

## 1-pole/2-pole 16A polarized power relays

## DJ RELAYS (ADJ)



Without a test button



With a test button

RoHS compliant

### FEATURES

#### 1. Variety of contact arrangements

Wide lineup of 1 Form C, 1 Form A, 1 Form B, 2 Form C, 2 Form A, 2 Form B, 1 Form A 1 Form B.

#### 2. Latching operation

Latching via a polarized magnetic circuit structure allows remote operation and lower energy consumption

#### 3. Compact with high capacity

16A (1-pole type) contact rating in a compact 29×13×16.5 mm (L×W×H) size.

#### 4. Low power consumption

1 coil latching: 150mW  
2 coil latching, single side stable: 250mW

#### 5. High insulation

Both clearance and creepage distance between coil and contact are at 8 mm min.

#### 6. With operation verification function

A test button (manual lever) type to facilitate circuit checks is also available (1 Form C, 1 Form A, 1 Form B types only).

### TYPICAL APPLICATIONS

1. FA equipment (brake circuits of industrial machine and robots, etc.)
2. Electric power devices (remote surveillance devices, etc.)
3. Household appliance networks (Motor control and lighting control, etc.)
4. Time switches

### ORDERING INFORMATION

ADJ

Contact arrangement

- 1: 1 Form C
- 2: 1 Form A
- 3: 1 Form B
- 4: 1 Form A 1 Form B
- 5: 2 Form C
- 6: 2 Form A
- 7: 2 Form B

Operating function and protective construction

- 1: 1 coil latching, Flux-resistant type
- 2: 1 coil latching, Sealed type
- 3: 2 coil latching, Flux-resistant type
- 4: 2 coil latching, Sealed type
- 5: Single side stable, Flux-resistant type
- 6: Single side stable, Sealed type

Auxiliary function

- 0: Without a test button
- 1: With a test button

Nominal coil voltage (DC)

- 05: 5 V, 06: 6 V, 12: 12 V, 24: 24 V, 48: 48 V

## TYPES

### 1. Without a test button

#### 1) Flux-resistant type

| Contact arrangement | Nominal coil voltage | Part No.                |                      |                      |
|---------------------|----------------------|-------------------------|----------------------|----------------------|
|                     |                      | Single side stable type | 1 coil latching type | 2 coil latching type |
| 1 Form C            | 5V DC                | ADJ15005                | ADJ11005             | ADJ13005             |
|                     | 6V DC                | ADJ15006                | ADJ11006             | ADJ13006             |
|                     | 12V DC               | ADJ15012                | ADJ11012             | ADJ13012             |
|                     | 24V DC               | ADJ15024                | ADJ11024             | ADJ13024             |
|                     | 48V DC               | ADJ15048                | ADJ11048             | ADJ13048             |
| 1 Form A            | 5V DC                | ADJ25005                | ADJ21005             | ADJ23005             |
|                     | 6V DC                | ADJ25006                | ADJ21006             | ADJ23006             |
|                     | 12V DC               | ADJ25012                | ADJ21012             | ADJ23012             |
|                     | 24V DC               | ADJ25024                | ADJ21024             | ADJ23024             |
|                     | 48V DC               | ADJ25048                | ADJ21048             | ADJ23048             |
| 1 Form B            | 5V DC                | ADJ35005                | Please use 1 Form A. | Please use 1 Form A. |
|                     | 6V DC                | ADJ35006                |                      |                      |
|                     | 12V DC               | ADJ35012                |                      |                      |
|                     | 24V DC               | ADJ35024                |                      |                      |
|                     | 48V DC               | ADJ35048                |                      |                      |
| 1 Form A 1 Form B   | 5V DC                | ADJ45005                | ADJ41005             | ADJ43005             |
|                     | 6V DC                | ADJ45006                | ADJ41006             | ADJ43006             |
|                     | 12V DC               | ADJ45012                | ADJ41012             | ADJ43012             |
|                     | 24V DC               | ADJ45024                | ADJ41024             | ADJ43024             |
|                     | 48V DC               | ADJ45048                | ADJ41048             | ADJ43048             |
| 2 Form C            | 5V DC                | ADJ55005                | ADJ51005             | ADJ53005             |
|                     | 6V DC                | ADJ55006                | ADJ51006             | ADJ53006             |
|                     | 12V DC               | ADJ55012                | ADJ51012             | ADJ53012             |
|                     | 24V DC               | ADJ55024                | ADJ51024             | ADJ53024             |
|                     | 48V DC               | ADJ55048                | ADJ51048             | ADJ53048             |
| 2 Form A            | 5V DC                | ADJ65005                | ADJ61005             | ADJ63005             |
|                     | 6V DC                | ADJ65006                | ADJ61006             | ADJ63006             |
|                     | 12V DC               | ADJ65012                | ADJ61012             | ADJ63012             |
|                     | 24V DC               | ADJ65024                | ADJ61024             | ADJ63024             |
|                     | 48V DC               | ADJ65048                | ADJ61048             | ADJ63048             |
| 2 Form B            | 5V DC                | ADJ75005                | Please use 2 Form A. | Please use 2 Form A. |
|                     | 6V DC                | ADJ75006                |                      |                      |
|                     | 12V DC               | ADJ75012                |                      |                      |
|                     | 24V DC               | ADJ75024                |                      |                      |
|                     | 48V DC               | ADJ75048                |                      |                      |

