

# POWER RELAY

## 1 POLE - 10A High Sensitivity

### FTR-K1 Series

RoHS compliant

#### ■ FEATURES

- Low profile (height: 15.7mm)
- HIGH ISOLATION  
Insulation Distance (between coil and contacts): 10mm min.  
Dielectric strength: 5KV  
Surge strength: 10KV
- UL F Class wire
- Low coil power (400mW)
- Cadmium free contacts
- SAFETY STANDARDS  
UL, CSA, VDE, SEMKO approved  
UL, CSA TV-5 rating approved (1 form A type)
- RoHS Compliant
- UL F class isolation
- VDE Glow-wire ignitability test 775 (IEC60335-1) approved



#### ■ ORDERING INFORMATION

[Example]      FTR-K1    A    L    005    W    LA    (– BG)  
                         (a)    (b)    (c)    (d)    (e)    (f)    (g)

|     |                            |                                                                                            |                             |                           |             |  |  |
|-----|----------------------------|--------------------------------------------------------------------------------------------|-----------------------------|---------------------------|-------------|--|--|
| (a) | Series Name                | FTR-K1 : FTR-K1 Series                                                                     |                             |                           |             |  |  |
| (b) | Contact Arrangement        | A : 1 form A (SPST-NO)                                                                     |                             |                           |             |  |  |
| (c) | Coil Type / Enclosure      | L : High sensitivity (200 mW) / flux free                                                  |                             |                           |             |  |  |
| (d) | Nominal Voltage            | 005 : 5 VDC,<br>018 : 18 VDC                                                               | 006 : 6VDC,<br>024 : 24VDC, | 009 : 9VDC<br>048 : 48VDC | 012 : 12VDC |  |  |
| (e) | Contact Material / TV type | W : AgSnO2                                                                                 |                             |                           |             |  |  |
| (f) | Terminal Pitch             | LA : 10A high sensitive (250mW) 3.5mm pitch<br>LB : 10A high sensitive (250mW) 5.0mm pitch |                             |                           |             |  |  |
| (f) | Special Designation        | BG : Gold plated ; 3μm                                                                     |                             |                           |             |  |  |

Actual marking does not carry the type name : "FTR"

E.g.: Ordering code: FTR-K1AL012WLA      Actual marking: K1AL012WLA

# FTR-K1 SERIES

## ■ PART NUMBERS

250mW type

| Ordering Part Number | Series | Contact     | Coil Power | Coil Voltage | Contact Material | Terminal Pitch         | Special         |
|----------------------|--------|-------------|------------|--------------|------------------|------------------------|-----------------|
| FTR-K1AL005W-LA-(BG) | FTR-K1 | A: 1 form A | L: 250 mW  | 5            | W: Ag-SnO2       | LA: 10A<br>3.5mm pitch | BG: Gold plated |
| FTR-K1AL006W-LA-(BG) |        |             |            | 6            |                  |                        |                 |
| FTR-K1AL009W-LA-(BG) |        |             |            | 9            |                  |                        |                 |
| FTR-K1AL012W-LA-(BG) |        |             |            | 12           |                  |                        |                 |
| FTR-K1AL018W-LA-(BG) |        |             |            | 18           |                  |                        |                 |
| FTR-K1AL024W-LA-(BG) |        |             |            | 24           |                  |                        |                 |
| FTR-K1AL048W-LA-(BG) |        |             |            | 48           |                  |                        |                 |
| FTR-K1AL005W-LB-(BG) |        |             |            | 5            |                  | LB: 10A<br>5.0mm pitch |                 |
| FTR-K1AL006W-LB-(BG) |        |             |            | 6            |                  |                        |                 |
| FTR-K1AL009W-LB-(BG) |        |             |            | 9            |                  |                        |                 |
| FTR-K1AL012W-LB-(BG) |        |             |            | 12           |                  |                        |                 |
| FTR-K1AL018W-LB-(BG) |        |             |            | 18           |                  |                        |                 |
| FTR-K1AL024W-LB-(BG) |        |             |            | 24           |                  |                        |                 |
| FTR-K1AL048W-LB-(BG) |        |             |            | 48           |                  |                        |                 |

