FUJITSU

# COMPACT POWER TWIN RELAY

## 1 POLE x 2 - 25A, H-Bridge (for automotive applications)

# 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)
- 125°C version is available
- 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) - HT (f)

| | | |
|---|---|---|
| (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.....12VDC<br>Coil rating table at page 3 |
| (e) | Contact material | W1 : Silver-tin oxide indium |
| (f) | Special type | Nil : Standard type (85°C)<br>HT : High temperature (125°C) |

Actual marking does not carry the type name: "FTR"
E.g.: Ordering code: FTR-P4CN012W1 Actual marking: P4CN012W1

## ■ SPECIFICATION

| Item | | | FTR-P4 | |
|---|---|---|---|---|
| | | | Standard | High temperature version |
| 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. inrush current | | 35A (reference) | |
| | Max. switching voltage | | 16VDC (reference) | |
| | Max. switching current | | 35A (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) | -40 °C to +125 °C (no frost) |
| | Storage temperature range | | -40 °C to +100 °C (no frost) | -40 °C to +125 °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)<br>Max. 15 ms (without bounce, with diode) | |
| Insulation | Resistance (initial) | | 100M Ω at 500VAC | |
| | Dielectric withstanding voltage (initial) | | 500VAC | |
| Other | Vibration resistance | Operational | 10 to 55Hz double amplitude 1.5mm (=9.13G at 55Hz)<br>55 to 100Hz, 45m/sec² (4.6G) | |
| | Shock | Operational | 100 m/s² minimum (11±1ms) | |
| | | Withstand, no damage | 1,000m/s² minimum (6±1ms) | |
| | Weight | | Approximately 10 g | |

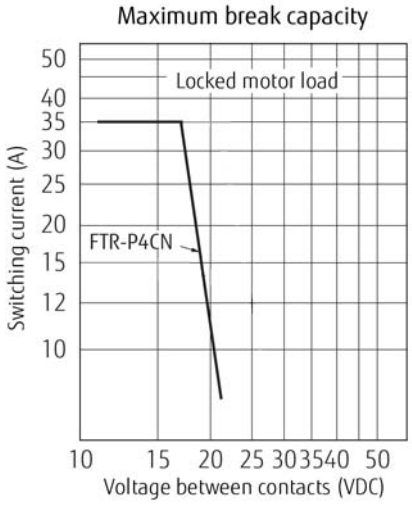
* Minimum switching loads mentioned above are reference values. Please perform the confirmation test with actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

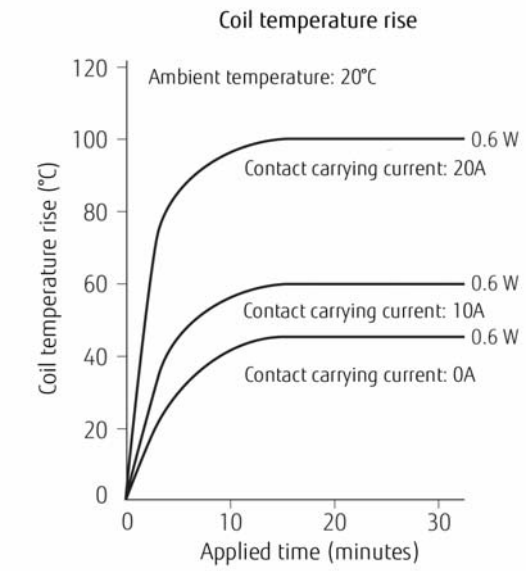
## ■ COIL RATING

FTR-P4 Series (0.3mm contact gap)

| Coil Code | Rated Coil Voltage (VDC) | Coil Resistance +/- 10% (Ohm) | Must Operate Voltage (VDC) * | Must Release Voltage (VDC) * | Coil Power at Nominal Voltage (W) | Thermal Resistance (approx.) |
|---|---|---|---|---|---|---|
| 009 | 9 | 135 | 5.5 (at 20 °C) | 0.7 (at 20 °C) | 0.6 | 73 °C/W |
| | | | 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

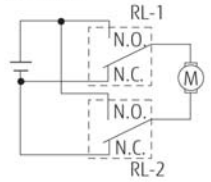


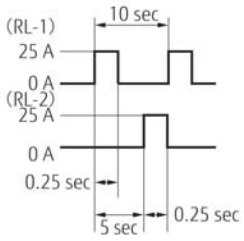
## Life test (examples)

