

SILENT TWIN RELAY

1 POLE x 2 - 25A, H-Bridge (for automotive applications)

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 mm² 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, Doorlock, Power seat, Wiper (for H-Bridge circuit)
- RoHS compliant
Please see page 7 for more information



■ PARTNUMBER INFORMATION

[Example] FTR-P2 C N 012 W1
 (a) (b) (c) (d) (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 2
(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

■ SPECIFICATION

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
	Max. switching current		35A
	Min. switching load *		6V, 1A (reference)
Life	Mechanical		Min. 10 million operations
	Electrical		Min. 100k operations (at contact rating)
Coil Data	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)
Other	Vibration resistance (operational)		10 to 55Hz double amplitude 1.5mm
	Shock	Operational	100 m/s ² minimum (10G)
		No damage	1,000 m/s ² minimum (100G)
	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.

■ COIL RATING

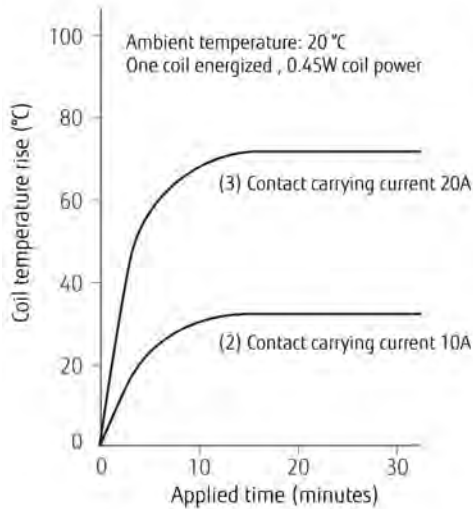
Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (V) *	Must Release Voltage (V) *	Power Consumption at Nominal Coil Voltage (mW)
009	9	180	5.5 (at 20 °C)	0.7 (at 20 °C)	450
			6.9 (at 85 °C)	0.9 (at 85 °C)	
010	10	220	6.3 (at 20 °C)	0.8 (at 20 °C)	455
			7.9 (at 85 °C)	1.0 (at 85 °C)	
012	12	320	7.3 (at 20 °C)	1.0 (at 20 °C)	450
			9.2 (at 85 °C)	1.3 (at 85 °C)	

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

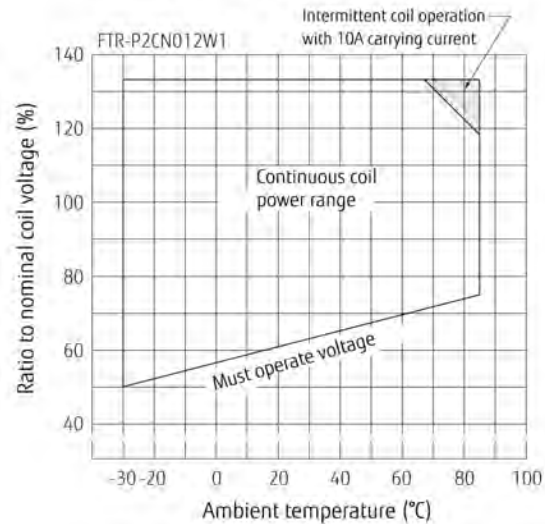
* Specified operate values are valid for pulse wave voltage.

