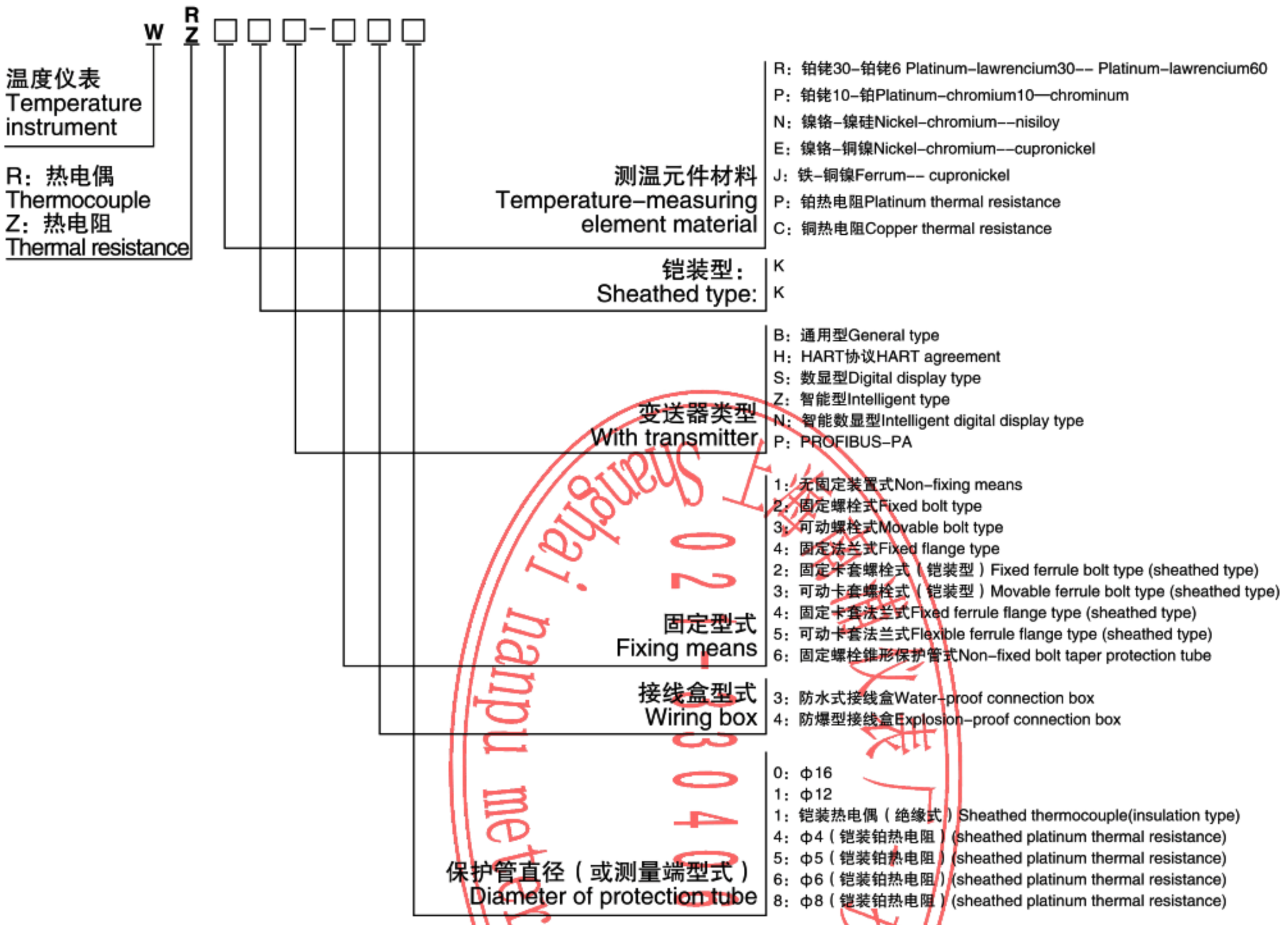
NANPU 上海南浦仪表厂

一体化温度变送器
Integration thermocouple and thermal resistance

在普通装配式、隔爆式、铠装式热电偶、热电阻产品的接线盒内装入两线制变送器模块（SBWR,SBWZ）组成了具有温度检测和变送功能的一体化结构的热电偶、热电阻产品。可直接测量液体、气体或蒸汽介质的温度。它接受标准分度号的热电偶、热电阻输入信号，产生了被测温度成线性的4~20mA DC直流电流输出信号，与计算机系统配套，从而实现对各种温度的检测与控制。可广泛应用于电力、冶金、石油、化工、航空、机械、轻工、纺织、医药、食品、国防等工业部门的科研领域。

