

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 isolation 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)
- RoHS compliant
Please see page 13 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
(d)	Coil rated voltage	005 : 5.....48 VDC Coil rating table at page 7
(e)	Contact material	W : AgSnO ₂ (applicable for 1 form C) T : AgSnO ₂ (applicable for 16A, 1 form A) (TV-5) E : AgNi (90/10)
(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 ₂ , E: AgNi	
	Resistance (initial)		Maximum 100mΩ 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		20 x 10 ⁶ operations minimum	
	Electrical	AC contact rating	100 x 10 ³ operations minimum	50 x 10 ³ operations minimum
		DC contact rating	100 x 10 ³ operations minimum	30 x 10 ³ operations minimum
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)		≤ 15ms (no bounce, no diode)	
	Release (at nominal voltage)		≤ 5ms (no bounce, no diode)	
Insulation	Resistance (initial)		≥ 1,000MΩ 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 ² (11 ± 1ms)	
		Endurance	1,000m/s ² (6 ± 1ms)	
	Weight		Approximately 13g	

* 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, E) - (MA, MB) - RG	FTR-K1 CK () (W, E) - (MA, MB) - RG
Contact Data	Configuration		1 form A	1 form C
	Construction		Single	
	Material		W: AgSnO ₂ , E: AgNi	
	Resistance (initial)		Maximum 100mΩ 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		20 x 10 ⁶ operations minimum	
	Electrical	AC contact rating	100 x 10 ³ operations minimum	
		DC contact rating	100 x 10 ³ operations minimum	
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)		≤ 15ms (no bounce)	
	Release (at nominal voltage)		≤ 5ms (no bounce, no diode)	
Insulation	Resistance (initial)		≥ 1,000MΩ 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 ² (11 ± 1ms)	
		Endurance	1,000m/s ² (6 ± 1ms)	
	Weight		Approximately 13g	

* 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, E) - (LA, LB) - RG	
Contact Data	Configuration	1 form A
	Construction	Single
	Material	W: AgSnO ₂ , E: AgNi
	Resistance (initial)	Maximum 100mΩ 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	20 x 10 ⁶ operations minimum
	Electrical	AC contact rating 100 x 10 ³ operations minimum
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)	≤ 15ms (no bounce, no diode)
	Release (at nominal voltage)	≤ 5ms (no bounce, no diode)
Insulation	Resistance (initial)	≥ 1,000MΩ 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
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 ² (11 ± 1ms)
		Endurance 1,000m/s ² (6 ± 1ms)
	Weight	Approximately 13g

* 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 AgSnO₂ contacts

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

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 AgSnO₂ contacts

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

12A, 3.5mm pitch and AgNi contacts

Ordering part number	Contact	Coil power	Contact material	Current	Special
FTR-K1AK(...)E-MA-RG	A: 1 form A	K: 400mW	E: AgNi (90/10)	MA: 12A	RG: Transparent cover
FTR-K1CK(...)E-MA-RG	C: 1 form C				

12A, 5.0mm pitch and AgSnO₂ contacts

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

(...) = coil voltage

FTR-K1 SERIES

■ PART NUMBERS

12A, 5.0mm pitch and AgNi contacts

Ordering part number	Contact	Coil power	Contact material	Current	Special
FTR-K1AK(...)E-MB-RG	A: 1 form A	K: 400mW	E: AgNi (90/10)	MB: 12A	RG: Transparent cover
FTR-K1CK(...)E-MB-RG	C: 1 form C				

10A, 3.5mm pitch and AgSnO₂ contacts

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

10A, 3.5mm pitch and AgNi contacts

Ordering part number	Contact	Coil power	Contact material	Current	Special
FTR-K1AL(...)E-LA-RG	A: 1 form A	L: 250mW	E: AgNi (90/10)	LA: 10A	RG: Transparent cover

10A, 5.0mm pitch and AgSnO₂ contacts

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

10A, 5.0mm pitch and AgNi contacts

Ordering part number	Contact	Coil power	Contact material	Current	Special
FTR-K1AL(...)E-LB-RG	A: 1 form A	L: 250mW	E: AgNi (90/10)	LB: 10A	RG: Transparent cover

(...) = coil voltage

FTR-K1 SERIES

■ COIL RATING

250 mW coils

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.

