110V coil: Not for new design

POWER RELAY
1 POLE - 16A SILVER NICKEL CONTACT

FTR-K1 Series

RoHS Compliant

■ FEATURES

- Suitable for low current load (silver nickel)
- 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)
- Safety standards: UL, CSA, VDE approved
- UL F class insulation wire
- Flux proof RTII
- RoHS compliant

■ APPLICATIONS

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

■ PART NUMBERS

[Example] FTR-K1 A K 012 E
(a) (b) (c) (d) (e)

(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	E : AgNi

Actual marking does not carry the type name : "FTR" E.g.: Ordering code: FTR-K1AK012E Actual marking: K1AK012E

*1: 110V coil is not for new design

■ SPECIFICATIONS

Item			Specifications		Remarks/Conditions
			FTR-K1AK( )E	FTR-K1CK( )E	
Contact Data	Configuration		1a (1 Form A)	1c (1 Form C)	
	Construction		Single		
	Material		AgNi		
	Resistance		Max. 100mΩ		Initial, at 1A, 6VDC
	Contact rating		16A, 250VAC/24VDC		Resistive
	Max. carrying current		20A		
	Max. switching voltage		440VAC/300VDC		
	Max. switching power		4,000VA/384W		
	Min. switching load *1		100mA, 5VDC		
Coil	Rated power (20°C)		400mW (430mW at 48V coil: 430mW, 60V/110V coil: 420mW)		
	Operate power (20°C)		200mW 48V coil: 210mW, 60V/110Vcoil: 206mW)		
	Operating temperature range		-40 °C to +85 °C		No frost
Time	Operate (at nominal voltage)		Max. 15ms		Without bounce, no diode
	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	Min. 50 x 10^3 operations	
		DC contact rating	Min. 100 x 10^3 operations	Min. 30 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 : 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.

Note: Need to consider the heat from PCB when max. current is more than 10A.

■ 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

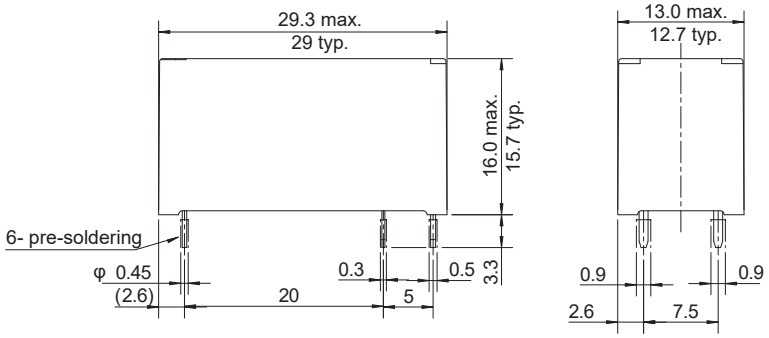
Type	Compliance	Contact Rating	
		FTR-K1AK( )E	FTR-K1CK( )E
UL	Flammability: UL 94-V-0 (plastics)		
	UL508 File No. 63614	16A, 277VAC (resistive) 20A, 277 VAC (resistive) 1 hp, 277VAC 1/2 hp, 125VAC Pilot duty: A300	16A, 277VAC / 24VDC (resistive) 20A, 277VAC (resistive) 1 hp, 277VAC 1/2 hp, 125VAC 1/8 hp, 125VAC Pilot duty: B300
CSA	C22.2 No. 14 File No. 40304	16A, 277VAC / 24VDC (resistive) 1 hp, 277VAC 1/2 hp, 125VAC Pilot duty: A300	16A, 277VAC / 24VDC (resistive) 1 hp, 277VAC 1/2 hp, 125VAC 1/8 hp, 125VAC Pilot duty: B300
VDE	IEC/EN 61810-1 EN60335-1 clause 15.3; 16.3; 29.1; 29.2; 29.3 EN60730-1 clause 12.2; 13.2; 20.1; 20.2; 20.3	16A, 250 VAC (cosφ=1), 85°C 3.5A, 250 VAC (cosφ=0.4), 85°C 16A, 24VDC (0ms), 85°C	

