

COMPACT POWER TWIN RELAY

1POLE X 2, H-BRIDGE— 25 A FOR AUTOMOTIVE APPLICATIONS

FTR-P4 Series

RoHS compliant

■ FEATURES

- Compact for high density packaging.
(60% volume of previous generation FBR512).
- High contact capacity with proven contact material.
(100,000 operations, 14 V, 25 A achieved, even with reduced size).
- 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.
- Optional over-voltage circuit breaking capability
(0.6mm gap, contact our representative).
- Packaging for auto-insertion
(tube packing, 30 relays/tube).
- RoHS compliant since date code: 0624
Please see page 8 for more information



■ ORDERING INFORMATION

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

| | | |
|-----|----------------------|---|
| (a) | Series Name | FTR-P4 Series |
| (b) | Contact Arrangement | C : 1 Form C x 2 (H-Bridge) |
| (c) | Contact Gap | N : 0.3mm gap P : 0.6mm gap |
| (d) | Nominal Coil Voltage | 009 : 9VDC 010 : 10VDC 012 : 12VDC |
| (e) | Contact Material | W1 : Silver-tin oxide-indium |
| (f) | Custom Designation | Nil : Standard (85°C) -01 : High temperature (125°C) |

Note: The part number stamped on the relay cover does not include "FTR".

Example: Ordering part number: FTR-P4CN012W1

 Stamped on part number: P4CN012W1

■ TYPICAL APPLICATIONS

| | | |
|--------------|------------|---------------------|
| Power window | Power seat | Tilt steering |
| Door lock | Sun roof | Retractable antenna |

FTR-P4 SERIES

■ SPECIFICATIONS

| Item | | Specification | | |
|---------------|---|---|--|------------------------------------|
| | | Standard | High Temperature version | |
| Contact | Arrangement | 1 form C x 2 (H-Bridge) | | |
| | Material | Silver-tin oxide-indium | | |
| | Voltage Drop (Resistance) | Maximum 100 mV (at 1 A 12 VDC) | | |
| | Rating | 25 A at 14 VDC (locked motor load) | | |
| | Maximum Carrying Current | 25 A / 1 hour (20° C, 100% rated coil voltage) | | |
| | Maximum Inrush Current (Reference) | 35 A | | |
| | Maximum Switching Current (Reference) | 35 A at 16 VDC | | |
| | Minimum Switching Load*1 (Reference) | 1 A, 6 VDC | | |
| Coil | 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 Values | Operate (at nominal voltage) | Maximum 10ms (not including bounce) | | |
| | Release (at nominal voltage) | Maximum 5ms (not including bounce, no diode) Maximum 15ms (not including bounce, with diode) | | |
| Life | Mechanical | 10 x 10 ⁶ operations minimum | | |
| | Electrical | 100 x 10 ³ operations minimum 14 VDC, 25 A (locked motor load) (1 operation = 1 forward, 1 reverse) | | |
| Other | Vibration Resistance | Operational | 10-55Hz, 1.5mm double amplitude (=9.13G @ 55Hz) 55-100Hz, 45m/sec ² (4.6G) | |
| | | Shock Resistance | Operational | 100 m/s ² minimum (10G) |
| | | Endurance | 1, 000 m/s ² minimum (100G) | |
| | Insulation Resistance (initial) | | 100M ohms @500 VAC | |
| | Dielectric Withstanding Voltage (initial) | | 500 VAC | |
| | Weight | | Approximately 9.0g | |

*1 Values when switching a resistive load at normal room temperature and humidity and in a clean environment.
The minimum switching load varies with the switching frequency and operating environment.

FTR-P4 SERIES

■ COIL DATA CHART

FTR-P4 Series (0.25mm contact gap)

| Model | Nominal Coil Voltage | Coil Resistance (±10% at 20°C) | Must Operate Voltage | Must Release Voltage (at 20°C) | Coil Power at Nominal Voltage | Thermal Resistance (approx.) |
|--------------------|----------------------|--------------------------------|--------------------------------------|--------------------------------|-------------------------------|------------------------------|
| FTR-P4-CN009W1 () | 9VDC | 135Ω | 5.5VDC (at 20°C) 6.9VDC (at 85°C) | 0.75VDC | 0.6W | 73°C/W |
| FTR-P4-CN010W1 () | 10VDC | 167Ω | 6.3VDC (at 20°C) 7.9VDC (at 85°C) | 0.9VDC | 0.6W | 73°C/W |
| FTR-P4-CN012W1 () | 12VDC | 240Ω | 7.3VDC (at 20°C) 9.2VDC (at 85°C) | 1.0VDC | 0.6W | 73°C/W |

