

温度巡检仪  
(二线制隔离型)  
使用说明书



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## 一、概述

XTRM- 系列温度远传监测仪具有多路输入一路输出的特点，它能同时对多个测量点进行测量，并自动将多个被测量点中温度最高的一个点作为输出，输出信号为4～20mA的标准电流。仪表具有中文液晶多路显示或LED高亮度大数码显示，在无选择时显示最高温度点的温度值，需要时用户可以通过面板上的按键，选择查看任一测量点的温度值。

本仪表主要用于多点温度测量监视及需要报警的各种场合。由于仪表采用先进的微处理器进行智能控制、SMT 工艺等各项先进技术，仪表具有较好的稳定性、可靠性和抗干扰性能。整机采用壁挂式结构，安装十分简便。

系列产品有2路、3路、4路、5路和6路。

## 二、产品选型

|      |             |             |                                   |             |             |
|------|-------------|-------------|-----------------------------------|-------------|-------------|
| XTRM | <div></div> | <div></div> | <div><div></div><div></div></div> | <div></div> | <div></div> |
|      | 通道数         | 显示方式        | 温度范围                              | 外壳形式        | 输入输出隔离      |
|      |             | 1 指针        | 10 0～100                          | A 铝合金       | G 隔离        |
|      |             | 2 LED数显     | 15 0～150                          | P 塑料        | 空 不隔离       |

## 三、技术参数

|        |                                                                                                                                                         |
|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| 输入信号   | 测量通道：1～4路巡回测量<br>传感器：电偶：标准热电偶 K、E、J、B、S、T、R 等<br>电 阻：标准热电阻 Pt100、远传压力电阻 30～350Ω 等<br>电 流：0～10mA、4～20mA等（输入电阻 ≤ 250Ω）<br>电 压：0～5V、1～5V、mV等（输入阻抗 ≥ 250KΩ） |
| 输出信号   | 模拟量输出：DC 4～20mA (负载电阻 ≤ 500Ω)                                                                                                                           |
| 特    性 | 测量精度：± 0.2%FS 或 ± 0.5%FS<br>分 辨 率： ±0.1字                                                                                                                |

显示范围：-199.9~9999

显示方式：0.8 英寸高亮度LED 数码显示

发光二极管工作状态显示：1~4测量通道号

温度补偿：-10 ~50 温度自动补偿

参数设定：面板轻触式按键数字设定

保护方式：电源欠压自动复位 工作异常自动复位

供电电压：16 ~ 42VDC

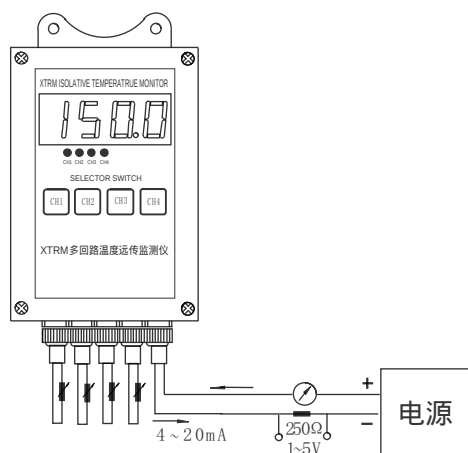
使用环境 环境温度：-25 ~80

相对湿度：≤90% RH 避免强腐蚀气体

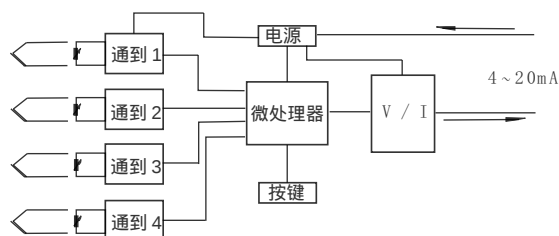
## 四、工作原理

以 XTRM-4 为例，它是四回路输入，一路4 ~ 20mA 二线制输出的信号转换器，二线制输出同时作为信号和仪表的供电回路。

输出电流是正比于被测输入信号的变化，指示仪表、记录仪表、调节器等与电源串联在输出回路，输出电流正比于温度变化，但独立于电源电压的变化。其应用原理如图一所示。来自热电阻或热电偶传感器的信号通过前置放大，然后输入摸数转换电路，经过微处理器计算比较后，将信号输给数摸转换电路，由转换电路转变为恒定的4 ~ 20mA 电流输出。原理框图如图二所示。

