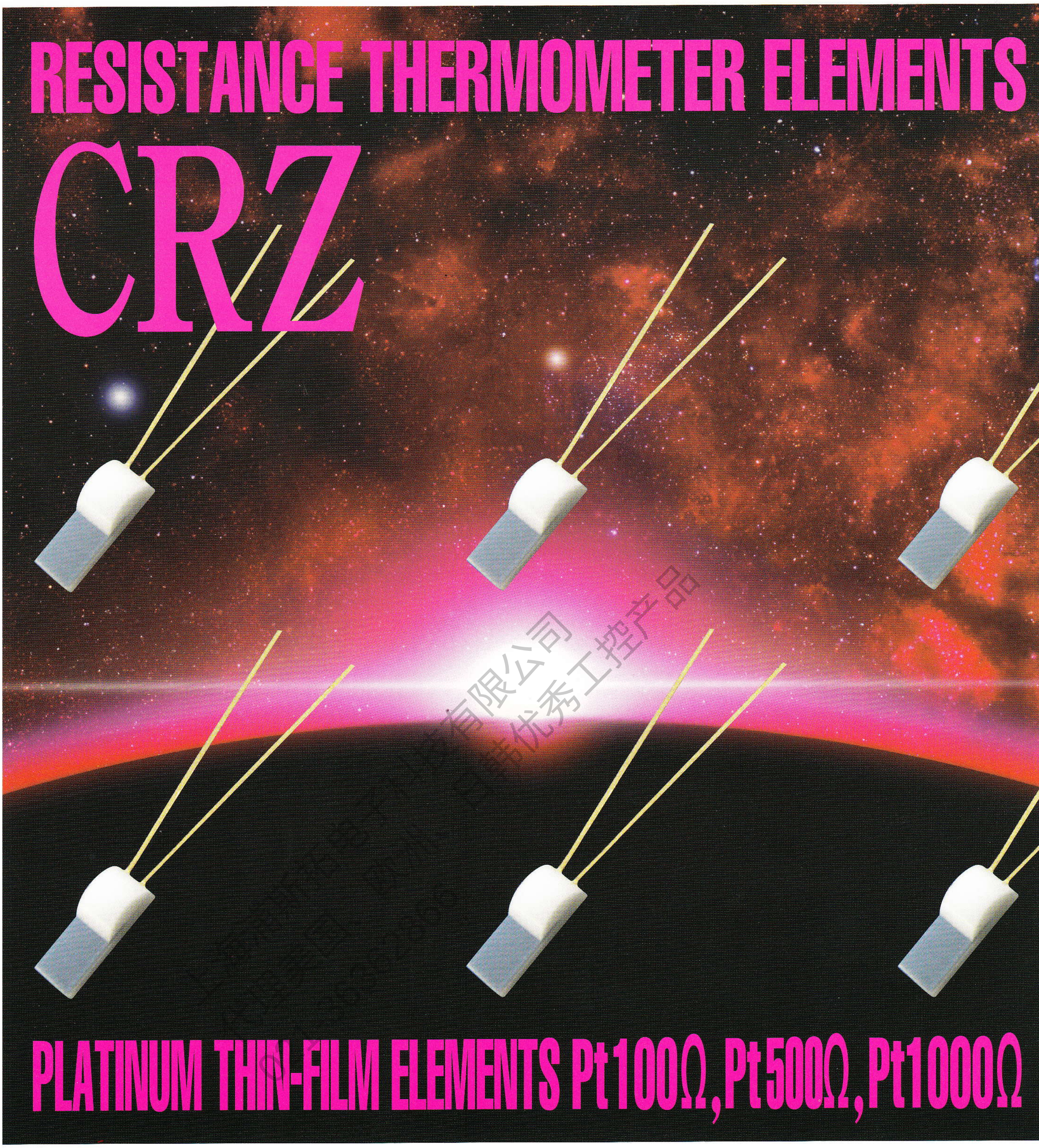
RESISTANCE THERMOMETER ELEMENTS

CRZ



PLATINUM THIN-FILM ELEMENTS Pt100Ω, Pt500Ω, Pt1000Ω

RoHS Compliance

High-tech temperature detectors

HAYASHI DENKO CO., LTD.

LLOYD'S REGISTER QUALITY ASSURANCE ISO9001

UKAS QUALITY MANAGEMENT 001

CRZ

PLATINUM THIN FILM RTD ELEMENTS

developed by full use of the latest high-technology

The epoch-making CRZ Platinum Thin Film RTD elements have been successfully developed by making full use of the state-of-the-art high technologies such as the sputtering technology laying thin films, the ultra fine patterning photolithography and dry-etching methods, and the resistance value adjustment by digital trimming for the accurate resistance.
Our automated manufacturing process at each stage enables to offer our products being at reasonable prices as well as meeting IEC and JIS Standards.

