FUJITSU THE POSSIBILITIES ARE INFINITE

# SILENT TWIN RELAY FOR AUTOMOTIVE APPLICATIONS

# 1POLE X 2, H-BRIDGE, 25A

# FTR-P2 SERIES

**RoHS compliant**

## ■ FEATURES




- Low operating sound
  An original silent mechanism decreases the propagation of operating sound when mounted on a PCB. (Average sound pressure: 50dB at 5 cm).
- Compact, high density package
  350 $mm^2$ mounting area. (11% less than the FBR 510 series non-quiet twin relay).
- High sensitivity, low power consumption
  (nominal power consumption: 450 mW).
- High capacity
  Heat dissipation is high due to a single cover structure.
- Ease of PCB layout
  The FTR-P2 incorporates internal H-Bridge connections typically used in reversing applications. All terminals are on the perimeter.
- High breaking capability.
  In addition to the standard gap product (0.3 mm), a higher gap product (0.6 mm), suitable for over voltage breaking can be supplied.
- Typical applications
  Power window, Doorlock, Power seat, Wiper (for H-Bridge circuit)
- RoHS compliant since date code: 0623
  Please see page 7 for more information

## ■ ORDERING INFORMATION

[Example] FTR-P2 (a) C (b) N (c) 012 (d) W1 (e) ** (f)

| | | |
|---|---|---|
| (a) | Series Name | FTR-P2 : FTR-P2 Series |
| (b) | Contact Arrangement | C : 1 FormC x 2 |
| (c) | Contact Gap | N : 0.3 mm gap |
| (d) | Nominal Voltage | 009: 9 VDC 010: 10 VDC 012: 12 VDC |
| (e) | Contact Material | W1 : Silver-Tin-Oxide-Indium Oxide |
| (f) | Special product specification | Symbol to specify special specification product |

Note: The part number is stamped on the relay cover as in the following example:
(Example) Ordering part number: FTR-P2CN012W1
Stamped part number: P2CN012W1

## ■ SPECIFICATIONS

| Item | | | Specifications |
|---|---|---|---|
| Contact | Arrangement | | 1 Form C x 2 H-Bridge |
| | Material | | Silver-tin oxide-indium |
| | Voltage drop | | 100mV (1A, 12VDC) |
| | Contact rating | | 14VDC, 25A (motor locked) |
| | Maximum carrying current | | 25A / 1 hour (25°C, nominal voltage applied to coil) |
| | Maximum switching current | | 35A, 16 VDC |
| | Minimum load (reference)* | | 6V, 1A |
| Coil | Operating temperature range | | -40°C to +85°C (no frost) |
| | Storage temperature range | | -40°C to +100°C (no frost) |
| Time | Operate (at nominal voltage) | | 10 ms maximum |
| | Release (at nominal voltage) | | 5 ms maximum (without diode) |
| Life | Mechanical | | 10 million operations minimum |
| | Electrical | | 100k operations minimum (at contact rating) |
| Other | Vibration resistance (operational) | | 10-55HZ, 1.5mm double amplitude |
| | Shock resistance | operational | 100 $m/s^2$ minimum (10G) |
| | | no damage | 100 $m/s^2$ minimum (100G) |
| | Weight | | Approximately 13 grams |
| | Average sound pressure | | Approximately 50dB at 5cm |

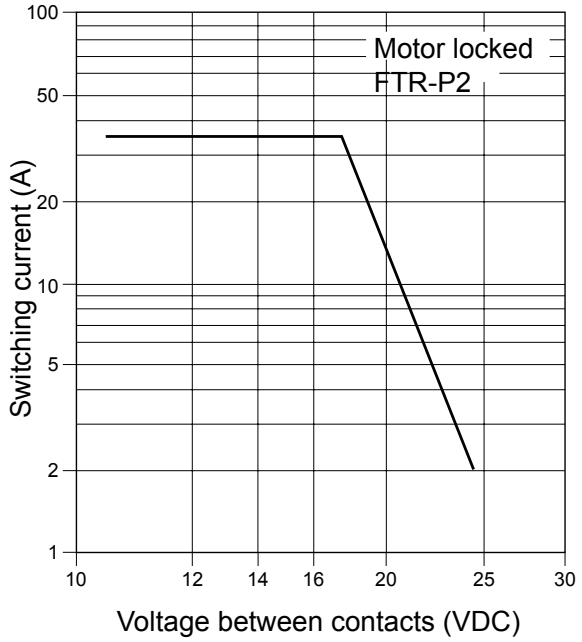
*This is the standard value of the minimum load level. This value may differ depending on the switching frequency, environmental conditions and target reliability standard. We recommend to check this value by an actual load prior to use.