The integration structural thermocouple and thermal resistance products with the function of temperature measurement and transmission can be realized through putting the two wire system modules of transmitter (SBWR and SBWZ) into the connection box of the thermocouple and thermal resistance products, such as normal packaged type, explosion proof type and sheathed type. The integration production can be used to measure the temperature of liquid, gas or steam medium directly. It receives the input signals of the thermocouple and thermal resistance with standard graduation mark and generates the linear 4~20mA DC by the measured temperature. The temperatures are measured and controlled by the contact of the DC output signal and computer system. This temperature transmitter can be widely used to the scientific research field of the industrial sectors, such as electric power, metallurgy, petroleum, chemical engineering, aviation, mechanics, light industry, textile, medicine, food and national defense.

型号命名Type designation



热电偶、热电阻推荐测量范围Recommended measuring range of thermocouple and thermal resistance

温度传感器类型 Type of temperature sensor	分度号 Graduation Mark	推荐测量范围(℃) Recommended Measuring Range(℃)
热电偶 Thermocouple	B	600~1600 800~1600 900~1800 1000~1600 1000~1800
	S	0~1300 0~1600 400~1600 600~1600 800~1400 800~1600 900~1400 1000~1400
	K	0~300 0~1600 0~800 0~1000 0~1300 400~800 400~1300 600~1300
	E	0~200 0~400 0~600 0~800 200~600 300~500 400~600
	J	0~200 0~400 0~600 300~600
	T	□200~0 □200~300 0~200 0~300
铂热电阻 Platinum thermal resistance	Pt100	□200~□50 □100~□50 □50~□50 □50~100 0~50 0~100 0~150 0~200 0~300 0~400 0~500 200~400 200~500
铜热电阻 Copper thermal resistance	Cu50	□50~□50 □50~□100 □50~□150 0~50 0~100 0~□150

主要技术指标Major technical indexes

1. 输入信号：热电偶:B、S、K、E、J、T。

1 Input signal: Thermocouple: B, S, K, E, J, T.

热电阻：Pt100、Cu50

Thermal resistance: Pt100、Cu50

2. 输出信号：在量程范围内输出与温度成线性的4～20mA直流信号。

2 Output signal: 4～20mA DC signal is output within rage lineal to temperature.

3. 基本精度：热电偶温度变送器±0.5%F·S;

热电阻温度变送器±0.2%F·S;

3 Basic degree of accuracy: Thermocouple temperature transmitter ±0.5%F·S;

Thermal resistance temperature transmitter ±0.2%F·S;

4. 传输方式：二线制。

4 Transmission model: Two wire system

5. 直流电源：12-30V DC,额定电压24V DC。

5 DC supply: 12-30V DC, rated voltage 24V DC

6. 负载阻抗：

极限负载电阻负载按下式计算：

RL(max)=50(U-12)

式中为变送器直流电源电压

在额定电压24V下:

RL(max)=50(24-12)=600Ω

6 Load impedance:

Calculate resistance load of limit load as follows;

RL(max)=50(U-12)

Among equation it is transmitter DC source voltage

Under 24V rated voltage:

RL(max)=50(24-12)=600Ω

7. 正常工作环境：

a.环境温度:□25～85℃ (特殊要求为℃□40～90℃)

b.相对温度:5%～95%

c.机械振动:10～150HZ, A=0.15mm

d.周围空气中不含有引起变送器腐蚀的介质

7 Normal operating environments

a. Ambient temperature: □25～85℃ (special requirement℃□40～90℃)

b. Relative temperature: 5%～95%

c. Mechanical vibration: 10～150HZ, A=0.15mm

d. Without any corrosive medium in the ambient air.

