

mm inch

## FEATURES

- **Excellent high frequency characteristics (Impedance 75Ω)**  
Isolation: Min. 60dB (at 1.5 GHz)  
Insertion loss: Max. 0.2dB (at 900 MHz)
- **V.S.W.R.: Max. 1.2 (at 900MHz)**
- **High sensitivity in small size**  
Size: 20.2 × 11.2 × 9.7 mm .795 × .441 × .382 inch  
Nominal power consumption: 200 mW (single side stable type)
- **Sealed construction for automatic cleaning**
- **Latching types are also available**

## SPECIFICATIONS

### Contact

Arrangement	1 Form C	
Contact material	Gold-clad	
Initial contact resistance, max. (By voltage drop 10V DC 10mA)	100 mΩ	
Rating	Max. switching power	10 W
	Max. switching voltage	30 V DC
	Max. switching current	0.5 A
	Nominal switching capacity	0.01 A 24 V DC 10 W (at 1.2 GHz, Impedance 50W)
High frequency characteristics (Impedance 75Ω) (Initial)	V.S.W.R.	Max. 1.2 (at 900 MHz)
	Insertion loss	Max. 0.2 dB (at 900 MHz)
	Isolation	Min. 60 dB (at 1.5 GHz)
High frequency characteristics (Impedance 50Ω) (Initial)	V.S.W.R.	Max. 1.5 (at 900 MHz)
	Insertion loss	Max. 0.3 dB (at 900 MHz)
	Isolation	Min. 60 dB (at 1.5 GHz)
Expected life (min. operations)	Mechanical	5×10 <sup>6</sup>
	Electrical	0.01 A 24 V DC
		10 W 1.2 GHz

### Coil (at 25°C, 68°F)

	Nominal operating power
Single side stable	200 mW
1 coil latching	200 mW
2 coil latching	400 mW

### Characteristics

Initial insulation resistance*1		Min. 100 MΩ at 500 V DC
Initial breakdown voltage*2	Between open contacts	500 Vrms
	Between contact and coil	1,000 Vrms
	Between contact and earth terminal	500 Vrms
Operate time [Set time]*3 (at nominal voltage)		Max. 10 ms (Approx. 6 ms) [Max. 10 ms [Approx. 5ms]]
Release time (without diode) [Reset time]*3 (at nominal voltage)*2		Max. 6 ms (Approx. 3 ms) [Max. 10 ms [Approx. 5ms]]
Temperature rise		Max. 60°C with nominal coil voltage across coil and at nominal switching capacity
Shock resistance	Functional*4	Min. 196 m/s <sup>2</sup> {20 G}
	Destructive*5	Min. 980 m/s <sup>2</sup> {100 G}
Vibration resistance	Functional*6	10 to 55 Hz at double amplitude of 3 mm
	Destructive	10 to 55 Hz at double amplitude of 5 mm
Conditions for operation, transport and storage*7 (Not freezing and condensing at low temperature)	Ambient temp.	-40°C to 70°C -40°F to 158°F
	Humidity	5 to 85% R.H.
Unit weight		Approx. 4.4 g .155 oz

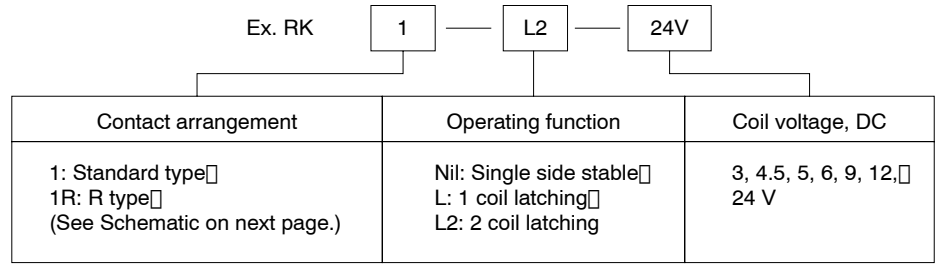
### Remarks

- \* Specifications will vary with foreign standards certification ratings.  
\*1 Measurement at same location as "Initial breakdown voltage" section  
\*2 Detection current: 10mA  
\*3 Excluding contact bounce time  
\*4 Half-wave pulse of sine wave: 11ms, detection time: 10μs  
\*5 Half-wave pulse of sine wave: 6ms  
\*6 Detection time: 10μs  
\*7 Refer to 5. Conditions for operation, transport and storage conditions in NOTES (Page 5).

