

High capacity SSR
up to 40A
with wide variation

AQ-N RELAYS



FEATURES

1. Five types available from 10A to 40A
2. Built-in varistor
3. Includes operation LED (red)
4. Dielectric voltage of 4,000V
5. 4 to 32V DC input voltage
6. Both zero-cross and random types available

TYPICAL APPLICATIONS

1. Molding machine (heater control)
2. Temperature controlled bath (heater control)
3. Printing machines (heater control)
4. Wrapping and packing machine (heater control)
5. Machine tools (Motor control)

Compliance with RoHS Directive

ORDERING INFORMATION

| | | | | | | |
|---|----------|----------|--|--|--|--|
| A | Q | N | | | | |
| AQ-N Solid State Relays | | | | | | |
| Load current | | | | | | |
| 1: 10 A | | | | | | |
| 2: 15 A | | | | | | |
| 3: 20 A | | | | | | |
| 4: 25 A | | | | | | |
| 6: 40 A | | | | | | |
| Load voltage | | | | | | |
| 1: 75 to 250 V AC, Zero-cross | | | | | | |
| 2: 75 to 250 V AC, Random | | | | | | |
| Input voltage | | | | | | |
| 1: 4 to 32 V DC | | | | | | |
| Function | | | | | | |
| Nil: None | | | | | | |
| V: Built-in varistor | | | | | | |
| L: With LED indication | | | | | | |
| VL: Built-in varistor and with LED indication | | | | | | |

TYPES

1. Standard type

| Type | Load current | Load voltage | Part No. |
|-----------------|--------------|---------------|----------|
| Zero-cross type | 10A | 75 to 250V AC | AQN111 |
| | 15A | | AQN211 |
| | 20A | | AQN311 |
| | 25A | | AQN411 |
| | 40A | | AQN611 |
| Random type | 10A | 75 to 250V AC | AQN121 |
| | 15A | | AQN221 |
| | 20A | | AQN321 |
| | 25A | | AQN421 |
| | 40A | | AQN621 |

2. With LED indication type

| Type | Load current | Load voltage | Part No. |
|-----------------|--------------|---------------|----------|
| Zero-cross type | 10A | 75 to 250V AC | AQN111L |
| | 15A | | AQN211L |
| | 20A | | AQN311L |
| | 25A | | AQN411L |
| | 40A | | AQN611L |
| Random type | 10A | 75 to 250V AC | AQN121L |
| | 15A | | AQN221L |
| | 20A | | AQN321L |
| | 25A | | AQN421L |
| | 40A | | AQN621L |

3. With varistor type

| Type | Load current | Load voltage | Part No. |
|-----------------|--------------|---------------|----------|
| Zero-cross type | 10A | 75 to 250V AC | AQN111V |
| | 15A | | AQN211V |
| | 20A | | AQN311V |
| | 25A | | AQN411V |
| | 40A | | AQN611V |
| Random type | 10A | 75 to 250V AC | AQN121V |
| | 15A | | AQN221V |
| | 20A | | AQN321V |
| | 25A | | AQN421V |
| | 40A | | AQN621V |

4. With varistor and LED indication type

| Type | Load current | Load voltage | Part No. |
|-----------------|--------------|---------------|----------|
| Zero-cross type | 10A | 75 to 250V AC | AQN111VL |
| | 15A | | AQN211VL |
| | 20A | | AQN311VL |
| | 25A | | AQN411VL |
| | 40A | | AQN611VL |
| Random type | 10A | 75 to 250V AC | AQN121VL |
| | 15A | | AQN221VL |
| | 20A | | AQN321VL |
| | 25A | | AQN421VL |
| | 40A | | AQN621VL |

Standard packing; carton: 2 pcs., case: 100 pcs.

