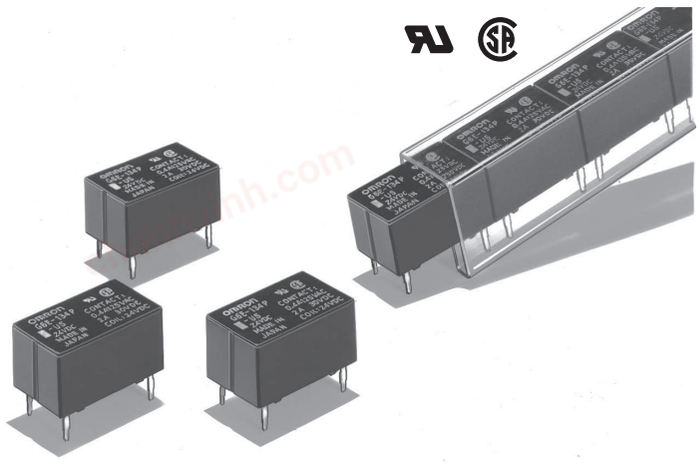
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# G6E
Low Signal Relay

## Subminiature, Sensitive SPDT Signal Switching Relay

- High sensitivity: 98-mW (Rated power consumption: 200mW) pickup coil power.
- Impulse withstand voltage of 1,500V (10×160 μs) meets FCC requirements.
- Stick packing employed in consideration of supporting automatic implementation.
- Plastic-sealed model that allows automatic soldering.
- New series of ultrasonically cleanable models is available.
- Standard model conforms to UL/CSA standards.



## ■Model Number Legend

G6E-□-□□□□□-□-□
1 2 3 4 5 6 7 8

**1. Relay Function**
None: Single-side stable
U : Single-winding latching
K : Double-winding latching

**2. Number of poles/ Contact Form**
1: 1-pole/SPDT (1c)

**3. Contact Type**
3: Bifurcated crossbar Ag (Au-Alloy) contact

**4. Enclosure Rating**
4: Fully sealed

**5. Terminals Shape**
P: PCB terminals

**6. Classification**
None : Standard
L : Low sensitivity coil (400 mW)

**7. Approved Standards**
US: UL, CSA
(UL: FILE No.E41515
CSA: FILE No.LR31928)

**8. Special Function**
None : Standard
U : For ultrasonically cleanable

## ■Application Examples

- Telecommunication equipment
- Office automation machines
- Industrial equipment
- Security equipment

G6E

## ■Ordering Information

### ●Standard Models (UL, CSA certified)

| Relay Function | Single-side stable | | | | Single-winding latching | | Double-winding latching | | | | Minimum packing unit |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Classification | Standard | | Low-sensitivity | | Standard | | Standard | | Low-sensitivity | | |
| Contact form | Model | Rated coil voltage | Model | Rated coil voltage | Model | Rated coil voltage | Model | Rated coil voltage | Model | Rated coil voltage | |
| SPDT (1c) | **G6E -134P-US** | 5 VDC | **G6E -134PL-US** | 5 VDC | **G6EU -134P-US** | 5 VDC | **G6EK -134P-US** | 5 VDC | **G6EK -134PL-US** | 5 VDC | 25 pcs/tube |
| | | 6 VDC | | 6 VDC | | 6 VDC | | 6 VDC | | 6 VDC | |
| | | 9 VDC | | 9 VDC | | 9 VDC | | 9 VDC | | – | |
| | | 12 VDC | | 12 VDC | | 12 VDC | | 12 VDC | | 12 VDC | |
| | | 24 VDC | | 24 VDC | | 24 VDC | | 24 VDC | | 24 VDC | |
| | | 48 VDC | – | – | – | – | – | – | – | – | |

