

# SILENT TWIN RELAY

## for automotive applications

### 1 POLE x 2 – 25A (for 12V car battery)

## FTR-P2 Series

### ■ 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
- High sensitivity, low power consumption  
(nominal power consumption: 450 mW)
- Simple PCB layout due to internal H-Bridge connections  
typically used in motor applications.  
All terminals are on the perimeter
- High breaking capability.
- Typical applications  
Power window, Door lock, Power seat, Wiper (for H-Bridge circuit)
- RoHS compliant



### ■ PARTNUMBER INFORMATION

[Example]     $\frac{\text{FTR-P2}}{\text{(a)}}$      $\frac{\text{C}}{\text{(b)}}$      $\frac{\text{N}}{\text{(c)}}$      $\frac{\text{012}}{\text{(d)}}$      $\frac{\text{W1}}{\text{(e)}}$

(a)	Relay type	FTR-P2	: FTR-P2 Series
(b)	Contact configuration	C	: 1 form C x 2, H-bridge
(c)	Contact gap	N	: 0.3mm gap
(d)	Coil rated voltage	012	: 9....12VDC Coil rating table at page 3
(e)	Contact material	W1	: Silver-tin oxide indium

Actual marking does not carry the type name: "FTR"

E.g.: Ordering code: FTR-P2CN012W1 Actual marking: P2CN012W1

# FTR-P2 Series

## ■ SPECIFICATIONS

Item			FTR-P2
Contact data	Configuration		1 form C x 2, H-Bridge
	Material		Silver-tin oxide indium
	Voltage drop		Max. 100mV at 1A, 12VDC
	Contact rating		14VDC, 25A (motor locked)
	Max. carrying current		25A/1 hour (25°C, nominal voltage applied to coil)
	Max. switching voltage		16VDC (reference)
	Max. switching current		35A (reference)
	Min. switching load		6V, 1A (reference)
Coil	Operating temperature range		-40 °C to +85°C (no frost)
	Storage temperature range		40°C to +100°C (no frost)
Timing data	Operate (at nominal voltage)		Max. 10 ms
	Release (at nominal voltage)		Max. 5 ms (without diode), Max. 15ms (with diode)
Life	Mechanical		Min. 10 million operations
	Electrical		Min. 100k operations (at contact rating)
Others	Vibration resistance	Misoperation	10 to 200Hz, acceleration 44m/s <sup>2</sup> (4.5G), constant acceleration
		Endurance	10 to 200Hz, acceleration 44m/s <sup>2</sup> (4.5G), constant acceleration
	Shock resistance	Misoperation	100 m/s <sup>2</sup> (11 ± 1ms)
		Endurance	1,000 m/s <sup>2</sup> (6 ± 1ms)
	Weight		Approximately 13 g
	Average sound pressure		Approximately 50dB at 5cm

\* 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.

# FTR-P2 Series

## ■ COIL RATING

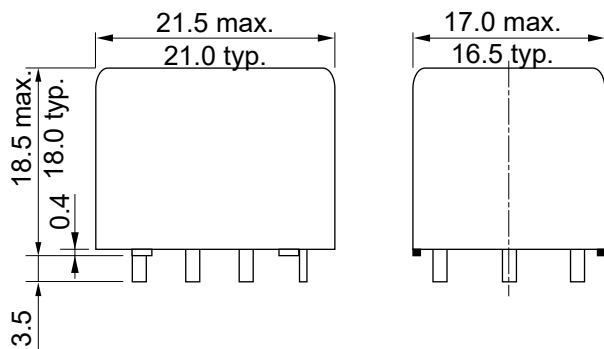
Coil Code	Rated Coil Voltage (VDC)	Coil Resistance $\pm 10\%$ ( $\Omega$ )	Must Operate Voltage* (VDC)	Must Release Voltage* (VDC)
009	9	180	5.5 (at 20°C) 6.9 (at 85°C)	0.7 (at 20°C) 0.9 (at 85°C)
010	10	220	6.3 (at 20°C) 7.9 (at 85°C)	0.8 (at 20°C) 1.0 (at 85°C)
012	12	320	7.3 (at 20°C) 9.2 (at 85°C)	1.0 (at 20°C) 1.3 (at 85°C)

Note: All values in the table are valid for 20°C and zero contact current unless otherwise stated.

