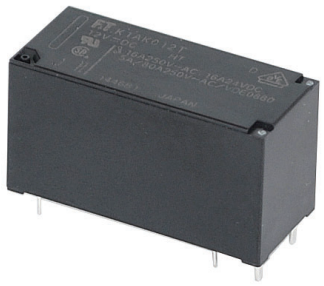
POWER RELAY FOR AUTOMORIVE APPLICATIONS
1 POLE - MAX.CARRYING CURRENT 20A, 105°C

FTR-K1-AM Series

RoHS Compliant

■ FEATURES

- High capacity current carrying (20A/277VAC) for automotive applications
- Manufactured in an IATF16949 certified factory
- 1 pole 16A 1a (1 Form A) or 1c (1 Form C) contact
- Usable in ambient temperature 105°C
- Low coil power (400mW)
- Low profile (height: 15.7mm), mounting area 368mm^2
- UL F class insulation wire
- High insulation in a small package
  Insulation distance (between coil and contacts): 10mm
  Dielectric strength: 5,000VAC
  Surge strength: 10,000V
- Through hole
- Plastic material: UL94V-0 flammability



■ APPLICATIONS

EV/PHV on-board charger (normal charging AC line)

■ PART NUMBERS

[Example] FTR-K1 C K 012 W - HT - AM
(a) (b) (c) (d) (e) (f) (g)

(a)	Relay type	FTR-K1 (FTR-K1-AM) series
(b)	Contact configuration	A : 1a (1 Form A, SPST-NO) C : 1c (1 Form C, SPDT)
(c)	Coil type	K : Standard type (400mW)
(d)	Coil rated voltage	012 : 012VDC Please refer to coil rating table
(e)	Contact material / TV type	T : $AgSnO_2$ (flux free: 1a) W : $AgSnO_2$ (flux free: 1c, plastic sealed: 1a/1c)
(f)	Special type	HT : 105°C, flux free type KW : 105°C, plastic sealed type
(g)	Option	AM : For automotive applications, made in an IATF16949 certified factory in Japan

Actual marking does not carry the type name : “FTR-” E.g.: Ordering code: FTR-K1CK012W-HT Actual marking: K1CK012W
HT marking not part of type number printing but next to coil rating print.

■ SPECIFICATIONS

Item			Specifications				Remarks/Conditions
			FTR-K1AK( ) T-HT-AM	FTR-K1CK( ) W-HT-AM	FTR-K1AK( ) W-KW-AM	FTR-K1CK( ) W-KW-AM	
Contact Data	Configuration		1a (1 Form A)	1c (1 Form C)	1a (1 Form A)	1c (1 Form C)	
	Construction		Single				
	Material		$AgSnO_2$				
	Resistance		Max. 100mΩ				Initial at 1A, 6VDC
	Contact rating		16A, 250VAC				Resistive
	Max. carrying current*1		20A				
	Max. inrush current		78A, 120VAC	-	-	-	
	Max. switching voltage		440VAC				
	Max. switching power		4,000VA				
	Min. switching load *2		100mA, 5VDC				
Coil	Rated power (20°C)		400mW				
	Operate power (20°C)		200mW				
	Operating temperature range		-40ºC to +105ºC				No frost
Time	Operate		Max. 15ms (without bounce, no diode)				
	Release		Max. 5ms (without bounce, no diode)				
Life	Mechanical		Min. 20 x 10^6 operations				
	Electrical		Min. 100 x 10^3 ops.	Min. 50 x 10^3 ops.	Min.20 x 10^3 ops.	MIn.10 x 10^3 ops.	Rating resistive load
Insula-tion	Insulation resistance		Min. 1,000MΩ				At 500VDC
	Dielectric withstanding 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 / creepage		10mm / 10mm				
	EN61810-1, VDE0435	Voltage	250V				
		Pollution degree	3				
		Material group	IIIa				
		Category	C / 250 (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	Min. 100m/s^2 (11±1ms)				Coil ON/OFF, 3 axis, total 36 operations
		Endurance	Min. 1,000m/s^2 (6±1ms)				Coil OFF, 3 axis, total 18 operations
	Dimensions / Weight		12.7 x 29.0 x 15.7 mm / approx. 13g				
	Sealing		Flux proof, RTII		Plastic sealed, RTIII		

*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)	Nominal Power (mW)
012	12	360	8.4	1.2	400

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

*1: Specified operated values are valid for pulse 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.