**TYPICAL APPLICATIONS**

- Audio visual equipment broadcast satellite tuners VCRs, CATVs, TVs
- Communication equipment automobile telephones maritime telephones emergency and disaster prevention communications, PCM switches
- Instrumentation test equipment measuring equipment

**ORDERING INFORMATION**



Note: Standard packing; Carton: 50 pcs. Case 500 pcs.

**TYPES AND COIL DATA (at 20°C 68°F)**

• Single side stable type

Part No.		Nominal voltage, V DC	Pick-up voltage, max. V DC	Drop-out voltage, min. V DC	Coil resistance, Ω (±10%)	Nominal operating current, mA	Nominal operating power, mW	Maximum allowable voltage, V DC (at 60°C 140°F)
RK1-3V	RK1R-3V	3	2.25	0.3	45	66.7	200	3.3
RK1-4.5V	RK1R-4.5V	4.5	3.38	0.45	101	44.4	200	4.95
RK1-5V	RK1R-5V	5	3.75	0.5	125	40.7	200	5.5
RK1-6V	RK1R-6V	6	4.5	0.6	180	33.3	200	6.6
RK1-9V	RK1R-9V	9	6.75	0.9	405	22.2	200	9.9
RK1-12V	RK1R-12V	12	9	1.2	720	16.7	200	13.2
RK1-24V	RK1R-24V	24	18	2.4	2,880	8.3	200	26.4

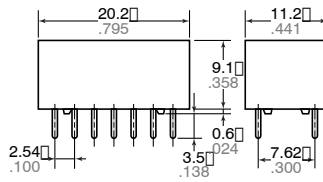
• 1 coil latching type

Part No.		Nominal voltage, V DC	Set voltage, max. V DC	Reset voltage, max. V DC	Coil resistance, Ω (±10%)	Nominal operating current, mA	Nominal operating power, mW	Maximum allowable voltage, V DC (at 60°C 140°F)
RK1-L-3V	RK1R-L-3V	3	2.25	2.25	45	66.7	200	3.3
RK1-L-4.5V	RK1R-L-4.5V	4.5	3.38	3.38	101	44.4	200	4.95
RK1-L-5V	RK1R-L-5V	5	3.75	3.75	125	40	200	5.5
RK1-L-6V	RK1R-L-6V	6	4.5	4.5	180	33.3	200	6.6
RK1-L-9V	RK1R-L-9V	9	6.75	6.75	405	22.2	200	9.9
RK1-L-12V	RK1R-L-12V	12	9	9	720	16.7	200	13.2
RK1-L-24V	RK1R-L-24V	24	18	18	2,880	8.3	200	26.4

• 2 coil latching type

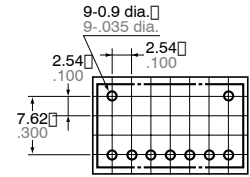
Part No.		Nominal voltage, V DC	Set voltage, max. V DC	Reset voltage, max. V DC	Coil resistance, Ω (±10%)	Nominal operating current, mA	Nominal operating power, mW	Maximum allowable voltage, V DC (at 60°C 140°F)
RK1-L2-3V	RK1R-L2-3V	3	2.25	2.25	22.5	133.3	400	3.3
RK1-L2-4.5V	RK1R-L2-4.5V	4.5	3.38	3.38	50.6	88.9	400	4.95
RK1-L2-5V	RK1R-L2-5V	5	3.75	3.75	62.5	80	400	5.5
RK1-L2-6V	RK1R-L2-6V	6	4.5	4.5	90	66.7	400	6.6
RK1-L2-9V	RK1R-L2-9V	9	6.75	6.75	202.5	44.4	400	9.9
RK1-L2-12V	RK1R-L2-12V	12	9	9	360	33.3	400	13.2
RK1-L2-24V	RK1R-L2-24V	24	18	18	1,440	16.7	400	26.4

# DIMENSIONS

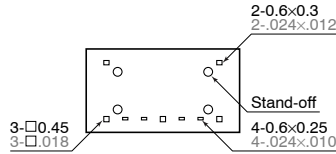


PC board pattern (Bottom view)