## ■ COIL DATA

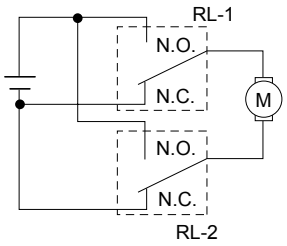
| Product Name | Nominal Coil Voltage | Coil Resistance* (±10%) | Power Consumption at nominal coil voltage* | Must Operate Voltage* | Must Release Voltage |
|---|---|---|---|---|---|
| FTR-P2CN009W1 | DC 9V | 180Ω | 450mW | 5.5V (20°) 6.9 V (85°) | 0.72 |
| FTR-P2CN010W1 | DC 10V | 220Ω | 455mW | 6.3V (20°) 7.9 V (85°) | 0.8 |
| FTR-P2CN012W1 | DC 12V | 320Ω | 450mW | 7.3V (20°) 9.2V (85°) | 0.96 |

## ■ CHARACTERISTIC DATA

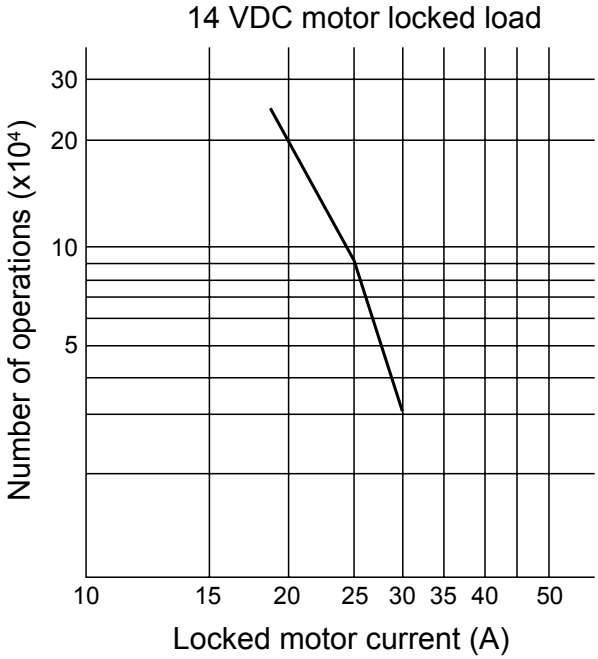
### 1. MAXIMUM BREAK CAPACITY




Test circuit




### 2. LIFE

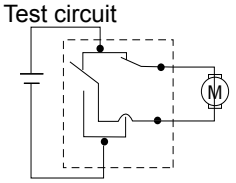


## ■ CHARACTERISTIC DATA

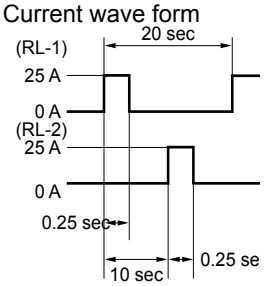
### 3. LIFE TEST (EXAMPLES)