Note: () is "Nil" or "-01"

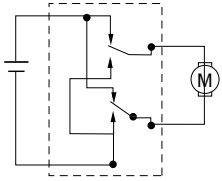
FTR-P4 Series (0.6mm contact gap)

| Model | Nominal Coil Voltage | Coil Resistance (±10% at 20°C) | Must Operate Voltage | Must Release Voltage (at 20°C) | Coil Power at Nominal Voltage | Thermal Resistance (approx.) |
|----------------|----------------------|--------------------------------|--------------------------------------|--------------------------------|-------------------------------|------------------------------|
| FTR-P4-CP009W1 | 9VDC | 100Ω | 5.5VDC (at 20°C) 6.9VDC (at 85°C) | 0.75VDC | 0.8W | 73°C/W |
| FTR-P4-CP010W1 | 10VDC | 125Ω | 6.3VDC (at 20°C) 7.9VDC (at 85°C) | 0.9VDC | 0.8W | 73°C/W |
| FTR-P4-CP012W1 | 12VDC | 167Ω | 7.3VDC (at 20°C) 9.2VDC (at 85°C) | 1.0VDC | 0.8W | 73°C/W |

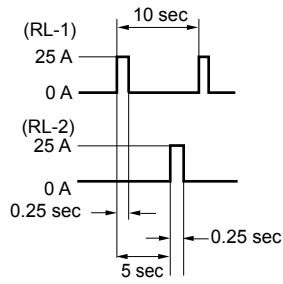
CHARACTERISTIC DATA

1. LIFE TEST (EXAMPLES)

- Test item
14 V DC-25 A
locked motor
100K operations* minimum
0.25 seconds ON,
9.75 seconds OFF

