

Compliant with  
European standards  
1a1b 10A/8A polarized  
power relays

## DE RELAYS (ADE)



RoHS compliant

### FEATURES

**1. Conforms to European safety standard (VDE0700 and VDE0631).**

Insulating distance between coil and contacts:

Clearance Min. 8mm .315 inch

Creepage Min. 8mm .315 inch

**2. Low operating power**

Nominal operating power at 200 mW  
(Single side stable, 2 coil latching)

**3. Compact body saves space**

Size: 12.5(W) × 25(L) × 12.5(H) mm

.492(W) × .984(L) × .492(H) inch

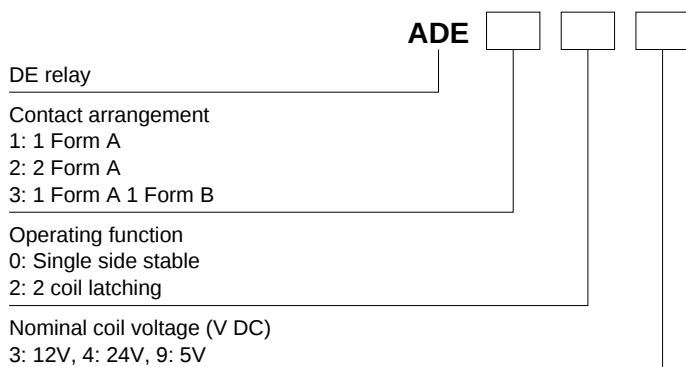
**4. Conforms to the various safety standards**

UL, CSA and VDE approved

### TYPICAL APPLICATIONS

1. Temperature controller
2. Automatic meter reading
3. OA equipment
4. FA equipment

## ORDERING INFORMATION



Notes: 1. Certified by UL, CSA and VDE

2. This product is manufactured by lot after an order is received.

## TYPES

| Contact arrangement | Nominal coil voltage | Single side stable type | 2 coil latching type |
|---------------------|----------------------|-------------------------|----------------------|
|                     |                      | Part No.                | Part No.             |
| 1 Form A            | 5V DC                | ADE109                  | ADE129               |
|                     | 12V DC               | ADE103                  | ADE123               |
|                     | 24V DC               | ADE104                  | ADE124               |
| 1 Form A 1 Form B   | 5V DC                | ADE309                  | ADE329               |
|                     | 12V DC               | ADE303                  | ADE323               |
|                     | 24V DC               | ADE304                  | ADE324               |
| 2 Form A            | 5V DC                | ADE209                  | ADE229               |
|                     | 12V DC               | ADE203                  | ADE223               |
|                     | 24V DC               | ADE204                  | ADE224               |

Standard packing: Tube package: 20 pcs.; Case: 500 pcs.

Note: This product is manufactured by lot after an order is received.

## RATING

### 1. Coil data

#### 1) Single side stable type

| Nominal coil voltage | Pick-up voltage<br>(at 20°C 68°F)            | Drop-out voltage<br>(at 20°C 68°F)           | Nominal operating current<br>[±10%] (at 20°C 68°F) | Coil resistance<br>[±10%] (at 20°C 68°F) | Nominal operating power | Max. applied voltage<br>(at 20°C 68°F) |
|----------------------|----------------------------------------------|----------------------------------------------|----------------------------------------------------|------------------------------------------|-------------------------|----------------------------------------|
| 5V DC                | 70%V or less of nominal voltage<br>(Initial) | 10%V or more of nominal voltage<br>(Initial) | 40 mA                                              | 125Ω                                     | 200mW                   | 130%V of nominal voltage               |
| 12V DC               |                                              |                                              | 16.6mA                                             | 720Ω                                     |                         |                                        |
| 24V DC               |                                              |                                              | 8.3mA                                              | 2,880Ω                                   |                         |                                        |

