FUJITSU THE POSSIBILITIES ARE INFINITE

MINIATURE RELAY

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

RA SERIES

RoHS Compliant

■ FEATURES

- Ultra high sensitivity
- High reliability-bifurcated contacts
- Conforms to FCC rules and regulations Part 68
  —Dielectric strength 1,500 VAC between coil and contacts
  —Surge strength 1,500 V
- UL, CSA recognized
- Wide operating range
- DIL pitch terminals
- Plastic sealed type
- Latching type available
- Dial-pulse relay available
- RoHS compliant since date code: 0418H
  Please see page 7 for more information

■ ORDERING INFORMATION

[Example] RA (a) L (b) – (*) D (c) 12 (d) W (e) – K (f)

(a)	Series Name	RA : RA 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

Note: Actual marking omits the hyphen (-) of (*)
For movable and stationary contact with gold overlay type, add suffix ""-OH"".

■ SAFETY STANDARD AND FILE NUMBERS

UL478, 508 (File No. E45026)
C22.2 No. 14 (File No. LR35579)
Please request when the approval markings are required on the cover.

Nominal voltage	Contact rating
1.5 to 48 VDC	0.5 A 120 VAC 2 A 30 VDC — resistive 0.5 A 60 VDC

■ SPECIFICATIONS

Item			Standard Type	Single Winding Latching Type	Double Winding Latching Type
			RA-( ) W-K	RAL-( ) W-K	RAL-D ( ) W-K
Contact	Arrangement		2 form C (DPDT)		
	Material		Gold overlay silver alloy		
	Style		Bifurcated		
	Resistance (initial)		Maximum 100 mΩ (at 1 A 6 VDC)		
	Rating (resistive)		0.5 A 120 VAC or 1 A 24 VDC		
	Maximum Carrying Current		2 A		
	Maximum Switching Power		60 VA, 24 W		
	Maximum Switching Voltage		250 VAC, 220 VDC		
	Maximum Switching Current		2 A		
	Minimum Switching Load*1		0.01 mA 10 mVDC		
	Capacitance (10 MHz)		Approximately 1.5 pF (between open contacts), 1.0 pF (adjacent contacts) Approximately 1.7 pF (between coil and contacts)		
Coil	Nominal Power (at 20°C)		0.15 to 0.2 W	0.075 to 0.2 W	0.15 to 0.2 W
	Operate Power (at 20°C)		0.07 to 0.09 W	0.04 to 0.05 W	0.07 to 0.09 W
	Operating Temperature		–40°C to +80°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	1,500 VAC 1 minute		
		between coil and contacts	1,500 VAC 1 minute		
	Surge Strength		1,500 V		
Life	Mechanical		2×10^7 operations minimum		
	Electrical		2×10^5 ops. min. (0.5 A 120 VAC), 5×10^5 ops. min. (1 A 24 VDC)		
Other	Vibration Resistance	Misoperation	10 to 55 Hz (double amplitude of 5.0 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 3.7 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	RA-1.5 W-K	1.5 VDC	15Ω	+1.0 VDC	+0.15 VDC	150 mW
	RA- 3 W-K	3 VDC	60Ω	+2.0 VDC	+0.3 VDC	150 mW
	RA-4.5 W-K	4.5 VDC	135Ω	+3.1 VDC	+0.45 VDC	150 mW
	RA- 5 W-K	5 VDC	167Ω	+3.4 VDC	+0.5 VDC	150 mW
	RA- 6 W-K	6 VDC	240Ω	+4.0 VDC	+0.6 VDC	150 mW
	RA- 9 W-K	9 VDC	540Ω	+6.1 VDC	+0.9 VDC	150 mW
	RA- 12 W-K	12 VDC	960Ω	+8.1 VDC	+1.2 VDC	150 mW
	RA- 18 W-K	18 VDC	2,160Ω	+12.3 VDC	+1.8 VDC	150 mW
	RA- 24 W-K	24 VDC	2,880Ω	+16.1 VDC	+2.4 VDC	200 mW
	RA- 48 W-K	48 VDC	11,520Ω	+32.2 VDC	+4.8 VDC	200 mW

