110V coil: Not for new design

POWER RELAY
1 POLE - 12A

FTR-K1 Series

RoHS Compliant

■ FEATURES

- 3.5mm and 5.0mm terminal pitch
- Low profile (height: 15.7mm)
- High insulation
  Insulation distance (between coil and contacts): 10mm min.
  Dielectric strength: 5,000V
  Surge strength: 10,000V
- Low coil power (400mW)
- Cadmium free contacts
- Safety standards: UL, CSA, VDE approved
- UL F class wire insulation
- Flux proof, RT II
- RoHS compliant

■ APPLICATIONS

Home appliances, heater control, FA equipment, I/O modules etc.

■ PART NUMBERS

[Example] FTR-K1 A K 012 W - MA - BG
(a) (b) (c) (d) (e) (f) (g)

(a)	Relay type	FTR-K1 series
(b)	Contact configuration	A : 1a (1 Form A) C : 1c (1 Form C)
(c)	Coil type / enclosure	K : Standard (400mW) / flux proof
(d)	Coil rated voltage	12 : 5....110VDC*1 Please refer to coil rating table
(e)	Contact material	W : $AgSnO_2$
(f)	Terminal pitch	MA : 3.5mm pitch MB : 5.0mm pitch
(g)	Special type	Nil : Standard type (without gold plate) BG : Gold plate 3μm

Actual marking does not carry the type name : "FTR" E.g.: Ordering code: FTR-K1AK012W-MA Actual marking: K1AK012W-MA

*1: 110V coil is not for new design.

■ SPECIFICATIONS

Item			Specifications	Remarks/Conditions
Contact Data	Configuration		1a (1 Form A) / 1c (1 Form C)	
	Construction		Single	
	Material		$AgSnO_2$	
	Resistance		Max. 100mΩ	Initial, at 1A, 6VDC
	Contact rating		12A, 250VAC/24VDC	Resistive
	Max. carrying current *1		14A	
	Max. switching voltage		440VAC/300VDC	
	Max. switching power		3,000VA/288W	
	Min. switching load *2		100mA, 5VDC	
Coil	Rated power (20°C)		400mW to 430mW	
	Operate power (20°C)		196mW to 211mW	
	Operating temperature range		-40 °C to +85 °C	No frost
Time	Operate (at nominal voltage)		Max. 15ms	Without bounce
	Release (at nominal voltage)		Max. 5ms	Without bounce, no diode
Life	Mechanical		Min. 20 x 10^6 operations	
Insulation	Electrical	AC contact rating	Min. 100 x 10^3 operations	
		DC contact rating	Min. 100 x 10^3 operations	
Insulation	Insulation resistance (initial)		Min. 1,000MΩ	At 500VDC
	Dielectric strength	Open contacs	1,000VAC (50/60Hz) 1 minute	
		Coil to contacts	5,000VAC (50/60Hz) 1 minute	
	Surge strength	Coil to contacts	10,000V / 1.2 x 50μs standard wave	
	Clearance		10mm	
	Creepage		10mm	
	EN61810-1, VDE0435	Voltage	250V	
		Pollution degree	3	
		Material group	IIIa	
		Category	C / 250V (Reference voltage) (VDE0110b)	
Others	Vibration resistance	Misoperation≥1μs	10 to 55 to 10Hz single amplitude 0.35mm	Coil ON/OFF, 3 axis, total 6 cycles
		Endurance	10 to 55 to 10Hz single amplitude 0.75mm	Coil OFF, 3 axis, total 6 hours
	Shock resistance	Misoperation≥1μs	100m/s² (11±1ms)	Coil ON/OFF, 3 axis, total 36 operations
		Endurance	1,000m/s² (6±1ms)	Coil OFF, 3 axis, total 18 operations
	Dimensions / Weight		12.7 x 29.0 x 15.7mm / Approximately 13g	
	Sealing		Flux proof, RTII	

* 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 actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

■ COIL DATA

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance ±10% (Ω)	Must Operate Voltage*1 (VDC)	Must Release Voltage*1 (VDC)	Rated Power (mW)
005	5	62	3.5	0.5	400
006	6	90	4.2	0.6	
009	9	202	6.3	0.9	
012	12	360	8.4	1.2	
018	18	810	12.6	1.8	
022	22	1,210	15.4	2.2	
024	24	1,440	16.8	2.4	
028	28	1,960	19.6	2.8	
048	48	5,360	33.6	4.8	430
060	60	8,570	42.0	6.0	420
110*2	110*2	28,800	77.0	11.0	

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.

*2: 110V coil is not for new design.