### ●Models for Ultrasonically Cleanable

| Relay Function | Single-side stable | | | | Single-winding latching | | Double-winding latching | | Minimum packing unit |
|---|---|---|---|---|---|---|---|---|---|
| Classification | Standard | | Low-sensitivity | | Standard | | Standard | | |
| Contact form | Model | Rated coil voltage | Model | Rated coil voltage | Model | Rated coil voltage | Model | Rated coil voltage | |
| SPDT (1c) | **G6E -134P-US-U** | 5 VDC | **G6E -134PL-US-U** | 5 VDC | **G6EU -134P-US-U** | 5 VDC | **G6EK -134P-US-U** | 5 VDC | 25 pcs/tube |
| | | 6 VDC | | – | | – | | – | |
| | | 9 VDC | | – | | – | | – | |
| | | 12 VDC | | 12 VDC | | 12 VDC | | 12 VDC | |
| | | 24 VDC | | 24 VDC | | – | | 24 VDC | |
| | | 48 VDC | – | – | – | – | – | – | |

Note: When ordering, add the rated coil voltage to the model number.
Example: G6E-134P-US DC5
Rated coil voltage
However, the notation of the coil voltage on the product case as well as on the packing will be marked as □□ VDC.

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# G6E

## ■Ratings

### ●Coil: Single-side Stable

| Classification | Rated voltage | Rated current (mA) | Coil resistance (Ω) | Must operate voltage (V) | Must release voltage (V) | Max. voltage (V) | Power consumption (mW) |
|---|---|---|---|---|---|---|---|
| | | | | % of rated voltage | | | |
| Standard | 5 VDC | 40.0 | 125 | 70% max. | 10% min. | 190% (at 23°C) | Approx. 200 |
| | 6 VDC | 33.3 | 180 | | | | |
| | 9 VDC | 22.2 | 405 | | | | |
| | 12 VDC | 16.7 | 720 | | | | |
| | 24 VDC | 8.3 | 2,880 | | | | |
| | 48 VDC | 8.3 | 5,760 | | | 170% (at 23°C) | Approx. 400 |
| Low-sensitivity | 5 VDC | 79.4 | 63 | 70% max. | 10% min. | 170% (at 23°C) | Approx. 400 |
| | 6 VDC | 66.6 | 90 | | | | |
| | 9 VDC | 44.3 | 203 | | | | |
| | 12 VDC | 33.3 | 360 | | | | |
| | 24 VDC | 16.7 | 1,440 | | | | |

### ●Coil: Single-winding latching

| Contact type | Rated voltage | Rated current (mA) | Coil resistance (Ω) | Must set voltage (V) | Must reset voltage (V) | Max. voltage (V) | Power consumption | |
|---|---|---|---|---|---|---|---|---|
| | | | | % of rated voltage | | | Set coil (mW) | Reset coil (mW) |
| Bifurcated crossbar | 5 VDC | 40.0 | 125 | 70% max. | 70% max. | 190% (at 23°C) | Approx. 200 | Approx. 200 |
| | 6 VDC | 33.3 | 180 | | | | | |
| | 9 VDC | 22.2 | 405 | | | | | |
| | 12 VDC | 16.7 | 720 | | | | | |
| | 24 VDC | 8.3 | 2,880 | | | | | |

### ●Coil: Double-winding latching

| Classification | Rated voltage | Rated current (mA) | | Coil resistance (Ω) | | Must set voltage (V) | Must reset voltage (V) | Max. voltage (V) | Power consumption | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Set coil | Reset coil | Set coil | Reset coil | % of rated voltage | | | Set coil (mW) | Reset coil (mW) |
| Standard | 5 VDC | 40.0 | 40.0 | 125 | 125 | 70% max. | 70% max. | 190% (at 23°C) | Approx. 200 | Approx. 200 |
| | 6 VDC | 33.3 | 33.3 | 180 | 180 | | | | | |
| | 9 VDC | 22.2 | 22.2 | 405 | 405 | | | | | |
| | 12 VDC | 16.7 | 16.7 | 720 | 720 | | | | | |
| | 24 VDC | 8.3 | 8.3 | 2,880 | 2,880 | | | | | |
| Low-sensitivity | 5 VDC | 79.4 | 79.4 | 63 | 63 | 70% max. | 70% max. | 170% (at 23°C) | Approx. 400 | Approx. 400 |
| | 6 VDC | 66.6 | 66.6 | 90 | 90 | | | | | |
| | 9 VDC | 44.3 | 44.3 | 203 | 203 | | | | | |
| | 12 VDC | 33.3 | 33.3 | 360 | 360 | | | | | |
| | 24 VDC | 16.7 | 16.7 | 1,440 | 1,440 | | | | | |

Note 1. The rated current and coil resistance are measured at a coil temperature of 23°C with a tolerance of ±10%.
2. Operating characteristics are measured at a coil temperature of 23°C.
3. The maximum voltage is the highest voltage that can be imposed on the relay coil.
4. Refer to the engineering data for relations between the ambient temperature and maximum coil voltage.

