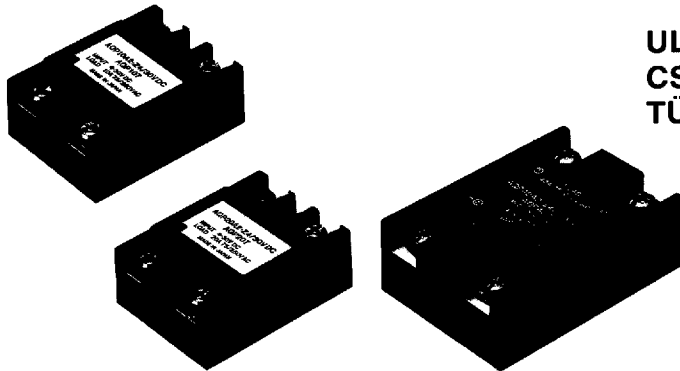


**High reliability, maintenance free and high power handling capacity (10 A to 40 A).**



**UL File No.: E133216**  
**CSA File No.: LR26550**  
**TÜV File No.: 88081645532**

- High power type with a load capacity of 10 to 40 A. (Load voltage: 75 to 250 V AC)
- Mounts to a rail with the DIN rail mounting plate (optional).
- Heatsink (optional) is available.
- LED operation indicator.
- Operates over a wide input voltage range of 4 to 30 V DC.

**TYPES**

Type	Part No.
Zero-cross 10 A	AQP10A2-Z4/30VDC
Zero-cross 20 A	AQP20A2-Z4/30VDC
Zero-cross 40 A	AQP40A2-Z4/30VDC

**APPLICATIONS**

- Traffic light flashes and copying machines
- Solenoid drive for vending machines and conveyors.
- AC motor switching in air conditioning equipment and machine tools.
- Heater control in copying machines.

**SPECIFICATIONS**

**Rating** (at 20°C 68°F, Input voltage ripple: 1% or less)

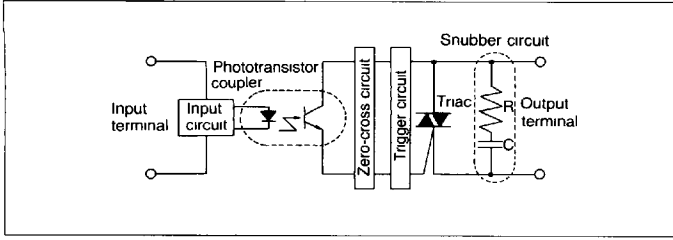
Item	Type	Zero-cross types			Remarks
		AQP10A2-Z4/30VDC	AQP20A2-Z4/30VDC	AQP40A2-Z4/30VDC	
Input side	Input voltage	4 to 30 V DC			
	Input impedance	Approx. 1.5 kΩ (4 to 30 V DC)			
	Drop-out voltage, min.	0.8 V DC			
Load side	Max. load current	10 A with heat sink 4 A without heat sink	20 A with heat sink 7 A without heat sink	40 A with heat sink 10 A without heat sink	See "DATA 1" on the following page.
	Load voltage	75 to 250 V AC			
	Non-repetitive surge current	150 A	220 A	440 A	During one cycle at 60 Hz
	Max. "OFF-state" leakage current	7 mA	10 mA		at 200 V AC 60 Hz
	Max. "ON-state" voltage drop	1.6 V			at max. carrying current
Min. load current	50 mA				

