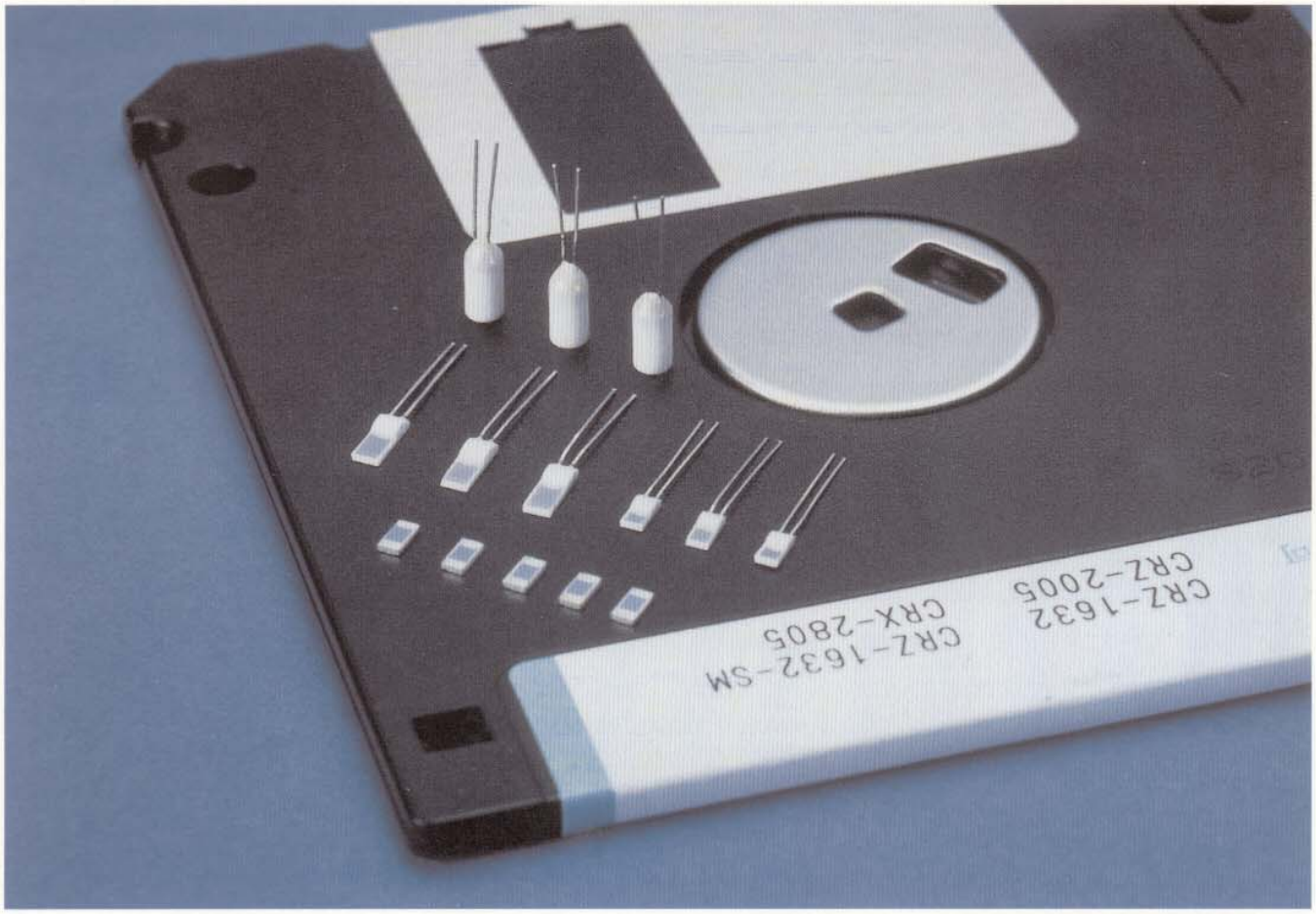
CRZ

RESISTANCE THERMOMETER ELEMENTS

PLATINUM THIN-FILM ELEMENTS Pt100Ω Pt500Ω Pt1000Ω



High-tech temperature detectors from

HAYASHI DENKO CO.,LTD.

CRZ

PLATINUM THIN FILM RTD ELEMENTS
developed by full use of the latest high-technology

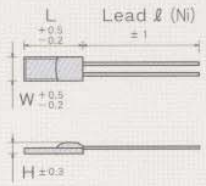
The epoch-making CRZ Platinum Thin Film RTD elements were developed successfully by making full use of the state-of-the-art high-technologies such as thin film laying by sputtering, ultra fine patterning technology by photolithography and dry-etching method, resistance value adjustment by digital trimming for accurate resistance by Hayashi Denko.
Automated manufacturing process at each stage enables us to offer reasonable prices as well as to conform with IEC and JIS Standard in specification.

Special Features

1. In addition class A and class B in accordance with IEC and JIS, we can offer two classes of our own: more accurate 1/3B and industrial grade class 2B.
2. The latest high-technology enables us to produce a Pt500Ω and Pt1000Ω element in addition to Pt100Ω. These resistance values are not defined in IEC and JIS, but geting popular in the industrial measurment field recently.
3. The elements are made exclusively of ceramic and Platinum, giving excellent stability even at high temperature. They are suitable for use between -40℃ to +400℃.
4. The Platinum thin film is sputtered on the ceramic surface, giving outstanding resistance to vibration and shock.
5. The surface of Pt thin film is coated with ceramic, so the element can withstand high voltage and show high insulation resistance.
6. 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 value at 0 deg. C.
7. We also provide cylindrical CRX elements as substitutes of ceramic wire-wound RTD elements.