400 mW coils

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	400
006	6	90	4.2	0.6	14.7	
009	9	202	6.3	0.9	22	
012	12	360	8.4	1.2	29.4	
018	18	810	12.6	1.8	44.1	
022	22	1210	15.4	2.2	53.9	
024	24	1440	16.8	2.4	58.8	
028	28	1960	19.6	2.8	68.6	
048	48	5360	33.6	4.8	117.6	430

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 () W
UL	UL 508	Flammability: UL 94-VII (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 (cosØ=1) 3.5A, 250 VAC (cosØ=0.4) 16 A 24VDC (0ms) 5A/80A, 250 VAC (only T-type)	16A, 250 VAC (cosØ=1) 3.5A, 250 VAC (cosØ=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 (cosØ=1) 85°C 16A, 250 VAC (cosØ=1) 85°C 12 A 24VDC (0ms) 16 A 24VDC (0ms) 3.5A, 250 VAC (cosØ=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

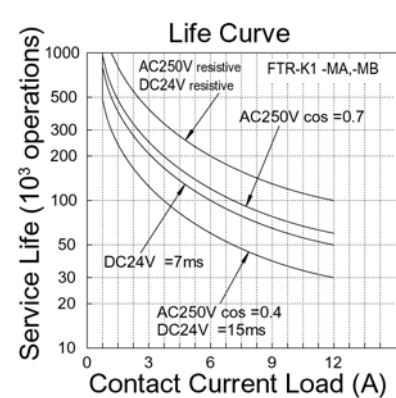
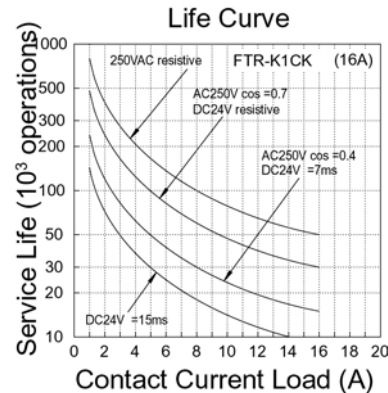
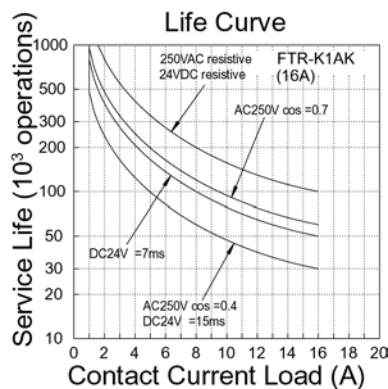
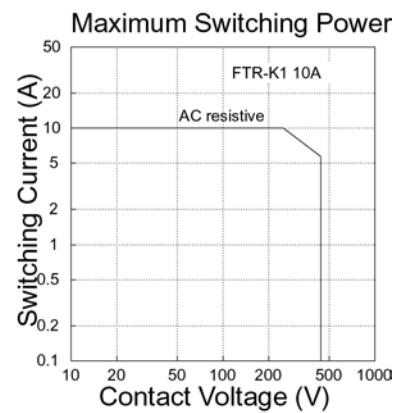
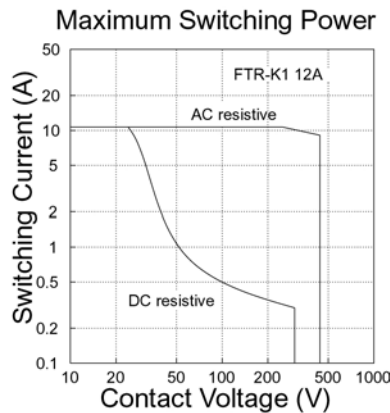
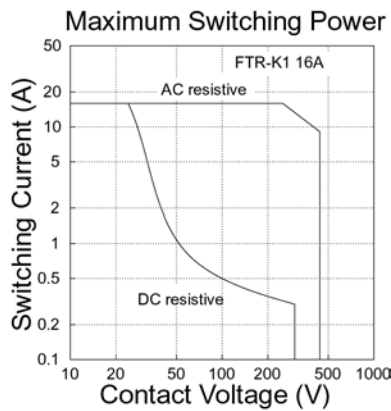
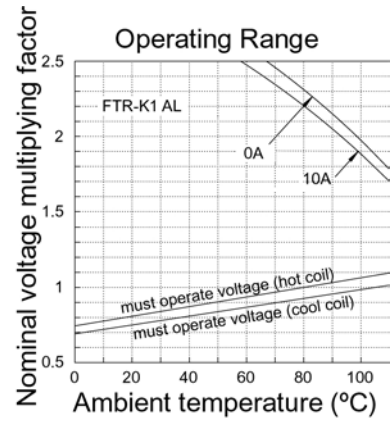
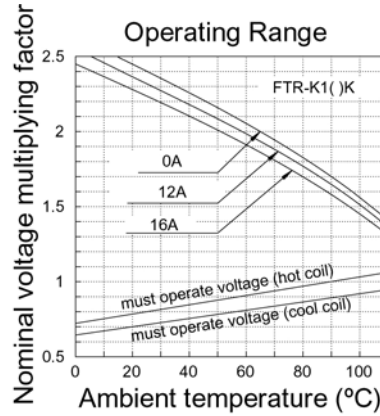
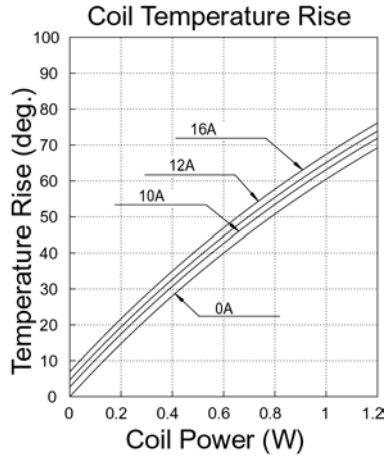
10A type