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

# DJ (ADJ)

## 2) Sealed type

| Contact arrangement | Nominal coil voltage | Part No.                |                      |                      |
|---------------------|----------------------|-------------------------|----------------------|----------------------|
|                     |                      | Single side stable type | 1 coil latching type | 2 coil latching type |
| 1 Form C            | 5V DC                | ADJ16005                | ADJ12005             | ADJ14005             |
|                     | 6V DC                | ADJ16006                | ADJ12006             | ADJ14006             |
|                     | 12V DC               | ADJ16012                | ADJ12012             | ADJ14012             |
|                     | 24V DC               | ADJ16024                | ADJ12024             | ADJ14024             |
|                     | 48V DC               | ADJ16048                | ADJ12048             | ADJ14048             |
| 1 Form A            | 5V DC                | ADJ26005                | ADJ22005             | ADJ24005             |
|                     | 6V DC                | ADJ26006                | ADJ22006             | ADJ24006             |
|                     | 12V DC               | ADJ26012                | ADJ22012             | ADJ24012             |
|                     | 24V DC               | ADJ26024                | ADJ22024             | ADJ24024             |
|                     | 48V DC               | ADJ26048                | ADJ22048             | ADJ24048             |
| 1 Form B            | 5V DC                | ADJ36005                | Please use 1 Form A. | Please use 1 Form A. |
|                     | 6V DC                | ADJ36006                |                      |                      |
|                     | 12V DC               | ADJ36012                |                      |                      |
|                     | 24V DC               | ADJ36024                |                      |                      |
|                     | 48V DC               | ADJ36048                |                      |                      |
| 1 Form A 1 Form B   | 5V DC                | ADJ46005                | ADJ42005             | ADJ44005             |
|                     | 6V DC                | ADJ46006                | ADJ42006             | ADJ44006             |
|                     | 12V DC               | ADJ46012                | ADJ42012             | ADJ44012             |
|                     | 24V DC               | ADJ46024                | ADJ42024             | ADJ44024             |
|                     | 48V DC               | ADJ46048                | ADJ42048             | ADJ44048             |
| 2 Form C            | 5V DC                | ADJ56005                | ADJ52005             | ADJ54005             |
|                     | 6V DC                | ADJ56006                | ADJ52006             | ADJ54006             |
|                     | 12V DC               | ADJ56012                | ADJ52012             | ADJ54012             |
|                     | 24V DC               | ADJ56024                | ADJ52024             | ADJ54024             |
|                     | 48V DC               | ADJ56048                | ADJ52048             | ADJ54048             |
| 2 Form A            | 5V DC                | ADJ66005                | ADJ62005             | ADJ64005             |
|                     | 6V DC                | ADJ66006                | ADJ62006             | ADJ64006             |
|                     | 12V DC               | ADJ66012                | ADJ62012             | ADJ64012             |
|                     | 24V DC               | ADJ66024                | ADJ62024             | ADJ64024             |
|                     | 48V DC               | ADJ66048                | ADJ62048             | ADJ64048             |
| 2 Form B            | 5V DC                | ADJ76005                | Please use 2 Form A. | Please use 2 Form A. |
|                     | 6V DC                | ADJ76006                |                      |                      |
|                     | 12V DC               | ADJ76012                |                      |                      |
|                     | 24V DC               | ADJ76024                |                      |                      |
|                     | 48V DC               | ADJ76048                |                      |                      |

