

POWER RELAY

1 POLE - 12A

FTR-K1 Series

RoHS compliant

■ FEATURES

- 12A
- 3.5mm and 5.0mm terminal pitch
- Low profile (height: 15.7mm)
- HIGH ISOLATION
Insulation Distance (between coil and contacts): 10mm min.
Dielectric strength: 5KV
Surge strength: 10KV
- Low coil power (400mW)
- Cadmium free contacts
- SAFETY STANDARDS
UL, CSA, VDE, SEMKO approved
- RoHS Compliant
- UL F class isolation wire
- VDE Glow-wire ignitability test 775 (IEC60335-1) approved



■ ORDERING INFORMATION

[Example] FTR-K1 C K 005 W -MA -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 | : 1 form C (SPDT) | | |
| (c) | Coil Type / Enclosure | K | : Standard (400 mW) / flux free | | |
| (d) | Nominal Voltage | 005 | 006 | 009 | 012 |
| | | : 5 VDC, | : 6VDC, | : 9VDC | : 12VDC |
| | | 018 | 022 | 024 | 028 |
| | | : 18 VDC | : 22VDC | : 24VDC | : 28VDC |
| | | 048 | : 48VDC | | |
| (e) | Contact Material / TV type | W | : AgSnO2 | | |
| | | E | : AgNi | | |
| (f) | Terminal pitch | MA | : 3.5mm pitch | | |
| | | MB | : 5.0mm pitch | | |
| (g) | Special Designation | BG | : Gold plated ; 3µm | | |

Actual marking does not carry the type name : "FTR"
 E.g.: Ordering code: FTR-K1CK012W Actual marking: K1CK012W

FTR-K1 SERIES

■ PART NUMBERS

3.5mm pitch and silver tin oxide type

| Ordering Part Number | Series | Contact | Coil Power | Coil Voltage | Contact Material | Terminal Pitch | |
|----------------------|--------|-------------|------------|--------------|------------------------|----------------|-----------|
| FTR-K1AK005W-MA | FTR-K1 | A: 1 form A | K: 400 mW | 5 | W: Ag-SnO ₂ | MA: 3.5mm | |
| FTR-K1AK006W-MA | | | | 6 | | | |
| FTR-K1AK009W-MA | | | | 9 | | | |
| FTR-K1AK012W-MA | | | | 12 | | | |
| FTR-K1AK018W-MA | | | | 18 | | | |
| FTR-K1AK022W-MA | | | | 22 | | | |
| FTR-K1AK024W-MA | | | | 24 | | | |
| FTR-K1AK028W-MA | | | | 28 | | | |
| FTR-K1AK048W-MA | | | | K: 430 mW | | | 48 |
| FTR-K1CK005W-MA | | | | C: 1 form C | | | K: 400 mW |
| FTR-K1CK006W-MA | | 6 | | | | | |
| FTR-K1CK009W-MA | | 9 | | | | | |
| FTR-K1CK012W-MA | | 12 | | | | | |
| FTR-K1CK018W-MA | | 18 | | | | | |
| FTR-K1CK022W-MA | | 22 | | | | | |
| FTR-K1CK024W-MA | | 24 | | | | | |
| FTR-K1CK028W-MA | | 28 | | | | | |
| FTR-K1CK048W-MA | | K: 430 mW | 48 | | | | |

3.5mm pitch and silver nickel type

| Ordering Part Number | Series | Contact | Coil Power | Coil Voltage | Contact Material | Terminal Pitch | |
|----------------------|--------|-------------|------------|--------------|------------------|----------------|-----------|
| FTR-K1AK005E-MA | FTR-K1 | A: 1 form A | K: 400 mW | 5 | E: AgNi | MA: 3.5mm | |
| FTR-K1AK006E-MA | | | | 6 | | | |
| FTR-K1AK009E-MA | | | | 9 | | | |
| FTR-K1AK012E-MA | | | | 12 | | | |
| FTR-K1AK018E-MA | | | | 18 | | | |
| FTR-K1AK022E-MA | | | | 22 | | | |
| FTR-K1AK024E-MA | | | | 24 | | | |
| FTR-K1AK028E-MA | | | | 28 | | | |
| FTR-K1AK048E-MA | | | | K: 430 mW | | | 48 |
| FTR-K1CK005E-MA | | | | C: 1 form C | | | K: 400 mW |
| FTR-K1CK006E-MA | | 6 | | | | | |
| FTR-K1CK009E-MA | | 9 | | | | | |
| FTR-K1CK012E-MA | | 12 | | | | | |
| FTR-K1CK018E-MA | | 18 | | | | | |
| FTR-K1CK022E-MA | | 22 | | | | | |
| FTR-K1CK024E-MA | | 24 | | | | | |
| FTR-K1CK028E-MA | | 28 | | | | | |
| FTR-K1CK048E-MA | | K: 430 mW | 48 | | | | |