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

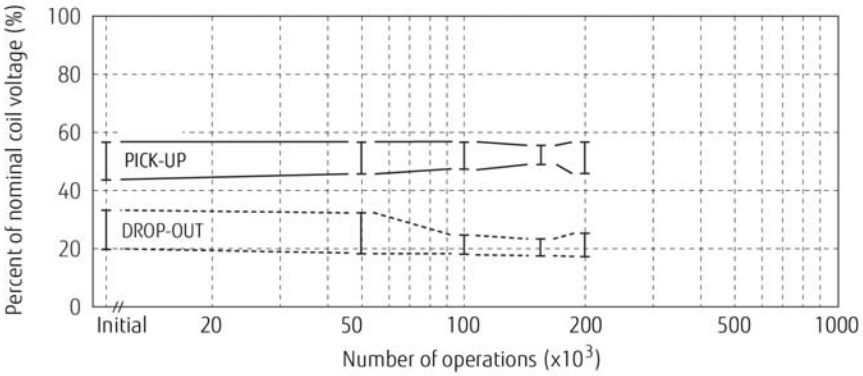
Test circuit




Current wave form

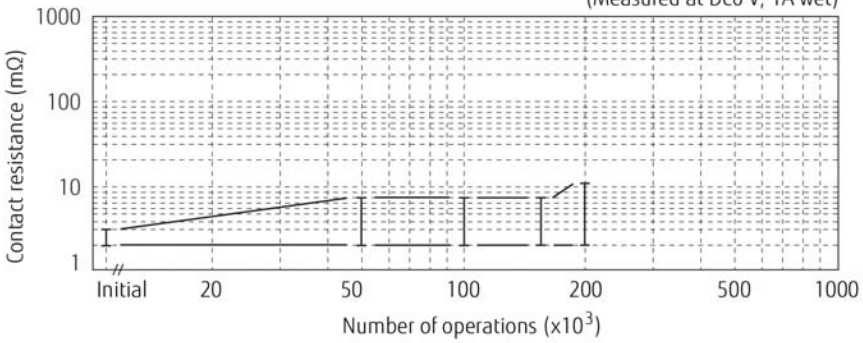



• Shift of pick-up drop-out voltage



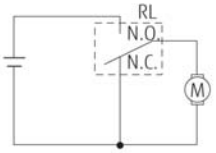

• Change of contact resistance

(Measured at DC6 V, 1A wet)

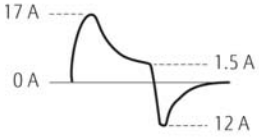



Test condition
Inrush current 17A, 14VDC
motor free
300,000 operations min.
0.25 seconds ON
9.75 seconds OFF