8. 电磁干扰：当离开变送器0.5米处有20～1000MHz、5W功率的无线电发送器工作时变化±0.15%F·S。

8 Electromagnet interference: When the radio transmitter of 20～1000MHz and 5W with 0.5 meters away from the transmitter works, it shall vary ±0.15%F·S.

9.温度漂移：温度环境每变化1℃，零点变化±0.15%F·S， 量程变化±0.01%F·S。

9 Temperature drift: When the environment temperature varies by 1℃, the zero point varies ±0.15%F·S and the measurement rang changes ±0.01%F·S.

使用与接线Use and wiring

1:接线时应注意：感温元件在出厂前已经联好，并按需要调好了量程，除有必要，一般不能变动量程调节电位器。

1 Notice to wiring: Please note that the temperature sensor has been well connected and adjusted the measurement range before leaving factory. Please do not adjust the measurement range and potentiometer, unless it is necessary.

2:一体化热电偶、热电阻的安装请参阅同类型的热电偶、热电阻的产品使用说明书进行。

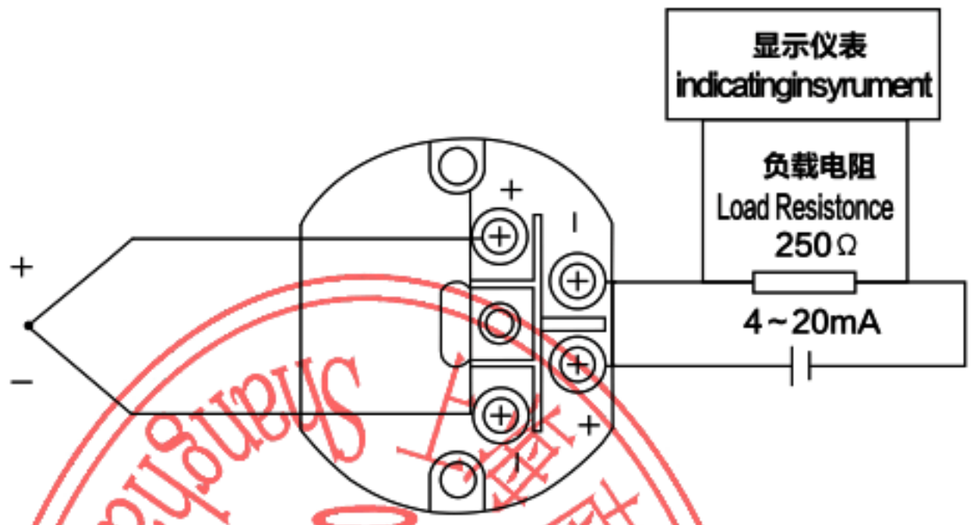
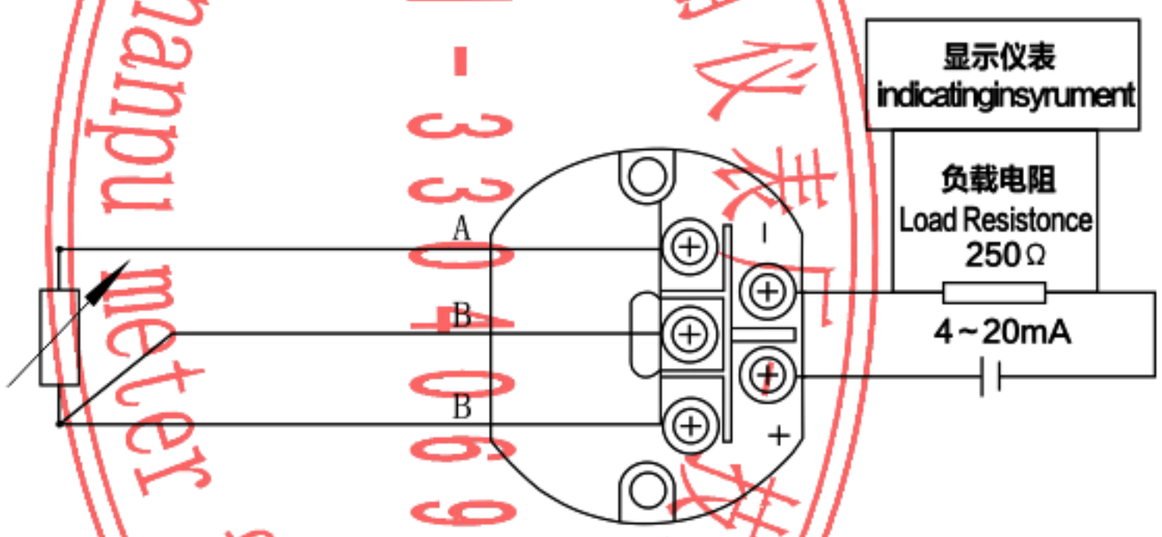
2 Please see other operating instruction manual of the same kinds for the assembling of integration thermocouple and thermal resistance.

