

# POWER RELAY

## 1 POLE - 16A/12A/10A Transparent cover

### FTR-K1 Series

#### ■ FEATURES

- 16A, 12A, 10A versions
  - Transparent cover
  - Low profile (height: 15.7mm)
  - High insulation  
Insulation distance (between coil and contacts): 10mm min.  
Dielectric strength: 5KV  
Surge strength: 10KV
  - UL F class insulation wire
  - Low coil power (400mW)
  - Cadmium free contacts
  - Safety standards  
UL, CSA, VDE, SEMKO approved  
UL, CSA TV-5 rating approved (1 form A type)
  - Flux proof, RTII
  - RoHS compliant
- Please see page 12 for more information



#### ■ PARTNUMBER INFORMATION

[Example]     FTR-K1   C   K   005   W   -   MA   -   RG  
                   (a)    (b)   (c)   (d)   (e)        (f)        (g)

(a)	Relay type	FTR-K1: FTR-K1 Series
(b)	Contact configuration	A : 1 form A (SPST-NO) C : 1 form C (SPDT) (standard type "K" only)
(c)	Coil type	K : Standard type (400mW) / flux free L : High sensitive (250mW) / flux free (only for LA; LB versions)
(d)	Coil rated voltage	005 : 5.....110 VDC (5...48VDC for LA; LB versions) Coil rating table at page 7
(e)	Contact material	W : AgSnO <sub>2</sub> (applicable for 1 form C) T : AgSnO <sub>2</sub> (applicable for 16A, 1 form A) (TV-5) E : AgNi (90/10) (16A type only)
(f)	Contact rating/Terminal pitch	Nil : 16A, 5mm pitch MA : 12A and 3.5mm pitch MB : 12A and 5.0mm pitch LA : 10A and 3.5mm pitch LB : 10A and 5.0mm pitch
(g)	Special type	RG : Transparent cover

Actual marking does not carry the type name : "FTR"

E.g.: Ordering code: FTR-K1CK005W

Actual marking: K1CK005W ("RG" is marked on the relay)

# FTR-K1 SERIES

## ■ SPECIFICATION

16A type

Item			FTR-K1 AK ( ) (T,W)-RG	FTR-K1 CK ( ) (W,E)-RG
Contact Data	Configuration		1 form A	1 form C
	Construction		Single	
	Material		T, W: AgSnO <sub>2</sub> , E: AgNi	
	Resistance (initial)		Max. 100mOhm at 1A, 6VDC	
	Contact rating (resistive)		16A, 250VAC / 24VDC	
	Max. carrying current *1		16A	
	Max. switching voltage		440VAC / 300VDC	
	Max. switching power		4,000VA / 384W	
	Min. switching load *2		10mA, 5VDC	
Life	Mechanical		Min. 20 x 10 <sup>6</sup> operations	
	Electrical	AC contact rating	Min. 100 x 10 <sup>3</sup> operations	Min. 50 x 10 <sup>3</sup> operations
		DC contact rating	Min. 100 x 10 <sup>3</sup> operations	Min. 30 x 10 <sup>3</sup> operations
Coil Data	Rated power (20 °C)		400mW (430mW at 48V coil)	
	Operate power (20 °C)		200mW (210mW at 48V coil)	
	Operating temperature range		-40 °C to +70 °C (no frost)	
Timing Data	Operate (at nominal voltage)		Max. 15ms (without bounce, no diode)	
	Release (at nominal voltage)		Max. 5ms (without bounce, no diode)	
Insulation	Resistance (initial)		Min. 1,000MOhm at 500VDC	
	Dielectric strength	Open contacts	1,000VAC (50/60Hz) 1min	
		Contacts to coil	5,000VAC (50/60Hz) 1min	
	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	III a	
	Category	C / 250V (Reference voltage) (VDE0110b)		
Other	Vibration resistance	Misoperation≥1us	10 to 55Hz double amplitude 0.7mm	
		Endurance	10 to 55Hz double amplitude 1.5mm	
	Shock	Misoperation≥1us	100m/s <sup>2</sup> (11 ± 1ms)	
		Endurance	1,000m/s <sup>2</sup> (6 ± 1ms)	
	Weight		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