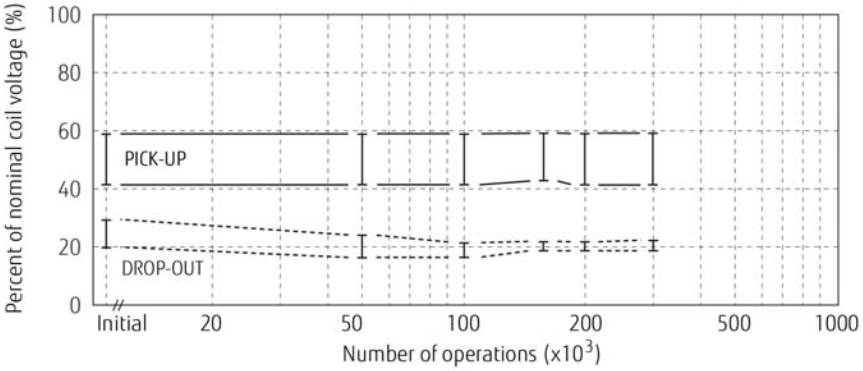
Test circuit




Current wave form

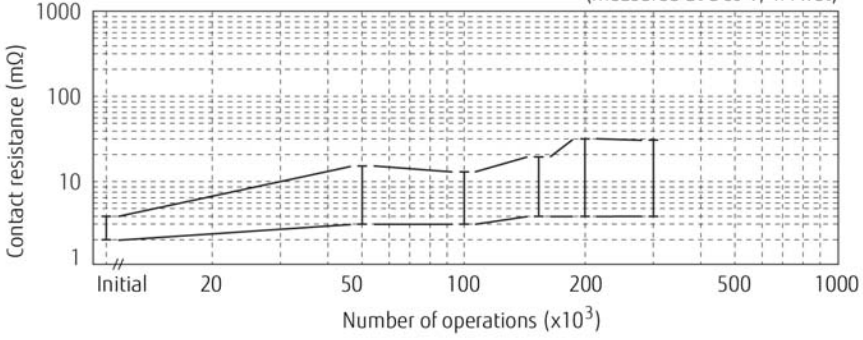



• Shift of pick-up drop-out voltage

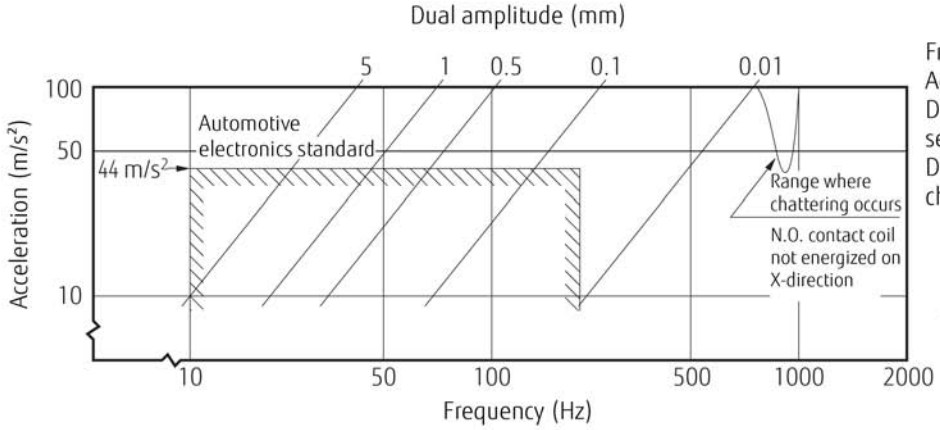



• Change of contact resistance

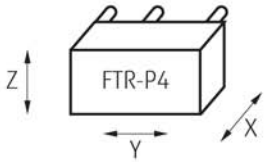
(Measured at DC6 V, 1A wet)



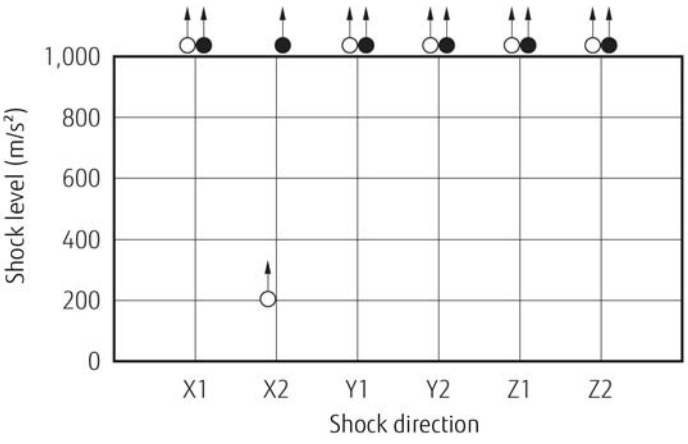
## Vibration resistance characteristics



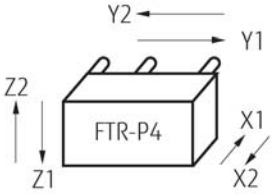

Frequency: 10~2000 Hz
Acceleration: 100 m/s² max.
Direction of vibration; see diagram below
Detection level: chatter > 1ms




