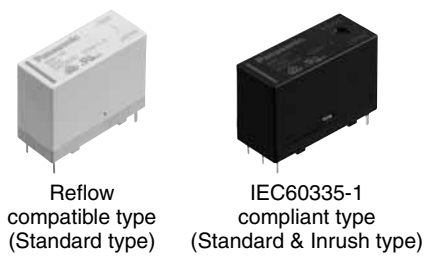




### 1 Form A 8/16A, Small Polarized Power Relays (latching type)

## DW RELAYS (ADW1)



**RoHS compliant**

### FEATURES

1. Inrush current 100A type available
2. IEC60335-1\* compliant, PTI 325V (VDE approved) type available
3. Surge breakdown voltage (between contact and coil): 12,000 V
4. Breakdown voltage (between contact and coil): 5,000 V
5. Reflow possible (pin-in-paste)

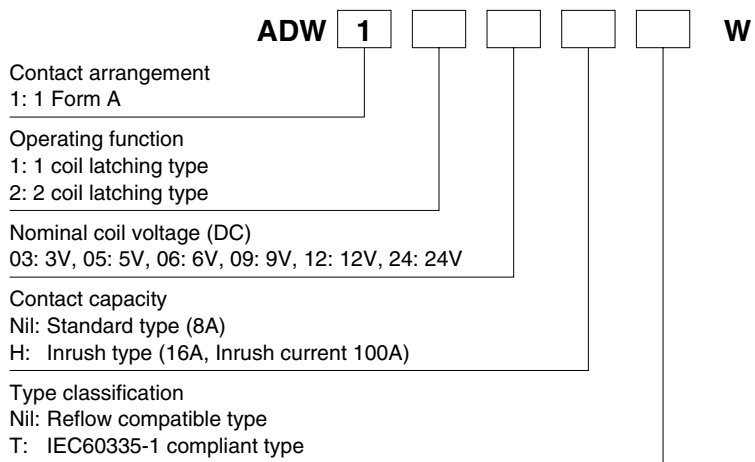
\* Common safety standard for major electrical appliance

### TYPICAL APPLICATIONS

1. Smart meters
2. Industrial equipment
3. Security equipment
4. Home appliances
5. Various power supplies
6. Lighting

\* Protective construction: Flux-resistant type

### ORDERING INFORMATION



Notes: 1. T type is non-compliant reflow soldering.  
2. The suffix "W" on the part number is only displayed on the inner and outer packaging. It is not displayed on the relay.

## TYPES

### 1. Standard type (8A) (Reflow compatible type)

Contact arrangement	Nominal coil voltage	Part No.	
		1 coil latching type	2 coil latching type
1 Form A	3V DC	ADW1103W	ADW1203W
	5V DC	ADW1105W	ADW1205W
	6V DC	ADW1106W	ADW1206W
	9V DC	ADW1109W	ADW1209W
	12V DC	ADW1112W	ADW1212W
	24V DC	ADW1124W	ADW1224W

Standard packing: Carton: 100 pcs.; Case: 500 pcs.

Note: Carton packing is standard. Tube packing type is also available. Please consult us for details.

### 2. Standard type (8A) (IEC60335-1 compliant type)

Contact arrangement	Nominal coil voltage	Part No.	
		1 coil latching type	2 coil latching type
1 Form A	3V DC	ADW1103TW	ADW1203TW
	5V DC	ADW1105TW	ADW1205TW
	6V DC	ADW1106TW	ADW1206TW
	9V DC	ADW1109TW	ADW1209TW
	12V DC	ADW1112TW	ADW1212TW
	24V DC	ADW1124TW	ADW1224TW

Standard packing: Carton: 100 pcs.; Case: 500 pcs.

Note: Carton packing is standard. Tube packing type is also available. Please consult us for details.

### 3. Inrush type (16A, Inrush current 100A)

Contact arrangement	Nominal coil voltage	Part No.	
		1 coil latching type	2 coil latching type
1 Form A	3V DC	ADW1103HTW	ADW1203HTW
	5V DC	ADW1105HTW	ADW1205HTW
	6V DC	ADW1106HTW	ADW1206HTW
	9V DC	ADW1109HTW	ADW1209HTW
	12V DC	ADW1112HTW	ADW1212HTW
	24V DC	ADW1124HTW	ADW1224HTW

Standard packing: 100 pcs.; Case: 500 pcs.

Note: Carton packing is standard. Tube packing type is also available. Please contact us for details.

