MINIATURE RELAY

2 POLES - 1 to 2A (for signal switching)

RY Series

■ FEATURES

- Ultra high sensitivity
- UL, CSA recognized (see note 2)
- Conforms to FCC rules and regulations Part 68
  - Surge strength 1,500 V
- High dielectric strength type available (RY-WF type)
- High reliability-bifurcated contacts
- Wide operating range
- DIL terminals
- Plastic sealed type, cat III
- RoHS compliant.

Please see page 9 for more information



■ PARTNUMBER INFORMATION

	RY	-	12	WF	-	K
[Example]	(a)	(*)	(b)	(c)		(d)

(a)	Relay type	RY	: RY-Series
(b)	Coil rated voltage	012	: 3.....48 VDC Coil rating table at page 3
(c)	Coil and contact type	W WZ WF WFZ D	: High sensitive type : Nominal 0.5W type : High dielectric strength type : 2A type : 2 form D (2 MMB type)
(d)	Enclosure	K	: Plastic sealed type

Note 1: Actual marking omits the hyphen (-) of (*)
For movable and stationary contact with gold overlay type, add suffix “–OH”. Note 2: Standard relay does not bear the UL/CSA marking.
In case UL/CSA certification is necessary, add -UL to the ordering partnumber.

■ SPECIFICATION

Item		High sensitive type	500 mW type	High dielectric strength	2 A type	Continous (MBB) type
		RY-( )W-K	RY-( )WZ-K	RY-( )WF-K	RY-( )WFZ-K	RY-( )D-K
Contact Data	Configuration	2 form C (DPDT)				2 form D (2 MBB)
	Construction	Bifurcated (cross bar)				Single
	Material	Gold overlay silver-palladium			Gold overlay silver-nickel	Gold overlay silver-palladium
	Resistance (initial)	Max. 100 mΩ at 6 VDC, 1A				
	Contact rating	1A, 24VDC 0.5A, 120VAC		1A, 24VDC 0.25A,120VAC	2A, 30VDC 0.5A,125VAC	0.15A, 48VDC 0.3A, 120VAC
	Max. carrying current	1.25A			2A	0.6A
	Max. switching voltage	120VAC, 60VDC			125VAC, 150VDC	120VAC, 60VDC
	Max. switching power	60VA / 24W		30VA / 24W	62.5VA /60W	36VA / 7.2W
	Max. switching current	1A				
	Min. switching load *	0.01 mA, 10 mVDC				0.1 mA, 10 mVDC
	Capacitance (at 10MHz)	Approximately 0.9 pF (open contacts), 1.4pF (adjacent contacts) Approximately 1.9 pF (between coil and contacts)				
Life	Mechanical	Min. 20 x 10^6 operations	Min. 10 x 10^6 operations			Min. 1 x 10^6 operations
	Electrical (at contact rating)	Min. 200 x 10^3 operations (0.5A, 120VAC) Min. 500 x 10^3 operations (1A, 24VDC)		Min. 500x10^3 operations (0.25A, 120VAC) (1A, 4VDC)	Min. 100x10^3 operations (2A, 30VDC)	Min.200x10^3 ops. (0.3A, 120VAC) Min.500x10^3 ops. (0.15A, 48VDC)
Coil Data	Rated power	150 - 300mW	500 - 580mW	450 - 460mW	500 - 580mW	450 - 480mW
	Operate power	75 -140mW	125 - 145mW	200 - 210mW	200 - 324mW	200 - 210mW
	Operating temperature range (no frost)	-30 °C to +90 °C (+80 °C for 48VDC type)	-30 °C to +60 °C			-30 °C to +70 °C (+65 °C for 48VDC type)

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

■ SPECIFICATION (CONTINUED)

Item			High sensitive type	500 mW type	High dielectric strength	2 A type	Continous (MBB)type
			RY-( )W-K	RY-( )WZ-K	RY-( )WF-K	RY-( )WFZ-K	RY-( )D-K
Timing Data	Operate (at nominal voltage)		Max. 6 ms				
	Release (at nominal voltage)		Max. 3 ms				
Insulation	Resistance (initial)		Min. 1,000MΩ at 500VDC				
	Dielectric strength	Open contacts	500VAC, 1min		1,000VAC, 1min.	500VAC, 1min	
		Contacts to coil/ adjacent contacts	1,000VAC 1min				
	Surge strength	Coil to contacts	1,500V / 10 x 160μs standard wave				
Other	Vibration resistance	Misoperation	10 to 55Hz double amplitude 1.5 mm				
		Endurance	10 to 55Hz double amplitude 4.5 mm				
	Shock resistance	Misoperation	Min. 100m/s² (11 ± 1ms)				
		Endurance	Min. 1,000m/s² (6 ± 1ms)				
	Weight		Approximately 5 g				
	Sealing		Sealed cat. RTIII				