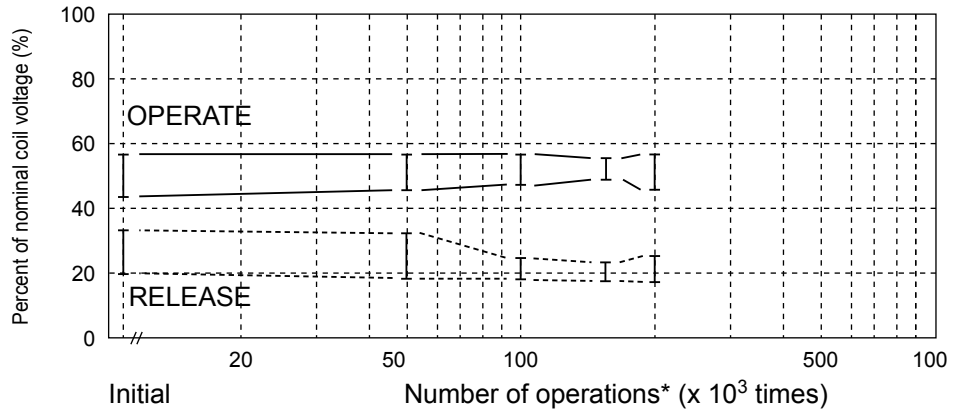


- Current wave form



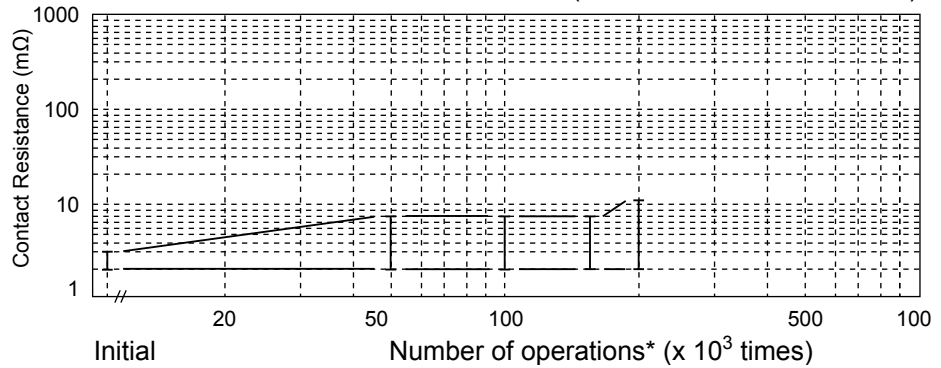
* 1 operation = 1 forward and 1 reverse

- Change of operate and release voltage

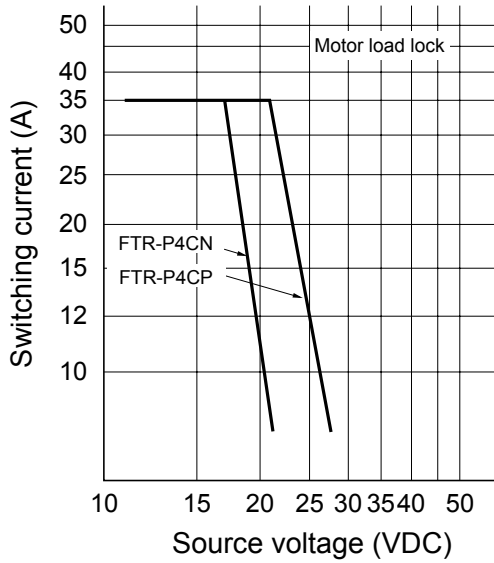


- Change in contact resistance

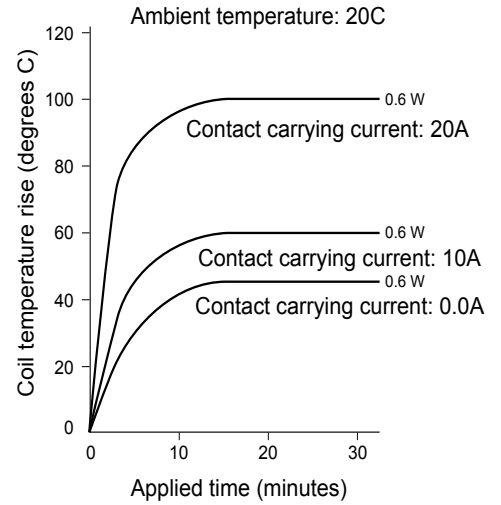
(Measured at 6 VDC, 1A wet)