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

## 2. With a test button

### Flux-resistant type

| Contact arrangement | Nominal coil voltage | Part No.                |                      |                      |
|---------------------|----------------------|-------------------------|----------------------|----------------------|
|                     |                      | Single side stable type | 1 coil latching type | 2 coil latching type |
| 1 Form C            | 5V DC                | ADJ15105                | ADJ11105             | ADJ13105             |
|                     | 6V DC                | ADJ15106                | ADJ11106             | ADJ13106             |
|                     | 12V DC               | ADJ15112                | ADJ11112             | ADJ13112             |
|                     | 24V DC               | ADJ15124                | ADJ11124             | ADJ13124             |
|                     | 48V DC               | ADJ15148                | ADJ11148             | ADJ13148             |
| 1 Form A            | 5V DC                | ADJ25105                | ADJ21105             | ADJ23105             |
|                     | 6V DC                | ADJ25106                | ADJ21106             | ADJ23106             |
|                     | 12V DC               | ADJ25112                | ADJ21112             | ADJ23112             |
|                     | 24V DC               | ADJ25124                | ADJ21124             | ADJ23124             |
|                     | 48V DC               | ADJ25148                | ADJ21148             | ADJ23148             |
| 1 Form B            | 5V DC                | ADJ35105                | Please use 1 Form A. | Please use 1 Form A. |
|                     | 6V DC                | ADJ35106                |                      |                      |
|                     | 12V DC               | ADJ35112                |                      |                      |
|                     | 24V DC               | ADJ35124                |                      |                      |
|                     | 48V DC               | ADJ35148                |                      |                      |

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

## RATING

### 1. Coil data

#### 1) Single side stable

| Nominal coil voltage | Pick-up voltage<br>(at 20°C 68°F)            | Drop-out voltage<br>(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                | 75%V or less of nominal<br>voltage (Initial) | 10%V or more of nominal<br>voltage (Initial) | 100Ω                                     | 250mW                   | 130%V of nominal voltage               |
| 6V DC                |                                              |                                              | 144Ω                                     |                         |                                        |
| 12V DC               |                                              |                                              | 576Ω                                     |                         |                                        |
| 24V DC               |                                              |                                              | 2,304Ω                                   |                         |                                        |
| 48V DC               |                                              |                                              | 9,216Ω                                   |                         |                                        |

#### 2) 1 coil latching

| Nominal coil voltage | Set voltage<br>(at 20°C 68°F)                | Reset voltage<br>(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<br>voltage (Initial) | 70%V or less of nominal<br>voltage (Initial) | 167Ω                                     | 150mW                   | 130%V of nominal voltage               |
| 6V DC                |                                              |                                              | 240Ω                                     |                         |                                        |
| 12V DC               |                                              |                                              | 960Ω                                     |                         |                                        |
| 24V DC               |                                              |                                              | 3,840Ω                                   |                         |                                        |
| 48V DC               |                                              |                                              | 15,360Ω                                  |                         |                                        |

#### 3) 2 coil latching

| Nominal coil voltage | Set voltage<br>(at 20°C 68°F)                | Reset voltage<br>(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<br>voltage (Initial) | 70%V or less of nominal<br>voltage (Initial) | 100Ω                                     | 250mW                   | 130%V of nominal voltage               |
| 6V DC                |                                              |                                              | 144Ω                                     |                         |                                        |
| 12V DC               |                                              |                                              | 576Ω                                     |                         |                                        |
| 24V DC               |                                              |                                              | 2,304Ω                                   |                         |                                        |
| 48V DC               |                                              |                                              | 9,216Ω                                   |                         |                                        |

