

SILENT RELAY

1 POLE - 25A (for automotive applications)

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
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) (f)

(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
(f)	Special type	To be assigned custom specification

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 oxide	
	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. inrush current	35A (reference)	
	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)	
Other	Vibration resistance	Operational	10 to 55Hz double amplitude 1.5mm , 3 shock in 6 directions
	Shock	Operational	Min. 100m/s ² (10g) (11 ± 1ms)
		No damage	Min. 1000m/s ² (100g) (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.

■ 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.

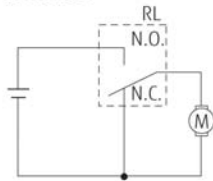
* Specified operate values are valid for pulse wave voltage.

CHARACTERISTIC DATA

Life test (examples)

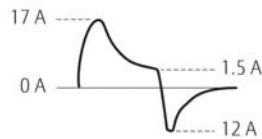
- Test item
14 VDC, 17A
Inrush current: 30A
Motor free
300K operations minimum
0.25 seconds ON
9.75 seconds OFF

• Test circuit

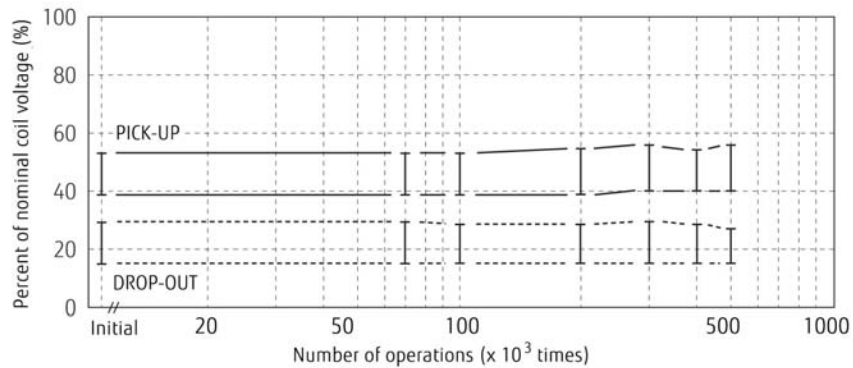


Note: NC contacts provide dynamic brake circuit

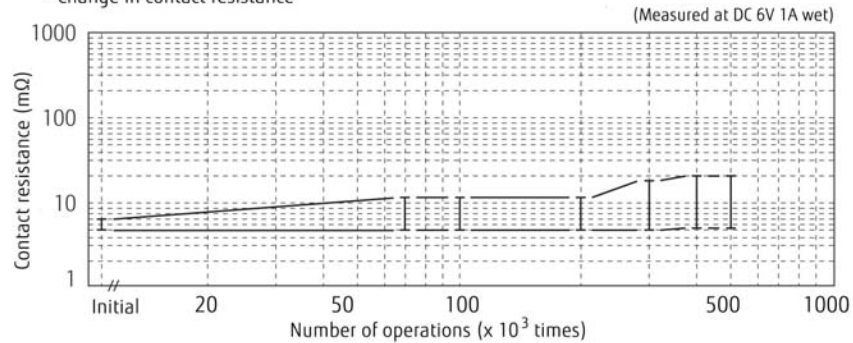
• Current wave form



• Change in pick-up drop-out voltage

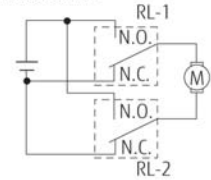


• Change in contact resistance

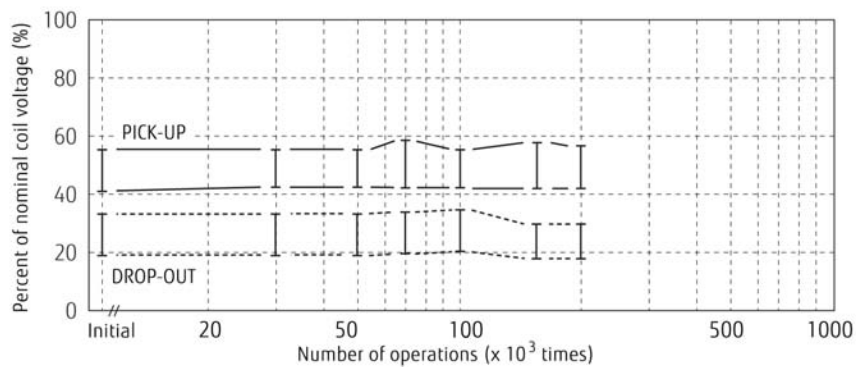


- Test item
14 VDC, 25A
Motor lock
100K operations minimum
(1 operation = 1 forward and 1 reverse)

