

# 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<sup>2</sup> 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   C   N   012   W1   \*\*  
                   (a)    (b)   (c)   (d)   (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

# FTR-P2 SERIES

## ■ 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 <sup>2</sup> minimum (10G)
		no damage	100 m/s <sup>2</sup> minimum (100G)
	Weight		Approximately 13 grams
Average sound pressure		Approximately 50dB at 5cm	

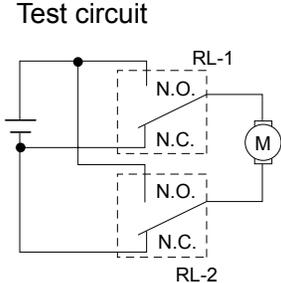
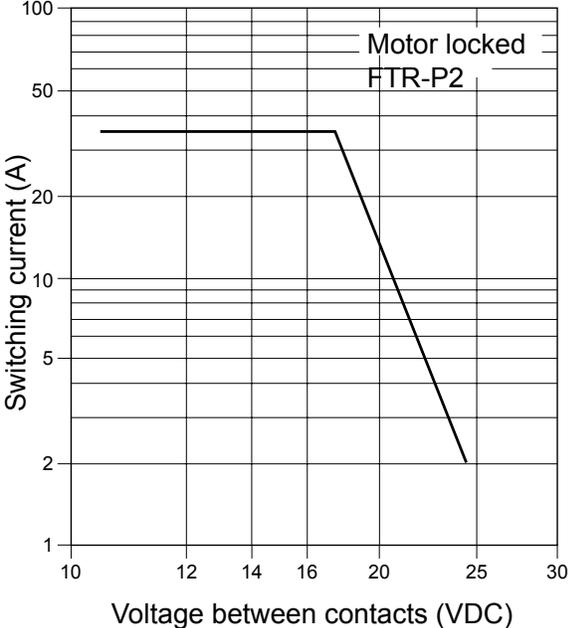
\*This is the standard value of the minimum load level. This value may differ depending on the switching frequency, environmental conditions and target reliability standard. We recommend to check this value by an actual load prior to use.

## ■ 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

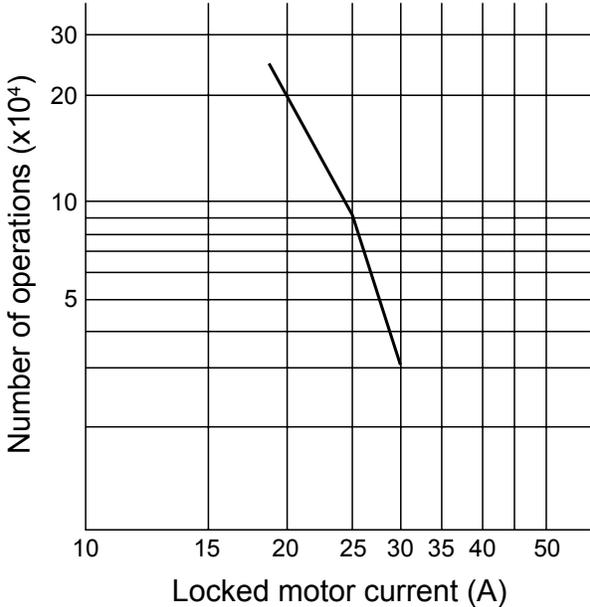
**CHARACTERISTIC DATA**

**1. MAXIMUM BREAK CAPACITY**



**2. LIFE**

14 VDC motor locked load

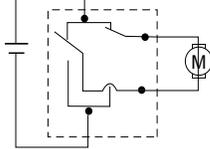


## CHARACTERISTIC DATA

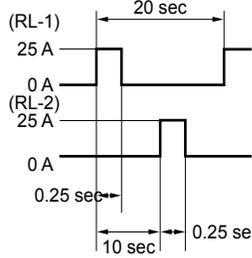
### 3. LIFE TEST (EXAMPLES)

