FUJITSU

COMPACT POWER RELAY
1 POLE - 25A (for automotive applications)
FTR-P3 Series

■ FEATURES

- Compact for high density packaging
- High contact capacity with proven contact material.
  (100,000 operations, 14 V, 25 A)
- 125 ℃ version is available.
- Surface mount compatible version (reflowable) is available
- 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)
- Optional over-voltage circuit breaking capability
  (0.6mm gap, contact our representative)
- Packaging for auto-insertion (tube packing, 30 relays/tube)
- Application examples: power window, power seat, tilt steering, sunroof, wiper/IWW, retractable antenna
- RoHS compliant
  Please see page 7 for more information

■ PARTNUMBER INFORMATION

	FTR-P3	C	N	012	W1	**
[Example]	(a)	(b)	(c)	(d)	(e)	(f)

(a)	Relay type	FTR-P3	: FTR-P3 Series
(b)	Contact configuration	C	: 1 form C
(c)	Contact gap	N P	: 0.3mm gap : 0.6mm gap
(d)	Coil rated voltage	012	: 9.....12VDC Coil rating table at page 3
(e)	Contact material	W1	: Silver-tin oxide indium
(f)	Special type	Nil -01	: Standard (85 ℃) : High temperature (125 ℃)

Actual marking does not carry the type name: "FTR"
E.g.: Ordering code: FTR-P3CN012W1 Actual marking: P3CN012W1

■ SPECIFICATION

Item			FTR-P3	
			Standard	High temperature version
Contact Data	Configuration		1 form C (SPDT)	
	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 *1		25A/1 hour (25 °C, 100% rated coil voltage)	
	Max. switching voltage		16VDC (reference)	
	Max. switching current		35A (reference)	
	Min. switching load * 2		6VDC, 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 ambient 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) 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)	
	Shock	Operational	100m/s² minimum (10G)	
		Withstand, no damage	1,000m/s² minimum (100G)	
	Weight		Approximately 5 g	

* 1 Need to consider the head from PCB when max. current is more than 10A.
* 2 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-P3 Series (0.25mm contact gap)

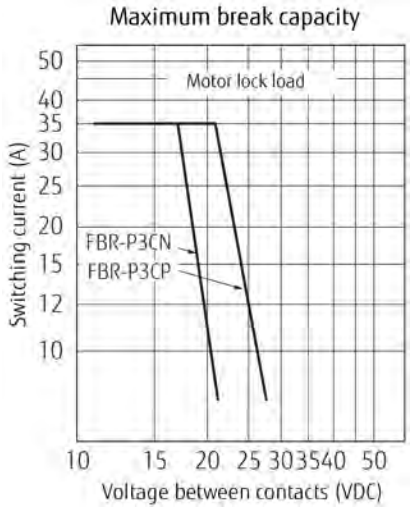
Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Must Release Voltage (VDC) *	Coil Power at Nominal Voltage (W)	Thermal Resistance (approx.)
009	9	135	5.5 (at 20 °C)	0.75	0.6	73 °C/W
			6.9 (at 85 °C)			
010	10	167	6.3 (at 20 °C)	0.9		
			7.9 (at 85 °C)			
012	12	240	7.3 (at 20 °C)	1		
			9.2 (at 85 °C)			

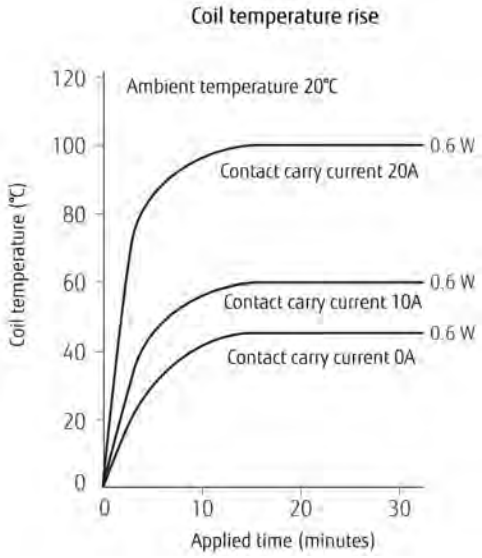
FTR-P3 Series (0.6mm contact gap)

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	100	5.5 (at 20 °C)	0.75	0.8	73 °C/W
			6.9 (at 85 °C)			
010	10	125	6.3 (at 20 °C)	0.9		
			7.9 (at 85 °C)			
012	12	167	7.3 (at 20 °C)	1		
			9.2 (at 85 °C)			

Note: All values in the tables are valid for 20°C and zero contact current, unless otherwise stated.
* Specified operate values are valid for pulse wave voltage.

