SILENT AUTOMOTIVE RELAY
1 POLE - 25A (FOR 12V CAR BATTERY)

FTR-P5 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 5cm, 45dB at 10cm)
- Compact, high density package 198mm^2 mounting area
- High sensitivity, low power consumption
  (nominal power consumption: 450mW)
- High capacity
  Maximum carrying current 25A 1 hour
  Heat dissipation is high due to a single cover structure
- RoHS compliant

■ APPLICATIONS

- Wiper, power window, door lock, power seat, sunroof, interior lighting, fan

■ PART NUMBERS

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

(a)	Relay type	FTR-P5 series
(b)	Contact configuration	C : 1c (1 Form C)
(c)	Sealing	N : Plastic sealed
(d)	Coil rated voltage	012 : 9....12VDC Please refer to coil rating table
(e)	Contact material	W1 : Silver tin oxide indium

Actual marking does not carry the type name: “FTR”

E.g.: Ordering code: FTR-P5CN012W1 Actual marking: P5CN012W1

■ SPECIFICATIONS

Item			Specifications	Remarks/Conditions
Contact Data	Configuration		1c (1 Form C)	
	Material		Silver tin oxide indium	
	Contact path voltage drop		Max. 100mV	At 1A, 12VDC
	Contact rating		25A, 14VDC	Motor locked load
	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 *1		1A, 6VDC	Reference
Coil	Operating temperature range		-40°C to +85°C	No frost
	Storage temperature range		-40°C to +100°C	No frost
Time	Operate		Max. 10ms	At nominal voltage
	Release		Max. 5 ms (without diode), max. 15ms (with diode)	At nominal voltage
Life	Mechanical		10×10^6 operations	
	Electrical (resistive)		100×10^3 operations	At contact rating
Others	Vibration resistance	Misoperation	10 to 200Hz, acceleration 44m/s^2 (4.5G) constant acceleration	Coil ON/OFF, 3 axis, total 6 cycles
		Endurance	10 to 200Hz, acceleration 44m/s^2 (4.5G) constant acceleration	Coil OFF, 3 axis, total 6 hours
	Shock resistance	Misoperation	100m/s^2 (11±1ms)	Coil ON/OFF, 3 axis, total 36 operations
		Endurance	1,000m/s^2 (6±1ms)	Coil OFF, 3 axis, total 18 operations
	Dimensions / Weight		9.7 x 20.4 x 16.7mm / Approximately 7g	
	Average sound pressure		Approximately 50dB at 5cm	

*1: 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 DATA

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ω)	Must Operate Voltage*1 (VDC)	Must Release Voltage*1 (VDC)	Power consumption at nominal coil voltage (mW)
009	9	180	5.5 (at 20°C) 6.9 (at 85°C)	0.7 (at 20°C) 0.9 (at 85°C)	450
010	10	220	6.3 (at 20°C) 7.9 (at 85°C)	0.8 (at 20°C) 1.0 (at 85°C)	455
012	12	320	7.3 (at 20°C) 9.2 (at 85°C)	1.0 (at 20°C) 1.3 (at 85°C)	450

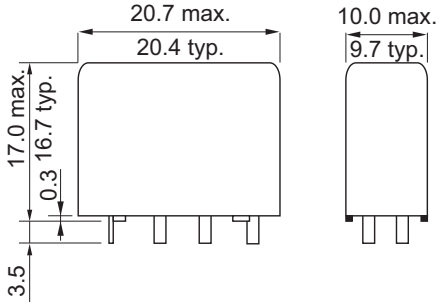
Note: All values in the table are valid for 20°C and zero contact current, unless otherwise stated.

*1: Specified operate values are valid for pulse wave voltage.

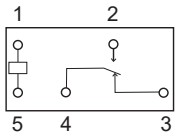
Please use at rated coil voltage. Please refer to characteristic data and set up adequate voltage in case of use at over voltage.

