To be discontinued in March 2027

COMPACT POWER TWIN RELAY FOR AUTOMOTIVE APPLICATIONS
1 POLE x 2 - 25A (FOR 12V CAR BATTERY)

FTR-P4 Series

RoHS Compliant

■ FEATURES

- Compact for high density packaging
- Hight contact capacity with proven contact material
  (100,000 operations, 25A, 14VDC)
- Coil power savings
  (600mW nominal achieved with state-of-the-art magnetic analysis/design)
- Ease of PCB layout
  (all terminals on perimeter, coil and contact terminals separated)
- Pin compatible with low acoustic noise relay, FTR-P2
- Packaging for auto-insertion (tube packing, 30 relays/tube)
- RoHS compliant

■ APPLICATIONS

Power window, power seat, tilt steering, door lock, sun roof, retractable antenna etc.

■ PART NUMBERS

[Example] FTR-P4 (a) C (b) N (c) 012 (d) W1 (e)

(a)	Relay type	FTR-P4 series
(b)	Contact configuration	C : 1c (1 Form C) x 2 (H bridge)
(c)	Contact gap	N : 0.25mm gap
(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-P4CN012W1 Actual marking: P4CN012W1

■ SPECIFICATIONS

Item			Specifications	Remarks/Conditions
Contact Data	Configuration		1c (1 Form C) x 2 (H-bridge)	
	Material		Silver-tin oxide indium	
	Contact path voltage drop		Max. 100mV	At 1A, 12VDC
	Contact rating		25A at 14VDC	Locked motor load
	Max. carrying current		25A/1 hour (25°C, 100% rated coil voltage at N.O.side, de-energized at N.C. side)	
	Max. switching power		35A, 16VDC	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 (without bounce)	At nominal voltage
	Release		Max. 5ms (without bounce, no diode) Max. 15ms (without bounce, with diode)	At nominal voltage
Life	Mechanical		Min. 10 x 10^6 operations	
	Electrical		Min. 100 x 10^3 operations (1 operation = 1 forward and 1 reverse)	25A, 14VDC, Locked motor load
Insulation	Insulation resistance		100MΩ	Initial, at 500VAC
	Dielectric withstanding voltage		500VAC	Initial
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	Operational	100 m/s^2 minimum (11±1ms)	Coil ON/OFF, 3 axis, total 36 operations
		Withstand, no damage	1,000m/s^2 minimum (6±1ms)	Coil OFF, 3 axis, total 18 operations
	Dimensions / Weight		14.2 x 17.4 x 13.5mm /Approximately 10g	

*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.

Note: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)
009	9	135	5.5 (at 20°C) 6.9 (at 85°C)	0.7 (at 20°C) 0.9 (at 85°C)
010	10	167	6.3 (at 20°C) 7.9 (at 85°C)	0.8 (at 20°C) 1.0 (at 85°C)
012	12	240	7.3 (at 20°C) 9.2 (at 85°C)	1.0 (at 20°C) 1.3 (at 85°C)

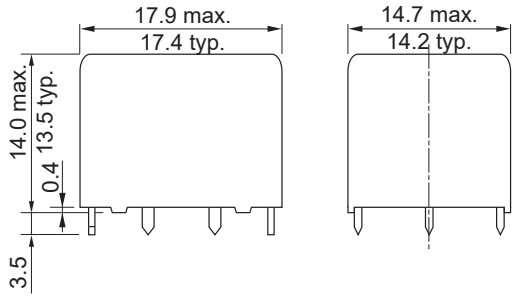
Note: All values in the table are valid at 20°C and zero contact current, unless otherwise specified.

*: Specified operated values are valid for pulse wave voltage.

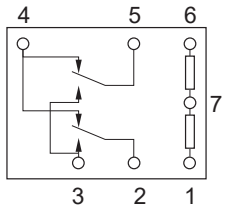
Note: Please use at rated coil voltage. Please refer to characteristic data and set up adequate voltage in case of use at over voltage.

■ DIMENSIONS

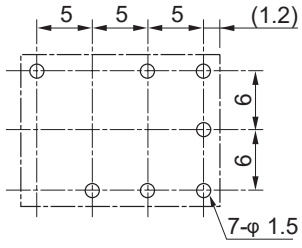
Dimensions



Schematics (BOTTOM VIEW)



PC board mounting hole layout (BOTTOM VIEW)



* Dimensions of the terminals do not include thickness of pre-solder.
* Tolerance of PC board mounting hole layout : ±0.1 unless otherwise specified.
* This datasheet provide only + tolerance for outer dimensions. Please ask for specification in case you need other tolerances.