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

■ SAFETY STANDARDS

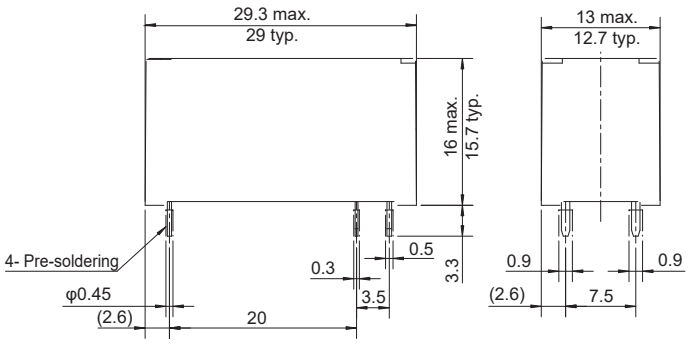
Type	Compliance	Contact Rating	
		1a (1 Form A)	1c (1 Form C)
UL	Flammability: UL 94-V-0 (plastics)		
	UL508 File No. E63614	**[FTR-K1AK( )W-(MA, MB)]** 12A/16A, 24 VDC (resistive), 85˚C 12/16A, 277 VAC (resistive), 85˚C 1/2hp, 277VAC, 85˚C 1/3hp, 125VAC, 85˚C Pilot duty: B300, 85˚C	**[FTR-K1CK( )W-(MA, MB)]** 12A/16A, 24 VDC (resistive), 85˚C 12A/16A, 277 VAC (resistive), 85˚C 1/2hp, 277VAC, 85˚C 1/3hp, 125VAC, 85˚C 1/8hp, 125VAC, 85˚C Pilot duty: B300, 85˚C
CSA	C22.2 No. 14 File No. LR40304	**[FTR-K1(A,C)K( )W-(MA, MB)]** 12A, 277VAC/24VDC (resistive) 16A, 277 VAC/24VDC (resistive) 1/2 hp, 277VAC 1/3 hp, 125VAC Pilot duty: B300	
VDE	IEC/EN61810-1 EN60335-1 clause 15.3; 16.3; 29.1; 29.2; 29.3 EN60730 clause 12.2; 13.2; 20.1; 20.2; 20.3	**[FTR-K1(A, C) K ( )W-(MA, MB)]** 12A, 250 VAC (cosφ=1), 85˚C 16A, 250 VAC (cosφ=1), 85˚C 12A, 24VDC (0ms), 85˚C 16A, 24VDC (0ms), 85˚C 3.5A, 250 VAC (cosφ=0.4), 85˚C	

The part numbers on the safety standards' certifications and the ordering part numbers may differe. Coil code is in ( ).

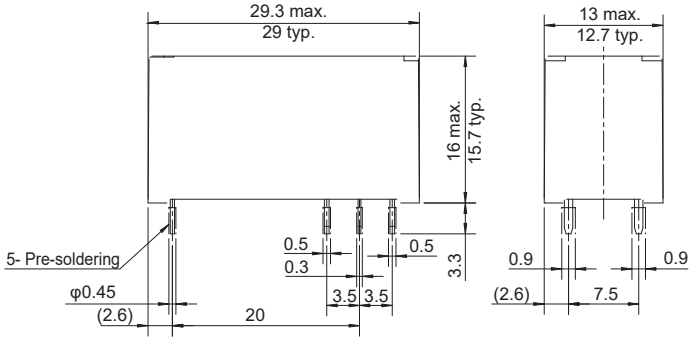
■ DIMENSIONS

3.5mm pitch

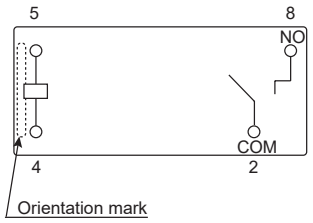
Dimensions (FTR-K1AK( )W-MA)



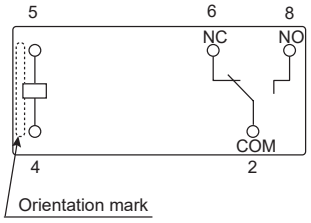
Dimensions (FTR-K1CK( )W-MA)



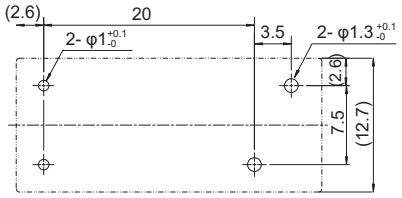
Schematics (FTR-K1AK( )W-MA)
(BOTTOM VIEW)



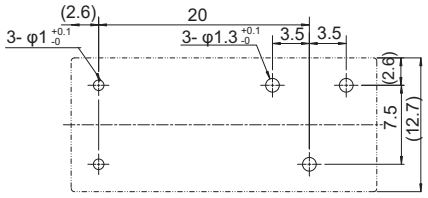
Schematics (FTR-K1CK( )W-MA)
(BOTTOM VIEW)



PC board mounting hole layout (FTR-K1AK ( )W-MA)
(BOTTOM VIEW)



