# 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 $mm_2$ 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

## ■ PARTNUMBER INFORMATION

[Example] FTR-P5 (a) C (b) N (c) 012 (d) W1 (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….12VDC<br>See coil rating table |
| (e) | Contact material | W1 | : Silver tin oxide indium |

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

## ■ SPECIFICATIONS

| 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℃, nominal voltage applied to coil) |
| | Max. switching voltage | | 16VDC (reference) |
| | Max. switching current | | 35A (reference) |
| | Min. switching load * | | 6VDC, 1A (reference) |
| Coil | Operating temperature range | | -40℃ to +85℃ (no frost) |
| | Storage temperature range | | -40℃ to +100℃ (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$^2$ (4.5G) constant acceleration |
| | | Endurance | 10 to 200Hz, acceleration 44m/s$^2$ (4.5G) constant acceleration |
| | Shock resistance | Misoperation | 100m/s$^2$ (11 ± 1ms) |
| | | Endurance | 1,000m/s$^2$ (6 ± 1ms) |
| | 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.

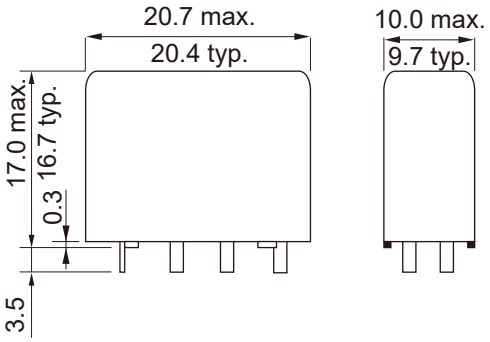
## ■ COIL RATING

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

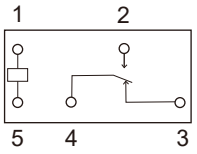
Note: All values in the table are valid for 20° C and zero contact current, unless otherwise stated.
*: Specified operate values are valid for pulse wave voltage.
Please use at rated coil voltage. Please refer to characteristic data and set up adequate voltage in case of use at over voltage.

## ■ DIMENSIONS

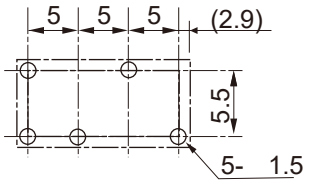
- Dimensions




- Schematics (Bottom view)




- PC board mounting hole layout (Bottom view)




Unit:mm
( ): Reference

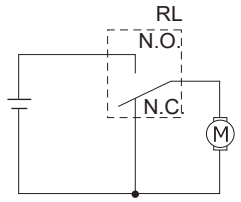
## ■ CHARACTERISTIC DATA

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

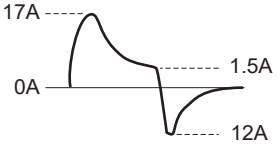
Life test (example)