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

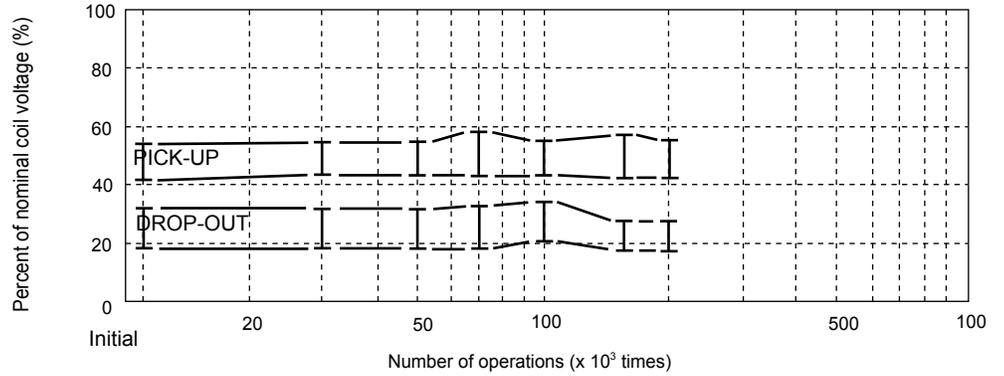
• Test circuit



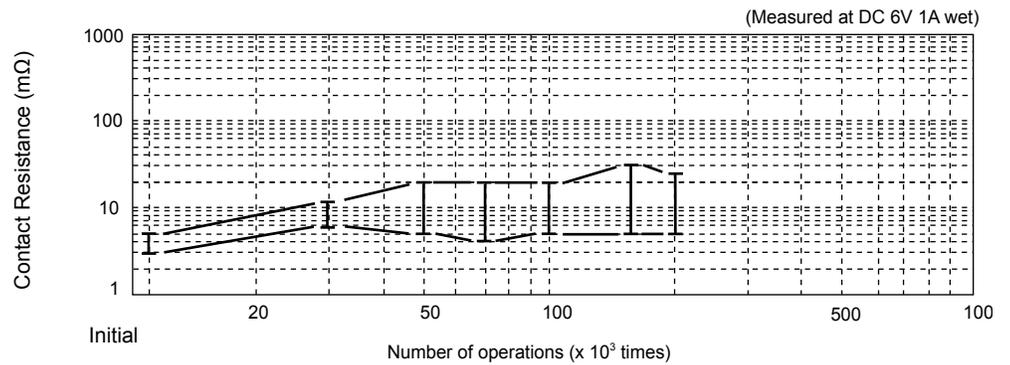
• Current wave form



- Shift of pick-up drop-out voltage

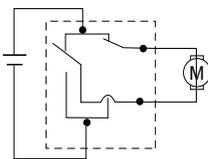


- Change in contact resistance



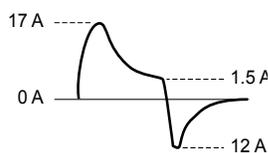
- Test item  
14 V DC,  
inrush current: 17A  
motor free  
300K operations minimum  
0.25 seconds ON,  
9.75 seconds OFF