■ DIMENSIONS

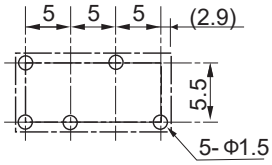
● Dimensions



● Schematics
(BOTTOM VIEW)



● PC board mounting hole layout
(BOTTOM VIEW)



Tolerance of PC board mounting hole layout:
±0.1 unless otherwise specificed.

( ): Reference
Unit: mm

■ PART NUMBER LIST

Part Number	Contact Configuration	Sealing	Contact Material
FTR-P5CN( )W1	1c (1 Form C)	Plastic sealed	Silver tin oxide indium

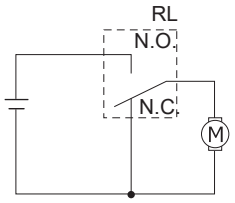
■ CHARACTERISTIC DATA

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

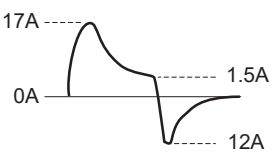
Life test (example)

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

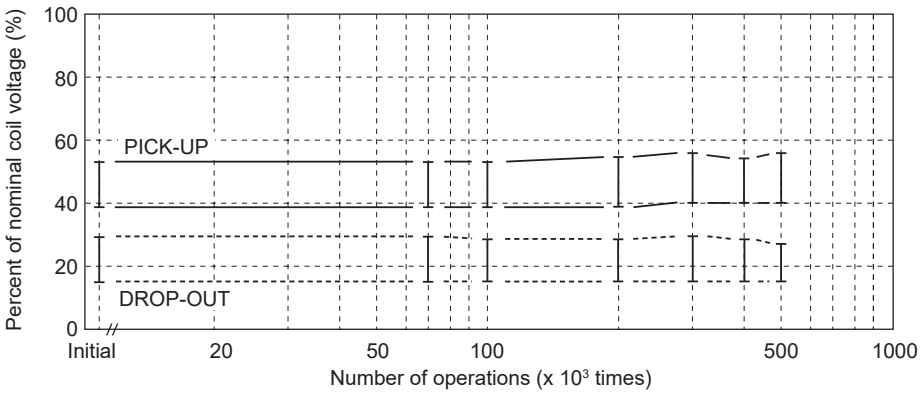
・Test circuit



・Current wave form

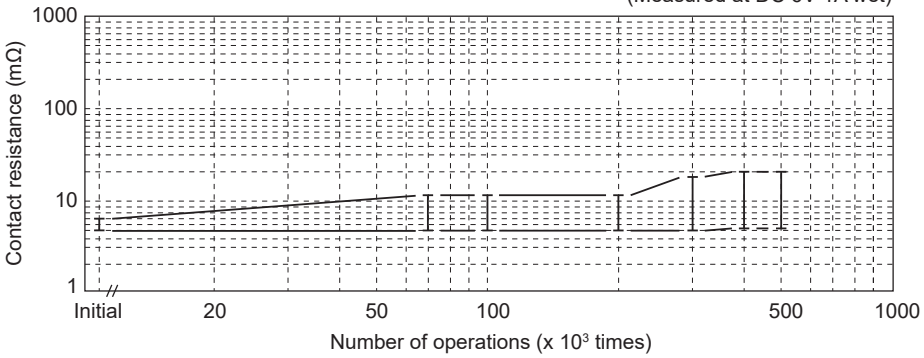


・Change in pick-up drop-out voltage



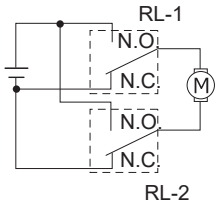
・Change in contact resistance

(Measured at DC 6V 1A wet)

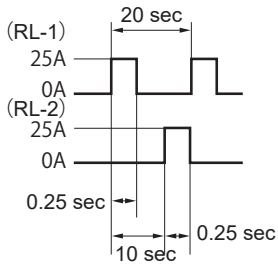


・Test item
25A 14VDC
Motor lock
100K operations minimum
0.25 seconds ON
9.75 seconds OFF

