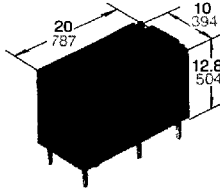


NAiS**AQ-C SOLID STATE RELAY****AQ-C
RELAYS**

UL File No.: E57521 CSA File No.: LR26550 TÜV File No.: 89021645540

- Compact DIL type: 20 mm (length)×10 mm (width)×12.8 mm (height) (.787×.394×.504 inch)
- Excellent in noise resistance
- Snubber circuit integrated
- High dielectric strength: 2,500 V between input and output
- Reverse polarity type available

mm inch

SPECIFICATIONS

Rating (at 20°C 68°F, Input voltage ripple: max. 1%)

1. AC output type

Item \ Type		AQC1A1-ZT5VDC	AQC1A1-ZT12VDC	AQC1A1-ZT24VDC	AQC1A2-ZT5VDC	AQC1A2-ZT12VDC	AQC1A2-ZT24VDC	Remarks
		AQC1A1-T5VDC	AQC1A1-T12VDC	AQC1A1-T24VDC	AQC1A2-T5VDC	AQC1A2-T12VDC	AQC1A2-T24VDC	
Input side	Input voltage	4 to 6 V DC	9.6 to 14.4 V DC	21.6 to 26.4 V DC	4 to 6 V DC	9.6 to 14.4 V DC	21.6 to 26.4 V DC	See "Data 3".
	Input impedance (Approx.)	0.3 kΩ	0.8 kΩ	1.8 kΩ	0.3 kΩ	0.8 kΩ	1.8 kΩ	
	Drop-out voltage, min.	0.5 V	1.2 V	2.4 V	0.5 V	1.2 V	2.4 V	
Load side	Max. load current	1 A						See "Data 1". Ta = Min. 40°C
	Load voltage	75 to 125 V AC			75 to 250 V AC			
	Non-repetitive surge current	20 A						See "Data 2". In one cycle at 60 Hz
	Max. "OFF-state" leakage current	0.6 mA (When 100 V AC applied)			1.1 mA (When 200 V AC applied)			
	Max. "ON-state" voltage drop	1.6 V						
	Min. load current	10 mA			20 mA			at max. carrying current

2. DC output type

Item		Type	AQC1AD1-5VDC	AQC1AD1-12VDC	AQC1AD1-24VDC	Remarks
Input side	Input voltage		4 to 6 V DC	9.6 to 14.4 V DC	21.6 to 26.4 V DC	See "Data 3".
	Input impedance (Approx.)		430 Ω	1.2 kΩ	2.8 kΩ	
	Drop-out voltage, min.		0.8 V			
Load side	Max. load current		1 A			See "Data 1". Ta = Min. 40°C.
	Load voltage		3 to 60 V DC			
	Non-repetitive surge current		1.5 A			See "Data 2" at 1 sec.
	Max. "OFF-state" leakage current		0.1 mA (When 60 V DC applied)			
	Max. "ON-state" voltage drop		1.6 V			
	Min. Load current		1 mA			at max. carrying current

Characteristics (at 20°C 68°F, Input voltage ripple: max. 1%)

Item	Type	AC output		DC output	Conditions
		Non zero-cross	Zero-cross		
Operate time, max.		1 msec.	(1/2 cycle of voltage sine wave)+1 msec.	0.5 msec.	
Release time, max.		(1/2 cycle of voltage sine wave)+1 msec.		1 msec.	
Insulation resistance, min.		10 ⁹ Ω between input and output			at 500 V DC
Breakdown voltage		2,500 Vrms between input and output			For 1 minute
Vibration resistance	Functional	10 to 55 Hz double amplitude of 3 mm			10 minutes for X, Y, Z, axis
	Destructive	10 to 55 Hz double amplitude of 3 mm			1 hour for X, Y, Z axis
Shock resistance	Functional	Min. 100 G			4 times each for X, Y, Z axis
	Destructive	Min. 100 G			5 times each for X, Y, Z axis
Ambient temperature		-30°C to +80°C -22°F to +176°F			
Storage temperature		-30°C to +100°C -22°F to +212°F			
Operational method		Random Turn-ON, Zero-cross Turn-OFF	Zero-cross (Turn-ON and Turn-OFF)	—	