### ●Contacts

| Item \ Load | Resistive load | Inductive load (cosϕ = 0.4; L/R = 7 ms) |
|---|---|---|
| Contact type | Bifurcated crossbar | |
| Contact material | Ag (Au-Alloy) | |
| Rated load | 0.4 A at 125 VAC; 2 A at 30 VDC | 0.2 A at 125 VAC; 1 A at 30 VDC |
| Rated carry current | 3 A | |
| Max. switching voltage | 250 VAC, 220 VDC | |
| Max. switching current | 3 A | |

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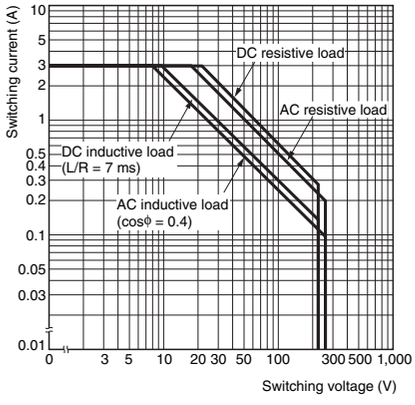
## ■Characteristics (Including Models for Ultrasonically Cleanable)

| Item | Relay Function | Single-side Stable | Single-winding Latching | Double-winding Latching |
|---|---|---|---|---|
| Contact resistance *1 | | 50 mΩ max. | | |
| Operate (set) time | | 5 ms max. | | |
| Release (reset) time | | 5 ms max. | | |
| Min. set pulse width | | – | 15 ms | |
| Min. reset pulse width | | – | 15 ms | |
| Insulation resistance *2 | | 1,000 MΩ min. (at 500 VDC) | | |
| Impulse withstand voltage | Between coil and contacts | 2,500 V (10×160 μs) (conforms to FCC part 68) | | |
| | Between contacts of same polarity | 1,500 V (10×160 μs) (conforms to FCC part 68) | | |
| Dielectric strength | Between coil and contacts | 1,500 VAC, 50/60 Hz for 1 min | | |
| | Between contacts of same polarity | 1,000 VAC, 50/60 Hz for 1 min | | |
| Vibration resistance | Destruction | 10 to 55 to 10 Hz, 2.5 mm single amplitude (5 mm double amplitude) | | |
| | Malfunction | 10 to 55 to 10 Hz, 1.65 mm single amplitude (3.3 mm double amplitude) | | |
| Shock resistance | Destruction | 1,000 m/s² | | |
| | Malfunction | 300 m/s² | | |
| Durability | Mechanical | 100,000,000 operations min. (at 36,000 operations/hr) | | |
| | Electrical | 100,000 operations min. (0.4 A at 125 VAC resistive load; 0.2 A at 125 VAC inductive load) (at 1,800 operations/hr) | | |
| | | 500,000 operations min. (2 A at 30 VDC resistive load; 1 A at 30 VDC inductive load) (at 1,800 operations/hr) | | |
| | | 200,000 operations min. (3 A at 30 VDC resistive load) (at 1,800 operations/hr) | | |
| Failure rate (P level) (reference value) *3 | | 10 μA at 10 mVDC | | |
| Ambient operating temperature | | -40°C to 70°C (with no icing or condenstion) | | |
| Ambient operating humidity | | 5% to 85% | | |
| Weight | | Approx. 2.7 g | | |

