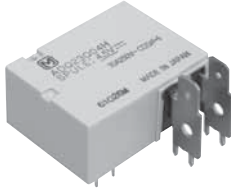


30A POWER LATCHING RELAY

DQ RELAYS (ADQ)



FEATURES

1. 30A capacity in small size
2. Latching type
3. High insulation
4,000V AC (between contacts and coil)
Surge 10,000V (between contacts and coil)
4. Cd-free, Pb-free
5. Sealed construction
6. UL/C-UL approved

TYPICAL APPLICATIONS

1. Time switches
2. Electric water heaters
3. Remote control of electric power meters

ORDERING INFORMATION

	ADQ		3	Q	0	
Operating function						
1: 1 coil latching (1 Form A)						
2: 2 coil latching (1 Form A)						
Contact capacity						
3: 30 A						
Terminal shape						
Q: 250 Faston terminal						
Contact characteristics						
0: Standard contact						
Coil voltage (DC)						
4H: 4.5 V, 06: 6 V, 09: 9 V, 12: 12 V, 24: 24 V						

TYPES

Contact arrangement	Nominal coil voltage	1 coil latching		2 coil latching	
		Part No.		Part No.	
1 Form A	4.5V DC	ADQ13Q04H		ADQ23Q04H	
	6V DC	ADQ13Q006		ADQ23Q006	
	9V DC	ADQ13Q009		ADQ23Q009	
	12V DC	ADQ13Q012		ADQ23Q012	
	24V DC	ADQ13Q024		ADQ23Q024	

Standard packing: Tube: 20 pcs.; Case: 200 pcs.

RATING

1. Coil data

1) 1 coil latching

Nominal coil voltage	Set voltage* (at 20°C 68°F)	Reset 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	Max. allowable voltage (at 20°C 68°F)
4.5V DC	70%V or less of nominal voltage (Initial)	70%V or less of nominal voltage (Initial)	111.1mA	40.5Ω	500mW	130%V of nominal voltage
6V DC			83.3mA	72Ω		
9V DC			55.6mA	162Ω		
12V DC			41.7mA	288Ω		
24V DC			20.8mA	1,152Ω		

* Pulse, direction of measurement: Terminal is downward.

2) 2 coil latching

Nominal coil voltage	Set voltage* (at 20°C 68°F)	Reset 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		Max. allowable voltage (at 20°C 68°F)
			Set coil	Reset coil	Set coil	Reset coil	Set coil	Reset coil	
4.5V DC	70%V or less of nominal voltage (Initial)	70%V or less of nominal voltage (Initial)	221.7mA	221.7mA	20.3Ω	20.3Ω	1,000mW	1,000mW	130%V of nominal voltage
6V DC			166.7mA	166.7mA	36Ω	36Ω			
9V DC			111.1mA	111.1mA	81Ω	81Ω			
12V DC			83.3mA	83.3mA	144Ω	144Ω			
24V DC			41.7mA	41.7mA	576Ω	576Ω			

* Pulse, direction of measurement: Terminal is downward.

DQ (ADQ)