PC board mounting hole layout (FTR-K1CK( )W-MA)
(BOTTOM VIEW)



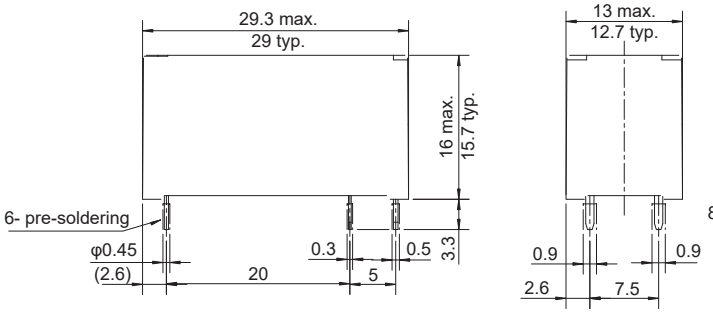
* Dimensions of the terminals do not include thickness of pre-soldering.
* Tolerance of PC board mounting hole layout : ±0.1 unless otherwise specified.
* Dimensions do not include tolerances. Please ask specification in case you need tolerances.

(Unit: mm)

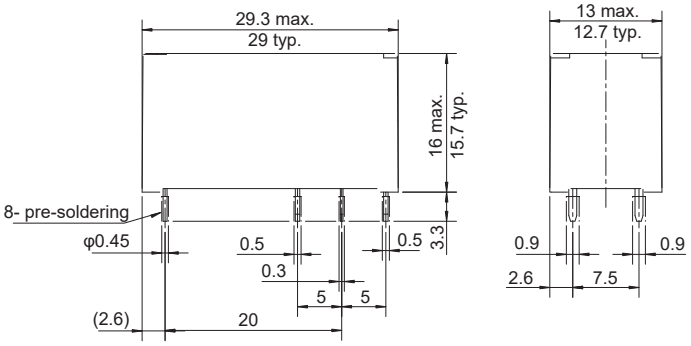
■ DIMENSIONS

5.0mm pitch

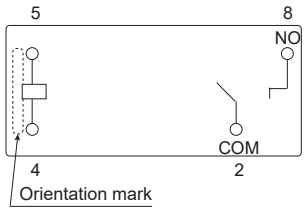
Dimensions (FTR-K1AK( )W-MB)



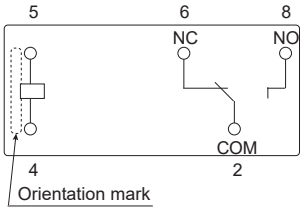
Dimensions (FTR-K1CK( )W-MB)



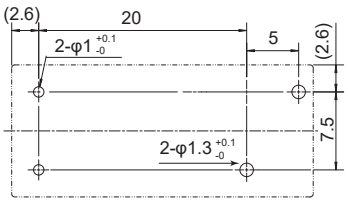
Schematics (FTR-K1AK( )W-MB)
(BOTTOM VIEW)



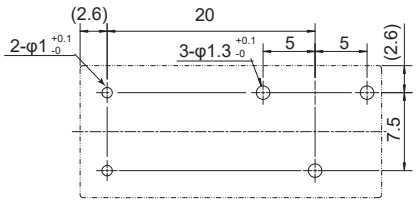
Schematics (FTR-K1CK( )W-MB)
(BOTTOM VIEW)



PC board mounting hole layout (FTR-K1AK( )W-MB)
(BOTTOM VIEW)



PC board mounting hole layout (FTR-K1CK( )W-MB)
(BOTTOM VIEW)



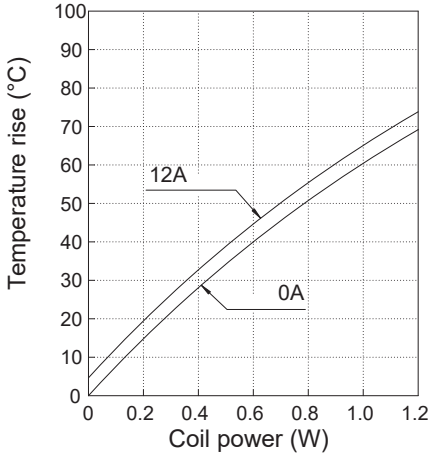
* Dimensions of the terminals do not include thickness of pre-soldering.
* Tolerance of PC board mounting hole layout : ±0.1 unless otherwise specified.
* Dimensions do not include tolerances. Please ask specification in case you need tolerances.