■ COIL RATING

High sensitive type (RY-xxW-K)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Must Release Voltage (VDC) *	Rated Power (mW)
3	3	60	2.1	0.15	150
4.5	4.5	135	3.2	0.23	
5	5	165	3.6	0.25	
6	6	240	4.3	0.3	
9	9	540	6.4	0.45	
12	12	960	8.5	0.6	
18	18	1,620	12.6	0.9	200
24	24	2,880	16.8	1.2	
48	48	7,680	32.6	2.4	300

Note: All values in the table are valid for 20°C and zero contact current.
* Specified operate values are valid for pulse wave voltage.

500 mW type (RY-xxWZ-K)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Must Release Voltage (VDC) *	Rated Power (mW)
3	3	18	1.5	0.15	500
4.5	4.5	36	2.25	0.23	560
5	5	45	2.5	0.25	
6	6	66	3	0.3	550
9	9	140	4.5	0.45	580
12	12	280	6	0.6	510
18	18	560	9	0.9	580
24	24	1,070	12	1.2	540
48	48	4,000	24	2.4	580

High dielectric type (RY-xxWF-K)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Must Release Voltage (VDC) *	Rated Power (mW)
5	5	56	3.3	0.25	450
6	6	80	4	0.3	
9	9	180	6	0.45	
12	12	320	8	0.6	
18	18	720	12	0.9	
24	24	1,260	15.9	1.2	
48	48	5,000	33	2.4	460

2A type (RY-xxWFZ-K)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Must Release Voltage (VDC) *	Rated Power (mW)
3	3	18	1.9	0.15	500
4.5	4.5	36	2.9	0.23	560
5	5	45	3.2	0.25	
6	6	66	3.8	0.3	550
9	9	140	5.7	0.45	580
12	12	280	7.6	0.6	510
18	18	560	11.4	0.9	580
24	24	1,070	15.2	1.2	540
48	48	4,000	36	2.4	580

Note: All values in the tables are measured at 20°C and zero contact current.
* Specified values are measured with pulse wave voltage

MBB type (RY-xxD-K)

Coil Code	Rated Coil Voltage (VDC)	Coil Resistance +/- 10% (Ohm)	Must Operate Voltage (VDC) *	Must Release Voltage (VDC) *	Rated Power (mW)
4.5	4.5	45	3	0.23	450
5	5	55	3.3	0.25	
6	6	80	3.95	0.3	
9	9	180	5.9	0.45	
12	12	320	7.9	0.6	
18	18	720	11.8	0.9	
24	24	1,280	15.8	1.2	
48	48	4,800	31.8	2.4	480

Note: All values in the table are measured at 20°C and zero contact current.
* Specified values are measured with pulse wave voltage

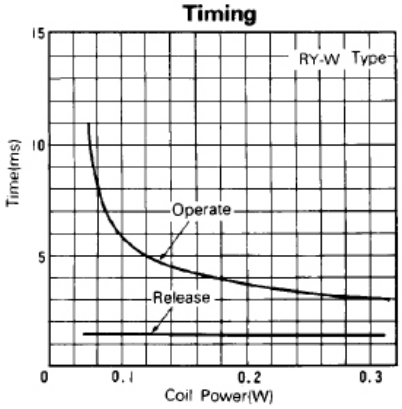
■ SAFETY STANDARDS *

Type	Compliance	Contact rating
UL	UL 478, UL 508 E 45026	Flammability: UL 94-V0 (plastics) [RY-W, RY-WZ] 0.5A, 120VAC (resistive) 1A, 24VDC (resistive) 0.3A, 60VDC (resistive) 2A, 30VDC, (resistive) [RY-WF] 0,5A,120VAC (resistive)(UL) 0.25A, 120VAC (resistive)(CSA) 1A, 24VDC (resistive) 0.3A, 60VDC (resistive) 2A, 30VDC (resistive) [RY-D] 0.3A, 120VAC (resistive) 0.2A, 60VDC (resistive) [RY-WFZ] 0.5A, 125VAC (resistive) 2A, 30VDC (resistive) 0.6A, 110VDC (resistive)
CSA	C22.2 No. 14 LR 35579	