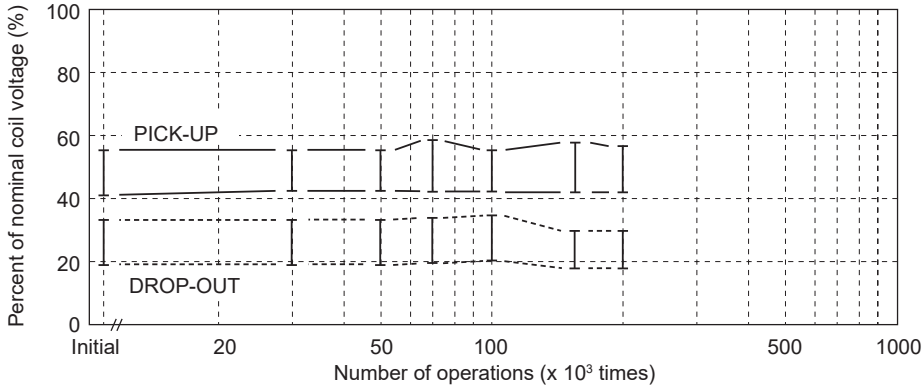
・Test circuit



・Current wave form

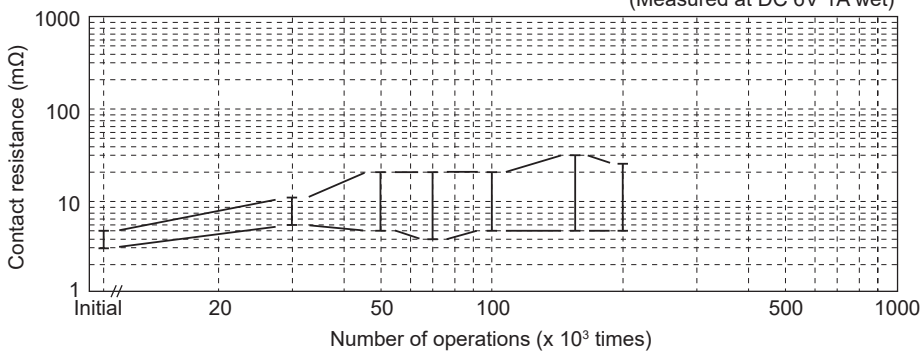


・Change in pick-up drop-out voltage



・Change in contact resistance

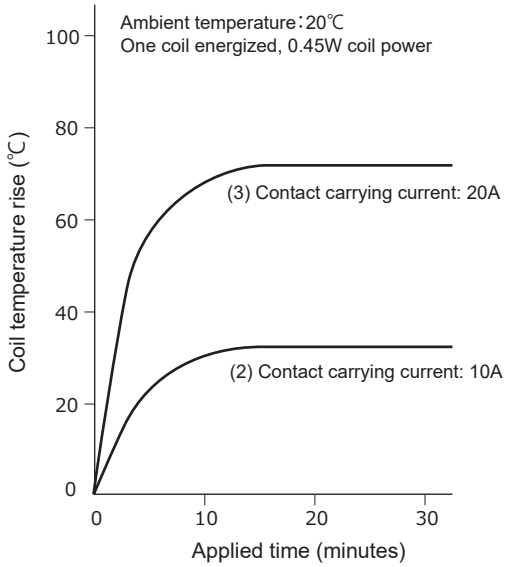
(Measured at DC 6V 1A wet)