( ): Reference
Unit: mm

■ PART NUMBER LIST

Part Number	Contact Configuration	Contact Gap	Contact Material
FTR-P4CN( )W1	1c (1 Form C) x 2	0.25mm	Silver-tin oxide indium

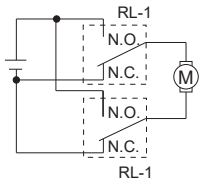
■ CHARACTERISTIC DATA

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

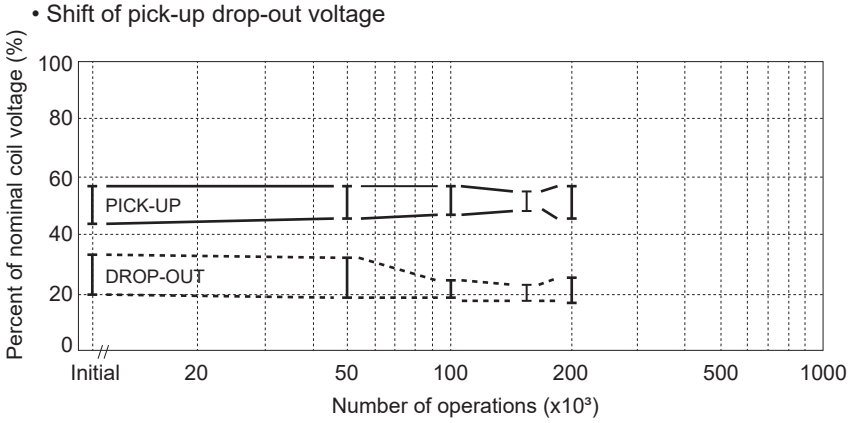
Life test (example)

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

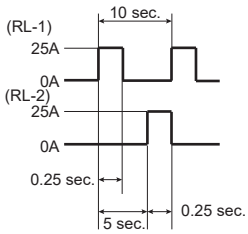
Test circuit



• Shift of pick-up drop-out voltage

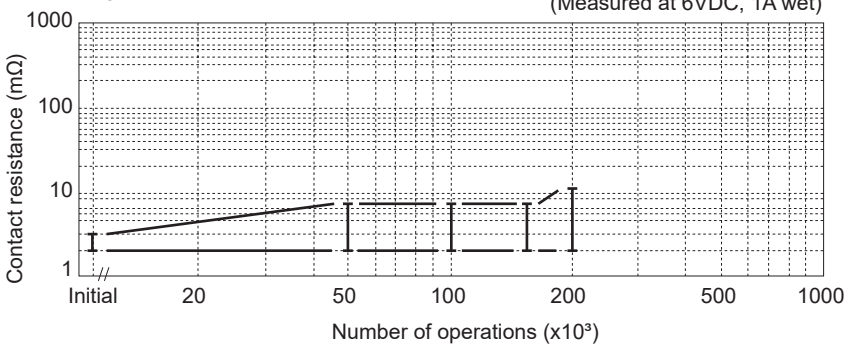


Current wave form



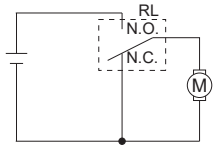
• Change of contact resistane

(Measured at 6VDC, 1A wet)

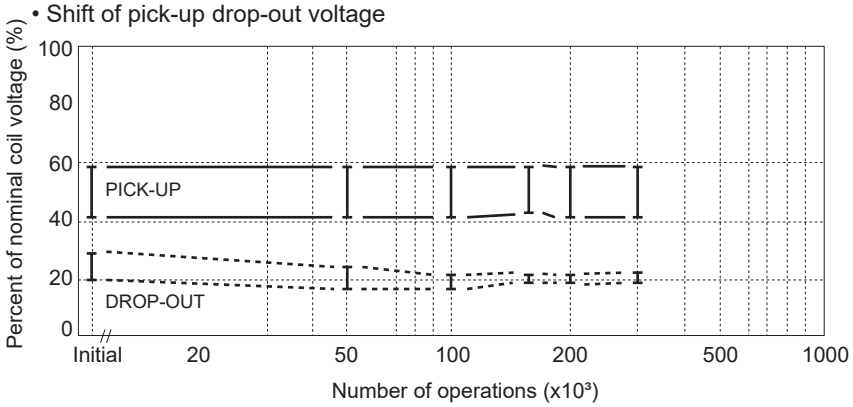


Test condition
Inrush current 17A, 14VDC
motor free
300,000 operations min.
0.25 seconds ON
9.75 seconds OFF

