

POWER RELAY

1 POLE - 16A Transparent Cover

FTR-K1 Series

RoHS compliant

■ FEATURES

- 10A / 12A/ 16A
- Transparent cover
- Low profile (height: 15.7mm)
- HIGH ISOLATION5
Insulation Distance (between coil and contacts): 10mm min.
Dielectric strength: 5KV
Surge strength: 10KV
- 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 since production
- UL F class isolation
- VDE Glow-wire ignitability test 775 (IEC60335-1) approved



■ ORDERING INFORMATION

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

(a)	Series Name	FTR-K1: FTR-K1 Series
(b)	Contact Arrangement	A : 1 form A (SPST-NO) C : 1 form C (SPDT) (standard type "K" only)
(c)	Coil Type / Enclosure	K : Standard (400 mW) L : High sensitive (250mW)
(d)	Nominal Voltage	005 : 5 VDC, 006 : 6VDC, 009 : 9VDC 012 : 12VDC 018 : 18 VDC (standard type only) 022 : 022VDC (standard type only), 024 : 24VDC, 028 : 28VDC 048 : 48VDC
(e)	Contact Material	W : Silver tin oxide (applicable for 1 form C) T : Silver tin oxide (applicable for 16A 1 form A) E : Silver nickel (90/10)
(f)	Contact Rated Current	Nil : 16A 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 Designation	RG : Transparent cover

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

E.g.: Ordering code: FTR-K1CK012W

Actual marking: K1CK012W

FTR-K1 SERIES

■ PART NUMBERS

16A and silver tin oxide

Ordering Part Number	Series	Contact	Coil Power	Coil Voltage	Contact Material	Current	Special	
FTR-K1AK005T-RG	FTR-K1	A: 1 form A	K: 400 mW	5	T: Silver tin oxide W: Silver tin oxide	Nil: 16A	RG: transparent cover	
FTR-K1AK006T-RG				6				
FTR-K1AK009T-RG				9				
FTR-K1AK012T-RG				12				
FTR-K1AK018T-RG				18				
FTR-K1AK022T-RG				22				
FTR-K1AK024T-RG				24				
FTR-K1AK028T-RG				28				
FTR-K1AK048T-RG		48						
FTR-K1CK005W-RG		C: 1 form C						5
FTR-K1CK006W-RG								6
FTR-K1CK009W-RG								9
FTR-K1CK012W-RG								12
FTR-K1CK018W-RG								18
FTR-K1CK022W-RG								22
FTR-K1CK024W-RG								24
FTR-K1CK028W-RG	28							
FTR-K1CK048W-RG	48							

16A and silver nickel

Ordering Part Number	Series	Contact	Coil Power	Coil Voltage	Contact Material	Current	Special	
FTR-K1AK005E-RG	FTR-K1	A: 1 form A	K: 400 mW	5	E: Silver nickel (90/10)	Nil: 16A	RG: transparent cover	
FTR-K1AK006E-RG				6				
FTR-K1AK009E-RG				9				
FTR-K1AK012E-RG				12				
FTR-K1AK018E-RG				18				
FTR-K1AK022E-RG				22				
FTR-K1AK024E-RG				24				
FTR-K1AK028E-RG				28				
FTR-K1AK048E-RG		48						
FTR-K1CK005E-RG		C: 1 form C						5
FTR-K1CK006E-RG								6
FTR-K1CK009E-RG								9
FTR-K1CK012E-RG								12
FTR-K1CK018E-RG								18
FTR-K1CK022E-RG								22
FTR-K1CK024E-RG								24
FTR-K1CK028E-RG	28							
FTR-K1CK048E-RG	48							