3:一体化热电偶、热电阻是二线制电流输出，因此只需使用二根铜导线。接线图如下：

3 The integration thermocouple and thermal resistance shall use two copper conductors for they are two wire system electric output.

接线图如下

Wiring diagram is as follows:

热电偶 TC	
热电阻 RTD	

订货举例Order example

订货时请写明型号、分度号、总长和置入深度，即 (IL)×。

Please indicate the model, graduation mark, total length and placed depth in order, i.e. (L×).

例 1:WRNKB-230

Example 1:WRNKB-230 K 1150×1000

即：二线制一体化铠装热电偶，固定螺栓安装，防水式接线盒，外径φ16mm、分度号K、总长1150、插入深度1000mm。

I.E.: Two wire system integration thermocouple, fixed bolt assembling, waterproof connection box, outer diameter φ16mm, graduation mark K, total length 1150, placed depth 1000mm.

例 2:WZPKB-336　Pt100　L=1000

Example 2: WZPKB-336　Pt100　L=1000

即：二线制一体化铠装铂热电阻，可动卡套螺栓安装、防水接线盒、外径φ6、分度号Pt100、总长1000mm。

I.E.: Two wire system integration sheathed platinum thermal resistance, movable ferrule bolt assembling, waterproof connection box, outer diameteφ 6, graduation mark Pt100, total length 1000mm.

全隔离一体化温度变送器
Full Isolation Integrated Temperature Transmitter

通用型一体化温度变送器，用于热电阻（RTD）、热电偶、电阻和电压信号输入，通过PC可组态，安装于传感器内部。（可选带PROFIBUS-PA；HART协议）。

General integrated temperature transmitter is used for the signal input of Thermal resistance (RTD), Thermocouple (TC), Resistance and Voltage, which can be installed in the sensor through PC configuration.（ PEOFIBUS-PA and HART protocols are available）.

应用场合

- PC可组态（PCP）一体化温度变送器用于将各种输入信号转换为4～20mA输出信号
- 输入

热电阻（RTD）
热电偶（TC）
电阻（Ω）
电压（mV）

- 通过PC，使用组态工具可进行在线组态

Applicable places:

The PCP integrated temperature transmitter can be used to transform all kinds of input signals into 4-20mA output signals

Input

Thermal resistance (RTD)
Thermocouple (TC)
Resistance (Ω)
Voltage (mV)

Through PC, the configuration tool can be used online.

特点

- 通用PC可组态型，适用于各种输入信号
- 电气隔离
- 二线制技术，4～20mA模拟量输出
- 高精度
- 传感器损坏或短路故障信号可预设，符合NAMUR NE 43
- EMC符合NAMUR NE 21，CE
- 防爆认证
- 输出模拟
- 用户可自定义测量范围

操作和系统结构

Characteristics:

General PCP can be used to all kinds of input signals
Electric isolation]
Two wire system and 4-20mA analogy quality output
High accuracy
The sensor damage or short trouble back signals can be set in advance in accordance with NAMUR NE 43.
EMC shall be in accordance with NAMUR NE 21, CE.
Explosion proof certification
Output simulation
The measurement range can be customized by customers
Operating system and systematic structure

测量系统 Measurement system	智能温度变送器是二线制温度变送器，带模拟量输出，输入2-、3-、4-线制热电阻（RTD）信号、热电偶信号和电压信号，通过组态工具可进行组态。 The intelligent temperature transmitter with analog output, input 2, 3 and 4-wire thermal resistance (RTD) signals, thermocouple signals and voltage signals can be configured through configuration tool.

