

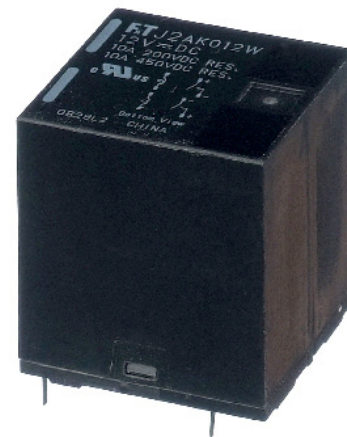
# POWER RELAY

## ULTRA SMALL HIGH VOLTAGE DC RELAY

### FTR-J2 Series

#### ■ FEATURES

- 10A, 450VDC high-voltage switching  
(2 x 10A, 200VDC switching)
  - Contact voltage drop: typical 0.1V
  - Inrush current 150A (capacitive load)
  - Compact size (L x W X H= 24x23.5x27mm)
  - 2 x 1 form A
  - Coil sensitivity 1W (each coil connect in series)
  - High insulation between contacts and coil
    - Insulation distance : Clearance/creepage > 6mm
    - Dielectric strength : 4,000 VAC
    - Surge strength : 10,000 V (1.2 x 50µsec)
  - Plastic materials conform to UL94 flame class V-0
  - Flux proof, RTII
  - RoHS compliant
- Please see page 8 for more information



#### ■ PARTNUMBER INFORMATION

[Example]       $\frac{\text{FTR-J2}}{\text{(a)}}$      $\frac{\text{A}}{\text{(b)}}$      $\frac{\text{K}}{\text{(c)}}$      $\frac{\text{012}}{\text{(d)}}$      $\frac{\text{W}}{\text{(e)}}$

(a)	Relay type	FTR-J2 : FTR-J2-Series
(b)	Contact configuration	A : 2 x 1 form A
(c)	Coil power	K : Standard sensitivity
(d)	Coil rated voltage	012 : 5.....110 VDC Coil rating table at page 3
(e)	Contact material	W : Silver alloy

Actual marking does not carry the type name : "FTR"  
E.g.: Ordering code: FTR-J2AK012W    Actual marking: J2AK012W

# FTR-J2 SERIES

## ■ SPECIFICATION

Item	FTR-J2		
Contact Data	Configuration	2 x 1 form A	
	Material	Silver alloy	
	Contact resistant (initial)	Max. 100 mΩ at 1A, 6VDC	
	Contact rating	10A, 450VDC (resistive load) (+ polarity pin 7 and 4) * each NO contact connected in series	
		10A, 200VDC (resistive load) (single contact) + (polarity pin 7 and 4) * for each NO contact	
	Overload switching *	10A, 500VDC (resistive load), 50 operations * each NO contact connected in series	
		10A, 250VDC (resistive load) * for each NO contact	
	Maximum carrying current	12A	
	Inrush current	Peak 150A	
	Maximum switching voltage	600VDC, each NO contact connection in series	
300VDC, each NO contact			
Contact voltage drop (initial)	Typical 0.1V (at nominal contact current)		
Life	Mechanical	2M operations	
	Electrical	10K operations	
Coil Data	Operate voltage (at 20 °C)	Maximum 70% of nominal voltage	
	Release voltage (at 20 °C)	Minimum 5% of nominal voltage	
	Operating temperature range (no frost)	-40 to +85 °C	
Timing Data	Operate (at nominal voltage)	Max. 15ms (without bounce)	
	Release (at nominal voltage)	Max. 5ms (no diode)	
Insulation	Resistance (initial)	Min. 1000MΩ at 500VDC	
	Dielectric strength	Between open contacts	1,000VAC (50/60Hz) 1min
		Between contact sets	1,000VAC (50/60Hz) 1min
		Between contacts and coil	4,000 VAC (50/60 Hz) 1 min.
Surge strength	Coil to contacts	10,000V/ 1.2 x 50μs standard wave	
Other	Vibration resistance	Misoperation	10 to 55Hz double amplitude 1.5mm
		Endurance	10 to 55Hz double amplitude 1.5mm
	Shock	Misoperation	Min. 200m/s <sup>2</sup> (11 ± 1ms)
		Endurance	Min. 1,000m/s <sup>2</sup> (6 ± 1ms)
	Weight	Approximately 26g	
	Sealing	Flux proof RTII	

Note: Use a varistor as a protective circuit against reverse surge connected parallel to the coil. The reverse blocking voltage should be about 3 times the value of the power source voltage.

\* 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.

