

Shenzhen Haodu Technology Co., Ltd.

Version number: HDV2.0

Number: HD-20210319001

Date: 2021-11-10

Product specification

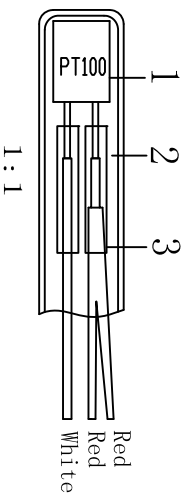
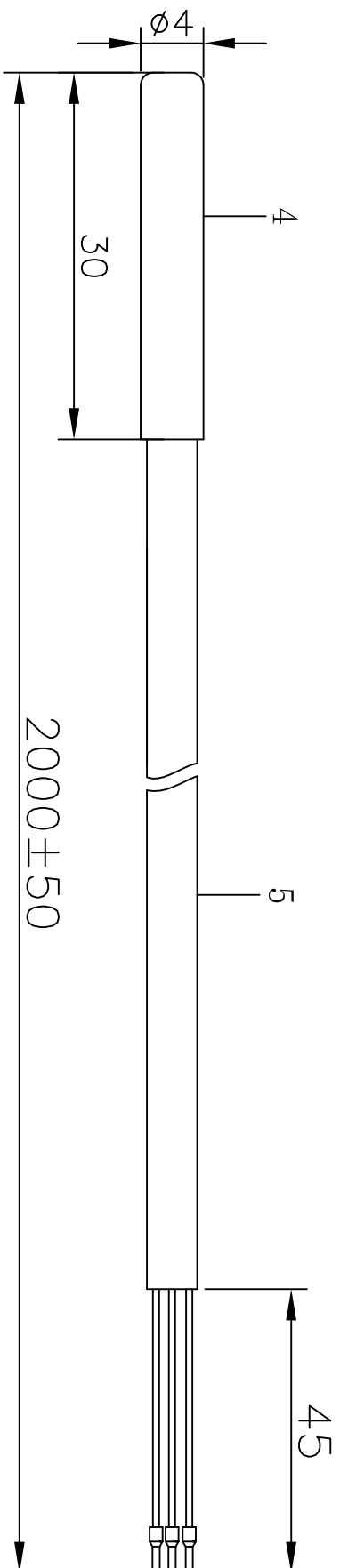
Customer name: _____

Product name: PT100 temperature sensor

Product specification: PT100/A

Product number: HD-PT100-2M

Unit: mm



Technical requirements:

- 1、E0308 at 5mm of three conductors;
- 2、Resistance value:PT100 R(0°C)=100 Ω;
- 3、Required service temperature:-50~200°C;
- 4、Unmarked dimensional tolerance shall be in accordance with IT14;
- 5、All materials meet ROHS requirements

Serial	Material Name	Specification and Model	Quantity	Remarks
5	Wire rod	PTFE/3xT8.15/2000mm	1	
4	Tube	SUS304/4x30mm	1	
3	Insulation	10x10mm	-	
2	Filler	Epoxy Resin	1	
1	IC	IE680751-M22-PT100-A	1	

Temperature Sensor

Part name	Temperature Sensor	
Shenzhen Haodu Technology co., Ltd	Engineering Department\2021	HD-PT100-2M

Sign	Change Content	Name	Date
Unit	MM		
Design	Mr. Hu		2021-11-10
Workmanship			
Approval			
Verify			

Shenzhen Haodu Technology co., Ltd	Proportion 1:1	Quantity: 1000pcs
	Page 1	Page of 1

Shenzhen Haodu Technology Co., Ltd.

Version number: HDV2.0

Number: HD-20210319001

Date: 2021-11-10

Product testing:

1 Product performance

- 1) Imported PT100 chip, class A, resistance resistance value R (0 °C)
= 100 Ω, 0 °C temperature error ± 0.15 °C;
- 2) 2 wire system, the lead adopts silver plated wire to ensure the
stability of resistance;
- 3) Withstand voltage test: AC 500V / 3S without breakdown or flicker
(cut-off current 1);
- 4) Insulation resistance test: DC 500V is greater than
100m Ω (between protective shell and lead);
- 5) Product operating temperature range: - 50 °C ~ + 200 °C;

Shenzhen Haodu Technology Co., Ltd.