FTR-K1 SERIES

5.0mm pitch and silver tin oxide type

| Ordering Part Number | Series | Contact | Coil Power | Coil Voltage | Contact Material | Terminal Pitch | |
|----------------------|--------|-------------|------------|--------------|---------------------|----------------|-----------|
| FTR-K1AK005W-MB | FTR-K1 | A: 1 form A | K: 400 mW | 5 | W: Silver tin oxide | MB: 5.0mm | |
| FTR-K1AK006W-MB | | | | 6 | | | |
| FTR-K1AK009W-MB | | | | 9 | | | |
| FTR-K1AK012W-MB | | | | 12 | | | |
| FTR-K1AK018W-MB | | | | 18 | | | |
| FTR-K1AK022W-MB | | | | 22 | | | |
| FTR-K1AK024W-MB | | | | 24 | | | |
| FTR-K1AK028W-MB | | | | 28 | | | |
| FTR-K1AK048W-MB | | | | K: 430 mW | | | 48 |
| FTR-K1CK005W-MB | | | | C: 1 form C | | | K: 400 mW |
| FTR-K1CK006W-MB | | 6 | | | | | |
| FTR-K1CK009W-MB | | 9 | | | | | |
| FTR-K1CK012W-MB | | 12 | | | | | |
| FTR-K1CK018W-MB | | 18 | | | | | |
| FTR-K1CK022W-MB | | 22 | | | | | |
| FTR-K1CK024W-MB | | 24 | | | | | |
| FTR-K1CK028W-MB | | 28 | | | | | |
| FTR-K1CK048W-MB | | K: 430 mW | 48 | | | | |

5.0mm pitch and silver nickel type

| Ordering Part Number | Series | Contact | Coil Power | Coil Voltage | Contact Material | Terminal Pitch | |
|----------------------|--------|-------------|------------|--------------|------------------|----------------|-----------|
| FTR-K1AK005E-MB | FTR-K1 | A: 1 form A | K: 400 mW | 5 | E: Silver nickel | MB: 5.0mm | |
| FTR-K1AK006E-MB | | | | 6 | | | |
| FTR-K1AK009E-MB | | | | 9 | | | |
| FTR-K1AK012E-MB | | | | 12 | | | |
| FTR-K1AK018E-MB | | | | 18 | | | |
| FTR-K1AK022E-MB | | | | 22 | | | |
| FTR-K1AK024E-MB | | | | 24 | | | |
| FTR-K1AK028E-MB | | | | 28 | | | |
| FTR-K1AK048E-MB | | | | K: 430 mW | | | 48 |
| FTR-K1CK005E-MB | | | | C: 1 form C | | | K: 400 mW |
| FTR-K1CK006E-MB | | 6 | | | | | |
| FTR-K1CK009E-MB | | 9 | | | | | |
| FTR-K1CK012E-MB | | 12 | | | | | |
| FTR-K1CK018E-MB | | 18 | | | | | |
| FTR-K1CK022E-MB | | 22 | | | | | |
| FTR-K1CK024E-MB | | 24 | | | | | |
| FTR-K1CK028E-MB | | 28 | | | | | |
| FTR-K1CK048E-MB | | K: 430 mW | 48 | | | | |

