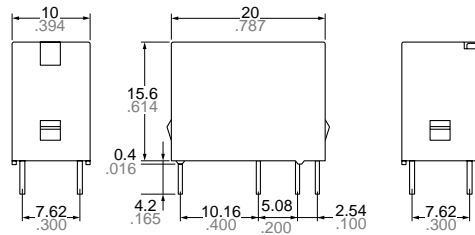
## DIMENSIONS



1 Form A

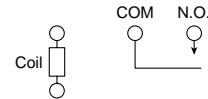


1 Form C

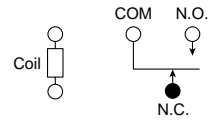


Schematic (Bottom view)

1 Form A

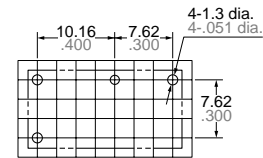


1 Form C

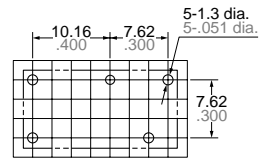


PC board pattern (Copper-side view)

1 Form A



1FormC

Tolerance:  $\pm 0.1 \pm .004$ 

### Dimension :

Max. 1mm .039 inch

1 to 5mm .039 to .118 inch

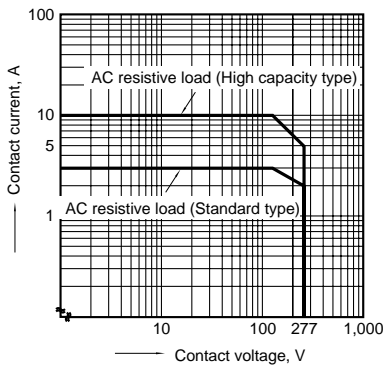
Min. 5mm .118 inch

### General tolerance

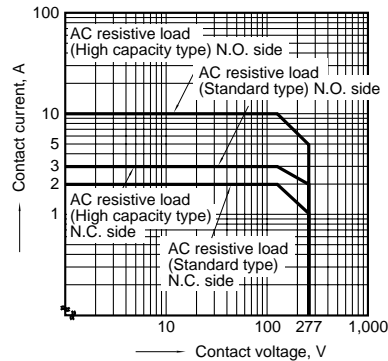
 $\pm 0.2 \pm .008$  $\pm 0.3 \pm .012$  $\pm 0.4 \pm .016$ 

## REFERENCE DATA

1-(1). Max. switching capacity (1 Form A type)



1-(2). Max. switching capacity (1 Form C type)

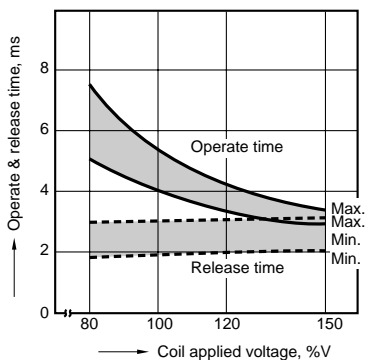


### Standard type

1-(1). Operate &amp; release time

(1 Form A type)

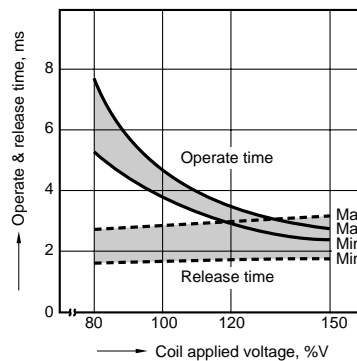
Tested sample: JQ1a-12V, 25 pcs.



1-(2). Operate &amp; release time

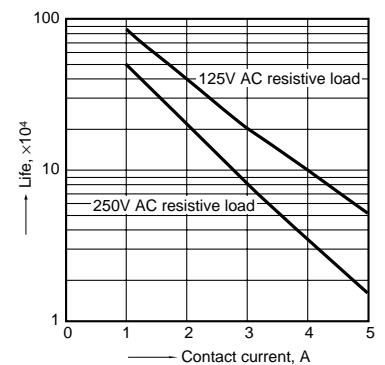
(1 Form C type)

Tested sample: JQ1-24V, 25 pcs.



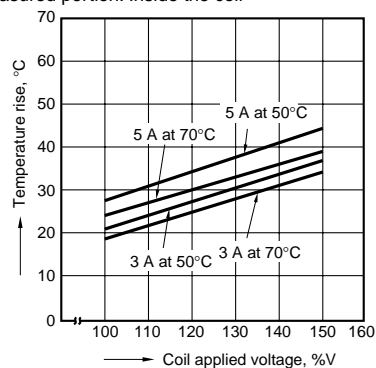
2. Life curve

Ambient temperature: room temperature



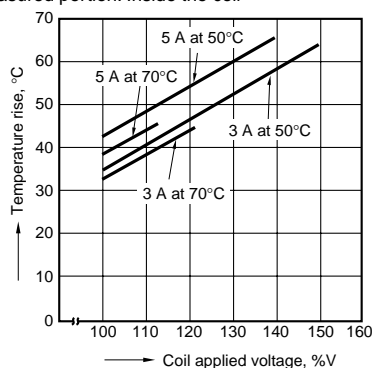
## 3-(1). Coil temperature rise (1 Form A type)

Contact carrying current: 3 A, 5 A  
Measured portion: Inside the coil



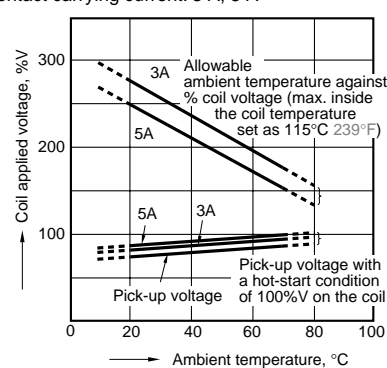
## 3-(2). Coil temperature rise (1 Form C type)