## Shock resistance characteristics

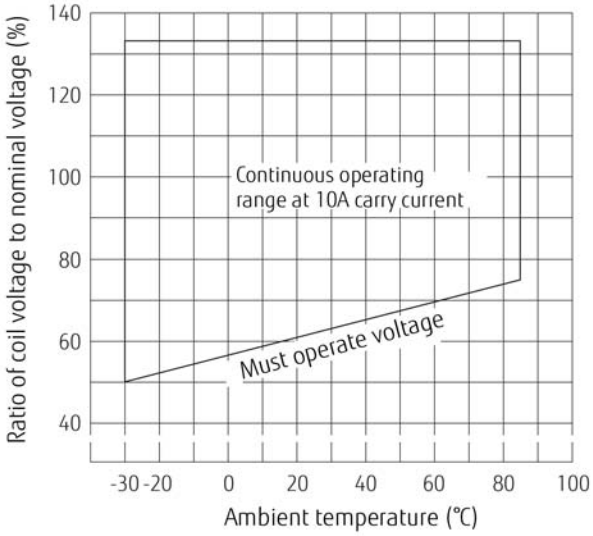


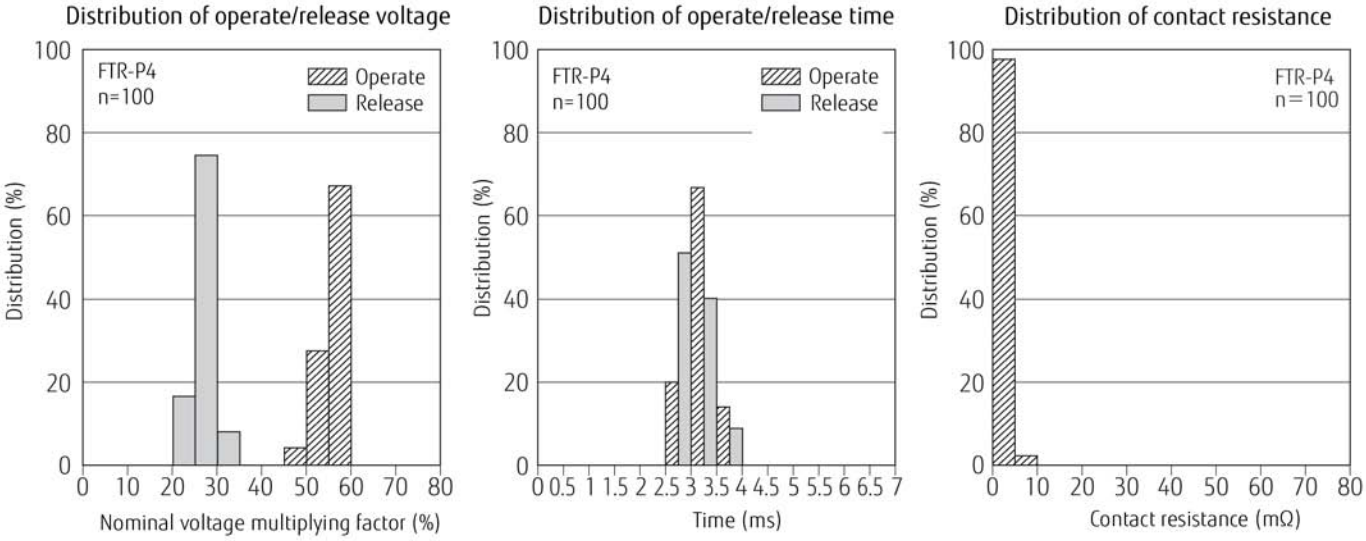

Shock application time: 11ms, half-sine wave
Test material: coil energized and de-energized
Shock direction: see diagram below
Detection level: chatter > 1ms




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

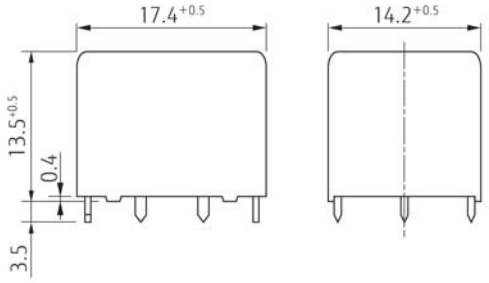
## Operating coil voltage range



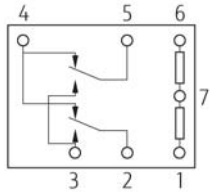



## ■ DIMENSIONS

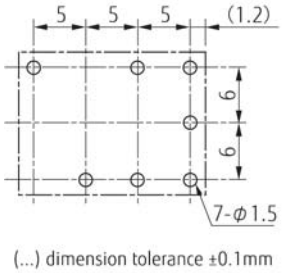
- **Dimensions**




- **Schematics**
(BOTTOM VIEW)