• Test item
14 V DC-25 A
Motor Lock
100K operations minimum

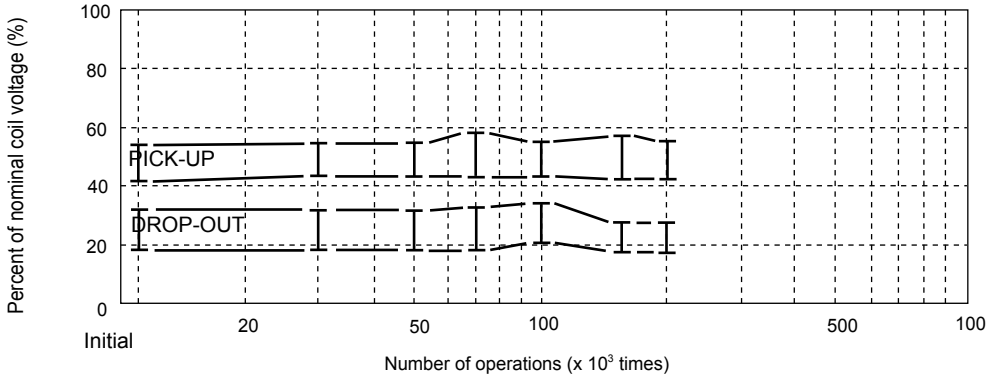
• Test circuit



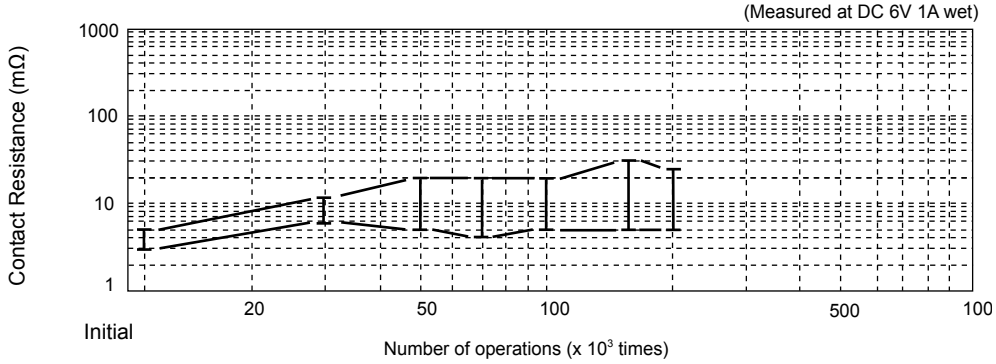

• Current wave form




• Shift of pick-up drop-out voltage

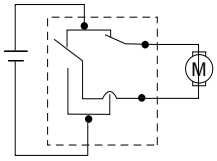



• Change in contact resistance



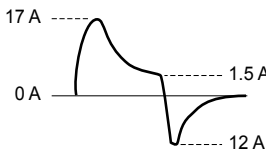

• Test item
14 V DC,
inrush current: 17A
motor free
300K operations minimum
0.25 seconds ON,
9.75 seconds OFF

• Test circuit

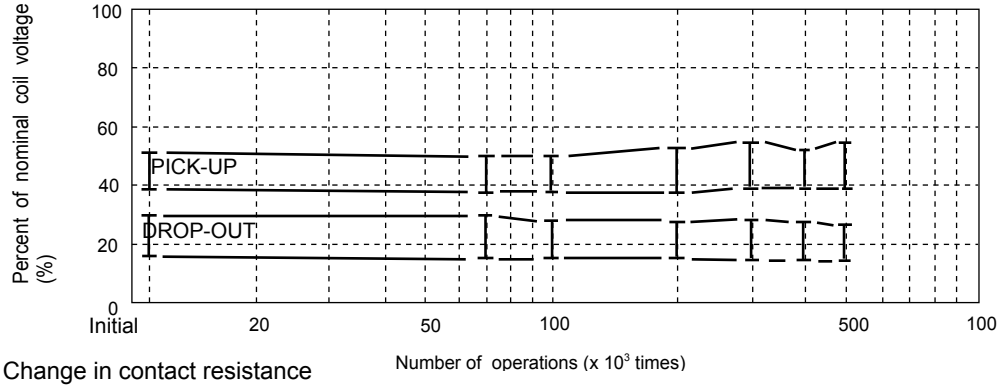



Notes: 1. Test was done on one side of twin relay
2. NC contacts provide dynamic brake circuits