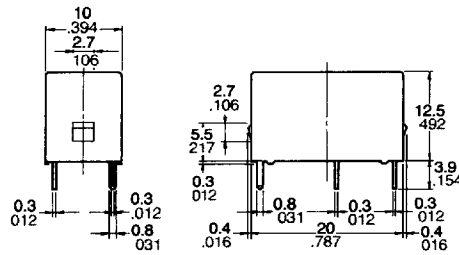
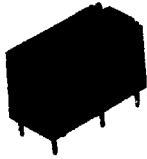
ORDERING INFORMATION

AQ-C 1A D1 — ZT 5VDC — R

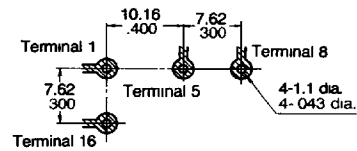
Load current	Load voltage	Type	Input voltage	Input polarity
1 A	1: 75 to 125 V AC 2: 75 to 250 V AC D1: 3 to 60 V DC	Nil: DC output T: AC output Non Zero-cross ZT: AC output Zero-cross	5, 12, 24 V DC	Nil: Standard polarity R: Reverse polarity

Standard packing: Carton: 50 pcs.; Case: 500 pcs.

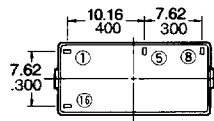
0955276 0002766 0T9



PC board pattern (Copper-side view)

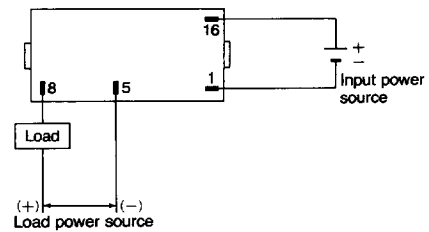


Tolerance: $\pm 0.1 \pm .004$



General tolerance: $\pm 0.5 \pm 0.20$

Schematic (Bottom view)

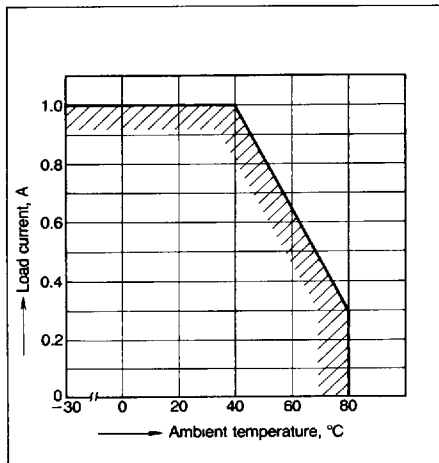


Specified polarities for DC types are shown in the parentheses.

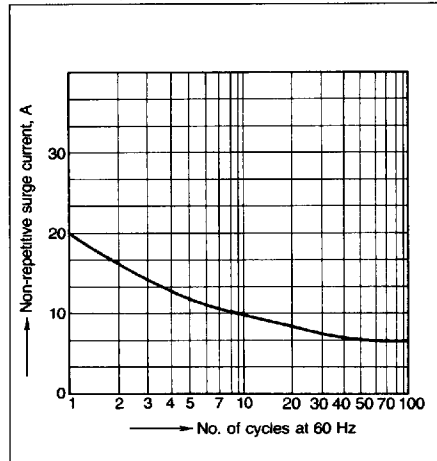
- | | |
|-------------------|------------------|
| AC output | DC output |
| ⑤ · Output: AC | ⑤ · Output: DC - |
| ⑧ · Output: AC | ⑧ · Output: DC + |
| ⑬ · Input: DC + | ⑬ · Input: DC - |
| ① · Input: DC - | ① · Input: DC + |
| Case color: Black | Case color: Red |