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

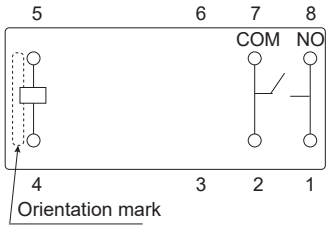
■ DIMENSIONS

FTR-K1AK( )E

Dimensions

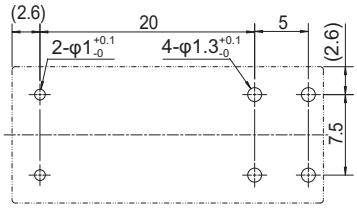


Schematics (BOTTOM VIEW)



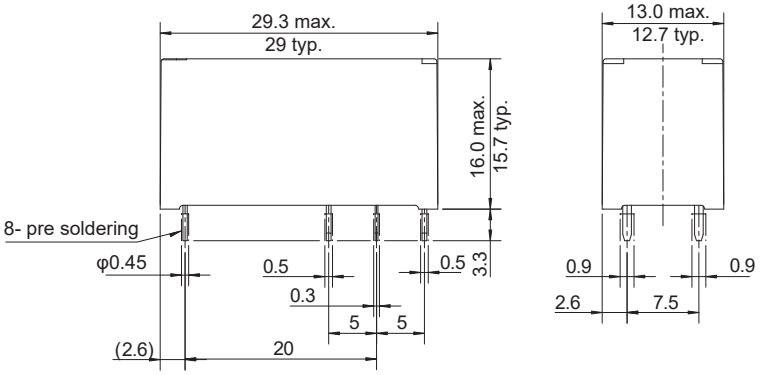
Connect terminal #1 and #8 on the PC board

PC board mounting hole layout (BOTTOM VIEW)

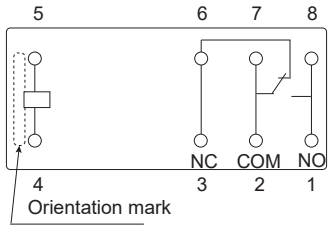


FTR-K1CK( )E

Dimensions

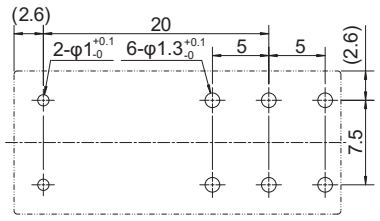


Schematics (BOTTOM VIEW)



Connect terminal #1 and #8 on the PC board

PC board mounting hole layout (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. (Unit: mm)

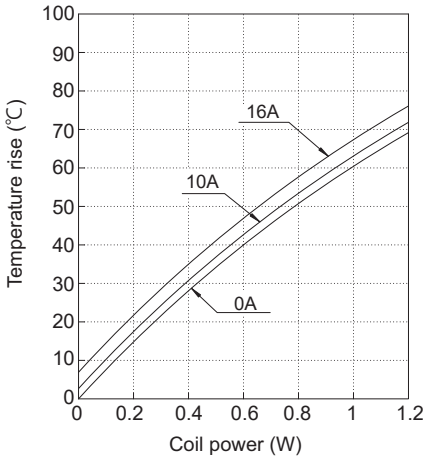
■ PART NUMBER LIST

Part Number	Contact Configuration	Nominal Power	Contact Material
FTR-K1AK( )E	1a（1 Form A)	Standard (400 to 430mW)	AgNi
FTR-K1CK( )E	1c（1 Form C)		