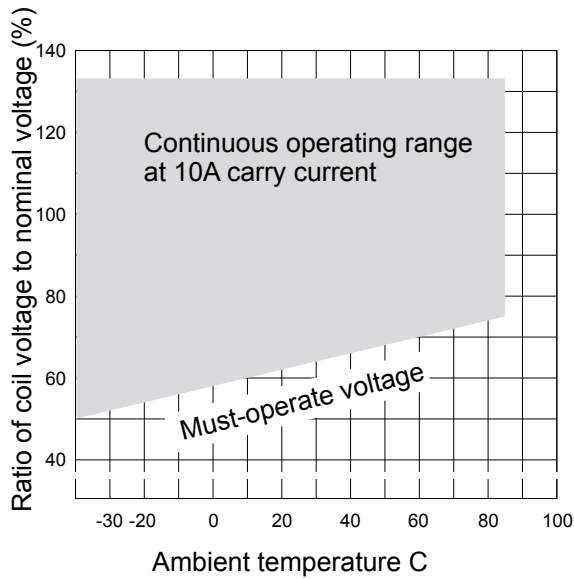
2. MAXIMUM BREAK CAPACITY



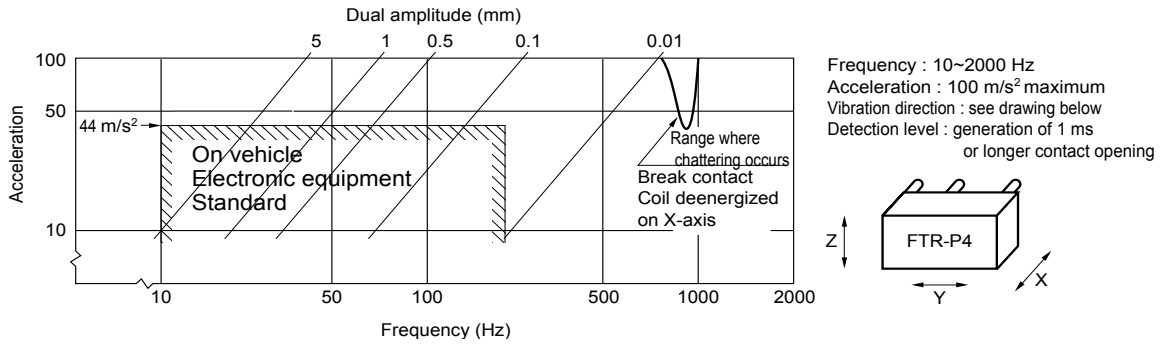
3. COIL TEMPERATURE RISE



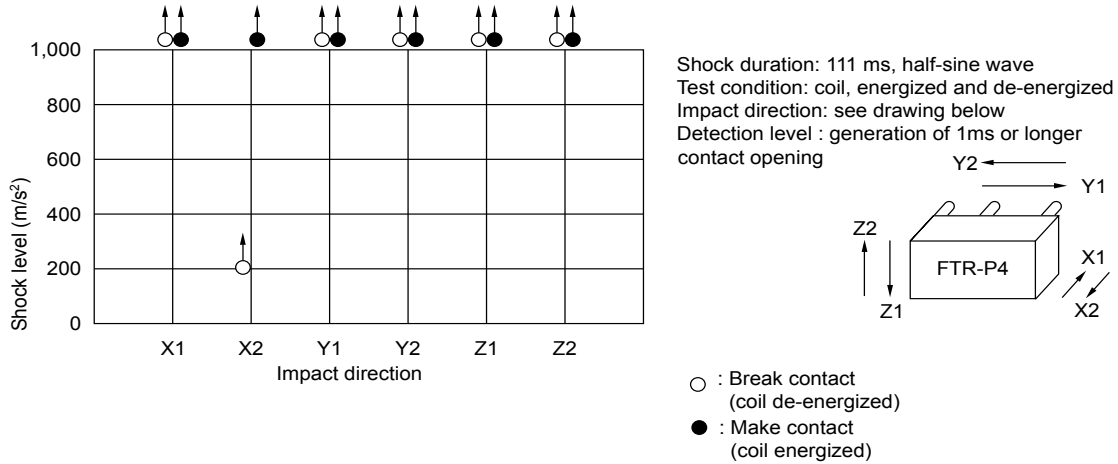
4. OPERATING COIL VOLTAGE RANGE



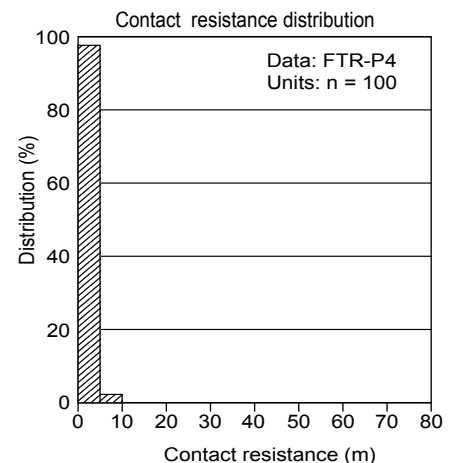
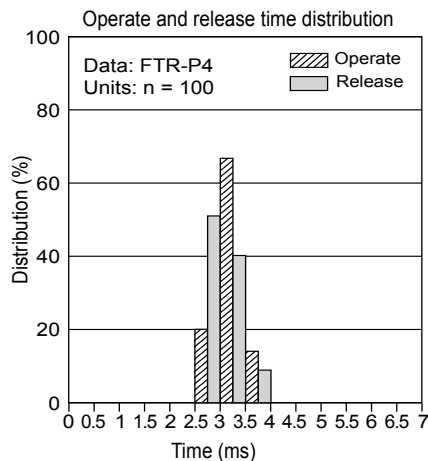
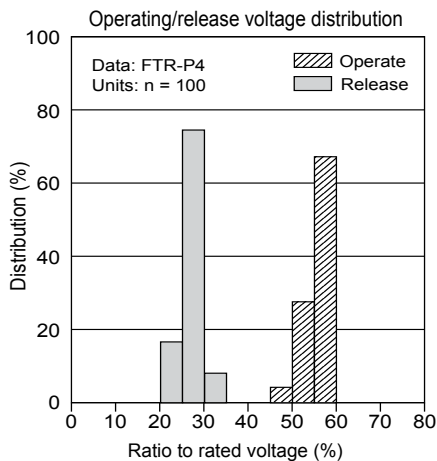
5. VIBRATION RESISTANCE CHARACTERISTIC