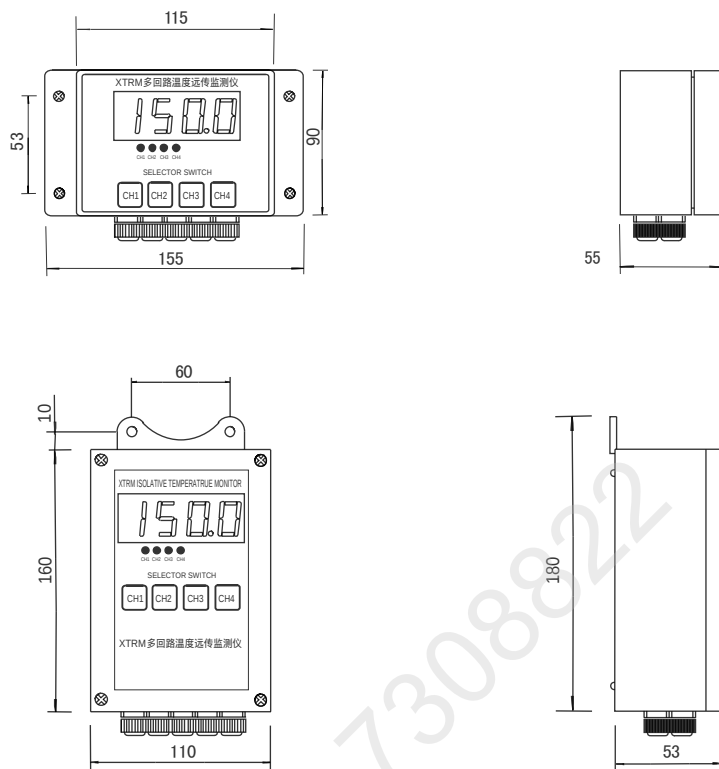


图一



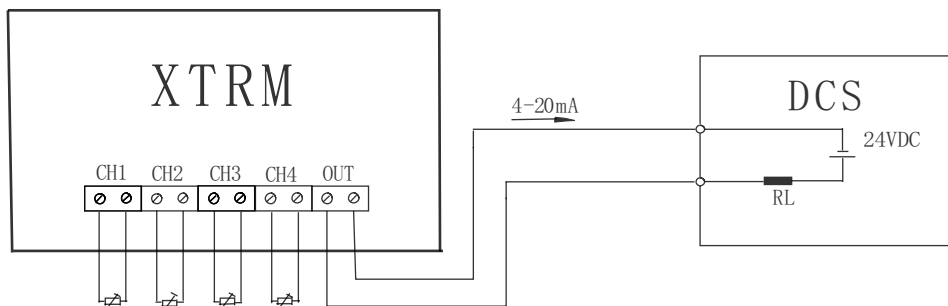
图二

## 五、结构尺寸



## 六、电气连接

仪表与外部热电阻的接线需打开仪表盖以后进行,输入与输出接线端子在底板上,输入端共8个端子,如图所示。



## 七、使用说明

开机后需预热10分钟，仪表的安装应该尽量靠近测量点，这样可以充分利用二线制的如下优点：

1.高的抗干扰能力，因为信号是在高电平情况下传送，达到抑止噪声和干扰的作用。

2.简单的布线，即仪表从现场控制室采用双绞导线连接就可以了，降低了布线的成本。

输入采用热电阻时 为了避免测量误差 传感器的引线电阻必须保证一定的数值，这里对于每一个Pt100的传感器，引线电阻固定为0.35Ω，0.35Ω相应导线的截面和长度如下所示：

| 导线长度    | 截面积   |
|---------|-------|
| 2×15m   | 1.5mm |
| 或 2×10m | 1.0mm |

也可以取任何截面积的导线，但引线总电阻必须确保为0.35Ω。否则将会产生引线误差，例每变化0.38Ω引线电阻将引起1 的温度误差。输入采用热电偶时，输入端与热电偶的连接必须采用相应的补偿导线，输入端的引线需考虑对外磁场的屏蔽。