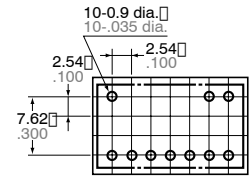
Single side stable and 1 coil latching



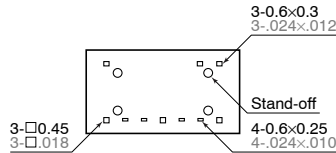
Single side stable and 1 coil latching



2 coil latching



2 coil latching

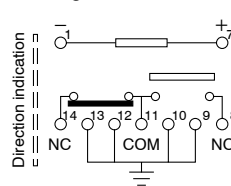


Tolerance:  $\pm 0.1 \pm 0.003$

General tolerance:  $\pm 0.3 \pm 0.012$

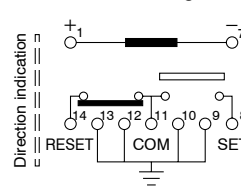
Schematic (Bottom view)

Single side stable



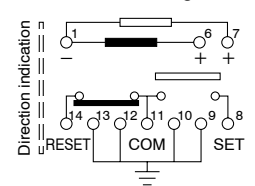
(Deenergized condition)

1 coil latching



(Reset condition)

2 coil latching



(Reset condition)

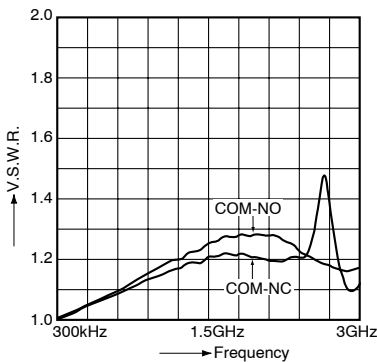
# REFERENCE DATA

1.-(1) High frequency characteristics (Impedance 75Ω)

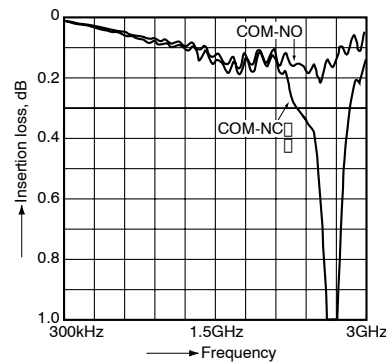
Sample: RK1-12V

Measuring method: Measured with HP network analyzer (HP8753C)

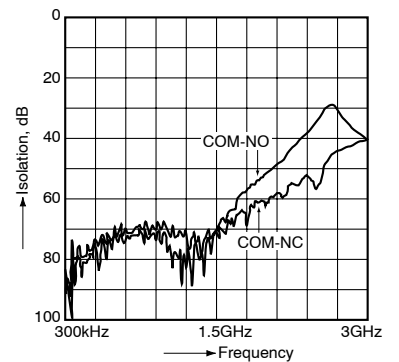
• V.S.W.R. characteristics



• Insertion loss characteristics



• Isolation characteristics

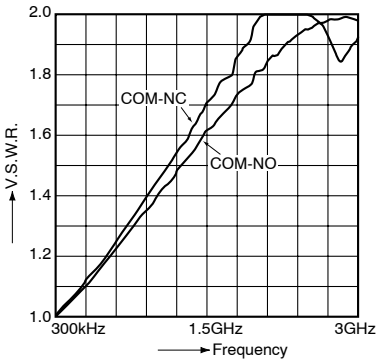


## 1.-(2) High frequency characteristics (Impedance 50Ω)

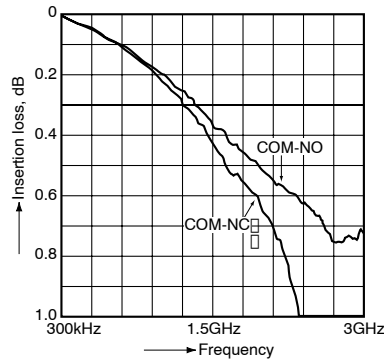
Sample: RK1-5V

Measuring method: Measured with HP network analyzer (HP8753C)