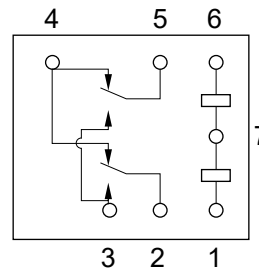
\*: Specified operated values are valid for pulse voltage.

## ■ DIMENSIONS

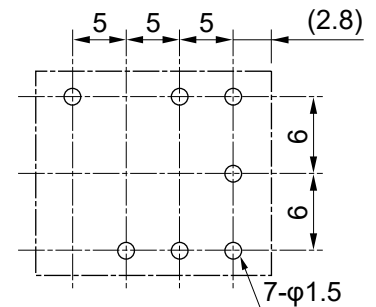
### ● Dimensions



### ● Schematics (Bottom view)



### ● PC board mounting hole layout (Bottom view)



\* Dimensions of the terminals do not include thickness of pre-solder.

Tolerance of PC board mounting hole layout :  $\pm 0.1$  unless otherwise specified.

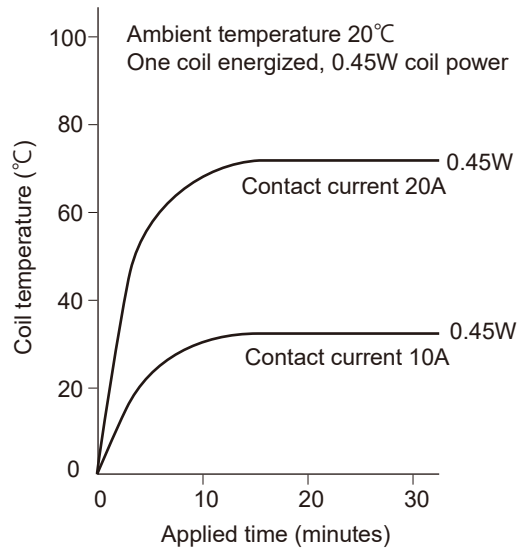
Unit:mm  
( ): Reference

# FTR-P2 Series

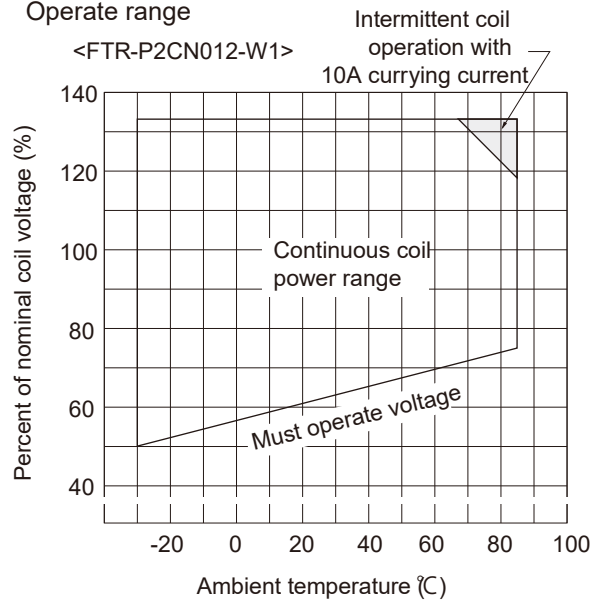
## ■ CHARACTERISTIC DATA

(Characteristic data is not guaranteed value but measured values of samples from production line)

