



## GWD series thermal resistors/thermocouples

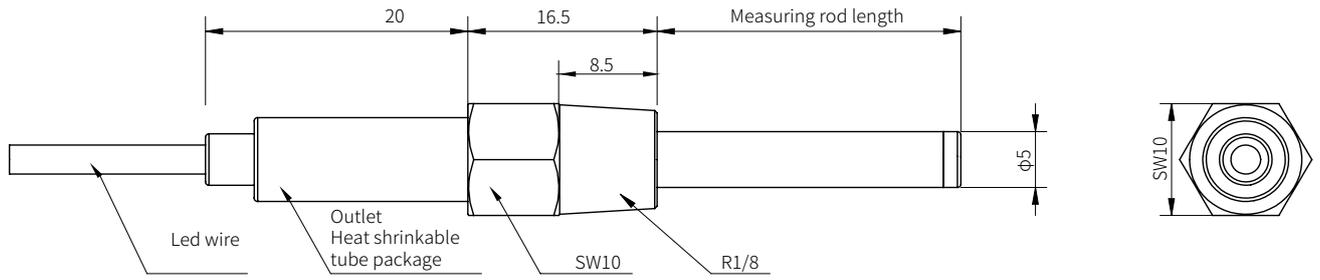
GWD series **JR/R/FR**

- + Convenient installation: integrated design
- + Resistant to harsh environment, high reliability and long service life
- + High protection level, suitable for harsh working environment
- + Adopt platinum thermal resistance and thermocouple sensitive element
- + Short response time and higher accuracy