FTR-K1 SERIES

■ 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 | 12.2 VDC | 62 Ω | 3.5 VDC | 0.5 VDC | 400 |
| 006 | 6 | 14.7 VDC | 90 Ω | 4.2 VDC | 0.6 VDC | |
| 009 | 9 | 22.0 VDC | 202 Ω | 6.3 VDC | 0.9 VDC | |
| 012 | 12 | 29.4 VDC | 360 Ω | 8.4 VDC | 1.2 VDC | |
| 018 | 18 | 44.1 VDC | 810 Ω | 12.6 VDC | 1.8 VDC | |
| 022 | 22 | 53.9 VDC | 1,210 Ω | 15.4 VDC | 2.2 VDC | |
| 024 | 24 | 58.8 VDC | 1,440 Ω | 16.8 VDC | 2.4 VDC | |
| 028 | 28 | 68.6 VDC | 1,960 Ω | 19.6 VDC | 2.8 VDC | 430 |
| 048 | 48 | 117.6 VDC | 5,360 Ω | 33.6 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 (A, C)K () (W, E)-MA | FTR-K1 (A, C)K () (W, E)-MB |
|------------|--|--|--|
| Contact | Arrangement | 1 form A, 1 form C | |
| | Material | W: AgSnO ₂ , E: AgNi | |
| | Resistance (initial) | Maximum 100 mΩ at 1 A, 6 VDC | |
| | Rating | 12 A, 250 VAC / 24 VDC | |
| | Maximum Carrying Current* ¹ | 14 A | |
| | Maximum Switching Rating | 3,000 VA / 288W | |
| | Maximum Switching Voltage | 440 VAC / 300VDC | |
| | Minimum Switching Load* ² | 10 mA 5 VDC | |
| Coil | Nominal Power (at 20°C) | 400mW (at 430mW 48V coil) | |
| | Operate Power (at 20°C) | 200 mW (210mW at 48V coil) | |
| | Operating Temperature | -40°C to +85°C (no frost) | |
| Time Value | Operate | Maximum 15ms (at nominal voltage, no bounce) | |
| | Release (without diode) | Maximum 5ms (at nominal voltage, no bounce) | |
| Life | Mechanical | 20 x 10 ⁶ operations minimum | |
| | Electrical | AC Contact rating | 100 x 10 ³ operations min. |
| | | DC contact rating | 100 x 10 ³ operations min. |
| 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 ² (11±1ms) |
| | | Endurance | Min. 1,000m/s ² (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

