FUJITSU

COMPACT POWER TWIN RELAY

for automotive applications

1 POLE x 2 - 25A (for 12V car battery)

FTR-P4 Series

■ FEATURES

- Compact for high density packaging
- High contact capacity with proven contact material (100,000 operations, 14 V, 25 A)
- 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)
- Application examples: power window, power seat, tilt steering, door lock, sun roof, retractable antenna
- RoHS compliant

Please see page 7 for more information

■ PARTNUMBER INFORMATION

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

(a)	Relay type	FTR-P4	: FTR-P4 Series
(b)	Contact configuration	C	: 1 form C X 2 (H-Bridge)
(c)	Contact gap	N	: 0.25mm gap
(d)	Coil rated voltage	012	: 9.....12 VDC Coil rating table at page 3
(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

■ SPECIFICATION

Item			FTR-P4
Contact Data	Configuration		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 *		6 VDC, 1A (reference)
Life	Mechanical		Min. 10 x 10^6 operations
	Electrical		Min. 100 x 10^3 operations, 14VDC, 25A (locked motor load) (1 operation = 1 forward and 1 reverse)
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 (without bounce)
	Release (at nominal voltage)		Max. 5 ms (without bounce, no diode) Max. 15 ms (without bounce, with diode)
Insulation	Resistance (initial)		100M Ω at 500VAC
	Dielectric withstanding voltage (initial)		500VAC
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	Operational	100 m/s^2 minimum (11±1ms)
		Withstand, no damage	1,000m/s^2 minimum (6±1ms)
	Weight		Approximately 10 g

* 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.

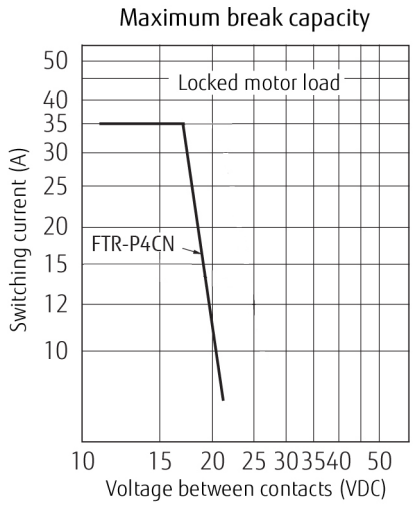
Note:
Care shall be taken on the heat generated on PC board when maximum carrying current exceeds 10A.
Please perform the confirmation test with actual conditions.

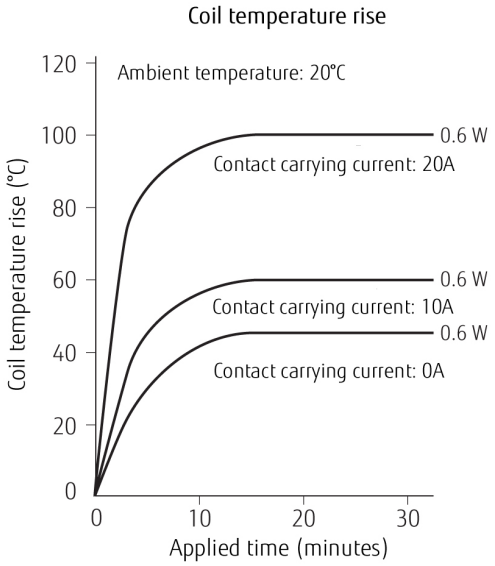
■ COIL RATING

P4 Series (0.25mm contact gap)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Must Release Voltage (VDC) *
009	9	135	5.5 (at 20 °C)	0.7 (at 20 °C)
			6.9 (at 85 °C)	0.9 (at 85 °C)
010	10	167	6.3 (at 20 °C)	0.8 (at 20 °C)
			7.9 (at 85 °C)	1.0 (at 85 °C)
012	12	240	7.3 (at 20 °C)	1.0 (at 20 °C)
			9.2 (at 85 °C)	1.3 (at 85 °C)

■ CHARACTERISTIC DATA

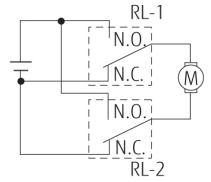




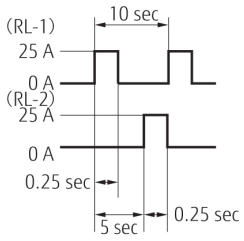
Life test (examples)

