# POWER RELAY

## 2 POLES - 5A Low Profile Type

# FTR-F1 Series

### FEATURES

- Low profile (height: 16.5mm)
- DPST/DPDT 5A
- High insulation
  (due to its reinforced insulation construction)
  Insulation Distance (between coil and contacts): 8mm min.
  Dielectric strength : 5,000 VAC
  Surge strength : 10,000 V
- Pin configuration compatible to VB
- UL, CSA, VDE, CQC recognized
- RoHS compliant (Please see page 6 for more information)


### Part Numbers

[Example] FTR-F1 A A 005 V - RG

\- (a) (b) (c) (d) (e) (f)

| | | |
|---|---|---|
| (a) | Relay type | FTR-F1 : FTR-F1 series |
| (b) | Contact configuration | A : 2 form A (DPST-NO)<br>C : 2 form C |
| (c) | Coil type / enclosure | A : Standard type (530mW)<br>D : High sensitivity type (400mW contact material V type only) |
| (d) | Coil rated voltage | 005 : 1.5....110VDC<br>Coil rating table at page 3 |
| (e) | Contact material / TV type | V : Gold plated silver alloy(standard type)<br>T : Gold plated silver alloy<br>(TV-3 rating type, only for 2 form A standard coil type) |
| (f) | Special type | Nil : Standard type<br>RG : Transparent cover type |

Actual marking does not carry the type name "FTR"
E.g.: Ordering code: "FTR-F1AA005V", actual marking: "F1AA005V"

■ **Specifications**

| Item | | | Standard type F1 (A, C) A ( ) V | TV-3 rating F1 AA ( ) T | Sensitive type F1 (A, C) D ( ) V | Remarks / conditions |
|---|---|---|---|---|---|---|
| Contact data | Configuration | | 2 form A (DPST-NO) 2 form C | 2 form A (DSDT-NO) | 2 form A (DPST-NO) 2 form C (DPDT) | |
| | Construction | | Single | | | |
| | Material | | Movable: Gold plate silver tin oxide (AgSnO2) Stationary: Silver tin oxide | | | |
| | Resistance | | Max.100mΩ at 6VDC, 1A | | | Initial |
| | Contact rating | | 5A, 250VAC / 24VDC | | | Resistive |
| | Max. carrying current | | 7A | | | |
| | Max. switching voltage | | 400VAC, 300VDC | | | |
| | Max. switching power | | 1250VA / 120W | | | |
| | Min. switching load *1 | | 10 mA, 5VDC | | | |
| Coil | Rated power (20°C) | | 530mW, 110V type: 550mW | | 400mW | |
| | Operate power (20°C) | | 260mW, 110V type: 270mW | | 225mW | |
| | Operating temperature range | | -40ºC ~ +75ºC (at rated voltage) -40ºC ~ +70ºC (Transparent cover type, -RG) | | | No frost |
| Timing data | Operate | | Max. 15ms | | | without bounce, no diode |
| | Release | | Max. 5ms | | | without bounce, no diode |
| Life | Mechanical | | Min. 20 x $10^6$ operations | | | |
| | Electrical (resistive) | AC contact rating | Min. 100 x $10^3$ operations | | | At rated load |
| | | DC contact rating | Min. 100 x $10^3$ operations | | | At rated load |
| | | Lamp load (TV-3) | - | 25 x $10^3$ operations min. | - | |
| Insulation | Insulation resistance | | Min. 1000MΩ at 500VDC | | | |
| | Dielectric strength | Open contacts | 1000VAC (50/60Hz), 1 minute | | | |
| | | Coil contact | 5000VAC (50/60Hz), 1 minute | | | |
| | | Adjecent contacts | 3000VAC (50/60Hz), 1 minute | | | |
| | Surge strength | Coil to contacts | 10000V / 1.2 x 50μs standard wave | | | |
| | Clearance | | 8mm | | | |
| | Creepage | | 8mm | | | |
| | EN61810-1, VDE0435 | Voltage | 250V | | | |
| | | Pollution | 3 | | | |
| | | Material group | III a | | | |
| | | Category | C / 250V (reference voltage) (VDE 0110b) | | | |
| Other | Vibration resistance | Misoperation | 10Hz ~ 55Hz ~ 10Hz single amplitude 0.825mm | | | |
| | | Endurance | 10Hz ~ 55Hz ~ 10Hz single amplitude 1.65mm | | | |
| | Shock resistance | Misoperation | Min. 100m/s² (11 ± 1ms) | | | |
| | | Endurance | Min. 1,000m/s² (6 ± 1ms) | | | |
| | Dimensions / weight | | 12.8 x 29.0 x 16.5 mm / approx. 12.0g | | | |
| | Sealing | | Plastic sealed RTIII | | | |

*1: 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 contions and expected reliability levels.

