

UL File No.: E43149

CSA File No.: LR49089M14



- Two types of terminal shape: Plug-in terminal and Screw terminal  
**Plug-in terminal (output side): #250  
 (input side): #110**
- Flat type of SSR realized by aluminium printed circuit board  
**Plug-in terminal: height max. 15 mm .591 inch  
 Screw terminal: height max. 17 mm .669 inch**
- High dielectric strength: 1500 V AC (between input and output)
- Heat sink and DIN mounting rail are available as accessories

## TYPES

### Plug-in terminal type

Type	Load voltage	Input voltage	Part No.
Zero-cross 10 A	75 to 125 V AC	4 to 6 V DC	AQR10A1-Z4/6VDC
		10 to 18 V DC	AQR10A1-Z10/18VDC
		18 to 28 V DC	AQR10A1-Z18/28VDC
	75 to 250 V AC	4 to 6 V DC	AQR10A2-Z4/6VDC
		10 to 18 V DC	AQR10A2-Z10/18VDC
		18 to 28 V DC	AQR10A2-Z18/28VDC
Zero-cross 15 A	75 to 125 V AC	4 to 6 V DC	AQR15A1-Z4/6VDC
		10 to 18 V DC	AQR15A1-Z10/18VDC
		18 to 28 V DC	AQR15A1-Z18/28VDC
	75 to 250 V AC	4 to 6 V DC	AQR15A2-Z4/6VDC
		10 to 18 V DC	AQR15A2-Z10/18VDC
		18 to 28 V DC	AQR15A2-Z18/28VDC
Zero-cross 20 A	75 to 125 V AC	4 to 6 V DC	AQR20A1-Z4/6VDC
		10 to 18 V DC	AQR20A1-Z10/18VDC
		18 to 28 V DC	AQR20A1-Z18/28VDC
	75 to 250 V AC	4 to 6 V DC	AQR20A2-Z4/6VDC
		10 to 18 V DC	AQR20A2-Z10/18VDC
		18 to 28 V DC	AQR20A2-Z18/28VDC

### Screw-terminal type

Type	Load voltage	Input voltage	Part No.
Zero-cross 10 A	75 to 125 V AC	4 to 6 V DC	AQR10A1-S-Z4/6VDC
		10 to 18 V DC	AQR10A1-S-Z10/18VDC
		18 to 28 V DC	AQR10A1-S-Z18/28VDC
	75 to 250 V AC	4 to 6 V DC	AQR10A2-S-Z4/6VDC
		10 to 18 V DC	AQR10A2-S-Z10/18VDC
		18 to 28 V DC	AQR10A2-S-Z18/28VDC
Zero-cross 15 A	75 to 125 V AC	4 to 6 V DC	AQR15A1-S-Z4/6VDC
		10 to 18 V DC	AQR15A1-S-Z10/18VDC
		18 to 28 V DC	AQR15A1-S-Z18/28VDC
	75 to 250 V AC	4 to 6 V DC	AQR15A2-S-Z4/6VDC
		10 to 18 V DC	AQR15A2-S-Z10/18VDC
		18 to 28 V DC	AQR15A2-S-Z18/28VDC
Zero-cross 20 A	75 to 125 V AC	4 to 6 V DC	AQR20A1-S-Z4/6VDC
		10 to 18 V DC	AQR20A1-S-Z10/18VDC
		18 to 28 V DC	AQR20A1-S-Z18/28VDC
	75 to 250 V AC	4 to 6 V DC	AQR20A2-S-Z4/6VDC
		10 to 18 V DC	AQR20A2-S-Z10/18VDC
		18 to 28 V DC	AQR20A2-S-Z18/28VDC

## APPLICATIONS

- Photocopiers
- Air conditioners
- Vending machines
- Machine tools

## ORDERING INFORMATION

Ex. AQR 10A 1 — S — Z 4/6VDC

Load current	Load voltage	Terminal shape	Type	Input voltage
10 A, 15 A, 20 A	1: 75 to 125 V AC 2: 75 to 250 V AC	Nil: Plug-in terminal S: Screw terminal	Z: Zero-cross type	4/6, 10/18, 18/28 V DC