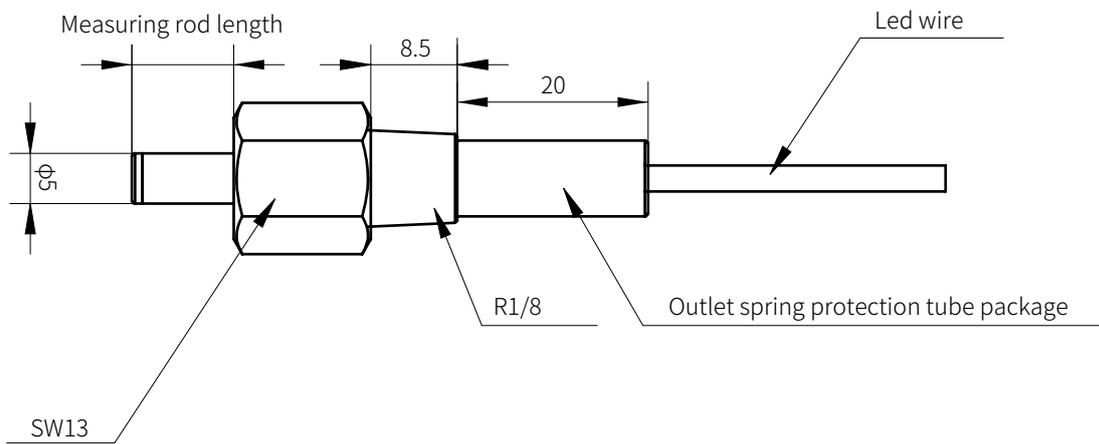


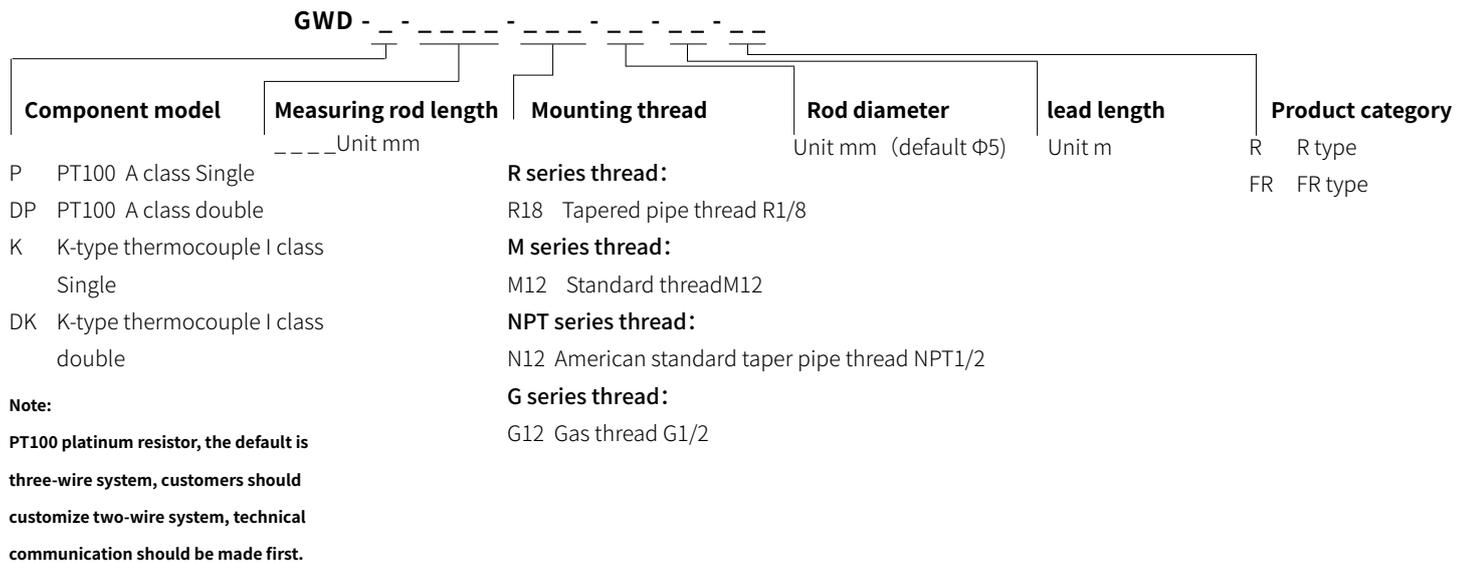
	Measurement data	Temperature												
Input	Temperature measuring range	JR type: -50...350°C (The temperature resistance of cables is -50-250°C if ordered); R type, FR type: -50...250°C												
	Graduation number/ resistance value	<table border="1"> <thead> <tr> <th></th> <th>Standard resistance value R<sup>0</sup> at 0°C</th> <th>Standard resistance value R<sup>100</sup> at 100°C</th> </tr> </thead> <tbody> <tr> <td>PT100</td> <td>100.00</td> <td>138.51</td> </tr> <tr> <td>PT1000</td> <td>1000.00</td> <td>1385.1</td> </tr> </tbody> </table>		Standard resistance value R <sup>0</sup> at 0°C	Standard resistance value R <sup>100</sup> at 100°C	PT100	100.00	138.51	PT1000	1000.00	1385.1			
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PT100	100.00	138.51												
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	Measurement difference	<table border="1"> <thead> <tr> <th>Grade</th> <th>Resistance difference at zero degree %</th> <th>Temperature difference °C</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>±0.06</td> <td>± (0.15+0.002   t  )</td> </tr> <tr> <td>B</td> <td>±0.12</td> <td>± (0.30+0.005   t  )</td> </tr> </tbody> </table>	Grade	Resistance difference at zero degree %	Temperature difference °C	A	±0.06	± (0.15+0.002   t  )	B	±0.12	± (0.30+0.005   t  )			
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A	±0.06	± (0.15+0.002   t  )												
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Precision	Response time	<table border="1"> <thead> <tr> <th>Measuring rod diameter</th> <th>5</th> <th>6</th> <th>8</th> <th>10</th> <th>12</th> </tr> </thead> <tbody> <tr> <td>Thermal response time s (T 0.5)</td> <td>≤ 8</td> <td>≤ 15</td> <td>≤ 30</td> <td>≤ 30</td> <td>≤ 30</td> </tr> </tbody> </table> <p>When the temperature changes rapidly in a short time, the time required for the output of the temperature sensor to change to 50% of the range change is called thermal response time, which is expressed by T0.5. The factors affecting T0.5 are related to the material, diameter and wall thickness of the protective tube, as well as its structural form, installation method, insertion depth, flow rate and type of the measured medium.</p>	Measuring rod diameter	5	6	8	10	12	Thermal response time s (T 0.5)	≤ 8	≤ 15	≤ 30	≤ 30	≤ 30
Measuring rod diameter	5	6	8	10	12									
Thermal response time s (T 0.5)	≤ 8	≤ 15	≤ 30	≤ 30	≤ 30									
	-200<t<0 °C	$R_t=R_0[1+At+Bt^2+C(t-100)t^3]$												
	0<t<850 °C	$R_t=R_0 (1+At+Bt^2)$												
	Rt	2ms (Customizable)												
	R0	<30ppm/°C												
Temperature/ resistance characteristics		<p>Temperature/resistance curve</p>												
	TRC=0.003851 Coefficient vaule	<table border="1"> <thead> <tr> <th>Coefficient</th> <th>A</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>Numerical value</td> <td><math>3.9083 \times 10^{-3} \text{°C}^{-1}</math></td> <td><math>-5.775 \times 10^{-7} \text{°C}^{-2}</math></td> <td><math>-4.183 \times 10^{-12} \text{°C}^{-4}</math></td> </tr> </tbody> </table>	Coefficient	A	B	C	Numerical value	$3.9083 \times 10^{-3} \text{°C}^{-1}$	$-5.775 \times 10^{-7} \text{°C}^{-2}$	$-4.183 \times 10^{-12} \text{°C}^{-4}$				
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Installation	Installation form	Metric system M10x1, G1/8, G1/4, G1/2, R 1/2, etc.												
Structure and materials	Lead wire	Tetrafluorosilver-plated shielded wire												
	Surveying rod	304/316L (default 304)												
Electrical connection	Outlet mode	Straight-out cable, electrical connector												
ITEM	CATEGORY	PARAMETER												

