FUJITSU THE POSSIBILITIES ARE INFINITE

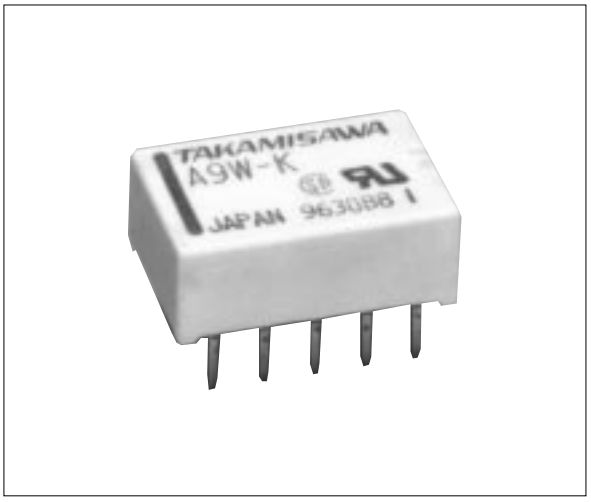
MINIATURE RELAY

2 POLES—1 to 2 A (FOR SIGNAL SWITCHING)

A SERIES

RoHS Compliant

■ FEATURES



- Extremely low profile and light weight
  —Height: 5 mm
  —Weight: approximately 1.2 g
- UL, CSA recognized
- Conforms to FCC rules and regulations part 68
  —Surge strength 1,500 V
- High reliability—bifurcated contacts
- Wide operating range
- DIL pitch terminals
- Plastic sealed type
- Latching version available
- RoHS compliant since date code: 0437B8
  Please see page 7 for more information

■ ORDERING INFORMATION

[Example] A (a) L (b) – (*) D (c) 12 (d) W (e) – K (f) - HA (g)

(a)	Series Name	A : A Series
(b)	Operation Function	Nil : Standard type L : Latching type
(c)	Number of Coil	Nil : Single winding type D : Double winding type
(d)	Nominal Voltage	Refer to the COIL DATA CHART
(e)	Contact	W : Bifurcated type
(f)	Enclosure	K : Plastic sealed type
(g)	Coil Sensitivity	Nil : Standard HA : 75% must voltage operate

Note: Actual marking omits the hyphen (-) of (*)

■ SAFETY STANDARD AND FILE NUMBERS

Nominal voltage	Contact rating
1.5 to 48 VDC	0.5 A 125 VAC 2 A 30 VDC 0.3 A 110 VDC — resistive

Only UL/CSA approval markings are marked on the cover.

■ SPECIFICATIONS

Item			Standard Type	Single Winding Latching Type	Double Winding Latching Type
			A-( ) W-K	AL-( ) W-K	AL-D ( ) W-K
Contact	Arrangement		2 form C (DPDT)		
	Material		Gold overlay silver alloy		
	Resistance (initial)		Maximum 50 mΩ (at 1 A 6 VDC)		
	Rating (resistive)		0.5 A 125 VAC or 1 A 30 VDC		
	Maximum Carrying Current		2 A		
	Maximum Switching Power		62.5 AV/30 W		
	Maximum Switching Voltage		250 VAC, 220 VDC		
	Maximum Switching Current		2 A		
	Minimum Switching Load*1		0.01 mA 10 mVDC		
	Capacitance		Approximately 0.5 pF (between open contacts, adjacent contacts) Approximately 1.0 pF (between coil and contacts)		
Coil	Nominal Power (at 20°C)		0.14 to 0.3 W	0.1 to 0.15 W	0.20 to 0.3 W
	Operate Power (at 20°C)		0.08 to 0.17 W	0.06 to 0.85 W	0.15 to 0.17 W
	Operating Temperature		–40°C to +85°C (no frost) (refer to the CHARACTERISTIC DATA)		
Time Value	Operate (at nominal voltage)		Maximum 6 ms	Maximum 6 ms (set)	
	Release (at nominal voltage)		Maximum 4 ms	Maximum 6 ms (reset)	
Insulation	Resistance (at 500 VDC)		Minimum 1,000 MΩ		
	Dielectric Strength	between open contacts	1,000 VAC 1 minute		
		between adjacent contacts	1,000 VAC 1 minute		
		between coil and contacts	1,000 VAC 1 minute		
	Surge Strength		1,500 V (between coil and contacts)		
Life	Mechanical		1×10^8 operations minimum	1×10^7 operations minimum	
	Electrical		2×10^5 ops. min. (0.5 A 125 VAC), 5×10^5 ops. min. (1 A 30 VDC)		
Other	Vibration Resistance	Misoperation	10 to 55 Hz (double amplitude of 3.3 mm)		
		Endurance	10 to 55 Hz (double amplitude of 5.0 mm)		
	Shock Resistance	Misoperation	500 m/s^2 (11 ±1 ms)		
		Endurance	1,000 m/s^2 (6 ±1 ms)		
	Weight		Approximately 1.2 g		

