



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.

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/s ² , 1 Form C: 196 m/s ² (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.)	
		Destructive	980 m/s ² (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.

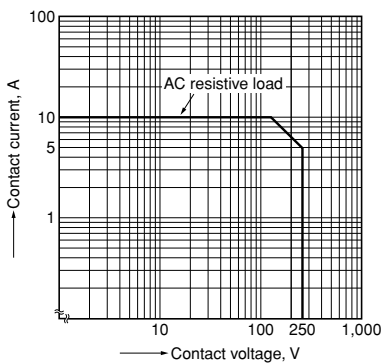
3. Expected electrical life

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

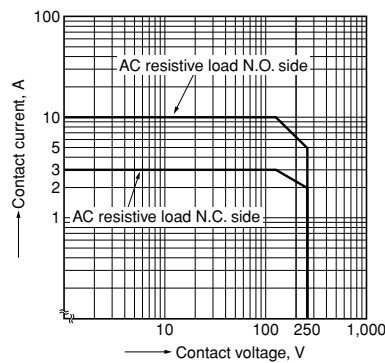
Type		Switching capacity	No. of operations
1 Form A (at 20 times/min.)		10 A 125 V AC	5×10 ⁴
		5 A 250 V AC	5×10 ⁴
		5 A 30 V DC	10 ⁵
1 Form C (at 20 times/min.)	N.O.	10 A 125 V AC	5×10 ⁴
		5 A 250 V AC	5×10 ⁴
		5 A 30 V DC	10 ⁵
	N.C.	3 A 125 V AC	2×10 ⁵
		2 A 250 V AC	2×10 ⁵
		1 A 30 V DC	10 ⁵

REFERENCE DATA

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

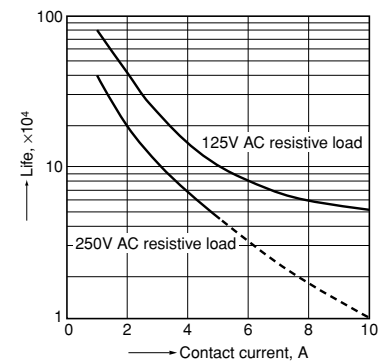


1.-(2) Max. switching capacity (1 Form C type)



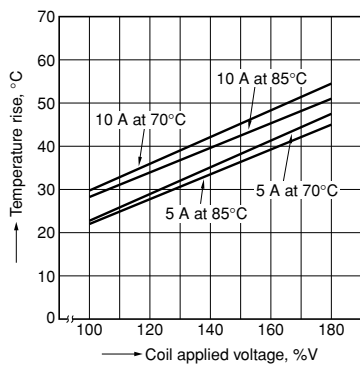
2. Life curve (N.O. side)

Ambient temperature: room temperature



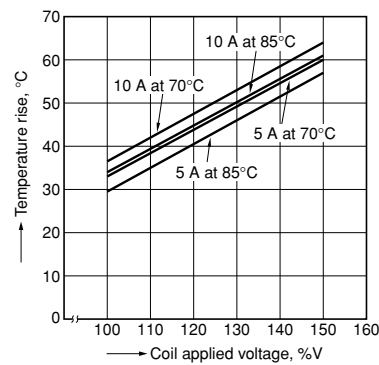
3.-(1) Coil temperature rise (1 Form A type)

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



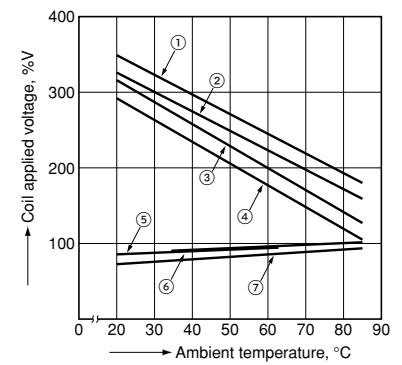
3.-(2) Coil temperature rise (1 Form C type)

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



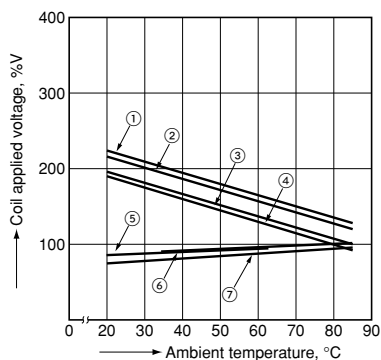
4.-(1) Ambient temperature characteristics (1 Form A type)

Contact carrying current: 5 A, 10 A



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

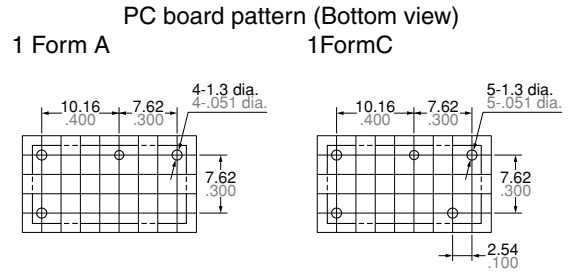
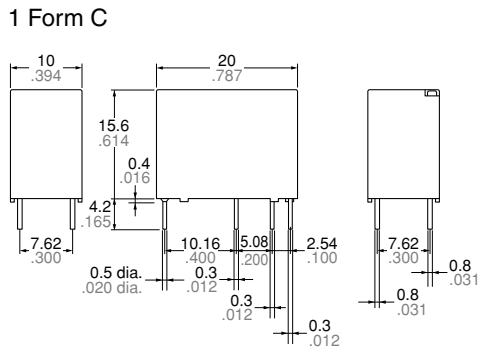
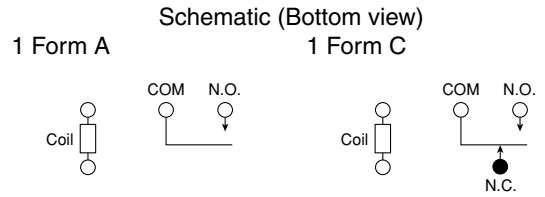
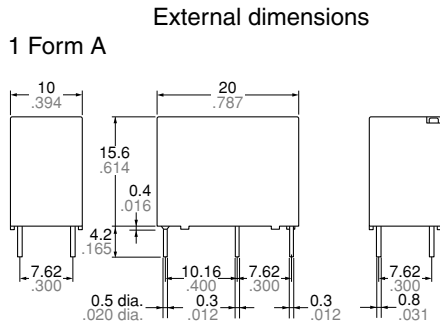
Contact carrying current: 5 A, 10 A



- 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

DIMENSIONS (mm inch)

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



Tolerance: $\pm 0.1 \pm 0.04$

Dimension:
 Less than 1mm .039inch: $\pm 0.2 \pm 0.08$
 Min. 1mm .039inch less than 5mm .197 inch: $\pm 0.3 \pm 0.12$
 Min. 5mm .197 inch: $\pm 0.4 \pm 0.16$

General tolerance
 $\pm 0.2 \pm 0.08$
 $\pm 0.3 \pm 0.12$
 $\pm 0.4 \pm 0.16$

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		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

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”.

Please contact

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