

SILENT AUTOMOTIVE RELAY

1 POLE - 25A (for 12V car battery)

FTR-P5 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, 45dB at 10cm)
- Compact, high density package 198 mm² mounting area
- High sensitivity, low power consumption
(nominal power consumption: 450 mW)
- High capacity
Maximum carrying current 25A 1 hour
Heat dissipation is high due to a single cover structure
- Typical applications:
Wiper, power window, doorlock, power seat
sunroof, interior lighting, fan
- RoHS compliant
Please see page 7 for more information



■ PARTNUMBER INFORMATION

[Example] FTR-P5 C N 012 W1
 (a) (b) (c) (d) (e)

(a)	Relay type	FTR-P5	: FTR-P5-Series
(b)	Contact configuration	C	: 1 form C
(c)	Sealing	N	: Plastic sealed
(d)	Coil rated voltage	012	: 9.....12 VDC Coil rating table at page 3
(e)	Contact material	W1	: Silver-tin oxide-indium oxide

Actual marking does not carry the type name: "FTR"
E.g.: Ordering code: FTR-P5CN012W1 Actual marking: P5CN012W1

■ SPECIFICATION

Item	FTR-P5		
Contact Data	Configuration		1 form C
	Material		Silver tin oxide indium
	Contact path 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 *		6VDC, 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), max. 15ms (with diode)
Other	Vibration resistance	Misoperation	10 to 200Hz, acceleration 44m/s ₂ (4.5G) constant acceleration
		Endurance	10 to 200Hz, acceleration 44m/s ₂ (4.5G) constant acceleration
	Shock	Misoperation	Min. 100m/s ² (11 ± 1 ms)
		Endurance	Min. 1000m/s ² (6 ± 1 ms)
	Weight		Approximately 7 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.

■ Care shall be taken on the heat generated on PC board when maximum carrying current exceeds 10A. Please perform the confirmation test with actual conditions.

■ COIL RATING

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Must Release Voltage (VDC) *	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.

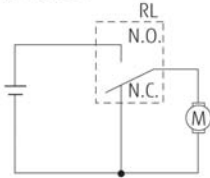
■ Please use at rated coil voltage. Please refer to characteristic data and set up adequate voltage in case of use at over voltage.

CHARACTERISTIC DATA

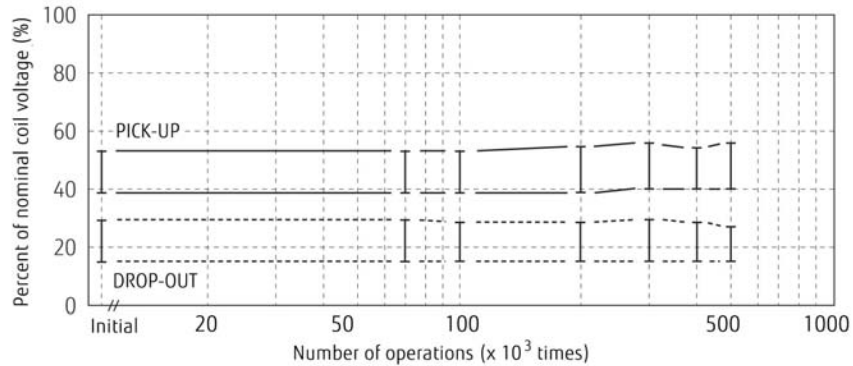
Life test (example)

- Test item
Inrush 17A 14VDC
Motor free
300K operations minimum
0.25 seconds ON
9.75 seconds OFF