## RATING

### 1. Coil data

#### 1) 1 coil latching type

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. applied voltage (at 20°C 68°F)
3V DC	*80%V or less of nominal voltage (Initial)	*80%V or less of nominal voltage (Initial)	66.7mA	45Ω	200mW	110%V of nominal voltage
5V DC			40.0mA	125Ω		
6V DC			33.3mA	180Ω		
9V DC			22.2mA	405Ω		
12V DC			16.7mA	720Ω		
24V DC			8.3mA	2,880Ω		

#### 2) 2 coil latching type

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. applied voltage (at 20°C 68°F)
			Set coil	Reset coil	Set coil	Reset coil	Set coil	Reset coil	
3V DC	*80%V or less of nominal voltage (Initial)	*80%V or less of nominal voltage (Initial)	133.3mA	133.3mA	22.5Ω	22.5Ω	400mW	400mW	110%V of nominal voltage
5V DC			80.0mA	80.0mA	62.5Ω	62.5Ω			
6V DC			66.7mA	66.7mA	90 Ω	90 Ω			
9V DC			44.4mA	44.4mA	202.5Ω	202.5Ω			
12V DC			33.3mA	33.3mA	360 Ω	360 Ω			
24V DC			16.7mA	16.7mA	1,440 Ω	1,440 Ω			

\*Pulse drive (JIS C 5442-1996)

## 2. Specifications

Characteristics	Item		Specifications	
			Standard type (8A Reflow compatible type, IEC60335-1 compliant type)	Inrush type (16A IEC60335-1 compliant type)
Contact	Arrangement		1 Form A	
	Contact resistance (Initial)		Max. 100 mΩ (By voltage drop 6 V DC 1A)	
	Contact material		AgSnO <sub>2</sub> type	
Rating	Nominal switching capacity (resistive load)		8A 250V AC	16A 277V AC
	Max. switching power (resistive load)		2,000V A	4,432V A
	Max. switching voltage		250V AC	277V AC
	Max. switching current		8A AC	16A AC
	Nominal operating power		200mW (1 coil latching type), 400mW (2 coil latching type)	
	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 "Breakdown voltage" section)	
	Breakdown voltage (Initial)	Between open contacts	1,000 Vrms for 1min. (Detection current: 10mA)	
		Between contact and coil	5,000 Vrms for 1min. (Detection current: 10mA)	
	Temperature rise (coil) (at 85°C 185°F)		Max. 35°C 95°F (By resistive method, contact carrying current: 8A, Coil: de-energized)	
	Surge breakdown voltage*2 (Between contact and coil)		12,000 V (Initial)	
	Set time (at 20°C 68°F)		Max. 15 ms (Nominal voltage applied to the coil, excluding contact bounce time)	
	Reset time (at 20°C 68°F)		Max. 15 ms (Nominal voltage applied to the coil, excluding contact bounce time)	
Mechanical characteristics	Shock resistance	Functional	100 m/s <sup>2</sup> (Half-wave pulse of sine wave: 11 ms; detection time: 10μs)	
		Destructive	1,000 m/s <sup>2</sup> (Half-wave pulse of sine wave: 6 ms)	
	Vibration resistance	Functional	10 to 55 Hz at double amplitude of 2 mm (Detection time: 10μs)	
		Destructive	10 to 55 Hz at double amplitude of 3 mm	
Expected life	Mechanical		Min. 10 <sup>6</sup> (at 180 times/min.)	
	Electrical	Resistive load	Both types: Min. 5 × 10 <sup>4</sup> (at 8A 250V AC, at 20 times/min.) IEC60335-1 type: Min. 10 <sup>5</sup> (at 5A 250V AC, at 20 times/min.)	Min. 2 × 10 <sup>4</sup> (at 16A 277V AC, ON:OFF = 1s:5s) Min. 5 × 10 <sup>4</sup> (at 8A 250V AC, at 20 times/min.)
		Inrush current	—	Min. 2.5 × 10 <sup>4</sup> [Inrush 100A 600W (120V AC) Tungsten] Cycle rate ON:OFF = 1s:59s
Conditions	Conditions for operation, transport and storage*3 *4		Temperature: -40°C to +85°C -40°F to +185°F (8A and less), -40°C to +70°C -40°F to +158°F (Over 8A to 16A) Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature)	
Unit weight			Approx. 8 g .28 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.

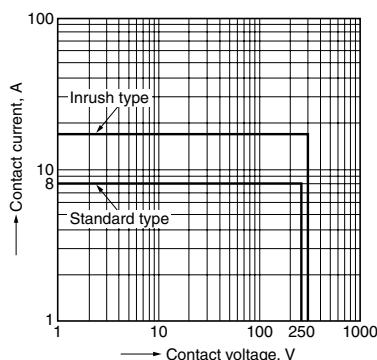
\*2. Wave is standard shock voltage of ±1.2×50μs according to JEC-212-1981

\*3. The upper limit of the ambient temperature is the maximum temperature that can satisfy the coil temperature rise value. Refer to Usage, transport and storage conditions in NOTES.