CHARACTERISTIC DATA

Coil temperature rise

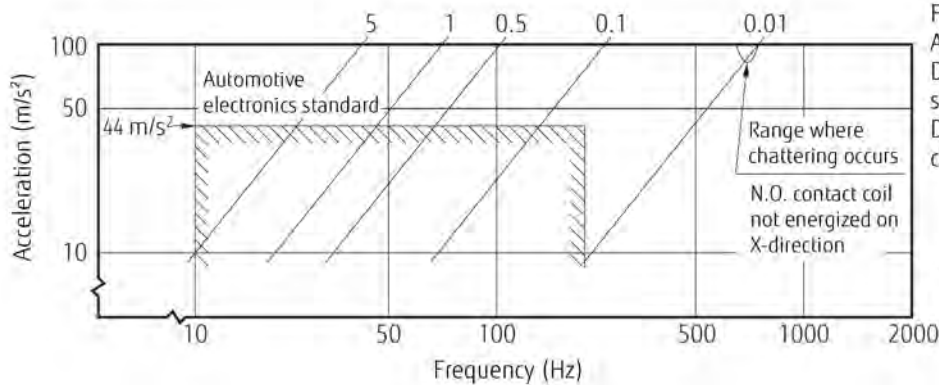


Operating coil voltage range

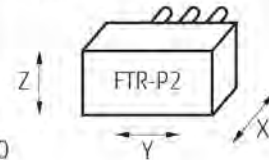


Vibration resistance characteristics

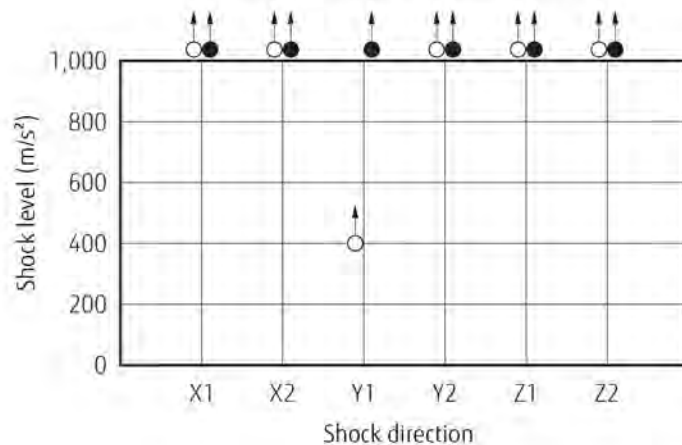
Dual amplitude (mm)



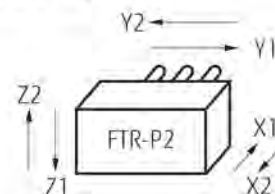
Frequency: 10~1000 Hz
Acceleration: 100 m/s² max.
Direction of vibration; see diagram below
Detection level: chatter > 1 ms



Shock resistance characteristics



Shock application time: 11 ms, half-sine wave
Test material: coil energized and de-energized
Shock direction: see diagram below
Detection level: chatter > 1 ms

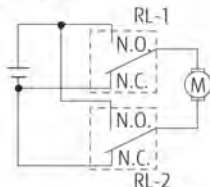


○ : Break contact coil de-energized
● : Make contact coil energized

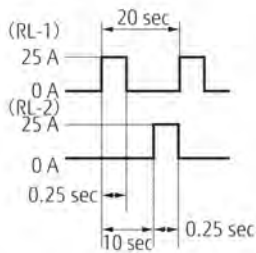
Life Test (examples)

Test condition
25A, 14VDC
motor lock
100,000 operations min.
0.25 seconds ON
9.75 seconds OFF

Test circuit

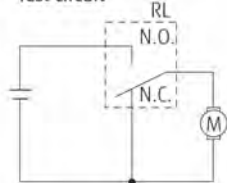


Current wave form

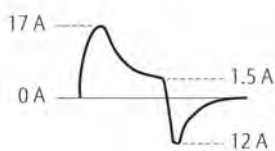


Test condition
Inrush current 17A, 14VDC
motor free
300,000 operations min.
0.25 seconds ON
9.75 seconds OFF