(Unit: mm)

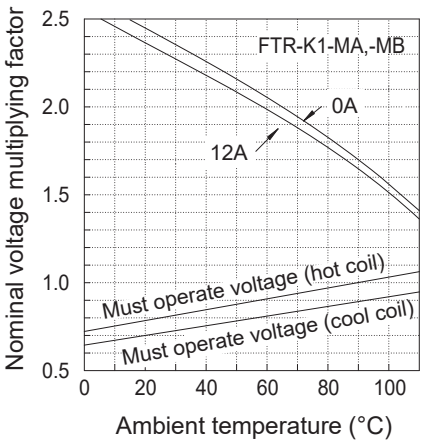
■ CHARACTERISTIC DATA

(Characteristic data is not guaranteed value but measured values of samples from production line.)

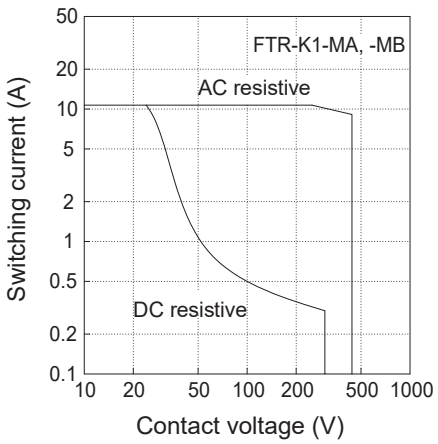
Coil temperature rise



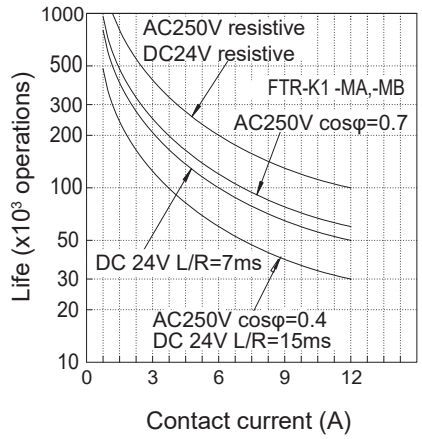
Operating range



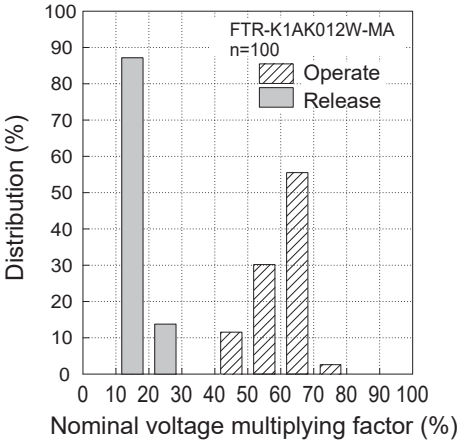
Maximum switching power



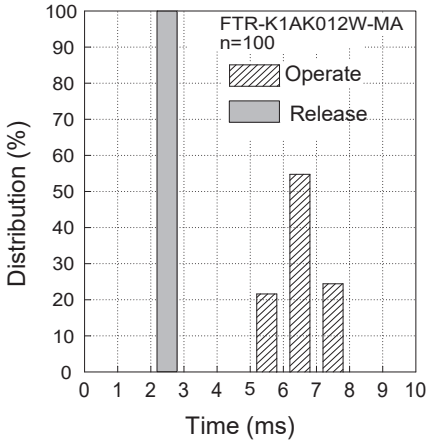
Life curve



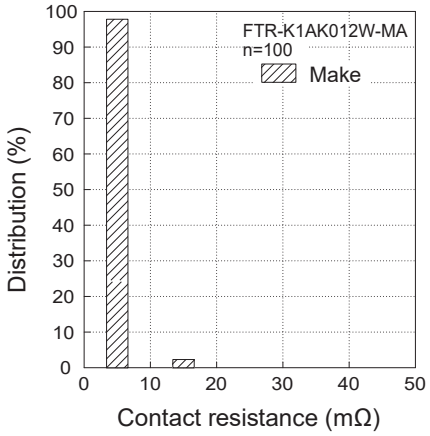
Distribution of operate, release voltage



Distribution of operate, release time



Distribution of contact resistance



■ PART NUMBER LIST

Part Number	Contact Configuration	Nominal Power	Contact Material	Terminal pitch
FTR-K1AK( )W-MA	1a (1 Form A)	Standard (400 to 430mW)	$AgSnO_2$	3.5mm
FTR-K1AK( )W-MA-BG			Gold plated $AgSnO_2$	
FTR-K1AK( )W-MB			$AgSnO_2$	5.0mm
FTR-K1AK( )W-MB-BG			Gold plated $AgSnO_2$	
FTR-K1CK( )W-MA	1c (1 Form C)	Standard (400 to 430mW)	$AgSnO_2$	3.5mm
FTR-K1CK( )W-MA-BG			Gold plated $AgSnO_2$	
FTR-K1CK( )W-MB			$AgSnO_2$	5.0mm
FTR-K1CK( )W-MB-BG			Gold plated $AgSnO_2$	

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:	Dip 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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