仪表负载电阻 RL的大小，取决于仪表的电源电压、电源纹波 VR的大小和是否采用输入输出隔离有关。

对于LED 数字显示仪表，其公式如下

$$RL_{\max} = \frac{VS - (0.5VR + 12)}{0.02} (\Omega)$$

对于LED 数字显示仪表（隔离型），其公式如下

$$RL_{\max} = \frac{VS - (0.5VR + 15)}{0.02} (\Omega)$$

例：如果VS=24V，VR=2V，则 RL=550Ω（LED 数字显示表）  
RL=400Ω（隔离型LED数字显示表）。

3.对于暂时不使用的回路其输入端接小于100Ω电阻或将输入用导线短接。如果输入开路仪表无法正常工作。

4.在正常工作情况下，仪表同时对四路温度进行测量，但仅显示和输出温度最高的一路信号。

## 八、维护与调整

由于在设计上已考虑到仪表的长期稳定性，并且仪表出厂前均经过长时间老化和校验，因此在正常的使用情况下，一般无须特别维护。如经验证实是仪表故障，可送本公司维修。公司对本系列产品实行终身维修。如果发现仪表已不能正常工作，仪表输出电流超过20mA。多数情况是传感器开路所致，也可能是传感器与保护套管的绝缘电阻下降引起(隔离型仪表能防止该故障)。如果一路输入短路，不会影响仪表工作。当按键选择该回路时，输出电流不变，表头指示低于零点。

量程调整步骤：

1. 同时按  和  键，保持6S。仪表显示 。
2. 按  键，仪表显示量程下限。
3. 按  键，下限递加；按  键，下限递减；
4. 按  键，仪表显示 。
5. 按  键，上限递加；按  键，上限递减；
6. 按  键，返回并保存。

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## **Temperature Monitor XTRM**

**Pt100 (RTD), thermocouples,  
electrical isolation**

Operating Instructions

**Manufacturer:**

**ANHUI TIANKANG (GROUP) SHARES CO.,LTD.**

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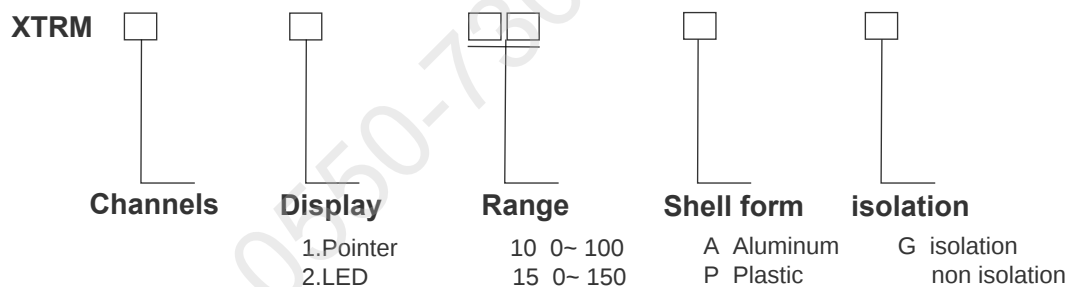
## 1 General information

XTRM Series Temperature Remote Monitor with the characteristics of multiple input and one way output, can measure a number of measurement points and will automatically identify the maximum temperature of a number of measurement points as output with output signal 4 ~ 20mA standard current. With LCD display or LED high brightness large digital display, in the absence of choice, it shows the temperature of the maximum temperature point. The user can use the front panel buttons to view the temperature at any measuring points.

