

## ■ SPECIFICATION

| Item         |  |                                   | Standard type  | Single winding latching type         | Double winding latching type      |
|--------------|--|-----------------------------------|--|--------------------------------------|-----------------------------------|
|              |  |                                   | NA - ( ) W - K   | NAL - ( ) W - K                      | NAL-D ( ) W - K                   |
| Contact Data | Configuration                                |                                   | 2 form C (DPDT)  |                                      |                                   |
|              | Construction                                 |                                   | Bifurcated   |                                      |                                   |
|              | Material                                     |                                   | Gold overlay silver alloy (AgPd)   |                                      |                                   |
|              | Resistance (Initial)                         |                                   | Max. 50 mΩ at 1 A, 6 VDC   |                                      |                                   |
|              | Contact rating (resistive)                   |                                   | 0.5A, 125VAC or 1A, 30VDC  |                                      |                                   |
|              | Max. carrying current                        |                                   | 2A   |                                      |                                   |
|              | Max. switching voltage                       |                                   | 250VAC / 220VDC  |                                      |                                   |
|              | Max. switching power                         |                                   | 62.5VA / 30W   |                                      |                                   |
|              | Max. switching current                       |                                   | 2A   |                                      |                                   |
|              | Min. switching load *                        |                                   | 0.01 mA, 10 mVDC   |                                      |                                   |
|              | Capacitance (at 1kHz, reference)             |                                   | Approx. 0.5 pF (open contacts, adjacent contacts)<br>Approx. 1.0 pF (between coil and contacts)            |                                      |                                   |
| Life         | Mechanical                                   |                                   | Min. 100 x 10 <sup>6</sup> operations  | Min. 10 x 10 <sup>6</sup> operations |                                   |
|              | Electrical                                   |                                   | Min. 200 x 10 <sup>3</sup> operations (0.5A, 125VAC),<br>Min. 500 x 10 <sup>3</sup> operations (1A, 30VDC) |                                      |                                   |
| Coil Data    | Rated power                                  |                                   | 140 - 300 mW   | 100 - 150 mW                         | 200 - 300 mW                      |
|              | Applied pulse width                          |                                   |  | min. 10ms                            |                                   |
|              | Operate power                                |                                   | 80 - 70 mW   | 60 - 85 mW                           | 115 - 170 mW                      |
|              | Operating temperature range                  |                                   | -40 °C to +85 °C (no frost)  |                                      |                                   |
| Timing Data  | Operate (at nominal voltage, without bounce) |                                   | Max. 6 ms  | Max. 6 ms (set)                      |                                   |
|              | Release (at nominal voltage, without bounce) |                                   | Max. 4 ms  | Max. 6 ms (reset)                    |                                   |
| Insulation   | Resistance (Initial)                         |                                   | Min. 1,000MΩ at 500VDC   |                                      |                                   |
|              | Dielectric strength                          | Open contacts / adjacent contacts | 1,000VAC (50/60Hz) 1min  |                                      |                                   |
|              |  | Contacts to coil                  | 1,500VAC (50/60Hz) 1min.   |                                      | 1,000VAC (50/60Hz) 1min           |
|              | Surge strength                               | Open contacts / adjacent contacts | 1,500V / 10 x 700μs standard wave  |                                      |                                   |
|              |  | Coil to contacts                  | 2,500V / 2 x 10μs standard wave  |                                      | 1,500V / 10 x 160μs standard wave |
| Other        | Vibration resistance                         | Misoperation                      | 10 to 55 to 10Hz single amplitude 1.65mm   |                                      |                                   |
|              |  | Endurance                         | 10 to 55 to 10Hz single amplitude 2.5mm  |                                      |                                   |
|              | Shock  | Misoperation                      | 500m/s <sup>2</sup> (11 ± 1ms)   |                                      |                                   |
|              |  | Endurance                         | 1,000m/s <sup>2</sup> (6 ± 1ms)  |                                      |                                   |
|              | Weight                                       |                                   | Approximately 1.6 g  |                                      |                                   |

\* Minimum switching loads mentioned above are reference values. Please perform the confirmation test with actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