**Characteristics** (at 20°C 68°F, Input voltage ripple: less than 1%)

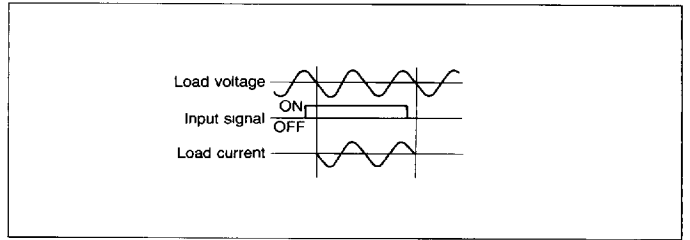
Item	Type	AQP10A2-Z4/30VDC	AQP20A2-Z4/30VDC	AQP40A2-Z4/30VDC	Remarks
Operate time, max.		(1/2 cycle of voltage sine wave)+1 msec.			
Release time, max.		(1/2 cycle of voltage sine wave)+1 msec.			
Insulation resistance, min.		100 MΩ between input, output and case			by 500 V DC
Breakdown voltage		1,500 Vrms between input, output and case			For 1 min
Vibration resistance	Functional	10 to 55 Hz double amplitude of 2 mm			10 minutes for X, Y, Z axis
	Destructive	10 to 55 Hz double amplitude of 2 mm			1 hour for X, Y, Z axis
Shock resistance	Functional	100 G			4 times each for X, Y, Z axis
	Destructive	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		Zero-cross (Turn-ON and Turn-OFF)			

# OPERATING PRINCIPLE

Internal circuit

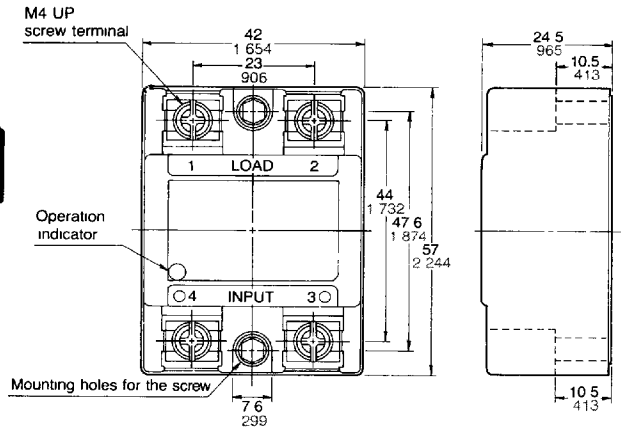
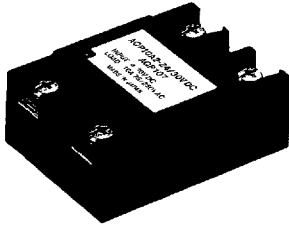


Wave form of input and output (Resistive load)

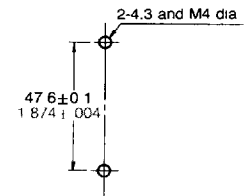


## DIMENSIONS

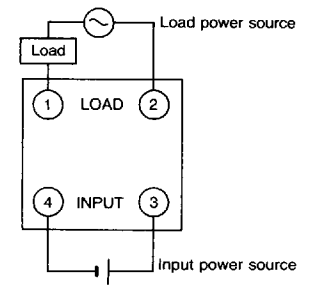
AQP10A2-Z4/30V  
AQP20A2-Z4/30V



Mounting dimension (Bottom view)

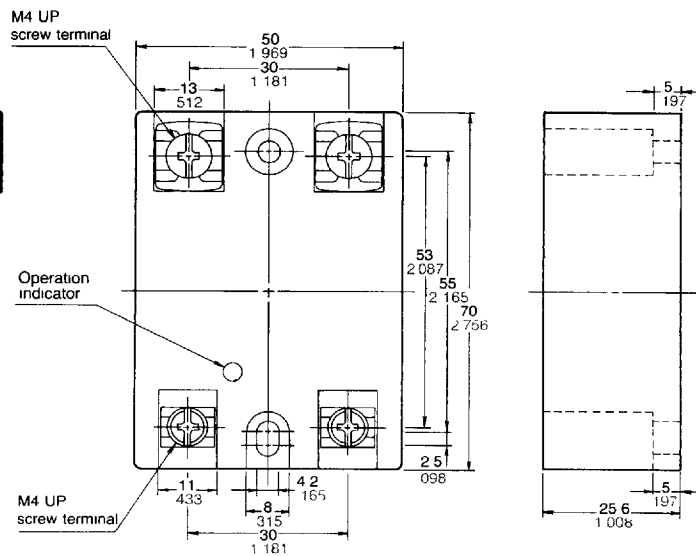
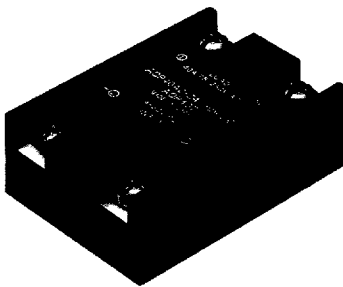