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

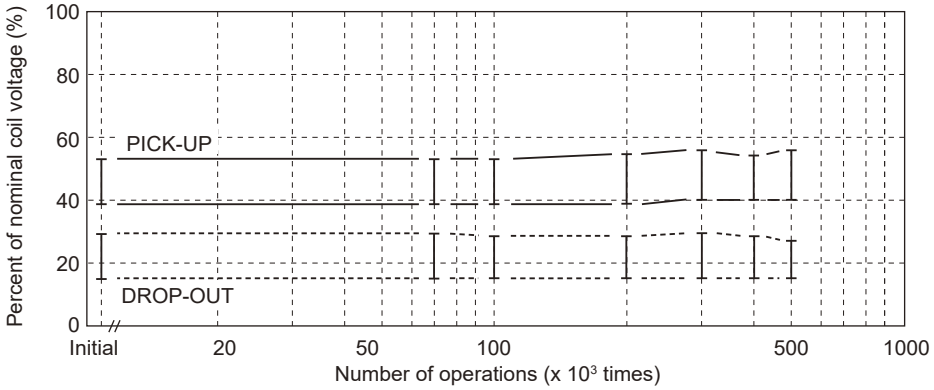
・Test circuit




・Current wave form

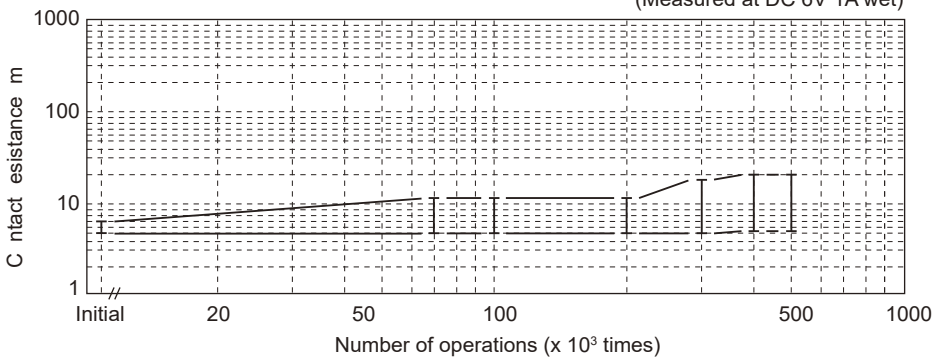



・Change in pick-up drop-out voltage



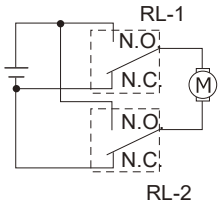

・Change in contact resistance

(Measured at DC 6V 1A wet)

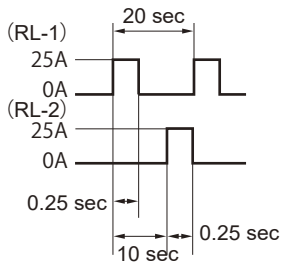



・Test item
25A 14VDC
Motor lock
100K operations minimum
0.25 seconds ON
9.75 seconds OFF