• Test circuit

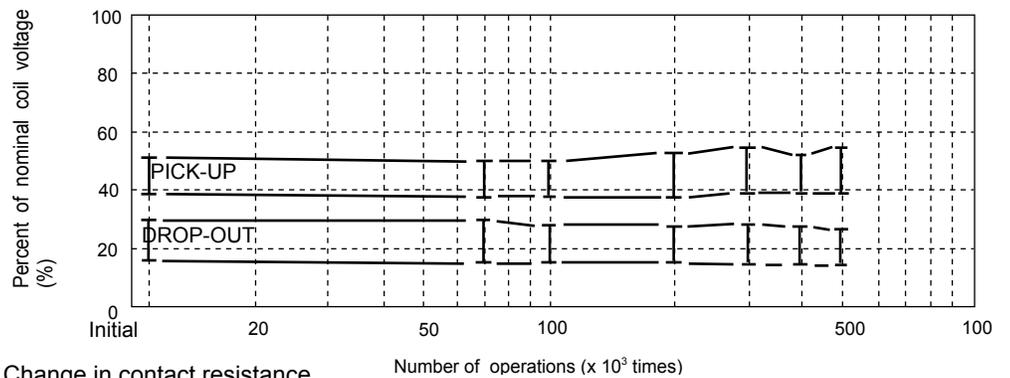


- Notes: 1. Test was done on one side of twin relay  
2. NC contacts provide dynamic brake circuits