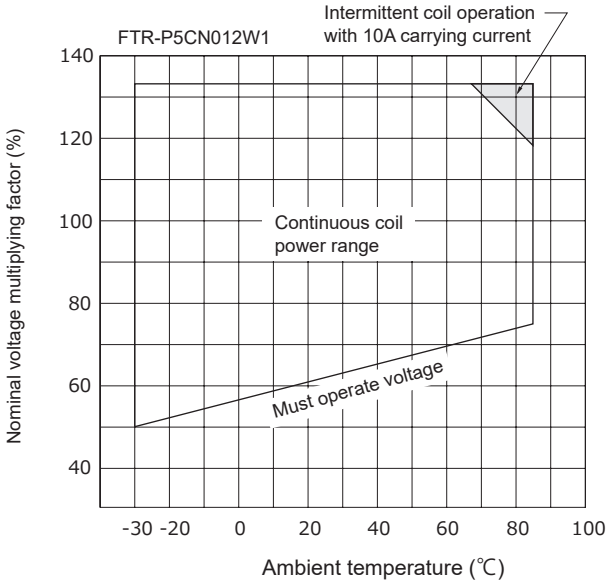
■ CHARACTERISTIC DATA

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

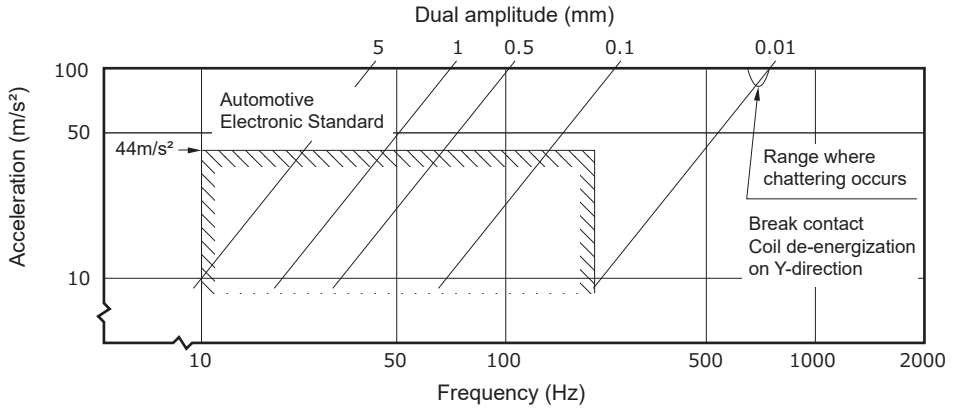
Coil temperature rise



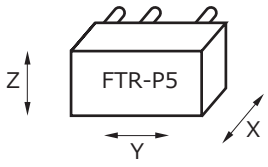
Operating coil voltage range



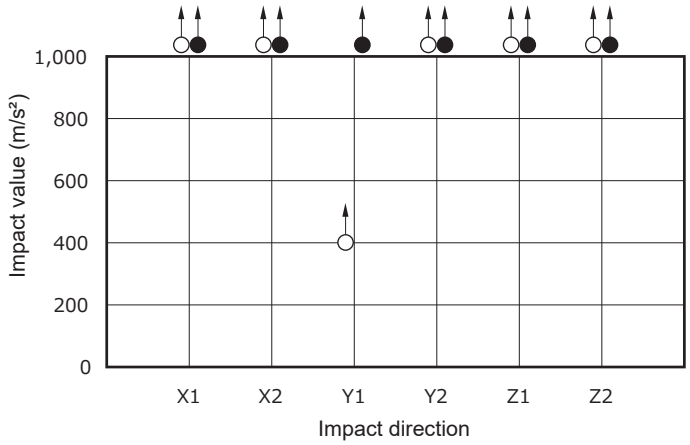
Vibration resistance characteristics



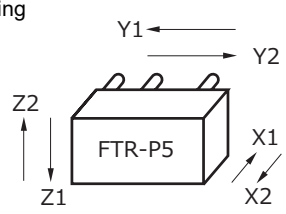
Frequency: 10 to 1000Hz
Acceleration: 100m/s² maximum
Vibration direction: See drawing below
Detection level: Generation of 1ms or longer chattering