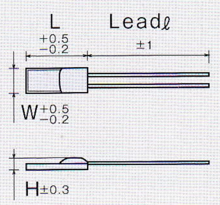
Special Features

1. In order to save customer's time and make sure to guarantee the quality of our products, we provide all of CRZ elements after inspecting and printing the actual resistance values at 0 ℃.
2. The elements exclusively made of ceramic and platinum have excellent stability even at high temperature. They are suitable for use between −40 and +500℃.
3. The platinum thin films sputtered on ceramic surfaces are outstandingly resistant to vibration and shock.
4. The latest high technology enables us to produce Pt 500 Ω and Pt 1000 Ω elements in addition to Pt100Ω. Those resistance values are not standardized in IEC and JIS but have been recently getting popular in the industrial measurement field.
5. The surface of Pt thin films is coated with a ceramic layer in order to withstand high voltage and maintain high insulation resistance.
6. We can offer two more classes in addition to class A and class B: more accurate 1/3 B: industrial class 2B.
7. We also provide cylindrical CRX elements improved physical strength as the substitutes of ceramic wire-wound RTD elements.

Specifications

■ CRZ Series

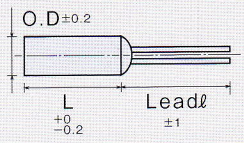
Model	Dimension of element (mm) Width×Length×Height	Number of Element S	D	Resistance Value	Measurement Current	Dimension of Lead Wire (mm) Width×Height×Length	Class	Recommendable Operating Temperature Range	Tolerance of Dimension (mm)
CRZ-1632-100	1.6×3.2×1.0	○	-	Pt 100 Ω	not exceeding 1mA	0.25×0.15×12	1/3B	1/3B -20 ～ +250℃	
CRZ-2005-100	2.0×5.0×1.0	○	-	Pt 100 Ω	not exceeding 1mA	0.25×0.15×12	A	A -20 ～ +400℃	
CRZ-2005-1000	2.0×5.0×1.0	○	-	Pt 500 Ω Pt 1000 Ω	not exceeding 0.5mA	0.25×0.15×12	B 2B	B, 2B -40 ～ +500℃※	



※ The range up to 500℃ is a special order.

■ CRX (Cylindrical element used CRZ)

CRX-3208	3.2×8	○	-	Pt 100 Ω	not exceeding 1mA	0.25×0.15×12	A B	A -20 ～ +300℃ B -40 ～ +300℃	



How to Order ● ● ● ● ● ●

Example: CRZ-1632 – 100 – B – 1

model / Resistance value / Class / Measurement Current

Tolerance

Class	Tolerance (℃)	Tolerance of Resistance at 0℃ (Ω)
1/3B	± (0.1+0.0017t)	±0.04
A	± (0.15+0.002t)	±0.06
B	± (0.3+0.005t)	±0.12
2B	± (0.6+0.01t)	±0.25

● t is the actual temperature of the platinum element in degree ℃

TCR (Alpha)

Class	ohm/ohm/℃
1/3B	0.003851±0.000004
A	0.003851±0.000005
B	0.003851±0.000012
2B	0.003851±0.000024

Stability

After continuously heating CRZ-1632 at 400 ℃ for 300 hours, the drift at 0 ℃ is within 0.06Ω (0.15℃)

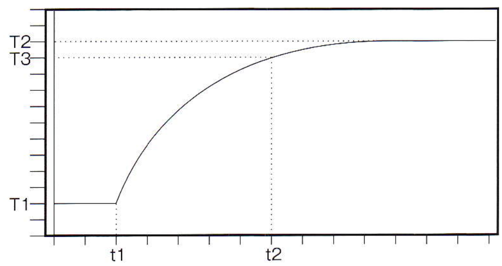
Response Data

Response time is the time required for the element to indicate the stated percent (%) value of the temperature source.

The following table indicates response characteristics of the temperature change from T1 to T2. T3 is 90% change of that temperature change and the associated 90% response time is t2 – t1.

Response time (90% response)

Model	Response Time (Time constant: :63.2%) /sec	
	Still Air	Stirred Water
CRZ-1632	4.3	0.3
CRZ-2005	4.8	0.4



Self-Heating and Measuring Current

A current used with an element should not exceed the specified current. When a CRZ-1632 is loaded in a 8.0 mm hollow protection tube, its resistance rises only 0.02Ω (approx. 0.05℃) at 1mA when measured in agitated water at 0℃. but the resistance value rises to 0.86Ω(appox.2.2℃) at 5mA.