# FTR-J2 SERIES

## ■ COIL RATING

Standard single coil

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm) *	Must Operate Voltage (VDC) *	Must Release Voltage (VDC) *	Rated Power (W) (±10%)
005	5	47	3.5	0.25	Approximately 0.53
006	6	68	4.2	0.3	
012	12	270	8.4	0.6	
024	24	1,100	16.8	1.2	
048	48	4,400	33.6	2.4	
060	60	6,790	42	3	
110	110	22,800	77	5.5	

2 coils in series (Connect relay coil terminal No.2 to No.3) See note 2.

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm) *	Must Operate Voltage (VDC) *	Must Release Voltage (VDC) *	Rated Power (W) (±10%)
005	10	94	7	0.5	Approximately 1.06
006	12	136	8.4	0.6	
012	24	540	16.8	1.2	
024	48	2,200	33.6	2.4	
048	96	8,800	67.2	4.8	
060	120	13,580	84	6	
110	220	45,600	154	11	

2 coils in parallel (Connect relay coil terminal No.1 to No.3 and No.2 to No.4)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm) *	Must Operate Voltage (VDC) *	Must Release Voltage (VDC) *	Rated Power (W) (±10%)
005	5	23.5	3.5	0.25	Approximately 1.06
006	6	34	4.2	0.3	
012	12	135	8.4	0.6	
024	24	550	16.8	1.2	
048	48	2,200	33.6	2.4	
060	60	3,395	42	3	
110	110	11,400	77	5.5	

Note 1: All values in the tables are valid for 20°C and zero contact current.

Note 2: Nominal voltage is different from indication of part number. Please refer to the coil rating chart "single coil (10A, 200VDC configuration)" for single coil configuration data.

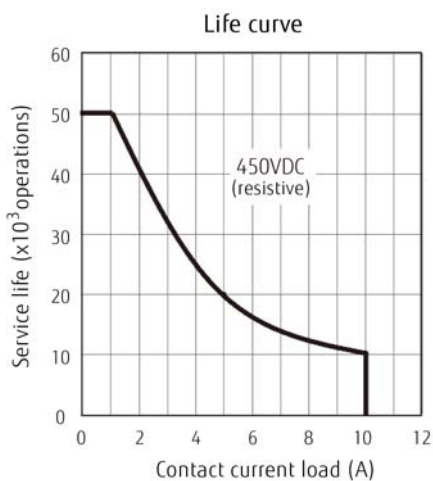
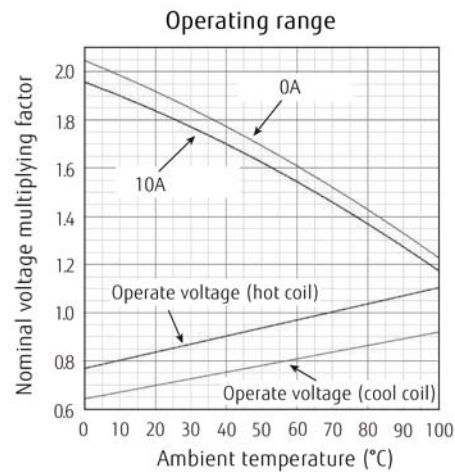
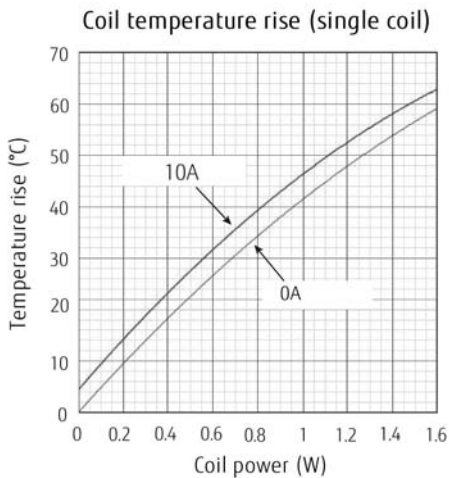
Note 3: Please use with nominal voltage. When energizing higher voltage to coil, please refer to characteristic data "coil temperature rise" and "operating range" (page 4) to set suitable voltage.

\* Specified operate values are valid for pulse wave voltage.