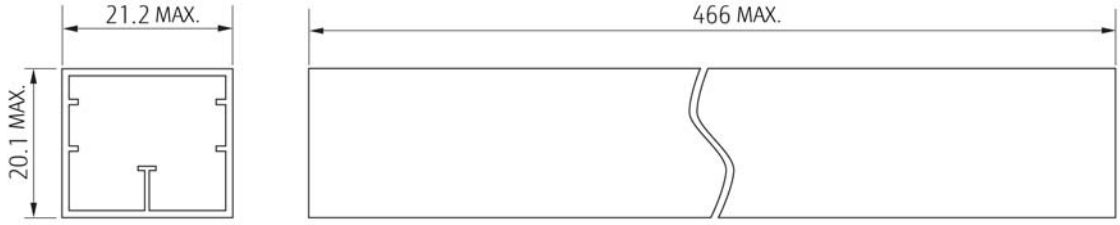



- **PC board mounting hole layout**
(BOTTOM VIEW)




(...) dimension tolerance ±0.1mm

- **Tube carrier**




Unit: mm

# RoHS Compliance and Lead Free Information

## 1. General Information

- All relays produced by Fujitsu Components are compliant with RoHS directive 2011/65/EU including amendments.
- Cadmium as used in electrical contacts is exempted from the RoHS directives.
  As per Annex III of directive 2011/65/EU.
- All relays are lead-free. Please refer to Lead-Free Status Info for older date codes at:
  http://www.fujitsu.com/downloads/MICRO/fcai/relays/lead-free-letter.pdf
- 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 Condition

- Recommended solder Sn-3.0Ag-0.5Cu.

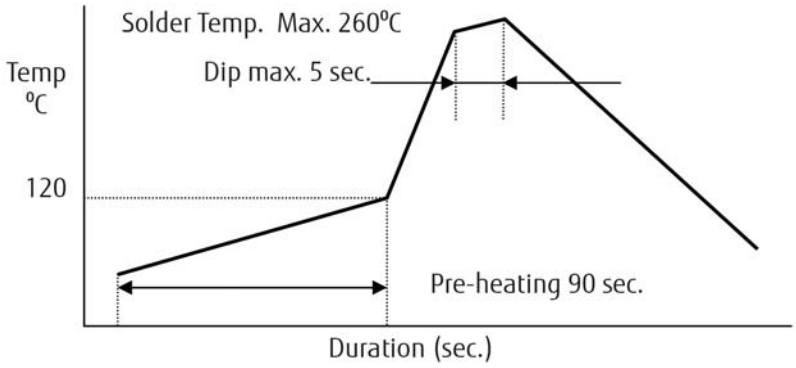
**Flow Solder Condition:**

| | |
|---|---|
| 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 Temperature: | 30-60W maximum 350-360˚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.

## Fujitsu Components International Headquarter Offices

**Japan**
Fujitsu Component Limited
Gotanda-Chuo Building
3-5, Higashigotanda 2-chome, Shinagawa-ku
Tokyo 141, Japan
Tel: (81-3) 5449-7010
Fax: (81-3) 5449-2626
Email: promothq@ft.ed.fujitsu.com
Web: www.fcl.fujitsu.com

**North and South America**
Fujitsu Components America, Inc.
250 E. Caribbean Drive
Sunnyvale, CA 94089 U.S.A.
Tel: (1-408) 745-4900
Fax: (1-408) 745-4970
Email: components@us.fujitsu.com
Web: http://us.fujitsu.com/components

**Europe**
Fujitsu Components Europe B.V.
Diamantlaan 25
2132 WV Hoofddorp
Netherlands
Tel: (31-23) 5560910
Fax: (31-23) 5560950
Email: info@fceu.fujitsu.com
Web: emea.fujitsu.com/components/

**Asia Pacific**
Fujitsu Components Asia Ltd.
102E Pasir Panjang Road
#01-01 Citilink Warehouse Complex
Singapore 118529
Tel: (65) 6375-8560
Fax: (65) 6273-3021
Email: fcal@fcal.fujitsu.com
Web: http://www.fujitsu.com/sg/services/micro/components/