#### 2) 2 coil latching type

| Nominal coil voltage | Set voltage<br>(at 20°C 68°F)                | Reset voltage<br>(at 20°C 68°F)              | Nominal operating current<br>[±10%] (at 20°C 68°F) |            | Coil resistance<br>[±10%] (at 20°C 68°F) |            | Nominal operating power |            | Max. applied voltage<br>(at 20°C 68°F) |
|----------------------|----------------------------------------------|----------------------------------------------|----------------------------------------------------|------------|------------------------------------------|------------|-------------------------|------------|----------------------------------------|
|                      |                                              |                                              | Set coil                                           | Reset coil | Set coil                                 | Reset coil | Set coil                | Reset coil |                                        |
| 5V DC                | 70%V or less of nominal voltage<br>(Initial) | 70%V or less of nominal voltage<br>(Initial) | 40 mA                                              | 40 mA      | 125Ω                                     | 125Ω       | 200mW                   | 200mW      | 130%V of nominal voltage               |
| 12V DC               |                                              |                                              | 16.6mA                                             | 16.6mA     | 720Ω                                     | 720Ω       |                         |            |                                        |
| 24V DC               |                                              |                                              | 8.3mA                                              | 8.3mA      | 2,880Ω                                   | 2,880Ω     |                         |            |                                        |

### 2. Specifications

| Characteristics            | Item                                                           |                          | Specifications                                                                                                                   |                                                                                                                                                                                          |          |
|----------------------------|----------------------------------------------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| Contact                    | Arrangement                                                    |                          | 1 Form A                                                                                                                         | 1 Form A 1 Form B                                                                                                                                                                        | 2 Form A |
|                            | Contact resistance (Initial)                                   |                          | Max. 30 mΩ (By voltage drop 6 V DC 1A)                                                                                           |                                                                                                                                                                                          |          |
|                            | Contact material                                               |                          | AgSnO <sub>2</sub> type                                                                                                          |                                                                                                                                                                                          |          |
| Rating                     | Nominal switching capacity (resistive load)                    |                          | 10A 250V AC, 10A 30V DC                                                                                                          | 8A 250V AC, 8A 30V DC                                                                                                                                                                    |          |
|                            | Max. switching power (resistive load)                          |                          | 2,500VA, 300W                                                                                                                    | 2,000VA, 240W                                                                                                                                                                            |          |
|                            | Max. switching voltage                                         |                          | 250V AC, 30V DC                                                                                                                  | 250V AC, 30V DC                                                                                                                                                                          |          |
|                            | Max. switching current                                         |                          | 10A                                                                                                                              | 8A                                                                                                                                                                                       |          |
|                            | Nominal operating power                                        |                          | 200mW                                                                                                                            |                                                                                                                                                                                          |          |
|                            | Min. switching capacity*1                                      |                          | 100mA 5V 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 1 min. (Detection current: 10 mA)                                                                                 |                                                                                                                                                                                          |          |
|                            |                                                                | Between contact sets     | —                                                                                                                                | 4,000 Vrms for 1 min. (Detection current: 10 mA)                                                                                                                                         |          |
|                            |                                                                | Between contact and coil | 5,000 Vrms for 1 min. (Detection current: 10 mA)                                                                                 |                                                                                                                                                                                          |          |
|                            | Surge breakdown voltage*2 (Between contact and coil) (Initial) |                          | 12,000 V                                                                                                                         |                                                                                                                                                                                          |          |
|                            | Temperature rise (coil) (at 70°C 158°F)                        |                          | Max. 50°C 122°F (By resistive method)                                                                                            |                                                                                                                                                                                          |          |
|                            | Operate time [Set time] (at 20°C 68°F)                         |                          | Max. 10 ms [Max. 10 ms]<br>(Nominal coil voltage applied to the coil, excluding contact bounce time.)                            |                                                                                                                                                                                          |          |
| Mechanical characteristics | Release time [Reset time] (at 20°C 68°F)                       |                          | Max. 5 ms [Max. 10 ms]<br>(Nominal coil voltage applied to the coil, excluding contact bounce time.) (without diode)             |                                                                                                                                                                                          |          |
|                            | Shock resistance                                               | Functional               | Min. 196 m/s <sup>2</sup> (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.)                                           |                                                                                                                                                                                          |          |
|                            |                                                                | Destructive              | Min. 980 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>7</sup> (at 300 times/min.)                                                                                         |                                                                                                                                                                                          |          |
|                            | Electrical                                                     |                          | Min. 10 <sup>5</sup><br>(resistive load, at 20 times/min., at nominal switching capacity)                                        | Min. 10 <sup>5</sup> (resistive load, at 20 times/min., at AC nominal switching capacity)<br>Min. 5×10 <sup>4</sup> (resistive load, at 20 times/min., at DC nominal switching capacity) |          |
| Conditions                 | Conditions for operation, transport and storage*3              |                          | Ambient temperature: −40°C to +70°C −40°F to +158°F;<br>Humidity: 5 to 85% R.H. (Not freezing and condensing at low temperature) |                                                                                                                                                                                          |          |
|                            | Max. operating speed                                           |                          | 20 times/min. (at nominal switching capacity)                                                                                    |                                                                                                                                                                                          |          |
| Unit weight                |                                                                |                          | Approx. 7 g .25 oz                                                                                                               |                                                                                                                                                                                          |          |