## ■ COIL DATA CHART

| Coil Voltage | Nominal Voltage (VDC) | Max. Coil Voltage*1 | Coil Resistance (±10%) | Must Operate Voltage*2 | Must Release Voltage*2 | Nominal Power (mW) |
|--------------|-----------------------|---------------------|------------------------|------------------------|------------------------|--------------------|
| 005          | 5                     | 15.0 VDC            | 100 Ω                  | 3.75 VDC               | 0.5 VDC                | 250                |
| 006          | 6                     | 18.0 VDC            | 145 Ω                  | 4.5 VDC                | 0.6 VDC                |                    |
| 009          | 9                     | 27.0 VDC            | 325 Ω                  | 6.75 VDC               | 0.9 VDC                |                    |
| 012          | 12                    | 36.0 VDC            | 575 Ω                  | 9.0 VDC                | 1.2 VDC                |                    |
| 018          | 18                    | 54.0 VDC            | 1,300 Ω                | 13.5 VDC               | 1.8 VDC                |                    |
| 024          | 24                    | 72.0 VDC            | 2,310 Ω                | 18.0 VDC               | 2.4 VDC                |                    |
| 048          | 48                    | 144.0 VDC           | 9,216 Ω                | 36.0 VDC               | 4.8 VDC                |                    |

Note: All values in the table are measured at 20°C.

\*1: No contact current at 20°C

\*2: Specified values are subject to pulse wave voltage

## ■ SPECIFICATIONS

| Item       |                            |                   | FTR-K1 AL ( ) W- (LA, LB)                        |
|------------|----------------------------|-------------------|--------------------------------------------------|
| Contact    | Arrangement                |                   | 1 form A                                         |
|            | Material                   |                   | AgSnO <sub>2</sub>                               |
|            | Resistance (initial)       |                   | Maximum 100 mΩ at 1 A, 6 VDC                     |
|            | Rating                     |                   | 10 A, 250 VAC                                    |
|            | Maximum Carrying Current*1 |                   | 10 A                                             |
|            | Maximum Switching Rating   |                   | 2,500VA                                          |
|            | Maximum Switching Voltage  |                   | 440 VAC                                          |
|            | Minimum Switching Load*2   |                   | 10 mA 5 VDC                                      |
| Coil       | Nominal Power (at 20°C)    |                   | 250mW                                            |
|            | Operate Power (at 20°C)    |                   | 141 mW                                           |
|            | Operating Temperature      |                   | -40°C to +85°C (no frost), (LB: -40°C to +105°C) |
| Time Value | Operate (without diode)    |                   | Maximum 15ms (at nominal voltage, no bounce)     |
|            | Release (without diode)    |                   | Maximum 5ms (at nominal voltage, no bounce)      |
| Life       | Mechanical                 |                   | 20 x 10 <sup>6</sup> operations minimum          |
|            | Electrical                 | AC Contact rating | 100 x 10 <sup>3</sup> operations min.            |
|            |                            | DC contact rating | -                                                |
| Other      | Vibration Resistance       | Misoperation      | 10 to 55 Hz, at double amplitude of 0.7 mm       |
|            |                            | Endurance         | 10-55Hz, at double amplitude of 1.5 mm           |
|            | Shock Resistance           | Misoperation      | Min. 100m/s <sup>2</sup> (11±1ms)                |
|            |                            | Endurance         | Min. 1,000m/s <sup>2</sup> (6±1ms)               |
|            | Weight                     |                   | Approximately 13g                                |

\*1 Need to consider the heat from PCB when max. current is more than 10A.

\*2 Minimum switching loads mentioned above are reference values. Please perform the confirmation test with the actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