*1 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.

■ COIL DATA CHART

	MODEL	Nominal voltage	Coil resistance (±10%)	Must operate voltage*1	Must release voltage*1	Nominal power
Standard Type	A-1.5W-K	1.5 VDC	16.1Ω	+1.13 VDC	+0.15 VDC	140 mW
	A- 3 W-K	3 VDC	64.3Ω	+2.25 VDC	+0.3 VDC	140 mW
	A-4.5W-K	4.5 VDC	145Ω	+3.38 VDC	+0.45 VDC	140 mW
	A- 5 W-K	5 VDC	178Ω	+3.75 VDC	+0.5 VDC	140 mW
	A- 6 W-K	6 VDC	257Ω	+4.5 VDC	+0.6 VDC	140 mW
	A- 9 W-K	9 VDC	579Ω	+6.75 VDC	+0.9 VDC	140 mW
	A-12 W-K	12 VDC	1,028Ω	+9.0 VDC	+1.2 VDC	140 mW
	A-18 W-K	18 VDC	1,620Ω	+13.5 VDC	+1.8 VDC	200 mW
	A-24 W-K	24 VDC	2,880Ω	+18.0 VDC	+2.4 VDC	200 mW
	A-48 W-K	48 VDC	7,680Ω	+36.0 VDC	+4.8 VDC	300 mW

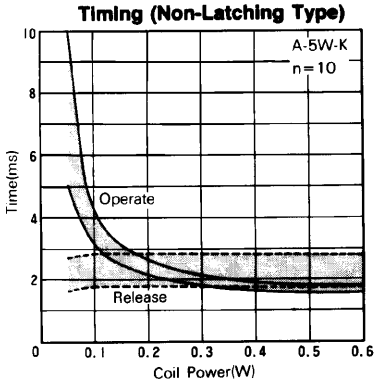
Note: *1 Specified values are subject to pulse wave voltage.
All values in the table are measured at 20°C.

	MODEL	Nominal voltage	Coil resistance (±10%)	Set voltage*1	Reset voltage*1	Nominal power
Single Winding Latching Type	AL-1.5W-K	1.5 VDC	22.5Ω	+1.13 VDC	-1.05 VDC	100 mW
	AL- 3 W-K	3 VDC	90Ω	+2.25 VDC	-2.1 VDC	100 mW
	AL-4.5W-K	4.5 VDC	203Ω	+3.38 VDC	-3.15 VDC	100 mW
	AL- 5 W-K	5 VDC	250Ω	+3.75 VDC	-3.5 VDC	100 mW
	AL- 6 W-K	6 VDC	360Ω	+4.5 VDC	-4.2 VDC	100 mW
	AL- 9 W-K	9 VDC	810Ω	+6.75 VDC	-6.3 VDC	100 mW
	AL-12 W-K	12 VDC	1,440Ω	+9.0 VDC	-8.4 VDC	100 mW
	AL-18 W-K	18 VDC	2,160Ω	+13.5 VDC	-12.6 VDC	150 mW
	AL-24 W-K	24 VDC	3,840Ω	+18.0 VDC	-16.8 VDC	150 mW
Double Winding Latching Type	AL-D1.5W-K	1.5 VDC	P 11.25Ω	+1.13 VDC		200 mW
			S 11.25Ω		+1.05 VDC	
	AL-D 3 W-K	3 VDC	P 45Ω	+2.25 VDC		200 mW
			S 45Ω		+2.1 VDC	
	AL-D4.5W-K	4.5 VDC	P 101Ω	+3.38 VDC		200 mW
			S 101Ω		+3.15 VDC	
	AL-D 5 W-K	5 VDC	P 125Ω	+3.75 VDC		200 mW
			S 125Ω		+3.5 VDC	
	AL-D 6 W-K	6 VDC	P 180Ω	+4.50 VDC		200 mW
			S 180Ω		+4.2 VDC	
	AL-D 9 W-K	9 VDC	P 405Ω	+6.75 VDC		200 mW
			S 405Ω		+6.3 VDC	
	AL-D12 W-K	12 VDC	P 720Ω	+9.0 VDC		200 mW
			S 720Ω		+8.4 VDC	
	AL-D18 W-K	18 VDC	P 1,080Ω	+13.5 VDC		300 mW
			S 1,080Ω		+12.6 VDC	
	AL-D24 W-K	24 VDC	P 1,920Ω	+18.0 VDC		300 mW
			S 1,920Ω		+16.8 VDC	