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

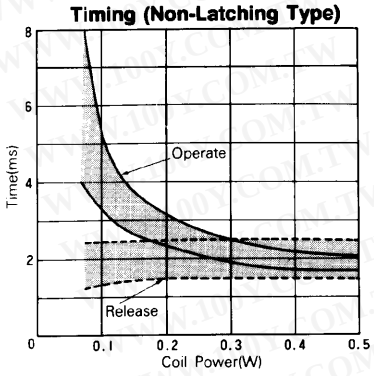
	MODEL	Nominal voltage	Coil resistance (±10%)	Set voltage*1	Reset voltage*1	Nominal power
Single Winding Latching Type	RAL-1.5 W-K	1.5 VDC	30Ω	+1.0 VDC	–1.0 VDC	75 mW
	RAL- 3 W-K	3 VDC	120Ω	+2.1 VDC	–2.1 VDC	75 mW
	RAL-4.5 W-K	4.5 VDC	270Ω	+3.1 VDC	–3.1 VDC	75 mW
	RAL- 5 W-K	5 VDC	335Ω	+3.4 VDC	–3.4 VDC	75 mW
	RAL- 6 W-K	6 VDC	480Ω	+4.1 VDC	–4.1 VDC	75 mW
	RAL- 9 W-K	9 VDC	1,080Ω	+6.3 VDC	–6.3 VDC	75 mW
	RAL- 12 W-K	12 VDC	1,920Ω	+8.3 VDC	–8.3 VDC	75 mW
	RAL- 18 W-K	18 VDC	4,320Ω	+12.5 VDC	–12.5 VDC	75 mW
	RAL- 24 W-K	24 VDC	5,760Ω	+16.6 VDC	–16.6 VDC	100 mW
	RAL -48 W-K	48 VDC	11,520Ω	+21.0 VDC	–21.0 VDC	200 mW
Double Winding Latching Type	RAL-D1.5 W-K	1.5 VDC	P 15Ω	+1.0 VDC		150 mW
			S 15Ω		+1.0 VDC	
	RAL-D 3 W-K	3 VDC	P 60Ω	+2.0 VDC		150 mW
			S 60Ω		+2.0 VDC	
	RAL-D4.5 W-K	4.5 VDC	P 135Ω	+3.1 VDC		150 mW
			S 135Ω		+3.1 VDC	
	RAL-D 5 W-K	5 VDC	P 167Ω	+3.4 VDC		150 mW
			S 167Ω		+3.4 VDC	
	RAL-D 6 W-K	6 VDC	P 240Ω	+4.0 VDC		150 mW
			S 240Ω		+4.0 VDC	
	RAL-D 9 W-K	9 VDC	P 540Ω	+6.1 VDC		150 mW
			S 540Ω		+6.1 VDC	
	RAL-D 12 W-K	12 VDC	P 960Ω	+8.1 VDC		150 mW
			S 960Ω		+8.1 VDC	
	RAL-D 18 W-K	18 VDC	P 2,160Ω	+12.3 VDC		150 mW
			S 2,160Ω		+12.3 VDC	
	RAL-D 24 W-K	24 VDC	P 2,880Ω	+16.1 VDC		200 mW
			S 2,880Ω		+16.1 VDC	
	RAL-D 48 W-K	48 VDC	P 11,520Ω	+32.2 VDC		200 mW
			S 11,520Ω		+32.2 VDC	

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

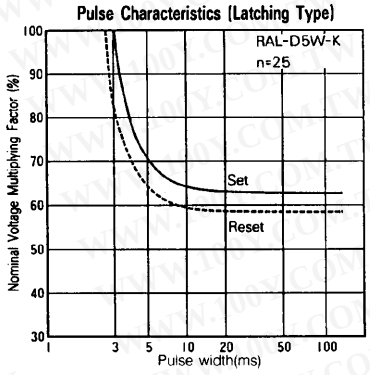
P: Primary coil S: Secondary coil

■ CHARACTERISTIC DATA

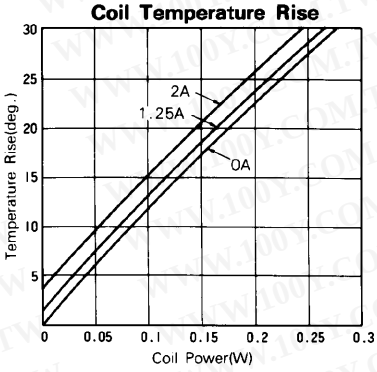
Timing (Non-Latching Type)



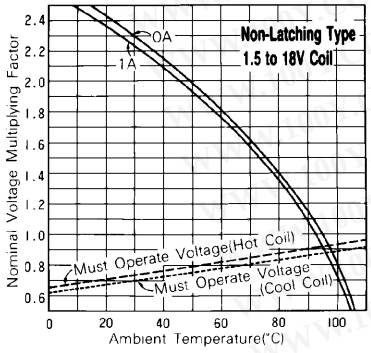
Pulse Characteristics (Latching Type)