FTR-K1 SERIES

12A, 3.5mm pitch and silver tin oxide

Ordering Part Number	Series	Contact	Coil Power	Coil Voltage	Contact Material	Current	Special	
FTR-K1AK005W-MA-RG	FTR-K1	A: 1 form A	K: 400 mW	5	W: Silver tin oxide	MA: 12A	RG: transparent cover	
FTR-K1AK006W-MA-RG				6				
FTR-K1AK009W-MA-RG				9				
FTR-K1AK012W-MA-RG				12				
FTR-K1AK018W-MA-RG				18				
FTR-K1AK022W-MA-RG				22				
FTR-K1AK024W-MA-RG				24				
FTR-K1AK028W-MA-RG				28				
FTR-K1AK048W-MA-RG				48				
FTR-K1CK005W-MA-RG		C: 1 form C						5
FTR-K1CK006W-MA-RG								6
FTR-K1CK009W-MA-RG								9
FTR-K1CK012W-MA-RG								12
FTR-K1CK018W-MA-RG								18
FTR-K1CK022W-MA-RG								22
FTR-K1CK024W-MA-RG								24
FTR-K1CK028W-MA-RG								28
FTR-K1CK048W-MA-RG								48

12A, 3.5mm pitch and silver nickel

Ordering Part Number	Series	Contact	Coil Power	Coil Voltage	Contact Material	Current	Special	
FTR-K1AK005E-MA-RG	FTR-K1	A: 1 form A	K: 400 mW	5	E: Silver nickel (90/10)	MA: 12A	RG: transparent cover	
FTR-K1AK006E-MA-RG				6				
FTR-K1AK009E-MA-RG				9				
FTR-K1AK012E-MA-RG				12				
FTR-K1AK018E-MA-RG				18				
FTR-K1AK022E-MA-RG				22				
FTR-K1AK024E-MA-RG				24				
FTR-K1AK028E-MA-RG				28				
FTR-K1AK048E-MA-RG				48				
FTR-K1CK005E-MA-RG		C: 1 form C						5
FTR-K1CK006E-MA-RG								6
FTR-K1CK009E-MA-RG								9
FTR-K1CK012E-MA-RG								12
FTR-K1CK018E-MA-RG								18
FTR-K1CK022E-MA-RG								22
FTR-K1CK024E-MA-RG								24
FTR-K1CK028E-MA-RG								28
FTR-K1CK048E-MA-RG								48

FTR-K1 SERIES

12A, 5.0mm pitch and silver tin oxide

Ordering Part Number	Series	Contact	Coil Power	Coil Voltage	Contact Material	Current	Special	
FTR-K1AK005W-MB-RG	FTR-K1	A: 1 form A	K: 400 mW	5	W: Silver tin oxide	MA: 12A	RG: transparent cover	
FTR-K1AK006W-MB-RG				6				
FTR-K1AK009W-MB-RG				9				
FTR-K1AK012W-MB-RG				12				
FTR-K1AK018W-MB-RG				18				
FTR-K1AK022W-MB-RG				22				
FTR-K1AK024W-MB-RG				24				
FTR-K1AK028W-MB-RG				28				
FTR-K1AK048W-MB-RG				48				
FTR-K1CK005W-MB-RG				C: 1 form C				
FTR-K1CK006W-MB-RG		6						
FTR-K1CK009W-MB-RG		9						
FTR-K1CK012W-MB-RG		12						
FTR-K1CK018W-MB-RG		18						
FTR-K1CK022W-MB-RG		22						
FTR-K1CK024W-MB-RG		24						
FTR-K1CK028W-MB-RG		28						
FTR-K1CK048W-MB-RG		48						

12A, 5.0mm pitch and silver nickel

Ordering Part Number	Series	Contact	Coil Power	Coil Voltage	Contact Material	Current	Special	
FTR-K1AK005E-MB-RG	FTR-K1	A: 1 form A	K: 400 mW	5	E: Silver nickel (90/10)	MB: 12A	RG: transparent cover	
FTR-K1AK006E-MB-RG				6				
FTR-K1AK009E-MB-RG				9				
FTR-K1AK012E-MB-RG				12				
FTR-K1AK018E-MB-RG				18				
FTR-K1AK022E-MB-RG				22				
FTR-K1AK024E-MB-RG				24				
FTR-K1AK028E-MB-RG				28				
FTR-K1AK048E-MB-RG				48				
FTR-K1CK005E-MB-RG				C: 1 form C				
FTR-K1CK006E-MB-RG		6						
FTR-K1CK009E-MB-RG		9						
FTR-K1CK012E-MB-RG		12						
FTR-K1CK018E-MB-RG		18						
FTR-K1CK022E-MB-RG		22						
FTR-K1CK024E-MB-RG		24						
FTR-K1CK028E-MB-RG		28						
FTR-K1CK048E-MB-RG		48						