GWD- R type



GWD- FR type



**Note:****1) Thermal resistance:**

- a Lead bending radius  $\geq 40\text{mm}$ ;
- b Default temperature measurement  $-50\text{-}250^{\circ}\text{C}$ , The lead wire is a tetrafluoride silver-plated shielded wire;
- c The highest temperature measurement is  $\leq 350^{\circ}\text{C}$  and  $\geq 250^{\circ}\text{C}$ . The lead wire is silver-plated shielded wire, which is waterproof and cannot be bent for multiple times.

**2) Thermocouple:** Lead bending radius  $\geq 40\text{mm}$ ; default temperature measurement  $0\text{-}500^{\circ}\text{C}$ ;

**3) Lead end:** the default is Y-type cold-pressed terminal SV1.25-4;

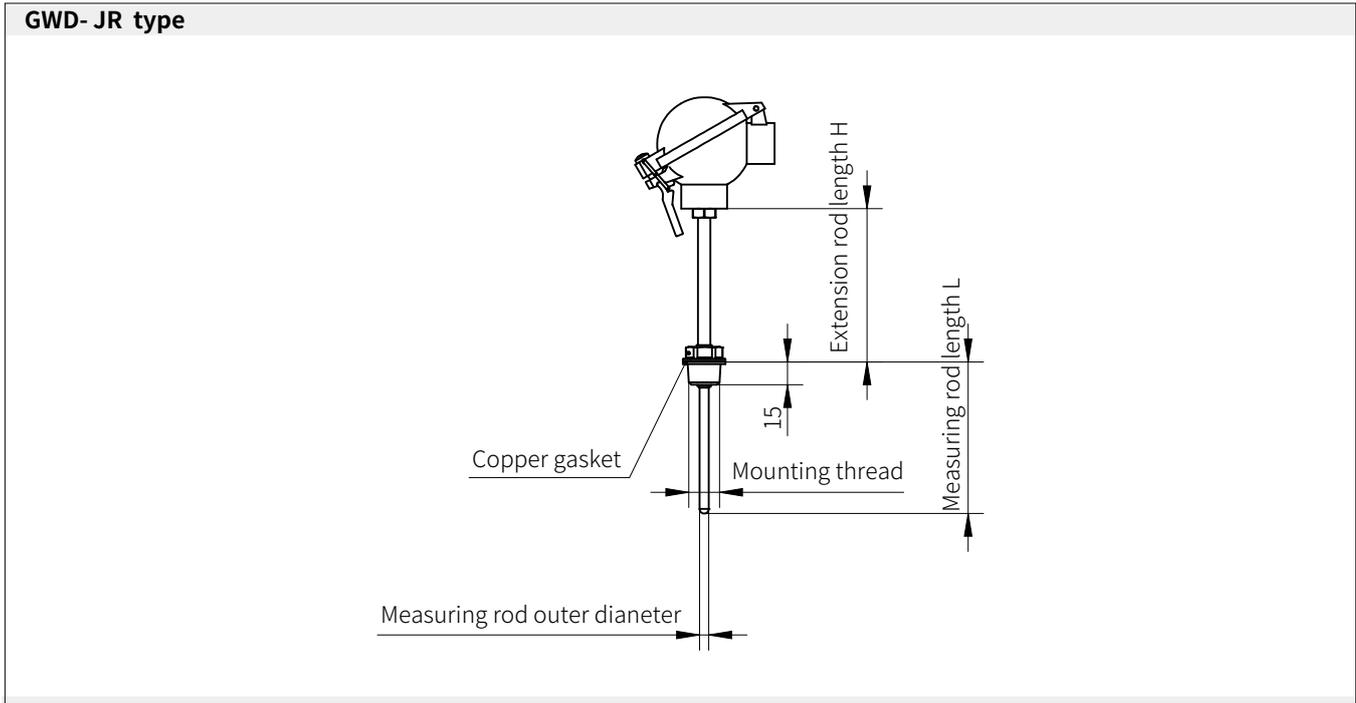
**4) Double-branch thermal resistance:** At the highest temperature of  $\leq 350^{\circ}\text{C}$  and  $\geq 250^{\circ}\text{C}$ , the outer diameter of the measuring rod is  $\geq 8\text{mm}$ ; The outer diameter of the measuring rod 6mm or higher when the highest temperature is  $\leq 250^{\circ}\text{C}$ ;