## ■ Coil Data

530mW standard type

| Coil code | Rated Coil Voltage (VDC) | Coil Resistance +/-10%(Ω) | Must Operate Voltage* (VDC) | Must Release Voltage* (VDC) | Rated Power (mW) |
|---|---|---|---|---|---|
| 1.5 | 1.5 | 4.2 | 1.05 | 0.15 | 530 |
| 005 | 5 | 47 | 3.5 | 0.5 | |
| 006 | 6 | 68 | 4.2 | 0.6 | |
| 009 | 9 | 155 | 6.3 | 0.9 | |
| 012 | 12 | 270 | 8.4 | 1.2 | |
| 018 | 18 | 610 | 12.6 | 1.8 | |
| 024 | 24 | 1,100 | 16.8 | 2.4 | |
| 048 | 48 | 4,400 | 33.6 | 4.8 | |
| 060 | 60 | 6,800 | 42.0 | 6.0 | |
| 110 | 110 | 22,000 | 77.0 | 11.0 | 550 |

400mW high sensitive type

| Coil code | Rated Coil Voltage (VDC) | Coil Resistance +/-10%(Ω) | Must Operate Voltage* (VDC) | Must Release Voltage* (VDC) | Rated Power (mW) |
|---|---|---|---|---|---|
| 1.5 | 1.5 | 5.6 | 1.125 | 0.15 | 400 |
| 003 | 3 | 22.5 | 2.25 | 0.3 | |
| 005 | 5 | 62 | 3.75 | 0.5 | |
| 006 | 6 | 90 | 4.5 | 0.6 | |
| 009 | 9 | 202 | 6.75 | 0.9 | |
| 012 | 12 | 360 | 9 | 1.2 | |
| 024 | 24 | 1,440 | 18 | 2.4 | |
| 048 | 48 | 5,760 | 36 | 4.8 | |

Note: All values in the table are valid at 20°C and zero contact current, unless otherwise specified.

*: Specified operated values are valid for pulse wave voltage.

Note: Please use at rated coil voltage. Please refer to characteristic data and set up adequate voltage in case of use at over voltage.

Care shall be taken on the heat generated on PC board when maximum carrying current exceeds 10A. Please perform the confirmation test with actual conditions.

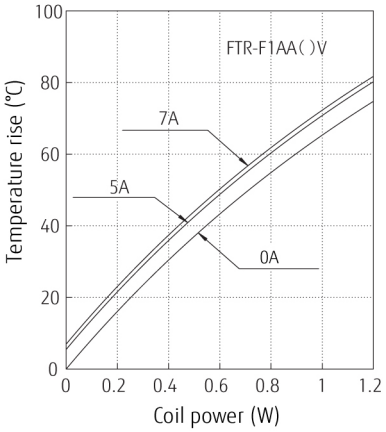
## ■ Safety Standards

| Type | Compliance | Contact rating |
|---|---|---|
| UL | UL 508 | Flammability: UL 94-V-0 (plastics) |
| CSA | C22.2 No. 14 File<br>No. LR 40304 | 5A, 24VDC (resistive)<br>5A, 250VAC (resistive)<br>1/6 hp, 125VAC<br>1/4 hp, 250VAC<br>Pilot duty: C300<br>Pilot duty: R300 (FTR-F1CA( )V)<br>TV-3 (FTR-F1AA( )T)<br>(except for -RG type) |
| VDE | IEC/EN61810-1<br>EN60065 clause 14.6.1 (FTR-F1AA ( )T)<br>EN60335-1 clause 15.3; 16.3; 29.1; 29.2; 29.3<br>EN60730-1 clause 12.2; 13.2; 20.1; 20.2; 20.3 | 5A, 250 VAC (cosφ=1)<br>2A, 250 VAC (cosφ=0.4)<br>5A, 24VDC (0ms)<br>2A/32A, 250VAC (FTR-F1AA( )T) |
| CQC | GB/T21711.1, GB15092.1<br>(No.17002164350) | 5A, 250VAC (FTR-F1CA( )V) |

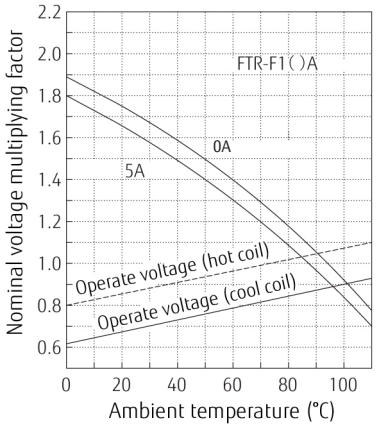
## ■ Characteristic Data (Reference)

* Characteristic data is not a guaranteed value, but measured values of samples from production line.