## ■ COIL RATING

Standard type

| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance +/- 10% (Ohm) | Must Operate Voltage (VDC) * | Must Release Voltage (VDC) * | Rated Power (mW) |
|-----------|--------------------------|-------------------------------|------------------------------|------------------------------|------------------|
| 1.5       | 1.5                      | 16.1                          | +1.13                        | +0.15                        | 140              |
| 3         | 3                        | 64.3                          | +2.25                        | +0.3                         |                  |
| 4.5       | 4.5                      | 145                           | +3.38                        | +0.45                        |                  |
| 5         | 5                        | 178                           | +3.75                        | +0.5                         |                  |
| 6         | 6                        | 257                           | +4.5                         | +0.6                         |                  |
| 9         | 9                        | 579                           | +6.75                        | +0.9                         |                  |
| 12        | 12                       | 1,028                         | +9                           | +1.2                         | 200              |
| 18        | 18                       | 1,620                         | +13.5                        | +1.8                         |                  |
| 24        | 24                       | 2,880                         | +18                          | +2.4                         |                  |
| 48        | 48                       | 7,680                         | +36                          | +4.8                         | 300              |

Single winding latching type

| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance +/- 10% (Ohm) | Set Voltage (VDC) * | Reset Voltage (VDC) * | Rated Power (mW) |
|-----------|--------------------------|-------------------------------|---------------------|-----------------------|------------------|
| 1.5       | 1.5                      | 22.5                          | +1.13               | -1.13                 | 100              |
| 3         | 3                        | 90                            | +2.25               | -2.25                 |                  |
| 4.5       | 4.5                      | 203                           | +3.38               | -3.38                 |                  |
| 5         | 5                        | 250                           | +3.75               | -3.75                 |                  |
| 6         | 6                        | 360                           | +4.5                | -4.5                  |                  |
| 9         | 9                        | 810                           | +6.75               | -6.75                 |                  |
| 12        | 12                       | 1,440                         | +9                  | -9                    |                  |
| 18        | 18                       | 2,160                         | +13.5               | -13.5                 | 150              |
| 24        | 24                       | 3,840                         | +18                 | -18                   |                  |

Note: All values in the tables are valid for 20°C and zero contact current.

\* Specified operate values are valid for pulse wave voltage.

Please use at rated coil voltage. Please refer to characteristic data and set up adequate voltage in case of use at over voltage.

## ■ COIL RATING

Double winding latching type

| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance +/- 10% (Ohm) | Set Voltage (VDC) * | Reset Voltage (VDC) * | Rated Power (mW) |
|-----------|--------------------------|-------------------------------|---------------------|-----------------------|------------------|
| 1.5       | 1.5                      | P 11.25                       | +1.13               |                       | 200              |
|           |                          | S 11.25                       |                     | +1.13                 |                  |
| 3         | 3                        | P 45                          | +2.25               |                       |                  |
|           |                          | S 45                          |                     | +2.25                 |                  |
| 4.5       | 4.5                      | P 101                         | +3.38               |                       |                  |
|           |                          | S 101                         |                     | +3.38                 |                  |
| 5         | 5                        | P 125                         | +3.75               |                       |                  |
|           |                          | S 125                         |                     | +3.75                 |                  |
| 6         | 6                        | P 180                         | +4.5                |                       |                  |
|           |                          | S 180                         |                     | +4.5                  |                  |
| 9         | 9                        | P 405                         | +6.75               |                       |                  |
|           |                          | S 405                         |                     | +6.75                 |                  |
| 12        | 12                       | P 720                         | +9                  |                       | 300              |
|           |                          | S 720                         |                     | +9                    |                  |
| 18        | 18                       | P 1,080                       | +13.5               |                       |                  |
|           |                          | S 1,080                       |                     | +13.5                 |                  |
| 24        | 24                       | P 1,920                       | +18                 |                       |                  |
|           |                          | S 1,920                       |                     | +18                   |                  |

Note: All values in the table are measured at 20°C and zero contact current.