5. Accessories

| Type | Part No. | Packaged quantity |
|--|---------------|-------------------------------|
| Standard heat sink (10A, 15A and 20A) | AQP-HS-J10A | 5 in a carton, 20 in a case |
| Standard heat sink (25A) | AQP-HS-30/40A | 5 in a carton, 20 in a case |
| Standard heat sink (40A) | AQP-HS-J25A | No carton, 5 in a case |
| Slim heat sink (45mm wide) (Mountable on a DIN rail) | AQP-HS-SJ20A | No carton, 8 in a case |
| DIN rail mounting plate | AQP-DP | 10 in a carton, 100 in a case |
| Terminal cover | AQP-NPC | 2 in a carton, 100 in a case |

RATINGS

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

1) Zero-cross type

| Item | Type | 10A | 15A | 20A | 25A | 40A | Remarks |
|-------------|----------------------------------|--|--|--|--|--|--------------------------|
| | Part No. | AQN111 AQN111L AQN111V AQN111VL | AQN211 AQN211L AQN211V AQN211VL | AQN311 AQN311L AQN311V AQN311VL | AQN411 AQN411L AQN411V AQN411VL | AQN611 AQN611L AQN611V AQN611VL | |
| Input side | Input voltage | 4 to 32V | | | | | *1 |
| | Input current | Max. 20mA | | | | | *1 |
| | Drop-out voltage | Min. 1V | | | | | |
| Output side | Max. load current | 10A | 15A | 20A | 25A | 40A | *2 |
| | Load voltage | 75V to 250V | | | | | |
| | Frequency | 45Hz to 65Hz | | | | | |
| | Non-repetitive surge current | 100A | 150A | 200A | 250A | 400A | In one cycle at 60Hz *3 |
| | Max. "OFF-state" leakage current | Max. 10mA | | | | | at 60Hz |
| | Max. "ON-state" voltage drop | 1.6V | | | | | at Max. carrying current |
| | Min. load current | 100mA | | | | | *4 |

Notes: *1. Please refer to REFERENCE DATA, "3. Input current vs. input voltage".

*2. Please refer to REFERENCE DATA, "1. Load current vs. ambient temperature".

*3. Please refer to REFERENCE DATA, "2. Non-repetitive surge current vs. carrying time".

*4. When the load current is less than the rated minimum load current, please refer to "Cautions for Use of SSR".

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2) Random type

| Item | Type | 10A | 15A | 20A | 25A | 40A | Remarks |
|-------------|----------------------------------|--|--|--|--|--|--------------------------|
| | Part No. | AQN121 AQN121L AQN121V AQN121VL | AQN221 AQN221L AQN221V AQN221VL | AQN321 AQN321L AQN321V AQN321VL | AQN421 AQN421L AQN421V AQN421VL | AQN621 AQN621L AQN621V AQN621VL | |
| Input side | Input voltage | 4 to 32V | | | | | *1 |
| | Input current | Max. 20mA | | | | | *1 |
| | Drop-out voltage | Min. 1V | | | | | |
| Output side | Max. load current | 10A | 15A | 20A | 25A | 40A | *2 |
| | Load voltage | 75V to 250V | | | | | |
| | Frequency | 45Hz to 65Hz | | | | | |
| | Non-repetitive surge current | 100A | 150A | 200A | 250A | 400A | In one cycle at 60Hz *3 |
| | Max. "OFF-state" leakage current | Max. 10mA | | | | | at 60Hz |
| | Max. "ON-state" voltage drop | 1.6V | | | | | at Max. carrying current |
| | Min. load current | 100mA | | | | | *4 |

Notes: *1. Please refer to REFERENCE DATA, "3. Input current vs. input voltage".

*2. Please refer to REFERENCE DATA, "1. Load current vs. ambient temperature".

*3. Please refer to REFERENCE DATA, "2. Non-repetitive surge current vs. carrying time".

*4. When the load current is less than the rated minimum load current, please refer to "Cautions for Use of SSR".