## 2. Specifications

| Characteristics            | Item                                              |                          | Specifications                                                                                                                                                |
|----------------------------|---------------------------------------------------|--------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Contact                    | Arrangement                                       |                          | 1 Form C, 1 Form A, 1 Form B, 1 Form A 1 Form B, 2 Form C, 2 Form A, 2 Form B                                                                                 |
|                            | Contact resistance (Initial)                      |                          | Max. 100 mΩ (By voltage drop 6 V DC 1A)                                                                                                                       |
|                            | Contact material                                  |                          | AgSnO <sub>2</sub> type (1 Form C, 1 Form A, 1 Form B),<br>Au-flashed AgSnO <sub>2</sub> type (1 Form A 1 Form B, 2 Form C, 2 Form A, 2 Form B)               |
| Rating                     | Nominal switching capacity (resistive load)       |                          | 16 A 250V AC (1 Form C, 1 Form A, 1 Form B),<br>10 A 250V AC (2 Form C, 2 Form A, 2 Form B, 1 Form A 1 Form B)                                                |
|                            | Max. switching power (resistive load)             |                          | 4,000 V A                                                                                                                                                     |
|                            | Max. switching voltage                            |                          | 250V AC                                                                                                                                                       |
|                            | Max. switching current                            |                          | 16 A (1 Form C, 1 Form A, 1 Form B),<br>10 A (1 Form A 1 Form B, 2 Form C, 2 Form A, 2 Form B)                                                                |
|                            | Nominal operating power                           |                          | 150mW (1 coil latching), 250mW (Single side stable, 2 coil latching)                                                                                          |
|                            | 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 | 4,000 Vrms for 1min. (Detection current: 10mA.)                                                                                                               |
|                            | Surge breakdown voltage*2 (Initial)               |                          | Min. 10,000 V                                                                                                                                                 |
|                            | Temperature rise (coil) (at 70°C 158°F)           |                          | Max. 55°C (By resistive method, nominal voltage applied to the coil, max. switching current.)                                                                 |
|                            | Operate time [Set time] (at 20°C 68°F)            |                          | Max. 20 ms [20 ms] (Nominal voltage applied to the coil, excluding contact bounce time.)                                                                      |
| Mechanical characteristics | Release time [Reset time] (at 20°C 68°F)          |                          | Max. 20 ms [20 ms] (Nominal voltage applied to the coil, excluding contact bounce time.)                                                                      |
|                            | Shock resistance                                  | Functional               | Min. 200 m/s <sup>2</sup> (Half-wave pulse of sine wave: 11 ms; detection time: 10μs.)                                                                        |
|                            |                                                   | Destructive              | Min. 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. 5×10 <sup>6</sup> (at 180 times/min.)                                                                                                                    |
|                            | Electrical (Resistive load)*3 (at 20 times/min.)  |                          | Min. 10 <sup>5</sup> (at 16A 250V AC): 1 Form C, 1 Form A, 1 Form B<br>Min. 10 <sup>5</sup> (at 10A 250V AC): 2 Form C, 2 Form A, 2 Form B, 1 Form A 1 Form B |
| Conditions                 | Conditions for operation, transport and storage*4 |                          | 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)                               |
| Unit weight                |                                                   |                          | Approx. 14 g .49 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.

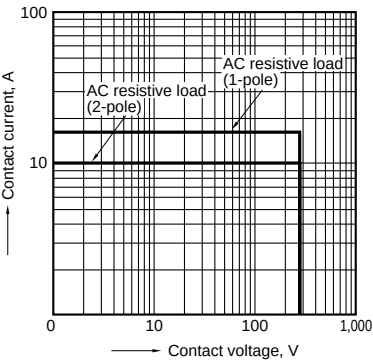
\*2. Wave is standard shock voltage of ±1.2×50μs according to JEC-212-1981

\*3. In order to obtain the full rated life cycles, the relay should be properly vented by removing the vent nib. More detail, please look at caution for NOTES.

\*4. 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.

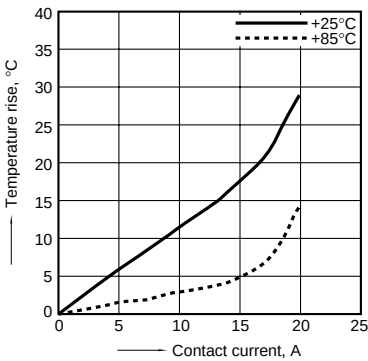
REFERENCE DATA

1. Max. switching capacity



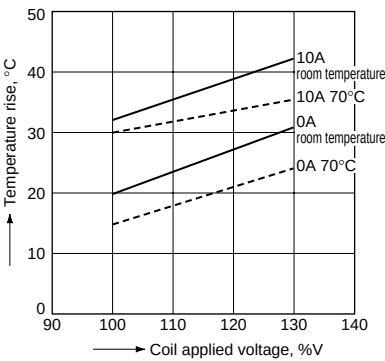
2. Temperature rise

Tested sample: ADJ12024, 6 pcs.  
Coil applied voltage: 0%V, Contact current: 16 A, 20 A  
Measured portion: Contact, Ambient temperature:  
25°C 77°F, 85°C 185°F