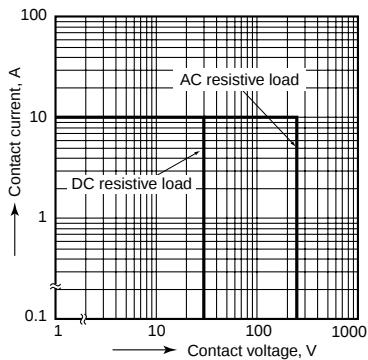
Notes: \*1. This value can change due to the switching frequency, environmental conditions, and desired reliability level, therefore it is recommended to check this with the actual load.

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

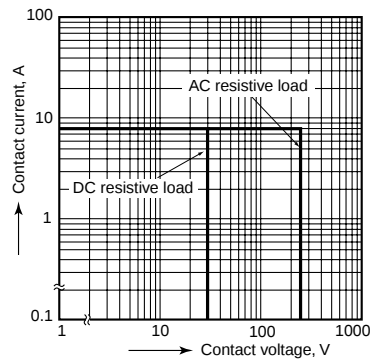
\*3. The upper limit of the ambient temperature is the maximum temperature that can satisfy the coil temperature rise value. Refer to Usage, transport and storage conditions in NOTES.

## REFERENCE DATA

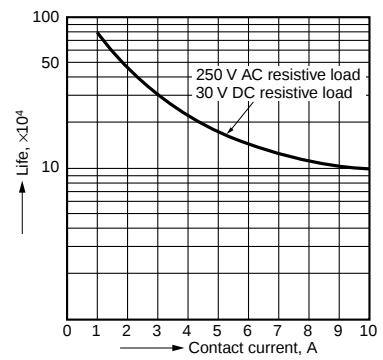
1.-(1) Maximum switching power (1 Form A)



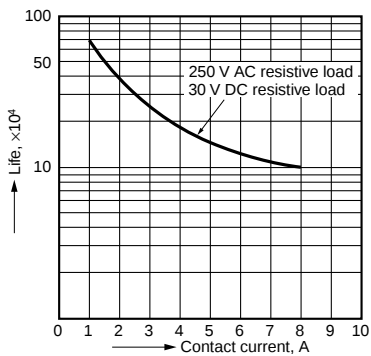
1.-(2) Maximum switching power (1 Form A 1 Form B, 2 Form A)



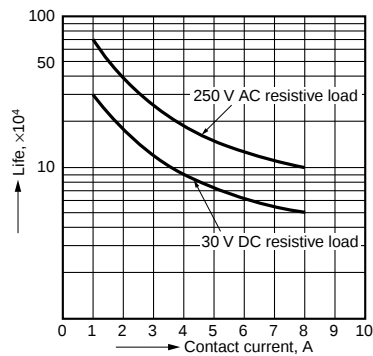
2.-(1) Life curve (1 Form A)



2.-(2) Life curve (1 Form A 1 Form B)



2.-(3) Life curve (2 Form A)

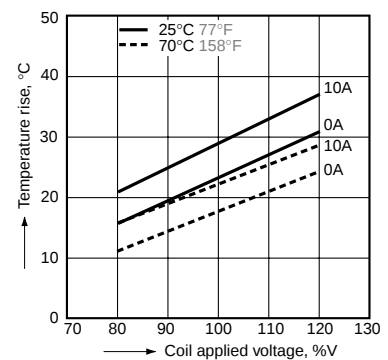


3.-(1) Coil temperature rise (1 Form A)