2. Specifications

Characteristics	Item	Specifications	
Contact	Arrangement	1 Form A	
	Initial contact resistance, max.	Max. 30 mΩ (By voltage drop 6 V DC 1A)	
	Contact material	AgSnO ₂ type	
Rating	Nominal switching capacity (resistive load)	30 A 250V AC	
	Max. switching power (resistive load)	7,500 V A	
	Max. switching voltage	250V AC	
	Max. switching current	30 A	
	Nominal operating power	500mW (1 coil latching), 1,000mW (2 coil latching)	
	Min. switching capacity (Reference value)*1	100mA 5 V DC	
Electrical characteristics	Insulation resistance (Initial)	Min. 1,000MΩ (at 500V DC) Measurement at same location as "Initial breakdown voltage" section.	
	Breakdown voltage (Initial)	Between open contacts	1,500 Vrms for 1min. (Detection current: 10mA.)
		Between contact and coil	4,000 Vrms for 1min. (Detection current: 10mA.)
	Surge breakdown voltage*2	Between contact and coil	Min. 10,000 V (initial)
	Temperature rise (at 65°C 149°F)		Max. 50°C (By resistive method, max. switching current) (Coil: de-energized)
	Set time (at 20°C 68°F)		Max. 20 ms (Nominal voltage applied to the coil, excluding contact bounce time.)
Reset time (at 20°C 68°F)		Max. 20 ms (Nominal voltage applied to the coil, excluding contact bounce time.)	
Mechanical characteristics	Shock resistance	Functional	Min. 200 m/s ² (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.)
		Destructive	Min. 1,000 m/s ² (Half-wave pulse of sine wave: 6 ms.)
	Vibration resistance	Functional	10 to 55 Hz at double amplitude of 1.5 mm (Detection time: 10μs.)
		Destructive	10 to 55 Hz at double amplitude of 2 mm
Expected life	Mechanical	Min. 10 ⁶ (at 180 cpm)	
	Electrical	Min. 10 ⁴ (At nominal switching capacity, operating frequency: 3s ON, 3s OFF)	
Conditions	Conditions for operation, transport and storage*3	Ambient temperature: -40°C to +65°C -40°F to +149°F Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)	
	Max. operating speed	10 cpm (at rated load)	
Unit weight		Approx. 35 g 1.23 oz	

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.

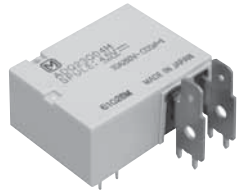
*2 Wave is standard shock voltage of $\pm 1.2 \times 50 \mu s$ according to JEC-212-1981.

*3 Refer to "6. Usage, Storage and Transport Conditions" in **AMBIENT ENVIRONMENT** section in **Relay Technical Information**.

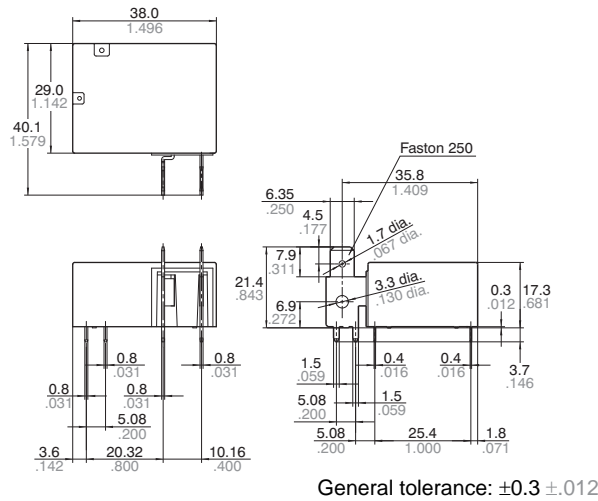
DIMENSIONS (mm inch)

Download [CAD Data](#) from our Web site.

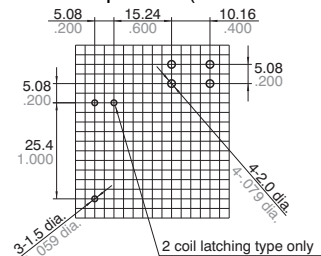
[CAD Data](#)



External dimensions

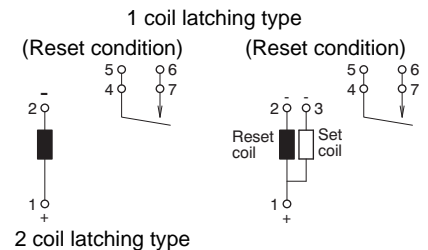


PC board pattern (Bottom view)



Tolerance: $\pm 0.1 \pm 0.04$

Schematic (Bottom view)



SAFETY STANDARDS

UL/C-UL (Recognized)	
File No.	Contact rating
E43149	30A 277V AC

* CSA standard: Certified by C-UL

NOTES

1. Coil operating power

Pure DC current should be applied to the coil. The wave form should be rectangular. If it includes ripple, the ripple factor should be less than 5%. However, check it with the actual circuit since the characteristics may be slightly different.

2. Coil connection

When connecting coils, refer to the wiring diagram to prevent mis-operation or malfunction.

3. Soldering and cleaning

1) When soldering the relays, ensure conformance with the conditions listed below.

