

POWER RELAY

1 POLE - 270A/320A

FTR-R1 Series

RoHS Compliant

■ FEATURES

- Contact rating 270A, 1,000VAC (FTR-R1) and 320A, 1,000VAC (FTR-R1A)
- 4.1 mm contact gap which complies with VDE0126.
- Low coil power consumption by holding current
- Flux proof or plastic sealed
- RoHS compliant



■ APPLICATIONS

Solar photovoltaic inverters, industrial equipment inverters, Uninterruptible power supply (UPS) systems, EV charging solution, various control circuit systems

■ PART NUMBERS

[Example] FTR-R1 A A K 012 E
 (a) (b) (c) (d) (e) (f)

(a)	Relay type	FTR-R1 series
(b)	Contact current capacity	Nil : 270A A : 320A
(c)	Contact configuration	A : 1a (1 Form X)
(d)	Enclosure	A : Plastic sealed (320A type) K : Flux proof
(e)	Coil rated voltage	Please refer to coil rating table
(f)	Contact material	E : Silver based material

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

E.g.: Ordering code: FTR-R1AAK012E Actual marking: R1AAAK012E

■ SPECIFICATIONS

Item		Specifications		Remarks/Conditions
		FTR-R1	FTR-R1A	
Contact Data	Configuration	1a (1 Form X)		
	Material	Silver based material		
	Resistance	Max. 1mΩ	Max. 0.5mΩ	At 20A
	Contact rating	Making 55A, carrying 270A, breaking 55A, 1,000VAC	Making 55A, carrying 320A, breaking 55A, 1,000VAC	Resistive
	Max. switching voltage	1,000VAC		
	Max. switching current	270A	320A	
Coil	Rated power consumption	Approx. 3W	Approx. 5W	At rated coil current
		Approx. 1.08W	Approx. 1.8W	At holding coil current
	Operate voltage	Max. 75% of rated coil voltage		Initial
	Release voltage	Min. 5% of rated coil voltage		Initial
	Operating temperature range	-40 to +85°C ^{*1}		No frost
Time	Operate	Max. 30ms (at rated voltage, without bounce)		
	Release	Max. 10ms (at rated voltage, without bounce)		
	Mechanical	Min. 1 x 10 ⁶ operations	Min. 3 x 10 ⁵ operations	
	Electrical	1 x 10 ⁴ operations Making 55A, carrying 270A, breaking 55A, 1,000VAC, Resistive load	1 x 10 ⁴ operations ^{*3} Making 55A, carrying 320A, breaking 55A, 1,000VAC, Resistive load	At 85 °C, 1 sec. on, 9 sec. off
		75 operations Making 55A, carrying 270A, breaking 270A, 1,000VAC, Resistive load	150 operations ^{*3} Making 320A, carrying 320A, breaking 320A, 1,000VAC, Resistive load	At 85 °C, 1 sec. on, 9 sec. off
Insulation	Insulation resistance		1,000MΩ	At 500VDC
	Dielectric strength	Open contacts	2,000VAC, 1minute	2,500VAC, 1 minute
		Coil to contacts	5,000VAC, 1 minute	
	Surge strength	Coil to contacts	10,000V / 1.2 x 50μs standard wave	
Others	Vibration resistance	Misoperation	10 to 55 to 10Hz, double amplitude 1.0mm	Coil ON/OFF, 3 axis, total 6 cycles
		Endurance	10 to 55 to 10Hz, double amplitude 1.5mm	Coil OFF, 3 axis, total 6 hours
	Shock resistance	Misoperation	98m/s ² (11±1ms)	Coil ON/OFF, 3 axis, total 36 operations
		Endurance	980m/s ² (6±1ms)	Coil OFF, 3 axis, total 18 operations
	Dimensions / Weight		65 x 45.9 x 53mm / Approx. 230g	
	Sealing		Flux proof	Flux proof, plastic sealed

*1: This value applies when the coil current is reduced to the holding current. Please refer to COIL DATA table.

*2: Electrical life mentioned above are the values when varistor or zener diode + diode is used as coil suppression device. Using protection device other than these, the contact life expectancy may decrease. Varistor voltage or zener voltage shall be approximately twice the voltage applied to the coil and connect it in parallel with the coil. As an example, Figure 2 on next page shows a case where a Zener diode + diode is used as a coil suppression device.

*3: Electrical life test is performed with flux proof. Please confirm with your actual equipment.