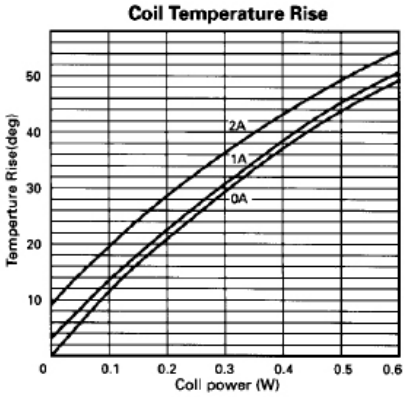
* Note: for UL/CSA certified relays; UL/CSA marking, add -UL to the ordering partnumber

■ CHARACTERISTIC DATA

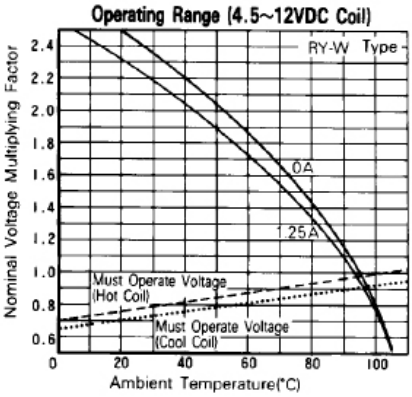
Timing



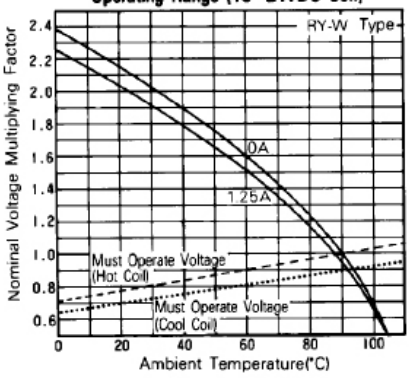
Coil Temperature Rise



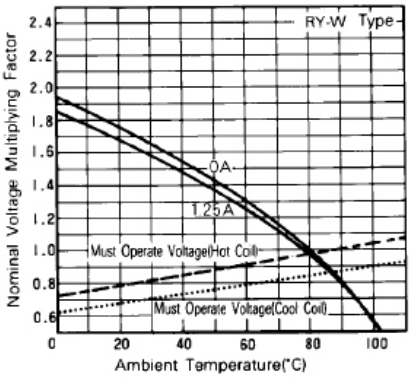
Operating Range (4.5~12VDC Coil)



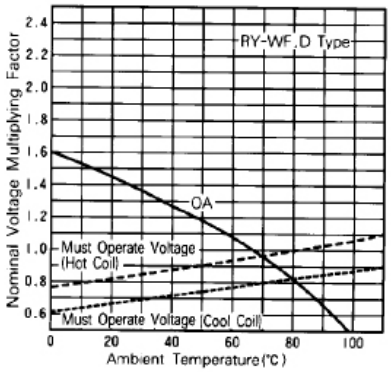
Operating Range (18~24VDC Coil)



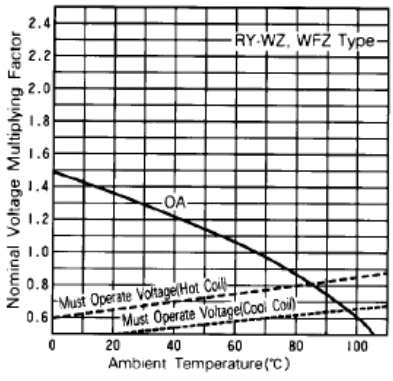
Operating Range (48VDC Coil)