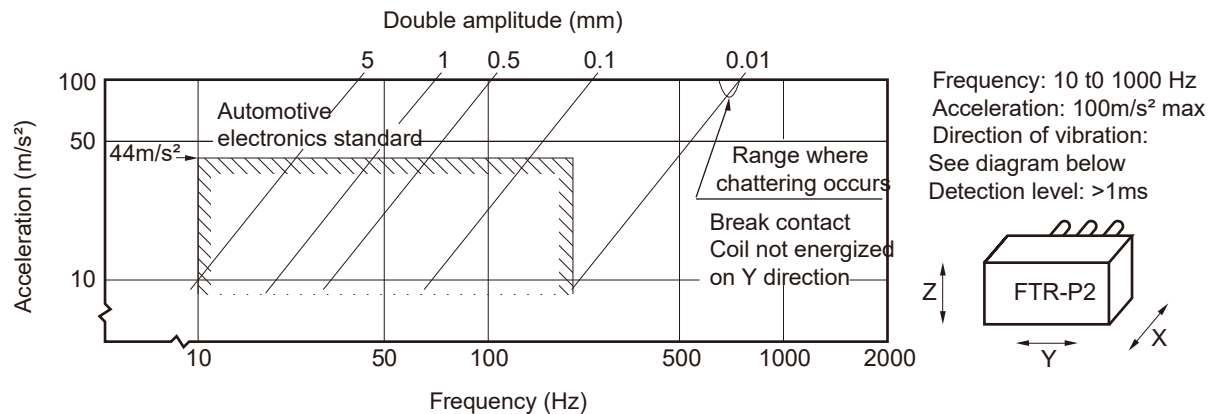
Coil temperature rise



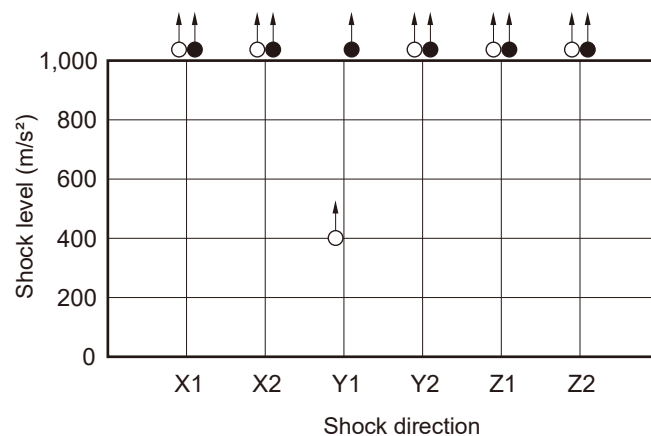
Operate range



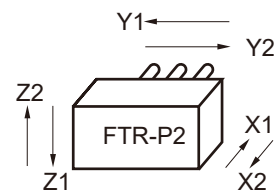
Vibration resistance characteristics



Shock resistance characteristics



Shock application time:  $6 \pm 1$ ms, half -sine wave  
Test conditions: coil energized and de-energized  
Shock direction: See diagram below  
Detection level: >1ms