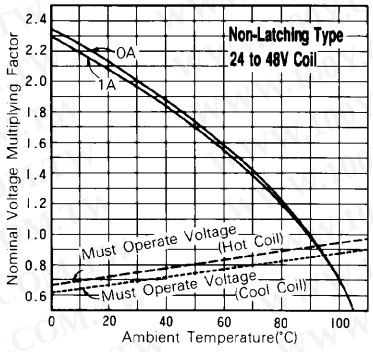
Coil Temperature Rise



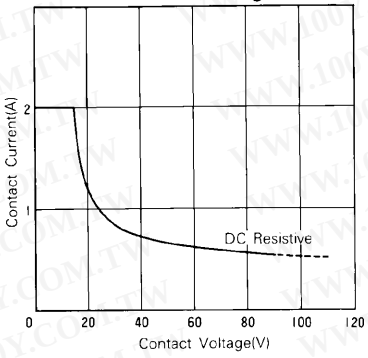
Operating Range



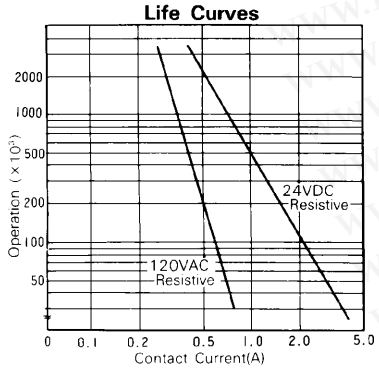
Operating Range



Maximum Switching Power

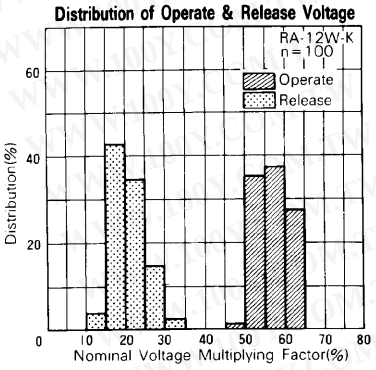


Life Curves

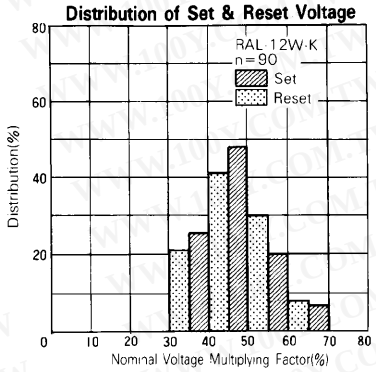


■ REFERENCE DATA

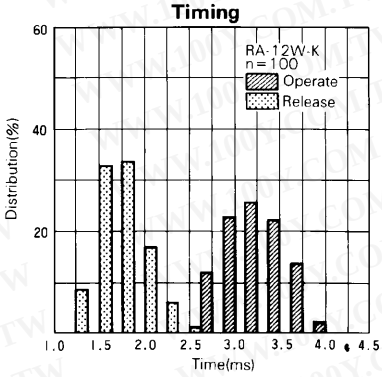
Distribution of Operate & Release Voltage