# SPECIFICATIONS

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

10 A type

Items		Part No.	AQR10A1-Z 4/6VDC	AQR10A1-Z 10/18VDC	AQR10A1-Z 18/28VDC	AQR10A2-Z 4/6VDC	AQR10A2-Z 10/18VDC	AQR10A2-Z 18/28VDC	Remarks
			AQR10A1-S-Z 4/6VDC	AQR10A1-S-Z 10/18VDC	AQR10A1-S-Z 18/28VDC	AQR10A2-S-Z 4/6VDC	AQR10A2-S-Z 10/18VDC	AQR10A2-S-Z 18/28VDC	
Input side	Input voltage		4 to 6 V DC	10 to 18 V DC	18 to 28 V DC	4 to 6 V DC	10 to 18 V DC	18 to 28 V DC	
	Input impedance		Approx. 0.26 kΩ	Approx. 0.86 kΩ	Approx. 1.36 kΩ	Approx. 0.26 kΩ	Approx. 0.86 kΩ	Approx. 1.36 kΩ	
	Drop-out voltage, min.		1 V						
Load side	Max. load current		10 A						See "DATA 1"
	Load voltage		75 to 125 V AC			75 to 250 V AC			
	Frequency		45 to 65 Hz						
	Repetitive peak voltage		400 V			600 V			
	Non-repetitive surge current		100 A						In one cycle at 60 Hz
	Max. "OFF-state" leakage current		2.5 mA (when 100 V AC applied)			5 mA (when 200 V AC applied)			at 60 Hz
	Max. "ON-state" voltage drop		1.6 V						at max. carrying current
	Min. load current		100 mA						
	OFF-state dV/dt		100 V/μs						

15 A type

Items		Part No.	AQR15A1-Z 4/6VDC	AQR15A1-Z 10/18VDC	AQR15A1-Z 18/28VDC	AQR15A2-Z 4/6VDC	AQR15A2-Z 10/18VDC	AQR15A2-Z 18/28VDC	Remarks
			AQR15A1-S-Z 4/6VDC	AQR15A1-S-Z 10/18VDC	AQR15A1-S-Z 18/28VDC	AQR15A2-S-Z 4/6VDC	AQR15A2-S-Z 10/18VDC	AQR15A2-S-Z 18/28VDC	
Input side	Input voltage		4 to 6 V DC	10 to 18 V DC	18 to 28 V DC	4 to 6 V DC	10 to 18 V DC	18 to 28 V DC	
	Input impedance		Approx. 0.26 kΩ	Approx. 0.86 kΩ	Approx. 1.36 kΩ	Approx. 0.26 kΩ	Approx. 0.86 kΩ	Approx. 1.36 kΩ	
	Drop-out voltage, min.		1 V						
Load side	Max. load current		15 A						See "DATA 1"
	Load voltage		75 to 125 V AC			75 to 250 V AC			
	Frequency		45 to 65 Hz						
	Repetitive peak voltage		400 V			600 V			
	Non-repetitive surge current		150 A						In one cycle at 60 Hz
	Max. "OFF-state" leakage current		2.5 mA (when 100 V AC applied)			5 mA (when 200 V AC applied)			at 60 Hz
	Max. "ON-state" voltage drop		1.6 V						at max. carrying current
	Min. load current		100 mA						
	OFF-state dV/dt		100 V/μs						

20 A type

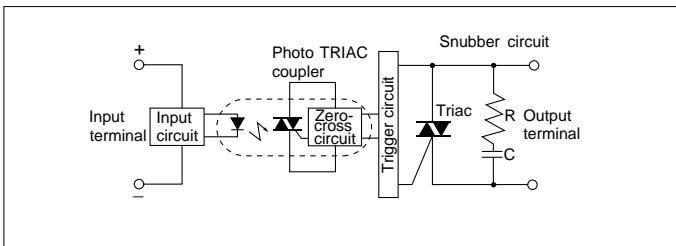
Items		Part No.	AQR20A1-Z 4/6VDC	AQR20A1-Z 10/18VDC	AQR20A1-Z 18/28VDC	AQR20A2-Z 4/6VDC	AQR20A2-Z 10/18VDC	AQR20A2-Z 18/28VDC	Remarks
			AQR20A1-S-Z 4/6VDC	AQR20A1-S-Z 10/18VDC	AQR20A1-S-Z 18/28VDC	AQR20A2-S-Z 4/6VDC	AQR20A2-S-Z 10/18VDC	AQR20A2-S-Z 18/28VDC	
Input side	Input voltage		4 to 6 V DC	10 to 18 V DC	18 to 28 V DC	4 to 6 V DC	10 to 18 V DC	18 to 28 V DC	
	Input impedance		Approx. 0.26 kΩ	Approx. 0.86 kΩ	Approx. 1.36 kΩ	Approx. 0.26 kΩ	Approx. 0.86 kΩ	Approx. 1.36 kΩ	
	Drop-out voltage, min.		1 V						
Load side	Max. load current		20 A						See "DATA 1"
	Load voltage		75 to 125 V AC			75 to 250 V AC			
	Frequency		45 to 65 Hz						
	Repetitive peak voltage		400 V			600 V			
	Non-repetitive surge current		200 A						In one cycle at 60 Hz
	Max. "OFF-state" leakage current		2.5 mA (when 100 V AC applied)			5 mA (when 200 V AC applied)			at 60 Hz
	Max. "ON-state" voltage drop		1.6 V						at max. carrying current
	Min. load current		100 mA						
	OFF-state dV/dt		100 V/μs						