Terminal connection diagram

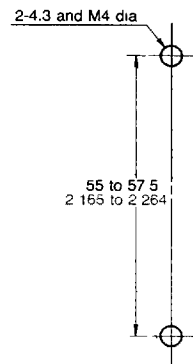


General tolerance:  $\pm 0.5 \pm 0.20$

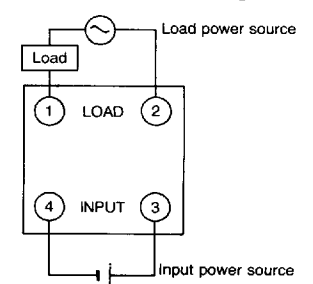
AQP40A2-Z4/30V



Mounting dimension (Bottom view)



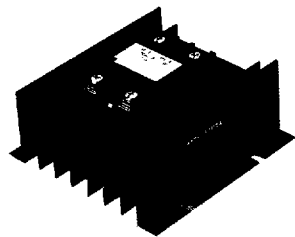
Terminal connection diagram



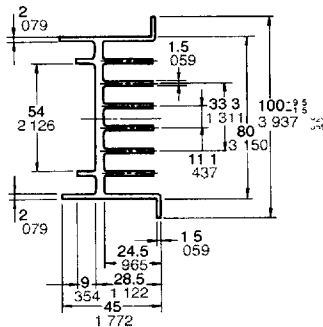
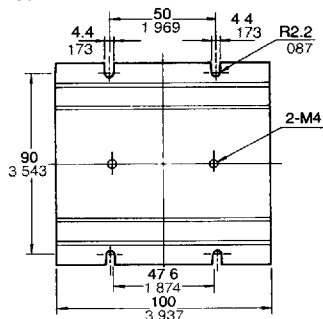
General tolerance:  $\pm 0.5 \pm 0.20$

### AQP-HS-20A

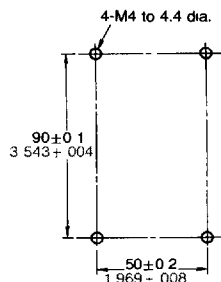
Heat sink for AQP10A2-Z4/30V (10 A type) and AQP20A2-Z4/30V (20 A type)



AQP-HS-20A



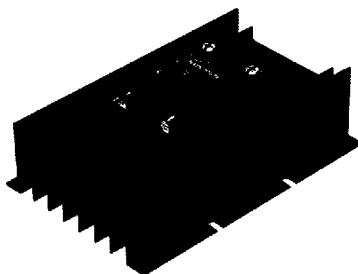
Mounting dimension (Bottom view)



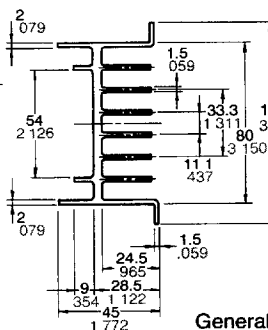
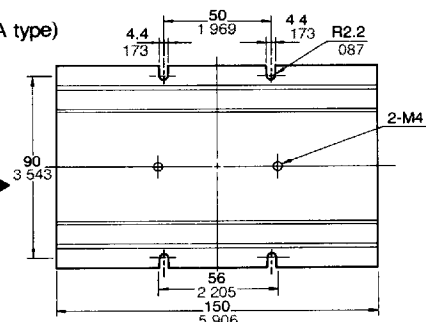
General tolerance:  $\pm 0.5 \pm .020$