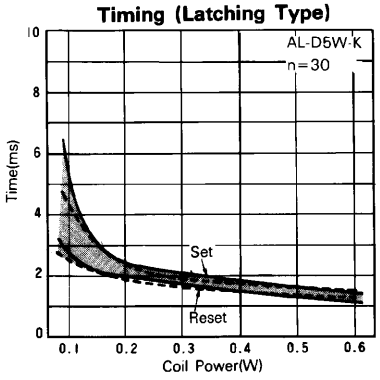
Note: *1 Specified values are subject to pulse wave voltage. P: Primary coil S: Secondary coil
All values in the table are measured at 20°C.

■ CHARACTERISTIC DATA

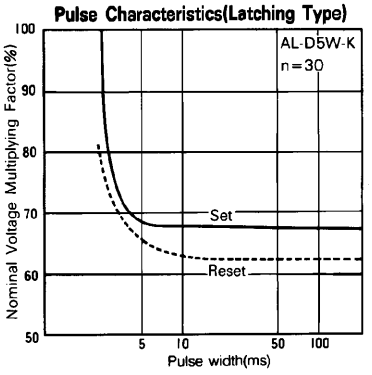
Timing (Non-Latching Type)



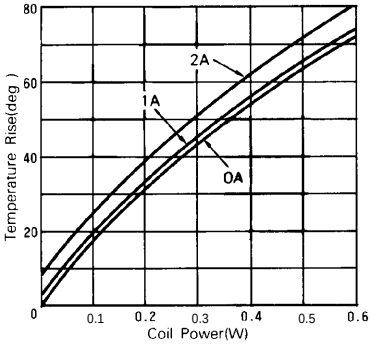
Timing (Latching Type)



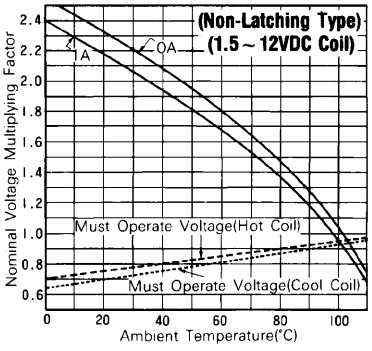
Pulse Characteristics(Latching Type)