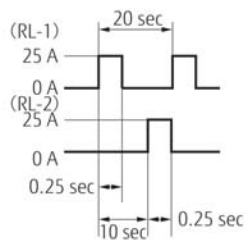
• Test circuit



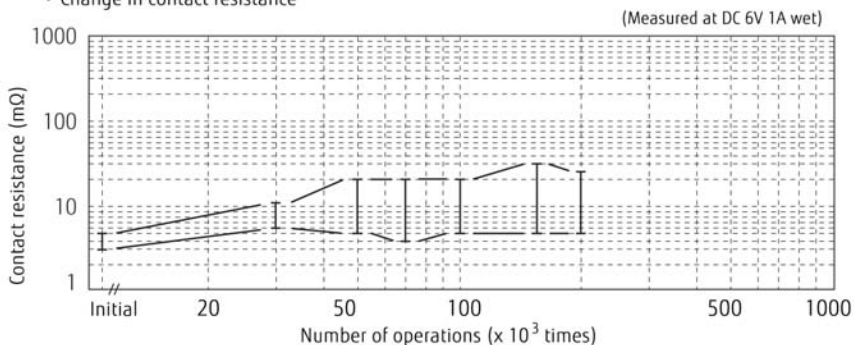
• Shift of pick-up drop-out voltage



• Current wave form

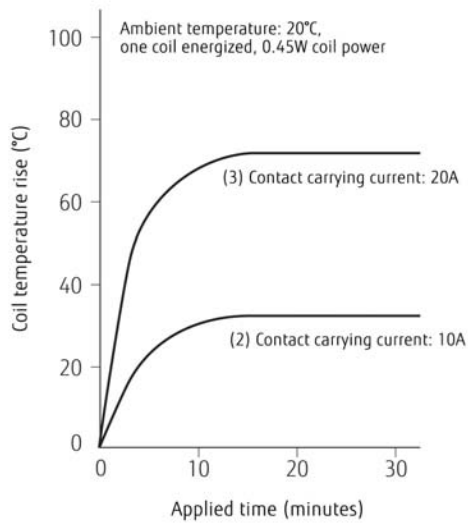


• Change in contact resistance

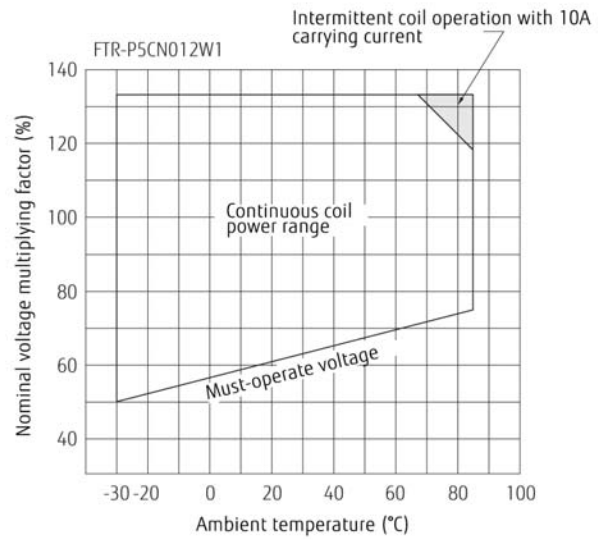


FTR-P5 SERIES

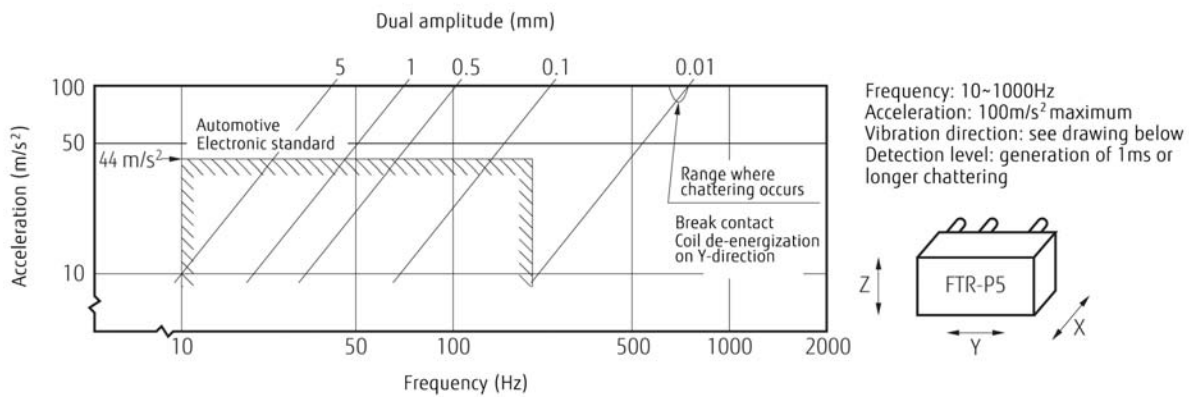
Coil temperature rise



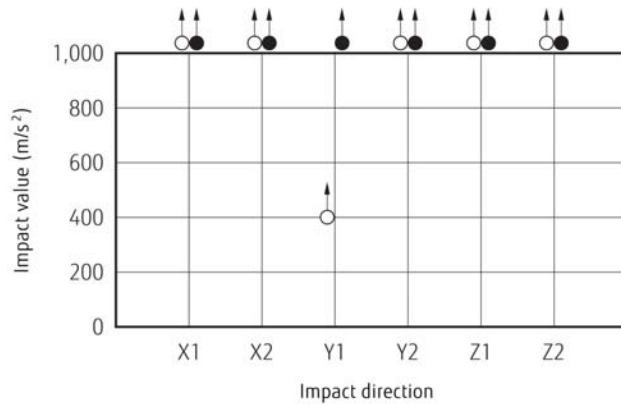
Operating coil voltage range