### AQP-HS-40A

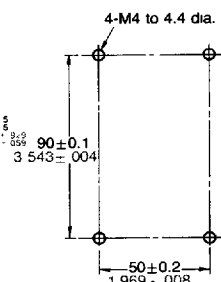
Heat sink for AQP40A2-Z4/30V (40 A type)



AQP-HS-40A



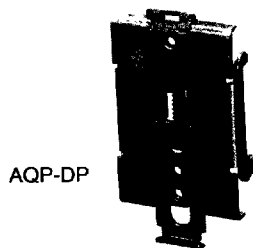
Mounting dimension (Bottom view)



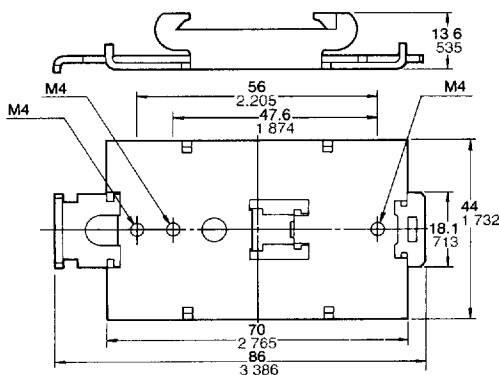
General tolerance:  $\pm 0.5 \pm .020$

### AQP-DP

DIN rail mounting plate



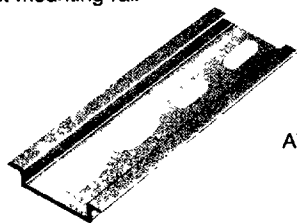
AQP-DP



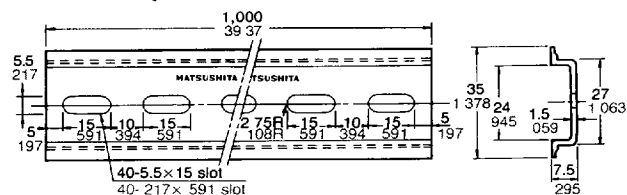
General tolerance:  $\pm 0.5 \pm .020$

### AT8-DLA1

Equipment mounting rail



AT8-DLA1

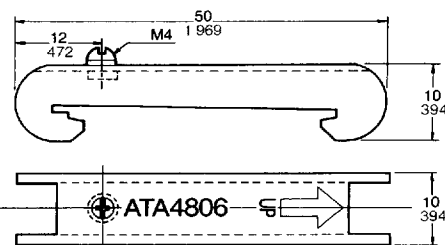


### ATA4806

Fastening plate



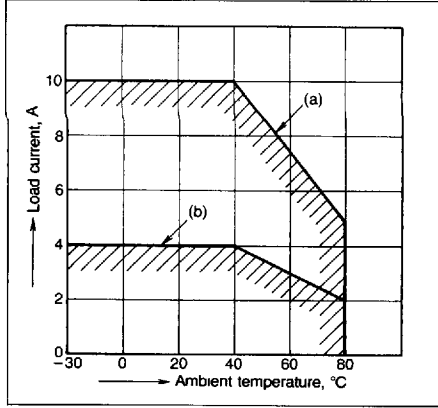
ATA4806



**DATA**

**1. Load current vs. ambient temperature**

1-1. AQP10A2-Z4/30VDC



**(a) With external heatsink**

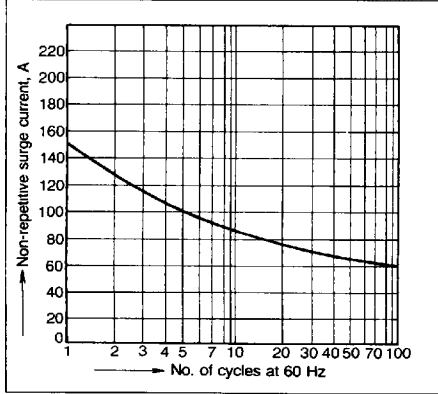
• A heatsink refers to the following.