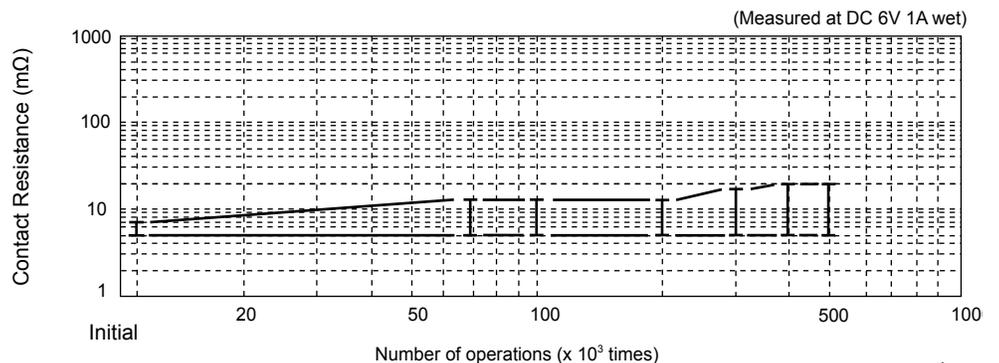
• Current wave form



- Change in pick-up drop-out voltage

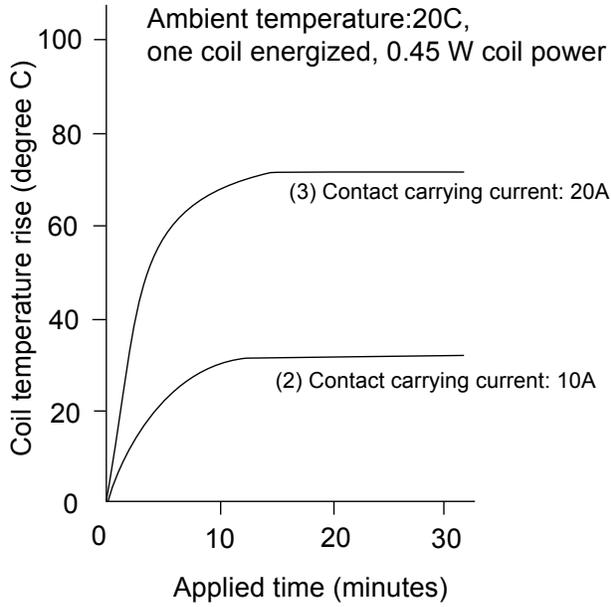


- Change in contact resistance

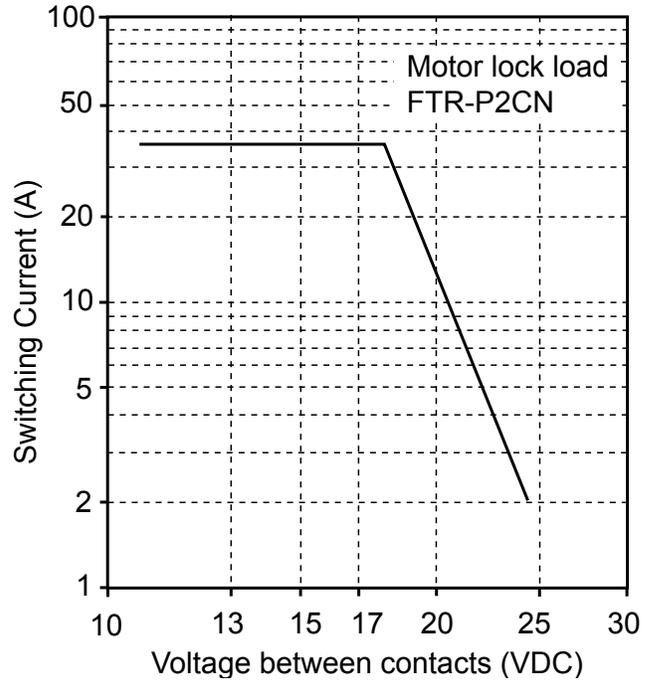


# FTR-P2 SERIES

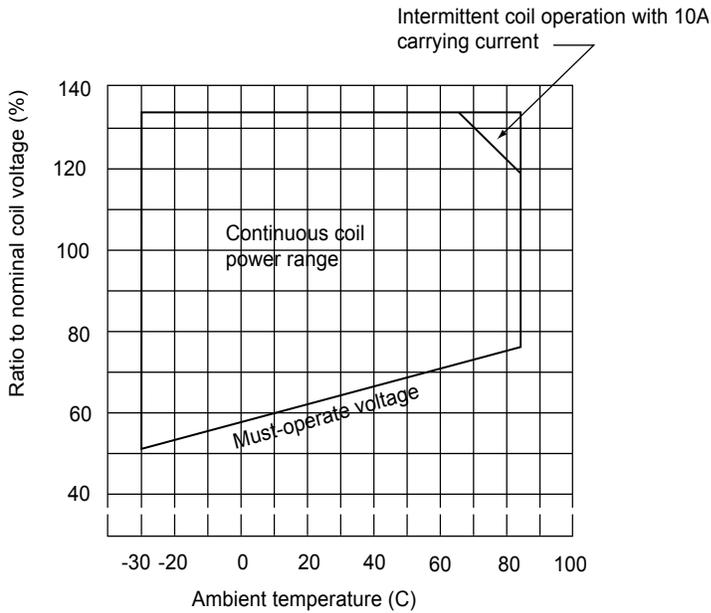
## 4. COIL TEMPERATURE RISE



## 5. MAXIMUM BREAK CAPACITY

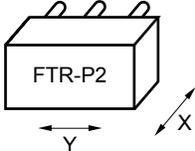
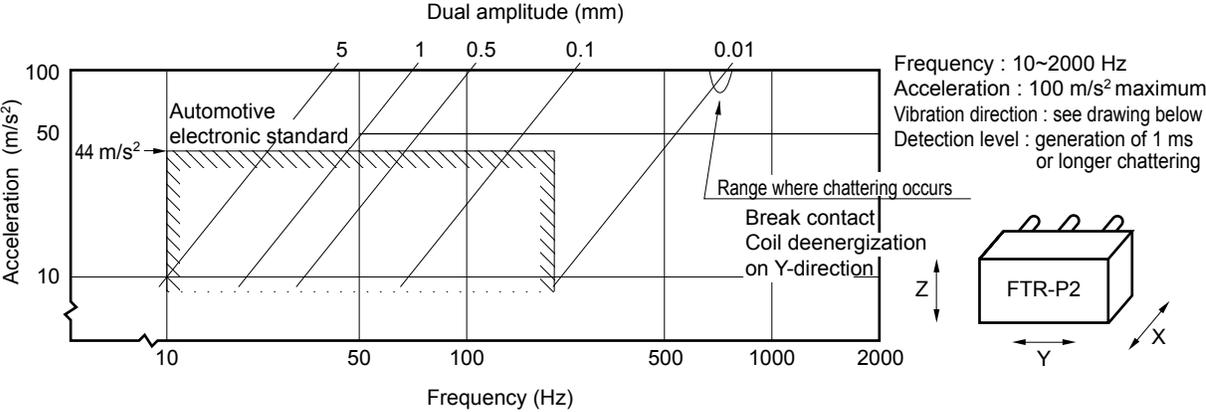