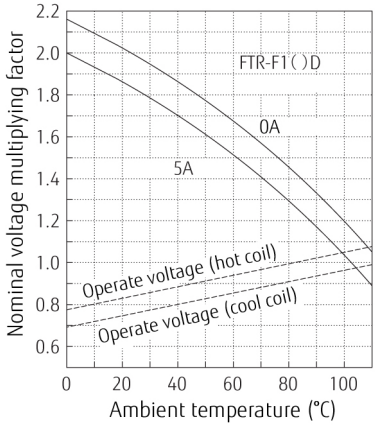
Coil temperature rise



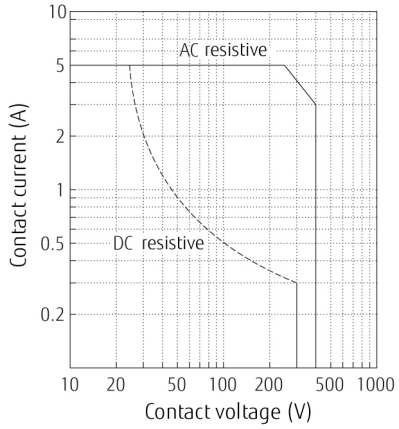

Operating range



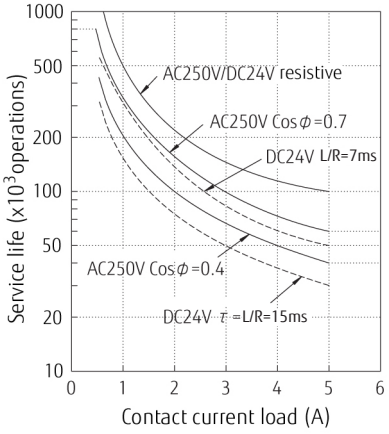

Operating range



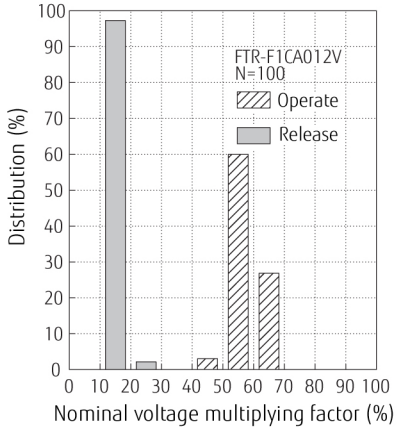

Maximum switching power



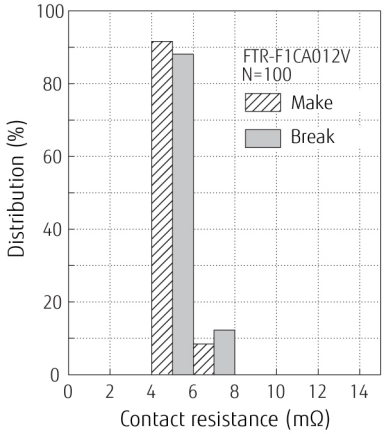

Life curve




Distribution of operate/release voltage



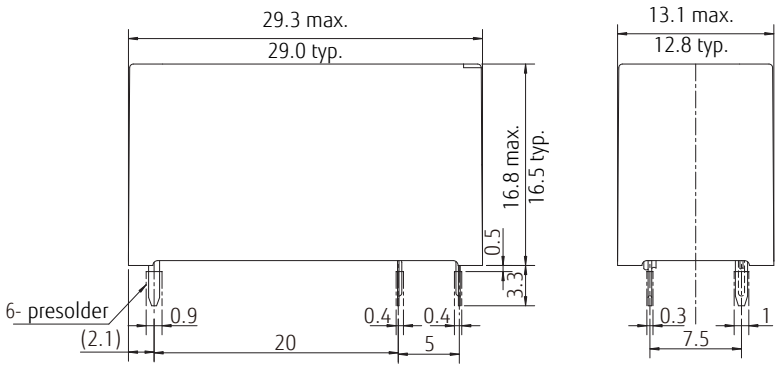

Distribution of contact resistance



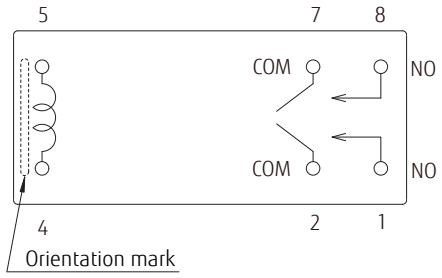
## ■ Dimensions

FTR-F1A Type

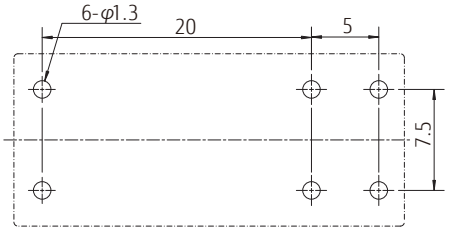
Dimensions




Schematics
(BOTTOM VIEW)

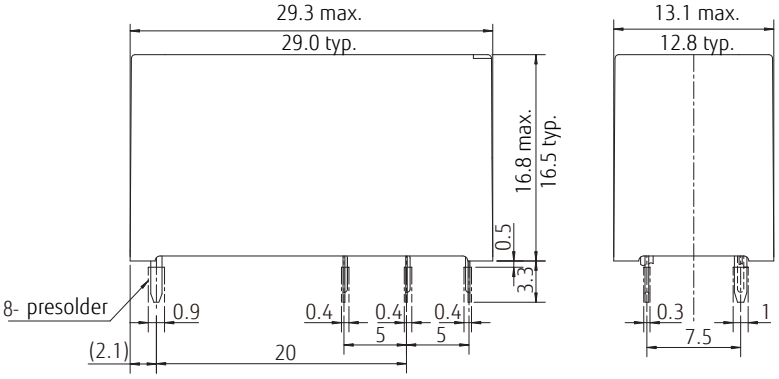



PC board mounting hole layout
(BOTTOM VIEW)

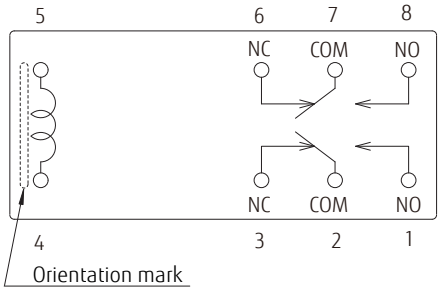



FTR-F1C Type

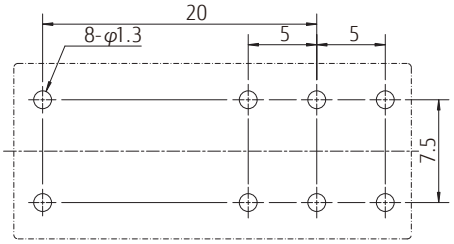
Dimensions




Schematics
(BOTTOM VIEW)




PC board mounting hole
layout (BOTTOM VIEW)




* Dimensions do not include tolerances.
* Dimensions of the terminals do not include thickness of pre-solder.
* Tolerance of PC board mounting hole layout : ±0.1 unless otherwise specified.

Unit: mm
( ): Reference

# CAUTIONS

- All values mentioned in this datasheet are provided under ideal conditions. Please perform the confirmation test before actual use.
- Reflow soldering is prohibited.
- Do not use relays in the atmosphere with sulfide gas, chloride gas or nitric oxide. Contact resistance may increase.
- Do not use silicon or silicon-containing product or materials near relays. It may cause contact failure.

# GENERAL INFORMATION

## 1. ROHS Compliance

- All relays produced by FCL Components are compliant with RoHS directive 2011/65/EU, including commission delegated directive 2015/863.

## 2. Recommended lead free solder condition

- 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.
- Recommended solder for assembly: Sn-3.0Ag-0.5Cu.

**Flow Solder Condition:**

| | |
|---|---|
| Pre-Heating: | Maximum 120˚C within 90 sec. |
| Soldering: | Eip within 5 sec. at 255°C±5°C solder bath |

Relay must be cooled by air immediately after soldering

**Solder by Soldering Iron:**

| | |
|---|---|
| Soldering Iron: | 30-60W |
| Temperature: | Maximum 340-360˚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.

# Contact

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