■ CHARACTERISTIC DATA

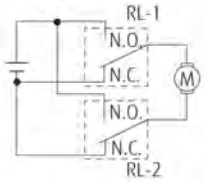




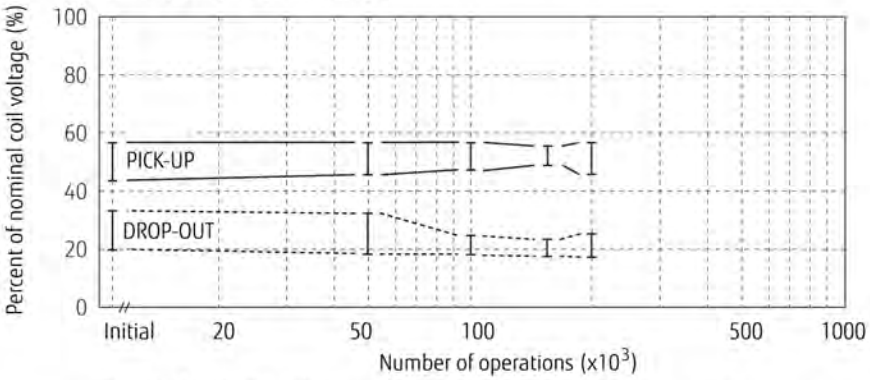
Life test (examples)

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

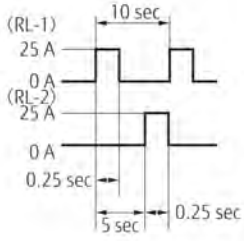
Test circuit



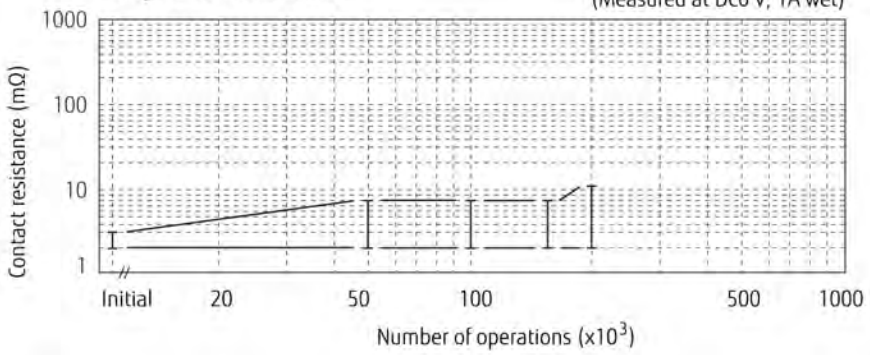
• Shift of pick-up drop-out voltage



Current wave form

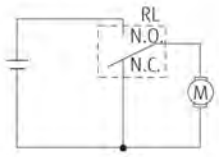


• Change of contact resistance (Measured at DC6 V, 1A wet)

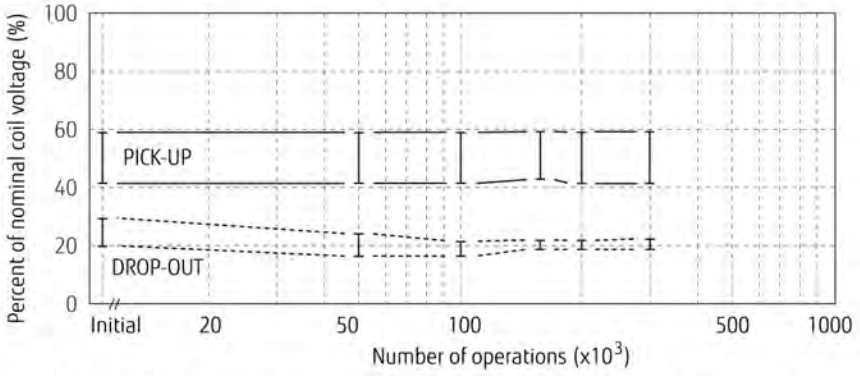


Test condition
Inrush current 17A, 14VDC
motor free
300,000 operations min.
0.25 seconds ON
9.75 seconds OFF