Version number: HDV2.0

Number: HD-20210319001

Date: 2021-11-10

2. Technical requirements

After the test, place it in the normal temperature and humidity environment for 1 hour for final determination.

Inspection items	Inspection method	Inspection equipment
Appearance and dimension inspection	The surface shall be flat without obvious color difference, material shortage and other defects. The appearance and installation dimensions shall comply with the product drawings	1. Vernier caliper 2. Straight steel ruler
Constant temperature detection	Place the product in a constant temperature environment for 20 minutes, and then conduct constant temperature test	Thermostatic bath (fluctuation 0.05 °C)

3. Reliability test

Inspection items	Inspection method	Inspection equipment
Free fall test	Drop the sensor freely from a height of 1.5m and place it on a hard wooden board about 15x15cm above 3cm horizontally	
tensile test	The probe has no shelling during 20n / 5S tensile test	Tensile testing instrument

Inspection items	Inspection method	Inspection equipment
Folding resistance test	Fix the sensor head horizontally and connect the sensor head with the wire for 20 times up and down 90 times. Bend test	Bending test fixture

Shenzhen Haodu Technology Co., Ltd.

Version number: HDV2.0

Number: HD-20210319001

Date: 2021-11-10

Insulation test	Apply 500VDC between the product shell and the pin for 30s	Megger
Thermal shock test	Put the product in hot water (80 °C) for 2 minutes, take it out, stay in the environment for 1 minute, and then immerse it in the - 20 °C oil tank for 2 minutes. Take it out after 20 rounds of alternating cold and heat, and place it at room temperature for 1 hour before testing	<ol style="list-style-type: none">1. Hot and cold impact machine2. Digital multimeter

	resistance	
hot temperature test	Place it in a 150 °C oven for 24 hours, take it out and place it for 1 hour, and then test the resistance value at constant temperature	<ol style="list-style-type: none">1. Constant temperature oven2. Digital multimeter3. Resistance tester
Low temperature test	Place it in the - 20 °C oven for 24 hours, take it out and place it for 1 hour, and then test the resistance value at constant temperature	<ol style="list-style-type: none">1. High and low temperature thermostatic bath2. Digital multimeter

Shenzhen Haodu Technology Co., Ltd.

Version number: HDV2.0
Number: HD-20210319001
Date: 2021-11-10

4. Electrical performance

Project	Test conditions	unit	performance requirement
Resistance value at 0 °C	Constant temperature environment = 0 ± 0.05 °C test power 0.1W flowing liquid test	Ohm	100.00 Ω
Insulation test	500V / AC power on for 30s		No damage
Operating temperature range		centigrade	-50°C~+200°C
Platinum resistance characteristics			Schedule I
PT100 resistance and thermometer			Schedule II

Schedule I

Platinum resistance temperature sensor

Temperature coefficient TCR of platinum resistance

According to IEC751 international standard, the temperature coefficient TCR = 0.003851, PT100 (R₀ = 100 Ω) and PT1000 (R₀ = 1000 Ω) are uniformly designed platinum resistors.

$$TCR = (R_{100} - R_0) / (R_0 \times 100)$$

Shenzhen Haodu Technology Co., Ltd.

