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1 Form A/1 Form C 10A Small power relays

LQ RELAYS (ALQ)



RoHS compliant

Protective construction: Sealed type

FEATURES

1. **Miniature size and small: 10(W) × 20(L) × 16(H) mm** .394(W) × .787(L) × .630(H) inch
2. **Compact with high capacity: 1 Form A and 1 Form C, 10 A**
3. **Class "F" coil is available**
4. **Contact rating at 105°C** 221°F **is approved by UL/C-UL (Class "F" coil only)**
   Please refer to "SAFETY STANDARDS" about the detail of contact rating.
5. **Surge 8,000 V, High breakdown voltage 4,000 V (Between contact and coil)**

TYPICAL APPLICATIONS

1. **Home appliances**
   - Refrigerators
   - Cooking ovens
   - Washing machine
   - Air conditioners
2. **Industrial equipment**
   - Motor control
   - Robot
   - Power supply

ORDERING INFORMATION

ALQ □ □ □

Contact arrangement
1: 1 Form C
3: 1 Form A

Coil insulation class
Nil: Class B insulation
F: Class F insulation

Nominal coil voltage (DC)
05: 5V, 06: 6V, 09: 9V, 12: 12V, 18: 18V, 24: 24V

Note: Certified by UL/C-UL, VDE and CQC

TYPES

Nominal coil voltage	Part No.	
	1 Form A	1 Form C
5V DC	ALQ305	ALQ105
6V DC	ALQ306	ALQ106
9V DC	ALQ309	ALQ109
12V DC	ALQ312	ALQ112
18V DC	ALQ318	ALQ118
24V DC	ALQ324	ALQ124

Standard packing: Carton 100 pcs., Case 500 pcs.

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RATING

1. Coil data

Contact arrangement	Nominal coil voltage	Pick-up voltage (at 20°C 68°F)	Drop-out voltage (at 20°C 68°F)	Nominal operating current [±10%] (at 20°C 68°F)	Coil resistance [±10%] (at 20°C 68°F)	Nominal operating power (at 20°C 68°F)	Max. applied voltage
1 Form A	5V DC	75%V or less of nominal voltage (Initial)	5%V or more of nominal voltage (Initial)	40.0mA	125 Ω	200mW	180% of nominal voltage (at 20°C 68°F) 130% of nominal voltage (at 85°C 185°F)*4
	6V DC			33.3mA	180 Ω		
	9V DC			22.2mA	405 Ω		
	12V DC			16.7mA	720 Ω		
	18V DC			11.1mA	1,620 Ω		
	24V DC			8.3mA	2,880 Ω		
1 Form C	5V DC	75%V or less of nominal voltage (Initial)	5%V or more of nominal voltage (Initial)	80.0mA	62.5Ω	400mW	150% of nominal voltage (at 20°C 68°F) 110% of nominal voltage (at 85°C 185°F)*4
	6V DC			66.7mA	90 Ω		
	9V DC			44.4mA	202.5Ω		
	12V DC			33.3mA	360 Ω		
	18V DC			22.2mA	810 Ω		
	24V DC			16.7mA	1,440 Ω		