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)	
CSA	C22.2 No. 14 LR 40304	1 /2HP, 125VAC 1/3 HP, 277VAC Pilot duty: B300 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 (cosØ=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)	

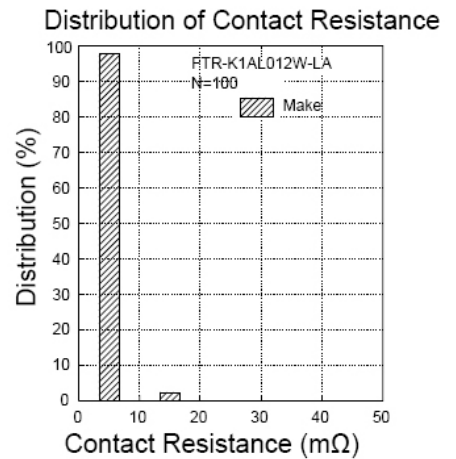
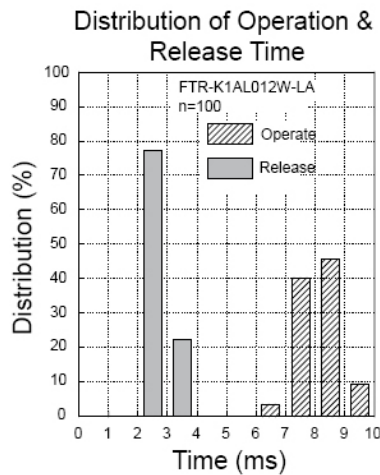
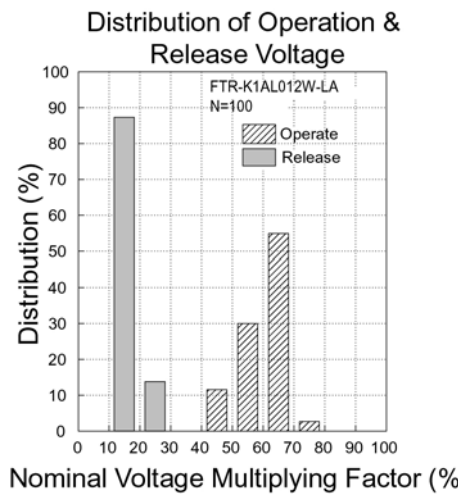
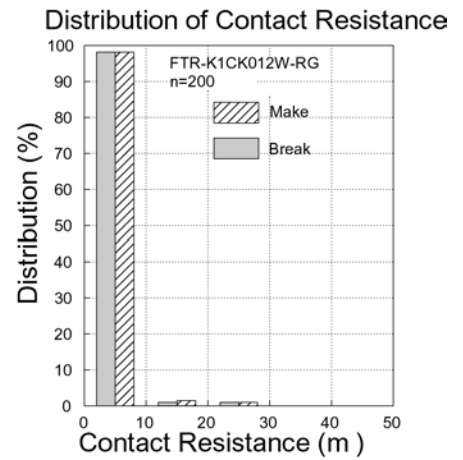
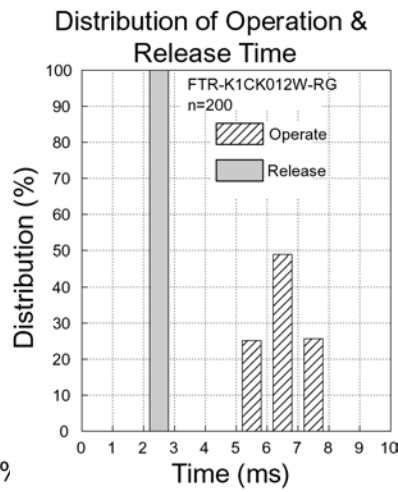
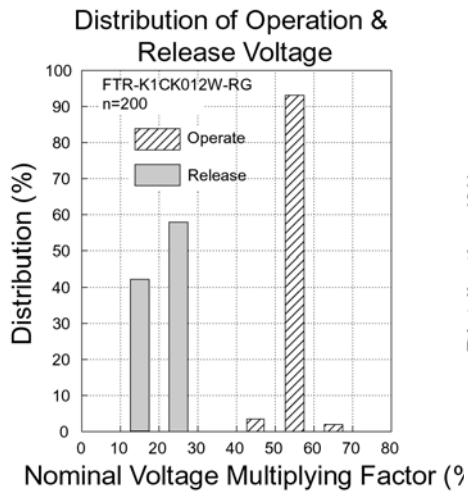
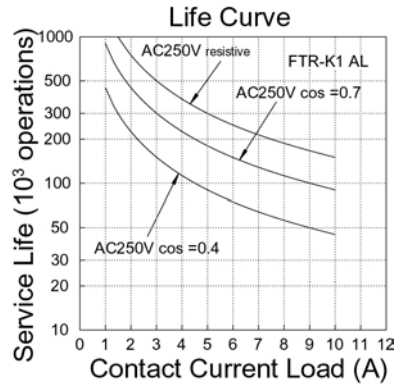
Complies with NEMKO, DEMKO, FIMKO