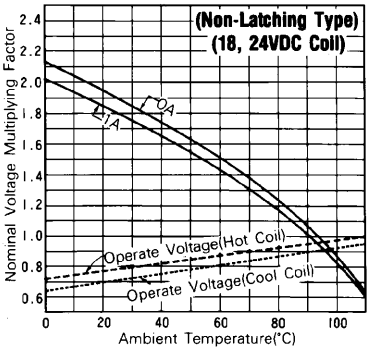
Coil Temperature Rise



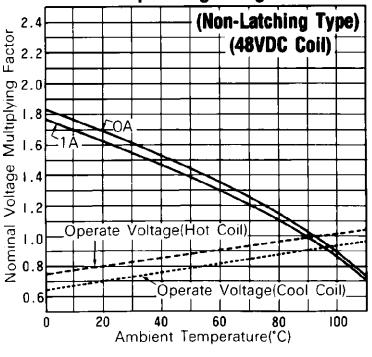
Operating Range



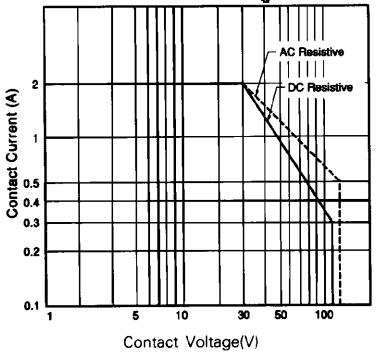
Operating Range



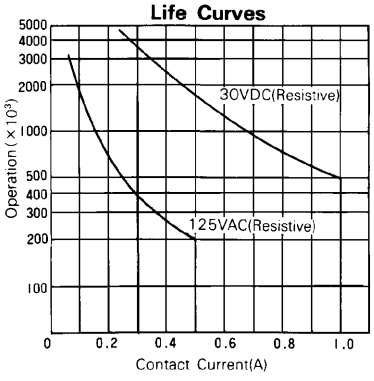
Operating Range



Maximum Switching Power

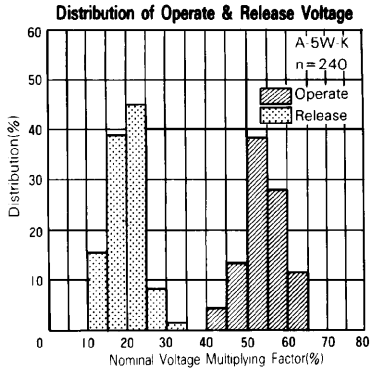


Life Curves

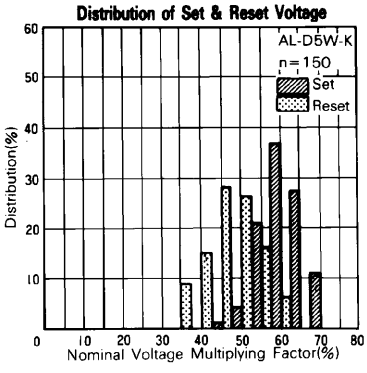


■ REFERENCE DATA

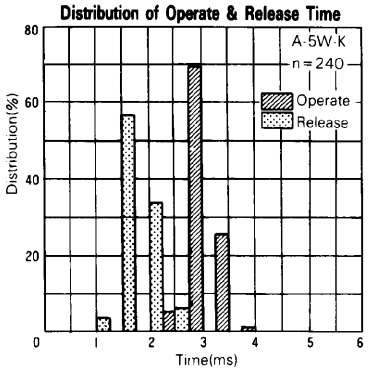
Distribution of Operate & Release Voltage