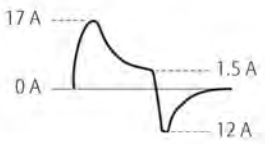
Test circuit



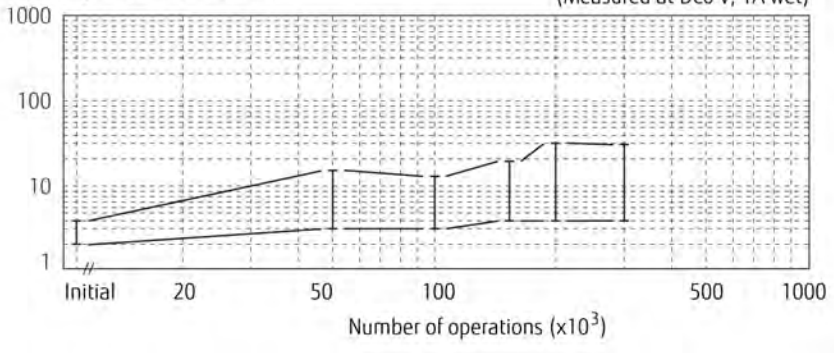
• Shift of pick-up drop-out voltage



Current wave form

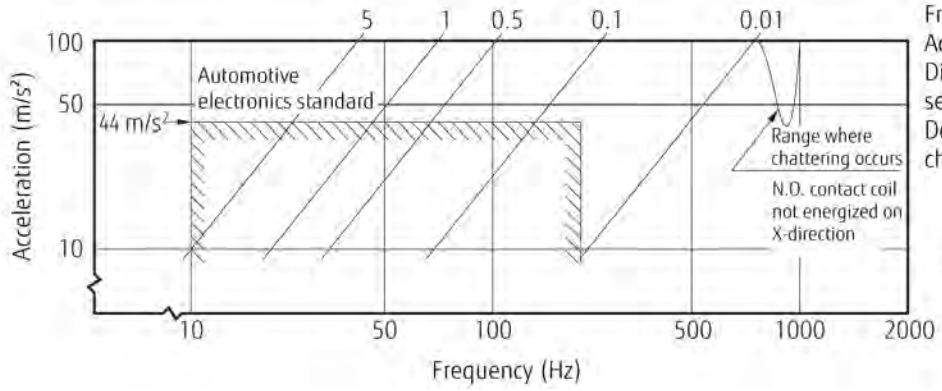


• Change of contact resistance (Measured at DC6 V, 1A wet)

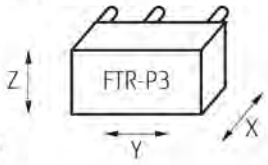


Vibration resistance characteristics

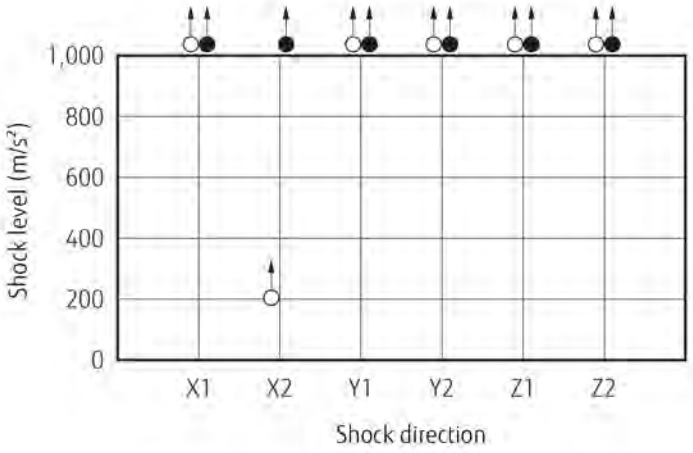
Dual amplitude (mm)



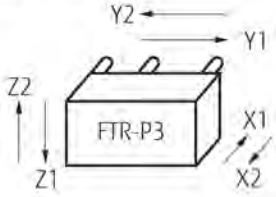
Frequency: 10~2000 Hz
Acceleration: 100 m/s² max.
Direction of vibration: see diagram below
Detection level: chatter > 1ms