P: Primary coil S: Secondary coil

\* Specified values are measured with pulse wave voltage

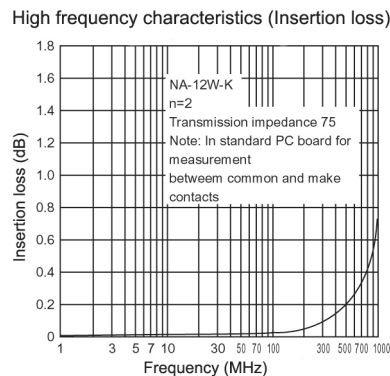
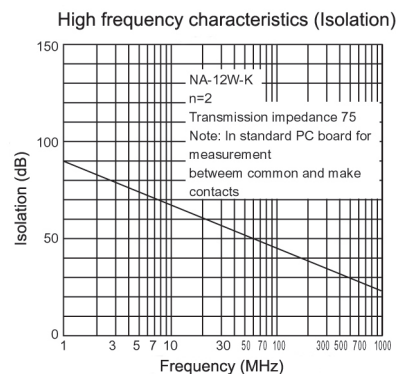
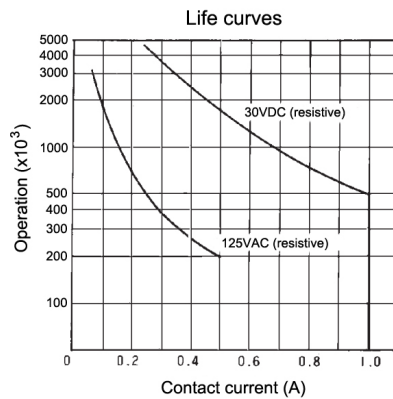
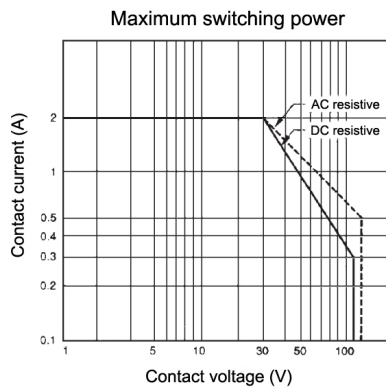
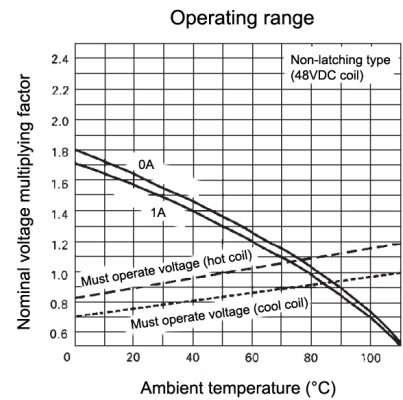
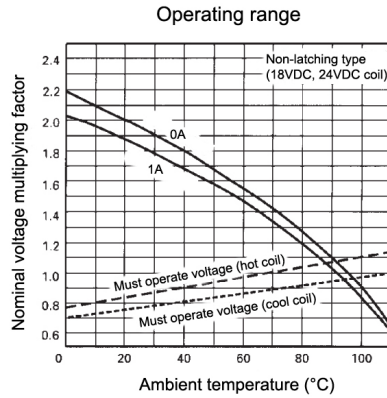
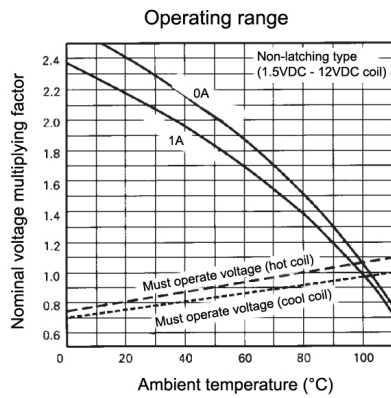
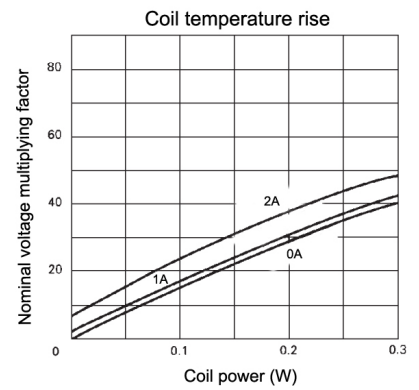
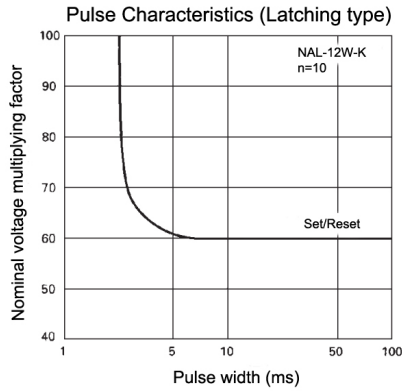
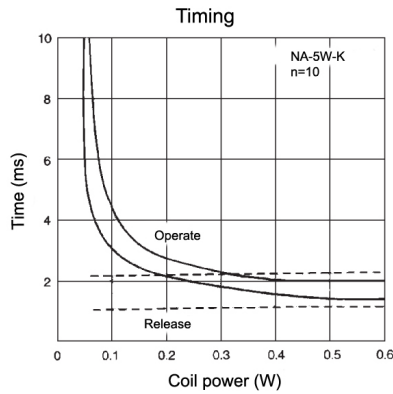
Please use at rated coil voltage. Please refer to characteristic data and set up adequate voltage in case of use at over voltage.