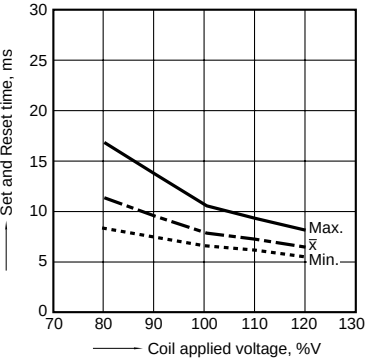
3. Coil temperature rise

Tested sample: ADJ56024, 6 pcs.  
Coil applied voltage: 100%V, 130%V of rating  
Contact current: 0 A, 10 A  
Measured portion: Inside the coil, Ambient  
temperature: Room temperature, 70°C 158°F



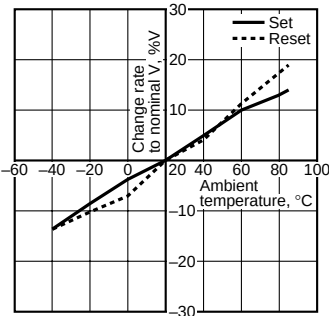
4. Set and Reset time

Tested sample: ADJ12024, 10 pcs  
Coil applied voltage: 80%V, 100%V, 120%V of rating



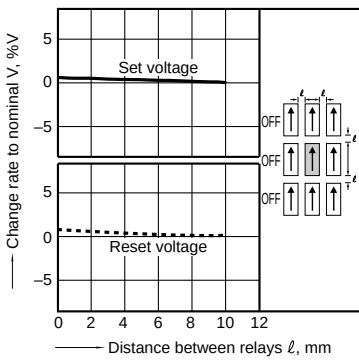
5. Ambient temperature characteristics

Tested sample: ADJ12024, 6pcs  
Ambient temperature: -40°C to 85°C -40°F to 185°F



6. Influence of adjacent mounting

Tested sample: ADJ12024, 6pcs  
Ambient temperature: Room temperature



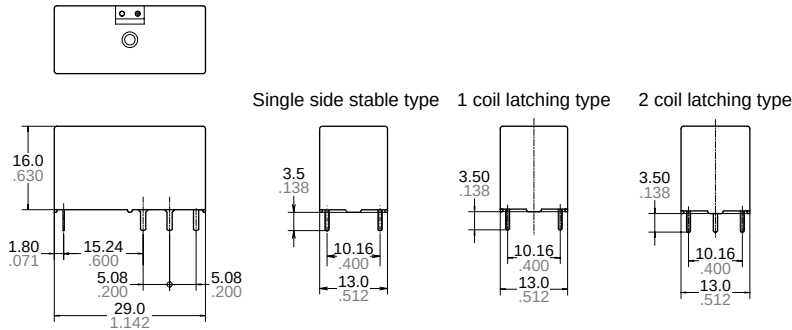
DIMENSIONS (mm inch)

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

1. 1 Form C, without a test button

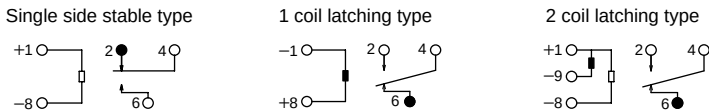
CAD Data

External dimensions

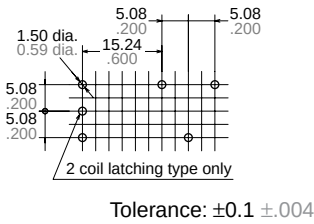


General tolerance:  $\pm 0.3 \pm 0.012$

Schematic (Bottom view)



PC board pattern (Bottom view)

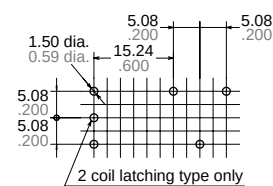
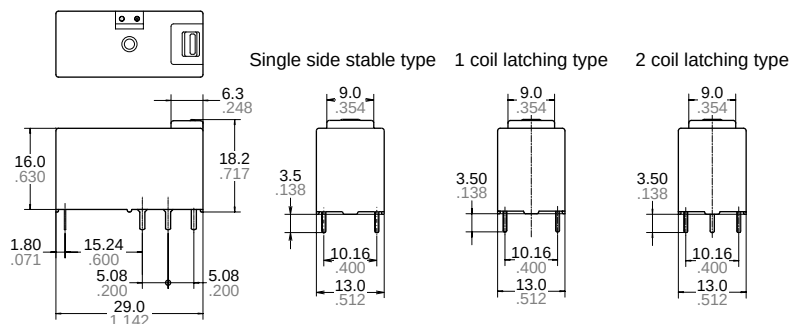