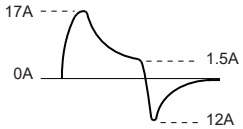
Test circuit



• Shift of pick-up drop-out voltage

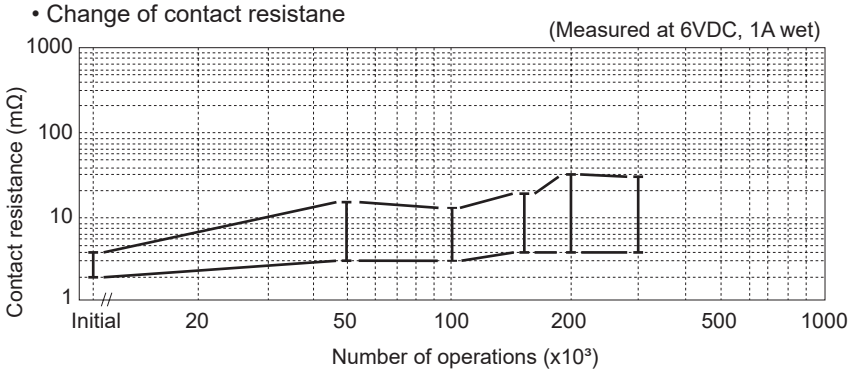


Current wave form



• Change of contact resistane

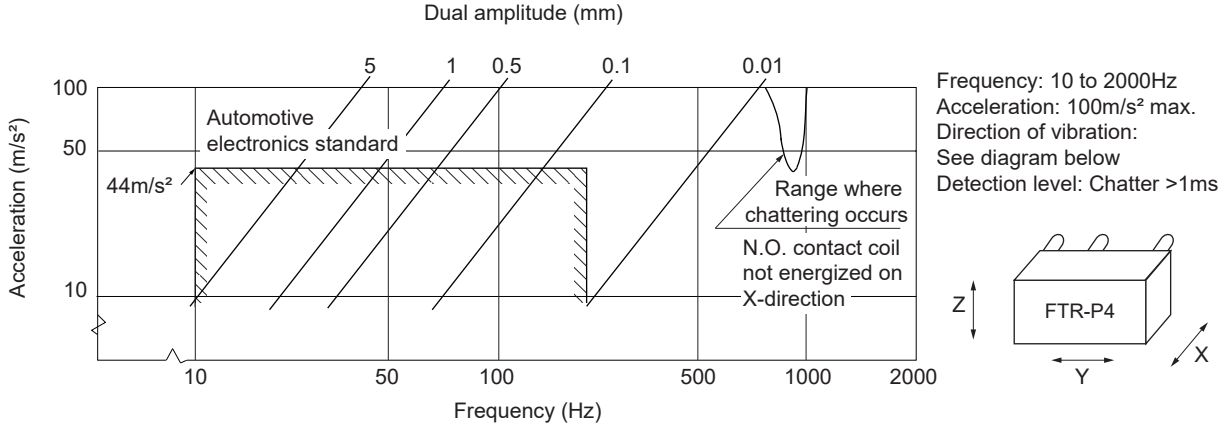
(Measured at 6VDC, 1A wet)



■ CHARACTERISTIC DATA

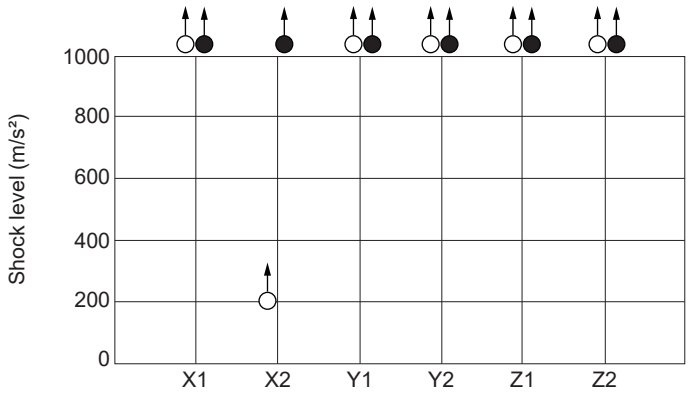
(Characteristic data is not guaranteed value but measured values of samples from production line.)

Vibration resistance characteristics

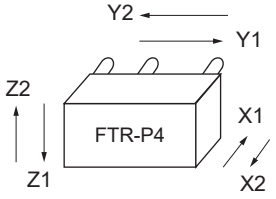


Frequency: 10 to 2000Hz
Acceleration: 100m/s² max.
Direction of vibration:
See diagram below
Detection level: Chatter >1ms