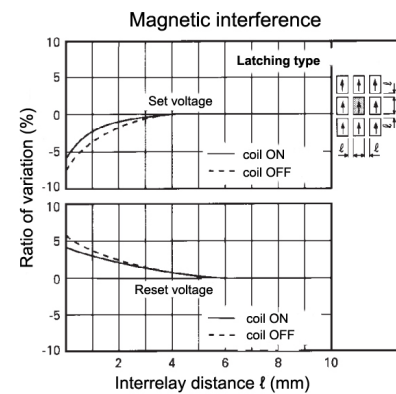
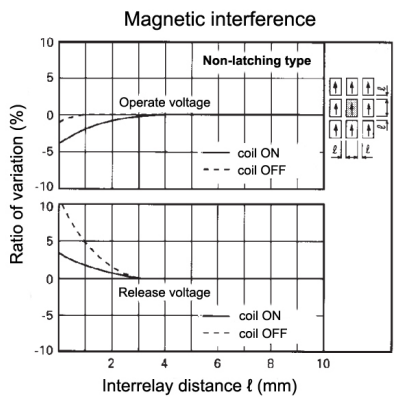
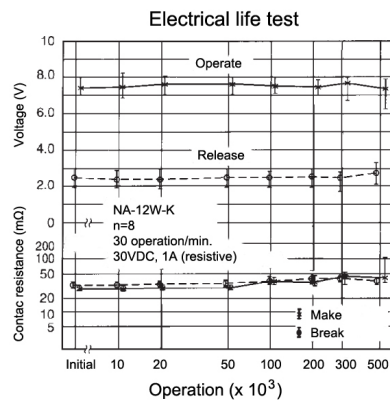
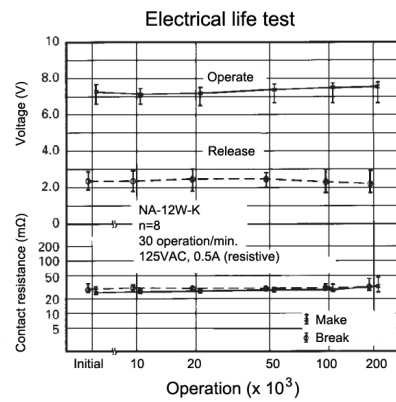
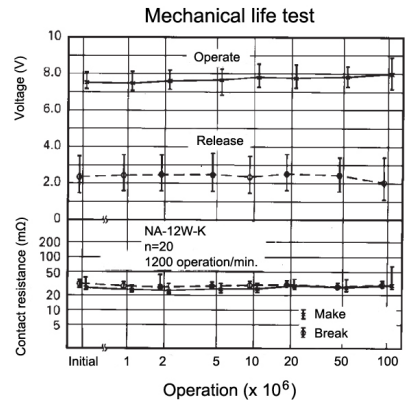
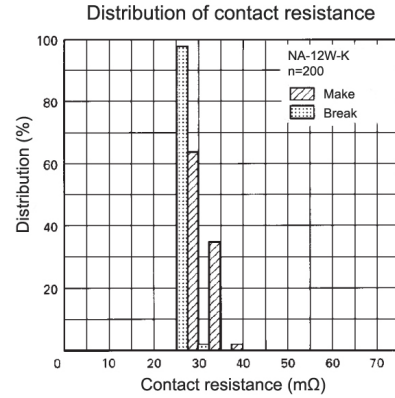
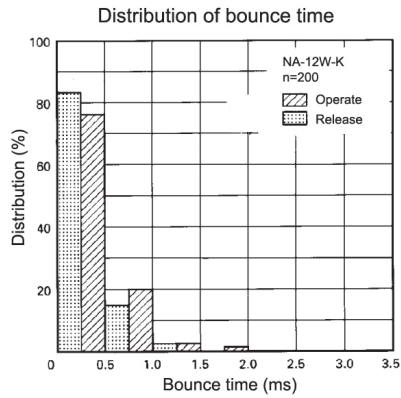
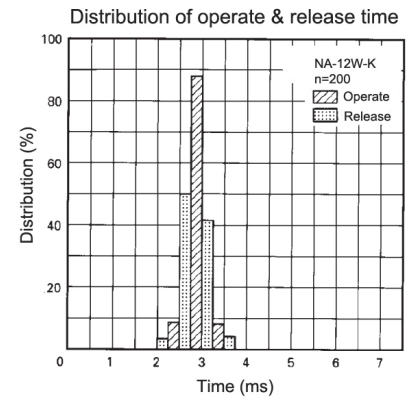
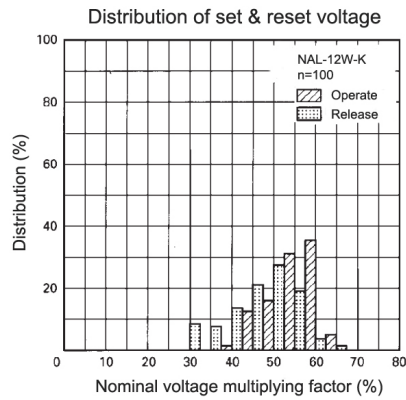
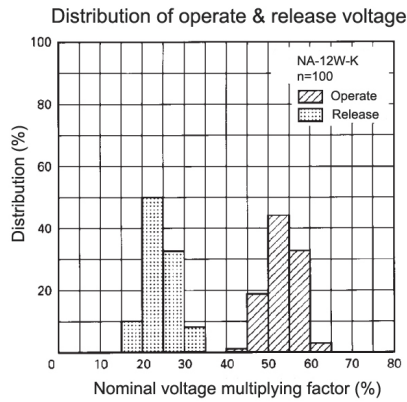
## ■ SAFETY STANDARDS