\*4. Allowable range when in original packaging is -40°C to +70°C -40°F to +158°F.

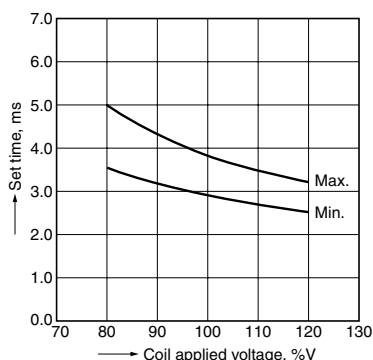
## REFERENCE DATA

### 1. Max. switching capacity (AC resistive load)



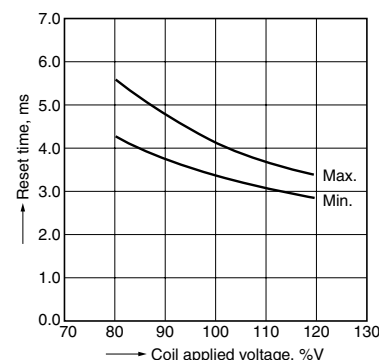
### 2. Set time

Tested sample: ADW1106, 15 pcs  
Ambient temperature: 28°C 82.4°F  
Contact load: 5V DC, 10mA



### 3. Reset time

Tested sample: ADW1106, 15 pcs  
Ambient temperature: 28°C 82.4°F  
Contact load: 5V DC, 10mA



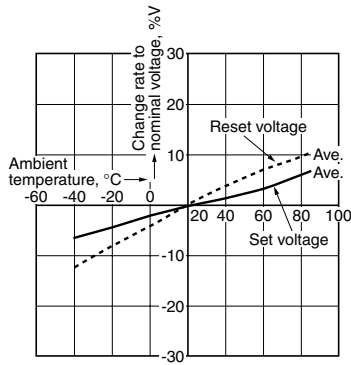
# DW (ADW1)

## 4. Ambient temperature characteristics

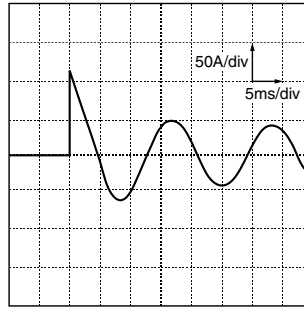
Tested sample: ADW1106, 6pcs

Ambient temperature: -40°C to +85°C

-40°F to +185°F



## 5. Inrush current wave form



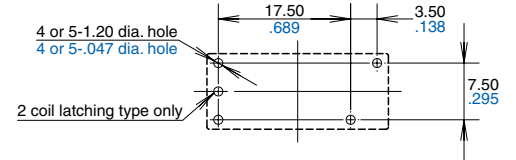
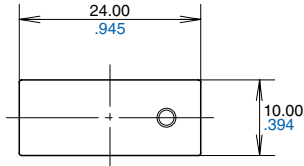
## DIMENSIONS (mm inch)

The CAD data of the products with a **CAD Data** mark can be downloaded from: <http://industrial.panasonic.com/ac/e/>

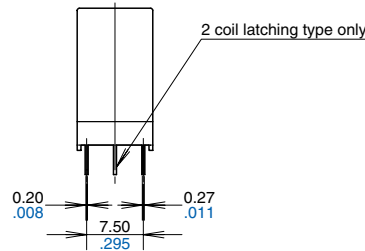
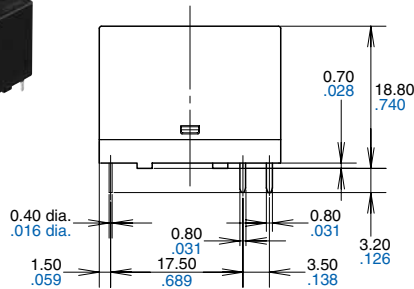
### CAD Data

### External dimensions

### PC board pattern (Bottom view)

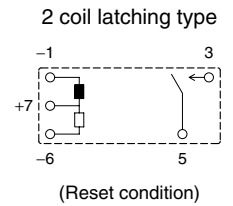
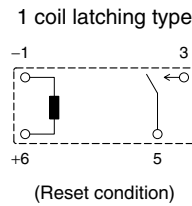


