



THUNDER PRECISION RESISTORS



APPROVAL SHEET

RRX SERIES

FUSIBLE WIRE WOUND RESISTORS

SMALL SIZE TYPE

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GENERAL INTRODUCTION

RRX series fusible wire wound resistors are designed as fusible safety resistor (or, AC mains input resistors) in electric appliances and energy meters. The specially selected resistive winding wire and special non-flammable silicon cement coating material are adopted to ensure safe and silent fusing operation without flame and immediate interruption in overload conditions. Wide range of overload currents is available upon request.

The resistor fuses without explosion when AC mains voltage is applied. At the same time, it acts as an in-rush current limiting resistor for the normal operation.

The specially developed lacquer coating has superior thermal and electrical insulating properties. This allows designers to more easily meet the requirements of safety approval, whilst eliminating the need to put additional fuses in series with the input resistors.

Surge voltage capability: 2 kV (10 Ω to 91 Ω) and 4 kV (100 Ω) as per IEC 61000-4-5.

One grey code behind tolerance code is for distinguishing from the other kind of resistors with the same fire retardant coating.

The resistors are compliance with RoHS and REACH.

The resistors are compliance with Thunder Enterprise standard:
Q\SLC023-2011.



THUNDER PRECISION RESISTORS



1. PRODUCT: FUSIBLE WIRE WOUND RESISTORS

2. PART NUMBER: Part number of the metal film resistor is identified by the name, power, tolerance, packing, temperature coefficient, special type and resistance value.

Example:

RRX	16	S	J	0	T	100
Series Name	Power rating	Size	Resistance Tolerance	Temperature Coefficient	Packing Style	Resistance Value

(1) Style: RRX series fusible wire wound resistors

(2) Power Rating: 15=1/2W; 16=1W; 17=2W; 18=3W

(3) Size cods: S = small size

(4) Tolerance: F=±1.0%; J=±5.0%

(5) T.C.R.: 1=±100ppm/°C; 0= ±200ppm/°C

(6) Packing type: T= tape/box;

B=BULK/box

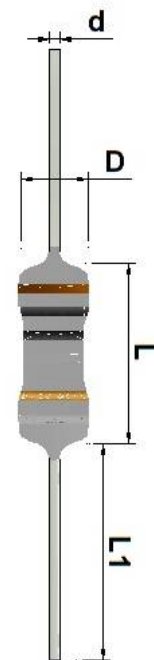
M= M type forming

F = F type forming

(7) Resistance Value: 0.22 Ω =R22、1.8 Ω =1R8、20 Ω =200、100 Ω =101

3. BAND-CODE:

COLOR	1st	2nd	Multiple	tolerance	ID
black	0	0	1		
brown	1	1	10	F(±1.0%)	
red	2	2	10 ²	G(±2.0%)	
orange	3	3	10 ³		
yellow	4	4	10 ⁴		
green	5	5	10 ⁵		
blue	6	6	10 ⁶		
purple	7	7			
gray	8	8			
white	9	9			
golden			10 ⁻¹	J(±5.0%)	
silver			10 ⁻²	K(±10%)	



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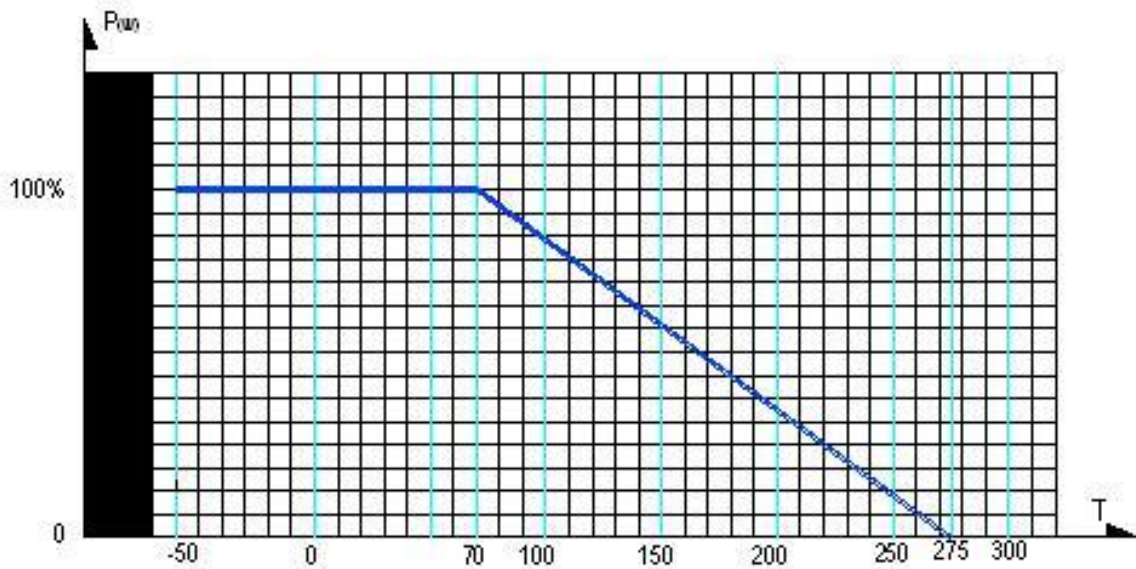


