■ 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

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■ 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 palladium		
	Style		Bifurcated (cross bar)		
	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 (20°C)		50 to 200 mW	75 to 200 mW	150 to 200 mW
	Operate Power (at)		0 to 00 mW	40 to 50 mW	70 to 90 mW
	Operating Temperature		–4 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)	
Life	Mechanical		2 × 10^7 operations minimum		
	Electrical		2 × 10^5 ops. min. (1 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 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.

■ INSULATION

Item		Standard	Single latch	Double latch
Isolation (initial)		Minimum 1,000 MΩ (at 500VDC)		
Dielectric Strength	open contacts	1,000VAC 1 min.,		
	coil and contacts/ adjacent contact	1,500VAC 1 min.,		
Surge Voltage		1500V (coil-contact) (10/160 μs standard wave)		

■ SAFETY STANDARDS

Type	Compliance	Contact rating
UL	UL 478, UL 508 E 45026	Flammability: UL 94-V0 (plastics) 0.5A, 120VAC (resistive) 2A, 30VDC (resistive) 0.5A, 60VDC (resistive)
CSA	C22.2 No. 14 LR 35579	

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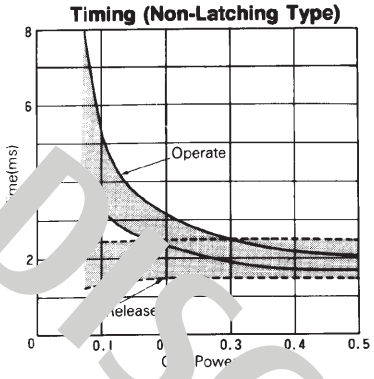
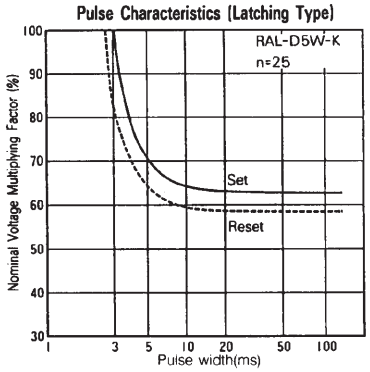
■ CHARACTERISTIC DATA

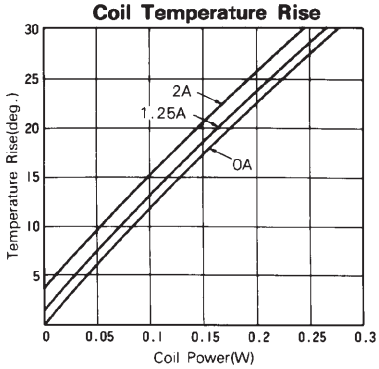
Timing (Non-Latching Type)



Pulse Characteristics (Latching Type)



Coil Temperature Rise



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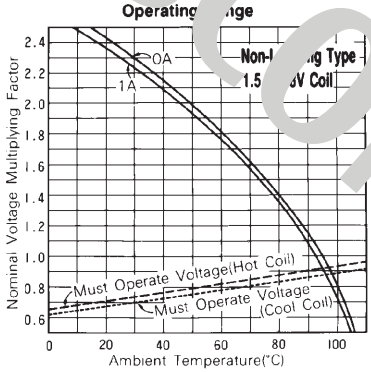
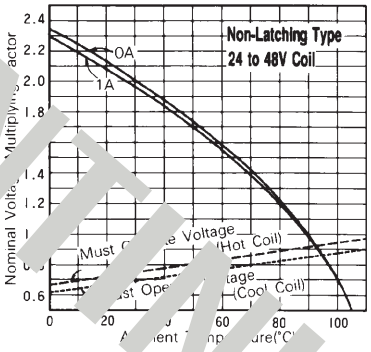
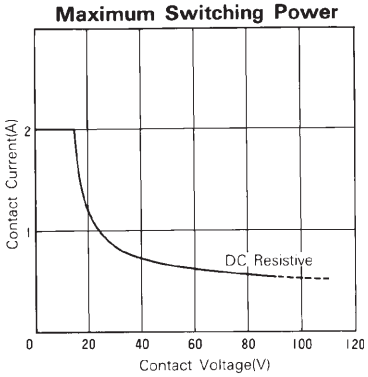