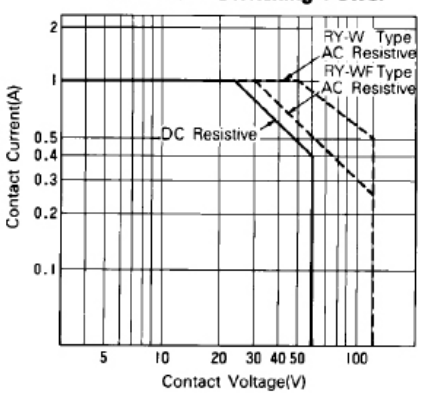
Operating Range



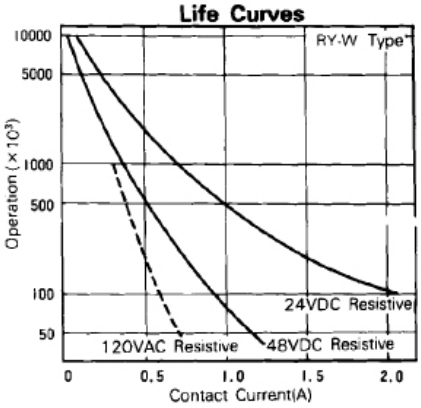
Operating Range

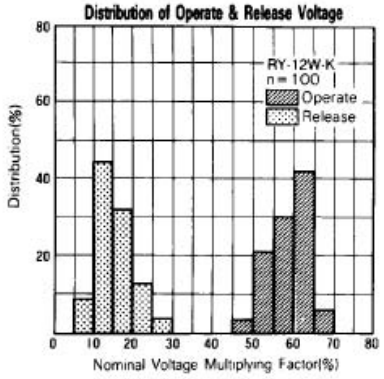


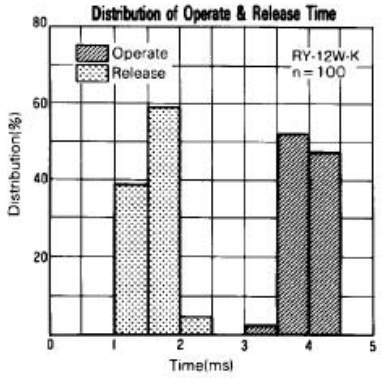
Maximum Switching Power

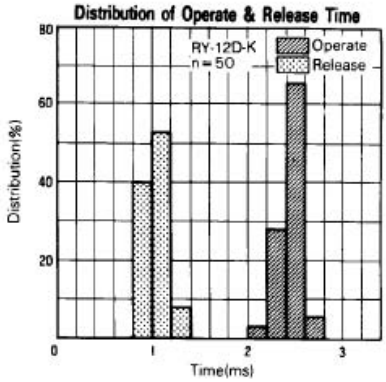


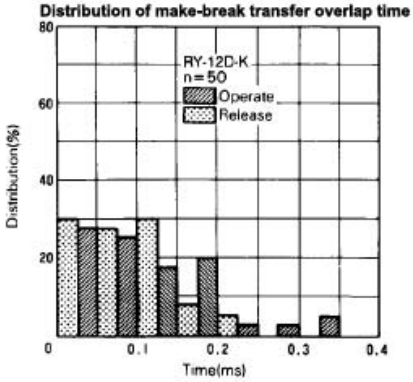
Life Curves

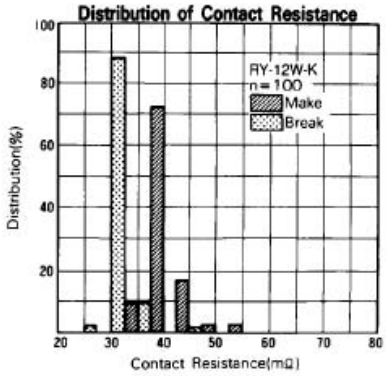


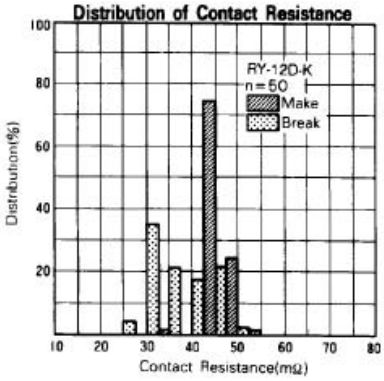

Distribution of Operate & Release Voltage
RY-12W-K
n=100
Operate
Release
Distribution(%)
Nominal Voltage Multiplying Factor(%)

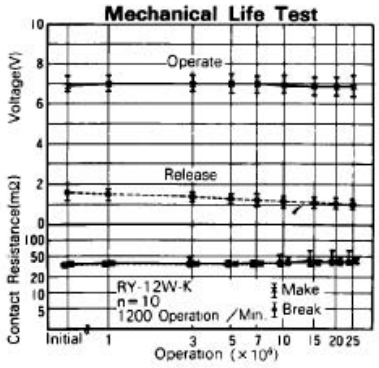

Distribution of Operate & Release Time
Operate
Release
RY-12W-K
n=100
Distribution(%)
Time(ms)

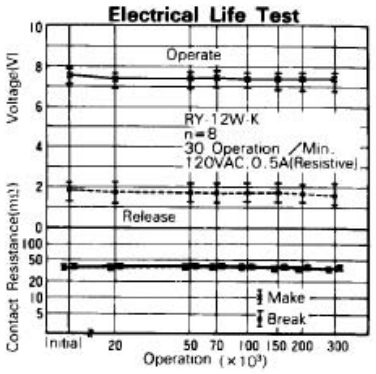

Distribution of Operate & Release Time
RY-12D-K
n=50
Operate
Release
Distribution(%)
Time(ms)