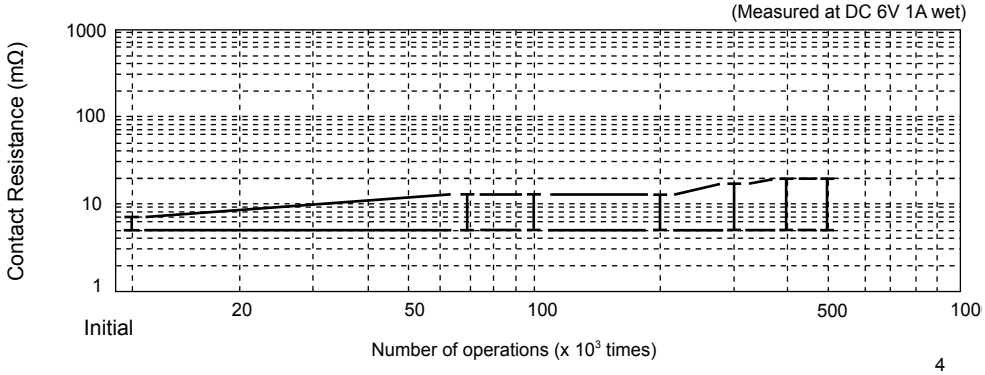
• Current wave form



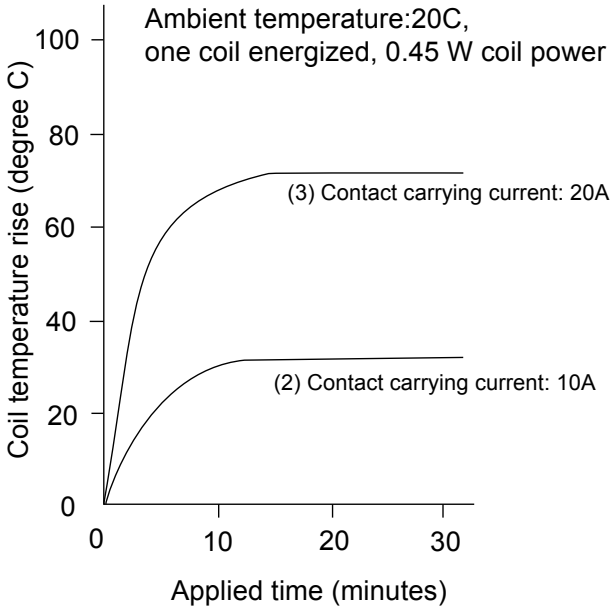

• Change in pick-up drop-out voltage



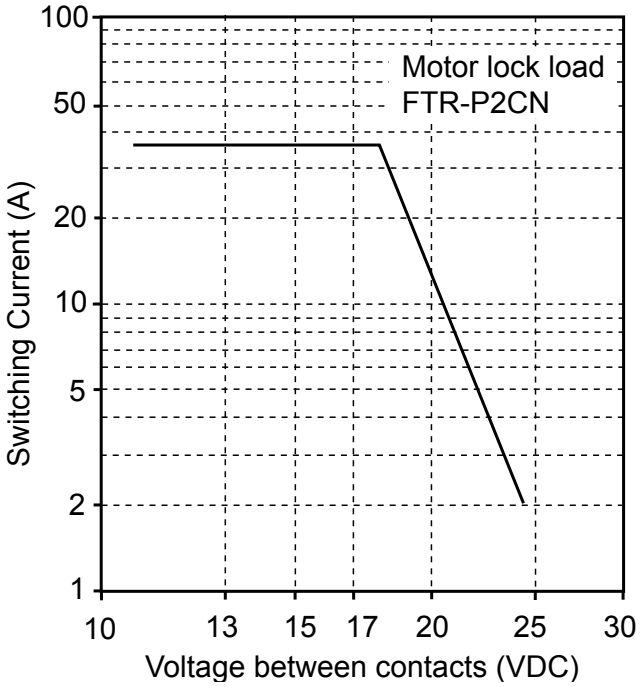

• Change in contact resistance



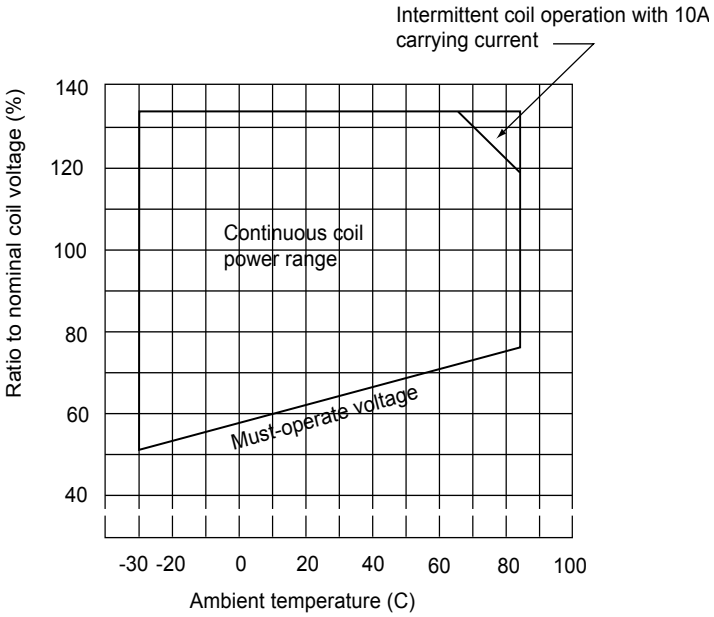