## 2. 1 Form C, with a test button

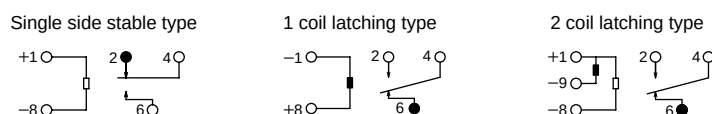
## CAD Data

## External dimensions

## PC board pattern (Bottom view)

Tolerance:  $\pm 0.1 \pm 0.04$ 

## Schematic (Bottom view)

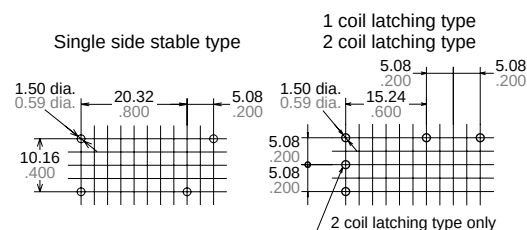
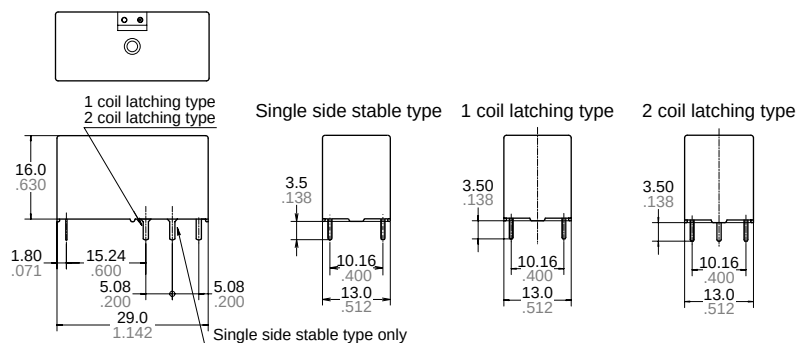


## 3. 1 Form A, without a test button

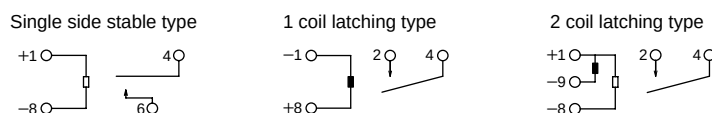
## CAD Data

## External dimensions

## PC board pattern (Bottom view)

Tolerance:  $\pm 0.1 \pm 0.04$ 

## Schematic (Bottom view)

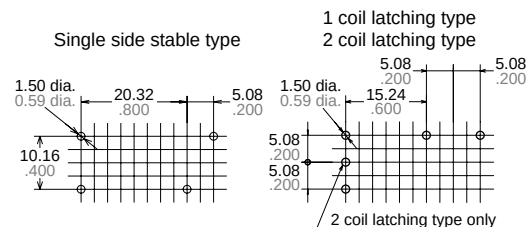
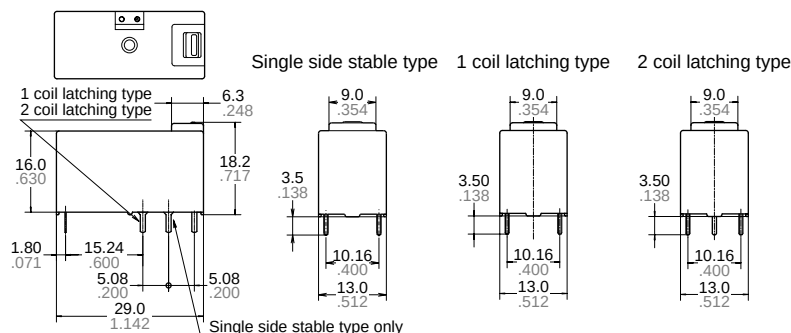