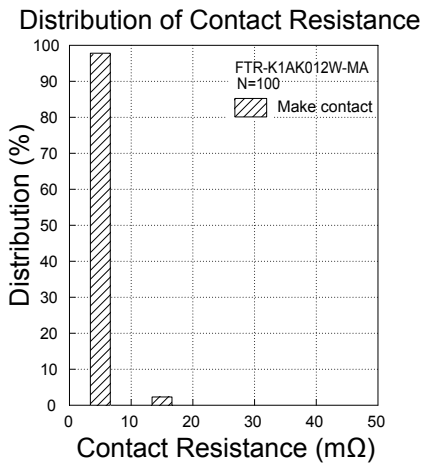
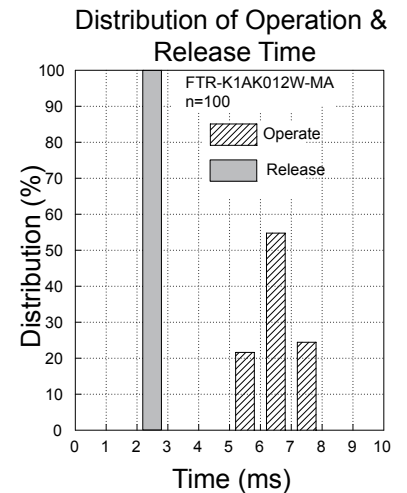
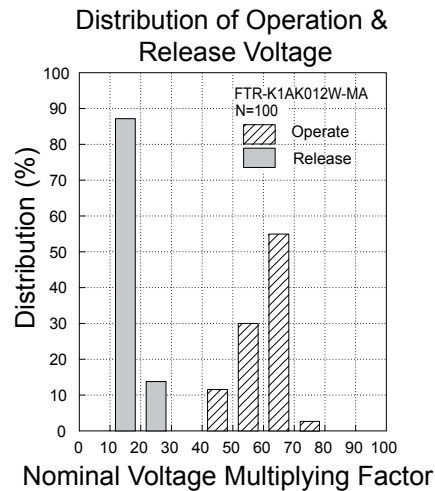
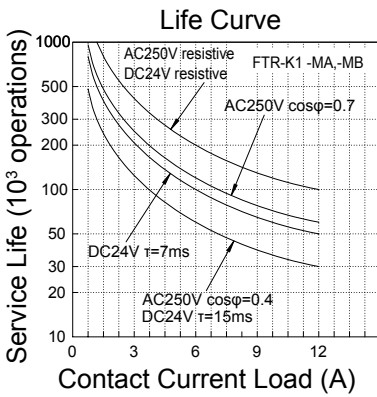
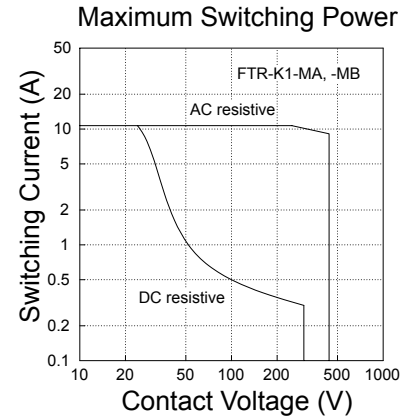
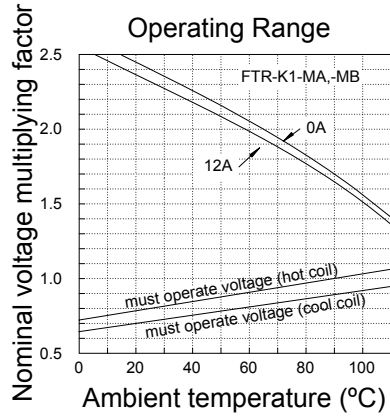
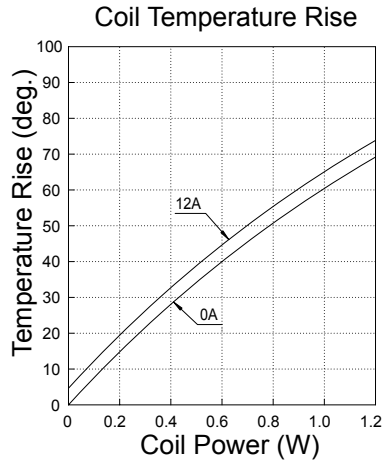
| Item | FTR-K1 | Note |
|---|-------------------------|-----------------------------|
| Resistance (initial) | Minimum 1,000 MΩ 1 min. | at 500 VDC |
| Dielectric Strength | open contacts | 1,000 VAC (50/60 Hz) 1 min. |
| | coil and contacts | 5,000 VAC (50/60 Hz) 1 min. |
| Surge Voltage (coil and 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 | <table border="1"> <tr> <td>FTR-K1CK()W-(MA, MB) 12A, 24 VAC (resistive) 16A, 277 VAC (resistive) 1/2 HP, 277VAC 1/3HP, 3 HP, 125VAC 1/8HP, 125VAC Pilot duty: B300</td> <td>FTR-K1AK()W-(MA, MB) 16A, 24 VAC (resistive) 16A, 277 VAC (resistive) 1/2 HP, 277VAC 1/3HP, 3 HP, 125VAC Pilot duty: B300</td> </tr> </table> | FTR-K1CK()W-(MA, MB) 12A, 24 VAC (resistive) 16A, 277 VAC (resistive) 1/2 HP, 277VAC 1/3HP, 3 HP, 125VAC 1/8HP, 125VAC Pilot duty: B300 |
| FTR-K1CK()W-(MA, MB) 12A, 24 VAC (resistive) 16A, 277 VAC (resistive) 1/2 HP, 277VAC 1/3HP, 3 HP, 125VAC 1/8HP, 125VAC Pilot duty: B300 | FTR-K1AK()W-(MA, MB) 16A, 24 VAC (resistive) 16A, 277 VAC (resistive) 1/2 HP, 277VAC 1/3HP, 3 HP, 125VAC Pilot duty: B300 | | |
| CSA | C22.2 No. 14 LR 40304 | FTR-K1(A,C)K()W-(MA, MB) 12A, 277VAC/24 VAC (resistive) 16A, 277 VAC/24VAC (resistive) 1/2 HP, 277VAC 1/3HP, 3 HP, 125VAC Pilot duty: B300 | |
| VDE | 0435, 0631, 0700, 0860, 40013848 | FTR-K1(A, C) K ()W-(MA, MB) 12A, 250 VAC (cosØ=1), 85°C 16A, 250 VAC (cosØ=1), 85°C 12A, 24VDC (0ms), 85°C 16A, 24VDC (0ms), 85°C 3.5A, 250 VAC (cosØ=0.4), 85°C | |
| SEMKO | EN 61058-1:1992 and A1 EN 61095:1993 and A1+A11 | 250VAC, 12 (3)A 40T85 | |

