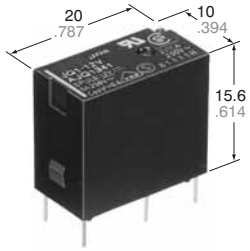
Panasonic
ideas for life

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, 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				$AgSnO_2$ 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			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

#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/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 “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: $AgSnO_2$ 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

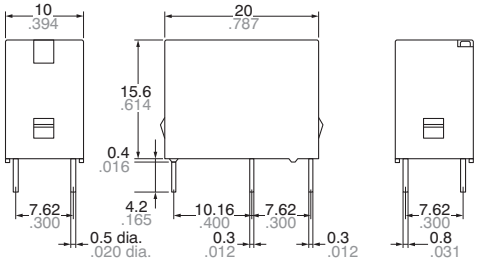
		Part No.	Nominal voltage, V DC	Pick-up voltage, V DC (min.)	Drop-out voltage, V DC (min.)	Nominal operating current, mA	Nominal operating power, mW	Coil resistance, Ω (±10%)	Max. allowable voltage, V DC
1 Form A	Standard type	JQ1a-5V-F	5	3.75	0.25	40	200	125	180% of nominal voltage (at 20°C 68°F)
		JQ1a-6V-F	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	
	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	

DIMENSIONS (mm inch)

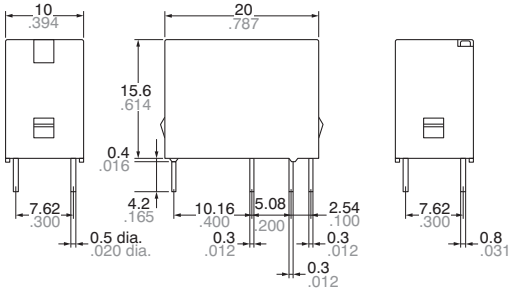
Download CAD Data from our Web site.

CAD Data

1 Form A

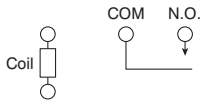


1 Form C

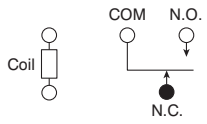


Schematic (Bottom view)

1 Form A

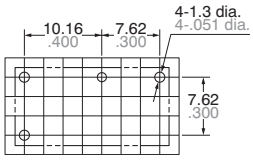


1 Form C

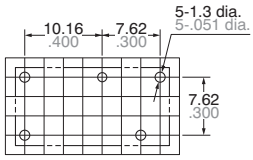


PC board pattern (Bottom view)

1 Form A



1FormC



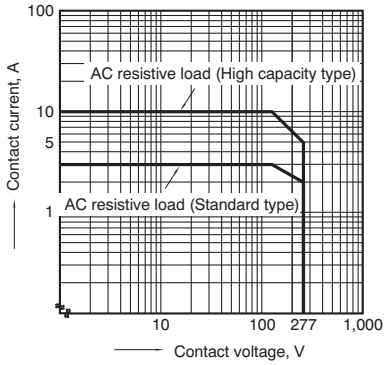
Tolerance: ±0.1 ±.004

Dimension :

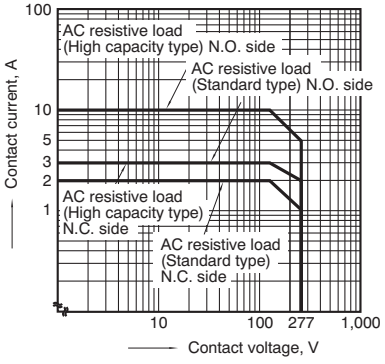
	General tolerance
Max. 1mm .039 inch	±0.2 ±.008
1 to 5mm .039 to .118 inch	±0.3 ±.012
Min. 5mm .118 inch	±0.4 ±.016

REFERENCE DATA

Max. switching capacity (1 Form A type)



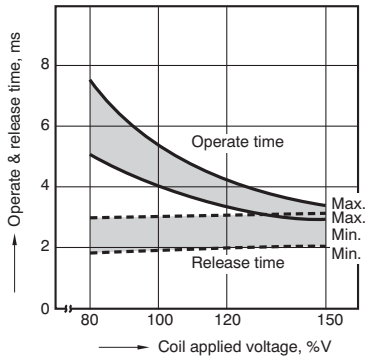
Max. switching capacity (1 Form C type)



Standard type

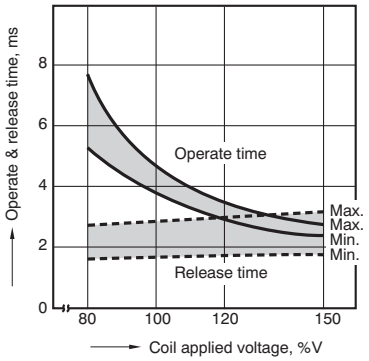
1-(1). Operate & release time (1 Form A type)