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

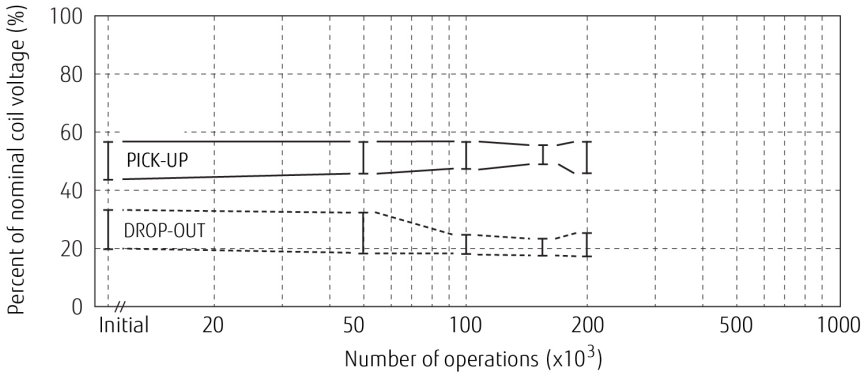
Test circuit



Current wave form

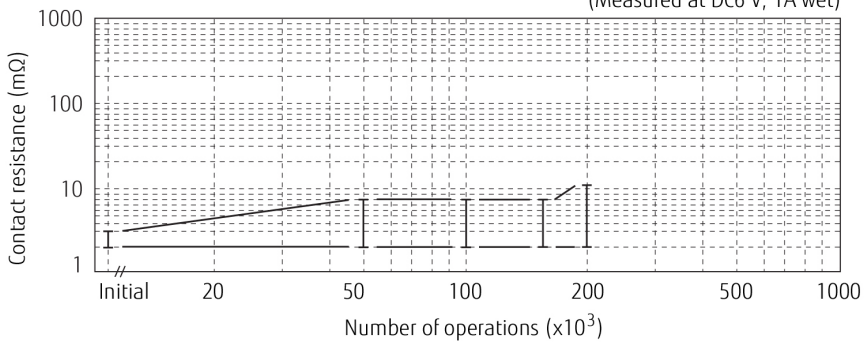


• Shift of pick-up drop-out voltage



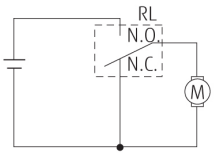
• Change of contact resistance

(Measured at DC6 V, 1A wet)

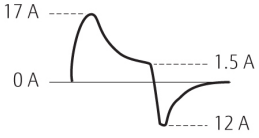


Test condition
Inrush current 17A, 14VDC
motor free
300,000 operations min.
0.25 seconds ON
9.75 seconds OFF