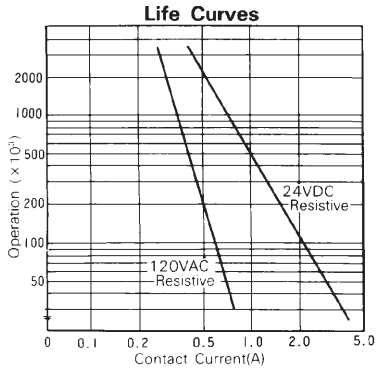
Operating Range



Maximum Switching Power



Life Curves



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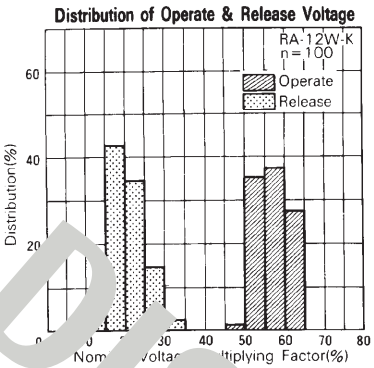
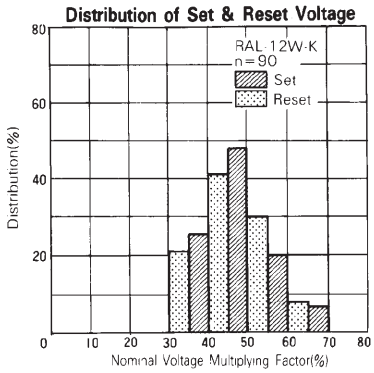
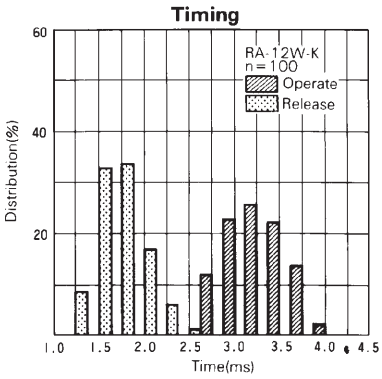
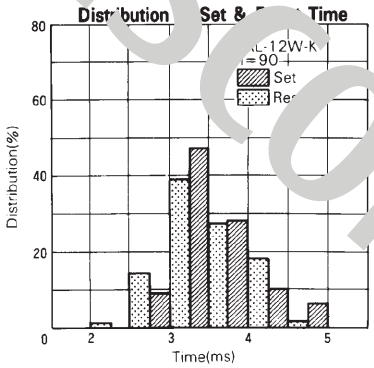
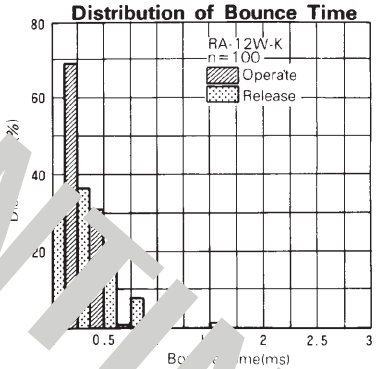
■ REFERENCE DATA