2. Characteristics (Measurement condition: at 20°C 68°F, Input ripple: 1% or less)

1) Zero-cross type

| Type | 10A | 15A | 20A | 25A | 40A | Remarks |
|-----------------------------------|--|--|--|--|--|------------------------------------|
| Part No. | AQN111 AQN111L AQN111V AQN111VL | AQN211 AQN211L AQN211V AQN211VL | AQN311 AQN311L AQN311V AQN311VL | AQN411 AQN411L AQN411V AQN411VL | AQN611 AQN611L AQN611V AQN611VL | |
| Operate time, max. | 1/2 cycle of voltage sine wave + 1ms | | | | | |
| Release time, max. | 1/2 cycle of voltage sine wave + 1ms | | | | | |
| Insulation resistance, min. | 100MΩ between input and output | | | | | at 500 V DC |
| Breakdown voltage | 4,000 Vrms between input and output; 2,500 Vrms between input, output and case | | | | | for 1min. |
| Vibration resistance (Functional) | 10 to 55Hz double amplitude of 1.5mm | | | | | X, Y, Z axes |
| Shock resistance (Functional) | Min. 980 m/s ² | | | | | X, Y, Z axes |
| Ambient temperature | -20°C to +80°C -4°F to +176°F*2 | | | | | Non-condensing at low temperatures |
| Storage temperature | -25°C to +85°C -13°F to +185°F | | | | | |
| Operational method | Zero-cross (Turn-ON and Turn-OFF) | | | | | |

2) Random type

| Type | 10A | 15A | 20A | 25A | 40A | Remarks |
|-----------------------------------|--|--|--|--|--|------------------------------------|
| Part No. | AQN121 AQN121L AQN121V AQN121VL | AQN221 AQN221L AQN221V AQN221VL | AQN321 AQN321L AQN321V AQN321VL | AQN421 AQN421L AQN421V AQN421VL | AQN621 AQN621L AQN621V AQN621VL | |
| Operate time, max. | 1ms | | | | | |
| Release time, max. | 1/2 cycle of voltage sine wave + 1ms | | | | | |
| Insulation resistance, min. | 100MΩ between input and output | | | | | at 500 V DC |
| Breakdown voltage | 4,000 Vrms between input and output; 2,500 Vrms between input, output and case | | | | | for 1min. |
| Vibration resistance (Functional) | 10 to 55Hz double amplitude of 1.5mm | | | | | X, Y, Z axes |
| Shock resistance (Functional) | Min. 980 m/s ² | | | | | X, Y, Z axes |
| Ambient temperature | -20°C to +80°C -4°F to +176°F | | | | | Non-condensing at low temperatures |
| Storage temperature | -25°C to +85°C -13°F to +185°F | | | | | |
| Operational method | Random Turn-ON, Zero-cross Turn-OFF | | | | | |

REFERENCE DATA

1. Load current vs. ambient temperature

Use load current within range specified in the figure below.

Tested condition

With external heat sink

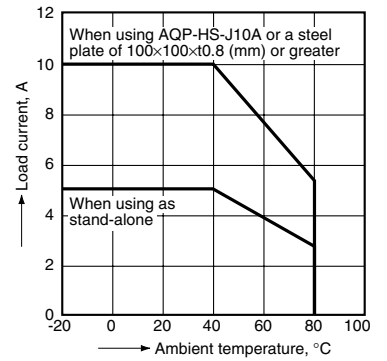
- 1) (1) 10A, 15A, 20A type
Shown with standard heat sink (AQP801)
- (2) Shown with 25A type standard heat sink (AQP804)
- (3) Shown with 40A type standard heat sink (AQP806)
- (4) In the case of the AQP812 slim heat-sink types, characteristics data are available for each type. Please refer to (6).

- 2) If attached to a heat sink, use a heat conductive compound (Ex. Toshiba silicone YG6111 or TSK5303) of similar coating to improve cooling.