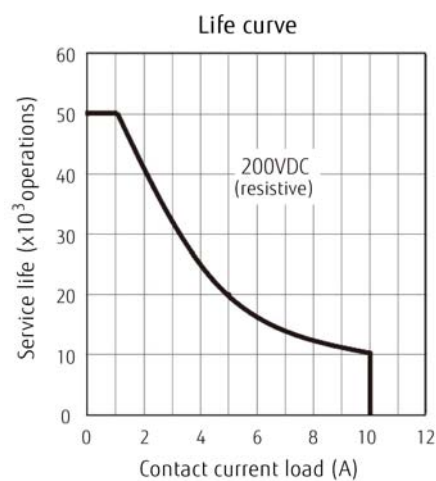
## ■ SAFETY STANDARDS

Type	Compliance	Contact rating
UL	UL 508	10A, 450VDC, resistive, 10,000 cycles for series connection of each NO contact 10A, 400VDC, resistive, 10,000 cycles for series connection of each NO contact 10A, 200VDC, resistive, 10,000 cycles for each NO contact
VDE	0435	10A, 400VDC, resistive, 10,000 cycles for series connection of each NO contact 10A, 200VDC, resistive, 10,000 cycles for each NO contact

## ■ CHARACTERISTIC DATA



\* Each NO contact connect in series

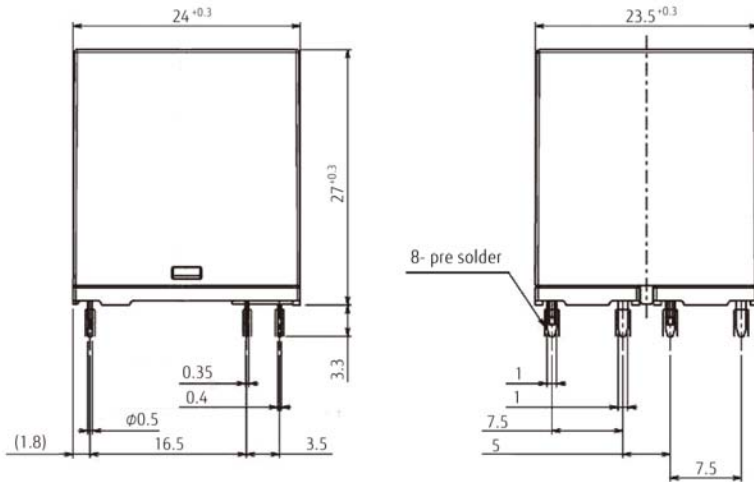


\* Each NO contact

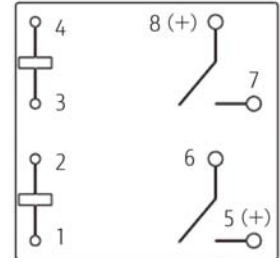
# FTR-J2 SERIES

## ■ DIMENSIONS

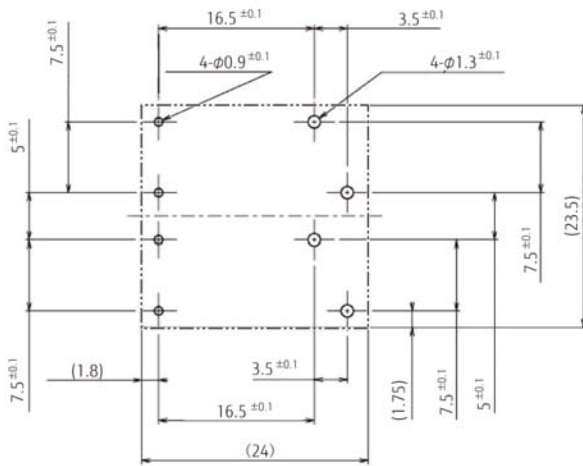
### ● Dimensions



### ● Schematics (BOTTOM VIEW)



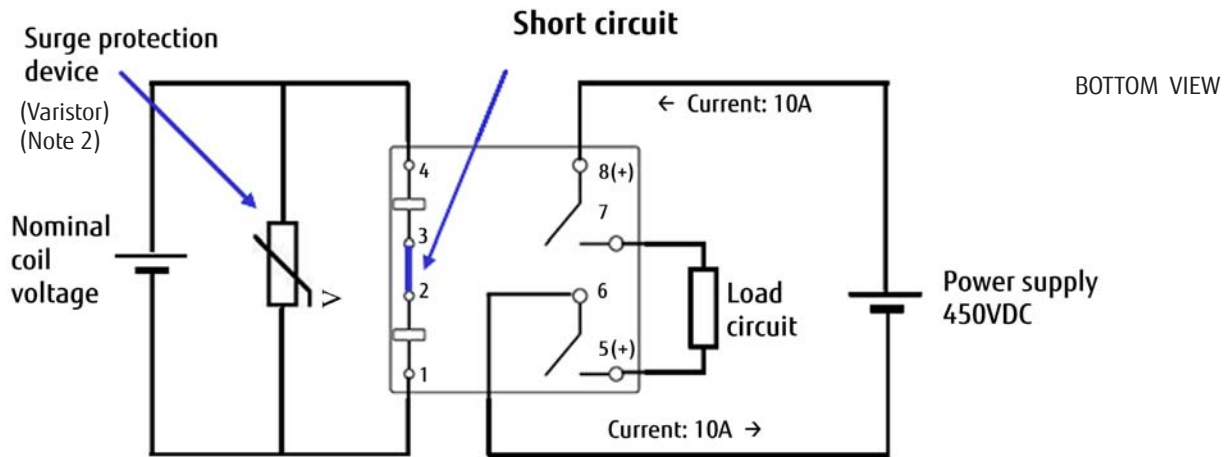
### ● PC board mounting hole layout (BOTTOM VIEW)