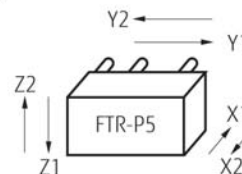
Vibration resistance characteristics



Shock resistance characteristics



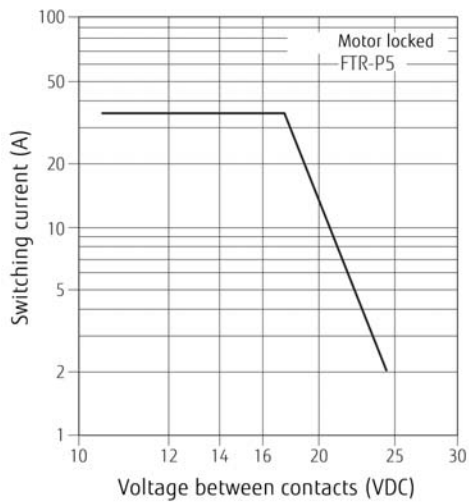
Impact apply time: 11 $\pm$ 1ms, half-sine wave
Test condition: coil, energized and de-energized
Impact direction: see drawing below
Detection level: generation of 1ms or longer contact chattering



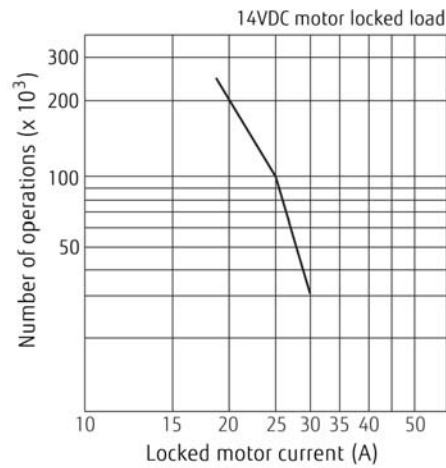
- : Break contact (coil de-energized)
- : Make contact (coil energized)