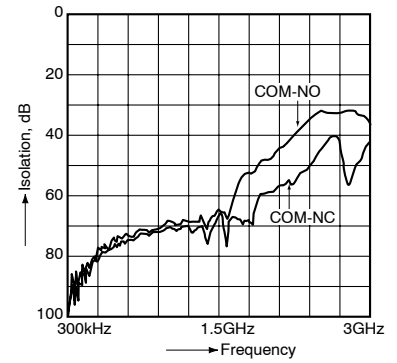
### • V.S.W.R. characteristics



### • Insertion loss characteristics



### • Isolation characteristics



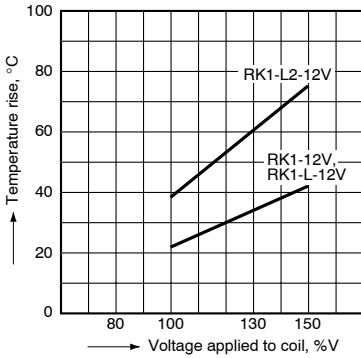
## 2. Coil temperature rise

Sample: RK1-12V, RK1-L-12V, RK1-L2-12V

No. of samples: n = 6

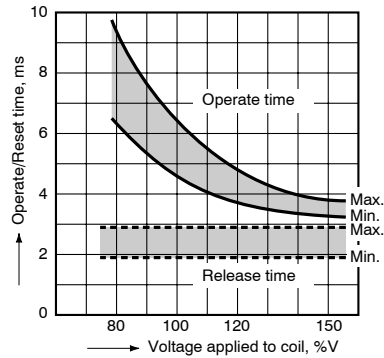
Carrying current: 10 mA

Ambient temperature: 25°C 77°F



## 3.-(1) Operate/Release time (Single side stable)

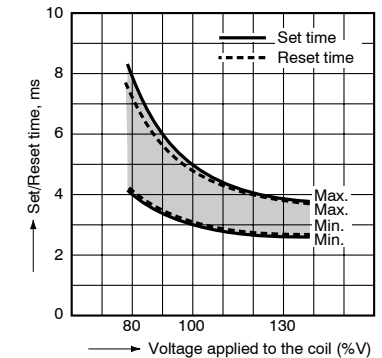
Sample: RK1-12V; No. of samples: n = 6



## 3.-(2) Set/Reset time (Latching)

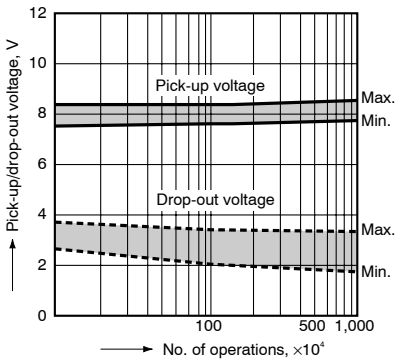
Sample: RK1-L-12V, RK1-L2-12V

No. of samples: n = 12



## 4.-(1) Mechanical life test (Single side stable)

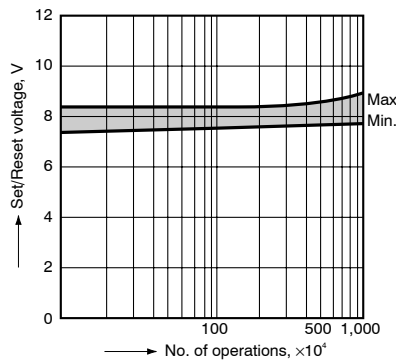
Sample: RK1-12V; No. of samples: n = 12



## 4.-(2) Mechanical life test (Latching)

Sample: RK1-L2-12V

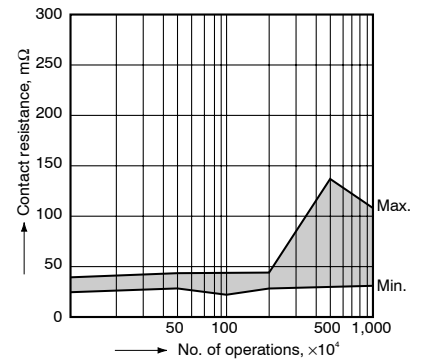
No. of samples: n = 12



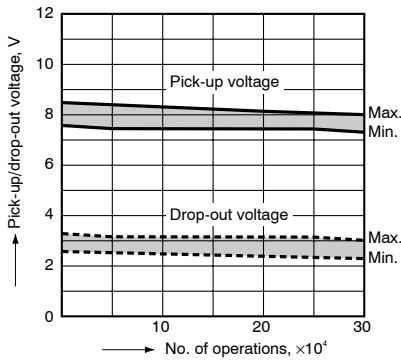
## 4.-(3) Mechanical life test

Sample: RK1-12V

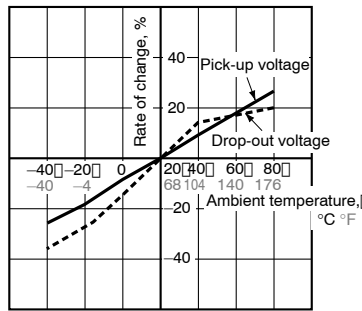
No. of samples: n = 20 (20 × 2 contacts)