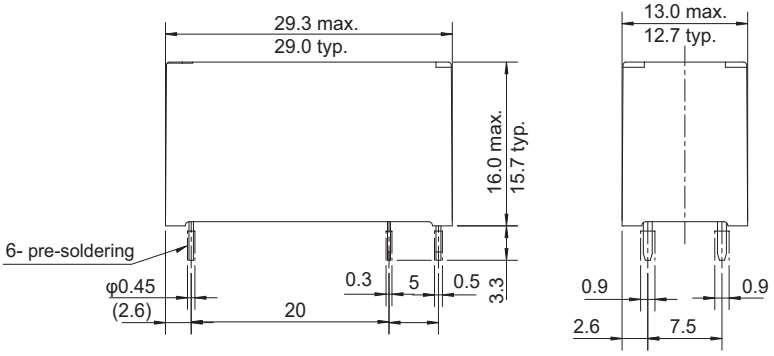
■ PART NUMBER LIST

Part Number	Contact Configuration	Nominal Power	Contact Material	Enclosure
FTR-K1AK( )T-HT-AM	1a (1 Form A)	Standard (400mW)	$AgSnO_2$	Flux free
FTR-K1CK( )W-HT-AM	1c (1 Form C)			
FTR-K1AK( )W-KW-AM	1a (1 Form A)			Plastic sealed
FTR-K1CK( )W-KW-AM	1c (1 Form C)			

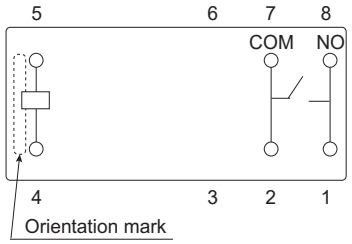
■ DIMENSIONS

FTR-K1AK( )T-HT-AM / FTR-K1AK( )W-KW-AM

● Dimensions

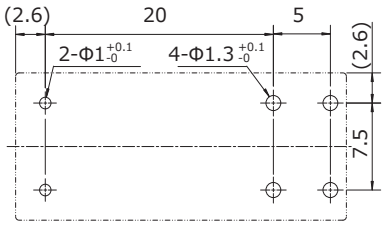


● Schematics
(BOTTOM VIEW)



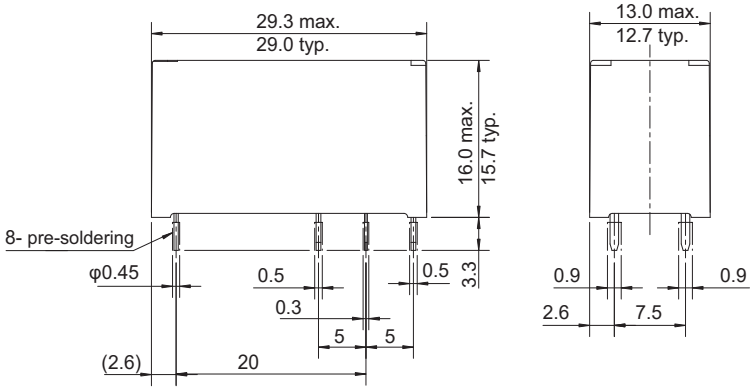
Connect terminal #1 and #8 on the PC baord

● PC borad mounting hole layout
(BOTTOM VIEW)



FTR-K1CK( )W-HT-AM / FTR-K1CK( )W-KW-AM

● Dimensions



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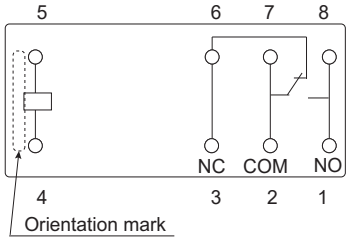
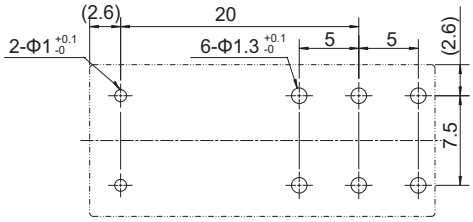
(BOTTOM VIEW)



Connect terminal #1 and #8 on the PC baord

● PC borad mounting hole layout
(BOTTOM VIEW)



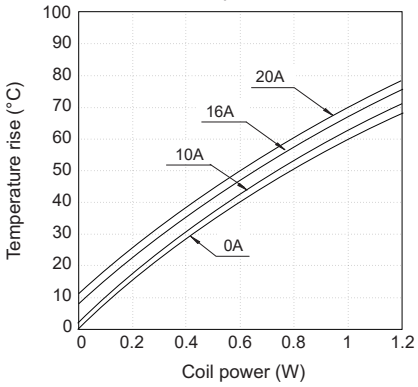
- Dimentions of the terminals do not include thickness of pre-soldering.
- Tolerance of PC board mounting hole layout: ±0.1 unless otherwise specified.
- Dimensions do not includes tolerances. Please ask specification in case you need tolerances.