Version number: HDV2.0
 Number: HD-20210319001
 Date: 2021-11-10

resistance Ω Graduation	0°C Resistance value R0	100°C Resistance value R100
PT100	100.00	138.51
PT1000	1000.00	1385.1

Temperature / resistance characteristics

$$-200 < t < 0^{\circ}\text{C} \quad R_t = R_0 [1 + At + Bt^2 + C (t-100) t^3]$$

$$0 < t < 850^{\circ}\text{C} \quad R_t = R_0 (1 + At + Bt^2)$$

R_t Resistance at t °C

R_0 Resistance value at 0 °C

TCR=0.003851 Coefficient value

coefficient	A	B	C
numerical value	$3.9083 \times 10^{-3} \text{ } ^{\circ}\text{C}^{-1}$	$-5.775 \times 10^{-7} \text{ } ^{\circ}\text{C}^{-2}$	$-4.183 \times 10^{-12} \text{ } ^{\circ}\text{C}^{-4}$

measurement error

Grade	Resistance error at zero	Temperature error °C	temperature coefficient TCR
1/3DIN B	± 0.04	$\pm (0.10 + 0.0017 t)$	$3.85 \times 10^{-3} \pm 4 \times 10^{-6}$
A	± 0.06	$\pm (0.15 + 0.002 t)$	$3.85 \times 10^{-3} \pm 5 \times 10^{-6}$
B	± 0.12	$\pm (0.30 + 0.005 t)$	$3.85 \times 10^{-3} \pm 1.2 \times 10^{-5}$

Shenzhen Haodu Technology Co., Ltd.

Version number: HDV2.0
 Number: HD-20210319001
 Date: 2021-11-10

Error data sheet (absolute value)

temperature e ^o C	Standard d resistan ce value Ω	1/3DIN B		A		B	
		Temperat ure error ^o C	Resistan ce error Ω	Temperat ure error ^o C	Resistan ce error Ω	Temperat ure error ^o C	Resistan ce error Ω
-200	18.52	0.44	0.16	0.55	0.24	1.3	0.56
-100	60.26	0.27	0.1	0.35	0.14	0.8	0.32
0	100.00	0.10	0.04	0.15	0.06	0.3	0.12
100	138.51	0.27	0.10	0.35	0.13	0.8	0.30
200	175.86	0.44	0.16	0.55	0.20	1.3	0.48
300	212.05	0.61	0.23	0.75	0.27	1.8	0.64
400	247.09	0.78	0.30	0.95	0.33	2.3	0.79
500	280.98	0.95	0.36	1.15	0.38	2.8	0.93
600	313.71	1.12	0.44	1.35	0.43	3.3	1.06
650	329.64	1.20	0.46	1.45	0.46	3.5	1.13

Schedule II:

PT100 platinum resistance graduation meter										
temperature	0	1	2	3	4	5	6	7	8	9
^o C	Resistance value (Ω)									
-200	18.52									
-190	22.83	22.4	21.97	21.54	21.11	20.68	20.25	19.82	19.38	18.95
-180	27.1	26.67	26.24	25.82	25.39	24.97	24.54	24.11	23.68	23.25
-170	31.34	30.91	30.49	30.07	29.64	29.22	28.8	28.37	27.95	27.52
-160	35.54	35.12	34.7	34.28	33.86	33.44	33.02	32.6	32.18	31.76
-150	39.72	39.31	38.89	38.47	38.05	37.64	37.22	36.8	36.38	35.96
-140	43.88	43.46	43.05	42.63	42.22	41.8	41.39	40.97	40.56	40.14
-130	48	47.59	47.18	46.77	46.36	45.94	45.53	45.12	44.7	44.29
-120	52.11	51.7	51.29	50.88	50.47	50.06	49.65	49.24	48.83	48.42
-110	56.19	55.79	55.38	54.97	54.56	54.15	53.75	53.34	52.93	52.52
-100	60.26	59.85	59.44	59.04	58.63	58.23	57.82	57.41	57.01	56.6
-90	64.3	63.9	63.49	63.09	62.68	62.28	61.88	61.47	61.07	60.66

Shenzhen Haodu Technology Co., Ltd.