# FTR-K1 SERIES

## ■ SPECIFICATION

12A type

Item			FTR-K1 AK ( ) W - (MA, MB) - RG	FTR-K1 CK ( ) W - (MA, MB) - RG	
Contact Data	Configuration		1 form A	1 form C	
	Construction		Single		
	Material		W: AgSnO <sub>2</sub>		
	Resistance (initial)		Max. 100mOhm at 1A, 6VDC		
	Contact rating (resistive)		12A, 250VAC / 24VDC		
	Max. carrying current *1		14A		
	Max. switching voltage		440VAC / 300VDC		
	Max. switching power		3,000VA / 288W		
	Min. switching load *2		10mA, 5VDC		
Life	Mechanical		Min. 20 x 10 <sup>6</sup> operations		
	Electrical	AC contact rating	Min. 100 x 10 <sup>3</sup> operations		
		DC contact rating	Min. 100 x 10 <sup>3</sup> operations		
Coil Data	Rated power (20 °C)		400mW (430mW at 48V coil)		
	Operate power (20 °C)		200mW (210mW at 48V coil)		
	Operating temperature range		-40 °C to +70 °C (no frost)		
Timing Data	Operate (at nominal voltage)		Max. 15ms (without bounce)		
	Release (at nominal voltage)		Max. 5ms (without bounce, no diode)		
Insulation	Resistance (initial)		Min. 1,000MOhm at 500VDC		
	Dielectric strength	Open contacts	1,000VAC (50/60Hz) 1min		
		Contacts to coil	5,000VAC (50/60Hz) 1min		
	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		III a	
Category		C / 250V (Reference voltage) (VDE0110b)			
Other	Vibration resistance	Misoperation≥1us	10 to 55Hz double amplitude 0.7mm		
		Endurance	10 to 55Hz double amplitude 1.5mm		
	Shock	Misoperation≥1us	100m/s <sup>2</sup> (11 ± 1ms)		
		Endurance	1,000m/s <sup>2</sup> (6 ± 1ms)		
	Weight		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

# FTR-K1 SERIES

## ■ SPECIFICATION

10A type

Item	FTR-K1 AL ( ) W - (LA, LB) - RG		
Contact Data	Configuration		1 form A
	Construction		Single
	Material		W: AgSnO <sub>2</sub>
	Resistance (initial)		Max. 100mOhm at 1A, 6VDC
	Contact rating (resistive)		10A, 250VAC / 24VDC
	Max. carrying current		10A
	Max. switching voltage		440VAC
	Max. switching power		2,500VA
	Min. switching load *		10mA, 5VDC
Life	Mechanical		Min. 20 x 10 <sup>6</sup> operations
	Electrical	AC contact rating	Min. 100 x 10 <sup>3</sup> operations
Coil Data	Rated power (20 °C)		250mW
	Operate power (20 °C)		141mW
	Operating temperature range		-40 °C to +70 °C (no frost)
Timing Data	Operate (at nominal voltage)		Max. 15ms (without bounce, no diode)
	Release (at nominal voltage)		Max. 5ms (without bounce, no diode)
Insulation	Resistance (initial)		Min. 1,000MOhm at 500VDC
	Dielectric strength	Open contacts	1,000VAC (50/60Hz) 1min
		Contacts to coil	5,000VAC (50/60Hz) 1min
	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	III a
	Category	C / 250V (Reference voltage) (VDE0110b)	
Other	Vibration resistance	Misoperation≥1us	10 to 55Hz double amplitude 0.7mm
		Endurance	10 to 55Hz double amplitude 1.5mm
	Shock	Misoperation≥1us	100m/s <sup>2</sup> (11 ± 1ms)
		Endurance	1,000m/s <sup>2</sup> (6 ± 1ms)
	Weight		Approximately 13g
	Sealing		Flux proof, RTII

\* 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.