## 6. OPERATING COIL VOLTAGE RANGE

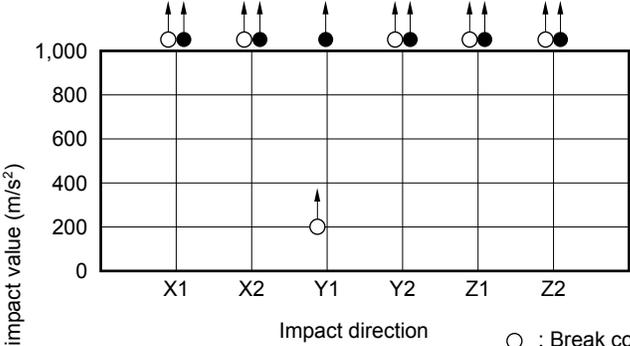


# FTR-P2 SERIES

## 5. VIBRATION RESISTANCE CHARACTERISTICS

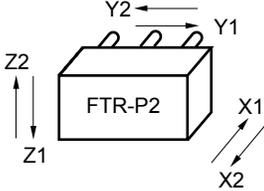


## 6. SHOCK RESISTANCE CHARACTERISTIC



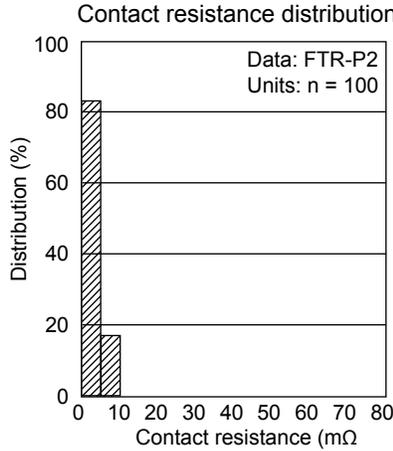
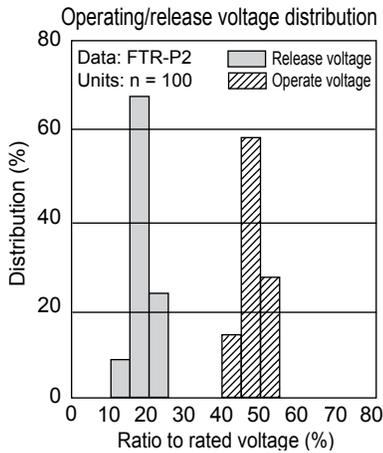
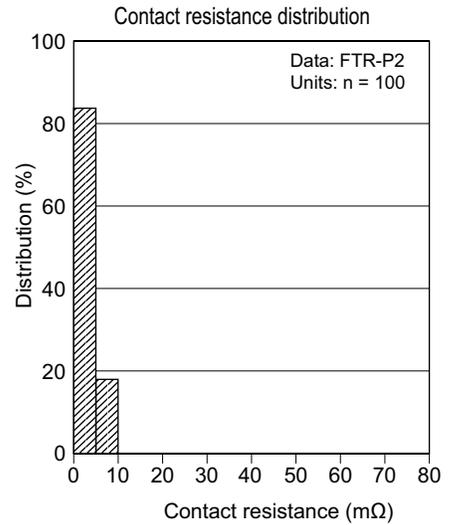
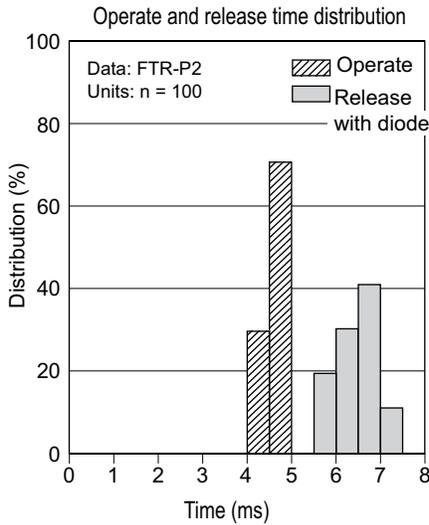
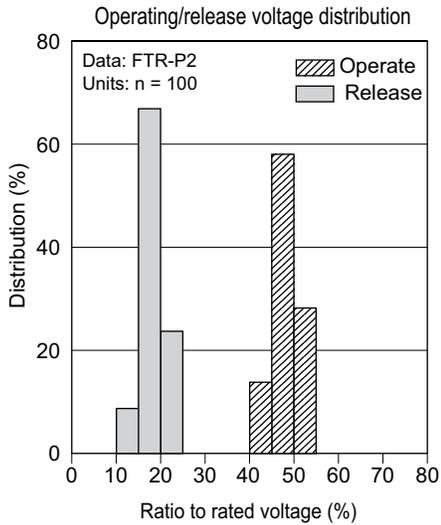
- : Break contact (coil de-energized)
- : Make contact (coil energized)