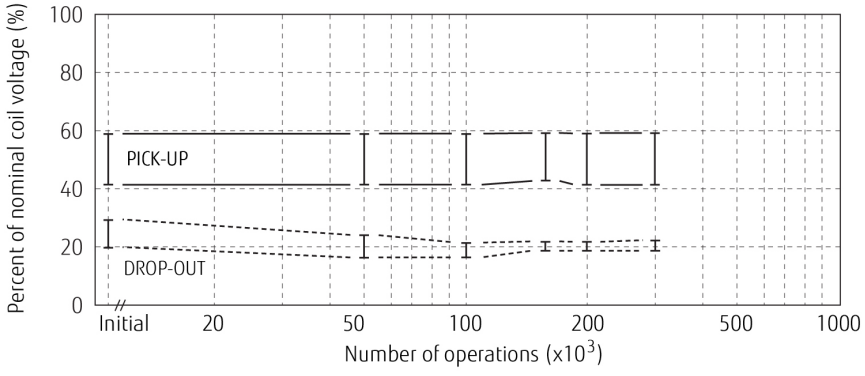
Test circuit



Current wave form

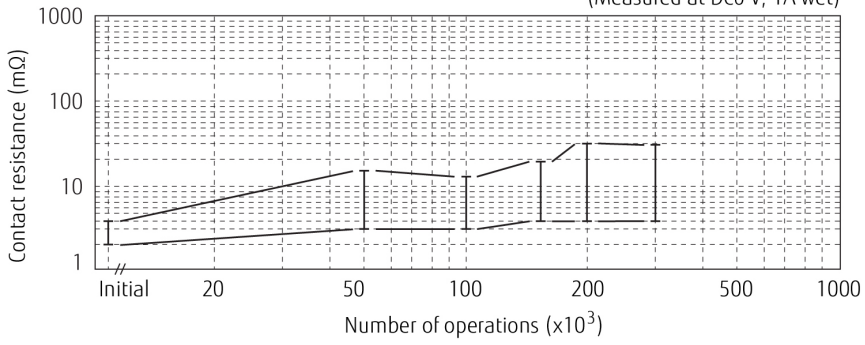


• Shift of pick-up drop-out voltage

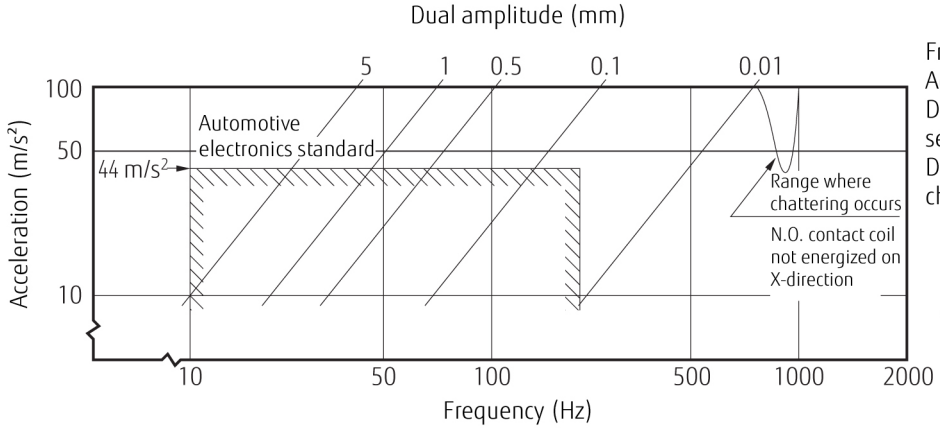


• Change of contact resistance

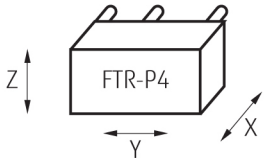
(Measured at DC6 V, 1A wet)



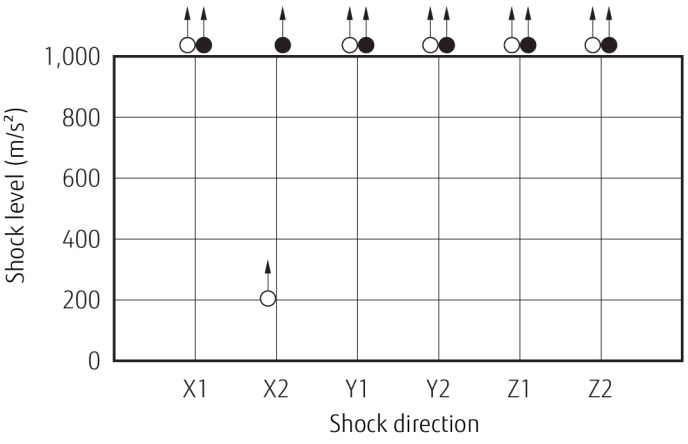
Vibration resistance characteristics



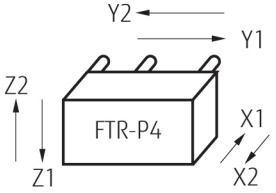
Frequency: 10~2000 Hz
Acceleration: 100 m/s² max.
Direction of vibration;
see diagram below
Detection level:
chatter > 1ms



Shock resistance characteristics

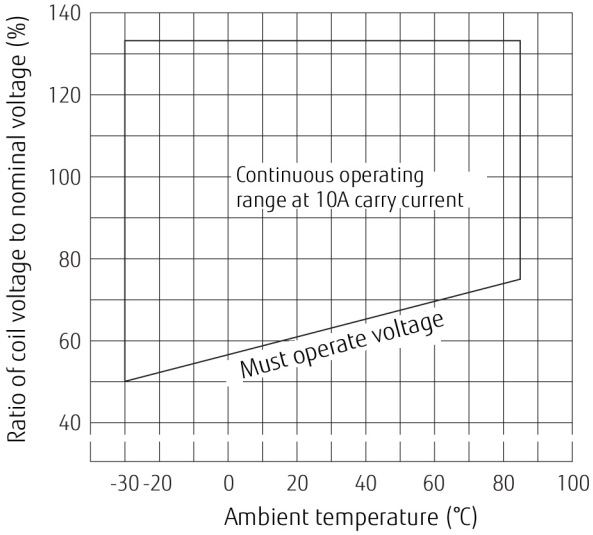


Shock application time: 6±1ms, half-sine wave
Test material: coil energized and de-energized
Shock direction: see diagram below
Detection level: chatter > 1ms