DATA

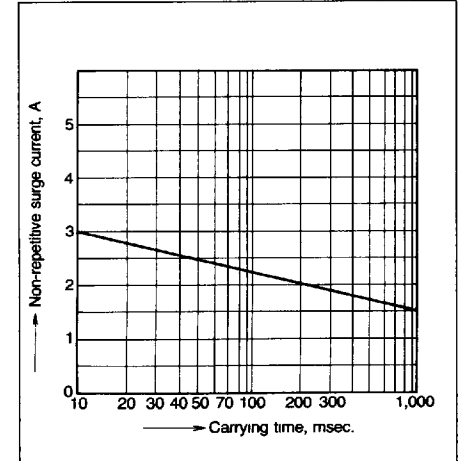
- ### 1. Load current vs. ambient temperature



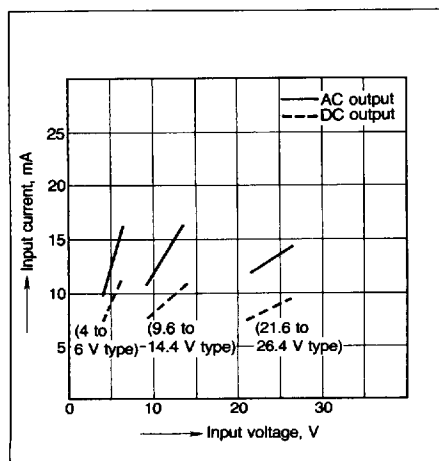
- ## 2.-(1) Non-repetitive surge current vs. carrying time (AC output)



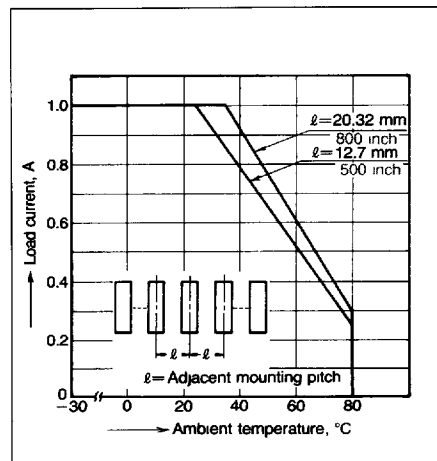
- 2.-(2) Non-repetitive surge current vs. carrying time (DC output)



- ### 3. Input voltage vs. input current characteristics



- #### 4. Load current vs. ambient temperature characteristics for adjacent mounting

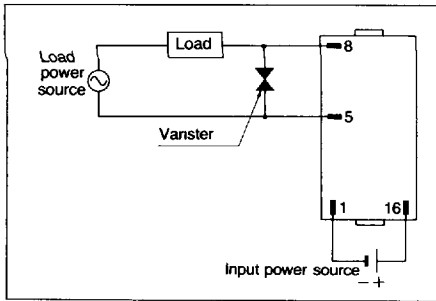


NOTES

1. Regarding the output side

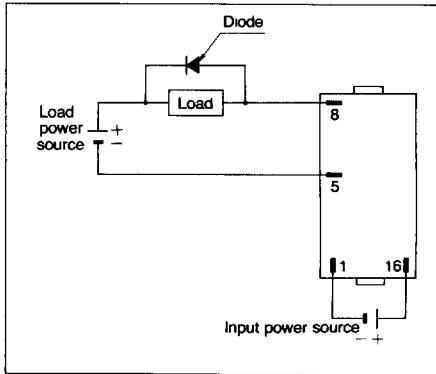
1) AC output type

When large noise or surge is applied to the load side, erroneous operation or damage may occur. In such a case, a varistor should be inserted into the circuit (as shown below).



2) DC output type

In the case of inductive loads (Ex. solenoid, motor, electromagnetic valves and so on), a diode should be connected to both ends of the load to prevent counter EMF.