Tested sample: ADE109

Quantity: n=6

Ambient temperature: 25°C to 70°C 77°F to 158°F

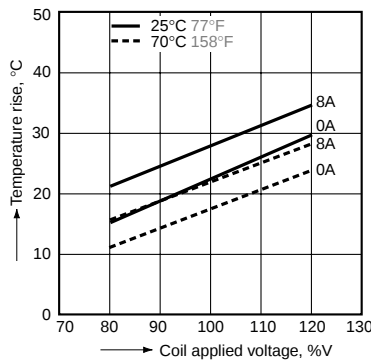


3.-(2) Coil temperature rise (1 Form A 1 Form B)

Tested sample: ADE309

Quantity: n=6

Ambient temperature: 25°C to 70°C 77°F to 158°F

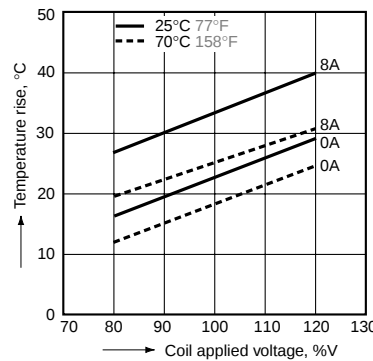


3.-(3) Coil temperature rise (2 Form A)

Tested sample: ADE209

Quantity: n=6

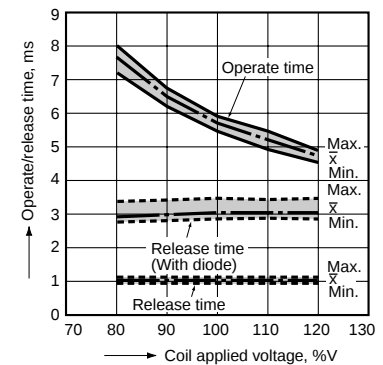
Ambient temperature: 25°C to 70°C 77°F to 158°F



4.-(1) Operate/release time (1 Form A)

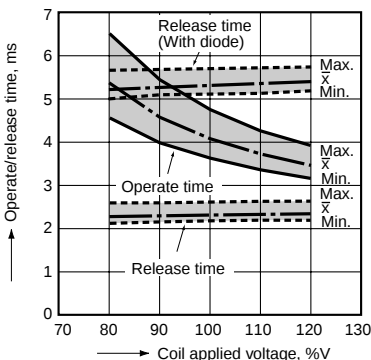
Tested sample: ADE109

Quantity: n=5



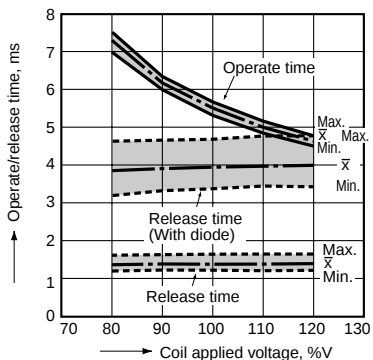
4.-(2) Operate/release time (1 Form A 1 Form B)

Tested sample: ADE309, Quantity: n=5



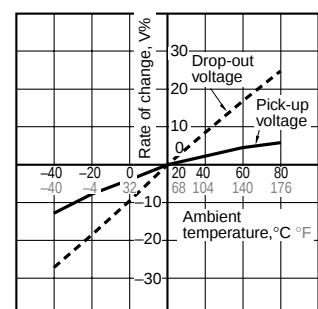
4.-(3) Operate/release time (2 Form A)

Tested sample: ADE209, Quantity: n=5



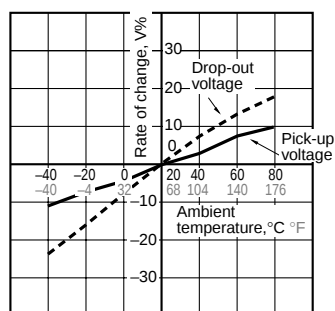
5.-(1) Ambient temperature characteristics (1 Form A)

Tested sample: ADE109, Ambient temperature: -40°C to 80°C -40°F to 176°F, Quantity: n=6