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

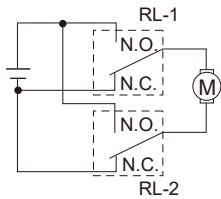
# FTR-P2 Series

## Life test (example)

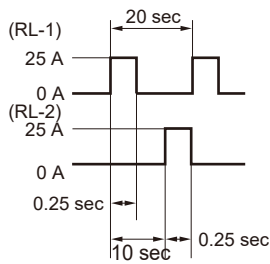
### Test Conditions

25A 14VDC  
Motor lock  
100,000 operations min.  
0.25 sec. ON, 9.75 sec. OFF

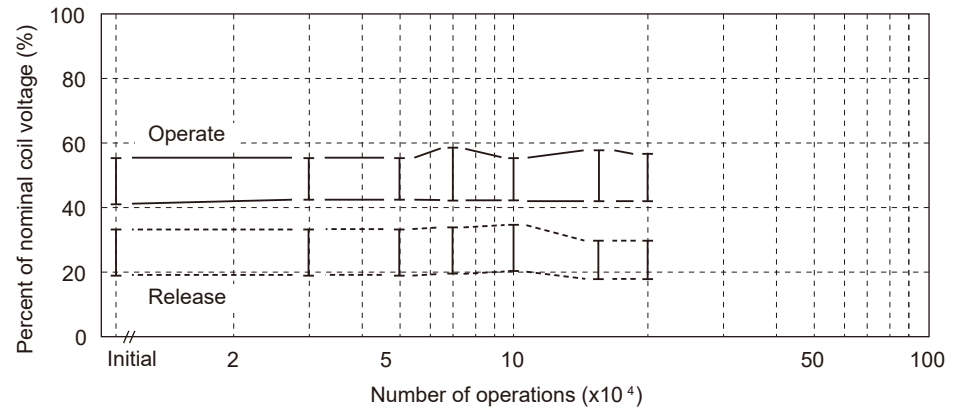
### Test Circuit



### Current wave form

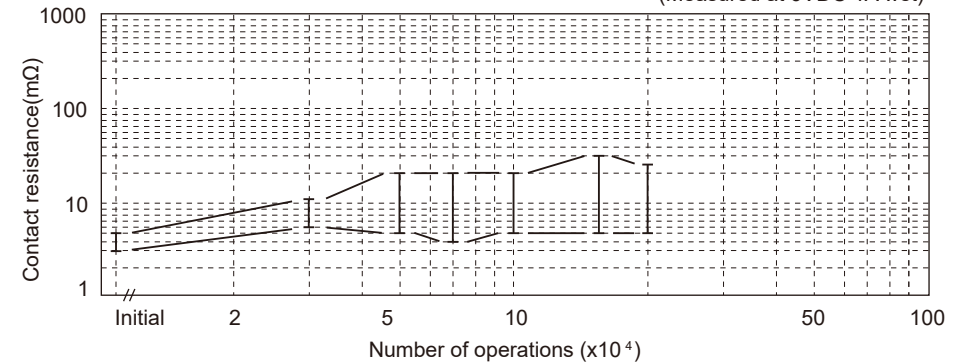


### Operate/release voltage



### Contact resistance

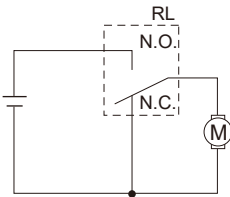
(Measured at 6VDC 1A wet)