2. When used for the load less than rated

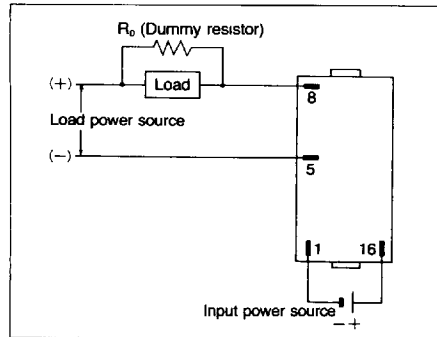
In the case of the load current less than rated, malfunction may result from the residual voltage across the both ends of the load even if the solid state relay is turned off.

Use a dummy resistor as a counter-measure.

The total of the current through the resistor and the load current must exceed the min. rated load current.

Rated value of load

Type	Rated value
AC output 100 V type	Min. 10 mA
AC output 200 V type	Min. 20 mA
DC output type	Min. 1 mA

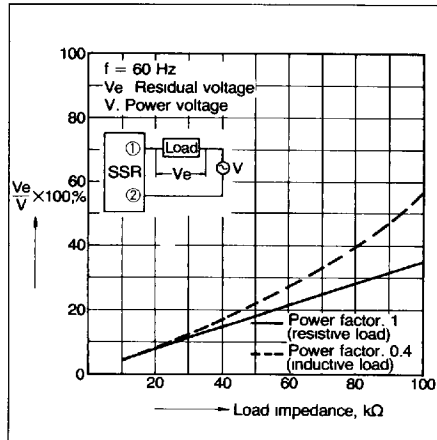


In case the dummy resistor is not used, keep in mind that the residual voltage becomes as follows:

Example:

For the inductive load by the 5 mA load current and the 200 V AC load voltage, the load impedance becomes 40 kΩ and $V_e/V = 16\%$ is estimated from the below graph. Accordingly, the 32 V voltage remains across the both ends of the load when the solid state relay is turned off.

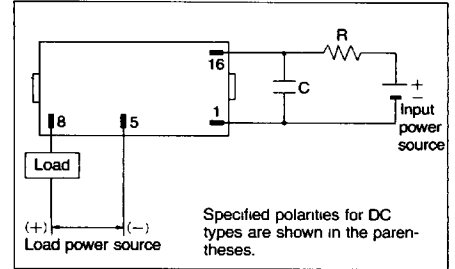
- Characteristics of load impedance vs. residual voltage



3. Noise and surge protection at the input side

When large noise or surge is applied to the input side, erroneous operation or damage may occur.

In such a case, a noise absorber circuit (consisting of a resistor and capacitor) should be added to the input (as shown below).



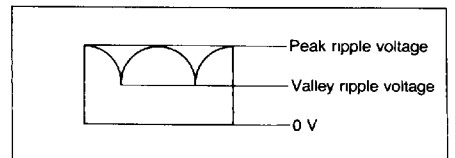
4. When the input terminals are connected with reverse polarity

When the input terminals are connected with reverse polarity, damage may occur. In case the input terminals are connected with reverse polarity, protection diode should be used.

5. If the operation voltage contains ripple

If the operation voltage contains ripple, the peak ripple voltage must not exceed the maximum rated operating voltage and the valley ripple voltage must be at least the minimum rated operating voltage.

Input voltage	Type	Peak ripple voltage (min.)	Valley ripple voltage (max.)
5 V type		6 V	4 V
12 V type		14.4 V	9.6 V
24 V type		26.4 V	21.6 V



6. Others

- 1) If the SSR is mounted closely to a heat generating device or another SSR, ambient temperature may rise. Care should be taken to layout and ventilation for the SSR. In case of adjacent mounting, please refer to Data 4.
- 2) Terminal soldering should be done at 260°C, 500°F within 5 seconds.
- 3) Correctly connect the terminals according to the wiring diagram.
- 4) For higher reliability, check operation under actual installation conditions.