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

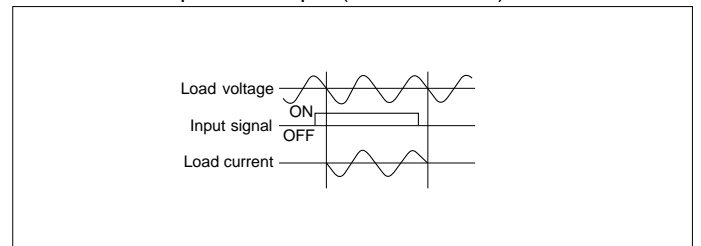
Item	Type	Zero-cross type	Remarks
Operate time, max.		(1/2 cycle of voltage sine wave) + 1 ms	
Release time, max.		(1/2 cycle of voltage sine wave) + 1 ms	
Insulation resistance, min., Initial		100 MΩ between input, output and case	by 500 V DC
Breakdown voltage		1,500 V AC between input, output and case	For 1 min.
Vibration resistance	Functional	10 to 55 Hz at double amplitude of 2 mm	10 minutes for X, Y, Z axes
	Destructive	10 to 55 Hz at double amplitude of 2 mm	1 hour for X, Y, Z axes
Shock resistance	Functional	Min. 980 m/s <sup>2</sup> (100 G)	4 time each for X, Y, Z axes
	Destructive	Min. 980 m/s <sup>2</sup> (100 G)	5 time each for X, Y, Z axes
Ambient temperature		-20°C to +80°C -4°F to +176°F	
Storage temperature		-25°C to +85°C -13°F to +185°F	
Operational method		Zero-cross (Turn-ON and Turn-OFF)	

**OPERATING PRINCIPLE**

Internal circuit



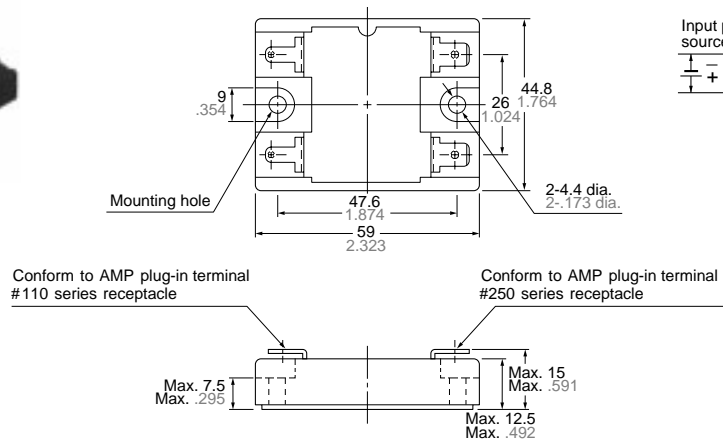
Wave form of input and output (Resistive load)