FTR-K1 SERIES

10A, 3.5mm pitch and silver tin oxide

Ordering Part Number	Series	Contact	Coil Power	Coil Voltage	Contact Material	Current	Special
FTR-K1AL005W-LA-RG	FTR-K1	A: 1 form A	L: 250 mW	5	W: Silver tin oxide	LA: 10A	RG: transparent cover
FTR-K1AL006W-LA-RG				6			
FTR-K1AL009W-LA-RG				9			
FTR-K1AL012W-LA-RG				12			
FTR-K1AL018W-LA-RG				18			
FTR-K1AL024W-LA-RG				24			
FTR-K1AL048W-LA-RG				48			

10A, 3.5mm pitch and silver nickel

Ordering Part Number	Series	Contact	Coil Power	Coil Voltage	Contact Material	Current	Special
FTR-K1AL005E-LA-RG	FTR-K1	A: 1 form A	L: 250 mW	5	W: Silver nickel (90/10)	LA: 10A	RG: transparent cover
FTR-K1AL006E-LA-RG				6			
FTR-K1AL009E-LA-RG				9			
FTR-K1AL012E-LA-RG				12			
FTR-K1AL018E-LA-RG				18			
FTR-K1AL024E-LA-RG				24			
FTR-K1AL048E-LA-RG				48			

10A, 5.0mm pitch and silver tin oxide

Ordering Part Number	Series	Contact	Coil Power	Coil Voltage	Contact Material	Current	Special
FTR-K1AL005W-LB-RG	FTR-K1	A: 1 form A	L: 250 mW	5	W: Silver tin oxide	LB: 10A	RG: transparent cover
FTR-K1AL006W-LB-RG				6			
FTR-K1AL009W-LB-RG				9			
FTR-K1AL012W-LB-RG				12			
FTR-K1AL018W-LB-RG				18			
FTR-K1AL024W-LB-RG				24			
FTR-K1AL048W-LB-RG				48			

10A, 5.0mm pitch and silver nickel

Ordering Part Number	Series	Contact	Coil Power	Coil Voltage	Contact Material	Current	Special
FTR-K1AL005E-LB-RG	FTR-K1	A: 1 form A	L: 250 mW	5	W: Silver nickel (90/10)	LB: 10A	RG: transparent cover
FTR-K1AL006E-LB-RG				6			
FTR-K1AL009E-LB-RG				9			
FTR-K1AL012E-LB-RG				12			
FTR-K1AL018E-LB-RG				18			
FTR-K1AL024E-LB-RG				24			
FTR-K1AL048E-LB-RG				48			

FTR-K1 SERIES

■ COIL DATA CHART

Coil Voltage	Nominal Voltage (VDC)	Max. Coil Voltage* ¹	Coil Resistance (±10%)	Must Operate Voltage* ²	Must Release Voltage* ²	Nominal Power (mW)
005	5	12.2 VDC	62 Ω	3.5 VDC	0.5 VDC	400
006	6	14.7 VDC	90 Ω	4.2 VDC	0.6 VDC	
009	9	22.0 VDC	202 Ω	6.3 VDC	0.9 VDC	
012	12	29.4 VDC	360 Ω	8.4 VDC	1.2 VDC	
018	18	44.1 VDC	810 Ω	12.6 VDC	1.8 VDC	
022	22	53.9 VDC	1,210 Ω	15.4 VDC	2.2 VDC	
024	24	58.8 VDC	1,440 Ω	16.8 VDC	2.4 VDC	
028	28	68.6 VDC	1,960 Ω	19.6 VDC	2.8 VDC	430
048	48	117.6 VDC	5,360 Ω	33.6 VDC	4.8 VDC	

Note: All values in the table are measured at 20°C.