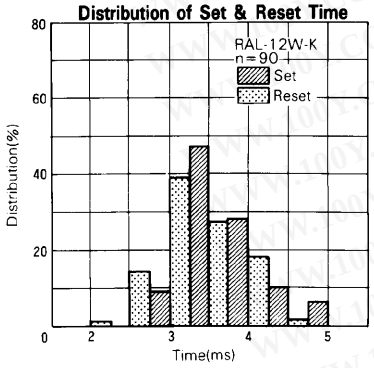
Distribution of Set & Reset Voltage



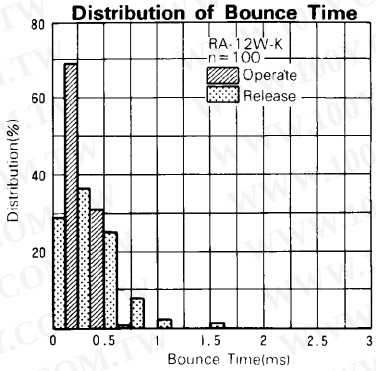
Timing



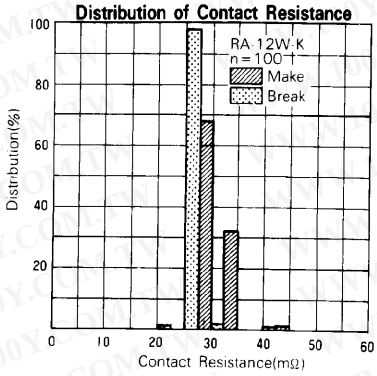
Distribution of Set & Reset Time



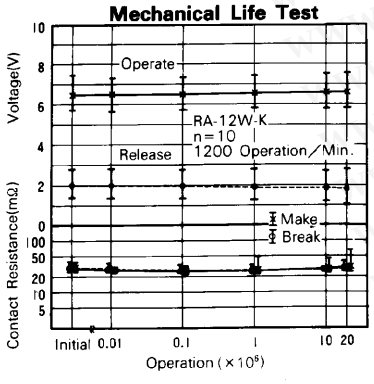
Distribution of Bounce Time



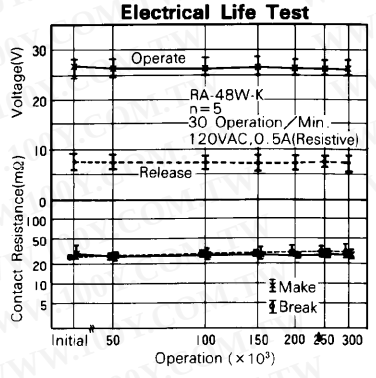
Distribution of Contact Resistance



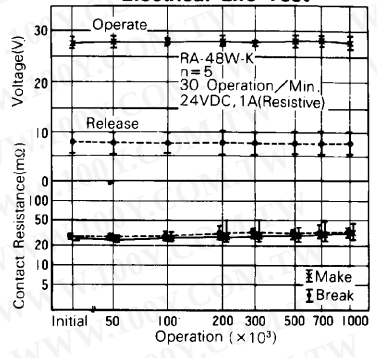
Mechanical Life Test



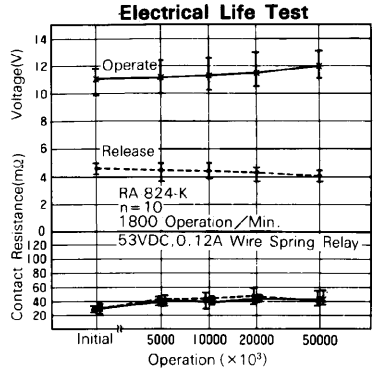
Electrical Life Test



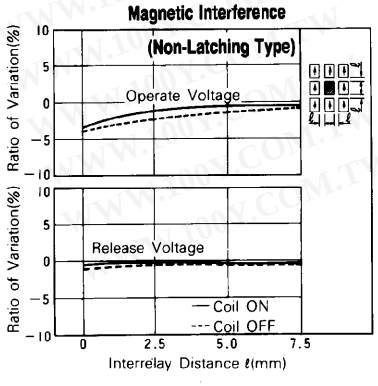
Electrical Life Test



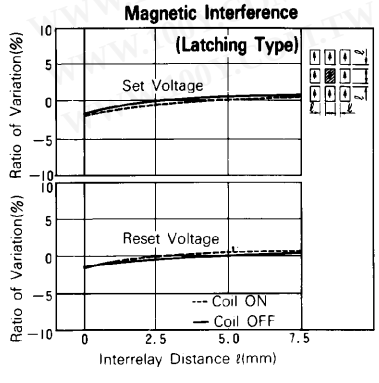
Electrical Life Test

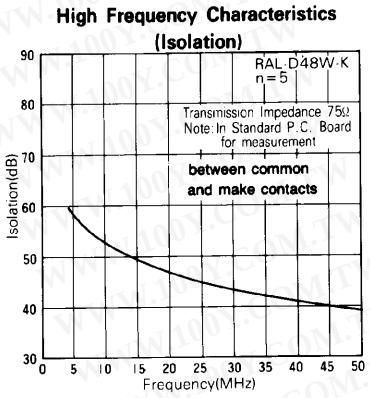


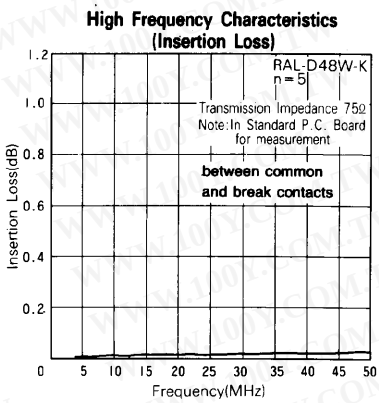
Magnetic Interference



Magnetic Interference



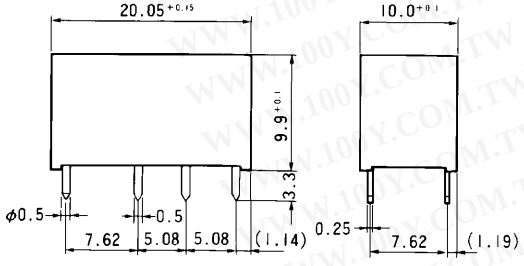




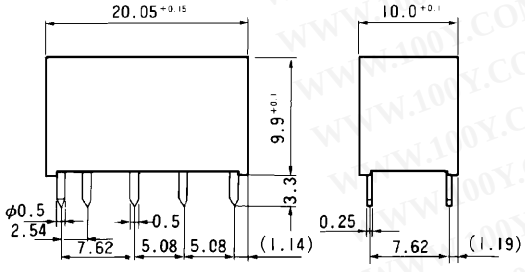
■ DIMENSIONS