6. SHOCK RESISTANCE CHARACTERISTIC

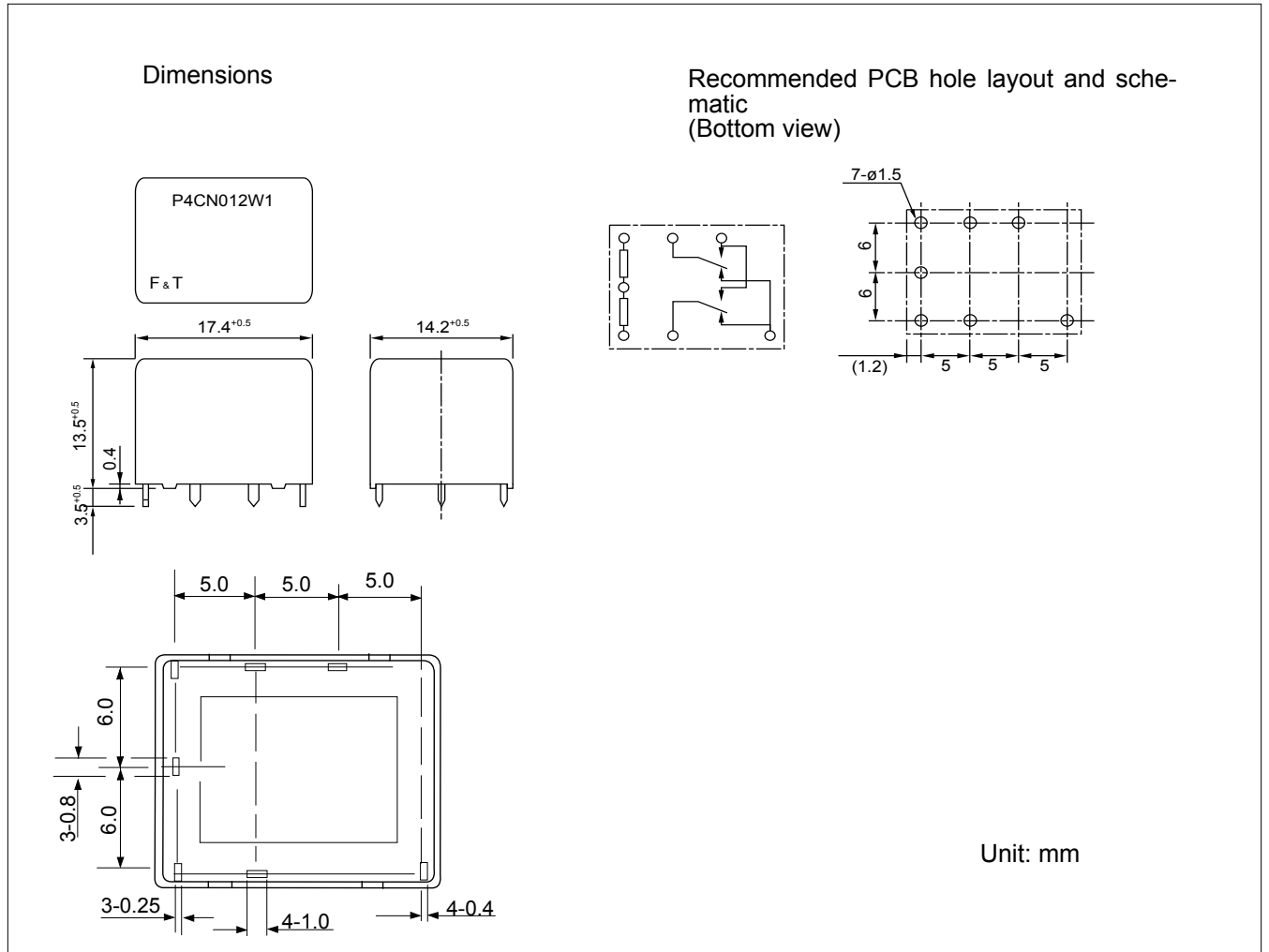


■ REFERENCE DATA



FTR-P4 SERIES

■ DIMENSIONS AND SCHEMATICS



■ PRECAUTIONS

Please refer to the Engineering Reference in our relay databook for general precautions.

RoHS Compliance and Lead Free Relay Information

1. General Information

- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. Most of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (<http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf>)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu.
- All signal and most power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 5 hazardous materials that are restricted by RoHS directive (lead, mercury, chromium IV, PBB, PBDE).
- It has been verified that using lead-free relays in leaded assembly process will not cause any problems (compatible).
- "LF" is marked on each outer and inner carton. (No marking on individual relays).
- To avoid leaded relays (for lead-free sample, etc.) please consult with area sales office.
- We will ship leaded relays as long as the leaded relay inventory exists.

Note: Cadmium was exempted from RoHS on October 21, 2005. (Amendment to Directive 2002/95/EC)

2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu.

Reflow Solder condition

Flow Solder condition:

Pre-heating: maximum 120°C
Soldering: dip within 5 sec. at
260°C solder bath

Solder by Soldering Iron:

Soldering Iron
Temperature: maximum 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.

4. Tin Whisker

- Dipped SnAgCu solder is known as low risk tin whisker. No considerable length whisker was found by our in house test.

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