- 1-1. AQP10A: Standard heatsink (AQP-HS-20A) or a 150×150×3.2 mm aluminium sheet (painted black)
- 1-2. AQP20A: Standard heatsink (AQP-HS-20A) or a 200×200×3.2 mm aluminium sheet (painted black)
- 1-3. AQP40A: Standard heatsink (AQP-HS-40A)

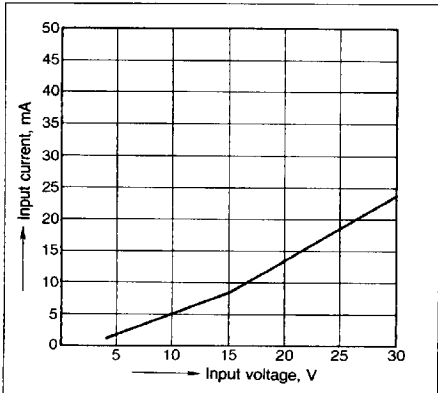
• The heat sink surface area is the required area for one solid-state relay.

**2. Non-repetitive current vs. carrying time**

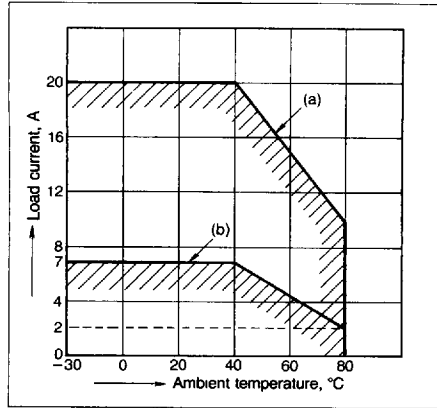
2-1. AQP10A2-Z4/30V (10 A type)



**3. Input voltage vs input current (10 A, 20 A, 40 A type)**



1-2. AQP20A2-Z4/30VDC

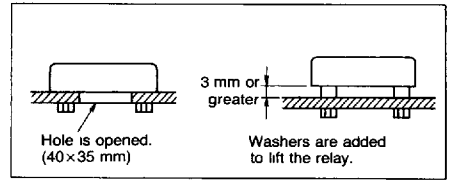
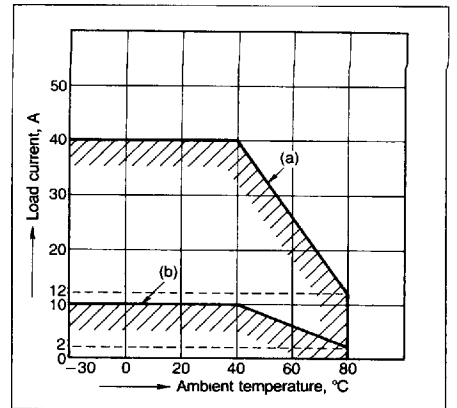


**(b) Without external heatsink**

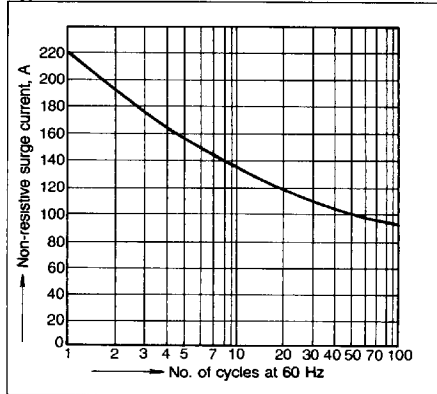
If the mounting surface is not metallic and a heatsink is not used, expose the rear surface and plate surface to improve heat dissipation.

The graphs show the characteristics when the relay is mounted as shown to the right.