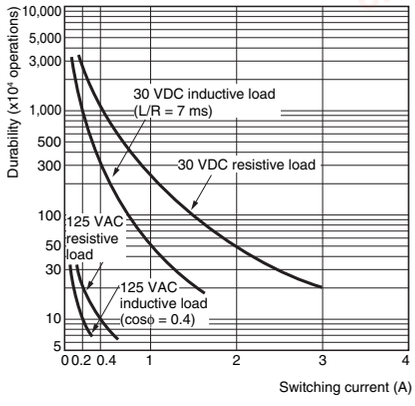
Note: The values here are initial values.
*1. The contact resistance was measured with 1 A at 5 VDC using a voltage-drop method.
*2. The insulation resistance was measured with a 500 VDC Megger Tester applied to the same parts as those used for checking the dielectric strength.
*3. This value was measured at a switching frequency of 120 operations/min and the criterion of contact resistance is 50 Ω.
This value may vary depending on the switching frequency and operating environment. Always double-check relay suitability under actual operating conditions.

## ■Engineering Data

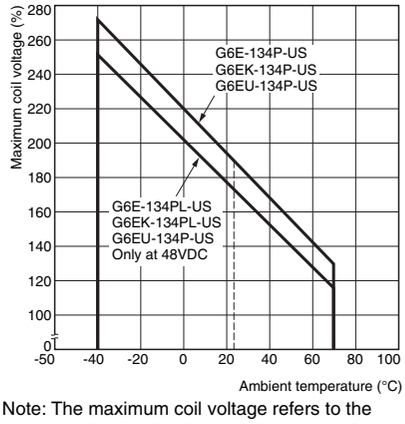
### ●Maximum Switching Power




### ●Durability

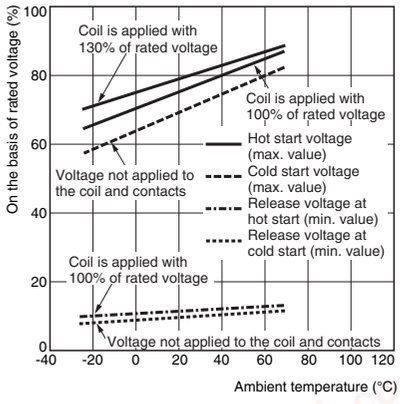



### ●Ambient Temperature vs. Maximum Coil Voltage

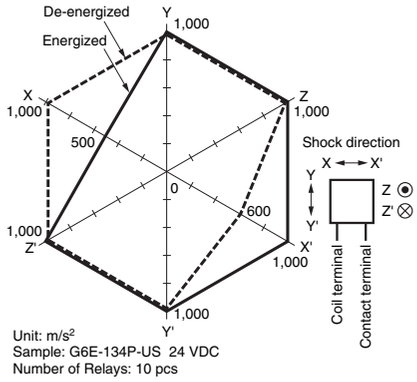



Note: The maximum coil voltage refers to the maximum value in a varying range of operating power voltage, not a continuous voltage.

### ●Ambient Temperature vs. Must Operate or Must Release Voltage

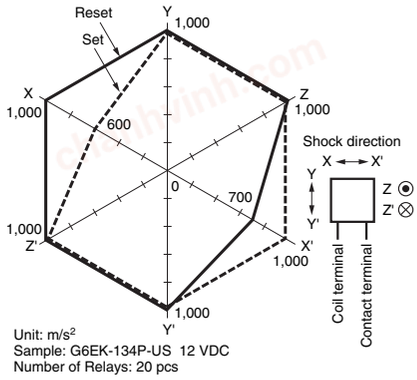



### ●Shock Malfunction G6E-134P-US




Unit: m/s²
Sample: G6E-134P-US 24 VDC
Number of Relays: 10 pcs

### G6EK-134P-US



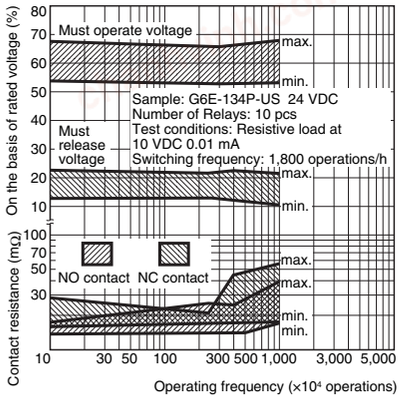

Unit: m/s²
Sample: G6EK-134P-US 12 VDC
Number of Relays: 20 pcs

Test Conditions: Shock is applied in ±X, ±Y, and ±Z directions three times each with and without energizing the Relays to check the number of contact malfunction.