2. Specifications

Characteristics	Item		Specifications	
Contact	Arrangement		1 Form A	1 Form C
	Contact resistance (Initial)		Max. 100mΩ (By voltage drop 6 V DC 1 A)	
	Contact material		AgNi type	
Rating	Nominal switching capacity (resistive load)		5 A 30 V DC, 10 A 125 V AC, 5 A 250 V AC	N.O. side: 10 A 125 V AC, 5 A 250 V AC, 5 A 30 V DC N.C. side: 3 A 125 V AC, 2 A 250 V AC, 1 A 30 V DC
	Max. switching power (resistive load)		150 W, 1,250 VA	N.O. side: 150 W, 1,250 VA N.C. side: 30 W, 500 VA
	Max. switching voltage		250 V AC, 30 V DC	
	Max. switching current		N.O.: 10 A (125V AC), N.C.: 3 A (125V AC)	
	Nominal operating power		200 mW	400 mW
	Min. switching capacity (reference value)*1		100 mA, 5 V DC	
Electrical characteristics	Insulation resistance (Initial)		Min. 1,000 MΩ (at 500 V DC) Measurement at same location as “Breakdown voltage” section.	
	Breakdown voltage (Initial)	Between open contacts	1,000 Vrms for 1 min. (Detection current: 10 mA)	750 Vrms for 1 min. (Detection current: 10 mA)
		Between contact and coil	4,000 Vrms for 1 min. (Detection current: 10 mA)	
	Surge breakdown voltage*2 (Between contact and coil)		8,000 V (Initial)	
	Operate time (at nominal voltage) (at 20°C 68°F)		Max. 20 ms (excluding contact bounce time.) (Initial)	
	Release time (at nominal voltage) (at 20°C 68°F)		Max. 20 ms (excluding contact bounce time, with diode) (Initial)	
Mechanical characteristics	Shock resistance	Functional	1 Form A: 294 m/s², 1 Form C: 196 m/s² (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.)	
		Destructive	980 m/s² (Half-wave pulse of sine wave: 6 ms.)	
	Vibration resistance	Functional	10 to 55 Hz at double amplitude of 1.6 mm (Detection time: 10μs.)	
		Destructive	10 to 55 Hz at double amplitude of 2.0 mm	
Expected life	Mechanical		Min. 10^7 (at 180 times/min.)	
Conditions	Conditions for operation, transport and storage*3		Ambient temperature: –40°C to +85°C –40°F to +185°F Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)	
	Max. operating speed		20 times/min. (at nominal switching capacity)	
Unit weight			Approx. 7 g .25 oz	

* Specifications will vary with foreign standards certification ratings.

Notes: *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.

*2. Wave is standard shock voltage of ±1.2×50μs according to JEC-212-1981

*3. The upper limit of the ambient temperature is the maximum temperature that can satisfy the coil temperature rise value. Refer to Usage, transport and storage conditions in NOTES.

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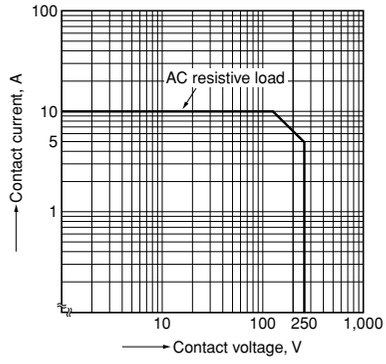
3. Expected electrical life

Condition: Resistive load, at 20°C 68°F, at 20 times/min., with diode

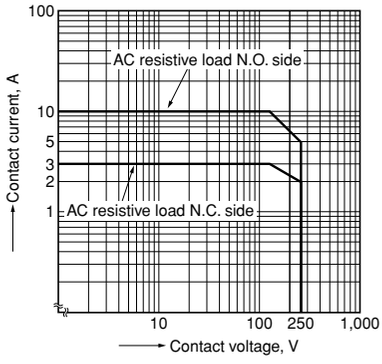
Type		Switching capacity	No. of operations
1 Form A (at 20 times/min.)		10 A 125 V AC 5 A 250 V AC 5 A 30 V DC	5×10^4 5×10^4 10^5
1 Form C (at 20 times/min.)	N.O.	10 A 125 V AC 5 A 250 V AC 5 A 30 V DC	5×10^4 5×10^4 10^5
	N.C.	3 A 125 V AC 2 A 250 V AC 1 A 30 V DC	2×10^5 2×10^5 10^5

REFERENCE DATA

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

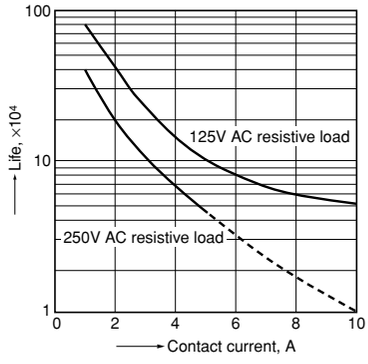


1.-(2) Max. switching capacity (1 Form C type)