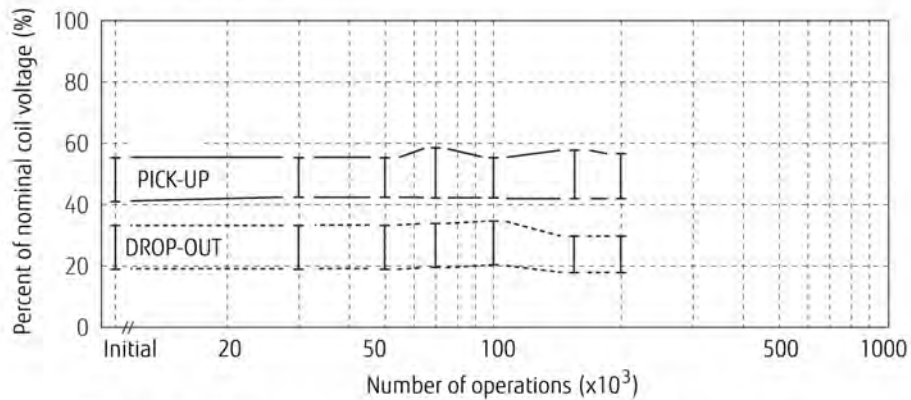
Test circuit



Current wave form

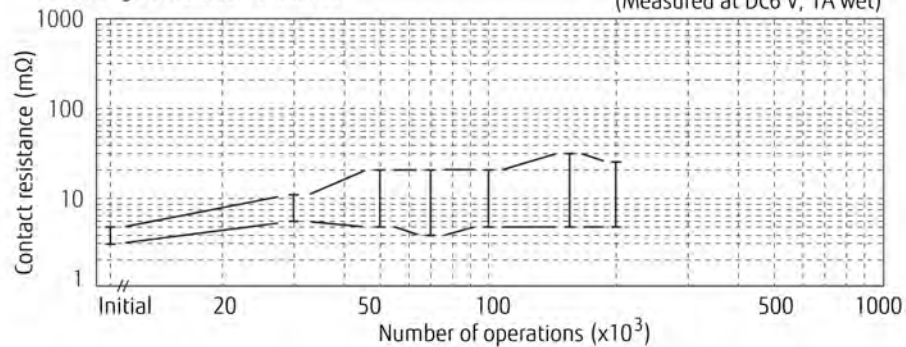


• Shift of pick-up drop-out voltage

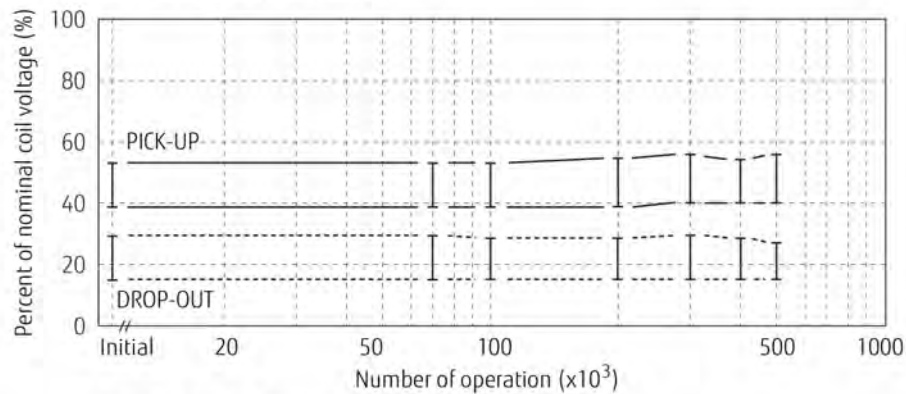


• Change of contact resistance

(Measured at DC6 V, 1A wet)

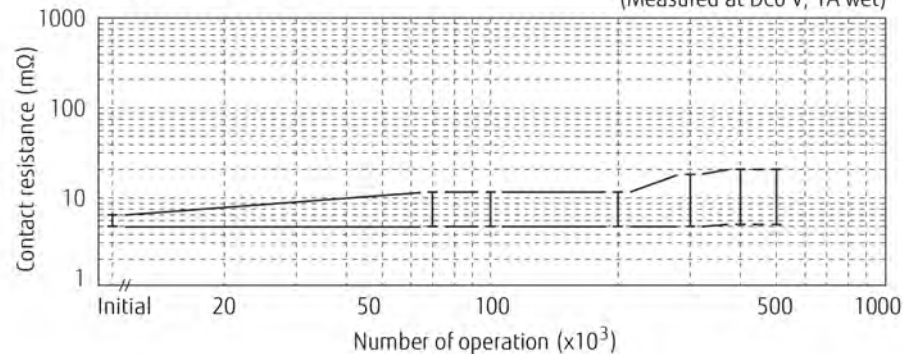


• Shift of pick-up drop-out voltage



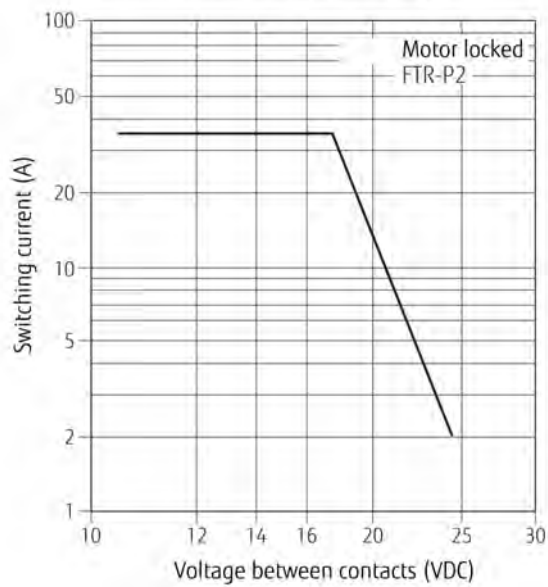
• Change of contact resistance

(Measured at DC6 V, 1A wet)