■ COIL DATA

● FTR-R1 (270A type)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance ^{*1} ±10% (Ω)	Must Operate Voltage ^{*1} (VDC)	Must Release Voltage ^{*1} (VDC)	Rated Coil Current ^{*2*3} (mA)	Holding Coil Current ^{*2*3} (mA)
012	12	48	9	0.6	Max.278 Min.227	Max.166 Min.114
024	24	192	18	1.2	Max.138 Min.113	Max.83 Min.69

● FTR-R1A (320A type)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance ^{*1} ±10% (Ω)	Must Operate Voltage ^{*1} (VDC)	Must Release Voltage ^{*1} (VDC)	Rated Coil Current ^{*2*3} (mA)	Holding Coil Current ^{*2*3} (mA)
012	12	28.8	9	0.6	Max. 463 Min. 378	Max. 277 Min.190
024	24	115.2	18	1.2	Max. 232 Min.189	Max. 138 Min.114

*1: These values are measured at 20° C. These values vary with temperature.

*2: These values are temperature-independent threshold. Please use within min. to max. range.

*3: Reduce the current to the coil holding current after applying the rated coil current to the relay coil for 100ms. Refer to figure 1.

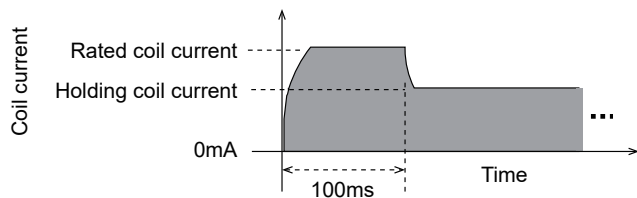


Figure 1 Example waveform of the relay coil holding current

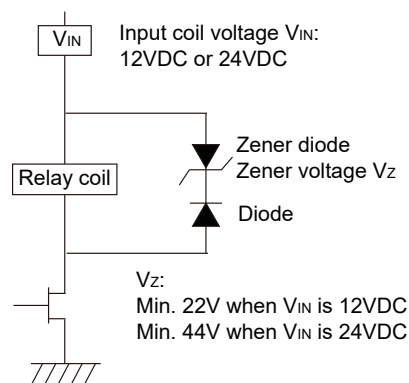


Figure 2 Circuit diagram example
Using zener diode and diode

■ PART NUMBER LIST

Part Number	Contact current capacity	Contact configuration	Enclosure	Contact Material
FTR-R1AK()E	270A	1a (1 Form X)	Flux proof	Silver based material
FTR-R1AAA()E	320A		Plastic sealed	
FTR-R1AAK()E			Flux proof	

■ SAFETY STANDARDS (PLAN)

- CSA: UL508, CSA22.2 No. 14
- TUV Rheinland: EN/IEC61810-1, EN/IEC61810-10

■ PRODUCT STANDARDS COMPLIANCE

- Compliance with TUV Rheinland: IEC62109-1/-2, IEC62477-1

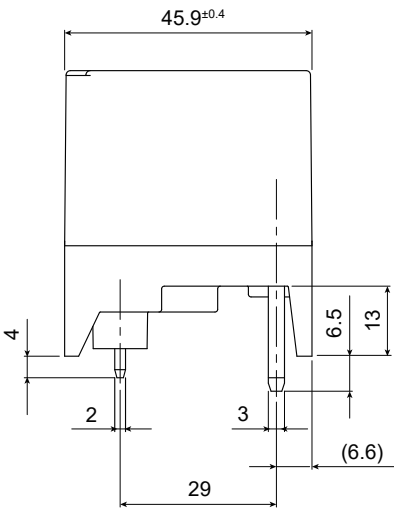
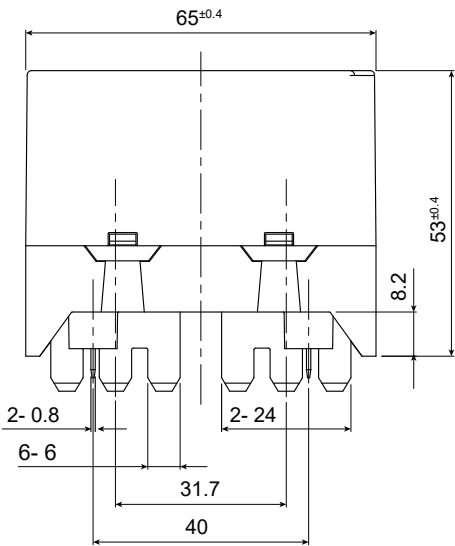
Creepage distance between coil to contact (required value)		12.5mm
Clearance between coil to contact (required value)		10.32mm
Insulation material group		I
Type of insulation	Coil to contact circuit	Basic (1,000V, OV-cat. III, up to 4,000m above sea level)
	Open contact circuit	Micro disconnection
Rated insulation system		1,000V
Pollution degree		3
Rated voltage system		1,000V
Category of protection (IEC61810-1)		RT II (Flux proof type) RT III (Plastic sealed type)
Flammability class (UL94)		V-0
Coil insulation system (UL)		Class F

*Note: This does not mean that the products get certified by TUV.