Version number: HDV2.0

Number: HD-20210319001

Date: 2021-11-10

-80	68.33	67.92	67.52	67.12	66.72	66.31	65.91	65.51	65.11	64.7
-70	72.33	71.93	71.53	71.13	70.73	70.33	69.93	69.53	69.13	68.73
-60	76.33	75.93	75.53	75.13	74.73	74.33	73.93	73.53	73.13	72.73
-50	80.31	79.91	79.51	79.11	78.72	78.32	77.92	77.52	77.12	76.73
-40	84.27	83.87	83.48	83.08	82.69	82.29	81.89	81.5	81.1	80.7
-30	88.22	87.83	87.43	87.04	86.64	86.25	85.85	85.46	85.06	84.67
-20	92.16	91.77	91.37	90.98	90.59	90.19	89.8	89.4	89.01	88.62
-10	96.09	95.69	95.3	94.91	94.52	94.12	93.73	93.34	92.95	92.55
0	100	99.61	99.22	98.83	98.44	98.04	97.65	97.26	96.87	96.48
0	100	100.39	100.78	101.17	101.56	101.95	102.34	102.73	103.12	103.51
10	103.9	104.29	104.68	105.07	105.46	105.85	106.24	106.63	107.02	107.4
20	107.79	108.18	108.57	108.96	109.35	109.73	110.12	110.51	110.9	111.29
30	111.67	112.06	112.45	112.83	113.22	113.61	114	114.38	114.77	115.15
40	115.54	115.93	116.31	116.7	117.08	117.47	117.86	118.24	118.63	119.01
50	119.4	119.78	120.17	120.55	120.94	121.32	121.71	122.09	122.47	122.86
60	123.24	123.63	124.01	124.39	124.78	125.16	125.54	125.93	126.31	126.69
70	127.08	127.46	127.84	128.22	128.61	128.99	129.37	129.75	130.13	130.52
80	130.9	131.28	131.66	132.04	132.42	132.8	133.18	133.57	133.95	134.33
90	134.71	135.09	135.47	135.85	136.23	136.61	136.99	137.37	137.75	138.13
100	138.51	138.88	139.26	139.64	140.02	140.4	140.78	141.16	141.54	141.91
110	142.29	142.67	143.05	143.43	143.8	144.18	144.56	144.94	145.31	145.69
120	146.07	146.44	146.82	147.2	147.57	147.95	148.33	148.7	149.08	149.46
130	149.83	150.21	150.58	150.96	151.33	151.71	152.08	152.46	152.83	153.21
140	153.58	153.96	154.33	154.71	155.08	155.46	155.83	156.2	156.58	156.95
150	157.33	157.7	158.07	158.45	158.82	159.19	159.56	159.94	160.31	160.68
160	161.05	161.43	161.8	162.17	162.54	162.91	163.29	163.66	164.03	164.4
170	164.77	165.14	165.51	165.89	166.26	166.63	167	167.37	167.74	168.11
180	168.48	168.85	169.22	169.59	169.96	170.33	170.7	171.07	171.43	171.8
190	172.17	172.54	172.91	173.28	173.65	174.02	174.38	174.75	175.12	175.49
200	175.86	176.22	176.59	176.96	177.33	177.69	178.06	178.43	178.79	179.16
210	179.53	179.89	180.26	180.63	180.99	181.36	181.72	182.09	182.46	182.82
220	183.19	183.55	183.92	184.28	184.65	185.01	185.38	185.74	186.11	186.47
230	186.84	187.2	187.56	187.93	188.29	188.66	189.02	189.38	189.75	190.11
240	190.47	190.84	191.2	191.56	191.92	192.29	192.65	193.01	193.37	193.74
250	194.1	194.46	194.82	195.18	195.55	195.91	196.27	196.63	196.99	197.35
260	197.71	198.07	198.43	198.79	199.15	199.51	199.87	200.23	200.59	200.95
270	201.31	201.67	202.03	202.39	202.75	203.11	203.47	203.83	204.19	204.55
280	204.9	205.26	205.62	205.98	206.34	206.7	207.05	207.41	207.77	208.13
290	208.48	208.84	209.2	209.56	209.91	210.27	210.63	210.98	211.34	211.7
300	212.05	212.41	212.76	213.12	213.48	213.83	214.19	214.54	214.9	215.25