FTR-P5 SERIES

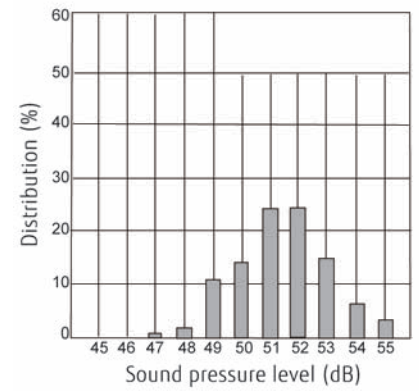
Maximum break capacity



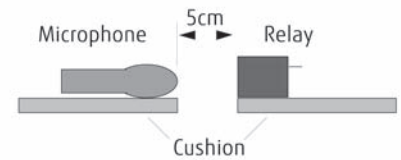
Life



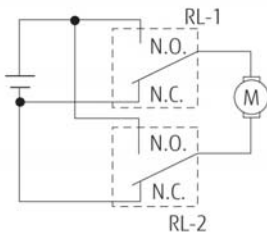
Distribution of sound pressure (with diode)



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

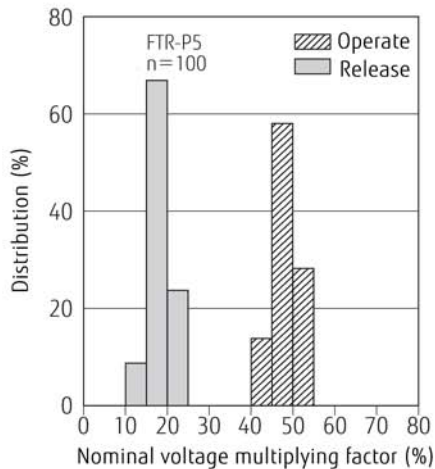


Test circuit

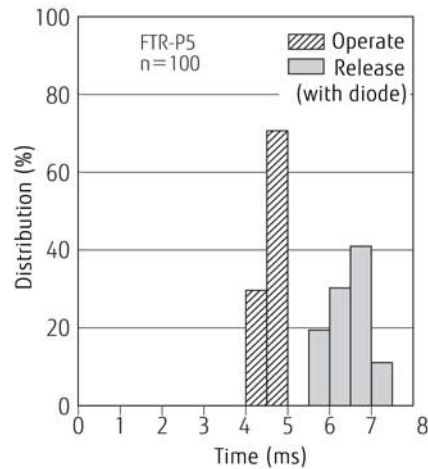


REFERENCE DATA

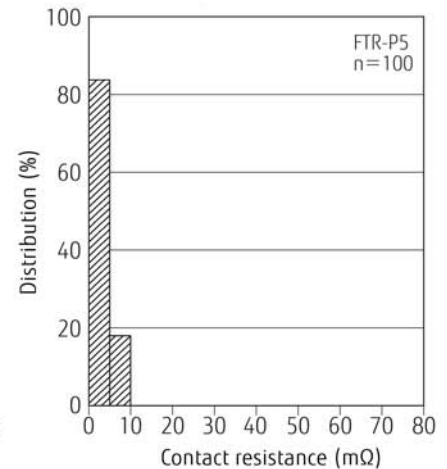
Distribution of operate/release voltage



Distribution of operate/release time

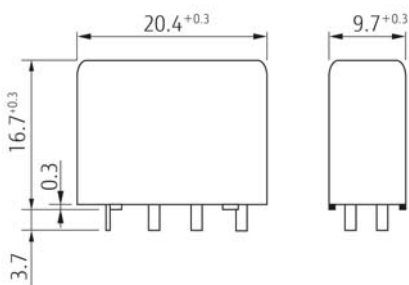


Distribution of contact resistance

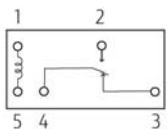


■ DIMENSIONS

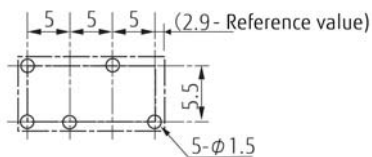
● Dimensions



● Schematics
(BOTTOM VIEW)



● PC board mounting
hole layout
(BOTTOM VIEW)



● Tube carrier



Unit: mm

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
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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