| Type | Compliance                        | Contact rating                                      |
|------|-----------------------------------|---|
| UL   | UL 508, UL 1950                   | Flammability: UL 94-V0 (plastics)                   |
|      | E 45026                           | 0.5A, 125VAC (general use)<br>2A, 30VDC (resistive) |
| CSA  | C22.2 No. 14, No. 950<br>LR 35579 | 0.3A, 110VDC (resistive)                            |

Complies to IEC60950-1; FCC part 68: Telcordia  
(Relay is only marked with UL and CSA logo)

## CHARACTERISTIC DATA

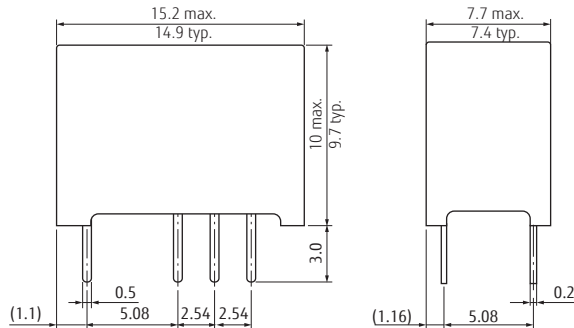




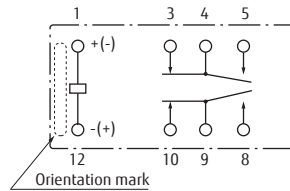
## ■ DIMENSIONS

NA (standard type)  
NAL (single winding latching type)