[Automatic soldering]

(1) Preheating: less than 120°C 248°F (solder target surface of terminal) for less than 120 sec

(2) Soldering: less than 265°C 509°F (solder temperature) for less than 6 sec (soldering time)

[Manual soldering]

(1) Soldering tip temperature: less than 350°C 662°F

(2) Soldering iron: 60 W to 100 W

(3) Soldering time: less than 3 sec
Furthermore, because the type of PC board used and other factors may influence the relays, test that the relays function properly on the actual board on which they are mounted.

2) Ultrasonic cleaning has adverse effects on relay characteristics: never use ultrasonic cleaning. For liquid cleaning, use alcohol-based liquids.

4. Others

1) If the relay has been dropped, the appearance and characteristics should always be checked before use.

2) The cycle lifetime is defined under the standard test condition specified in the JIS* C 5442-1996 standard (temperature 15 to 35°C 59 to 95°F, humidity 25 to 75%). Check this with the real device as it is affected by coil driving circuit, load type, activation frequency, activation phase, ambient conditions and other factors.

Also, be especially careful of loads such as those listed below.

(1) When used for AC load-operating and the operating phase is synchronous.

Rocking and fusing can easily occur due to contact shifting.

(2) High-frequency load-operating
When high-frequency opening and closing of the relay is performed with a load that causes arcs at the contacts, nitrogen and oxygen in the air is fused by the arc energy and HNO₃ is formed. This can corrode metal materials.

Three countermeasures for these are listed here.

1. Incorporate an arc-extinguishing circuit.
2. Lower the operating frequency
3. Lower the ambient humidity
3) For secure operations, the voltage applied to the coil should be nominal voltage. In addition, please note that pick-up and drop-out voltage will vary according to the ambient temperature and operation conditions.

4) Heat, smoke, and even a fire may occur if the relay is used in conditions outside of the allowable ranges for the coil ratings, contact ratings, operating cycle lifetime, and other specifications. Therefore, do not use the relay if these ratings are exceeded. Also, make sure that the relay is wired correctly.

5) Incorrect wiring may cause unexpected events or the generation of heat or flames.

6) Check the ambient conditions when storing or transporting the relays and devices containing the relays. Freezing or condensation may occur in the relay, causing functional damage. Avoid subjecting the relays to heavy loads, or strong vibration and shocks.

7) Relays are shipped in a 'reset' state. During shipping and handling, however, shocks may change the state to 'set.' Consequently, at time of use (at power on) it is recommended to ensure that circuits are returned to the desired state ('set' or 'reset').

8) If more than 20 A is delivered via the plug-in terminal connection, to prevent loosening of contacts loss long periods of operation, ensure that the plug-in terminal is soldered to the receptacle terminal.

5. Usage, transport and storage conditions

1) Ambient temperature, humidity, and atmospheric pressure during usage, transport, and storage of the relay:

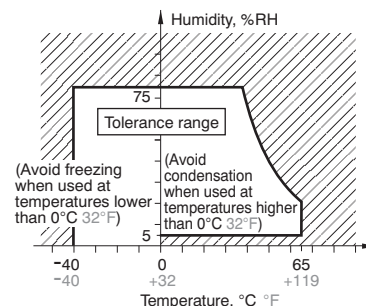
(1) Temperature:

–40 to +65°C –40 to +149°F

(2) Humidity: 5 to 75% RH

(Avoid freezing and condensation.)

The humidity range varies with the temperature. Use within the range indicated in the graph below.



(3) Atmospheric pressure: 86 to 106 kPa
Temperature and humidity range for usage, transport, and storage:

2) Condensation

Condensation forms when there is a sudden change in temperature under high temperature and high humidity conditions. Condensation will cause deterioration of the relay insulation.

3) Freezing

Condensation or other moisture may freeze on the relay when the temperature is lower than 0°C 32°F. This causes problems such as sticking of movable parts or operational time lags.

4) Low temperature, low humidity environments

The plastic becomes brittle if the relay is exposed to a low temperature, low humidity environment for long periods of time.

For Cautions for Use, see [Relay Technical Information](#).