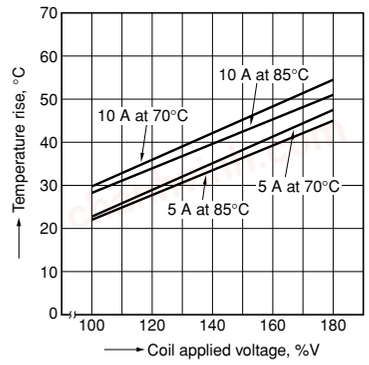
2. Life curve (N.O. side)

Ambient temperature: room temperature



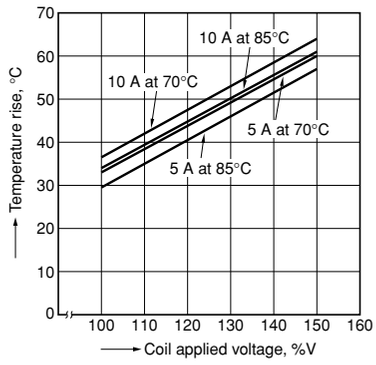
3.-(1) Coil temperature rise (1 Form A type)

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



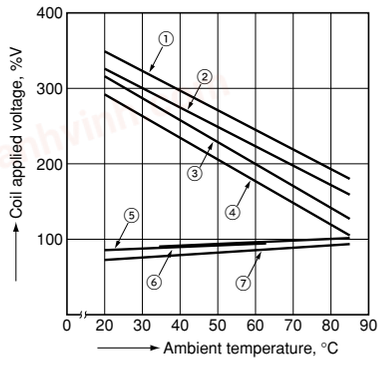
3.-(2) Coil temperature rise (1 Form C type)

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



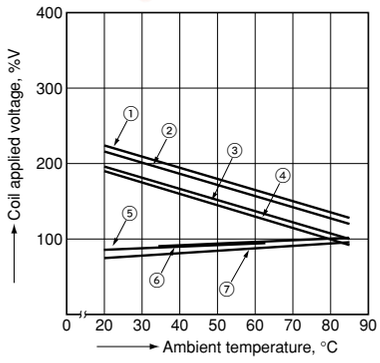
4.-(1) Ambient temperature characteristics (1 Form A type)

Contact carrying current: 5 A, 10 A



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

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

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LQ (ALQ)

DIMENSIONS (mm inch)

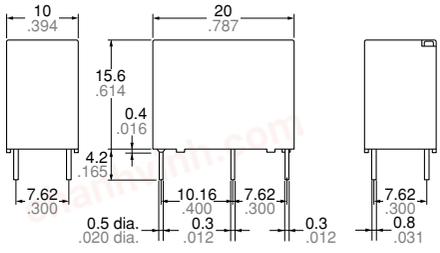
The CAD data of the products with a CAD mark can be downloaded from: http://industrial.panasonic.com/ac/e/

CAD

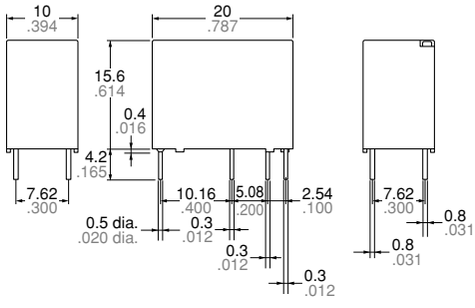


External dimensions

1 Form A

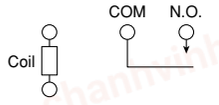


1 Form C

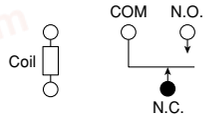


Schematic (Bottom view)

1 Form A

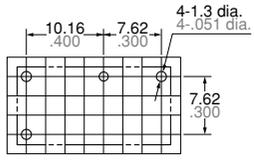


1 Form C

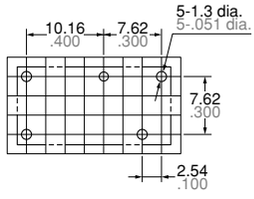


PC board pattern (Bottom view)

1 Form A



1FormC



Tolerance: ±0.1 ±.004

Dimension:	General tolerance
Less than 1mm .039inch:	±0.2 ±.008
Min. 1mm .039inch less than 5mm .197 inch:	±0.3 ±.012
Min. 5mm .197 inch:	±0.4 ±.016