# FTR-K1 SERIES

## ■ PART NUMBERS

16A and AgSnO<sub>2</sub> contacts

Ordering part number	Contact	Coil power	Contact material	Current	Special
FTR-K1AK(...)T-RG	A: 1 form A	K: 400mW	T: AgSnO <sub>2</sub>	Nil: 16A	RG: Transparent cover
FTR-K1CK(...)W-RG	C: 1 form C		W: AgSnO <sub>2</sub>		

16A and AgNi contacts

Ordering part number	Contact	Coil power	Contact material	Current	Special
FTR-K1AK(...)E-RG	A: 1 form A	K: 400mW	E: AgNi (90/10)	Nil: 16A	RG: Transparent cover
FTR-K1CK(...)E-RG	C: 1 form C				

12A, 3.5mm pitch and AgSnO<sub>2</sub> contacts

Ordering part number	Contact	Coil power	Contact material	Current	Special
FTR-K1AK(...)W-MA-RG	A: 1 form A	K: 400mW	W: AgSnO <sub>2</sub>	MA: 12A	RG: Transparent cover
FTR-K1CK(...)W-MA-RG	C: 1 form C				

12A, 5.0mm pitch and AgSnO<sub>2</sub> contacts

Ordering part number	Contact	Coil power	Contact material	Current	Special
FTR-K1AK(...)W-MB-RG	A: 1 form A	K: 400mW	W: AgSnO <sub>2</sub>	MB: 12A	RG: Transparent cover
FTR-K1CK(...)W-MB-RG	C: 1 form C				

10A, 3.5mm pitch and AgSnO<sub>2</sub> contacts

Ordering part number	Contact	Coil power	Contact material	Current	Special
FTR-K1AL(...)W-LA-RG	A: 1 form A	L: 250mW	W: AgSnO <sub>2</sub>	LA: 10A	RG: Transparent cover

10A, 5.0mm pitch and AgSnO<sub>2</sub> contacts

Ordering part number	Contact	Coil power	Contact material	Current	Special
FTR-K1AL(...)W-LB-RG	A: 1 form A	L: 250mW	W: AgSnO <sub>2</sub>	LB: 10A	RG: Transparent cover

(...) = coil voltage

# FTR-K1 SERIES

## ■ COIL RATING

400 mW coils (standard type)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Must Release-Voltage (VDC) *	Max. Coil Voltage (VDC)	Rated Power (mW)
005	5	62	3.5	0.5	12.2	12.2
006	6	90	4.2	0.6	14.7	14.7
009	9	202	6.3	0.9	22	22
012	12	360	8.4	1.2	29.4	29.4
018	18	810	12.6	1.8	44.1	44.1
022	22	1210	15.4	2.2	53.9	53.9
024	24	1440	16.8	2.4	58.8	58.8
028	28	1960	19.6	2.8	68.6	68.6
048	48	5360	33.6	4.8	117.6	430
060	60	8570	42.0	6.0	147.0	420
110	110	28800	77.0	11.0	269.5	

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

\* Specified operate values are valid for pulse wave voltage.

250 mW coils (-LA; -LB types only)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Must Release-Voltage (VDC) *	Max. Coil Voltage (VDC)	Rated Power (mW)
005	5	100	3.75	0.5	15	250
006	6	145	4.5	0.6	18	
009	9	325	6.75	0.9	27	
012	12	575	9	1.2	36	
018	18	1300	13.5	1.8	54	
024	24	2310	18	2.4	72	
048	48	9216	36	4.8	144	

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

\* Specified operate values are valid for pulse wave voltage.

# FTR-K1 SERIES

## ■ SAFETY STANDARDS

16A type

Type	Compliance	Contact rating	
		FTR-K1AK ( ) (T,E)-RG	FTR-K1CK ( ) (E,W)-RG
UL	UL 508	Flammability: UL 94-V0 (plastics)	
	E63614	16A, 24 VAC (resistive) 16A, 277VAC (resistive) 20A, 277VAC (resistive) 1 HP, 277VAC 1/2 HP, 125VAC TV-5, 120VAC, 120VAC 25,000 cycles Pilot duty: A300	16A, 277 VAC/24VDC (resistive) 20A, 277VAC (resistive) 1 HP, 277VAC 1/2 HP, 125VAC 1/8 HP, 125VAC TV-5, 250VAC 25,000 cycles Pilot duty: B300
CSA	C22.2 No. 14  LR 40304		16A, 277 VAC/24VDC (resistive) 20A, 277VAC (resistive) 1 HP, 277VAC 1/2 HP, 125VAC 1/8 HP, 125VAC TV-5, 120VAC 25,000 cycles Pilot duty: B300
VDE	0435, 0631, 0700, 0860  40013848	16A, 250 VAC (cos $\varphi=1$ ) 3.5A, 250 VAC (cos $\varphi=0.4$ ) 16 A 24VDC (0ms) 5A/80A, 250 VAC (only T-type)	16A, 250 VAC (cos $\varphi=1$ ) 3.5A, 250 VAC (cos $\varphi=0.4$ ) 16A 24VDC (0ms)
SEMKO	EN 61058-1:1992 and A1 EN 61095:1993 and A1+A11	250VAC, 16 (3)A 40T70 5A/80A 250VAC (only T-type)	250VAC, 16(3)A40T70

