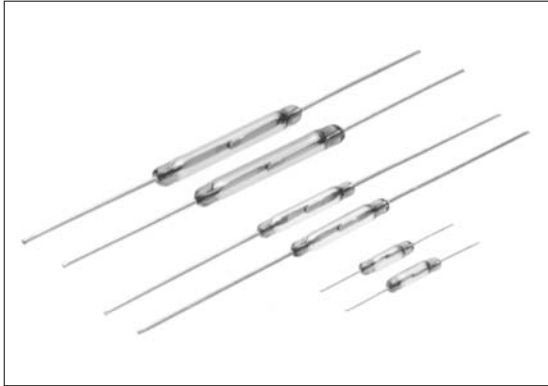


Reed Switches



Outline

NEC TOKIN provides a wide range of reed switches for minute-load to high-power switching purposes. The reed switches are available in two types, i.e., a reed switch having ruthenium-plated contacts and a reed switch having rhodium-plated contacts. Please choose the optimum reed switch best-suited to your intended applications from a wide selection of reed switches.

Features

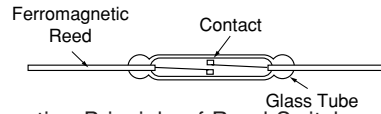
- **Compact and Lightweight**
The reed switches are suitable for use as a compact and lightweight magnetically responsive switch, thereby rendering equipment smaller.
- **Ambient Resistance**
Contacts of the reed switch are encapsulated in a glass tube together with inert gas (nitrogen gas), which protects the reed switch from the effects of the exterior environment, for example, gas, dust, or moisture in the atmosphere.
- **Relatively stable characteristics are ensured from low to high temperatures.** The reed switches are usable over a wide variety of temperatures.
- **High Reliability**
Considerably high reliability is assured as a result of the adoption of NEC TOKIN's unique contact processing technique.
- **High-speed Operation**
Since the reed switch operates at high speed, it is easy to interface with a transistor or an IC.
- **Long Life**
A long-life reed switch without mechanical friction is implemented as a result of its simple structure.
- **Extensive Applications**
When used in combination with a permanent magnet, the reed switch finds extensive application in switching and sensing.



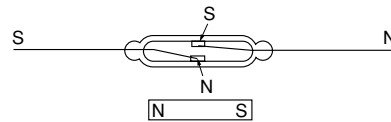
Structure and Principle of Operation

A reed switch encapsulated in a glass tube has two ferromagnetic reeds which face each other with a given contact clearance between them, as shown in diagrams on the right. The glass tube is filled with nitrogen gas to prevent the activation of the contacts, thus providing improved reliability and extended life.

Upon receipt of a magnetic field from the outside in the axial direction of the reed switch, the reeds of the reed switch are magnetized. The free opposite ends of the reeds attract each other and come into contact with each other, to close the circuit. When the magnetic field is removed, the circuit opens by means of the resiliency of the reeds.



● Operating Principle of Reed Switch



Contact Material

- Ruthenium (Ru) plated contact
Ruthenium-plated contacts developed by NEC TOKIN's unique technique are made of a very hard material having with a high melting point. The contacts are resistant to mechanical friction and heat generation, and they have excellent anti-sticking performance.
- Rhodium (Rh) plated contact
Power reed switches what are susceptible to relatively large consumption employ Rh-plated contacts, which results in extended life of the reed switches (compensating for contact consumption).

Characteristics of Contact Material

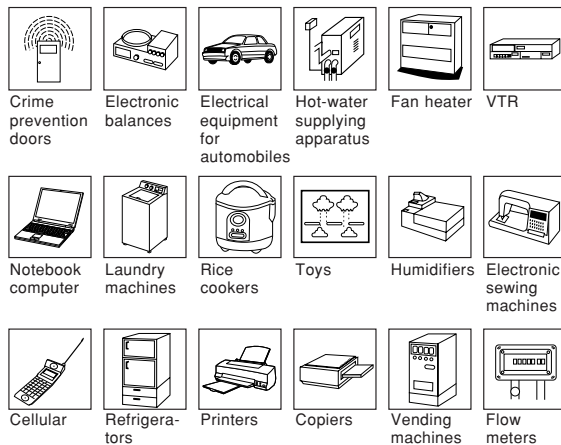
Items	Ru (Ruthenium)	Rh (Rhodium)	Au (Gold)
Atomic Weight	101	103	197
Melting Point (K)	2,523	2,233	1,338
Boiling Point (K)	4,173	4,000	2,983
Density (g/cm ³)	12.1	12.4	19.3
Specific Heat (J/g·K) 0°C	0.234	0.238	0.128
Hardness (HV)	220	100	25
Tensile Strength (kgf/mm ²) (N/m ²)	50.0 490×10 ⁶	54.9 538×10 ⁶	13.5 132×10 ⁶

Types and Applications

When used in combination with a permanent magnet, the reed switch finds extensive applications in which it provides switching and sensing capabilities.