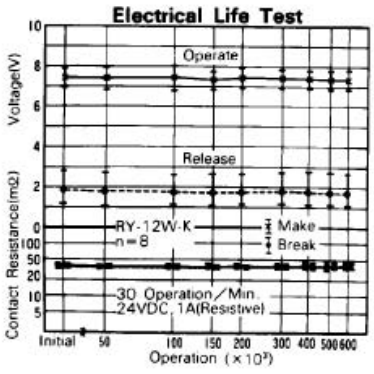

Distribution of make-break transfer overlap time
RY-12D-K
n=50
Operate
Release
Distribution(%)
Time(ms)

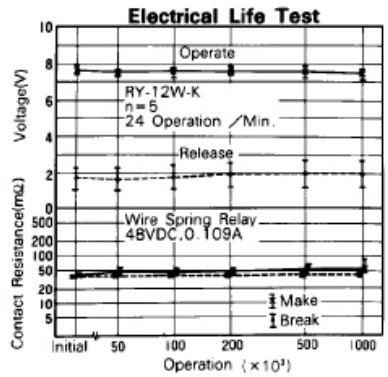

Distribution of Contact Resistance
RY-12W-K
n=100
Make
Break
Distribution(%)
Contact Resistance(mΩ)


Distribution of Contact Resistance
RY-12D-K
n=50
Make
Break
Distribution(%)
Contact Resistance(mΩ)


Mechanical Life Test
Operate
Release
Voltage(V)
Contact Resistance(mΩ)
RY-12W-K
n=10
1200 Operation /Min.
Make
Break
Initial
Operation (×10⁶)

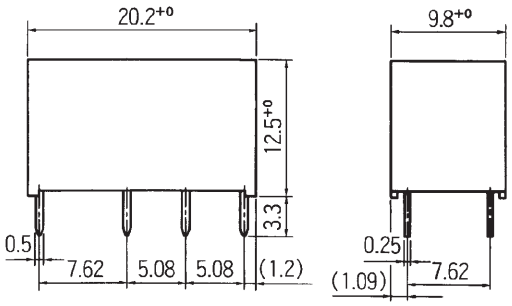

Electrical Life Test
Operate
RY-12W-K
n=8
30 Operation /Min.
120VAC, 0.5A(Resistive)
Release
Voltage(V)
Contact Resistance(mΩ)
Make
Break
Initial
Operation (×10³)


Electrical Life Test
Operate
Release
RY-12W-K
n=8
Make
Break
30 Operation /Min.
24VDC, 1A(Resistive)
Voltage(V)
Contact Resistance(mΩ)
Initial
Operation (×10³)

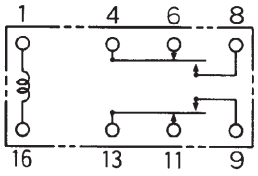

Electrical Life Test
Operate
RY-12W-K
n=5
24 Operation /Min.
Release
Wire Spring Relay
48VDC, 0.109A
Make
Break
Voltage(V)
Contact Resistance(mΩ)
Initial
Operation (×10³)

■ DIMENSIONS

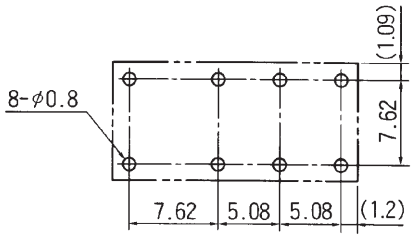
- **Dimensions**



- **Schematics**
(BOTTOM VIEW)



- **PC board mounting hole layout**
(BOTTOM VIEW)



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. Recommended lead free solder condition

- Lead free solder plating on relay terminals is Sn-3.0Ag-0.5Cu, unless otherwise specified. This material has been verified to be compatible with PbSn assembly process.
- Recommended solder for assembly: Sn-3.0Ag-0.5Cu.

Flow Solder Condition:

Pre-Heating:	Maximum 120˚C within 90 sec.
Soldering:	Eip within 5 sec. at 255°C±5°C solder bath

Relay must be cooled by air immediately after soldering

Solder by Soldering Iron:

Soldering Iron:	30-60W
Temperature:	Maximum 340-360˚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, unless otherwise indicated.

4. 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.

Contact

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