Complies with NEMKO, DEMKO, FIMKO

# FTR-K1 SERIES

## ■ SAFETY STANDARDS

12A type

Type	Compliance	Contact rating	
		FTR-K1AK ( ) (W)(MA, MB)	FTR-K1CK ( ) (W)(MA, MB)
UL	UL 508	Flammability: UL 94-VII (plastics)	
	E63614	16A, 24VAC (resistive) 16A, 277 VAC (resistive) 1 /2HP, 277VAC 1/3 HP, 125VAC Pilot duty: B300	12A, 24VAC (resistive) 16A, 277 VAC (resistive) 1 /2HP, 277VAC 1/3 HP, 125VAC 1/8 HP, 125VAC Pilot duty: B300
CSA	C22.2 No. 14 LR 40304	FTR-K1(A, C)K ( ) (W)(MA, MB) 12A, 277VAC/24VDC (resistive) 16A, 277 VAC/24VDC (resistive) 1 /2HP, 277VAC 1/3 HP, 125VAC Pilot duty: B300	
VDE	0435, 0631, 0700, 0860  40013848	FTR-K1(A, C)K ( ) (W)(MA, MB) 12A, 250 VAC (cos φ=1) 85°C 16A, 250 VAC (cos φ=1) 85°C 12 A 24VDC (0ms) 16 A 24VDC (0ms) 3.5A, 250 VAC (cos φ=0.4) 85°C	
SEMKO	EN 61058-1:1992 and A1 EN 61095:1993 and A1+A11	250VAC, 12 (3)A 40T70	