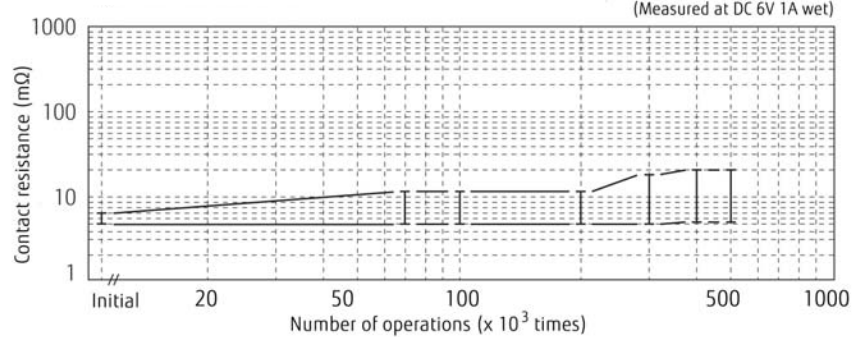
- Test circuit



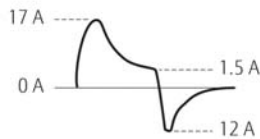
- Change in pick-up drop-out voltage



- Change in contact resistance

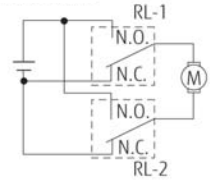


- Current wave form

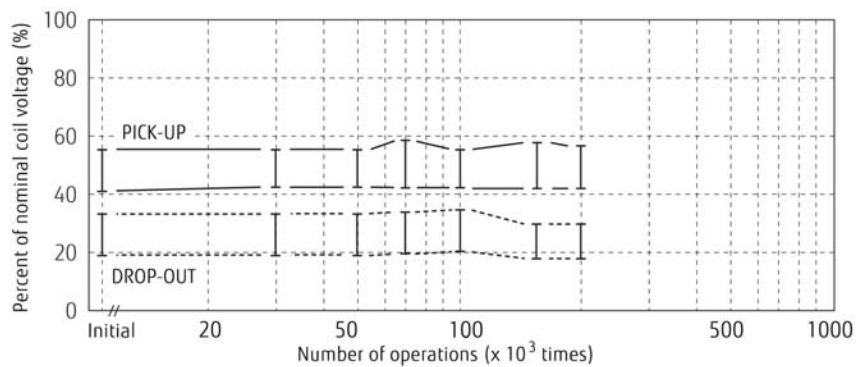


- Test item
25A 14VDC
Motor lock
100K operations minimum
0.25 seconds ON
9.75 seconds OFF