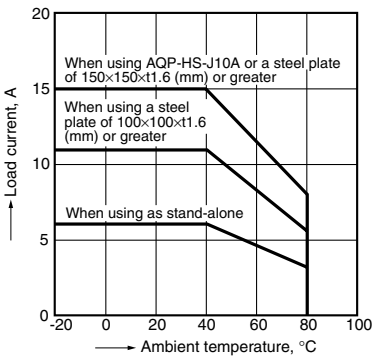
Without external heat sink

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.

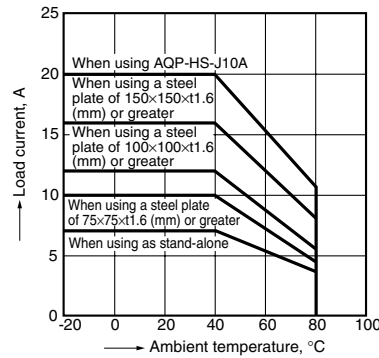
(1) 10A type



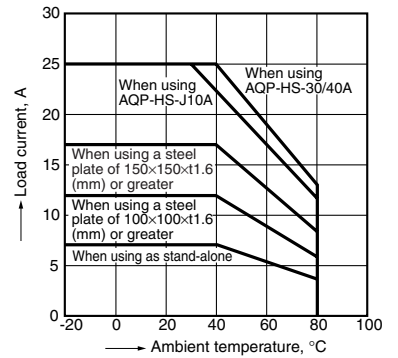
(2) 15A type



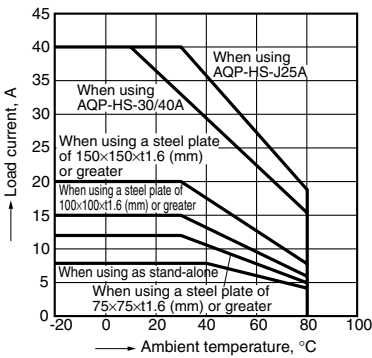
(3) 20A type



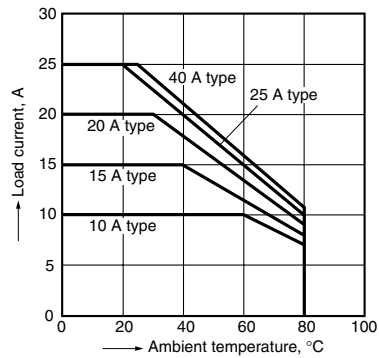
(4) 25A type



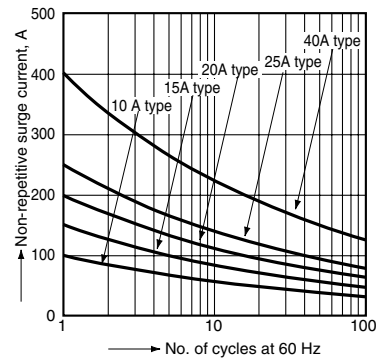
(5) 40A type



(6) Data when mounted on an AQP-HS-SJ20A slim heat sink

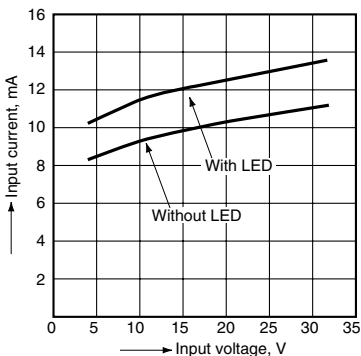


2. Non-repetitive surge current vs. carrying time



3. Input current vs. input voltage

10A, 15A, 20A, 25A, 40A common



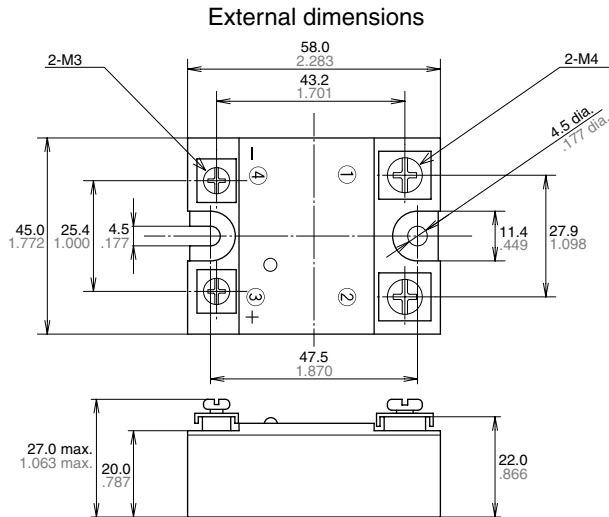
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DIMENSIONS (mm inch)