FTR-K1 SERIES

■ CHARACTERISTIC DATA



FTR-K1 SERIES

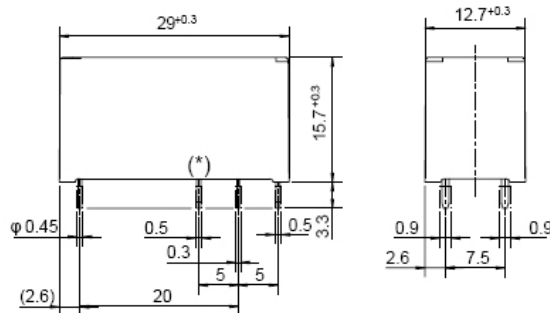


FTR-K1 SERIES

■ DIMENSIONS

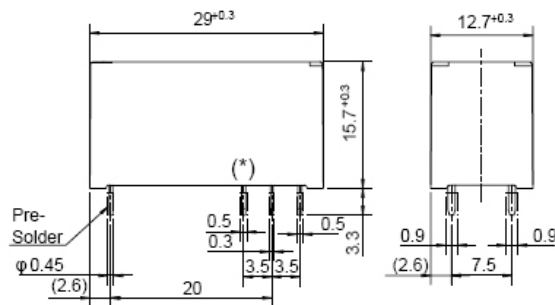
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FTR-K1 () / LB



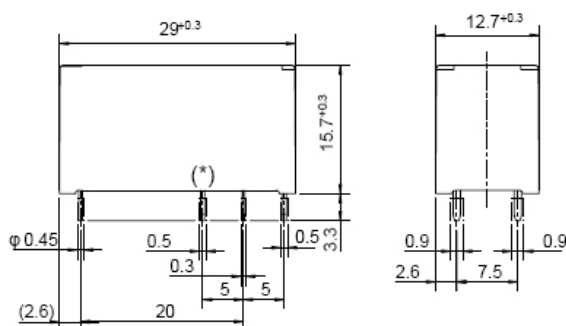
- **Dimensions**

FTR-K1 () MA / LA



- **Dimensions**

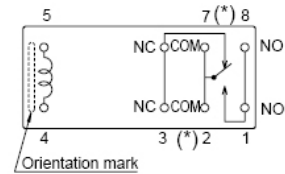
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* terminals omitted in case of 1 form A version

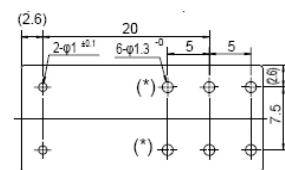
- **Schematics**

(BOTTOM VIEW)



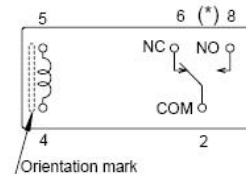
- **PC board mounting**

hole layout
(BOTTOM VIEW)



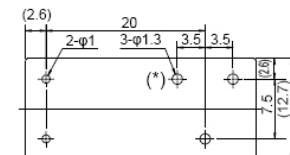
- **Schematics**

(BOTTOM VIEW)



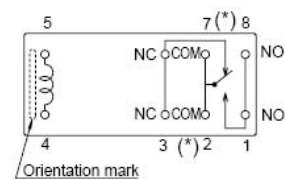
- **PC board mounting**

hole layout
(BOTTOM VIEW)



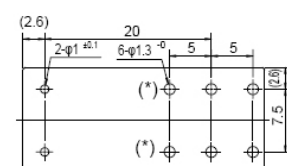
- **Schematics**

(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 2002/95/EC 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.

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