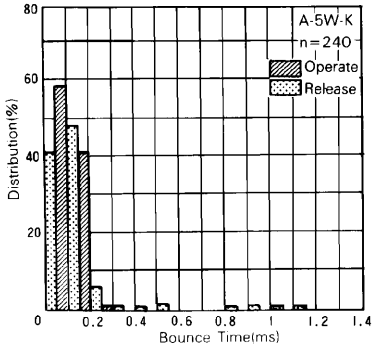
Distribution of Set & Reset Voltage



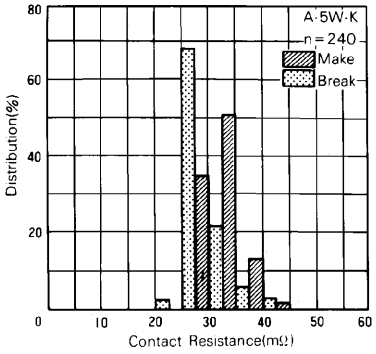
Distribution of Operate & Release Time



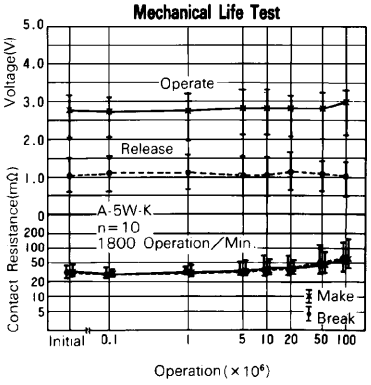
Distribution of Bounce Time



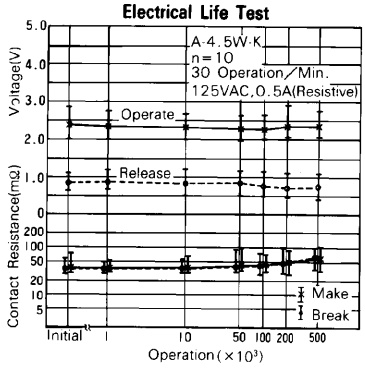
Distribution of Contact Resistance



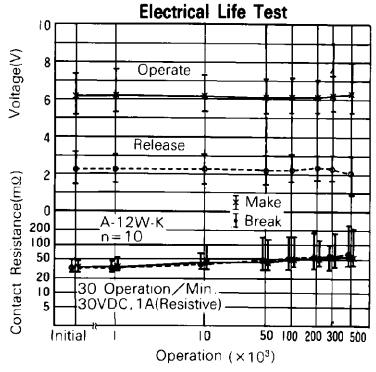
Mechanical Life Test



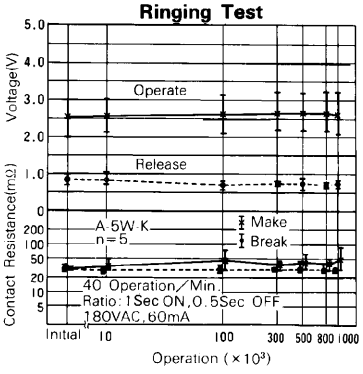
Electrical Life Test



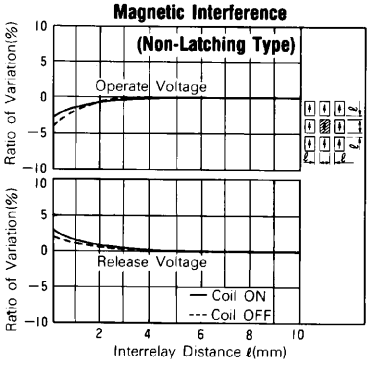
Electrical Life Test



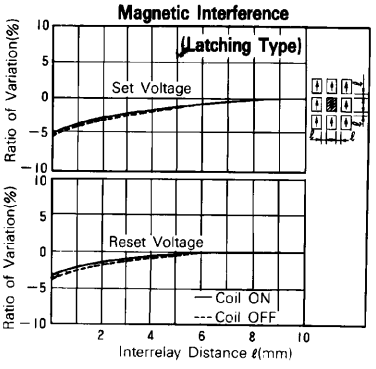
Ringing Test



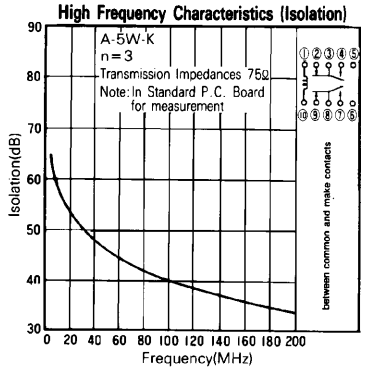
Magnetic Interference



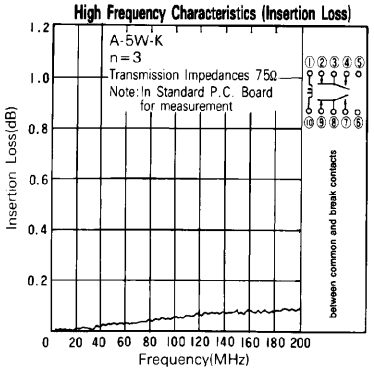
Magnetic Interference



High Frequency Characteristics (Isolation)



High Frequency Characteristics (Insertion Loss)