Complies with NEMKO, DEMKO, FIMKO

## ■ SAFETY STANDARDS

10A type

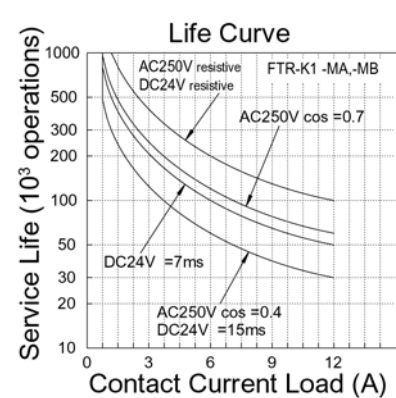
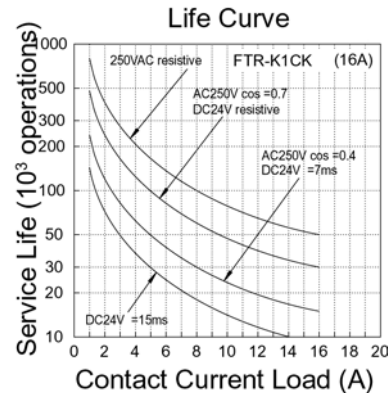
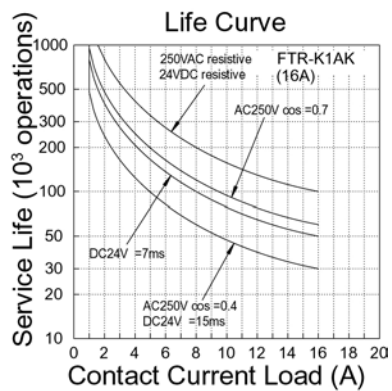
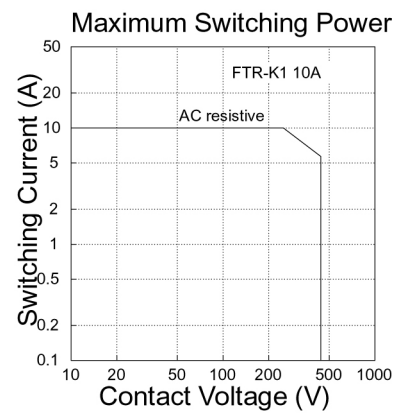
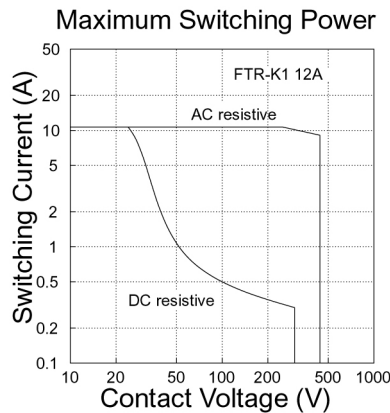
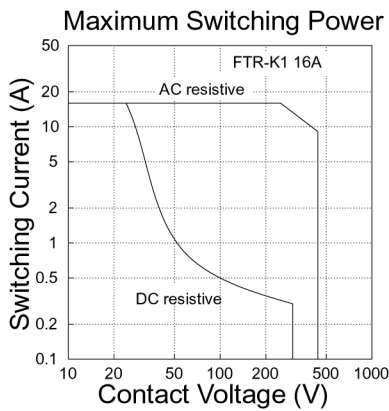
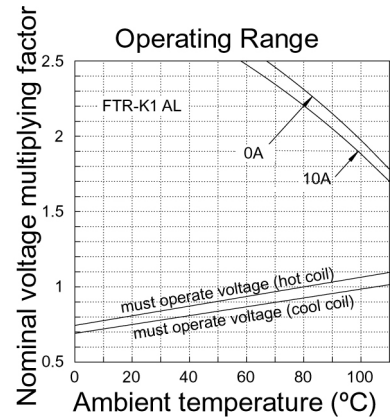
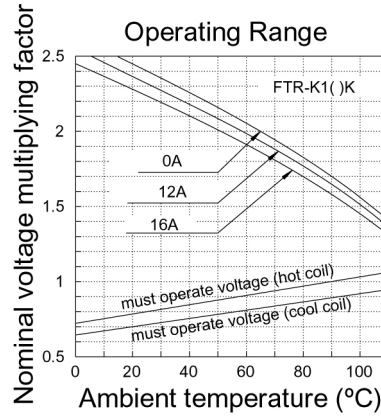
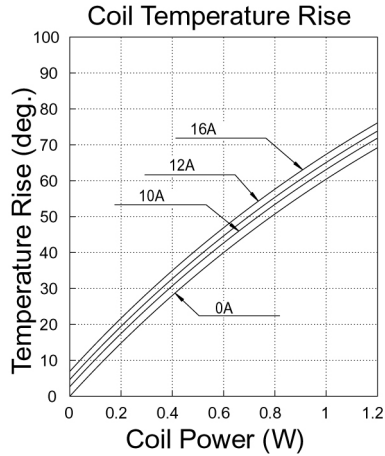
Type	Compliance	Contact rating	
		FTR-K1AL ( ) (W,E)(LA, LB)-RG	
UL	UL 508	Flammability: UL 94-VII (plastics)	
	E63614	FTR-K1AL ( ) (W)(LA, LB) 10A, 277 VAC (resistive) 1/2HP, 277VAC 1/3 HP, 125VAC Pilot duty: B300	
CSA	C22.2 No. 14 LR 40304	FTR-K1CL ( )W-LA 10A, 277VAC (resistive)	
VDE	0435, 0631, 0700, 0860  40013848	FTR-K1 AL ( )W-(LA, LB) 10A, 250 VAC, 150,000 cycles LA: 85°C, LB:85°C 3A, 250 VAC (cos φ=0.4) 100,000 cycles LA: 85°C, LB:85°C FTR-K1CL ( )W-LA 10A, 250 VAC, 100,000 cycles 85°C	
SEMKO	EN 61058-1:1992 and A1 EN 61095:1993 and A1+A11	250VAC, 10 (3)A 40T85 (-LA) 250VAC, 10 (3)A 40T85 (-LB)	