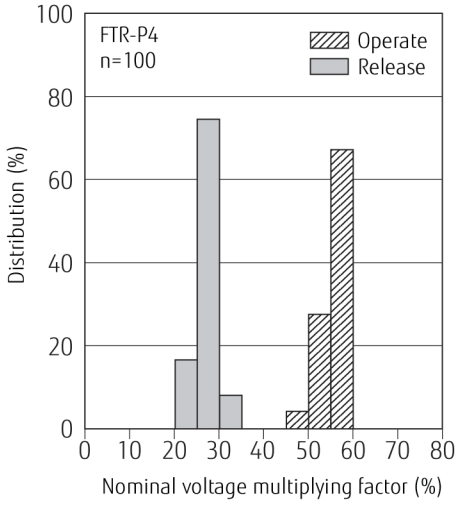


○ : break contact (coil de-energized)
● : make contact (coil energized)

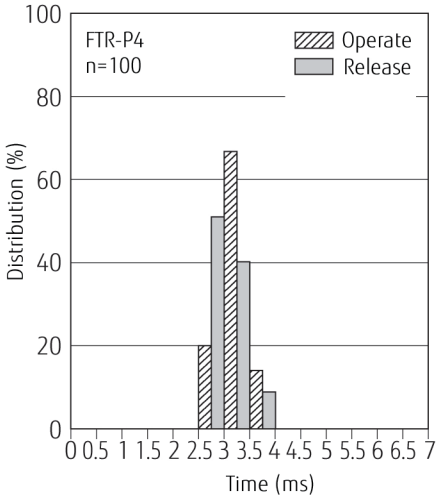
Operating coil voltage range



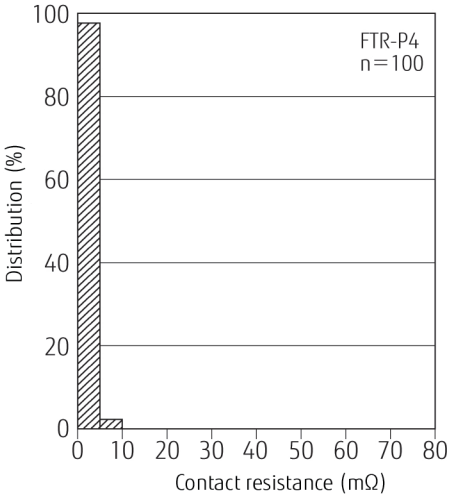
Distribution of operate/release voltage



Distribution of operate/release time

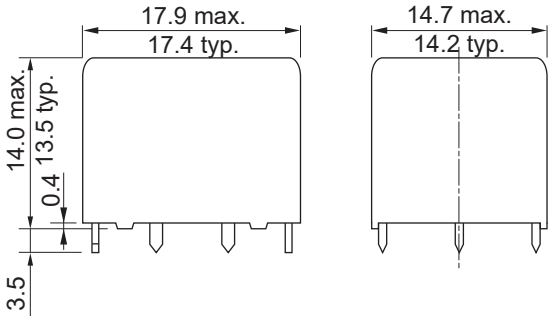


Distribution of contact resistance

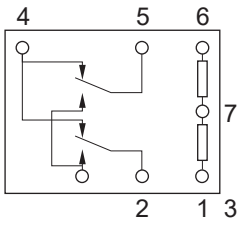


■ DIMENSIONS

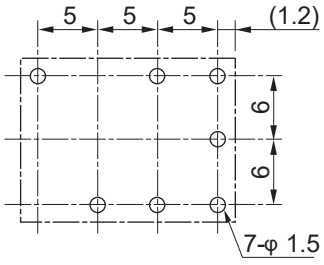
- **Dimensions**



- **Schematics**
(BOTTOM VIEW)



- **PC board mounting hole layout**
(BOTTOM VIEW)



* Dimensions of the terminals do not include thickness of pre solder.
* This datasheet provide only + tolerance for outer dimensions.
Please ask for specification in case you need other tolerances.

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

( ): Reference
Unit: mm

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 Fujitsu 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:	Eip 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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