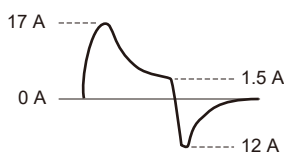
### Test Conditions

17A 14VDC  
Motor free  
300,000 operations min.  
0.25 sec. ON, 9.75 sec. OFF

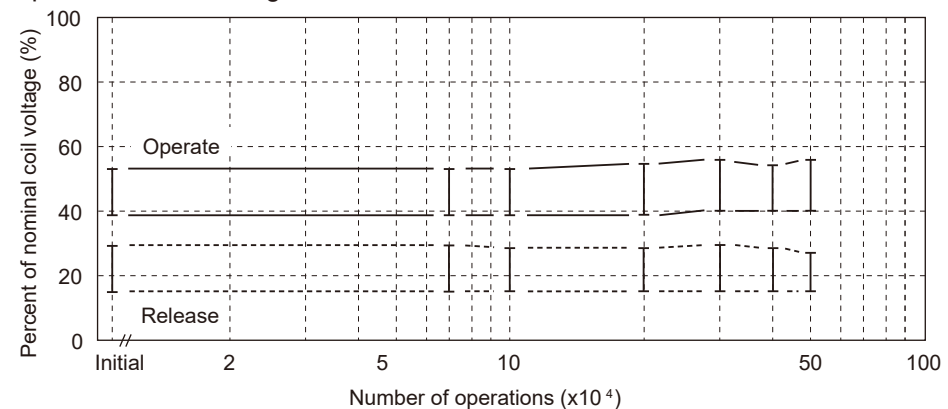
### Test Circuit



### Current wave form

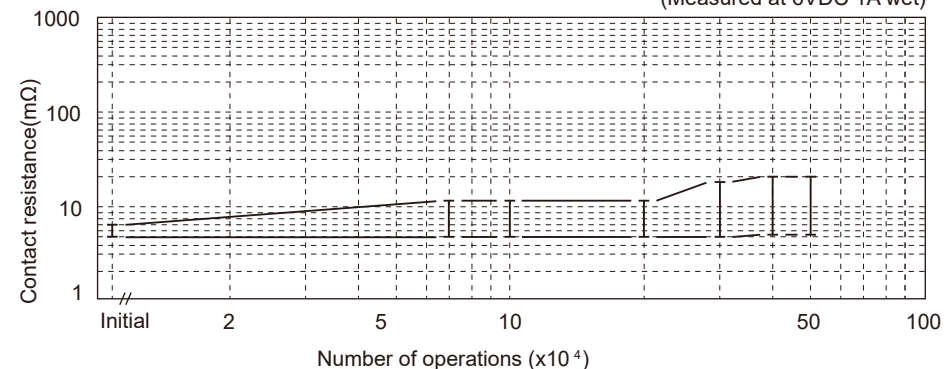


### Operate/release voltage



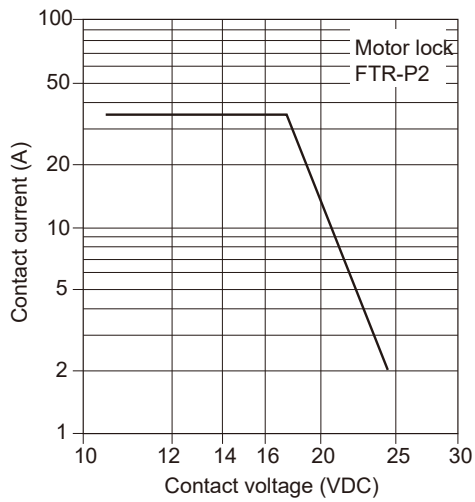
### Contact resistance

(Measured at 6VDC 1A wet)