*1: No contact current at 20°C

*2: Specified values are subject to pulse wave voltage

■ SPECIFICATIONS

● 16A

Item		FTR-K1 AK () (T, W)-RG	FTR-K1 CK ()(W, E)-RG	
Contact	Arrangement	1 form A	1 form C	
	Material	T, W: Silver tin oxide, E: Silver nickel		
	Configuration	Single		
	Resistance (initial)	Maximum 100 mΩ at 1 A, 6 VDC		
	Rating	16 A, 250 VAC / 24 VDC		
	Maximum Carrying Current* ¹	16 A		
	Maximum Switching Rating	4,000 VA / 384W		
	Maximum Switching Voltage	440 VAC / 300VDC		
Coil	Maximum Switching Load* ²	10 mA 5 VDC		
	Nominal Power (at 20°C)	400mW (at 430mW 48V coil)		
	Operate Power (at 20°C)	200 mW (210mW at 48V coil)		
Time Value	Operating Temperature	-40°C to +70°C (no frost)		
	Operate (without diode)	Maximum 15ms (at nominal voltage, no bounce)		
Life	Release (without diode)	Maximum 5ms (at nominal voltage, no bounce)		
	Mechanical	20 x 10 ⁶ operations minimum		
Other	Electrical	AC Contact rating	100 x 10 ³ operations min. / 50 x 10 ³ operations min.	
		DC contact rating	100 x 10 ³ operations min. / 30 x 10 ³ operations min.	
	Vibration Resistance	Misoperation	10 to 55 Hz, at double amplitude of 0.7 mm	
		Endurance	10-55Hz, at double amplitude of 1.5 mm	
Shock Resistance	Misoperation	Min. 100m/s ² (11±1ms)		
	Endurance	Min. 1,000m/s ² (6±1ms)		
	Weight	Approximately 13g		

*¹ Need to consider the head from PCB when max. current is more than 10A.

*² Minimum switching loads mentioned above are reference values. Please perform the confirmation test with the actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

FTR-K1 SERIES

■ SPECIFICATIONS

- 12A

Item		FTR-K1AK () (W, E)-(MA, MB)-RG	FTR-K1CK() (W, E)-(MA, MB)-RG
Contact	Arrangement	1 form A	1 from C
	Material	W: Silver tin oxide, E: Silver nickel	
	Configuration	Single	
	Resistance (initial)	Maximum 100 mΩ at 1 A, 6 VDC	
	Rating	12 A, 250 VAC / 24 VDC	
	Maximum Carrying Current*1	14 A	
	Maximum Switching Rating	3,000 VA / 288W	
	Maximum Switching Voltage	440 VAC / 300VDC	
	Maximum Switching Load*2	10 mA 5 VDC	
Coil	Nominal Power (at 20°C)	400mW (at 430mW 48V coil)	
	Operate Power (at 20°C)	200 mW (210mW at 48V coil)	
	Operating Temperature	-40°C to +70°C (no frost)	
Time Value	Operate (without diode)	Maximum 15ms (at nominal voltage, no bounce)	
	Release (without diode)	Maximum 5ms (at nominal voltage, no bounce)	
Life	Mechanical	20 x 10 ⁶ operations minimum	
	Electrical	AC Contact rating	100 x 10 ³ operations min.
		DC contact rating	100 x 10 ³ operations min.
Other	Vibration Resistance	Misoperation	10 to 55 Hz, at double amplitude of 0.7 mm
		Endurance	10-55Hz, at double amplitude of 1.5 mm
	Shock Resistance	Misoperation	Min. 100m/s ² (11±1ms)
		Endurance	Min. 1,000m/s ² (6±1ms)

*1 Need to consider the head from PCB when max. current is more than 10A.

*2 Minimum switching loads mentioned above are reference values. Please perform the confirmation test with the actual load before production since reference values may vary according to switching frequencies, environmental conditions and expected reliability levels.