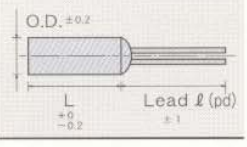
Specifications

■CRZ Series

Model	Dimensions of element(mm) Width×Length×Height	Number of Element S	Number of Element D	Resistance Value	Measurement Current	Dimensions of Lead wire(mm) Width×Height×Length	Class	Recommendable Operating Temperature Range	Tolerance of Dimension(mm)
CRZ-1632	1.6×3.2×1.0	○	–	Pt100Ω	not exceeding 1mA	0.25×0.15×12	1/3B	1/3B −20 to+250℃	
CRZ-2005	2.0×5.0×1.0	○	–	Pt100Ω	not exceeding 1mA	0.25×0.15×12	A	A −20 to+400℃	
CRZ-2005	2.0×5.0×1.0	○	–	Pt500Ω Pt1000Ω	not exceeding 0.5mA	0.25×0.15×12	B ※1	B −40 to+400℃	

※1 Classes 1/3B and 2B. are Hayashi Denko's. They are not IEC, JIS.

■CRX Series (Cylindrical element used CRZ)

CRX-2805	2.8×5	○	–	Pt100Ω	not exceeding 1mA	0.25×0.15×9	A B (Class B only for Double element)	A −20 to+300℃ B −40 to+300℃	
CRX-3208	3.2×8	○	○	Pt100Ω	not exceeding 1mA	0.3×0.2×9			

■CRZ−SM (Surface Mount model) is being devlopped.

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

●Where t is the actual temperature, in degrees ℃. of the platinum element.

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

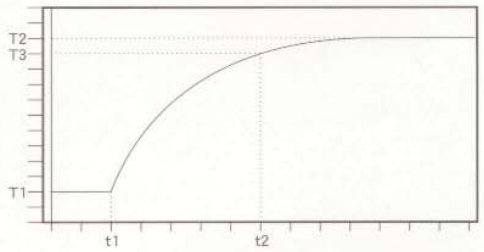
CRZ elements possess excellent long-term stability.
After continuously heating model CRZ-1632 at 400℃ for 1000 hours, the margin of error at 0℃ is within 0.008Ω (0.02℃).

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 tesponse 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(sec)		
	Air		Water
	V=1.0m/s	V=3.0m/s	
CRZ-1632	10	7	0.3
CRZ-2005	16	11	0.3



Self-Heating and Measuring Current

The current used with the element should not exceed 1mA. When model CRZ-1632 is put in a φ8.0mm protecting tube without any filling, 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 (approx.2.2℃) at 5mA.

●A current passing through the resistance element causes the element to heat.The magnitude of this self-heating error is expressed as follows:

$$\triangle T = P / E K (℃)$$

△T=Self-heating in ℃
EK=Self-heating coefficient in mW/℃
P =Electrical energy input to resistance element expressed as
$P = I^2 \times R / 1000 (mW)$
where I = current (mA) and R =ohms resistance of element.

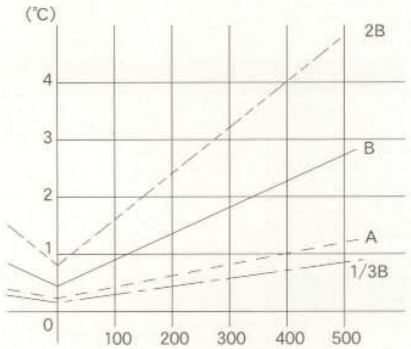
●Thus measuring current should be selected to lower the self-heating error calculated from the above formula.
Coefficient EK, which depends on the ambient medium and element size, is shown in the table.
For instance,when apply 1mA to CRZ-2005-1000, the temperature goes up by 0.5℃ by self-heating in still air.

■Self-heating coefficient

model	Coefficient(mW/℃)		
	Air		Water Still
	V=1m/s	Still	
CRZ-1632 100Ω	2	1	12
CRZ-2005 100Ω	4	2	20
CRZ-2005 1000Ω	4	2	20

Tolerance Against Temperature (Pt100Ω)

Temperature (°C)	Resistance Value (Ω)	1/3B		A		B		2B	
		°C	Ω	°C	Ω	°C	Ω	°C	Ω
−100	60.26	±0.27	±0.10	±0.35	±0.14	±0.8	±0.32	±1.4	±0.57
0	100.00	±0.10	±0.04	±0.15	±0.06	±0.3	±0.12	±0.6	±0.25
100	138.51	±0.27	±0.10	±0.35	±0.14	±0.8	±0.30	±1.4	±0.53
200	175.86	±0.44	±0.16	±0.55	±0.20	±1.3	±0.48	±2.2	±0.80
300	212.05	±0.61	±0.21	±0.75	±0.27	±1.8	±0.64	±3.0	±1.10
400	247.09	±0.78	±0.26	±0.95	±0.33	±2.3	±0.79		
500	280.98	±0.95	±0.31	±1.15	±0.38	±2.8	±0.93		
600	313.71	±1.12	±0.35	±1.35	±0.43	±3.3	±1.06		



Pt100Ω Resistance Table

JIS C 1604-1997,IEC751-1995

Temperature (°C)	−100	−0	Temperature (°C)	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	153.58 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	236.70 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°C respectively.
To obtain the resistance values of Pt500Ω and Pt1000Ω, multiply the above values by 5 and 10, respectively.

MANUFACTURER

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