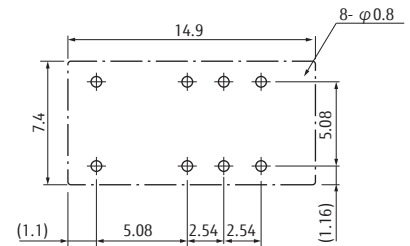
### ● Dimensions



### ● Schematics (BOTTOM VIEW)

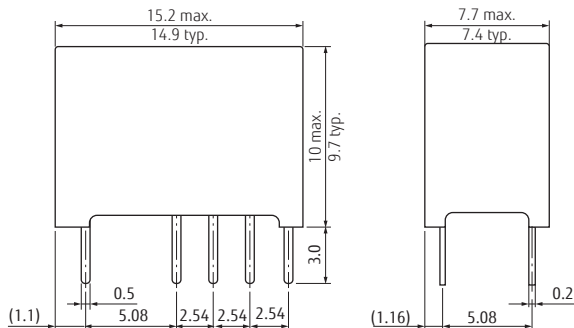


### ● PC board mounting hole layout (BOTTOM VIEW)

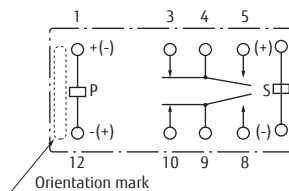


NAL-D (double winding latching type)

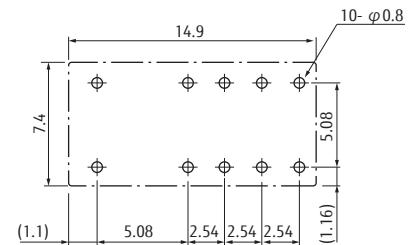
### ● Dimensions



### ● Schematics (BOTTOM VIEW)



### ● PC board mounting hole layout (BOTTOM VIEW)



- \* Contacts drawn in reset condition.
- \* +/-: set voltage applied polarity, (+)/(-): reset voltage applied polarity.
- \* P: Set coil, S: Reset coil

- \* Dimensions of the terminals do not include thickness of pre-solder.
- \* Dimensions do not include tolerances.
- \* Tolerances of PC board mounting hole layout:  $\pm 0.1$  unless otherwise specified.

Unit: mm

## RoHS Compliance and Lead Free Information

### 1. General Information

- All relays produced by Fujitsu Components are compliant with RoHS directive 2011/65/EU including amendments.
- Cadmium as used in electrical contacts is exempted from the RoHS directives.  
As per Annex III of directive 2011/65/EU.
- All relays are lead-free. Please refer to Lead-Free Status Info for older date codes at:  
<http://www.fujitsu.com/downloads/MICRO/fcai/relays/lead-free-letter.pdf>
- Lead free solder plating on relay terminals is Sn-3.0Ag-0.5Cu, unless otherwise specified.  
This material has been verified to be compatible with PbSn assembly process.

### 2. Recommended Lead Free Solder Condition

- Recommended solder Sn-3.0Ag-0.5Cu.

#### Flow Solder Condition:

Pre-heating: maximum 120 °C  
within 90 sec.  
Soldering: dip within 5 sec. at  
255 °C ± 5 °C solder bath  
Relay must be cooled by air immediately  
after soldering

#### Solder by Soldering Iron:

Soldering Iron 30-60W  
Temperature: maximum 350-360 °C  
Duration: maximum 3 sec.

**We highly recommend that you confirm your actual solder conditions**

### 3. Moisture Sensitivity

- Moisture Sensitivity Level standard is not applicable to electromechanical relays, unless otherwise indicated.

### 4. Tin Whiskers

- Dipped SnAgCu solder is known as presenting a low risk to tin whisker development. No considerable length whisker was found by our in house test.

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