Unit: mm
( ): Reference

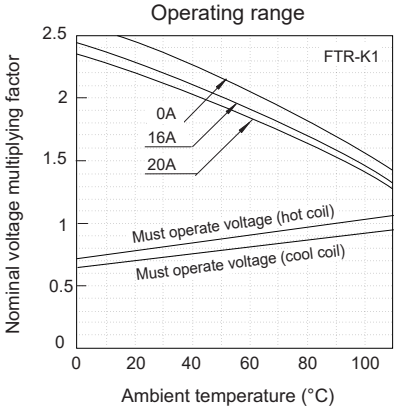
■ CHARACTERISTIC DATA

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

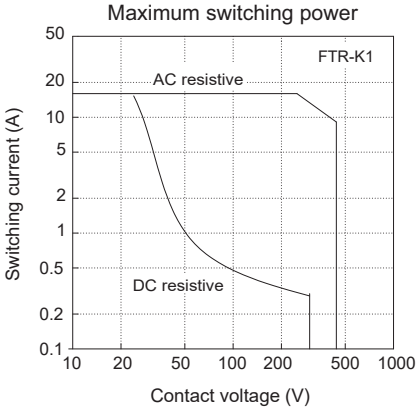
Coil temperature rise



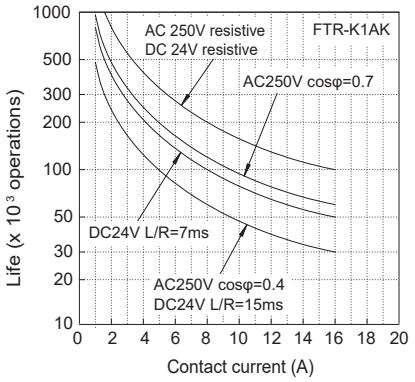
Operating range



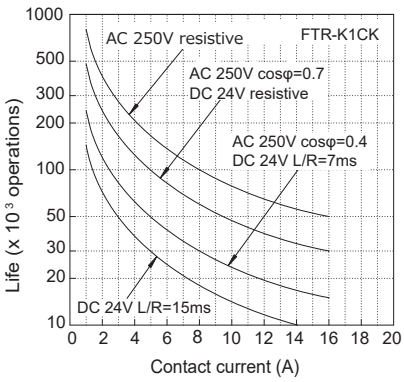
Maximum switching power



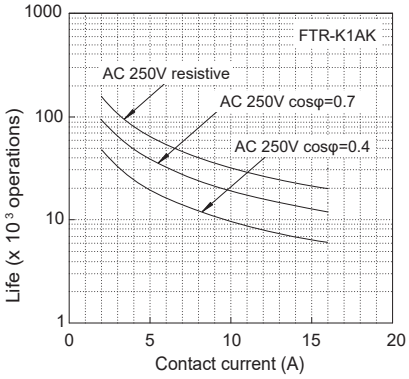
Life curve (flux free)



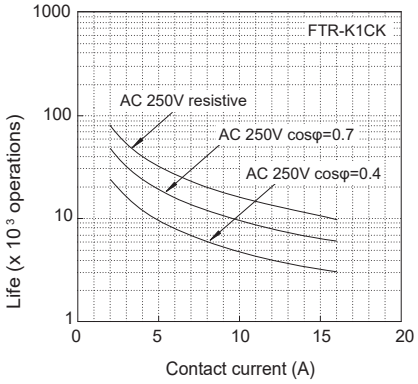
Life curve (flux free)



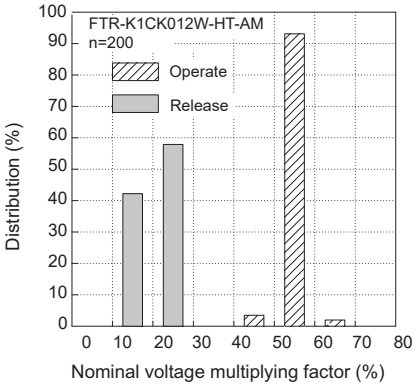
Life curve (plastic sealed)



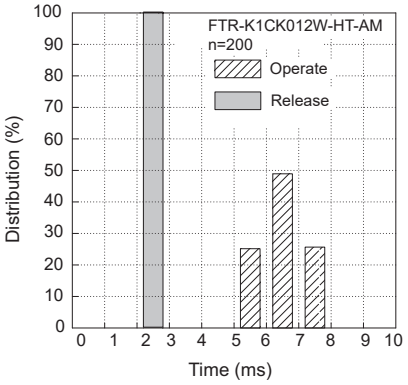
Life curve (plastic sealed)



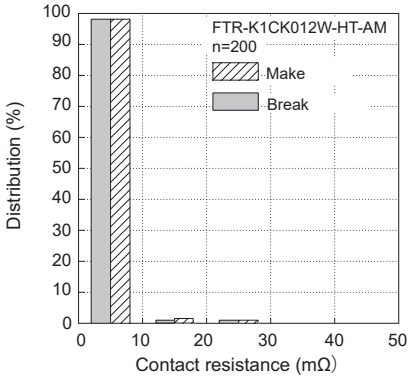
Distribution of operate, release voltage



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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