Complies with NEMKO, DEMKO, FIMKO

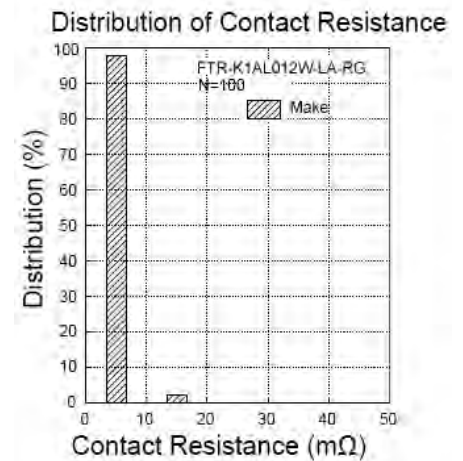
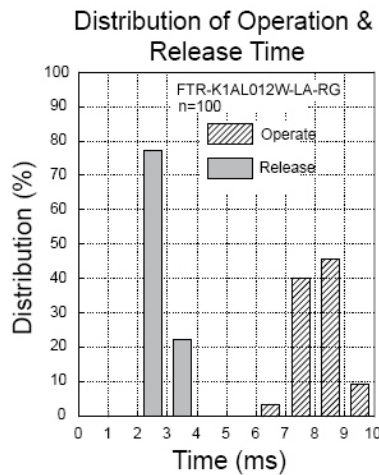
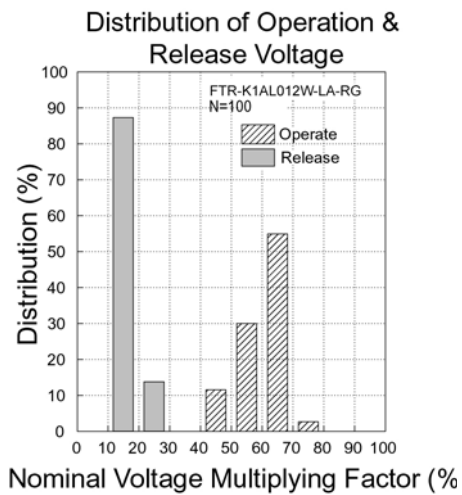
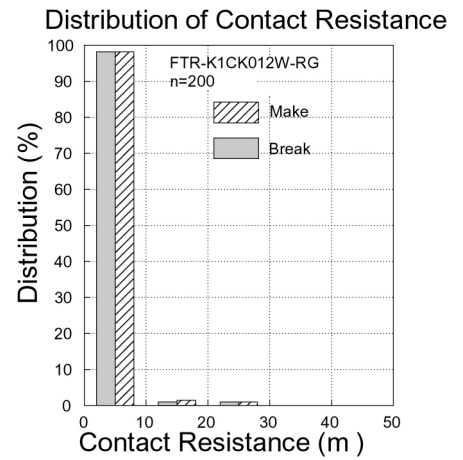
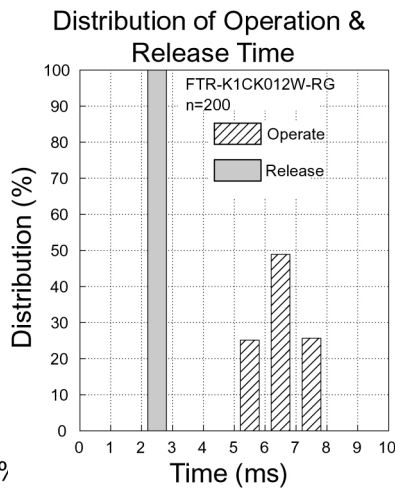
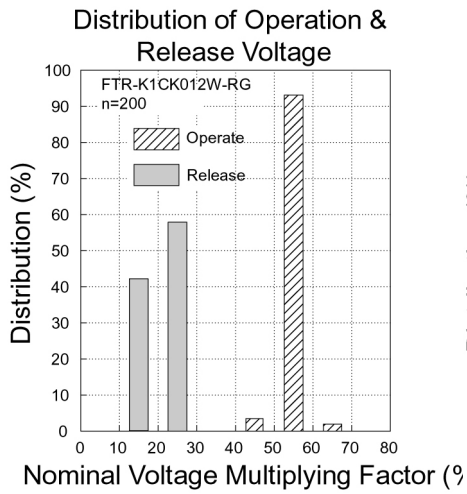
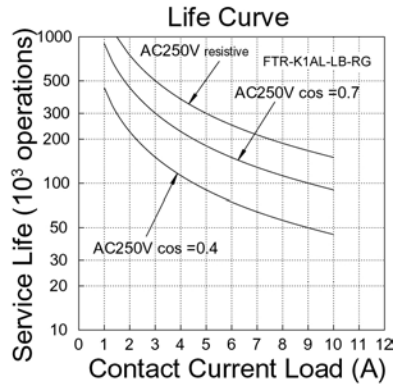