Unit: mm

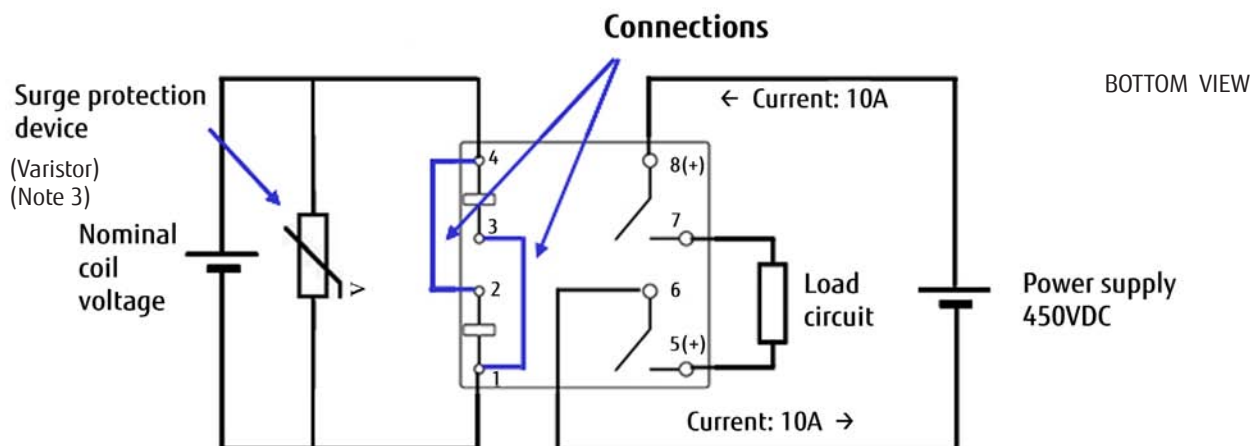
## ■ CIRCUIT

- **Load circuit and input circuit (coil sides) for 10A, 450VDC**  
2 coils connect in series



Load circuit contact terminals have polarities (+) and (-). Coils do not have polarity.

- **Load circuit and input circuit (coil sides) for 10A, 450VDC**  
2 coils connect in parallel



**Note 1:** In case 2 coils are connected in series, connect coil terminal #2 to #3 on PCB circuit. In case 2 coils are connected in parallel, connect coil terminal #1 to #3 and connect coil terminal #2 to #4 on PCB. Regarding terminal number, refer to schematics data.

**Note 2:** Please use varistor as surge protection device. If varistor will not be used, the electrical life need to be derated.

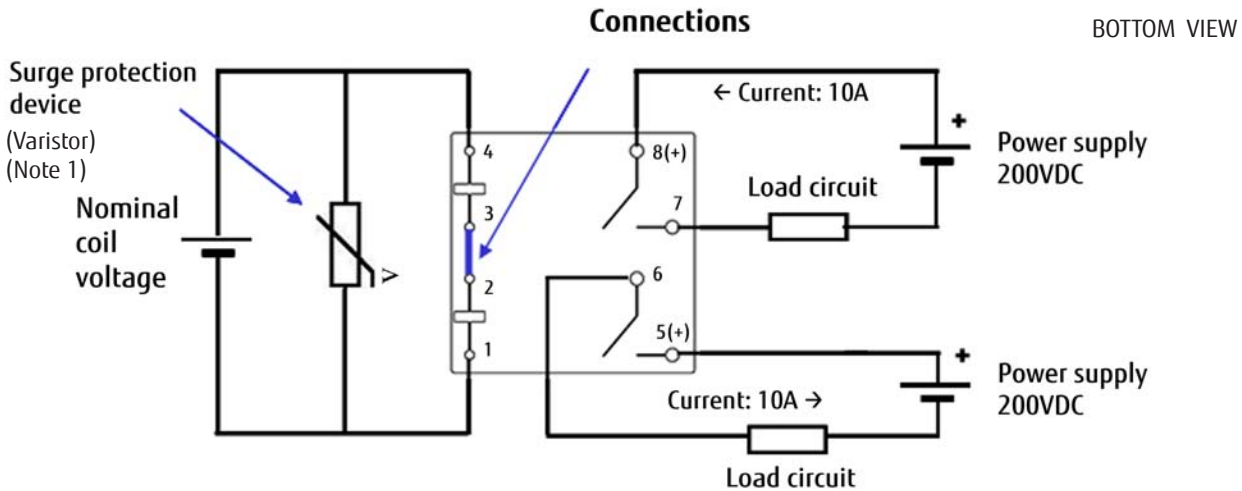
**Note 3:** Varistor surge protection device should be connect parallel to coil(s). Suitable voltage of varistor is 3 times the coil voltage.