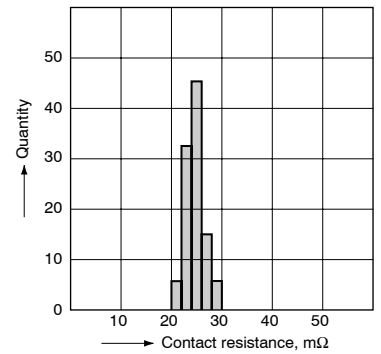
5. Electrical life test (0.01 A 24 V DC)  
Sample: RK1-12V; No. of samples: n = 6



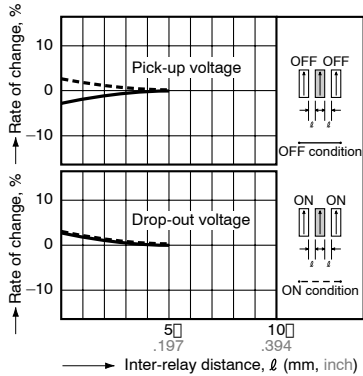
6. Ambient temperature characteristics  
Sample: RK1-12V; No. of samples: n = 6



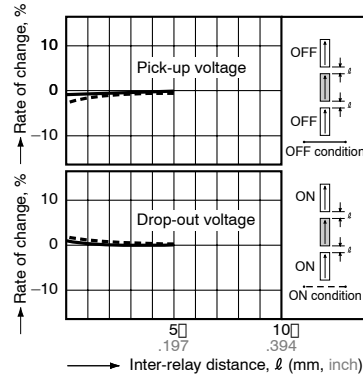
7. Contact resistance distribution (initial)  
Sample: RK1-12V  
No. of samples: n = 50 (50 × 2 contacts)



8.-(1) Influence of adjacent mounting  
Sample: RK1-12V; No. of sample: n = 10



8.-(2) Influence of adjacent mounting  
Sample: RK1-12V; No. of samples: n = 10



NOTES

1. Coil operating power

Pure DC current should be applied to the coil. The wave form should be rectangular. If it includes ripple, the ripple factor should be less than 5%. However, check it with the actual circuit since the characteristics may be slightly different. The nominal operating voltage should be applied to the coil for more than 20 ms to set/reset the latching type relay.

2. Coil connection

When connecting coils, refer to the wiring diagram to prevent mis-operation or malfunction.

3. External magnetic field

Since RK relays are highly sensitive polarized relays, their characteristics will be affected by a strong external magnetic field. Avoid using the relay under that condition.

4. Soldering and cleaning

1) Perform manual soldering under the conditions below.

- Within 10 s at 260°C 500°F
- Within 3 s at 350°C 662°F

Preheat according to the following conditions.

Temperature	120°C 248°F or less
Time	Within 2 minute

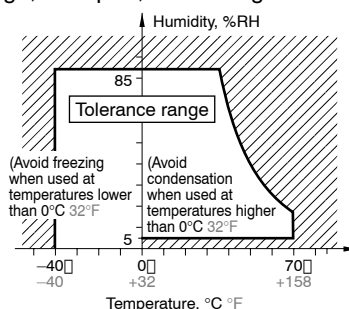
Soldering should be done at 260±5°C 500±5°F within 6 s.

2) For automatic cleaning, the boiling method is recommended. Avoid ultrasonic cleaning which subjects the relays to high frequency vibrations, which may cause the contacts to stick. It is recommended that alcoholic solvents be used.

5. Conditions for operation, transport and storage conditions

1) Ambient temperature, humidity, and atmospheric pressure during usage, transport, and storage of the relay:

- (1) Temperature: -40 to +70°C -40 to +158°F
  - (2) Humidity: 5 to 85% RH (Avoid freezing and condensation.) The humidity range varies with the temperature. Use within the range indicated in the graph below.
  - (3) Atmospheric pressure: 86 to 106 kPa
- Temperature and humidity range for usage, transport, and storage:



2) Condensation

Condensation forms when there is a sudden change in temperature under high temperature and high humidity conditions. Condensation will cause deterioration of the relay insulation.

3) Freezing

Condensation or other moisture may freeze on the relay when the temperature is lower than 0°C 32°F. This causes problems such as sticking of movable parts or operational time lags.

4) Low temperature, low humidity environments

The plastic becomes brittle if the relay is exposed to a low temperature, low humidity environment for long periods of time.

6. Latching relay

In order to assure proper operating regardless of changes in the ambient usage temperature and usage conditions, nominal operating voltage should be applied to the coil for more than 30 ms to set/reset the latching type relay.