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



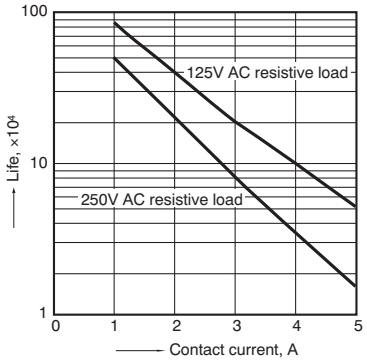
1-(2). Operate & release time (1 Form C type)

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



2. Life curve

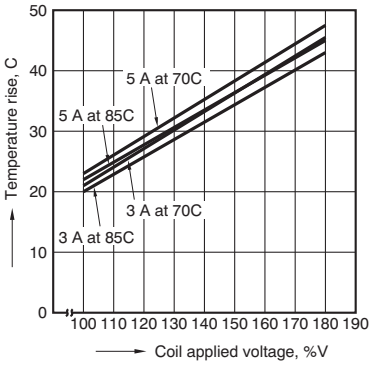
Ambient temperature: room temperature



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

Contact carrying current: 3 A, 5 A

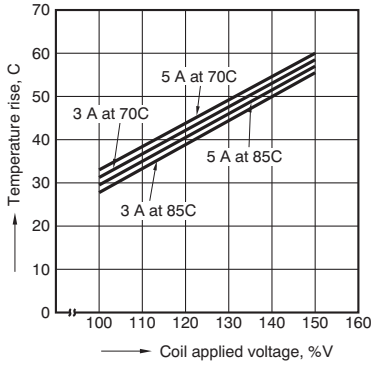
Measured portion: Inside the coil



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

Contact carrying current: 3 A, 5 A

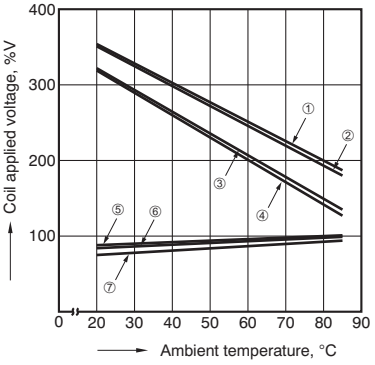
Measured portion: Inside the coil



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

Tested sample: JQ1a-24V-F

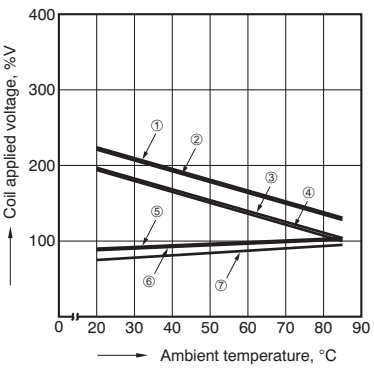
Contact carrying current: 3 A, 5 A



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)

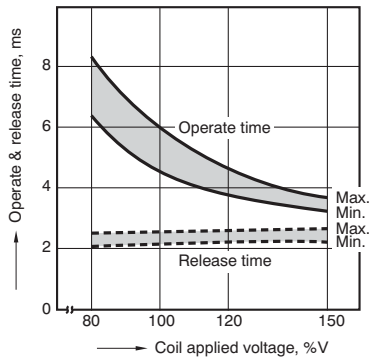
⑤ Pick-up voltage with a hot-start condition of 100%V on the coil (Carrying current: 5 A)

⑥ Pick-up voltage with a hot-start condition of 100%V on the coil (Carrying current: 3 A)

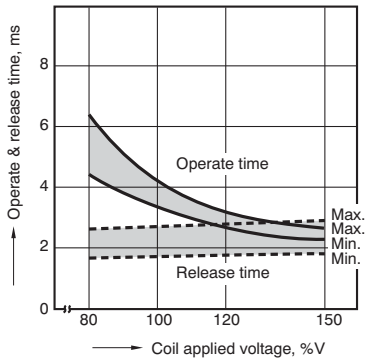
⑦ Pick-up voltage

High capacity type

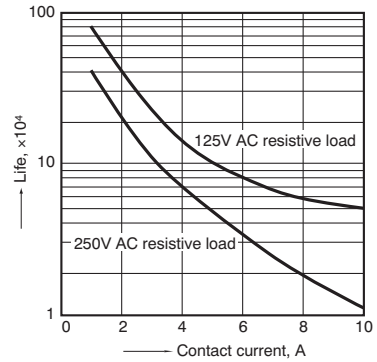
1-(1). Operate & release time (1 Form A type)
Tested sample: JQ1aP-12V-F, 25 pcs.



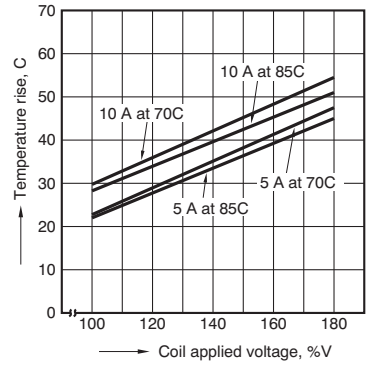
1-(2). Operate & release time (1 Form C type)
Tested sample: JQ1P-12V-F, 25 pcs.