■ INSULATION

Item		FTR-K1	Note
Resistance (initial)		Minimum 1,000 MΩ 1 min.	at 500 VDC
Dielectric Strength	open contacts	1,000 VAC (50/60 Hz) 1 min.	
	coil and contacts	5,000 VAC (50/60 Hz) 1 min.	
Surge Voltage (coil and contact)		10,000 V	1.2 x 50μs standard wave
Clearance/Creepage		10 mm / 10 mm	
Insulation (DIN EN61810-1 VDE0435)			
Voltage		250 V	
Pollution		3	
Isolation material group		IIIa	
Isolation category / Reference voltage (VDE0110b)		C / 250 V	

FTR-K1 SERIES

■ SAFETY STANDARDS

● 16A

Type	Compliance	Contact rating	
		FTR-K1AK () (T,E)-RG	FTR-K1CK () (T,E)-RG
UL	UL 508	Flammability: UL 94-VII (plastics)	
	E63614	16A, 277 VAC (cosØ=1) 16A, 24 VAC (0ms)	16A, 277 VAC (cosØ=1) 1 HP, 277VAC
CSA	C22.2 No. 14 LR 40304	1 HP, 277VAC 1/2 HP, 125VAC Pilot duty: A300 TV-5, 120VAC (only T-type)	1/2 HP, 125VAC 1/8 HP, 125VAC Pilot duty: B300
VDE	0435, 0631, 0700, 0860	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

● 12A

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

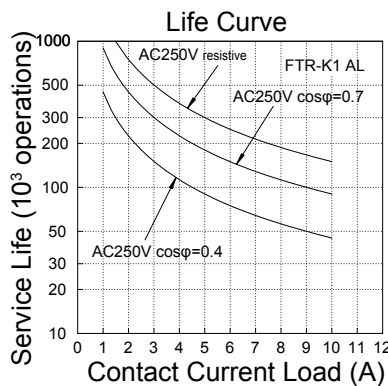
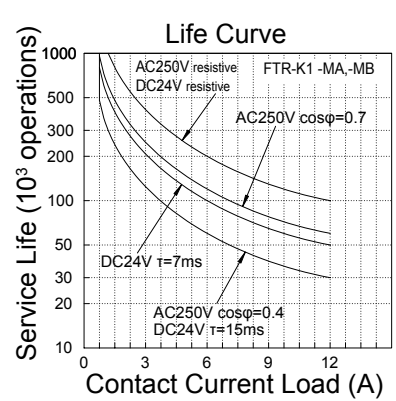
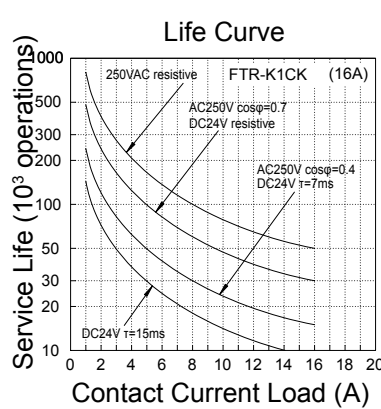
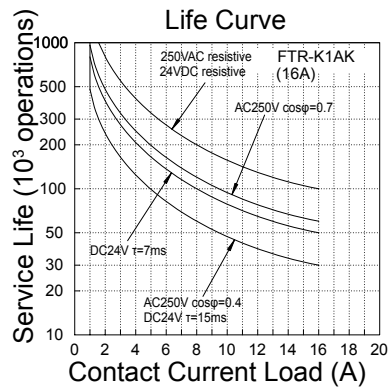
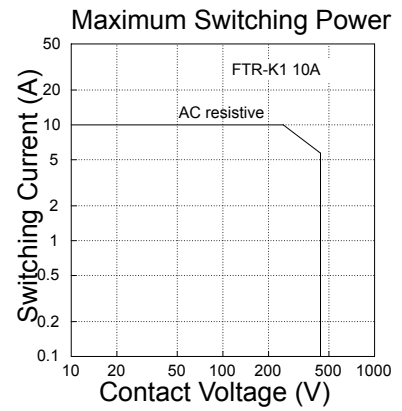
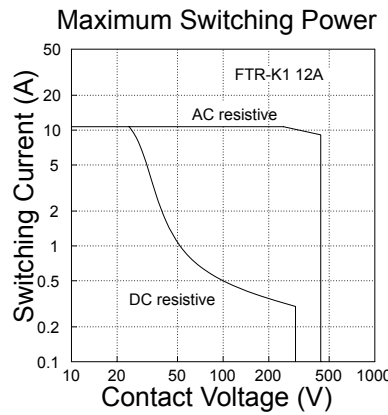
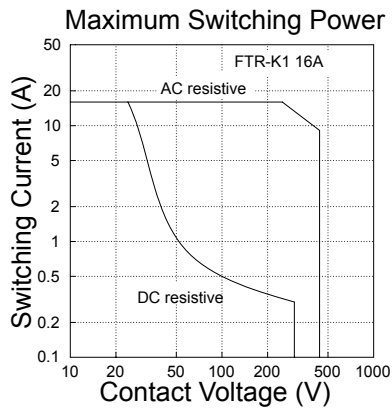
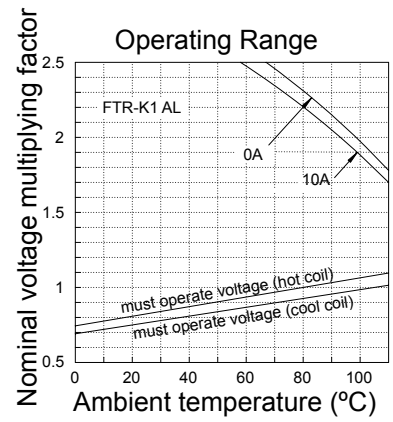
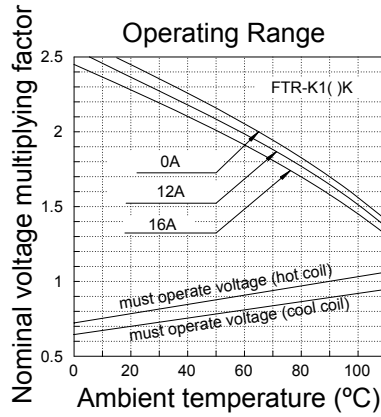
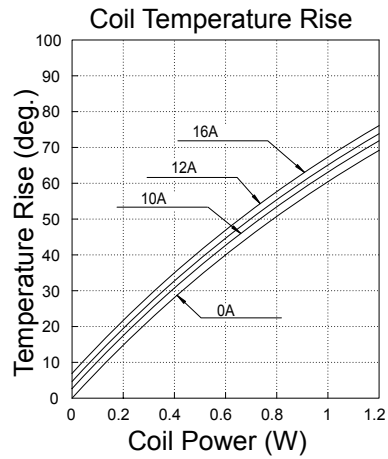
Complies with NEMKO, DEMKO, FIMKO