SAFETY STANDARDS

Type	UL/C-UL (Recognized)*1					VDE (Certified)				
	File No.	Contact	Load	Temp.	Cycles	File No.	Contact	Load	Temp.	Cycles
1 Form C (ALQ1**)	E43028	N.O.	10A 125V AC, General Use	40°C 104°F	5×10^4	40032836	N.O.	10A 250V AC (cosϕ=1.0)	85°C 185°F	10^4
			5A 277V AC, General Use	40°C 104°F	10^5			10A 250V AC (cosϕ=0.4)	85°C 185°F	10^4
			5A 240V AC, Resistive	80°C 176°F	10^5			5A 250V AC (cosϕ=1.0)	85°C 185°F	5×10^4
			5A 30V DC, General Use	40°C 104°F	10^5			5A 30V DC (0ms)	85°C 185°F	10^4
			4FLA/4LRA 277V AC, AC Motor	105°C 221°F	10^5			—	—	—
			3FLA/18LRA 240V AC, AC Motor	85°C 185°F	10^5			—	—	—
			1/6HP 125V AC, AC Motor Starting	40°C 104°F	10^3			—	—	—
			1/6HP 277V AC, AC Motor Starting	40°C 104°F	10^3			—	—	—
		N.C.	3A 240V AC, Resistive	80°C 176°F	10^5		N.C.	3A 250V AC (cosϕ=0.4)	85°C 185°F	10^4
			3A 125V AC, General Use	40°C 104°F	10^5			—	—	—
			2A 277V AC, General Use	40°C 104°F	10^5			—	—	—
			2A 30V DC, Resistive	40°C 104°F	10^5			—	—	—
1 Form A (ALQ3**)	E43028	N.O.	10A 125V AC, General Use	40°C 104°F	5×10^4	40032836	N.O.	10A 250V AC (cosϕ=1.0)	85°C 185°F	10^4
			10A 125V AC, Carry Only	85°C 185°F	5×10^4			10A 250V AC (cosϕ=0.4)	85°C 185°F	10^4
			5A 277V AC, General Use	40°C 104°F	10^5			5A 250V AC (cosϕ=1.0)	85°C 185°F	5×10^4
			5A 240V AC, General Use	105°C 221°F	6×10^3			5A 30V DC (0ms)	85°C 185°F	10^4
			5A 30V DC, General Use	40°C 104°F	10^5			—	—	—
			4FLA/4LRA 277V AC, AC Motor Starting	105°C 221°F	10^5			—	—	—
			1/6HP 277V AC, AC Motor Starting	40°C 104°F	10^3			—	—	—
			1/6HP 125V AC, AC Motor Starting	40°C 104°F	10^3			—	—	—
			4A 125V AC, Resistive Load	105°C 221°F	10^5			—	—	—
			2A 120V AC, Tungsten Load	105°C 221°F	6×10^3			—	—	—
			1A 125V AC, Pilot Duty	105°C 221°F	10^5			—	—	—

Type	CQC		
	File No.	Contact	Load
1 Form C (ALQ1**)	CQC14002108384	N.O.	5A 250V AC
		N.C.	2A 250V AC
1 Form A (ALQ3**)		N.O.	5A 250V AC

Note: *1. CSA standard: Certified by C-UL

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EN/IEC VDE Certified
INSULATION CHARACTERISTIC (IEC61810-1)

Item	Characteristic
Clearance/Creepage distance (IEC61810-1)	Min. 4.0mm/4.0mm (1a type)
Category of protection (IEC61810-1)	RTIII
GWT (IEC60335-1)	—
Tracking resistance (IEC60112)	PTI175
Insulation material group	IIIa
Over voltage category	III
Impulse Withstand Voltage	4 kV
Rated voltage	250V
Pollution degree	2
Type of insulation (Between contact and coil)	Basic insulation
Type of insulation (Between open contact)	Micro Disconnection

NOTES

1. For cautions for use, please read "GENERAL APPLICATION GUIDELINES".

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