## 4. 1 Form A, with a test button

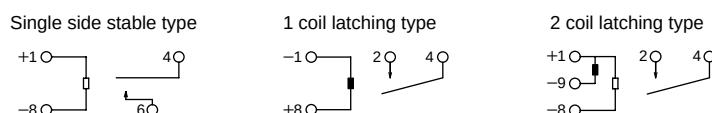
## CAD Data

## External dimensions

## PC board pattern (Bottom view)

Tolerance:  $\pm 0.1 \pm 0.04$ 

## Schematic (Bottom view)

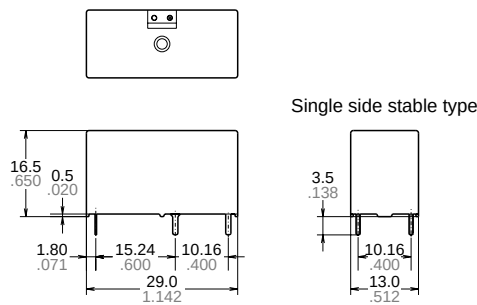


DJ (ADJ)

5. 1 Form B, without a test button

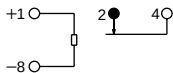
CAD Data

External dimensions

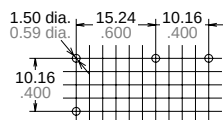


General tolerance:  $\pm 0.3 \pm .012$

Schematic (Bottom view)



PC board pattern (Bottom view)

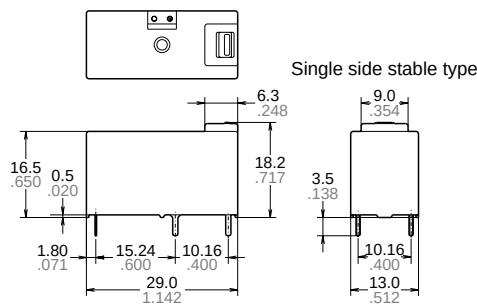


Tolerance:  $\pm 0.1 \pm .004$

6. 1 Form B, with a test button

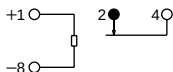
CAD Data

External dimensions



General tolerance:  $\pm 0.3 \pm .012$

Schematic (Bottom view)



PC board pattern (Bottom view)

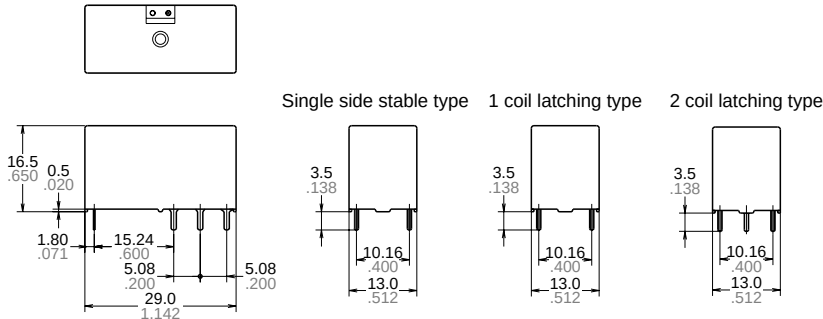


Tolerance:  $\pm 0.1 \pm .004$

7. 1 Form A 1 Form B, without a test button

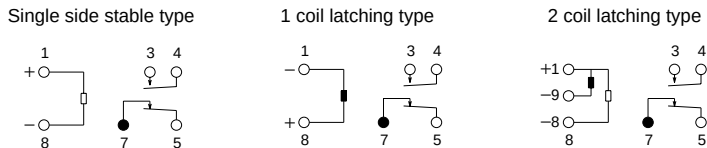
CAD Data

External dimensions

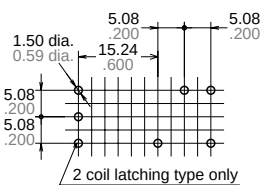


General tolerance:  $\pm 0.3 \pm .012$

Schematic (Bottom view)



PC board pattern (Bottom view)

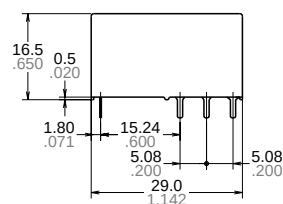
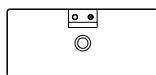