● 10A

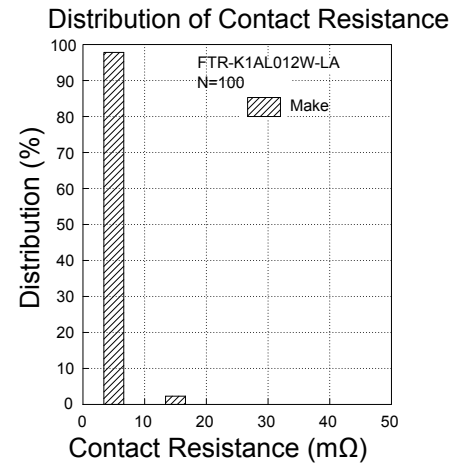
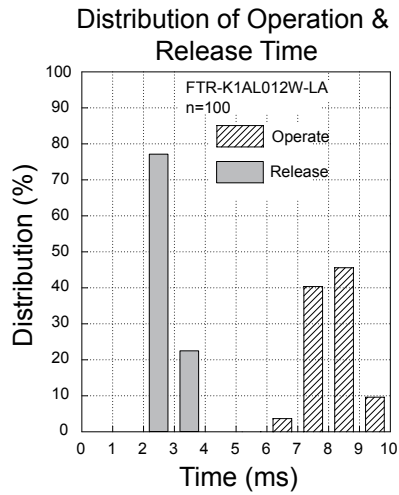
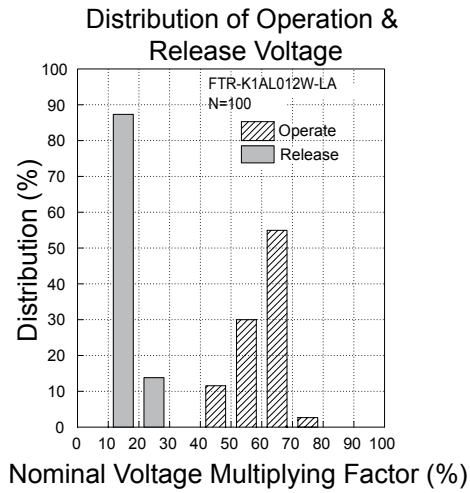
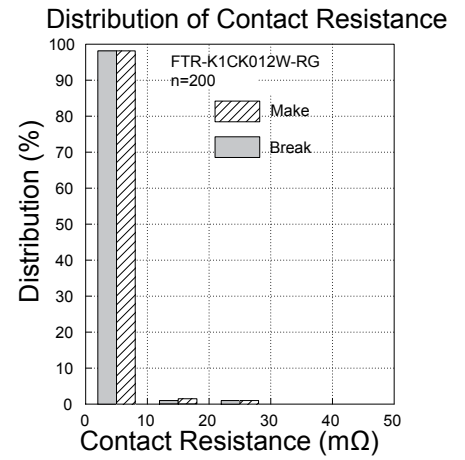
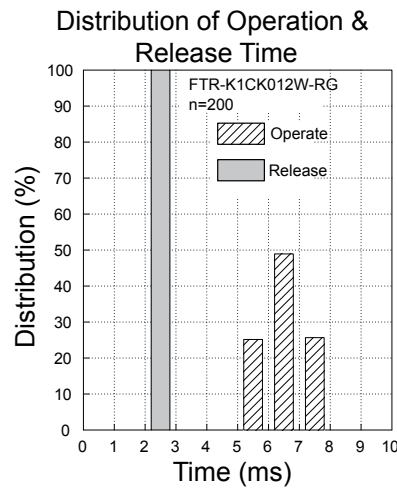
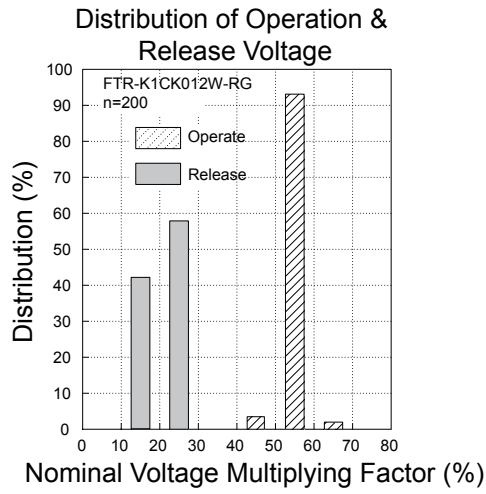
Type	Compliance	Contact rating	
		FTR-K1AL() (W,E)(LA, LB)-RG	
UL	UL 508	Flammability: UL 94-VII (plastics)	
	E63614	10A, 277 VAC (cosØ=1) 1 /2HP, 277VAC	
CSA	C22.2 No. 14 LR 40304	1/3 HP, 125VAC Pilot duty: B300	
VDE	0435, 0631, 0700, 0860	10A, 250 VAC (cosØ=1) 3A, 250 VAC (cosØ=0.4)	
SEMKO	EN 61058-1:1992 and A1 EN 61095:1993 and A1+A11	250VAC, 10 (3)A 40T70	