# FTR-K1 SERIES

## ■ INSULATION

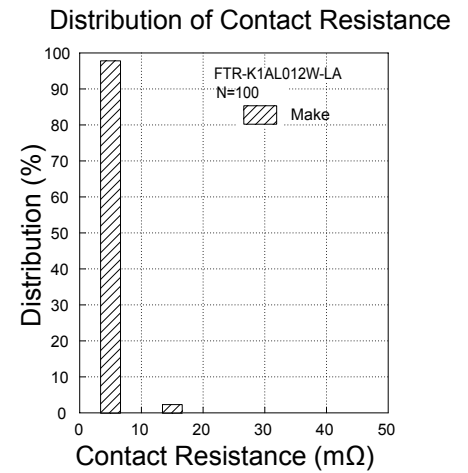
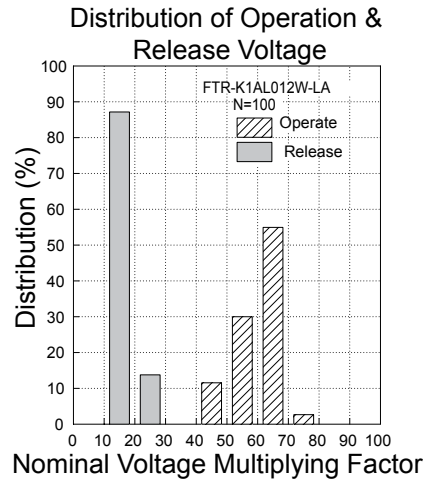
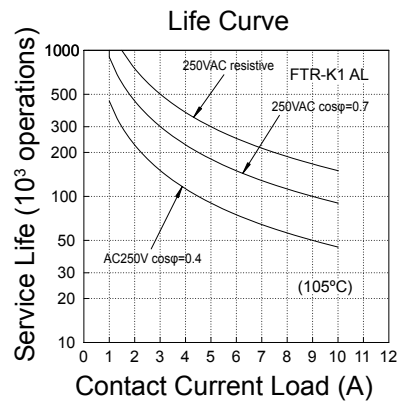
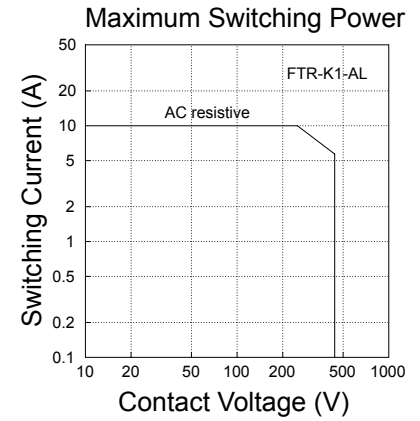
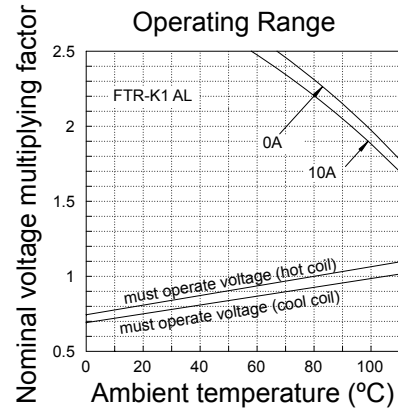
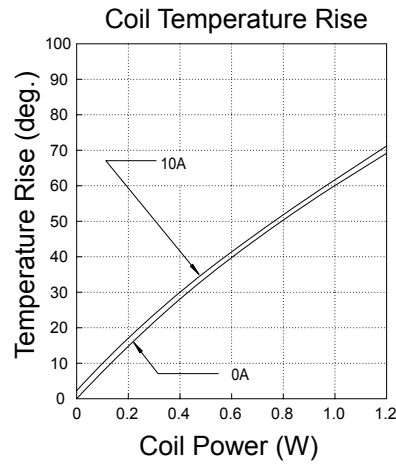
| Item                                              | FTR-K1                  | Note                        |
|---------------------------------------------------|-------------------------|-----------------------------|
| Resistance (initial)                              | Minimum 1,000 MΩ 1 min. | at 500 VDC                  |
| Dielectric Strength                               | open contacts           | 1,000 VAC (50/60 Hz) 1 min. |
|                                                   | coil and contacts       | 5,000 VAC (50/60 Hz) 1 min. |
| Surge Voltage (coil and contact)                  | 10,000 V                | 1.2 x 50μs standard wave    |
| Clearance/Creepage                                | 10 mm / 10 mm           |                             |
| Insulation (DIN EN61810-1 VDE0435)                |                         |                             |
| Voltage                                           | 250 V                   |                             |
| Pollution                                         | 3                       |                             |
| Isolation material group                          | IIIa                    |                             |
| Isolation category / Reference voltage (VDE0110b) | C / 250 V               |                             |