● Construction of Reed Switch

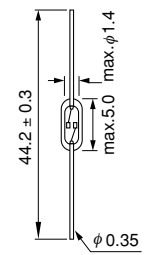
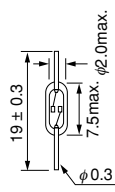
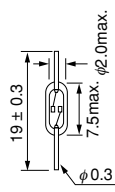
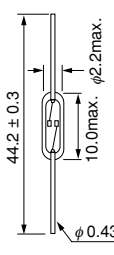
Type	Part No.	Applications
General purpose	RD-7AA/ 7B/24B NRS-771	For general control purposes (about 10W)
High power	RD-24E	Heavy load (50W)
Lamp load	RD-8N	Direct switching of a 3.4W lamp (for surge current use)
Compact	RD-9A/9B	For general control purposes (about 5W)
Ultra compact	RD-18A/18B /75AA NRS-701	Light load



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Reed Switches

(The switches are arranged in ascending order of glass tube length.)

Items	Types	RD-75AA	RD-18A	RD-18B	RD-9A	RD-9B	
Outer Dimensions (mm)							
Pick up Ampereturns (A)		10 to 20	15 to 30	10 to 30	10 to 30	10 to 30	
Drop-out Ampereturns (A) min.		1	5	5	35% of Pick up	3	
Operating Time (ms) max.		0.5	0.5	0.5	1	0.5	
Release Time (ms) max.		0.05	0.05	0.05	0.05	0.05	
Bounce Time (ms) max.		0.5	0.5	0.5	0.5	0.5	
Contact Rating	Maximum Switching Power (W)	3	1	1	5	5	
	Maximum Switching Voltage (VDC)	20	30	30	100	100	
	Maximum Switching Current (A)	0.2	0.1	0.1	0.5	0.3	
	Maximum Carrying Current (A)	0.3	0.3	0.3	0.7	0.5	
Contact Resistance (mΩ)		200	200	250	150	200	
Withstand Voltage (VDC)		100	200	200	200	200	
Insulation Resistance (Ω)		10 ⁹ (at an application of 100VDC)					
Shock and Vibration Resistance (m/s ²)		Fracture 294	Faulty Operation 98 (Fracture 490)				
Operating Temperature Range (°C)		-40 to +125					
Reed Resonant Frequency (kHz)		13.7	10	10	7.2	7.2	
Life Expectancy (operations)	Mechanical Life Expectancy	1×10 ⁸					
	Electrical Life Expectancy	5VDC, 10mA, and Resistive Load	1×10 ⁷	1×10 ⁷	1×10 ⁷	5×10 ⁷	5×10 ⁷
	Others						
Contact Material		Rh (Rhodium)	Rh (Rhodium)	Ru (Ruthenium)	Rh (Rhodium)	Ru (Ruthenium)	
Characteristics and Applications		Ultra-compact light load			Compact, and general control purposes		
NEC TOKIN's Standard Coil		N-104			N-103		
UL File No.		-	-	-	-	-	

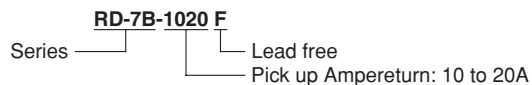
*Pre-soldering on terminals are lead-free (Sn100%)



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RD-7AA	RD-7B	RD-8N	RD-24B	RD-24E	Remarks	
					Terminal dimension is measured before it is pro-cessed (soldered).	
10 to 40	10 to 40	30 to 50	20 to 60	20 to 60		
5	5	10	8	8	With use of NEC TOKIN's standard coil	
0.5	0.5	1.0	1.0	1.0		
0.05	0.05	0.05	0.1	0.05		
0.5	0.5	0.5	0.5	0.5		
10	10	10 (rush current 30)	15	50		
100	100	100	100	125V.AC 200V.DC		
0.5	0.5	Rush current of 3A	0.5	1.0		
1.0	1.0	2.0	1.0	2.0		
150	150	150	150	150		With use of four-terminalfall-of-potential method
200	200	250	300	300		Leakage current of less than 1mA
10 ⁹ (at an application of 100V.DC)						
Faulty operation 98 (fracture 490)						
-40 to +125						
4.8	4.9	4.3	2.2	2.2		
1×10 ⁸						
5×10 ⁷						
		5×10 ⁴ 12V.DC, 3.4W Lamp load		1×10 ⁶ 50V. DC 0.1A Resistive load		
Rh (Rhodium)	Ru (Ruthenium)	Rh (Rhodium)	Ru (Ruthenium)	Rh (Rhodium)		
Compact, and general-purpose use	Compact, and general-purpose use	Lamp load use	Long life (light load)	High power		
N-103			N-102			
-	-	-	-	-		

Numbering System



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