4. ELECTRICAL CHARACTERISTICS

Type	RRX15S	RRX16S	RRX17S	型号	
Resistance range	0.47Ω to 47Ω	0.47Ω to 100Ω	0.47Ω to 150Ω	阻值范围	
Resistance tolerance	F(±1%); J(±5%)			精度	
Temperature coefficient	±100ppm/°C; ±200ppm/°C;			温度系数	
Rated dissipation P_{70}	0.50W	1.0W	2.0W	70°C 以下额定功率	
Minimum Overload power to Fuse	> 1R0 = 8W; < 1R0 =10W	> 1R0 = 16W; < 1R0 =20W	> 1R0 = 32W; < 1R0 =40W	最低熔断功率	
Time to fuse	< 30 seconds or upon request			熔断时间	
Temperature range	-55°C to 275°C			工作温度范围	
Insulation voltage	200V	300V	350V	绝缘耐压	
Insulation resistance	10,000M			绝缘阻抗	
Dimension	±1.0(mm)	L=6, D=2.5	L=9, D=3.5	L=11.5, D=5.0	尺寸
	±0.05(mm)	d=0.56	d=0.60	d=0.75	
	±3.0(mm)	L ₁ =26	L ₁ =26	L ₁ =26	

- Unless otherwise specified, all values are tested at the following condition:
Temperature: 21°C to 25°C; Relative humidity: 45% to 70%
- Rated Continuous Working Voltage (RCWV)= $\sqrt{\text{Power Rating} \times \text{Resistance Value}}$

5. Derating curve





6. ENVIRONMENTAL CHARACTERISTICS

(1) Short time over load test

IEC60115-1 4.13: At 10 times rated voltage for 5 seconds, the resistor should be free from defects. The change of the resistance value should be within $\pm(2\%+0.05 \Omega)$ as compared with the value before the test.

(2) Resistance to soldering heat test

IEC 60115-1, 4.18: $260\pm 3^{\circ}\text{C}$ for 10 ± 1 Seconds, immersed to a point $3\pm 0.5\text{mm}$ from the body. The change of the resistance value should be within $\pm(1.0\%+0.05 \Omega)$ as compared with the value before the test.

(3) Temperature coefficient test

IEC 60115-1, 4.8: Test of resistors above room temperature 60°C at the constant temperature for over 4 to 5 minutes. Then measure the resistance. The Temperature Coefficient is calculated by the following equation and its value should be within the range of requested. (Other temperature range is available upon request)

$$\text{Resistor Temperature Coefficient} = \frac{R - R_0}{R_0} \times \frac{1}{t - t_0} \times 10^6$$

R = Resistance value under the testing temperature

R₀ = Resistance value at the room temperature

t = The testing temperature

t₀ = Room temperature Ω

(4) Insulation Resistance

IEC 60115-1, 4.6: in V-block for 60 seconds, the test resistance should be high than 10,000 M Ohm.

(5) Solderability

IEC 60115-1, 4.17: $235\pm 5^{\circ}\text{C}$ for 3 ± 0.5 Seconds, there are at least 95% solder coverage on the termination.

(6) Resistance to Solvent

IEC 60115-1, 4.30: IPA for 5 ± 0.5 Min. with ultrasonic. No deterioration of coating and color code.

(7) Endurance at 70°C

IEC 60115-1, 4.25: $70\pm 2^{\circ}\text{C}$ at RCWV for 1,000 Hr. (1.5Hr. on, 0.5Hr. off). The change of the resistance value should be within $\pm(5\%+0.05 \Omega)$ as compared with the value before the test.



(8) Damp Heat Steady State

IEC 60115-1, 4.24: $40\pm 2^{\circ}\text{C}$, 90-95% RH for 56 days, loaded with 0.1 times RCWV. The change of the resistance value should be within $\pm(5\%+0.05\ \Omega)$ as compared with the value before the test.

(9) Temperature Cycling

IEC 60115-1, 4.19: -55°C to Room Temp. to $+155^{\circ}\text{C}$ to Room Temp. (5 cycles). The change of the resistance value shall be within $\pm(1\%+0.05\ \Omega)$.

(10) Accidental Overload Test

IEC 60115-1, 4.26: 4 times RCWV for 1 Min. No evidence of flaming or arcing