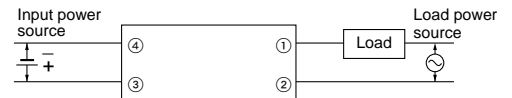
**DIMENSIONS**

mm inch

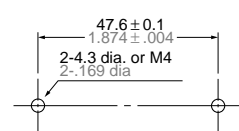
Plug-in terminal



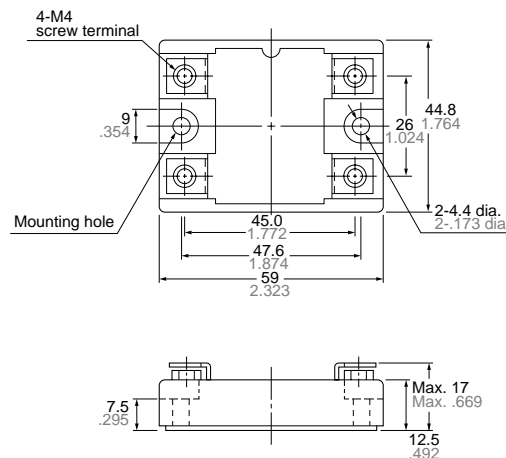
Schematic



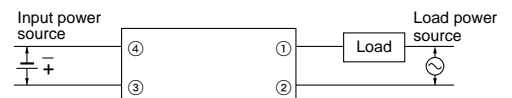
Mounting dimensions (Bottom view)



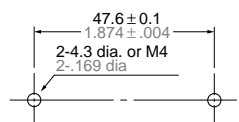
Screw terminal



Schematic



Mounting dimensions (Bottom view)



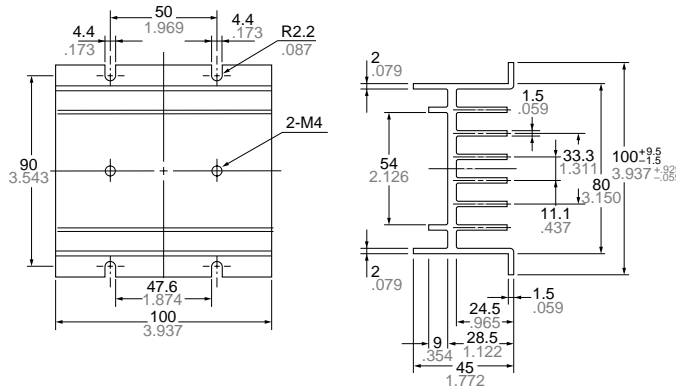
# AQ-R SOLID STATE RELAY ACCESSORIES

mm inch

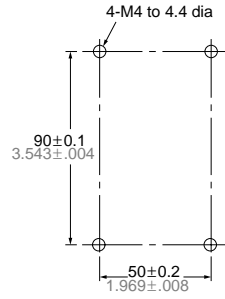
AQP-HS-20A  
Heat sink



AQP-HS-20A



Mounting dimension (Bottom view)