### 4. COIL TEMPERATURE RISE



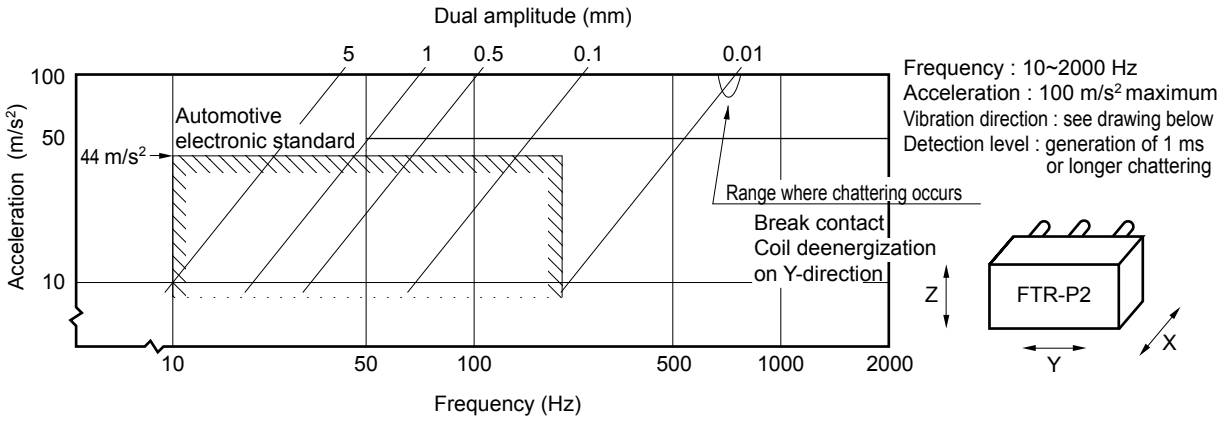

### 5. MAXIMUM BREAK CAPACITY



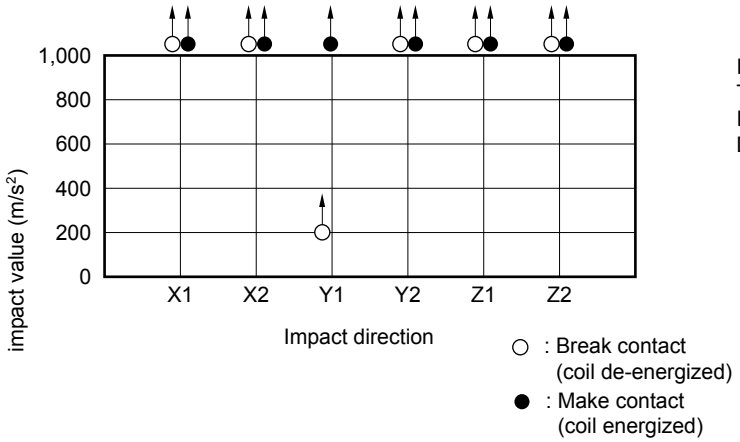

### 6. OPERATING COIL VOLTAGE RANGE



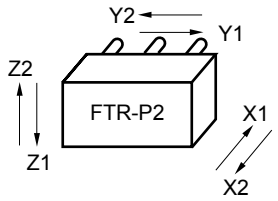
## 5. VIBRATION RESISTANCE CHARACTERISTICS