Shock resistance characteristics



Impact apply time: 6±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

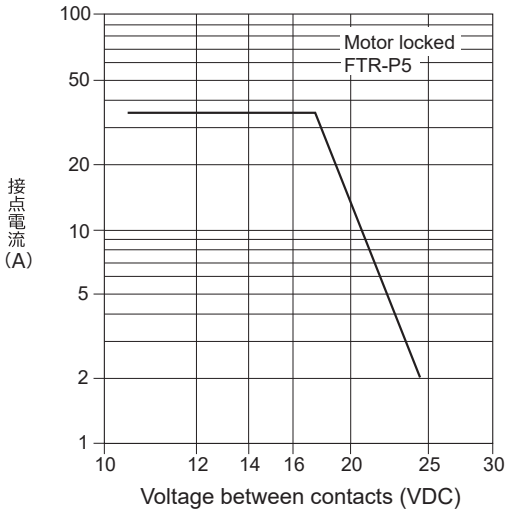


○ : Break contact (coil de-energized)
● : Make contact (coil energized)

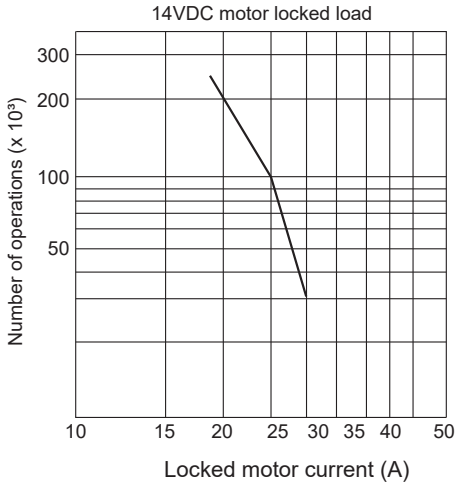
■ CHARACTERISTIC DATA

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

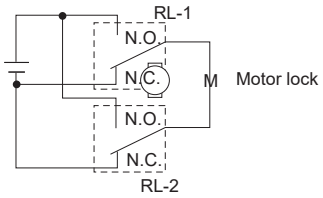
Maximum break capacity



Life

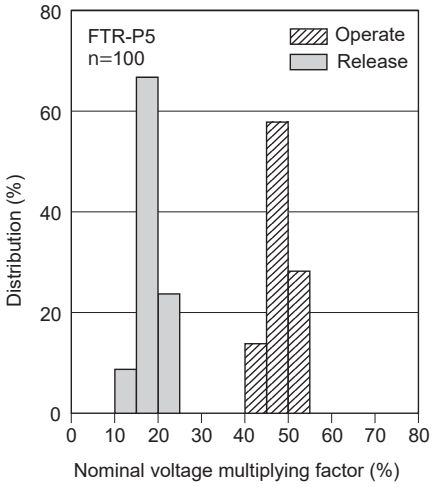


Test circuit

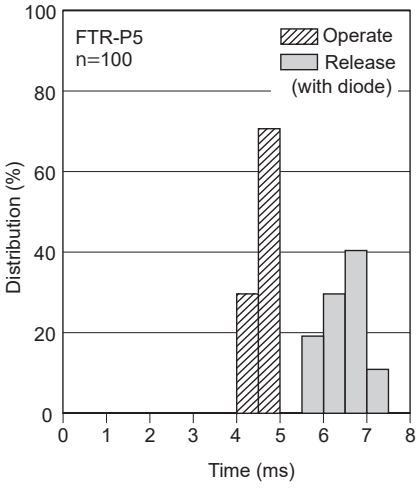


8. Initial Distribution Data

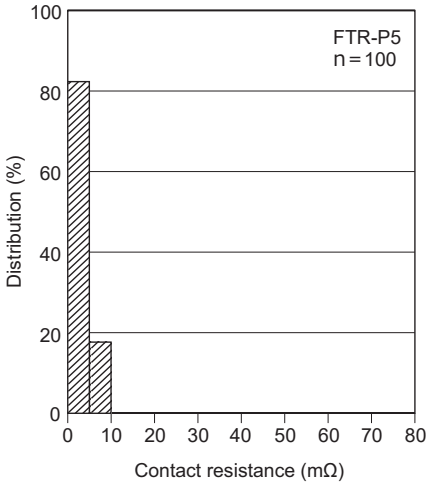
Distribution of operate/release voltage



Distribution of operate/release time



Distribution of contact resistance



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 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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