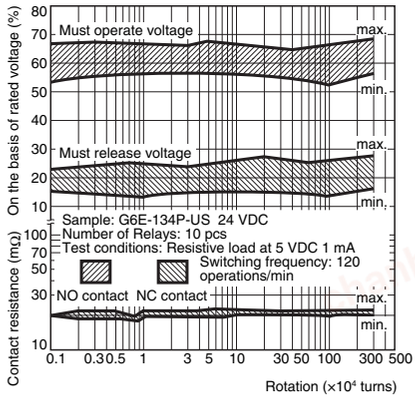
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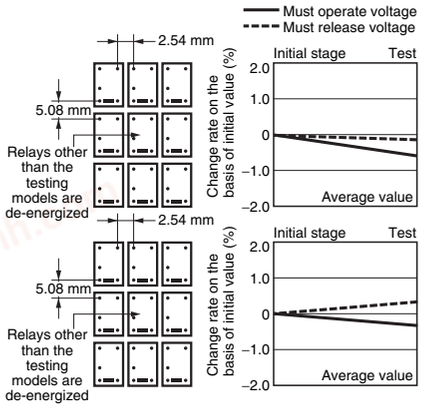
## ●Contact Reliability Test *1, *2
### G6E-134P-US




## ●Contact Reliability Test (70°C) *1, *2
### G6E-134P-US

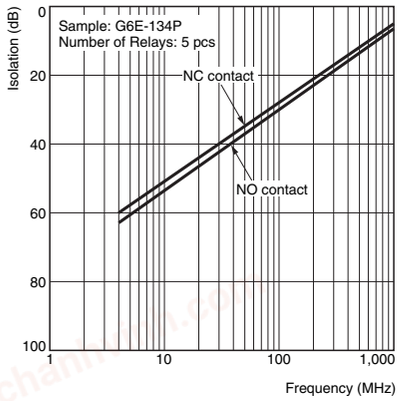



## ●Mutual Magnetic Interference
### G6E-134P-US



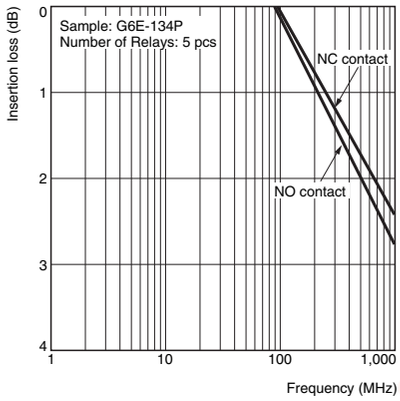

## ●High-frequency Characteristics (Isolation) *1, *3
### G6E-134P-US

(Average value (initial))

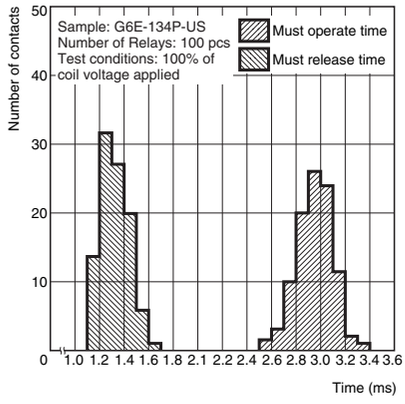



## ●High-frequency Characteristics (Insertion Loss) *1, *3
### G6E-134P-US

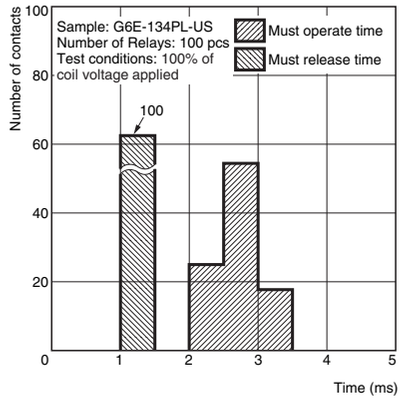
(Average value (initial))