● A current passing through the resistance element causes the element's self-heating. The magnitude of the self-heating error is shown as follow:

● Measuring methods

Without MgO··· An element is loaded in a hollow metal protection tube(φ12×t1)

With MgO········ An element is loaded in a metal protection tube filled with MgO (φ8×t1)

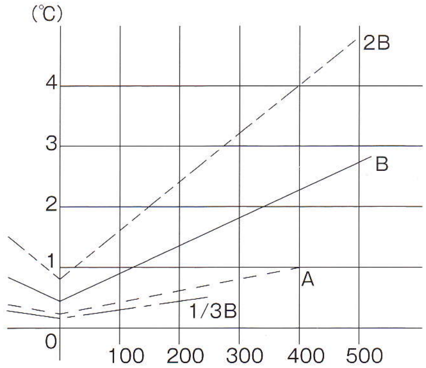
Self-heating

Model	Condition	Self-Heating/ deg. C			
		0.1mA	0.5mA	1mA	(2mA)
CRZ1632-100	Without MgO		0.03	0.13	0.52
	With MgO		0.01	0.03	0.11
CRZ2005-100	Without MgO		0.03	0.12	0.49
	With MgO		0.01	0.02	0.09
CRZ2005-1000	Without MgO	0.01	0.28	1.13	4.51
	With MgO	0.00	0.05	0.19	0.76

※ 2mA is used only for examination. As a notification above, the current should not exceed 1 mA for your application.

Tolerance Against Temperature（Pt100 Ω）

Temperature (℃)	Resistance Value (Ω)	1/3B		A		B		2B	
		℃	Ω	℃	Ω	℃	Ω	℃	Ω
-40	84.27					±0.5	±0.25	±1.0	±0.4
0	100.00	±0.10	±0.04	±0.15	±0.06	±0.3	±0.12	±0.6	±0.24
100	138.51	±0.27	±0.10	±0.35	±0.14	±0.8	±0.30	±1.6	±0.61
200	175.86	±0.44	±0.16	±0.55	±0.20	±1.3	±0.48	±2.6	±0.96
300	212.05			±0.75	±0.27	±1.8	±0.64	±3.6	±1.28
400	247.09			±0.95	±0.33	±2.3	±0.79	±4.6	±1.59
500	280.98					±2.8	±0.93	±5.6	±1.87



Pt100Ω Resistance Table

JIS C 1604-1997,IEC751-1995

Temperature (℃)	-100	-0	Temperature (℃)	0	100	200	300	400	500	600	700	800
-0	60.26 4.07	100.00 3.91	0	100.00 3.90	138.51 3.78	175.86 3.67	212.05 3.56	247.09 3.44	280.98 3.32	313.71 3.21	345.28 3.10	375.70 2.98
-10	56.19 4.08	96.09 3.93	10	103.90 3.89	142.29 3.78	179.53 3.66	215.61 3.54	250.53 3.43	284.30 3.32	316.92 3.20	348.38 3.08	378.68 2.97
-20	52.11 4.11	92.16 3.94	20	107.79 3.88	146.07 3.76	183.19 3.65	219.15 3.53	253.96 3.42	287.62 3.30	320.12 3.18	351.46 3.07	381.65 2.95
-30	48.00 4.12	88.22 3.95	30	111.67 3.87	149.83 3.75	186.84 3.63	222.68 3.53	257.38 3.40	290.92 3.29	323.30 3.18	354.53 3.06	384.60 2.95
-40	43.88 4.16	84.27 3.96	40	115.54 3.86	158.58 3.75	190.47 3.63	226.21 3.51	260.78 3.40	294.21 3.28	326.48 3.16	357.59 3.05	387.55 2.93
-50	39.72 4.18	80.31 3.98	50	119.40 3.84	157.33 3.72	194.10 3.61	229.72 3.49	264.18 3.38	297.49 3.26	329.64 3.15	360.64 3.03	390.48
-60	35.54 4.20	76.33 4.00	60	123.24 3.84	161.05 3.72	197.71 3.60	233.21 3.49	267.56 3.37	300.75 3.26	332.79 3.14	363.67 3.03	
-70	31.34 4.24	72.33 4.00	70	127.08 3.82	164.77 3.71	201.31 3.59	263.70 3.48	270.93 3.36	304.01 3.24	335.93 3.13	366.70 3.01	
-80	27.10 4.27	68.33 4.03	80	130.90 3.81	168.48 3.69	204.90 3.58	240.18 3.46	274.29 3.35	307.25 3.24	339.06 3.12	369.71 3.00	
-90	22.85 4.31	64.30 4.04	90	134.71 3.80	172.17 3.69	208.48 3.57	243.64 3.45	277.64 3.34	310.49 3.22	342.18 3.10	372.71 2.99	
-100	18.52	60.26	100	138.51	175.86	212.05	247.09	280.98	313.71	345.28	375.70	

The figures under the resistance values are resistance values change at every 10℃ respectively.
To obtain the resistance values of Pt500 Ω and Pt1000 Ω, multiply the above values by 5 and 10, respectively.

S11-CO1

● Specifcations are subject to change without notice.

MANUFACTURER

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