Shock resistance characteristics

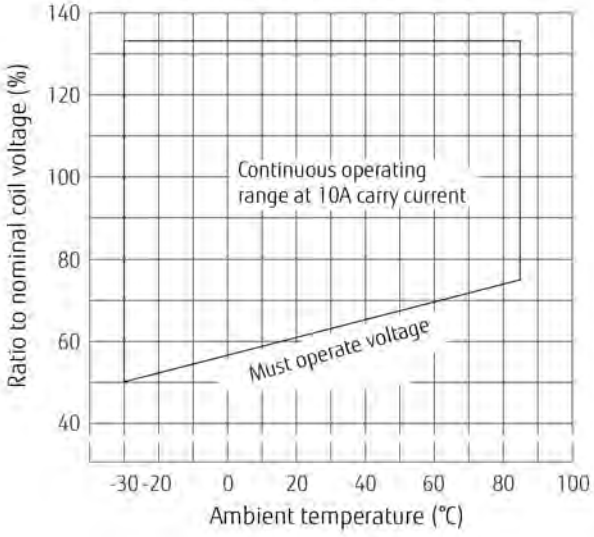


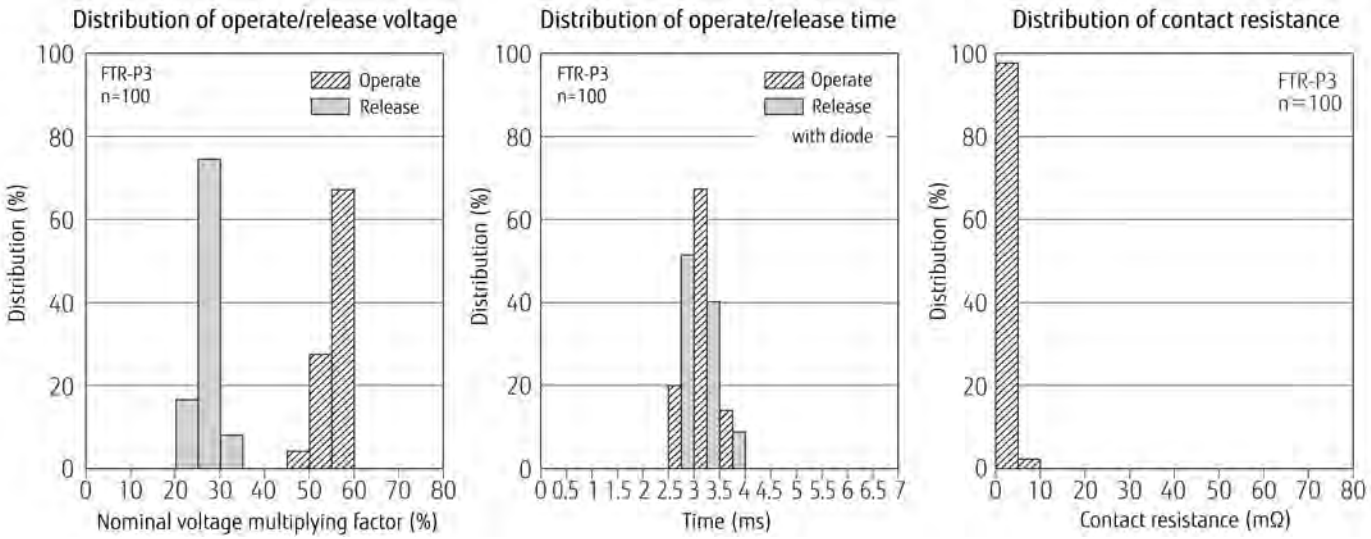
Shock application time: 11ms, half-sine wave
Test material: coil energized and de-energized
Shock direction: see diagram below
Detection level: chatter > 1ms



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

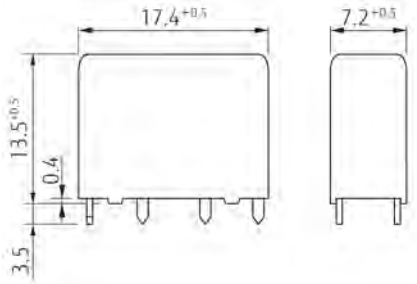
Operating coil voltage range



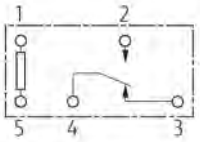


■ DIMENSIONS

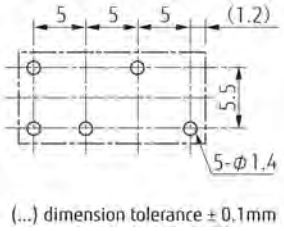
- **Dimensions**



- **Schematics**
(BOTTOM VIEW)

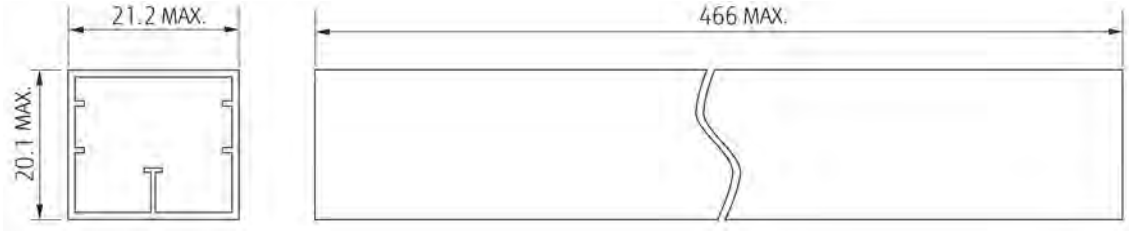


- **PC board mounting hole layout**
(BOTTOM VIEW)



(...) 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

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, 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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