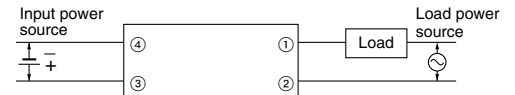
The CAD data of the products with a **CAD Data** mark can be downloaded from: <http://panasonic-electric-works.net/ac>

* The right figure is the LED indication type. The standard type has the same dimensions.

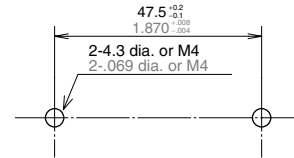
CAD Data



Schematic



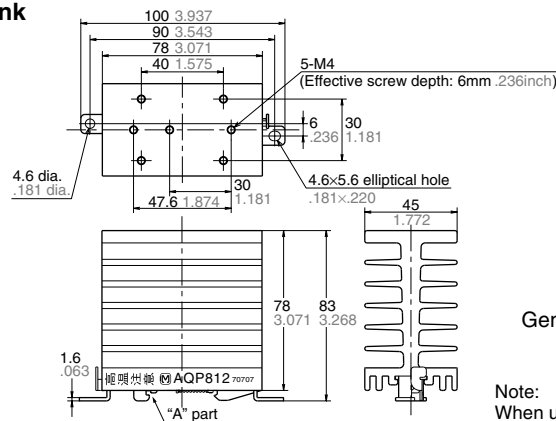
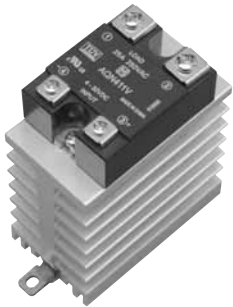
Mounting dimensions



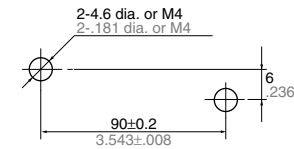
ACCESSORIES

AQP-HS-SJ20A Slim Heat Sink

CAD Data



Mounting dimensions

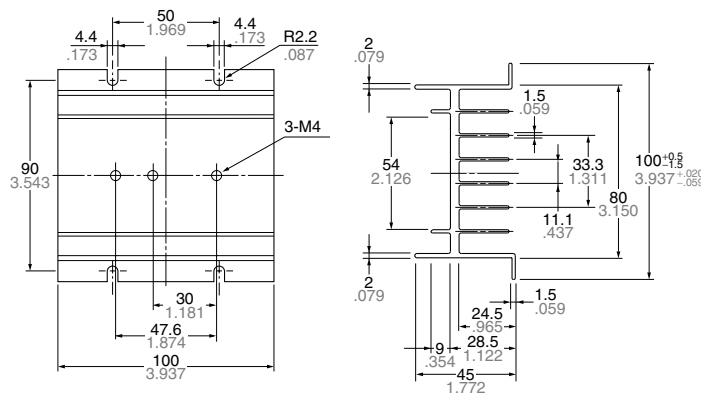
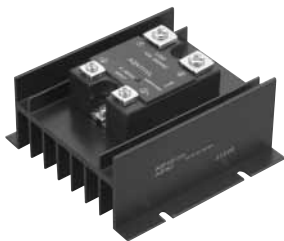


General tolerance: $\pm 1.0 \pm .039$

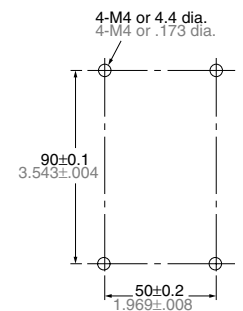
Note: When using on a DIN rail, please install so that the "A" part is on top.