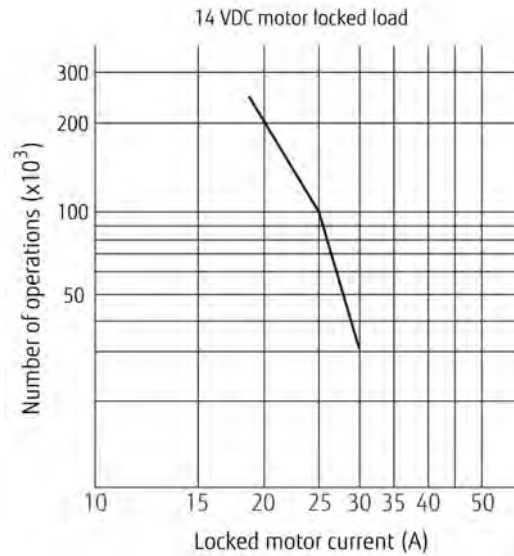


FTR-P2 SERIES

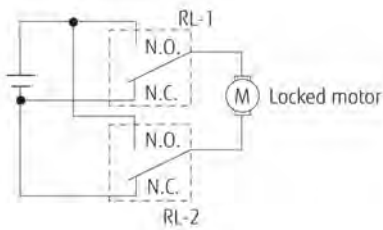
Maximum break capacity



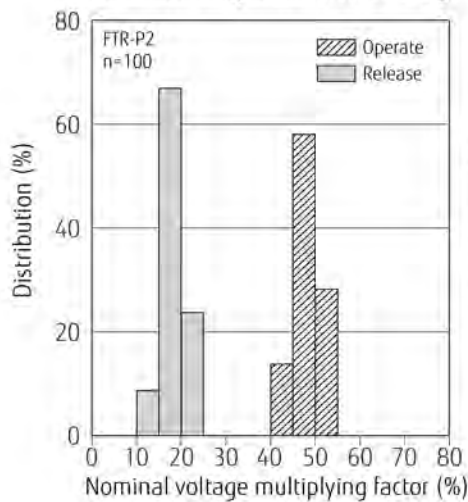
Life



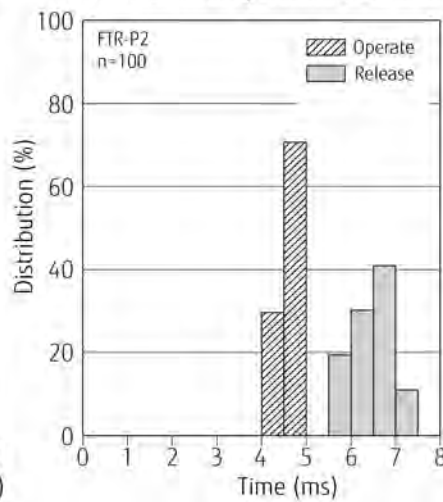
Test circuit



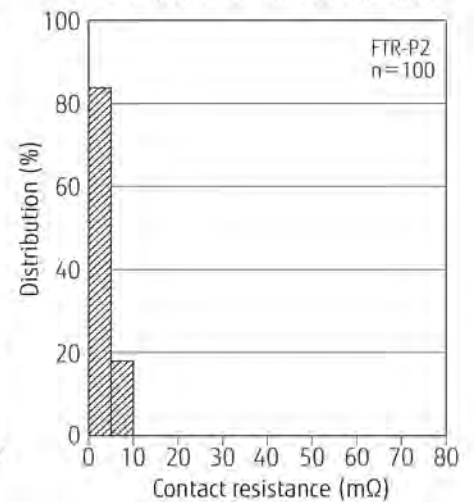
Distribution of operate/release voltage



Distribution of operate/release time

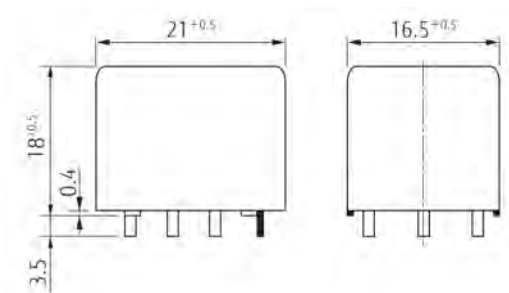


Distribution of contact resistance

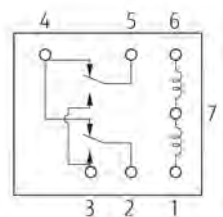


■ DIMENSIONS

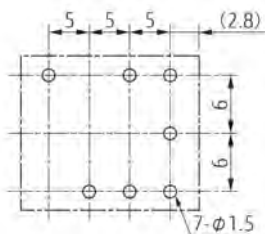
● Dimensions



● Schematics
(BOTTOM VIEW)

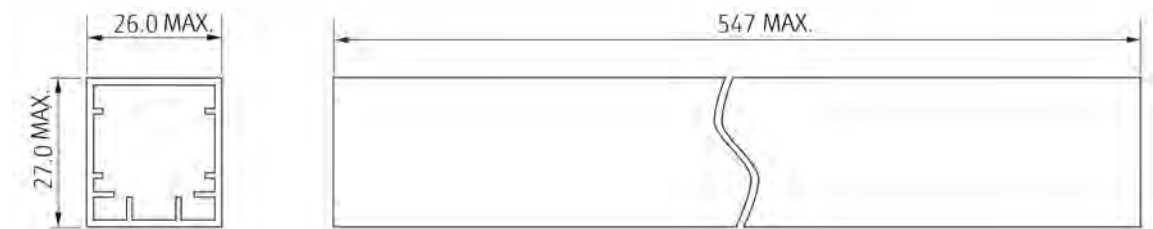


● PC board mounting
hole layout
(BOTTOM VIEW)



(...) dimension tolerance ± 0.1 mm

● Tube carrier



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
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, 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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