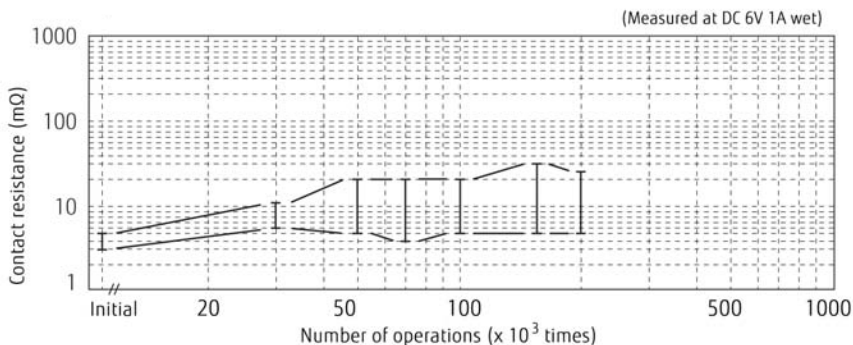
- Test circuit



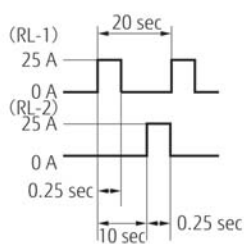
- Change in pick-up drop-out voltage



- Change in contact resistance

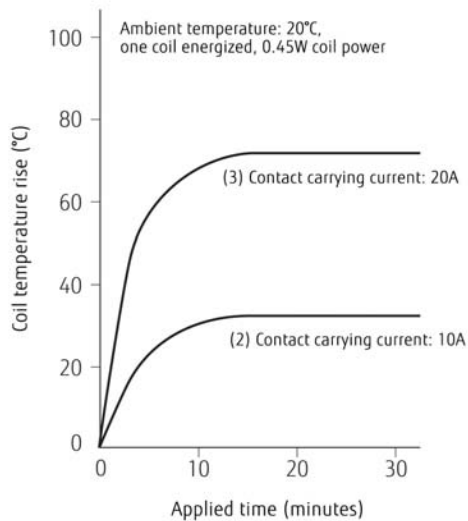


- Current wave form

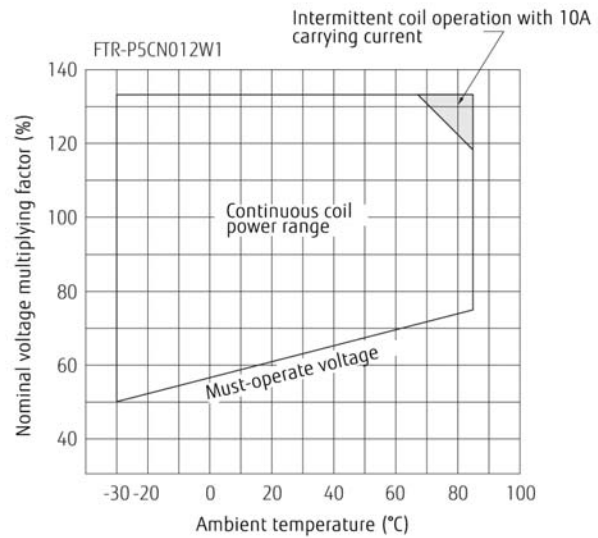


FTR-P5 SERIES

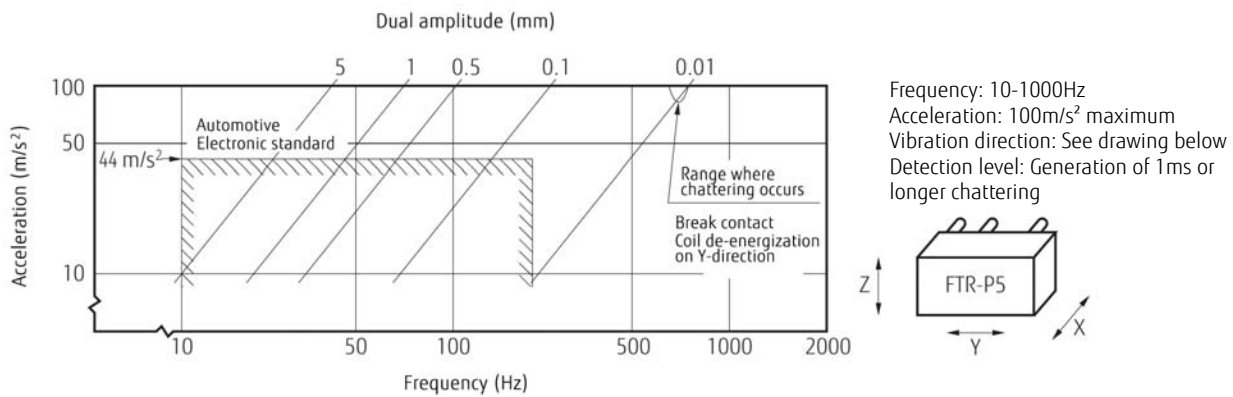
Coil temperature rise



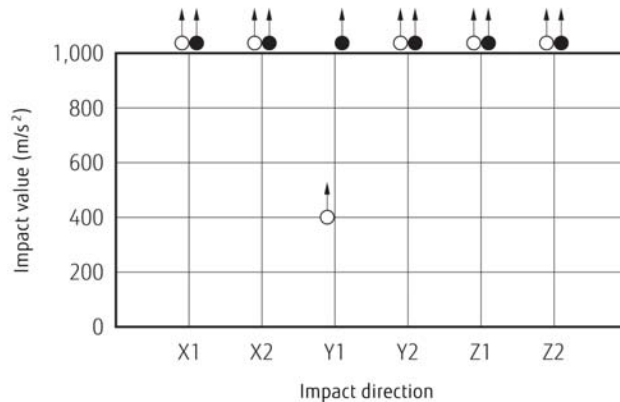
Operating coil voltage range



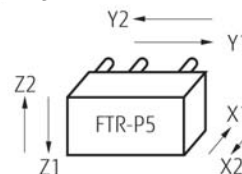
Vibration resistance characteristics



Shock resistance characteristics

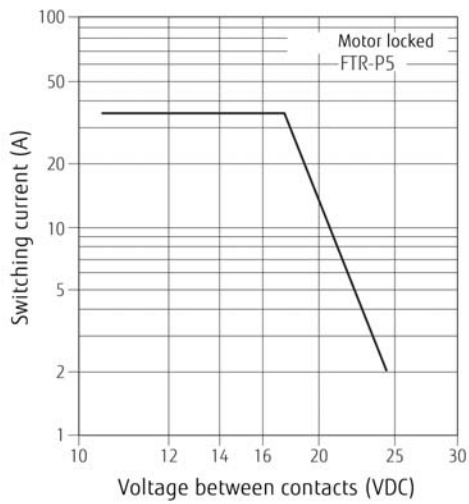


Impact apply time: 6 ± 1 ms, half sine wave
Test condition: Coil energized and de-energized
Impact direction: See drawing below
Detection level: Generation of 1ms or longer contact chattering

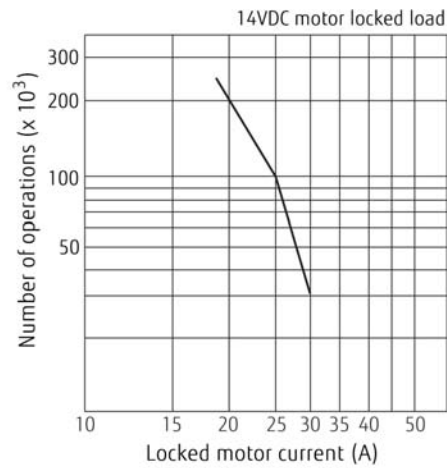


- : Break contact (coil de-energized)
- : Make contact (coil energized)