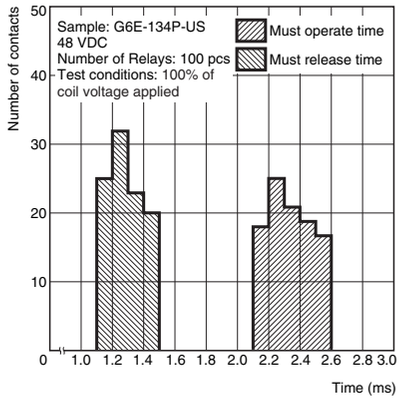

## ●Must Operate and Must Release Time Distribution *1
### G6E-134P-US



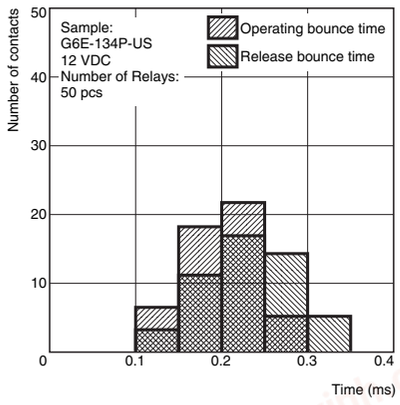

### G6E-134PL-US



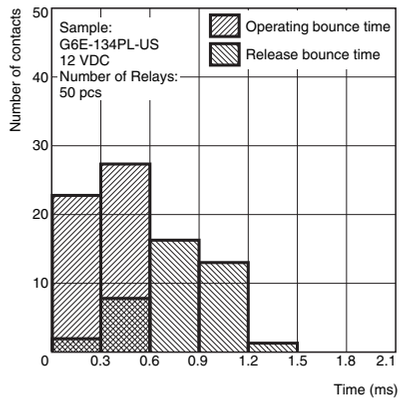

### G6E-134P-US 48 VDC




## ●Distribution of Bounce Time *1
### G6E-134P-US




### G6E-134PL-US




*1. The tests were conducted at an ambient temperature of 23°C.

*2. The contact resistance data are periodically measured reference values and are not values from each monitoring operation. Contact resistance values will vary according to the switching frequency and operating environment, so be sure to check operation under the actual operating conditions before use.

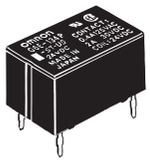
*3. High-frequency characteristics depend on the PCB to which the Relay is mounted. Always check these characteristics, including durability, in the actual machine before use.

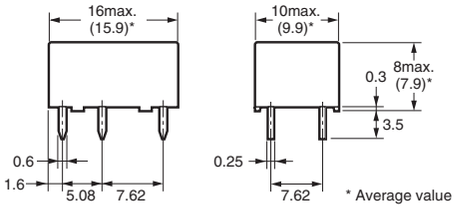
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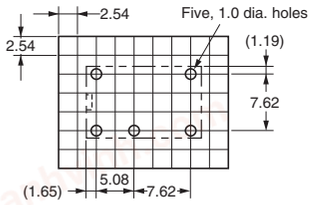
## ■Dimensions

### Single-side stable
**G6E-134P-US**
**G6E-134PL-US**
**G6E-134P-US-U**
**G6E-134PL-US-U**



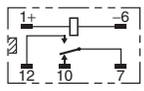



**PCB Mounting Holes**
(Bottom View)
Tolerance: ±0.1



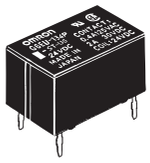

Note: Orientation marks are indicated as follows: ⬚ ▨

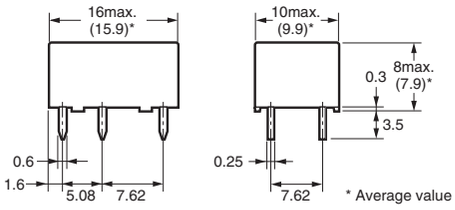
**Terminal Arrangement/ Internal Connections**
(Bottom View)



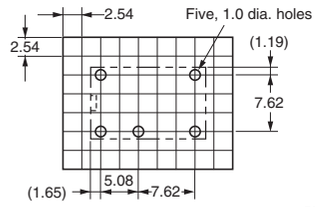

Note: Be sure to confirm coil polarity.