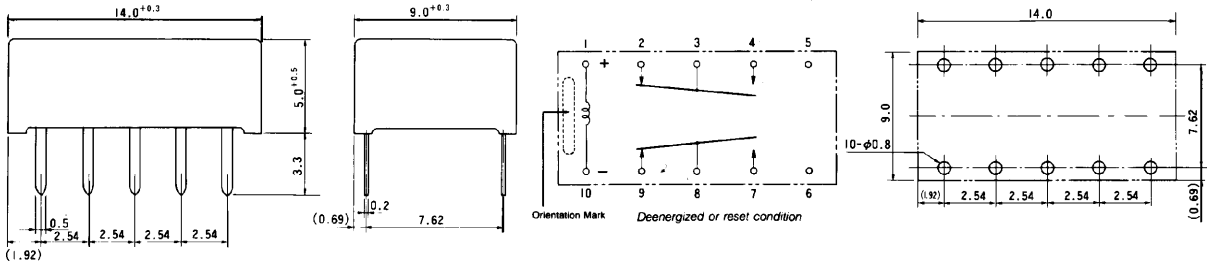
■ DIMENSIONS

●Dimensions

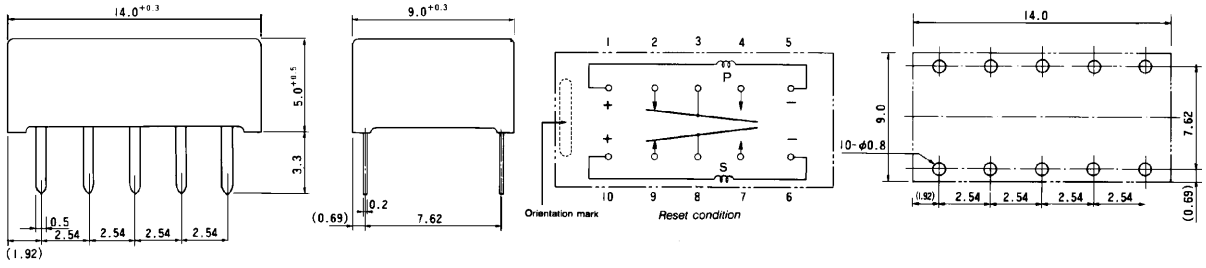
●Schematics
(Bottom View)

●PC board mounting hole layout
(Bottom View)

A, AL type (Non-latching type, single winding latching type)



AL-D type (Double winding latching type)



Unit: mm

RoHS Compliance and Lead Free Relay Information

1. General Information

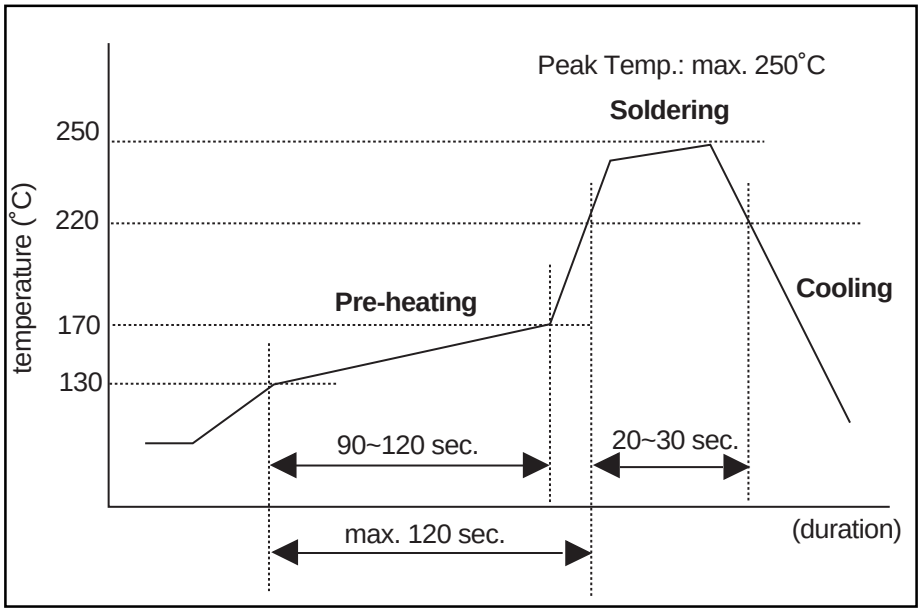
- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. Most of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (http://www.fcai.fujitsu.com/pdf/LeadFreeLetter.pdf)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu. From February 2005 forward Sn-3.0Cu-Ni will be used for FTRB3 and FTR-B4 series relays.
- Most signal and some power relays also comply with RoHS. Please refer to individual data sheets. Relays that are RoHS compliant do not contain the 6 hazardous materials that are restricted by RoHS directive (lead, mercury, cadmium, 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.

2. Recommended Lead Free Solder Profile

- Recommended solder paste Sn-3.0Ag-0.5Cu and Sn-3.0 Cu-Ni (only FTR-B3 and FTR-B4 from February 2005)

Reflow Solder condtion



Flow Solder condtion:

Pre-heating:	maximum 120˚C
Soldering:	dip within 5 sec. at 260˚C soler 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 realys.

4. Tin Whisker

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

5. Solid State Relays

- Each lead terminal will be changed from solder plating to Sn plating and Nickel plating. A layer of Nickel plating is between the terminal and the Sn plating to avoid whisker.

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