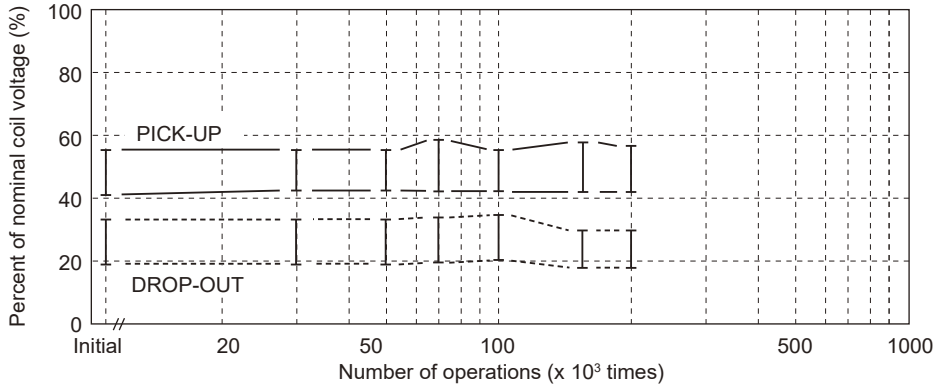
・Test circuit




・Current wave form

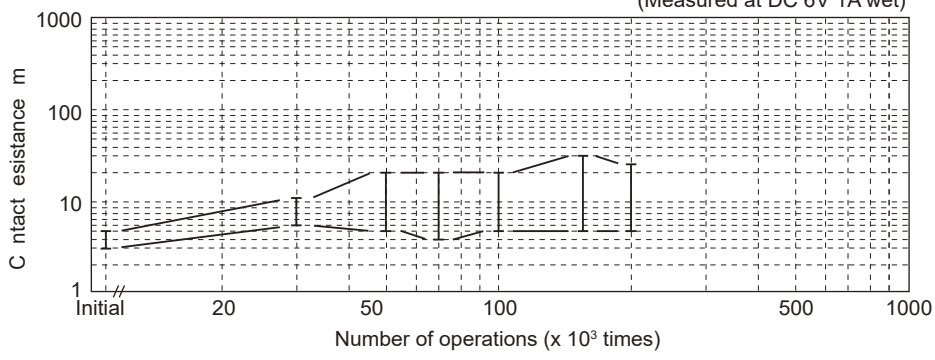



・Change in pick-up drop-out voltage

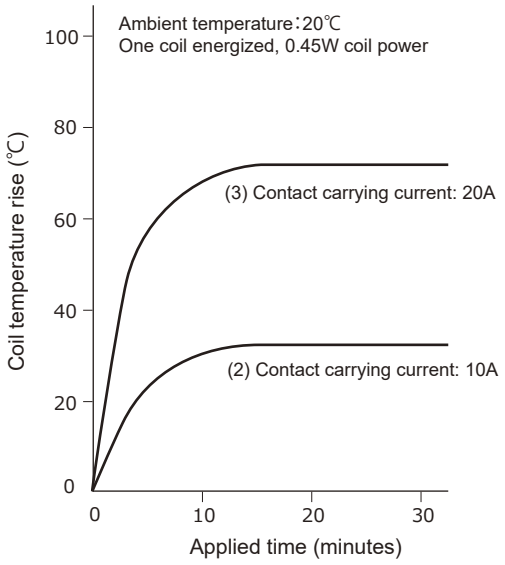



・Change in contact resistance

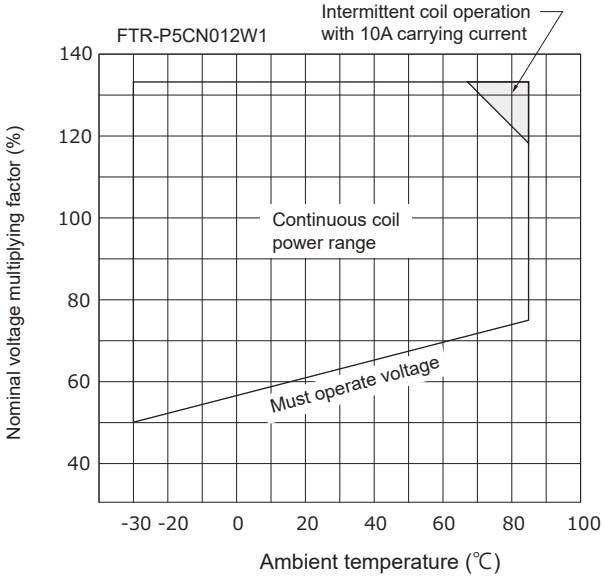
(Measured at DC 6V 1A wet)



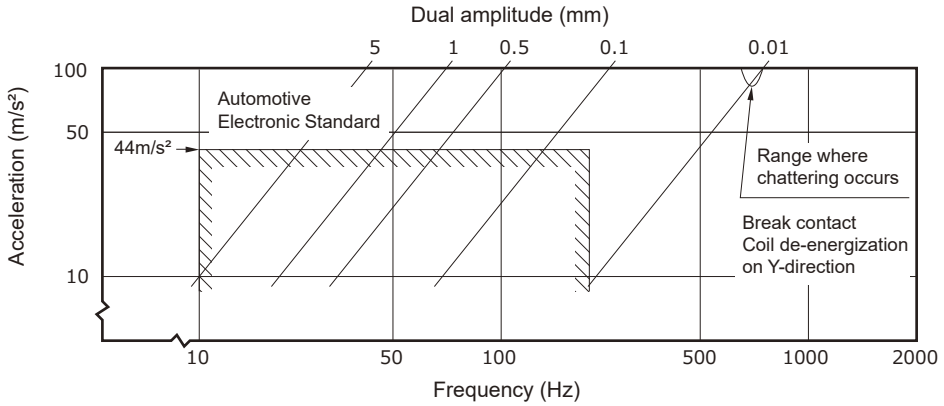
Coil temperature rise



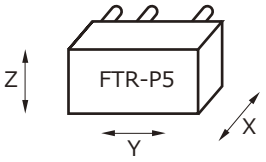

Operating coil voltage range



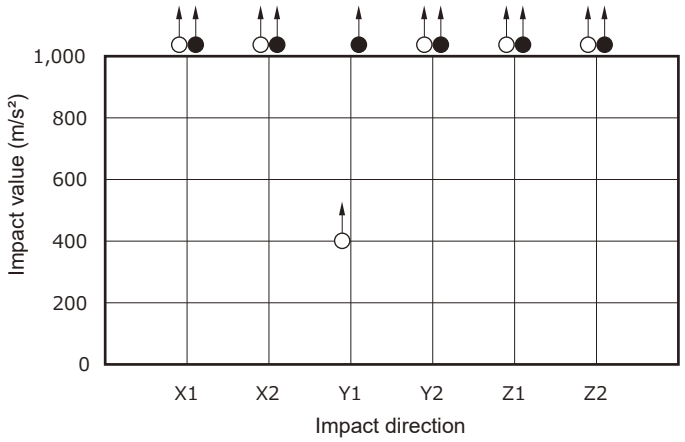

Vibration resistance characteristics



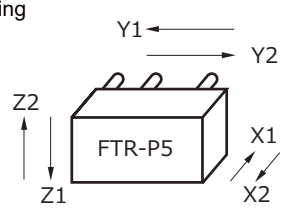

Frequency: 10-1000Hz
Acceleration: 100m/s² maximum
Vibration direction: See drawing below
Detection level: Generation of 1ms or longer chattering