Complies with NEMKO, DEMKO, FIMKO

CHARACTERISTIC DATA



FTR-K1 SERIES

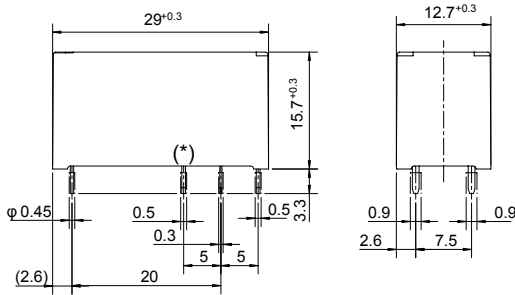


FTR-K1 SERIES

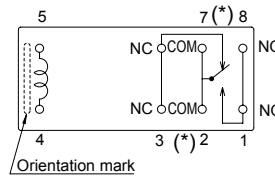
■ DIMENSIONS

● Dimensions

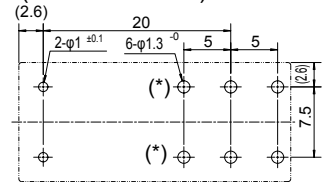
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● Schematics (BOTTOM VIEW)

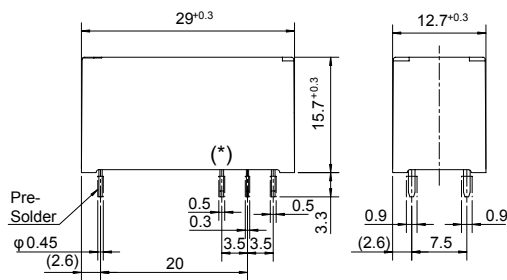


● PC board mounting hole layout (BOTTOM VIEW)

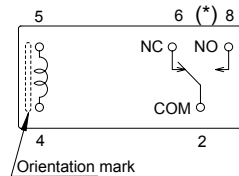


● Dimensions

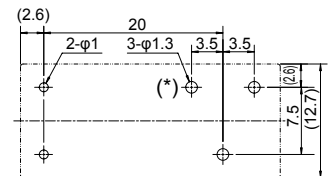
FTR-K1() /MA /LA



● Schematics (BOTTOM VIEW)

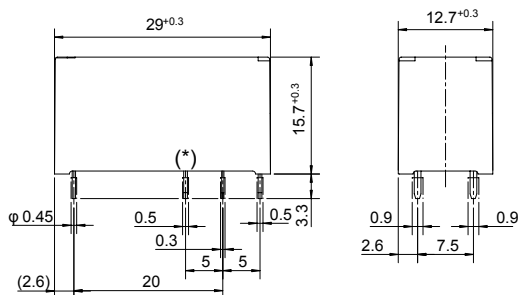


● PC board mounting hole layout (BOTTOM VIEW)

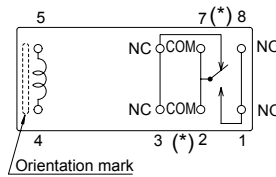


● Dimensions

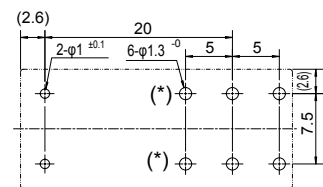
FTR-K1() /MB



● Schematics (BOTTOM VIEW)



● PC board mounting hole layout (BOTTOM VIEW)



Unit: mm

RoHS Compliance and Lead Free Relay Information

1. General Information

- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. All of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (<http://www.fujitsu.com/us/downloads/MICRO/fcai/relays/lead-free-letter.pdf>)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu.
- All signal and power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 5 hazardous materials that are restricted by RoHS directive (lead, mercury, chromium IV, PBB, PBDE).
- It has been verified that using lead-free relays in leaded assembly process will not cause any problems (compatible).
- "LF" is marked on each outer and inner carton. (No marking on individual relays).
- To avoid leaded relays (for lead-free sample, etc.) please consult with area sales office.
- We will ship leaded relays as long as the leaded relay inventory exists.

Note: Cadmium was exempted from RoHS on October 21, 2005. (Amendment to Directive 2002/95/EC)

2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu.

Reflow Solder condition

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.

4. Tin Whisker

- Dipped SnAgCu solder is known as low risk tin whisker. No considerable length whisker was found by our in house test.

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Rev. January 28, 2008.