AQP-HS-J10A Standard Heat Sink

CAD Data

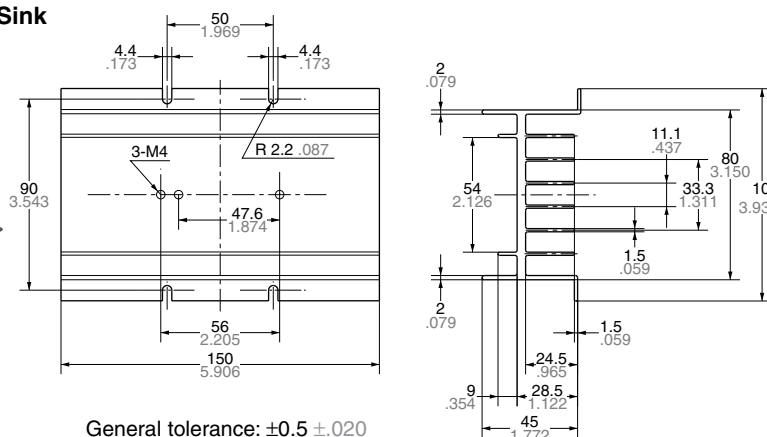


Mounting dimensions

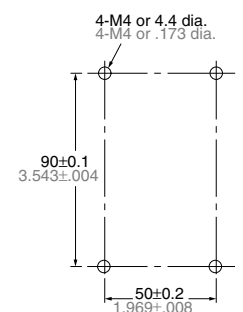


AQP-HS-30/40A Standard Heat Sink

CAD Data



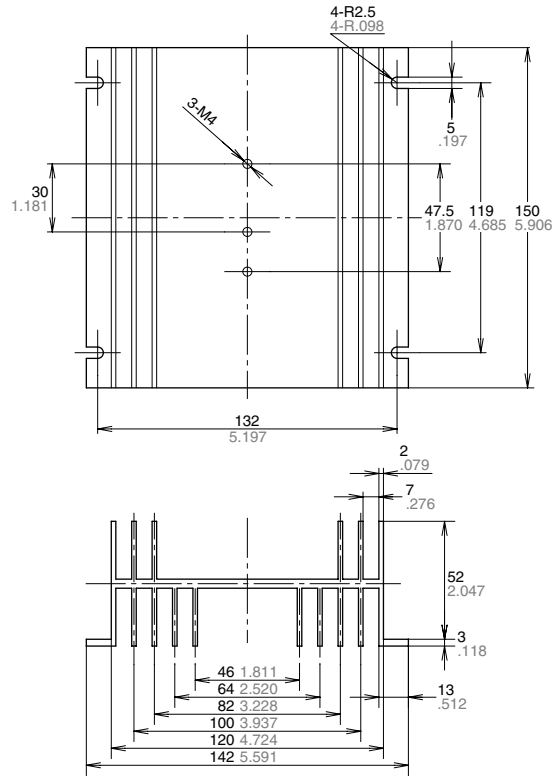
Mounting dimensions



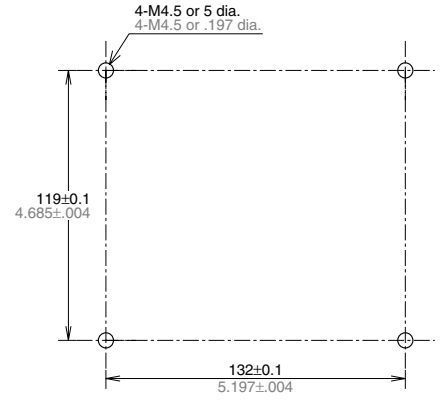
General tolerance: $\pm 0.5 \pm .020$

AQP-HS-J25A Standard Heat Sink

CAD Data

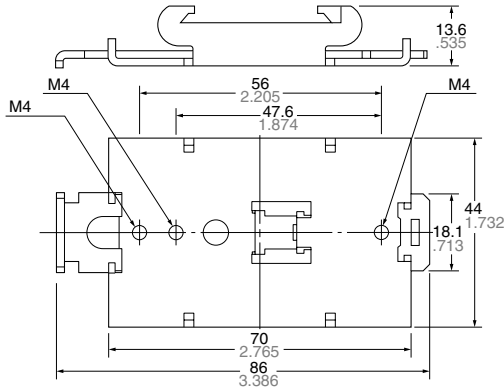


Mounting dimensions



AQP-DP DIN Rail Mounting Plate

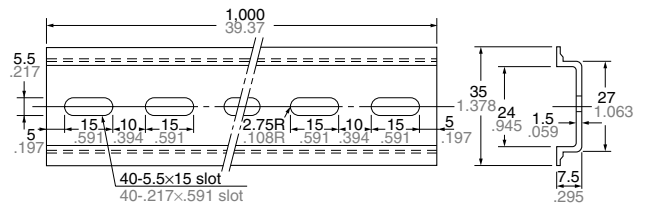
CAD Data



General tolerance: ±0.5 ±.020

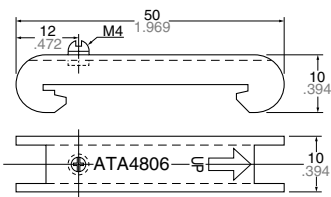
AT8-DLA1 Mounting Rail

CAD Data



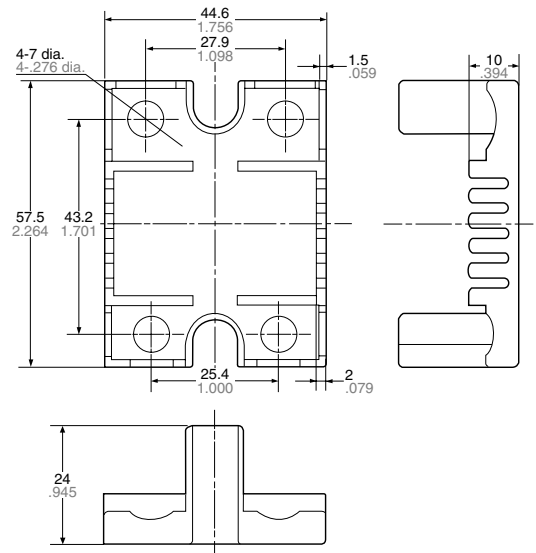
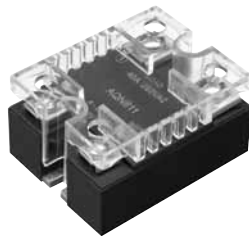
ATA4806 Fastening Plate

CAD Data



AQP-NPC Terminal Cover

CAD Data



Recommended Temperature Controllers



<KT4H Temperature Controller>

Our temperature controller is recommended for use with our Solid State Relays.

Features

- Data can be collected using the RS485 communications interface via a PLC.
- Improved visibility using a negative type LCD and backlight.
- Depth-wise length (chassis dimension) is 56 mm 2.205 inch.

Substitute part numbers

| Power supply | Control output | Part No. |
|-----------------|----------------|-------------|
| 100 to 240 V AC | Relay contact | AKT4H111100 |

*For detailed product information about temperature controllers, please refer to our website:
http://panasonic-denko.co.jp/ac/e/fasys/component/temperature_controller/

For Cautions for Use