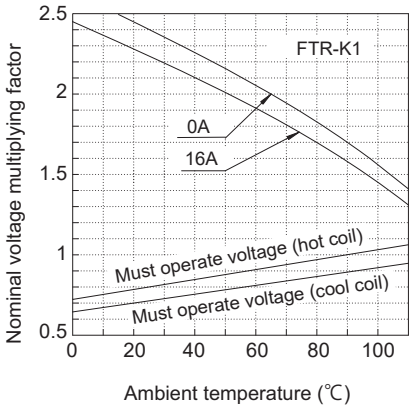
■ CHARACTERISTIC DATA

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

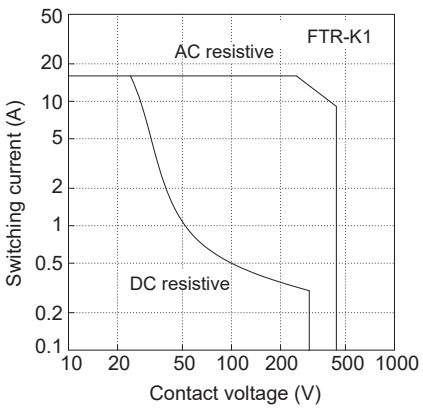
Coil temperature rise



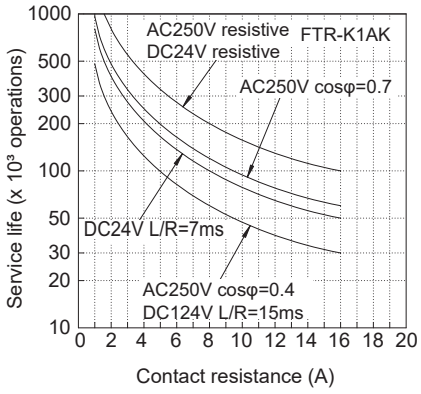
Operating range



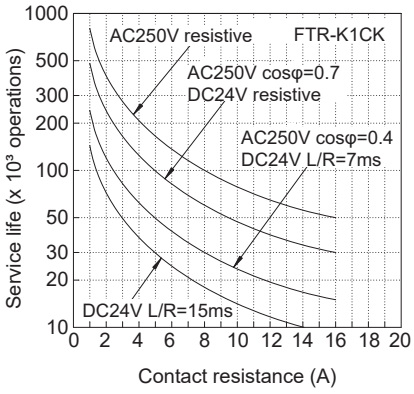
Maximum switching power



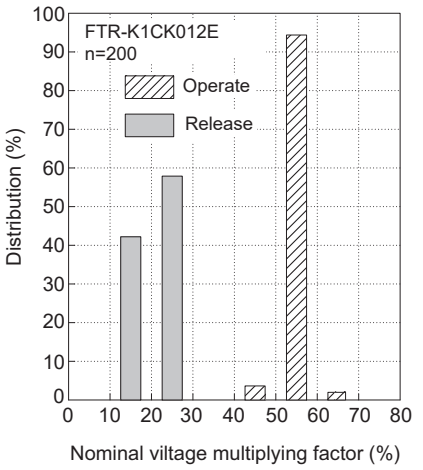
Life curve (1a)



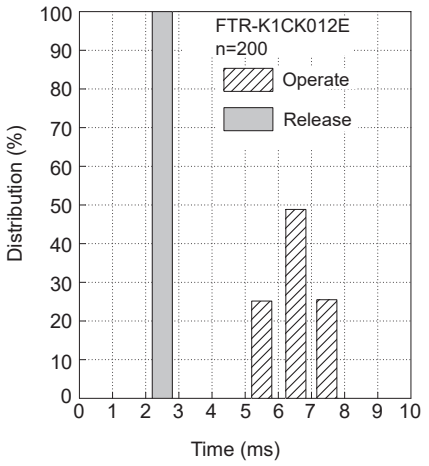
Life curve (1c)



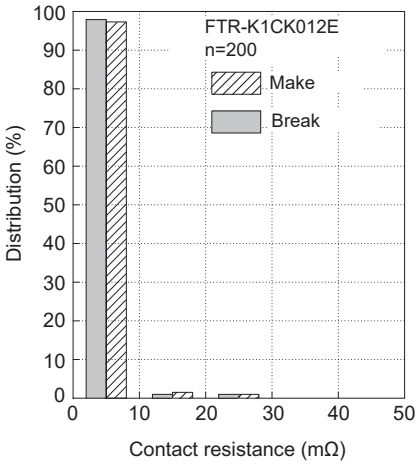
Distribution of operate/release voltage



Distribution of operate/release time



Distribution of contact resistance



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.

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