## ■ SAFETY STANDARDS

| Type  | Compliance               | Contact rating                                                                                                                                                                                   |
|-------|--------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UL    | UL 508                   | Flammability: UL 94-V0 (plastics)                                                                                                                                                                |
|       | E63614                   | FTR-K1AL ( )W-(LA, LB)<br>10A, 277 VAC (resistive)                                                                                                                                               |
| CSA   | C22.2 No. 14             | 1/3 HP, 125VAC                                                                                                                                                                                   |
|       | LR 40304                 | 1/2 HP, 277VAC<br>Pilot duty: B300<br>FTR-K1CL( )W-LA<br>10A, 277 VAC (resistive)                                                                                                                |
| VDE   | 0435, 0631, 0700, 0860   | FTR-K1AL ( )W-(LA, LB)<br>10A, 250 VAC, 150,000 cycles, LA: 85°C, LB:105°C<br>3A, 250 VAC (cosØ=0.4), 100,000 cycles, LA: 85°C, LB:105°C<br>FTR-K1CL( )W-LA<br>10A, 250VAC, 100,000 cycles, 85°C |
|       |                          |                                                                                                                                                                                                  |
| SEMKO | EN 61058-1:1992 and A1   | 250VAC, 10 (3)A 40T85 (-LA)                                                                                                                                                                      |
|       | EN 61095:1993 and A1+A11 | 250VAC, 10 (3)A 40T105(-LB)                                                                                                                                                                      |

Complies with NEMKO, DEMKO, FIMKO

## ■ CHARACTERISTIC DATA

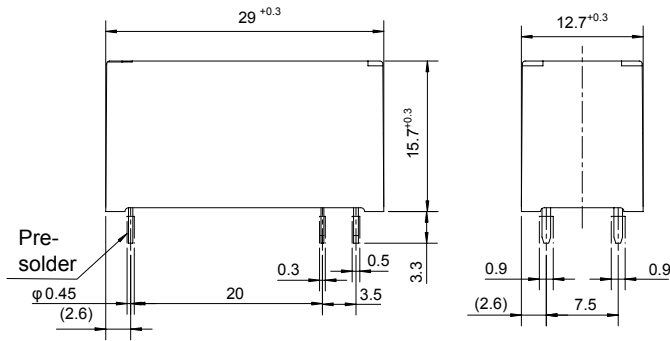


# FTR-K1 SERIES

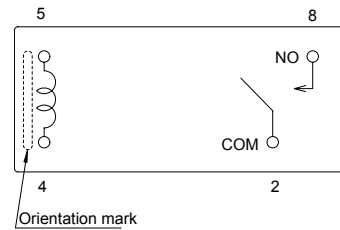
## ■ DIMENSIONS

- **Dimensions**

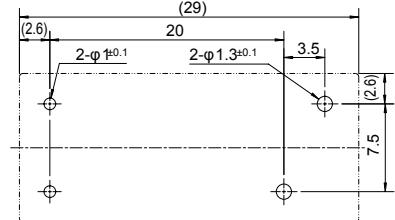
FTR-K1AL ( ) W-LA



- Schematics  
(BOTTOM VIEW)

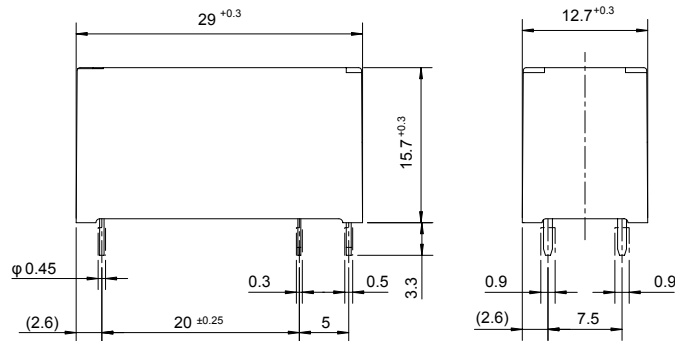


● **PC board mounting  
hole layout  
(BOTTOM VIEW)**

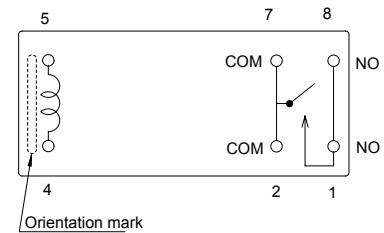


- **Dimensions**

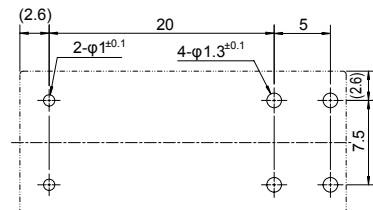
FTR-K1AL ( ) W-LB



- Schematics  
(BOTTOM VIEW)



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



Unit: mm

## 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. All 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 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, DecaBDE).
  - 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).
- 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.

#### 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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