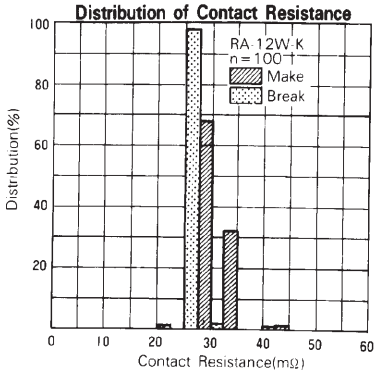


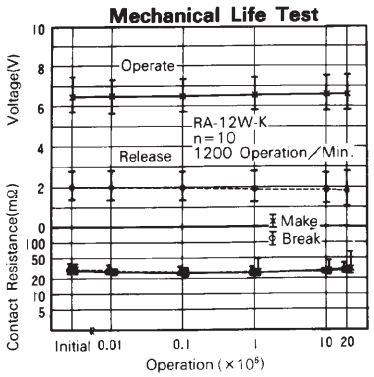


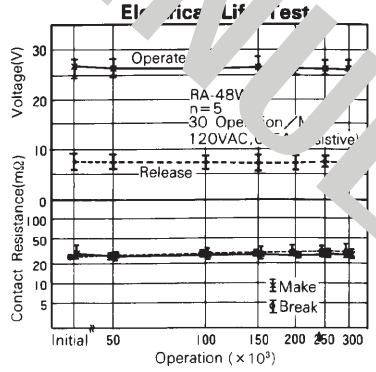


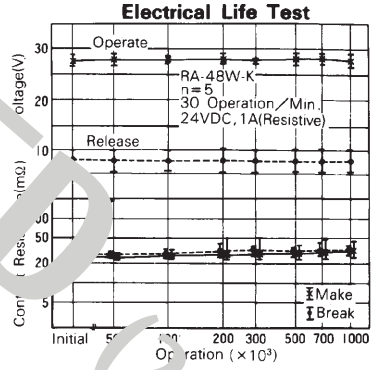


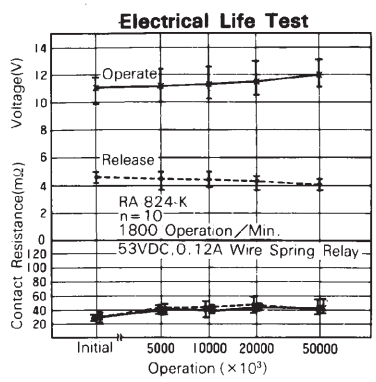


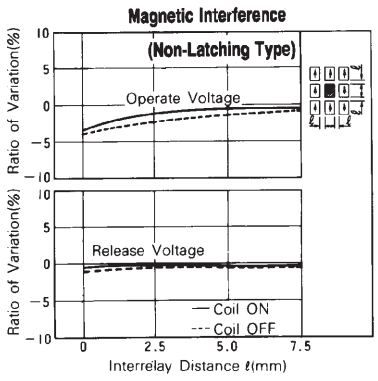


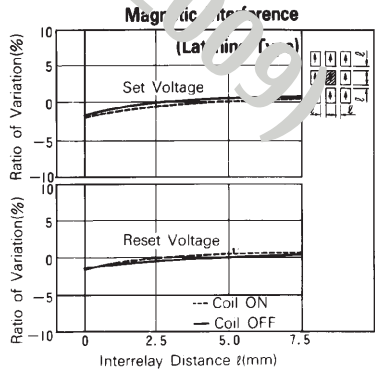












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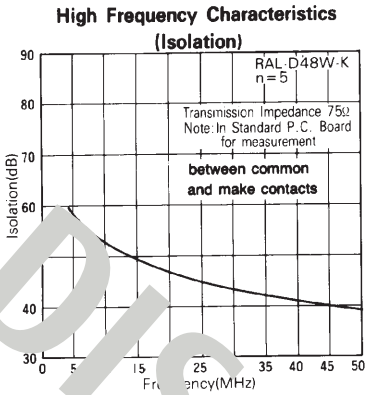
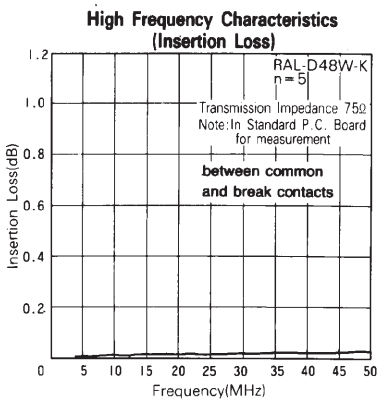
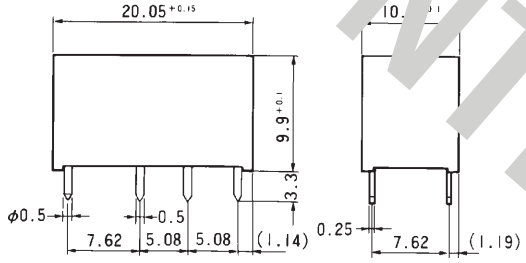


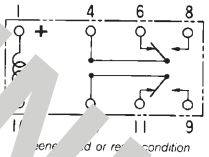


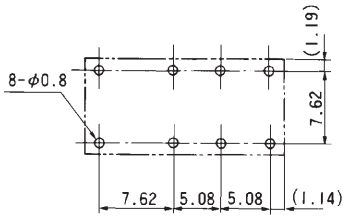
■ DIMENSION

- **Dimensions**
- **Schematics** (Bottom View)
- **PC board mounting hole layout** (Bottom View)

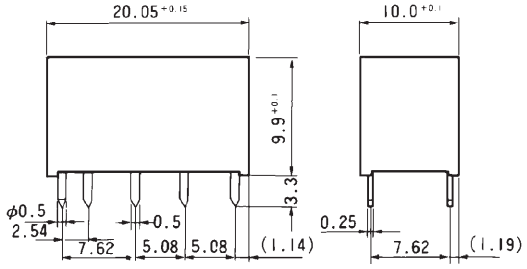
RA, RAL type (Non-latching type, single winding latching type)

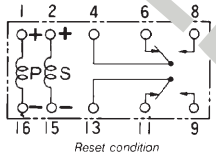


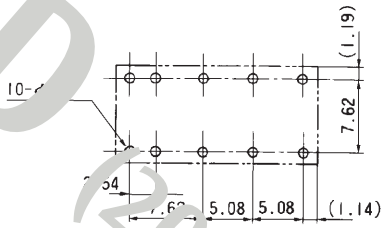




RAL-D type (Double winding latching type)







Unit: mm

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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.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 most 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 (example).
- "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 RoHSon 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 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

- 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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