**5) Double thermocouple:** measuring rod outer diameter  $\geq 6\text{mm}$ ;

**6) Special requirements:** Customer's special requirements for structural size, temperature measuring range, cable, etc. can be customized through technical communication first.

**Model selection** | Model: GWD-P-0100-R18-05-10-R

Explanation: GWD-R type thermal resistance, platinum resistance with accuracy of PT100A class, measuring rod length of 100mm, R1/8 taper pipe thread, measuring rod diameter of 5mm, with 10m lead.



**GWD-series JR-type order code**

**GWD - - - - - JR**

<p><b>Component model</b></p> <p>P PT100 level A kick stand</p> <p>DP PT100 level A double branch</p> <p><b>Note:</b></p> <p>PT100 platinum resistor, the default is three-wire system, customers should customize two-wire system, technical communication should be made first.</p>	<p><b>Extension rod length:H</b></p> <p>___unit mm (Less than four digits can be ignored)</p> <p><b>Measuring rod length:L</b></p> <p>___unit mm (Less than four digits can be ignored)</p>	<p><b>Mounting thread</b></p> <p><b>R series thread:</b></p> <p>R18 Tapered pipe thread R1/8</p> <p><b>M series thread:</b></p> <p>M12 Standard thread M12</p> <p><b>NPT series thread:</b></p> <p>N12 American standard taper pipe thread NPT1/2</p> <p><b>G series thread:</b></p> <p>G12 Gas thread G1/2</p> <p><b>Cable length</b></p> <p>DG__ with __m cable conductor</p>	<p><b>Rod diameter</b></p> <p>unit mm</p> <p><b>Measuring range</b></p> <p>250 -50-250°C</p> <p>300 -50-300°C</p>	<p><b>Product category</b></p> <p>JR JR-type</p>
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**Note:**

**1)Thermal resistance:**

- a Lead bending radius  $\geq 40\text{mm}$ ;
- b Default temperature measurement  $-50-250^{\circ}\text{C}$ , The lead wire is a tetrafluoride silver-plated shielded wire;

**2)Cable end:** the default is Y-type cold-pressed terminal SV1.25-4;

**3)Double-branch thermal resistance:** maximum temperature measurement  $\leq 350^{\circ}\text{C}$ , and  $\geq 250^{\circ}\text{C}$ , measuring rod outer diameter  $\geq 8\text{mm}$ ; maximum temperature measurement  $\leq 250^{\circ}\text{C}$ , measuring rod outer diameter  $\geq 6\text{mm}$

**4)Special requirements:** Customer's special requirements for structural size,temperature measuring range, cable, etc. can be customized through technical communication first.

**Model selection** | Model: GWD-P-0100--0080-DG10-G12-250-08-JR

Explanation: GWD-JR type thermal resistance,platinum resistance with accuracy of PT100A class,measuring rod length of 100mm,the extension rod is 80mm,with 10m cable,installed with G1/2 thread,with temperature measuring range of  $-50-250^{\circ}\text{C}$  and measuring rod diameter of 8mm.

## Comparison table of platinum resistance

TECHNOLOGY PERCEIVES THE FUTURE

Pt100 Dividing table (-90~300°C)										
Temperature	0	1	2	3	4	5	6	7	8	9
°C	Resistance vaule (Ω)									
-90	64.3	63.9	63.49	63.09	62.68	62.28	61.88	61.47	61.07	60.66
-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

Remarks: The graduation table of Pt1000 is multiplied by 10 by the graduation table of Pt100.

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