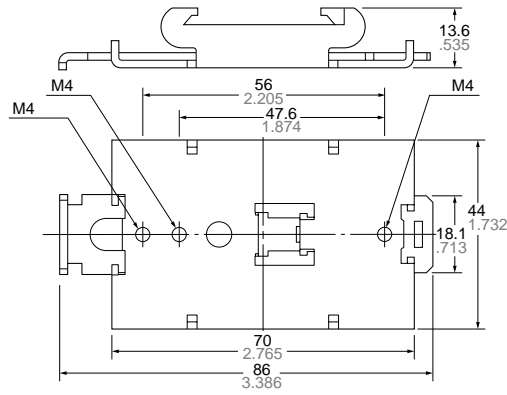


General tolerance:  $\pm 0.5 \pm 0.20$

AQP-DP  
DIN rail mounting plate



AQP-DP

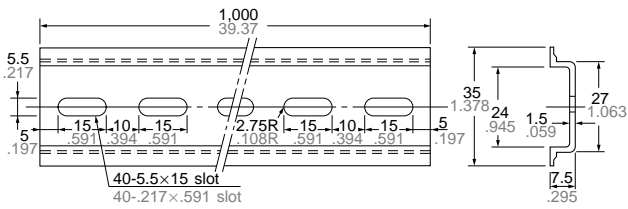


General tolerance:  $\pm 0.5 \pm 0.20$

AT8-DLA1  
Mounting rail



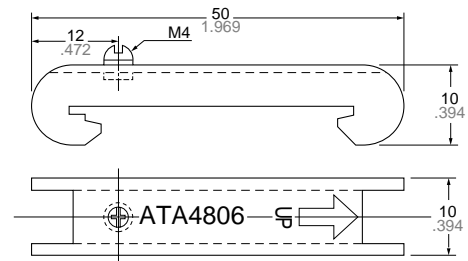
AT8-DLA1



ATA4806  
Fastening plate

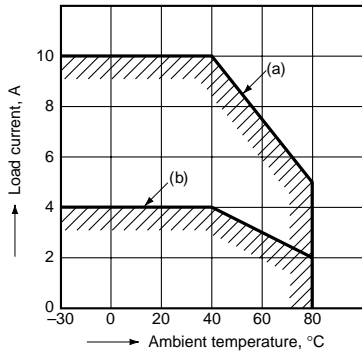


ATA4806

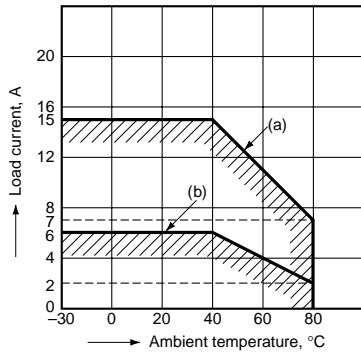


**DATA**

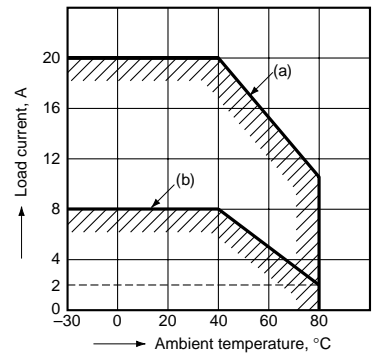
1. Load current vs. ambient temperature  
10 A type



15 A type



20 A type

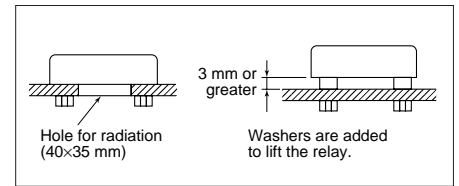


**(a) With external heat sink**

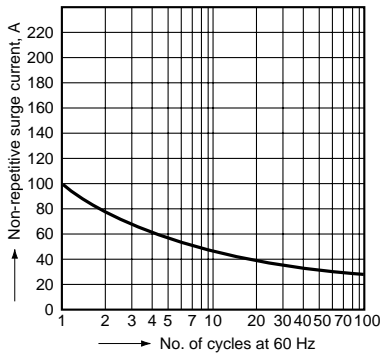
- A heat sink; optional heat sink (AQP-HS-20A) or a 150×150×3.2 mm aluminum sheet (painted black)
- The heat sink surface area is the required area for one solid-state relay.

**(b) Without external heat sink**

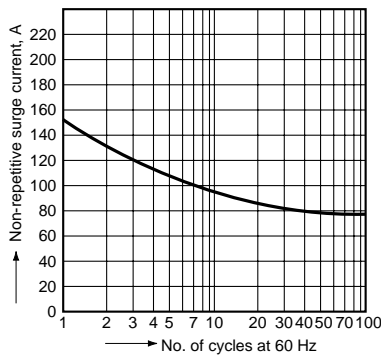
If the mounting surface is not metallic and a heat sink is not used, expose the bottom surface and plate surface to improve heat dissipation. The graphs show the characteristics when the relay is mounted as shown in the right figure.



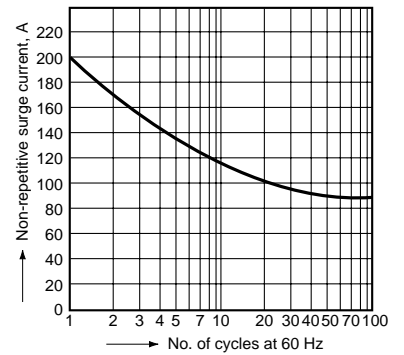
2-1. Non-repetitive surge current vs. carrying time (10 A type)



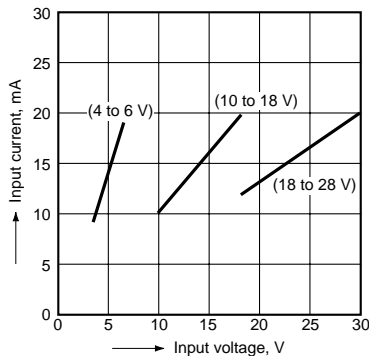
2-2. Non-repetitive surge current vs. carrying time (15 A type)



2-3. Non-repetitive surge current vs. carrying time (20 A type)



3. Input voltage vs. input current  
(10 A, 15 A, 20 A type)



**NOTE**

**Regarding installation**

**DIN Rail Mounting**

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

**For Cautions for Use**