Tolerance:  $\pm 0.1 \pm 0.004$



General tolerance:  $\pm 0.3 \pm 0.012$

### Schematic (Bottom view)



## SAFETY STANDARDS

Item	UL/C-UL (Recognized)		VDE (Recognized)	
	File No.	Contact rating	File No.	Contact rating
Standard type (8A)	E43149	8A 250V AC R 85°C 185°F 5A 30V DC R 85°C 185°F	40032254	8A 250V AC ( $\cos\phi=1.0$ ) 85°C 185°F 5A 30V DC (0ms) 85°C 185°F
Inrush type (16A)	E43149	8A 250V AC R 85°C 185°F 16A 277V AC R 60°C 140°F 5A 30V DC R 85°C 185°F 600W Tungsten, 120V AC 50°C 122°F 1200W Tungsten, 240V AC 50°C 122°F 1200W Standard ballast 277V AC 50°C 122°F 5A 347V AC R 85°C 185°F (UL standards only)	—	Please consult us for details.

Note: CSA standards; Certified by C-UL

## NOTES

### ■ Usage, transport and storage conditions

#### 1) Temperature:

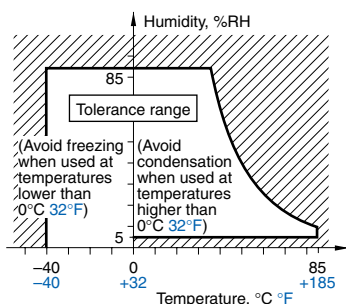
–40 to +85°C –40 to +185°F (Allowable range is –40 to +70°C –40 to +158°F when in original packaging and when the contact current is in excess of 8 A for the inrush type.)

#### 2) Humidity: 5 to 85% 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



#### 4) 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.

#### 5) 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.

#### 6) 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.

### ■ Solder and cleaning conditions

#### 1) Flow solder mounting conditions

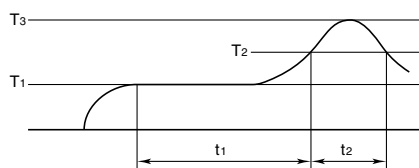
Please obey the following conditions when soldering automatically.

(1) Preheating: within 120°C 248°F (solder surface terminal portion) and within 120 seconds

(2) Soldering iron: 260°C±5°C 500°F±41°F (solder temperature) and within 6 seconds (soldering time)

\* Furthermore, because the type of PC board used and other factors may influence the relays, test that the relays function properly on the actual PC board on which they are mounted.

#### 2) Reflow solder mounting (Pin-in-Paste mounting) conditions



T<sub>1</sub> = 150 to 180°C 302 to 356°F  
T<sub>2</sub> = 230°C 446°F or more  
T<sub>3</sub> = 250°C 482°F or less  
t<sub>1</sub> = 60 to 120 seconds  
t<sub>2</sub> = within 30 seconds

• Cautions to observe when mounting temperature increases in the relay are greatly dependent on the way different parts are located a PC board and the heating method of the reflow device. Therefore, please conduct testing on the actual device beforehand after making sure the parts soldered on the relay terminals and the top of the relay case are within the temperature conditions given above.

3) Since this is not a sealed type relay, do not clean it as is. Also, be careful not to allow flux to overflow above the PC board or enter the inside of the relay.

### ■ Cautions for use

1) For precautions regarding use and explanations of technical terminology, please refer to Group Catalog or our web site.

2) Since this relay is polarized, please observe the coil polarity (+ and –). Be sure to connect as shown in the attached product specifications diagram.

3) To ensure good operation, please keep the voltage on the coil ends to ±5% (at 20°C 68°F) of the rated coil operation voltage.

Also, please be aware that the pick-up voltage and drop-out voltage may change depending on the temperature and conditions of use.

4) Keep the ripple rate of the nominal coil voltage below 5%.

5) The cycle lifetime is defined under the standard test condition specified in the JIS C 5442 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 are synchronous. Rocking and fusing can easily occur due to contact shifting.

(2) Highly frequent load-operating  
When highly frequent 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 HNO<sub>3</sub> is formed. This can corrode metal materials.

Three countermeasures for these are listed here.

- Incorporate an arc-extinguishing circuit.
- Lower the operating frequency
- Lower the ambient humidity

6) Minimum switching capacity provides a guideline for low level load switching. 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.

7) 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.

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

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

10) This relay can be oriented in any way when installing. However, the set/reset voltage and set/reset time, etc., may be affected slightly by the orientation due to the influence of gravitation. Therefore, when evaluating the relay, please do so with the relay placed in your intended orientation.

11) In order to maintain consistent set/reset pulse time of the latching type relay so that positive movement is ensured under ambient temperature fluctuations and other usage conditions, we recommend that you keep the coil applied set/reset pulse width to 30 ms or higher using the nominal coil voltage.

12) 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').

13) Do not use parts that generate organic silicon. When present in the vicinity, conduction failure may occur.

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Please contact .....

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