Complies with NEMKO, DEMKO, FIMKO

CHARACTERISTIC DATA

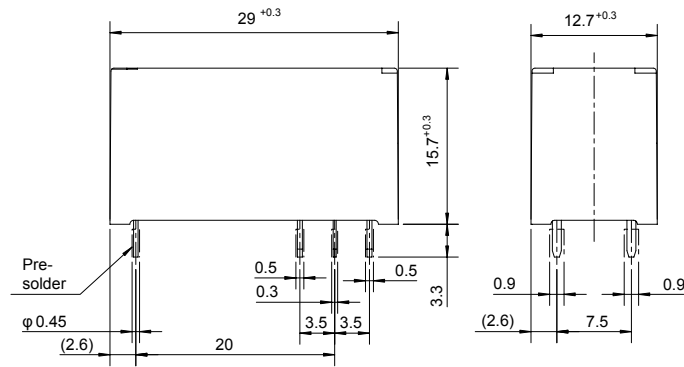


FTR-K1 SERIES

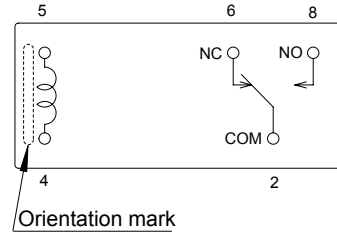
■ DIMENSIONS

● Dimensions

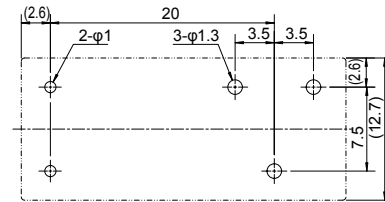
FTR-K1MA



● Schematics (BOTTOM VIEW)

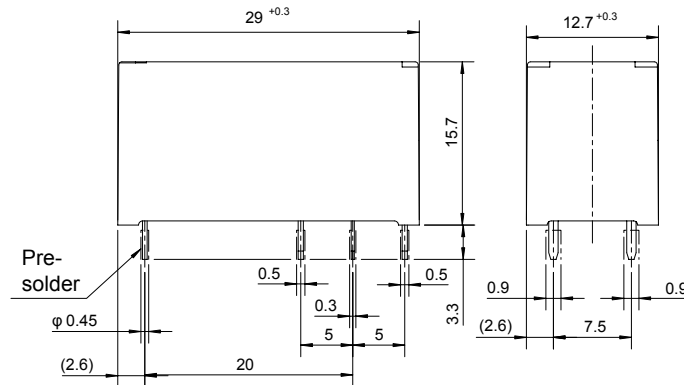


● PC board mounting hole layout (BOTTOM VIEW)

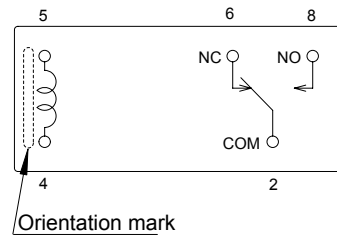


● Dimensions

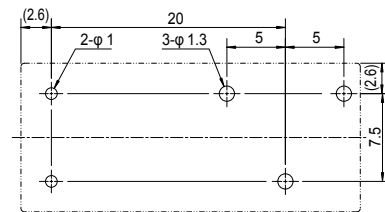
FTR-K1MB



● 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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