●Dimensions

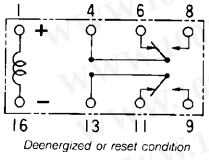
RA, RAL type (Non-latching type, single winding latching type)

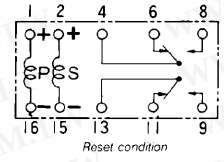


RAL-D type (Double winding latching type)

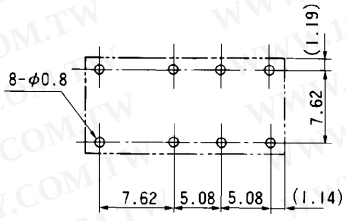


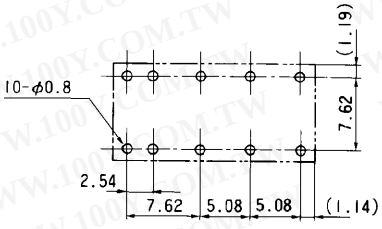
●Schematics
(Bottom View)





●PC board mounting hole layout
(Bottom View)





Unit: mm

RoHS Compliance and Lead Free Relay Information

1. General Information

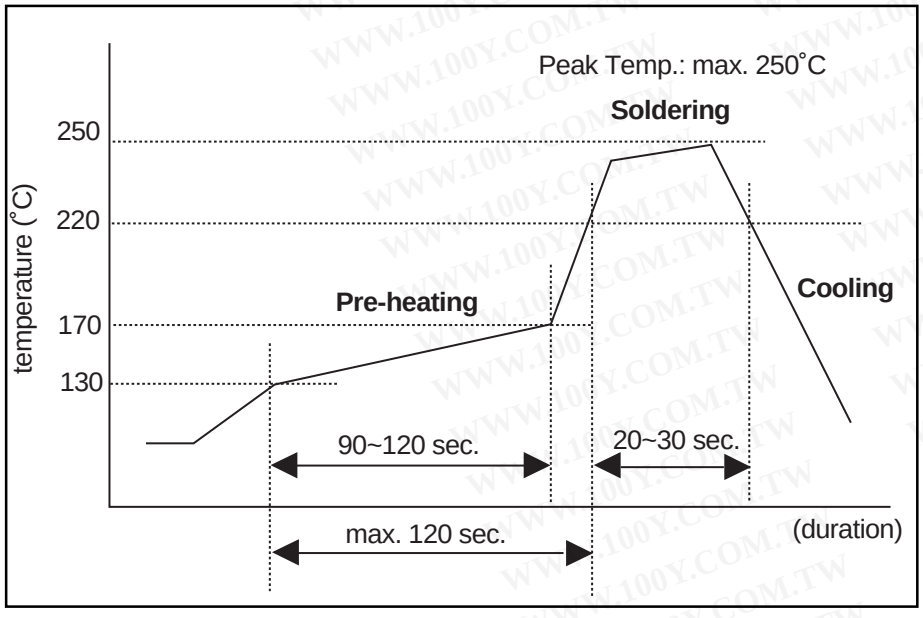
- Relays produced after the specific date code that is indicated on each data sheet are lead-free now. Most of our signal and power relays are lead-free. Please refer to Lead-Free Status Info. (http://www.fcai.fujitsu.com/pdf/LeadFreeLetter.pdf)
- Lead free solder paste currently used in relays is Sn-3.0Ag-0.5Cu. 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.