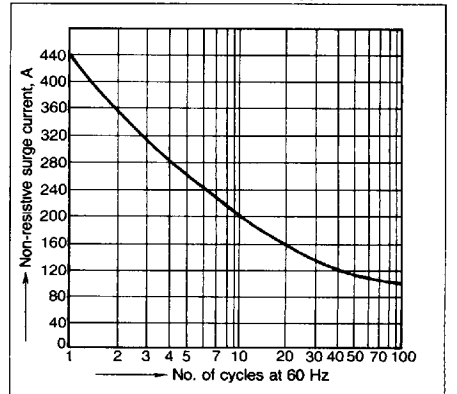
1-3. AQP40A2-Z4/30VDC



2-2. AQP20A2-Z4/30V (20 A type)



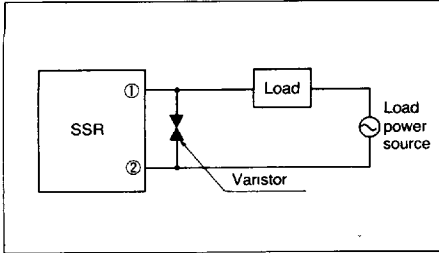
2-3. AQP40A2-Z4/30V (40 A type)



## REMARKS

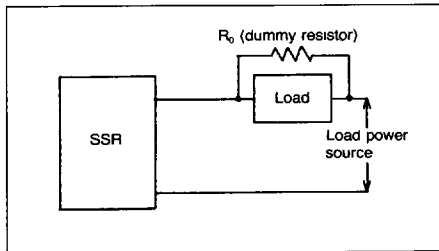
### 1. Regarding the output side

When a large noise or surge is applied at the output side, faulty operation or damage may result. In such case, a varistor should be inserted in the circuit as shown below.



### 2. When loads lower than the prescribed value are used

Because the possibility of erroneous operation exists, a dummy resistor should be used.

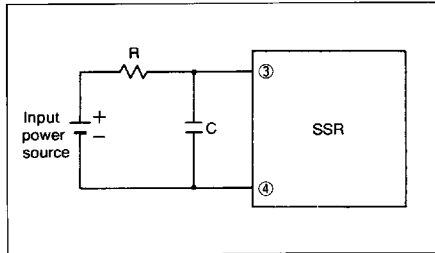


Prescribed value of load

Type	Prescribed value
AC 10 A, 20 A, 40 A	Min. 50 mA

### 3. Noise and surge protection at the input

If a large noise or surge is applied at the input, faulty operation or damage may result. In this case, add a noise absorber circuit (consisting of a resistor and capacitor) to the input as shown below.

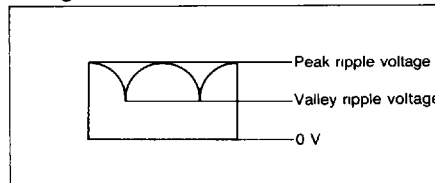


### 4. When the input terminals are connected with reverse polarity

A reverse connection protection diode is built in all AQP relays. Even if the input terminals are accidentally connected with reverse polarity, no damage will result although the relay will not operate.

### 5. If the operating voltage contains ripple

If the operating 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.



### 6. Regarding installation

#### 1) DIN Rail Mounting

When the relay is mounted to a rail using the DIN rail mounting plate (optional), the rated capacity is limited to the characteristics of a relay without a heatsink attached.

2) If the terminal screws are replaced, use screws which have a thread length of 8 to 12 mm.

#### 7. Heat-radiating design

To assure full reliability of equipment and devices using an SSR, thermal conditions must be closely considered. Due to power loss, heat-radiating from joined parts is important to the function and life of an SSR. Accordingly, in ambient over 40°C, it is necessary to reduce the load current as shown in the "Load current vs. ambient temperature" data previously. In conditions where a heat sink is necessary, apply a thermal conductive compound between the SSR and heat sink to assure maximum heat dissipation.

Exclusive radiator

Load current	Exclusive heat sink
10 A type	AQP-HS-20A
20 A type	AQP-HS-20A
40 A type	APQ-HS-40A

#### 8. Others

1) If the SSR is mounted close to a heat generating device or another SSR, the local ambient temperature may rise. Carefully consider layout and ventilation for the SSR.

2) Correctly connect the terminals according to the wiring diagram.

3) For higher reliability, check operation under actual installation conditions.