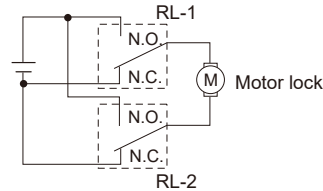


# FTR-P2 Series

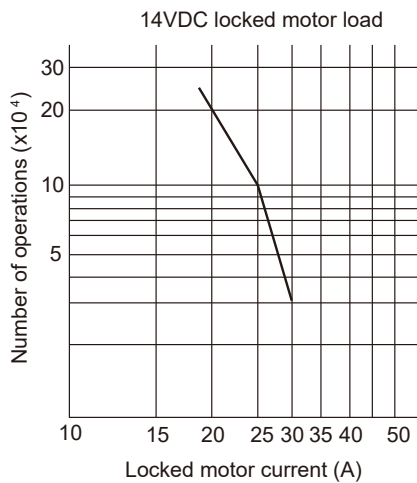
Maximum break capacity



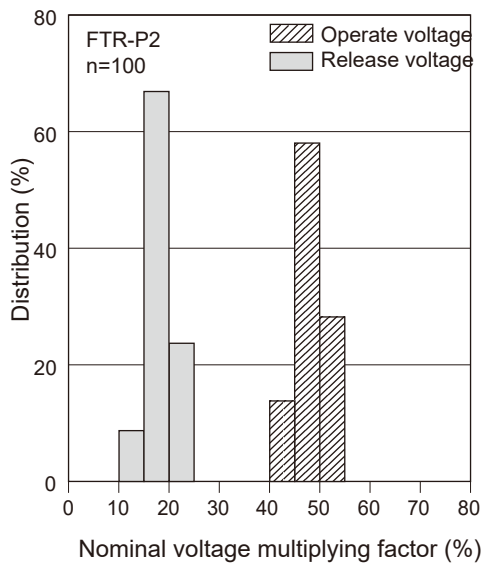
Test circuit



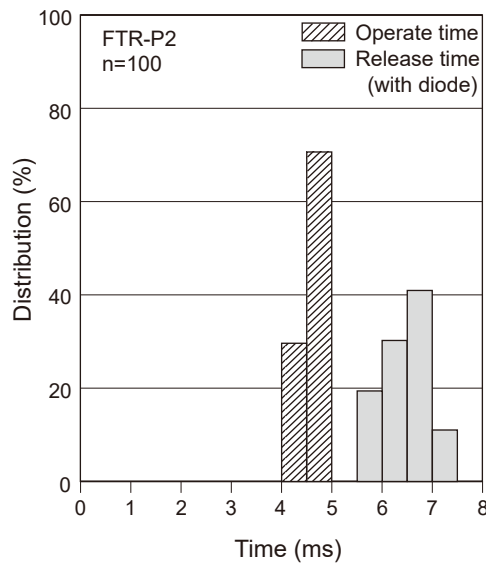
Life curve



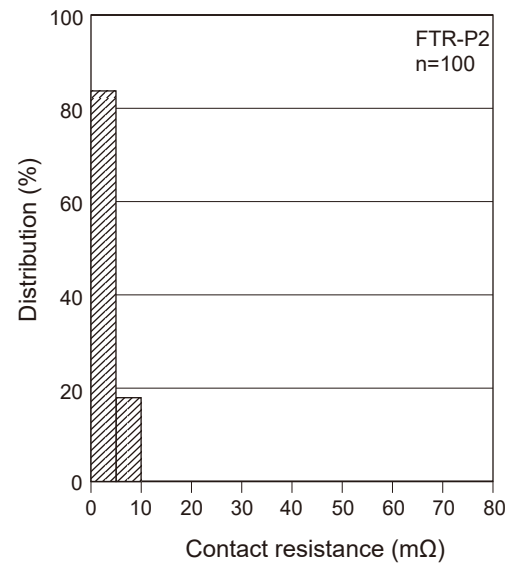
Distribution of operate/release voltage



Distribution of operate/release time



Distribution of contact resistance



# FTR-P2 Series

## CAUTIONS

- All values mentioned in this datasheet are provided under ideal conditions. Please perform the confirmation test before actual use.
- Reflow soldering is prohibited.
- Do not use relays in the atmosphere with sulfide gas, chloride gas or nitric oxide. Contact resistance may increase.
- Do not use silicon or silicon-containing product or materials near relays. It may cause contact failure.

## GENERAL INFORMATION

### 1. ROHS Compliance

- All relays produced by FCL Components are compliant with RoHS directive 2011/65/EU, including commission delegated directive 2015/863.

### 2. Recommended lead free solder condition

- 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.
- Recommended solder for assembly: 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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# Contact

**Japan**  
FCL COMPONENTS LIMITED  
Shinagawa Seaside Park Tower  
12-4, Higashi-shinagawa 4-chome,  
Tokyo 140 0002, Japan  
Tel: +81-3-3450-1682  
Email: fcl-contact@cs.fcl-components.com

**Asia Pacific**  
FCL COMPONENTS ASIA PTE LTD.  
No. 20 Harbour Drive, #07-01B  
Singapore 117612  
Tel: +65-6375-8560  
Email: fcal@fcl-components.com

**North and South America**  
FCL COMPONENTS AMERICA, INC.  
2055 Gateway Place Suite 480,  
San Jose, CA 95110 USA  
Tel: +1-408-745-4900  
Email: fcai.components@fcl-components.com

**China**  
FCL COMPONENTS (SHANGHAI) CO., LTD.  
Unit 1105, Central Park - Jing An,  
No.329 Heng Feng Road, Shanghai 200070,  
China  
Tel: +86-21-3253 0998  
Email: fcsh@fcl-components.com

**Europe**  
FCL COMPONENTS EUROPE B.V.  
Diamantlaan 25  
2132 WV Hoofddorp, Netherlands  
Tel: +31-23-556-0910  
Email: info.fceu@cs.fcl-components.com

**Web:** [www.fcl-components.com/en/](http://www.fcl-components.com/en/)

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