Tolerance:  $\pm 0.1 \pm .004$

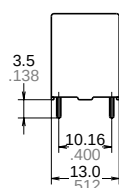
## 8. 2 Form C, without a test button

## CAD Data

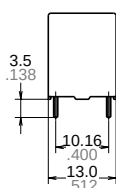
## External dimensions



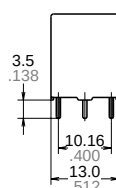
Single side stable type



1 coil latching type

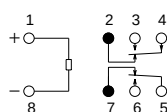


2 coil latching type

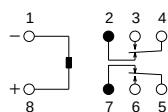
General tolerance:  $\pm 0.3 \pm 0.012$ 

## Schematic (Bottom view)

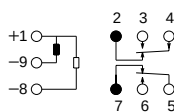
Single side stable type



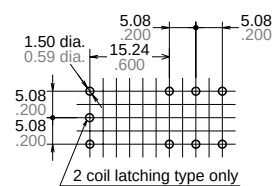
1 coil latching type



2 coil latching type



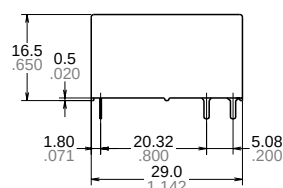
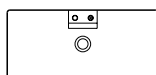
## PC board pattern (Bottom view)

Tolerance:  $\pm 0.1 \pm 0.004$ 

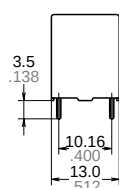
## 9. 2 Form A, without a test button

## CAD Data

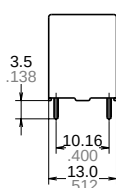
## External dimensions



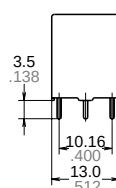
Single side stable type



1 coil latching type

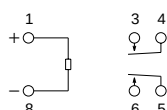


2 coil latching type

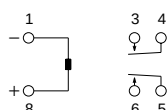
General tolerance:  $\pm 0.3 \pm 0.012$ 

## Schematic (Bottom view)

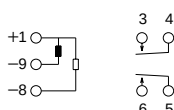
Single side stable type



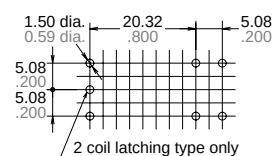
1 coil latching type



2 coil latching type



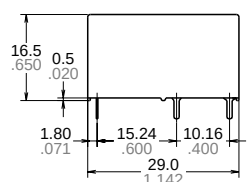
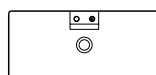
## PC board pattern (Bottom view)

Tolerance:  $\pm 0.1 \pm 0.004$ 

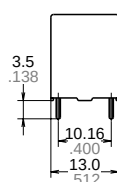
## 10. 2 Form B, without a test button

## CAD Data

## External dimensions

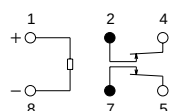


Single side stable type

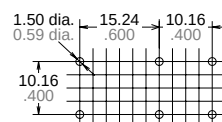
General tolerance:  $\pm 0.3 \pm 0.012$ 

## Schematic (Bottom view)

Single side stable type



## PC board pattern (Bottom view)

Tolerance:  $\pm 0.1 \pm 0.004$



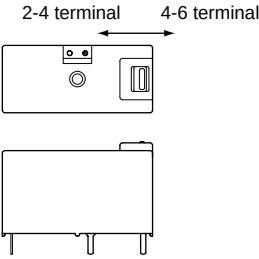
SAFETY STANDARDS

| UL/C-UL (Recognized) |                                             | VDE (Certified) |                                                               |
|----------------------|---------------------------------------------|-----------------|---------------------------------------------------------------|
| File No.             | Contact rating                              | File No.        | Contact rating                                                |
| E43149               | 16A 277V AC (1 pole), 10A 277V AC (2 poles) | 40009736        | AC 250V 16A (cosφ=1) (1 pole), AC 250V 10A (cosφ=1) (2 poles) |

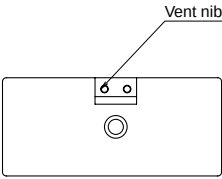
\* CSA standard: Certified by C-UL

NOTES

1. Test button (manual lever) operation  
The relay contacts switch over as follows:



2. Electrical life (Sealed type)  
In order to obtain the full rated life cycles, the relay should be properly vented by removing the vent nib after the soldering/ washing process.



For Cautions for Use.