## 6. SHOCK RESISTANCE CHARACTERISTIC

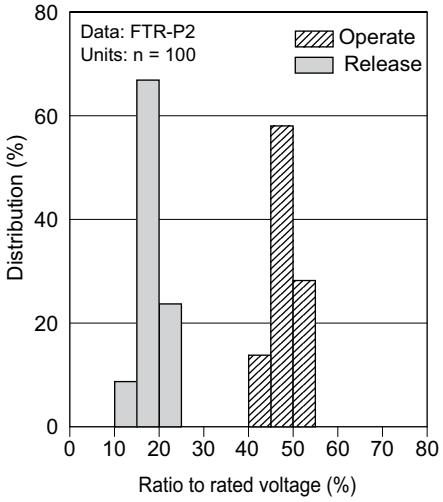



Impact apply time : 111 ms, half-sine wave
Test condition: coil, energized and de-energized
Impact direction: see drawing below
Detection level : generation of 1ms or longer
contact chattering

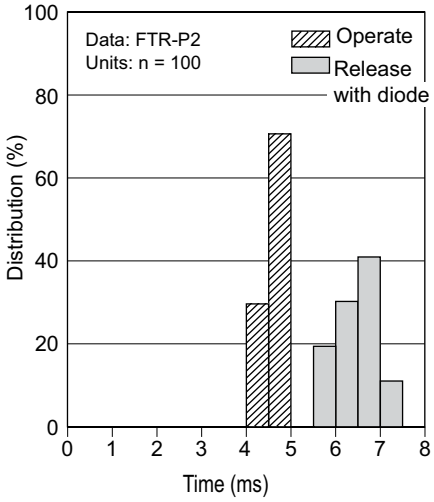


## ■ REFERENCE DATA

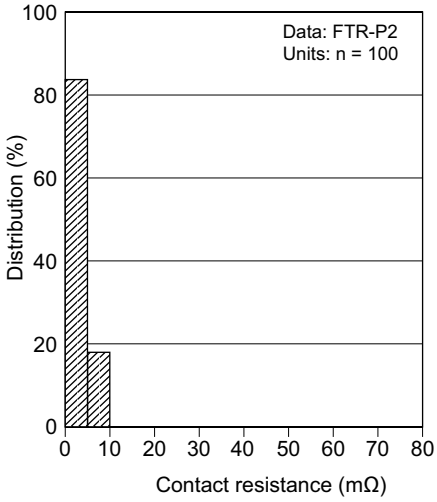
Operating/release voltage distribution



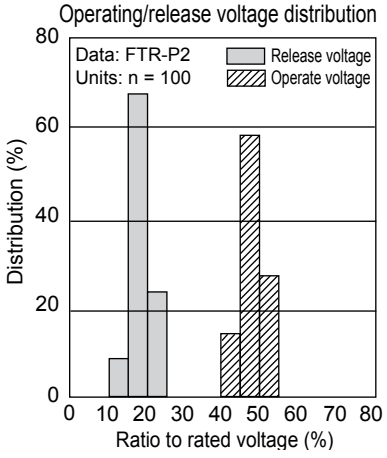

Operate and release time distribution



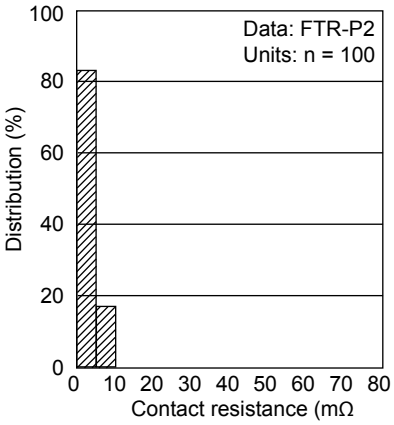

Contact resistance distribution



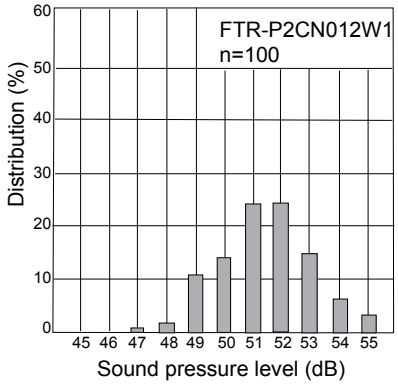

Operating/release voltage distribution



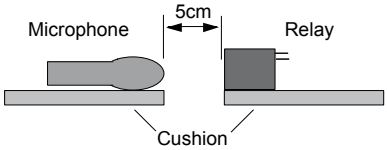

Contact resistance distribution



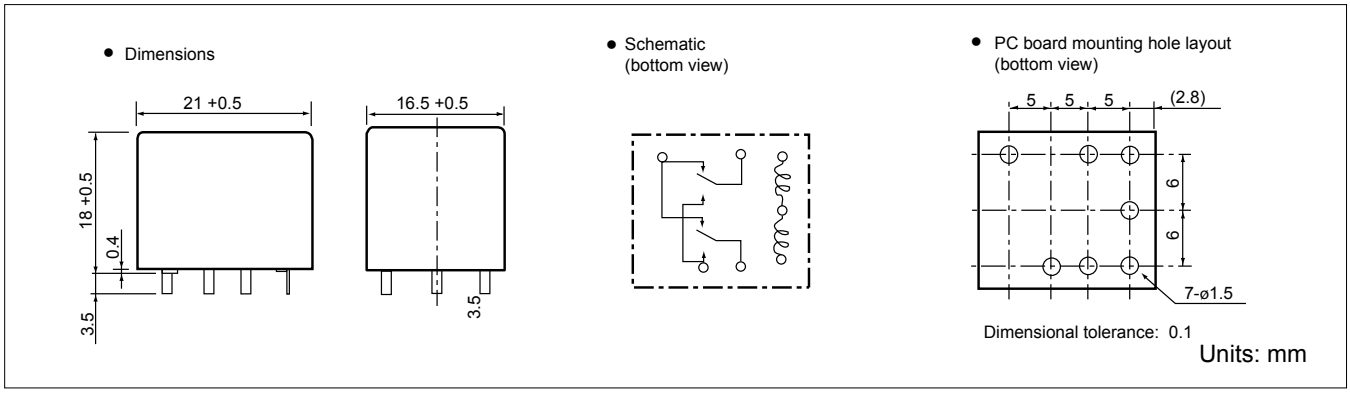

Distribution of sound pressure (with diode)




Method of acoustic noise measure
Measuring condition: Distance from 5 cm, relay operation at 10Hz
Tester: Noise tester Ryon NA-61, A range




## ■ DIMENSIONS



# RoHS Compliance and Lead Free Relay Information

## 1. General Information

- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. Most of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu.
- All signal and most power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 5 hazardous materials that are restricted by RoHS directive (lead, mercury, chromium IV, PBB, PBDE).
- It has been verified that using lead-free relays in leaded assembly process will not cause any problems (compatible).
- “LF” is marked on each outer and inner carton. (No marking on individual relays).
- To avoid leaded relays (for lead-free sample, etc.) please consult with area sales office.
- We will ship leaded relays as long as the leaded relay inventory exists.

Note: Cadmium was exempted from RoHS on October 21, 2005. (Amendment to Directive 2002/95/EC)

## 2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu.

### Reflow Solder condition

**Flow Solder condition:**

| | |
|---|---|
| Pre-heating: | maximum 120˚C |
| Soldering: | dip within 5 sec. at 260˚C soler bath |

**Solder by Soldering Iron:**

| | |
|---|---|
| Soldering Iron Temperature: | maximum 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 realys.

## 4. Tin Whisker

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

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