# FTR-K1 SERIES

## CHARACTERISTIC DATA



# FTR-K1 SERIES

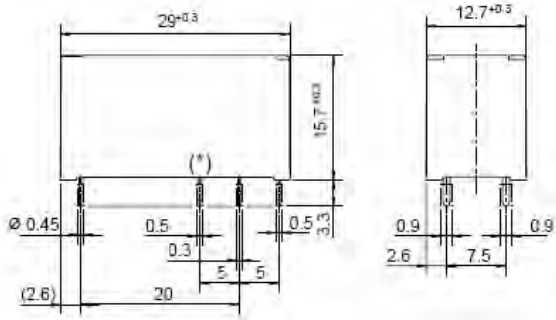


# FTR-K1 SERIES

## ■ DIMENSIONS

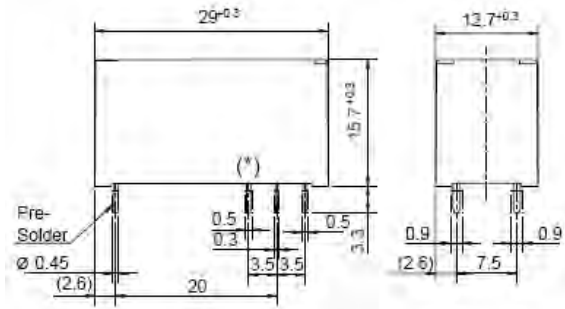
### • Dimensions

FTR-K1 ( ) / LB



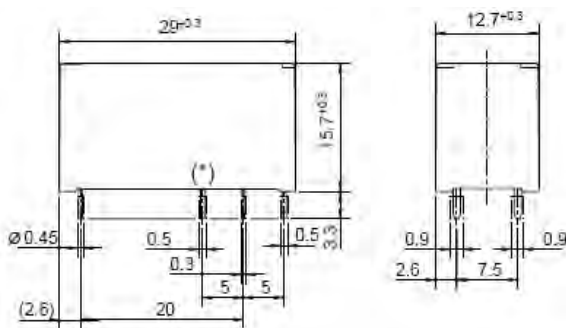
### • Dimensions

FTR-K1 ( ) MA / LA



### • Dimensions

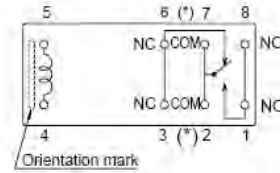
FTR-K1 ( ) / MB



\* terminals omitted in case of 1 form A version

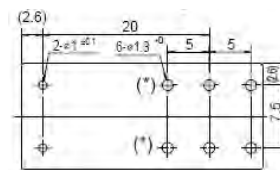
### • Schematics

(BOTTOM VIEW)



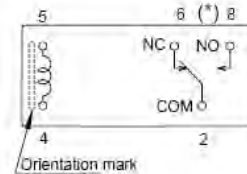
### • PC board mounting

hole layout (BOTTOM VIEW)



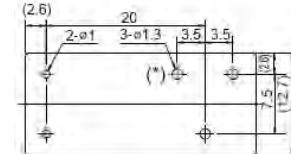
### • Schematics

(BOTTOM VIEW)



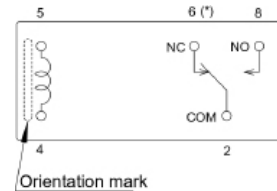
### • PC board mounting

hole layout (BOTTOM VIEW)



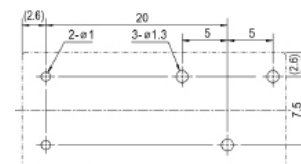
### • Schematics

(BOTTOM VIEW)



### • PC board mounting

hole layout (BOTTOM VIEW)



## RoHS Compliance and Lead Free Information

### 1. General Information

- All signal and power relays produced by Fujitsu Components are compliant with RoHS directive 2002/95EC including amendments.
- Cadmium as used in electrical contacts is exempted from the RoHS directives on October 21st, 2005. (Amendment to Directive 2002/95/EC)
- All of our signal and power relays are lead-free. Please refer to Lead-Free Status Info for older date codes at: <http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf>
- 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.

### 2. Recommended Lead Free Solder Profile

- Recommended solder Sn-3.0Ag-0.5Cu.

**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, 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.

## Fujitsu Components International Headquarter Offices

### Japan

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