**Note 4:** For max. contact life and correct functioning of the relay, positive polarity of load should be connected to pin 8 and pin 5. If not, damage to the relay can occur.

**Warning:** At current loads at max. switching capacity 10A (450VDC) correct polarity is vital for the correct and safe functioning of the relay.

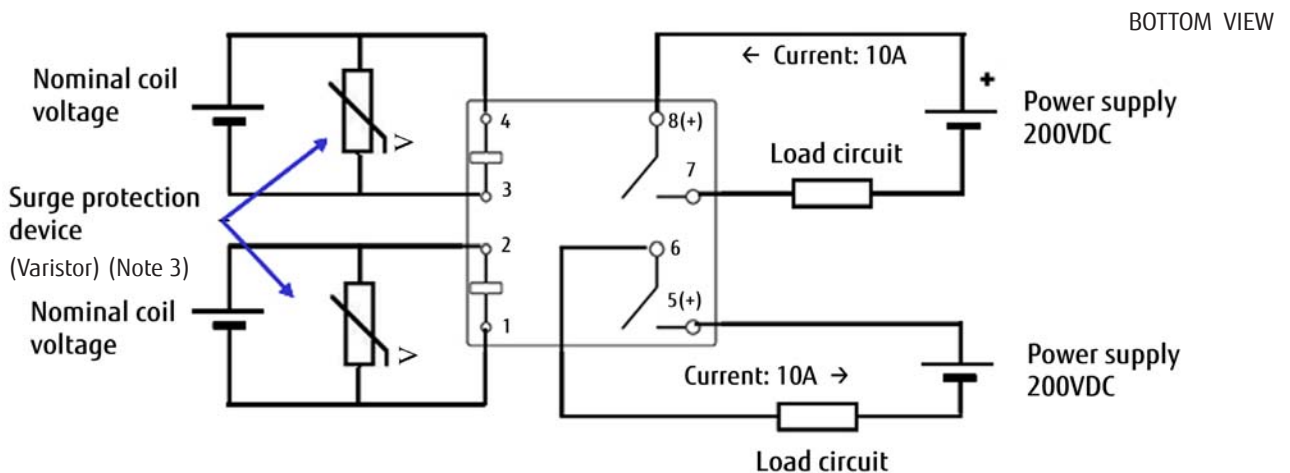
## ■ CIRCUIT

- **Load circuit and input circuit (coil sides) for 10A, 200VDC (dual circuits)**  
2 coils connect in series



Load circuit contact terminals have polarities (+) and (-). Coils have no polarity.

- **Load circuit and input circuit (coil sides) for 10A, 200VDC (dual circuits)**



**Note 1:** In case 2 coils are connected in series, connect coil terminal #2 to #3 on PCB circuit. In case 2 coils are connected in parallel, connect coil terminal #1 to #3 and connect coil terminal #2 to #4 on PCB. Regarding terminal number, refer to schematics data.

**Note 2:** Please use varistor as surge protection device. If varistor will not be used, the electrical life need to be derated.

**Note 3:** Varistor surge protection device should be connect parallel to coil(s). Suitable voltage of varistor is 3 times the coil voltage.

**Note 4:** For max. contact life and correct functioning of the relay, positive polarity of load should be connected to pin 8 and pin 5. If not, damage to the relay can occur.

**Warning:** At current loads at max. switching capacity 10A (200VDC) correct polarity is vital for the correct and safe functioning of the relay.

## RoHS Compliance and Lead Free Information

### 1. General Information

- All signal and power relays produced by Fujitsu Components are compliant with RoHS directive 2002/95/EC including amendments.
- Cadmium as used in electrical contacts is exempted from the RoHS directives on October 21st, 2005. (Amendment to Directive 2002/95/EC)
- All of our signal and power relays are lead-free. Please refer to Lead-Free Status Info for older date codes at: <http://www.fujitsu.com/us/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 Profile

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

#### 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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