输入热电阻（RTD）Input Thermal resistance (RTD)

类型 Type	测量范围 Measurement Range	最小测量范围 Maximum Measurement Range
Pt100 Pt500 Pt1000 符合IEC 751 In accordance with	-200～850℃-328～1562°F -200～250℃-328～482°F -200～250℃-328～482°F	10K（18°F） 10K（18°F） 10K（18°F）
Ni100 Ni500 Ni1000 符合DIN 43760	-60～180℃ -76～356°F -60～150℃ -76～302°F -60～150℃ -76～302°F	10K（18°F） 10K（18°F） 10K（18°F）
接线类型 wiring type	2-，3-或4-连接二线制测量电缆电阻补偿（0～20Ω） Resistance compensation of 2-，3-，or 4- connecting two-wire system measurement cable（0-20Ω）	
传感器电缆电阻 Resistance of sensor cable	max.11Ω/每根电缆 Each cable wire	
传感器电流 Sensor current	≤0.6mA	

电阻信号（Ω）Resistance signal

类型 Type	测量范围 Measurement Range	最小测量范围 Maximum Measurement Range
电阻（Ω） Resistance	10... 400Ω 10... 2000Ω	10Ω 100Ω

热电偶（TC）Thermocouple (TC)

类型 Type	测量范围 Measurement Range	最小测量范围 Maximum Measurement Range
B（PtRh30-PtRh6） C（W5Re-W26Re）[3] D（W3Re-W25Re）[3] E（NiCr-CuNi） J（Fe-CuNi） K（NiCr-Ni） L（Fe-CuNi）[2] N（NiCrSi-NiSi） R（PtRh13-Pt） S（PtRh10-Pt） T（Cu-CuNi） U（Cu-CuNi）[2] MoRe5-MoRe41[1] 符合IEC 584 Part 1 In accordance with	0～+1820℃ 32～3308°F 0～+2320℃ 32～4208°F 0～+2495℃ 32～4523°F -200～+915℃ -328～1679°F -200～+1200℃ -328～2192°F -200～+1372℃ -328～2501°F -200～+900℃ -328～1652°F -270～+1300℃ -454～2372°F 0～+1768℃ 32～3214°F 0～+1768℃ 32～3214°F -200～+400℃ -328～752°F -200～+600℃ -328～1112°F 0～+2000℃ 32～3632°F	500K（900°F） 500K（900°F） 500K（900°F） 50K（900°F） 50K（900°F） 50K（900°F） 50K（900°F） 50K（900°F） 500K（900°F） 500K（900°F） 50K（900°F） 50K（900°F） 500K（900°F）
冷端 Cold junction	内部（Pt100）或外部（0...80℃），32...176°F Inner（Pt100）or Outer（0...80℃），32...176° F	
冷端精度 Accuracy of cold junction	±1K	
传感器电流 Sensor current	30nA	

电压信号（mV）Voltage signal (mV)

类型 Type	测量范围 Measurement Range	最小测量范围 Maximum Measurement Range
毫伏（mV） Millivolt（mV）	-10... 100mV	5mV

输出 输出（模拟量）Input Output (analog quantity)

输出信号 Input signal	4...20 mA, 20...4 mA
传输特性 Transmit characteristics	温度线性，电阻线性，电压线性 Temperature, resistance and voltage linearity
最大负载 Maximum load	（$V_{电源}$−8V）/0.025A

（1）无参考
（2）符合DIN 43710
（3）符合ASTM E988
(1) Without reference
(2) In accordance with DIN 43710
(3) In accordance with ASTM E988

数字过滤器第1级 Digital filter Grade 1	0...8 s
输入电流 Input current	≤3.5 mA
电流限制 Current limitation	≤25 mA
延时开关 Time delay switch	4 s（在上电过程中 Ia=3.8mA） 4 s（During power on I a=3.8mA）
响应时间 Response time	1 s

故障信号（故障监测）Troubleback(fault)signal(faultmonitoring)

低于测量下限 Lower than measurement lower limit	输出降至3.8 mA Output down to 3.8 mA
超过测量上限 Beyond measurement upper limit	输出升至20.5 mA Output up to 20.5 mA
传感器损坏 Sensor damage 传感器短路[1] Sensor short circuit	可设置为≤3.6mA或≥21.0 mA Can be set as≤3.6mA or ≥21.0 mA