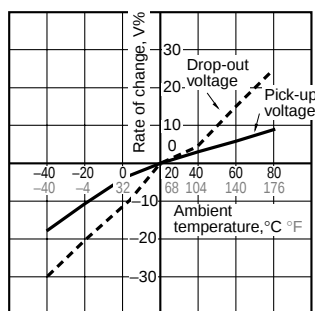
### 5.-(2) Ambient temperature characteristics (1 Form A 1 Form B)

Tested sample: ADE309, Ambient temperature:  
-40°C to 80°C -40°F to 176°F, Quantity: n=6



### 5.-(3) Ambient temperature characteristics (2 Form A)

Tested sample: ADE209, Ambient temperature:  
-40°C to 80°C -40°F to 176°F, Quantity: n=6



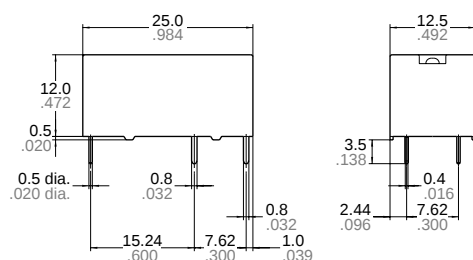
## DIMENSIONS (mm inch)

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

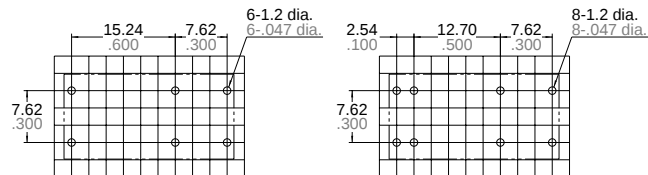
### CAD Data



### External dimensions Single side stable

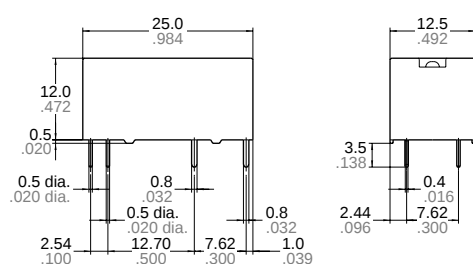


### PC board pattern (Bottom view) Single side stable 2 coil latching type



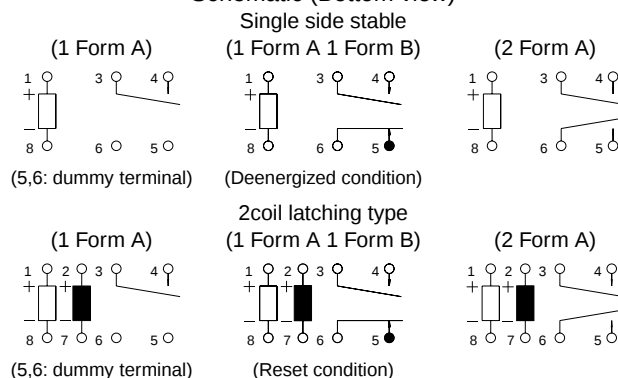
Tolerance :  $\pm 0.1 \pm 0.004$

### 2 coil latching type



Tolerance:  $\pm 0.3 \pm 0.012$

### Schematic (Bottom view)



## SAFETY STANDARDS

| Item                 | UL/C-UL (Recognized) |                         | CSA (Certified) |                         | VDE (Certified) |                       |
|----------------------|----------------------|-------------------------|-----------------|-------------------------|-----------------|-----------------------|
|                      | File No.             | Contact rating          | File No.        | Contact rating          | File No.        | Contact rating        |
| 1 Form A             | E120782              | PILOT DUTY B300<br>R300 | LR85932         | PILOT DUTY B300<br>R300 | 115944          | 8A 250V AC (cosφ=1.0) |
| 1 Form A<br>1 Form B | E120782              | PILOT DUTY B300<br>R300 | LR85932         | PILOT DUTY B300<br>R300 | 115944          | 8A 250V AC (cosφ=1.0) |
| 2 Form A             | E120782              | PILOT DUTY B300<br>R300 | LR85932         | PILOT DUTY B300<br>R300 | 115944          | 8A 250V AC (cosφ=1.0) |

## For Cautions for Use.