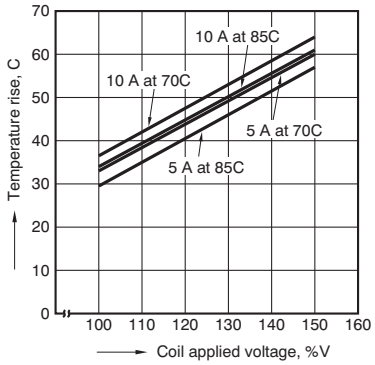
2. Life curve
Ambient temperature: room temperature



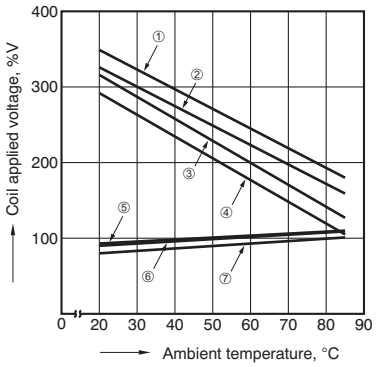
3-(1). Coil temperature rise (1 Form A type)
Contact carrying current: 5 A, 10 A
Measured portion: Inside the coil



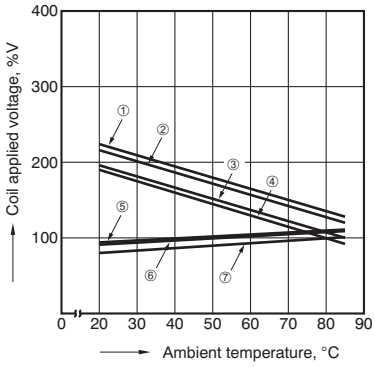
3-(2). Coil temperature rise (1 Form C type)
Contact carrying current: 5 A, 10 A
Measured portion: Inside the coil



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

SAFETY STANDARDS

Item	UL/C-UL (Recognized)		CSA (Certified)		VDE (Certified)		TÜV (Certified)		SEMKO (Certified)	
	File No.	Contact rating	File No.	Contact rating	File No.	Contact rating	File No.	Rating	File No.	Contact rating
Standard type (5A) 1 Form A	E43028	5A 125V AC 5A 277V AC 5A 30V DC 0.3A 110V DC 1/10HP 125V AC 1/6HP 277V AC	LR26550	5A 125V AC 5A 277V AC 5A 30V DC 0.3A 110V DC 1/10HP 125V AC 1/6HP 277V AC	40011435	5A 250V AC (cosϕ=0.4)	B 08 09 13461 252	5A 250V AC (cosϕ=0.4) 5A 30V DC (0ms)	817138	3(2)A 125V AC 2(1)A 250V AC 5A 30V DC
Standard type (5A) 1 Form C	E43028	5A 125V AC 5A 277V AC 5A 30V DC 0.3A 110V DC 1/10HP 125V AC 1/6HP 277V AC	LR26550	5A 125V AC 5A 277V AC 5A 30V DC 0.3A 110V DC 1/10HP 125V AC 1/6HP 277V AC	40011435	5A 250V AC (cosϕ=0.4) (N.O.) 3A 250V AC (cosϕ=0.4) (N.C.)	B 08 09 13461 252	5A 250V AC (cosϕ=0.4) 5A 30V DC (0ms)	817138	3(2)A 125V AC 2(1)A 250V AC 5A 30V DC
High capacity type (10A) 1 Form A	E43028	10A 125V AC 8A 277V AC 5A 30V DC 0.3A 110V DC 1/6HP 125V AC 1/6HP 277V AC	LR26550	10A 125V AC 8A 277V AC 5A 30V DC 0.3A 110V DC 1/6HP 125V AC 1/6HP 277V AC	40011435	10A 250V AC (cosϕ=0.4)	B 08 09 13461 252	10A 250V AC (cosϕ=0.4) 5A 30V DC (0ms)	817138	5(3)A 250V AC 5A 30V DC
High capacity type (10A) 1 Form C	E43028	10A 125V AC 8A 277V AC 5A 30V DC 0.3A 110V DC 1/6HP 125V AC 1/6HP 277V AC	LR26550	10A 125V AC 8A 277V AC 5A 30V DC 0.3A 110V DC 1/6HP 125V AC 1/6HP 277V AC	40011435	(N.O.) 10A 250V AC (cosϕ=0.4) (N.C.) 3A 250V AC (cosϕ=0.4)	B 08 09 13461 252	10A 250V AC (cosϕ=0.4) 5A 30V DC (0ms)	817138	5(3)A 250V AC 5A 30V DC

For Cautions for Use, see Relay Technical Information.