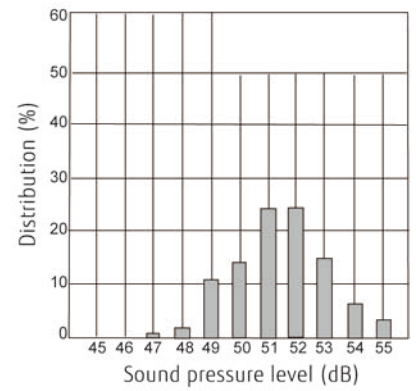
Maximum break capacity



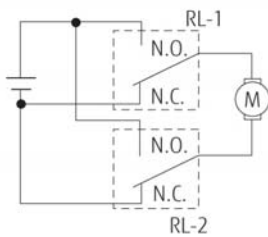
Life



Distribution of sound pressure (with diode)

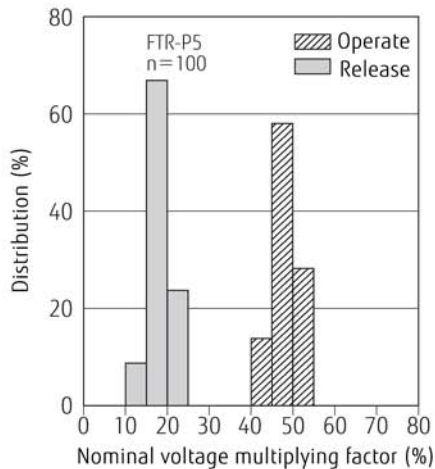


Test circuit

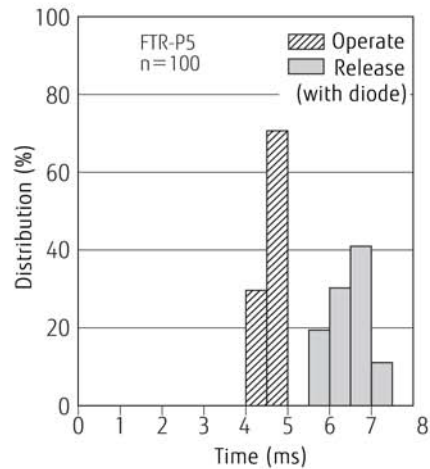


REFERENCE DATA

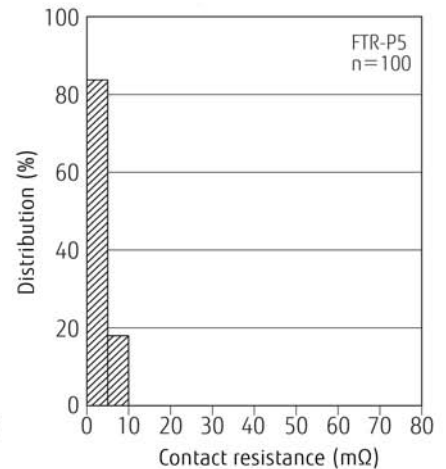
Distribution of operate/release voltage



Distribution of operate/release time

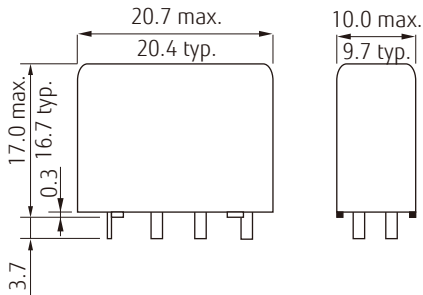


Distribution of contact resistance

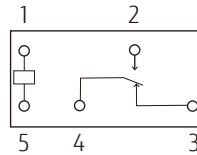


■ DIMENSIONS

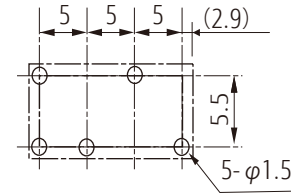
● Dimensions



● Schematics (BOTTOM VIEW)



● PC board mounting hole layout (BOTTOM VIEW)



Unit: mm
(): Reference

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.

RoHS Compliance and Lead Free Information

1. General Information

- All automotive relays produced by Fujitsu Components are compliant with RoHS directive 2002/95EC including amendments.
- Cadmium as used in electrical contacts is exempted from the RoHS directives on October 21st, 2005. (Amendment to Directive 2002/95/EC)
- All of our automotive relays are lead-free.
- 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 Profile

- Recommended solder 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 340-360°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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