

Products

No.S-HK0003-2

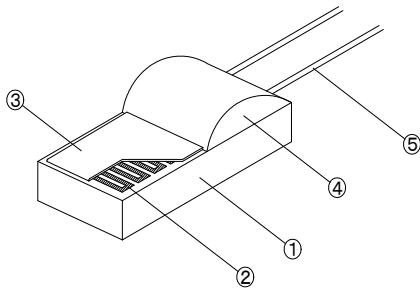
This specification note is applied to CRZ platinum thin film resistance temperature detectors produced by Hayashi Denko Co., Ltd..

Standard:

JIS C 1604- 1997 Resistance Thermometer Sensors

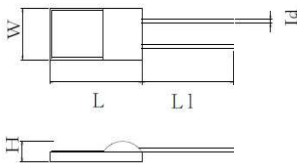
IEC 751- 1983 Industrial platinum resistance thermometer sensors

Construction



	Part name	Material
①	Substrate	high purity Alumina
②	Thin film circuit	Platinum
③	Protection Layer	Glass
④	Connection Reinforcement	Glass
⑤	Lead wire	Au-plated Nickel

Dimension



Model	Dimension (mm)				
	L	W	H	Ll	Ld
	± 0.2	± 0.2	± 0.2	± 2.0	± 0.05
CRZ2005R	5.0	2.0	1.1	11.0	0.2
CRZ1632R	3.2	1.6	1.1	11.0	0.2

Rated Specification

Item	Content	
Model	CRZ2005R	CRZ1632R
Resistance value	Pt100, Pt500, Pt1000	Pt100
TCR	3851ppm/°C	
Tolerance	JISC1604-1997 Class 1/3B, A, B, 2B Refer to Table : Tolerance *1/3B = F 0.1, A = F 0.15, B = F 0.3, and 2B = F 0.6 to IEC60751:2008	
Measuring Current	Pt100: 1mA or Less Pt500 and Pt1000: 0.5mA or less	Pt100: 1mA or Less
Operating Temperature Range	Class 1/3B: -20 to +150 °C Class A: -40 to +300 °C Class B and 2B: -70 to +400 °C	
Limit Temperature Range *	Class 1/3B: +250 °C Class A: +400 °C Class B and 2B: +500 °C	

* The temperature ranges are the maximum temperatures that elements can maintain the class at 0 °C after the drift due to the temperature stress after temporary exposed in high temperature. In that temperature above the operating temperature ranges, elements cannot maintain class accuracies.

Tolerance

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Class	Tolerance/°C	Tolerance at 0°C	
		Resistance Value Ω*	Temperature °C
1/3B (F0.1)	$\pm(0.1+0.0017 t)$	± 0.04	± 0.1
A (F0.15)	$\pm(0.15+0.002 t)$	± 0.06	± 0.15
B (F0.3)	$\pm(0.3+0.005 t)$	± 0.12	± 0.3
2B (F0.6)	$\pm(0.6+0.01 t)$	± 0.25	± 0.6

|t|: absolute value of actual temperature

*Pt500 is 5 times, Pt1000 is 10 times of the numbers

Data on Electrical Characteristics

Item	Test Condition	Characteristic Value
Self Heating	Measuring Current: 0.5, 1mA	Appendix Table 1
Response time	Still Air and Stirred Water	Appendix Table 2
Insulation Resistance*	DC100V	Over 100MΩ

*Insulation resistance value is to measure insulation resistance of the protection layer.

Appendix Table 1 Self-Heating Specification

Model	Condition	Self-Heating/ deg. C		
		0.5mA	1mA	(2mA)*
CRZ1632R-100	Still Air without MgO	/	0.10	0.49
	Still Air with MgO		0	0.08
CRZ2005R-100	Still Air without MgO		0.08	0.47
	Still Air with MgO		0	0.07
CRZ2005R-1000	Still Air without MgO	0.23	1.08	4.46
	Still Air with MgO	0	0.14	0.71

*Comparison of how different current values affect on self heating using sensors filled with MgO powder in the protection tubes and exposed elements without protection tubes.

*2mA for 100Ω and 1mA for 1000Ω are out of standard.

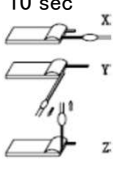
Appendix Table 2 Response Time

Model	Response Time (Time constant: :63.2%)/sec	
	Still Air	Stirred Water
CRZ1632R	4.3	0.3
CRZ2005R	4.8	0.4

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Data on Reliability Test

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Item	Test Condition	Characteristic Value
Stability	Room temp, 1000 hour	$\Delta R0 < \pm 0.02^{\circ}\text{C}$
Heat Resistibility	200°C, 1000 hour 400°C, 1000 hour	$\Delta R0 < \pm 0.05^{\circ}\text{C}$ (200°C) $\Delta R0 < \pm 0.10^{\circ}\text{C}$ (400°C)
Cold Resistibility	-70°C, 100 hour	$\Delta R0 < \pm 0.05^{\circ}\text{C}$
Heat Cycle	Low temp side: -40°C High temp side: 120°C Heat Cycle: 100 times	$\Delta R0 < \pm 0.05^{\circ}\text{C}$
Thermal Shock	Low temp side: 0°C High temp side: 200, 400°C Heat Cycle: 10 times	$\Delta R0 < \pm 0.05^{\circ}\text{C}$ (200°C) $\Delta R0 < \pm 0.10^{\circ}\text{C}$ (400°C)
Connection Reinforcement Strength	Pull Force, Each Direction, 10 sec X Axial Direction: 2.5N Y Axial Direction: 1.0N Z Axial Direction: 1.0N 	$\Delta R0 < \pm 0.05^{\circ}\text{C}$
Vibration Resistibility	Fixed on a rigid hardware and applied to the vibration condition as below. Frequency: 10 Hz to 150 Hz Acceleration: 20m/s ² Period 2 minutes Pull Cycle: 10 times	$\Delta R0 < \pm 0.05^{\circ}\text{C}$
Physical Shock Resistibility	Continuously Dropped on a iron plate above 250mm for 10 times.	$\Delta R0 < \pm 0.05^{\circ}\text{C}$

Data on Chemical Contents

Ratio by Weight (Wt%)						
Part name						
Substrate	Thin Film Circuit	Protection Layer	Connection Reinforcement	Lead wire	Weight	
CRZ2005R	57.4%	0.6%	1.8%	14.6%	25.6%	32.2mg
CRZ1632R	45.5%	0.5%	1.9%	13.3%	38.8%	21.1mg

Content of restricted materials in RoHS(ppm) ND= not detected										
Heavy Metal				PBB	PBDE	DEHP	BBP	DBP	DIBP	
Cadmium and the compound	Lead and the compound	Mercury and the compound	Hexavalent Chromium							
CRZ2005R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CRZ1632R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

On European RoHS directive, lead contained products shall be an exception under Annex III, 7(c)-1 (2011/65/EU) and ammended Annex II (2015/863/EU).

HAYASHI DENKO CO.,LTD.