Shock resistance characteristics

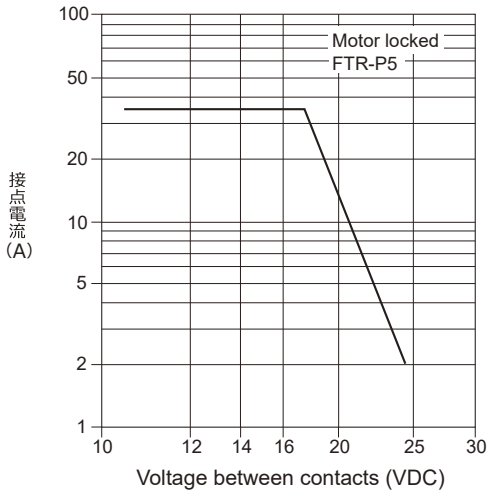



Impact apply time: 6±1ms, half sine wave
Test condition: Coil energized and de-energized
Impact direction: See drawing below
Detection level: Generation of 1ms or longer contact chattering

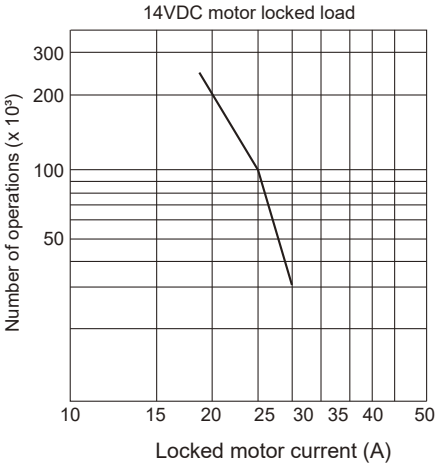



○ : Break contact (coil de-energized)
● : Make contact (coil energized)

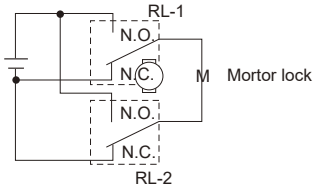
Maximum break capacity




Life

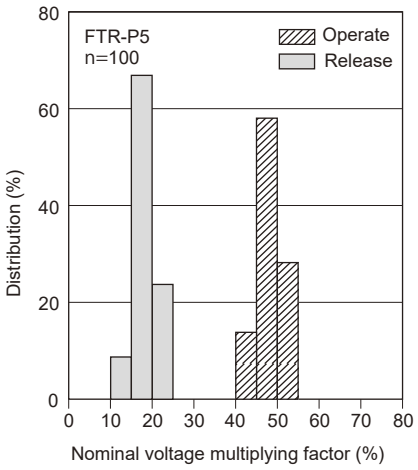



Test circuit

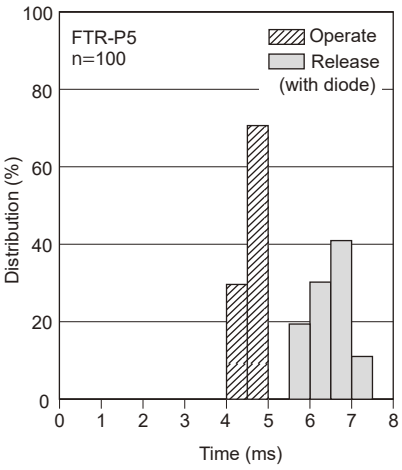



8. Initial Distribution Data

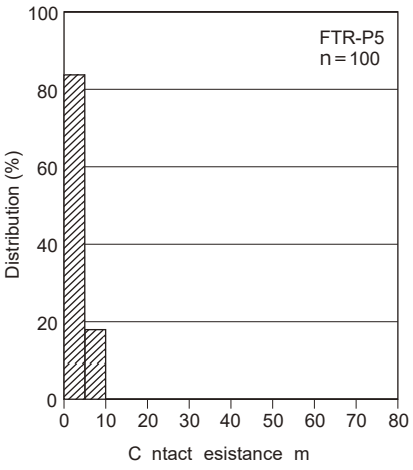
Distribution of operate/release voltage




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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