Contact carrying current: 3 A, 5 A  
Measured portion: Inside the coil



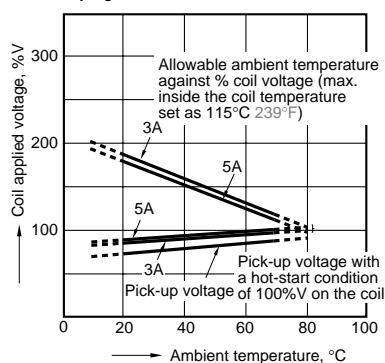
## 4-(1). Ambient temperature characteristics (1 Form A type)

Tested sample: JQ1a-24V  
Contact carrying current: 3 A, 5 A



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

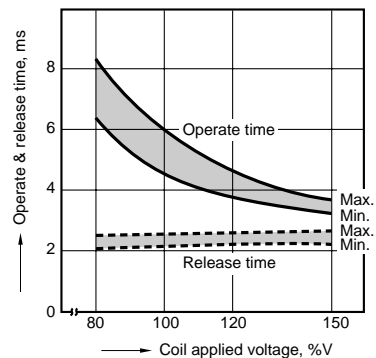
Tested sample: JQ1-24V  
Contact carrying current: 3 A, 5 A



## High capacity type

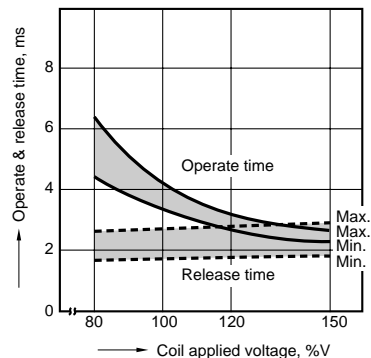
### 1-(1). Operate & release time (1 Form A type)

Tested sample: JQ1aP-12V, 25 pcs.



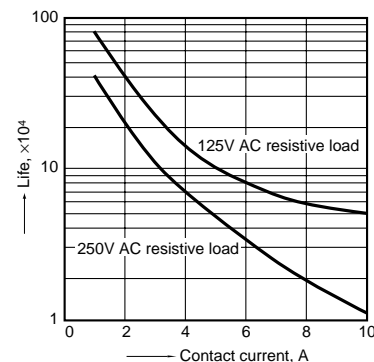
### 1-(2). Operate & release time (1 Form C type)

Tested sample: JQ1P-12V, 25 pcs.



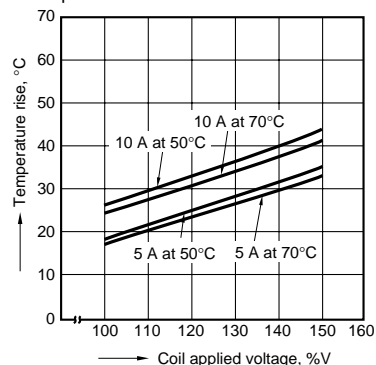
### 2. Life curve

Ambient temperature: room temperature



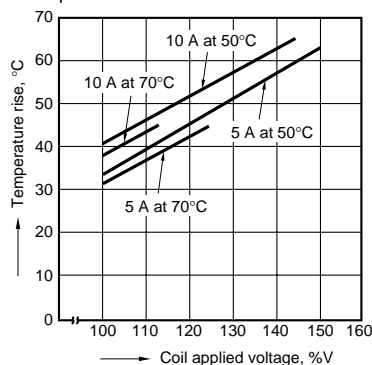
## 3-(1). Coil temperature rise (1 Form A type)

Contact carrying current: 5 A, 10 A  
Measured portion: Inside the coil



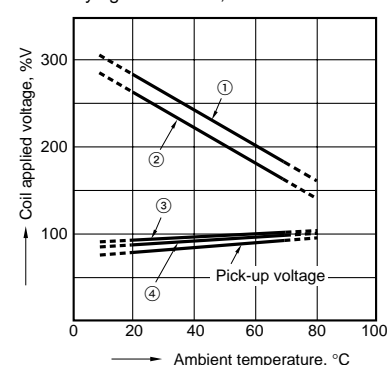
## 3-(2). Coil temperature rise (1 Form C type)

Contact carrying current: 5 A, 10 A  
Measured portion: Inside the coil



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

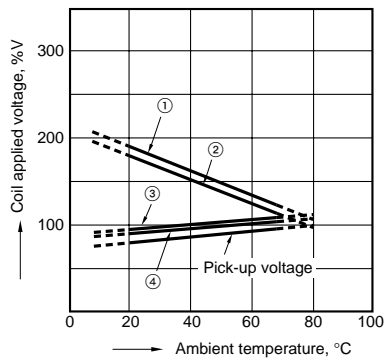
Tested sample: JQ1aP-24V  
Contact carrying current: 5 A, 10 A



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 115°C 239°F)(Carrying current: 5 A)
- ② Allowable ambient temperature against % coil voltage (max. inside the coil temperature set as 115°C 239°F)(Carrying current: 10 A)
- ③ Pick-up voltage with a hot-start condition of 100%V on the coil (Carrying current: 10A)
- ④ Pick-up voltage with a hot-start condition of 100%V on the coil (Carrying current: 5A)

**For Cautions for Use, see Relay Technical Information (Page 11 to 39).**