Shock resistance characteristics

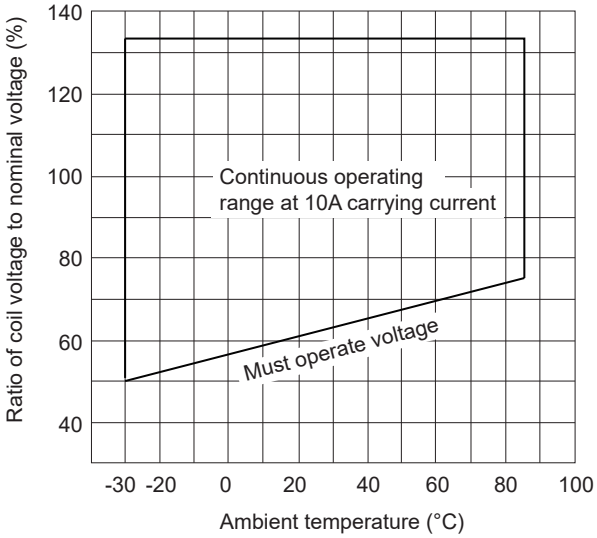


Shock application time: 6±1ms, half-sine wave
Test material: Coil energized and de-energized
Shock direction: See diagram below
Detection level: Chatter >1ms



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

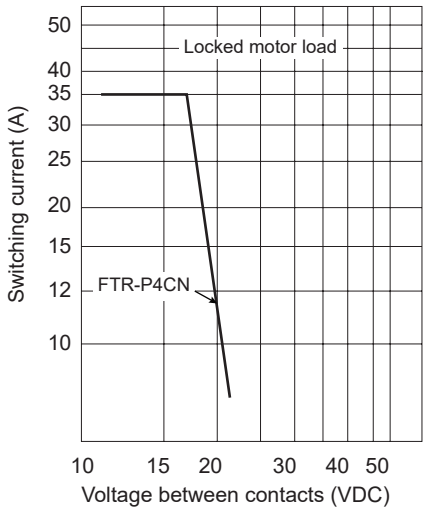
Operating coil voltage range



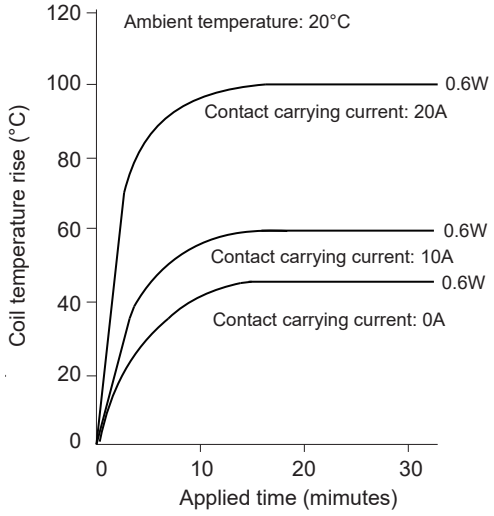
■ CHARACTERISTIC DATA

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

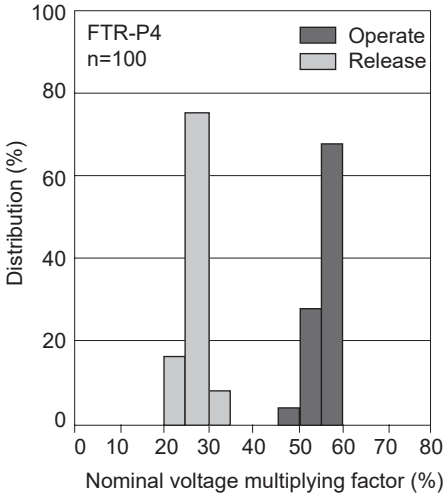
Maximum break capacity



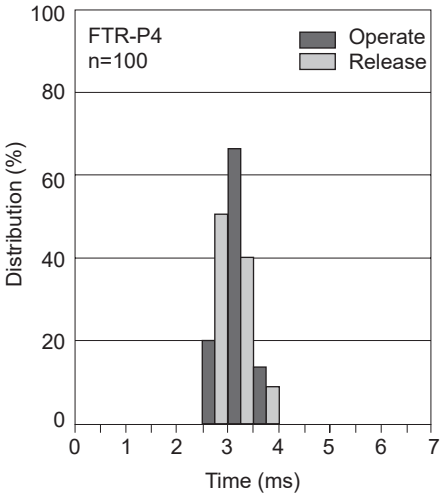
Coil temperature rise



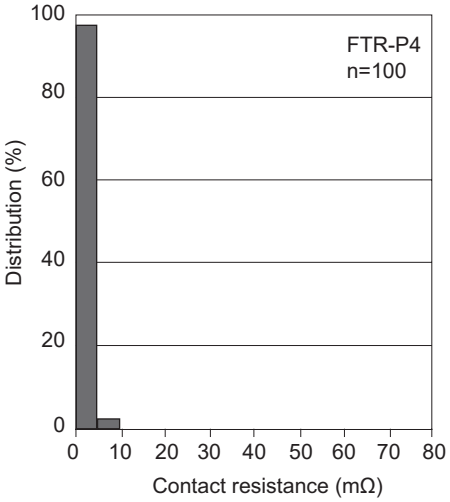
Distribution of operate/release voltage



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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