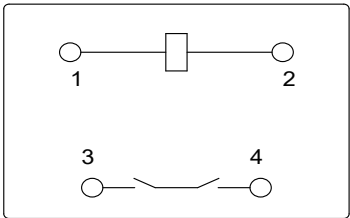
DIMENSIONS

- FTR-R1 (270A type)

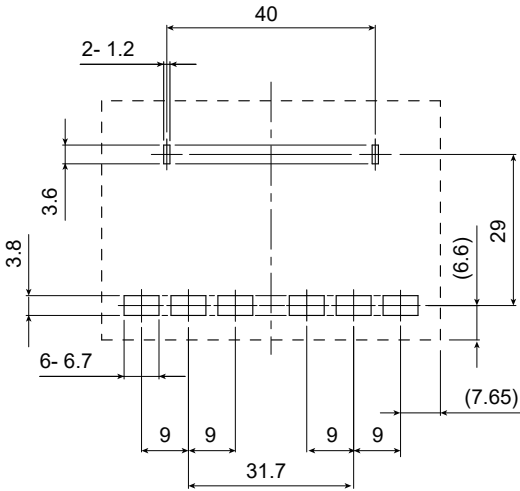
Dimensions



Schematics
(BOTTOM VIEW)



PC board mounting hole layout
(BOTTOM VIEW)



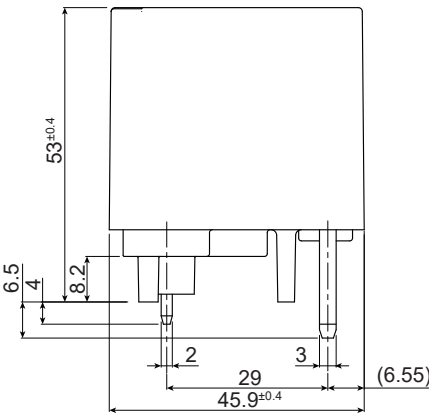
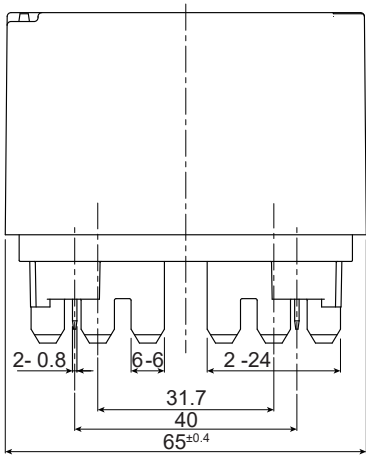
- Tolerance of PC board mounting hole layout: ± 0.05 unless otherwise specified.
- Dimensions do not include tolerances. Please ask specification in case you need tolerances.

(): Reference
Unit: mm

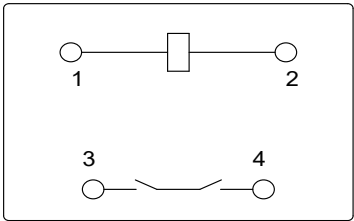
DIMENSIONS

- FTR-R1A (320A type)

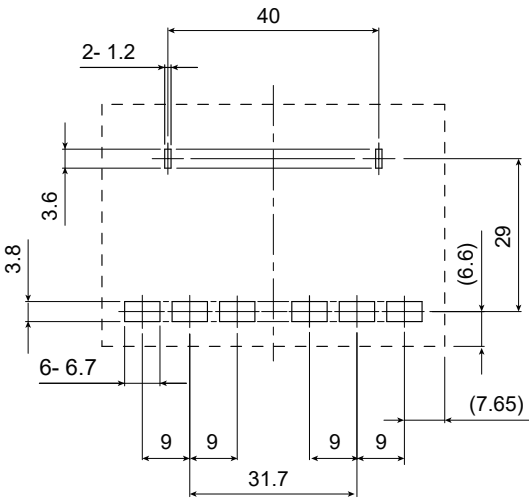
Dimensions



Schematics
(BOTTOM VIEW)



PC board mounting hole layout
(BOTTOM VIEW)



- Tolerance of PC board mounting hole layout: ±0.05 unless otherwise specified.
- Dimensions do not include tolerances. Please ask specification in case you need tolerances.

(): Reference
Unit: mm

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. Moisture Sensitivity

- Moisture Sensitivity Level standard is not applicable to electromechanical relays, unless otherwise indicated.

3. 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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