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

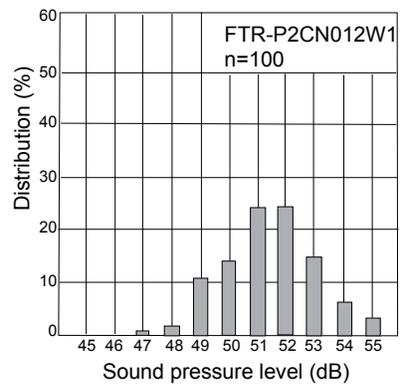


# FTR-P2 SERIES

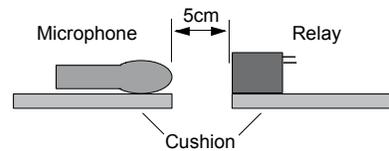
## REFERENCE DATA



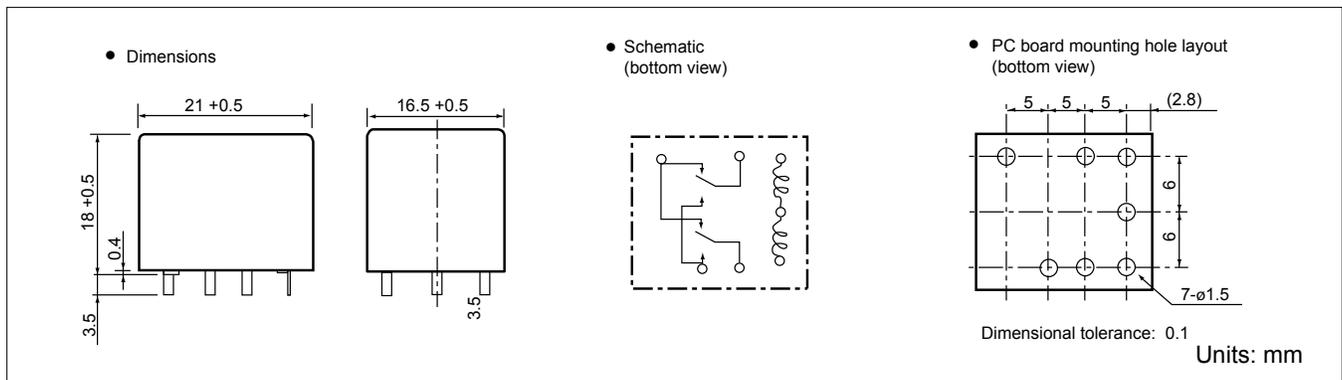
Distribution of sound pressure (with diode)



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 solder 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 relays.

### 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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