电气连接Electric connection

电源 Power supply	U_b=8...35 V DC，极性保护 Polarity protection
电气隔离（输入/ 输出） Electric isolation (Input/Output)	U=3.75 kV AC
允许波动范围 Allowable vibration range	U_{ss}≤5V（当Ub≥13V，f_{max}=1 kH_z时）

精度 Accuracy

参考条件 Reference condition	标定温度23℃（73.4°F）±5K Labeled temperature23℃（73.4° F）±5K

热电阻（RTD）Thermal resistance (RTD)

类型Type	测量精度[2]Measurement accuracy
Pt100，Ni100 Pt500，Ni500 Pt1000，Ni1000	0.2 K或0.08% 0.5 K或0.20% 0.3 K或0.12%

电阻信号（Ω）Resistance signal

类型Type	测量精度[2]Measurement accuracy	测量范围Measurement range
电阻（Ω） Resistance	±0.1Ω或0.08%	10...40Ω
	±1.5Ω或0.12%	10...2000Ω

热电偶（TC）Thermocouple (TC)

类型 Type	测量精度[2]Measurement accuracy
K，J，T，E，L，U N，C，D S，B，R MoRe5-MoRe41	typ.0.5 K或0.08% typ.1.0 K或0.08% typ.2.0 K或0.08%
内部参考端影响 Affected by internal reference end	pt100 DIN IEC 751 C1.B

电压信号（mV）Voltage signal (mV)

类型 Type	测量精度[2]Measurement accuracy	测量范围Measurement range
毫伏（mV） Millivolt（mV）	±20μV或0.08% ±20μV or 0.08%	-10... 10 mV

电源影响 Affected by power supply	≤±0.01%/ V 偏离24V[3] ≤±0.01%/ V with deviation of 24V[3]	测量范围Measurement range
负载影响 Affected by load		

（2）%相对于可调测量范围（取大值）

（3）所有数据与20 mA时的测量终值（FSD）有关

(1) Not applicable to thermocouple.

(2) Select the maximum value % for adjustable measurement range

(3) All data are related to the final value of measurement(FSD)

温度漂移 Temperature shift	热电阻（RTD） Temperature shift Td=±（15 ppm/K*最大测量范围）±50 ppm/K*预设测量范围）*△θ热电阻Pt100: Td=±（15 ppm/K*Maximum measurement range）±50 ppm/K*Measurement range set in advance）*△θ Thermal resistance Pt100: Td=±（15 ppm/K*（测量终值+200）+50ppm/k*预设测量范围）*△θ热电偶（TC）: Td=±（15 ppm/K*（Final value of measurement+200）+50ppm/k*Measurement range set in advance）*△θ Thermocouple（TC）: Td=±（50 ppm/K*最大测量范围+50ppm/k*预设测量范围）*△θ △θ=环境温度对参考温度的偏离值 Td=±（50 ppm/K*Maximum measurement range+50ppm/k*Measurement range set in advance）*△θ △θ=Stray value between environment temperature and reference temperatur
长期稳定性 long-term stability	≤0.1K/年[1]或≤0.05%/ 年[1][2] ≤0.1K/ Year[1] or ≤0.05%/ Year[1][2]

安装条件Installation condition

安装角度Installation angle	无限制No limitation
安装区域Installation area	防水接线盒或隔补接线盒Waterproof connecting box or isolation connecting box

应用条件环境条件Application condition Environment condition

环境温度 Environment temperature	-40...+85℃（-40...185°F），用于防爆区域 -40...+85℃（-40...185° F），Applicable to explosion proof area
贮存温度 Storage temperature	-40...+100℃（-40...212°F）
气候等级 Climate grade	符合EN 60654-1，Class C In accordance with EN 60654-1，Class C
冷凝 Condensation	允许Permission
防护等级 Degree of protection	IP 00/ IP 66安装 IP 00/ IP 66 Installation
震动保护 Shock protection	4g / 2...150Hz，符合IEC 60068-2-6
电磁兼容性 Electromagnetic compatibility	抗干扰和干扰辐射符合EN 61326-1和NAMUR NE 21 Anti-interference and anti-interference radiation in accordance with EN 61326-1和NAMUR NE 21