### Single-winding latching
**G6EU-134P-US**
**G6EU-134P-US-U**



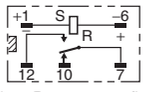



**PCB Mounting Holes**
(Bottom View)
Tolerance: ±0.1



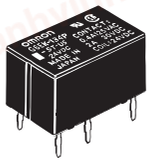

Note: Orientation marks are indicated as follows: ⬚ ▨

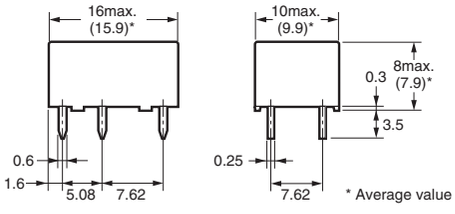
**Terminal Arrangement/ Internal Connections**
(Bottom View)



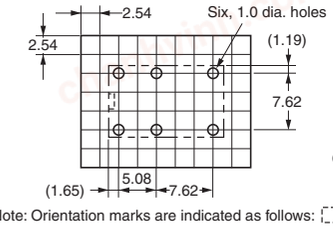

Note: Be sure to confirm coil polarity.

### Double-winding latching
**G6EK-134P-US**
**G6EK-134PL-US**
**G6EK-134P-US-U**



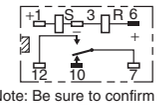



**PCB Mounting Holes**
(Bottom View)
Tolerance: ±0.1




Note: Orientation marks are indicated as follows: ⬚ ▨

**Terminal Arrangement/ Internal Connections**
(Bottom View)




Note: Be sure to confirm coil polarity. The model G6EK-134P-1-US has positive (+) terminal #3 and negative (-) terminals #1 and #6.

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## ■ Approved Standards

• The approval rating values for overseas standards are different from the performance values determined individually. Confirm the values before use.

**UL recognized: (File No. E41515)**
**CSA certified: (File No. LR31928)**

| Model | Contact form | Coil ratings | Contact ratings | Number of test operations |
|---|---|---|---|---|
| G6E( )-134P( )US | SPDT (1c) | 5 to 48 VDC | 0.2 A, 250 VAC | 6,000 |
| | | | 0.6 A, 125 VAC | |
| | | | 2 A, 30 VDC | |
| | | | 0.6 A, 125 VDC | |

## ■Precautions

●Please refer to “PCB Relays Common Precautions” for correct use.

Correct Use

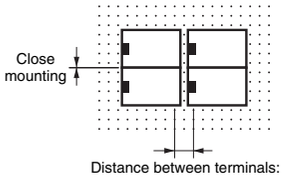
### ●Long-term Continuously ON Contacts

• Using the Relay in a circuit where the Relay will be ON continuously for long periods (without switching) can lead to unstable contacts because the heat generated by the coil itself will affect the insulation, causing a film to develop on the contact surfaces. We recommend using a latching relay (magnetic-holding relay) in this kind of circuit. If a single-side stable model must be used in this kind of circuit, we recommend using a fail-safe circuit design that provides protection against contact failure or coil burnout.

### ●Mounting

• Do not reverse the polarity of the coil (+, –).

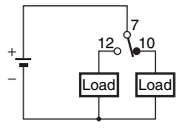
• Provide sufficient space between Relays when mounting two or more on the same PCB, as shown in the following diagram.




Distance between terminals:
2.54 × 2 (pitch) max.

### ●Wiring

• Refer to the following diagram when wiring to switch a DC load. The difference in polarity applied to the contacts will affect the endurance of the Relay due to the amount of contact movement. To extend the endurance characteristics beyond the performance ratings, wire the common (pin 7) terminal to the positive (+) side.




Wiring Diagram

### ●Ultrasonic Cleaning

• Do not use ultrasonic cleaning on standard relay models. Doing so may result in resonance, coil burnout, and contact adhesion within the Relay. Use a model designed for ultrasonic cleaning if ultrasonic cleaning is required.

### ●Relay Handling

• When washing the product after soldering the Relay to a PCB, use a water-based solvent or alcohol-based solvent, and keep the solvent temperature to less than 40°C. Do not put the Relay in a cold cleaning bath immediately after soldering.

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