This instrument is mainly used for monitoring multi-point temperature measurements and various occasions for alarm. As the instrument use advanced microprocessor, SMT technology and other advanced technologies, the device has the characteristics of good stability, reliability and robustness. The device use wall structure and the installation is very simple.

Series products: 2 loop, 3 loop, 4 loop, 5 loop and 6 loop.

## 2 Ordering information



## 3 Technical data

|                 |                                                                                                                                                                                                                                                                                                                                 |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input signal    | Measurement channels: 1 ~ 4 Road Tour measurement<br>Sensors: Standard thermocouple K, E, J, B, S, T, R, etc.<br>Resistance: Standard Pt100; Remote resistance of 30 ~ 350ohm, etc.<br>Current: 0 ~ 10mA, 4 ~ 20mA, etc. (Input resistance $\leq$ 250ohm)<br>Voltage: 0 ~ 5V, 1 ~ 5V, mV, etc. (input impedance $\geq$ 250Kohm) |
| Output signal   | Analog Output: DC 4 ~ 20mA (load resistance $\leq$ 500ohm)                                                                                                                                                                                                                                                                      |
| Characteristics | Accuracy: $\pm 0.2\%$ FS or $\pm 0.5\%$ FS<br>Resolution: $\pm 0.1$ words                                                                                                                                                                                                                                                       |

Display Range: -199.9 ~ 9999  
Display: 0.8 inch high-brightness LED digital display  
LED working status display: No. 1 to 4 measurement channels  
Temperature Compensation: -10 ~ 50 automatic compensation  
Parameters: the number set button touch panel  
Protection mode: Power voltage automatic reset abnormal working  
Supply Voltage: 16 ~ 42VDC  
environment Ambient temperature: -25 ~ 80  
Relative humidity:  $\leq 90\%$  RH, avoid the strong corrosive gas

## 4 Work Principle

To XTRM-4, for example, it is the four-loop input: one-wire 4 ~ 20mA output signal converter; two-wire output signal and the instrument at the same time as the power supply circuits.

Output current is proportional to the measured input signal changes, indicating meters, recording instruments, regulators and other power supply in series with the output circuit. Output current is proportional to temperature changes, but independent of supply voltage changes. The application of theory as shown in Figure 1. Signals from the thermal resistance or thermocouple sensor signals enlarge through the front, then enter the touch-digital conversion circuit. After the signals are calculated and compared through the microprocessor, the signal loss to analog conversion circuit. Then the converter circuit makes it into a constant of 4 ~ 20mA current output ( Diagram shown in Figure 2.)

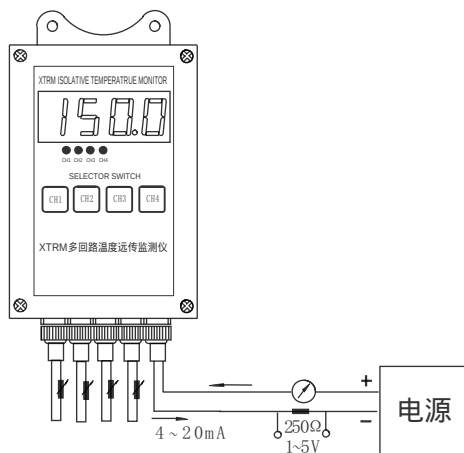


Figure 1.

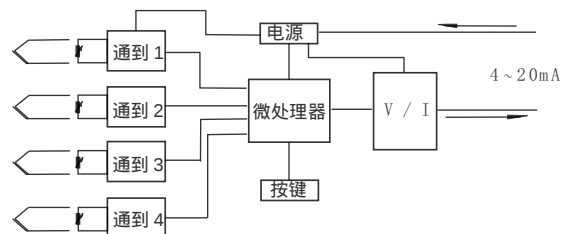
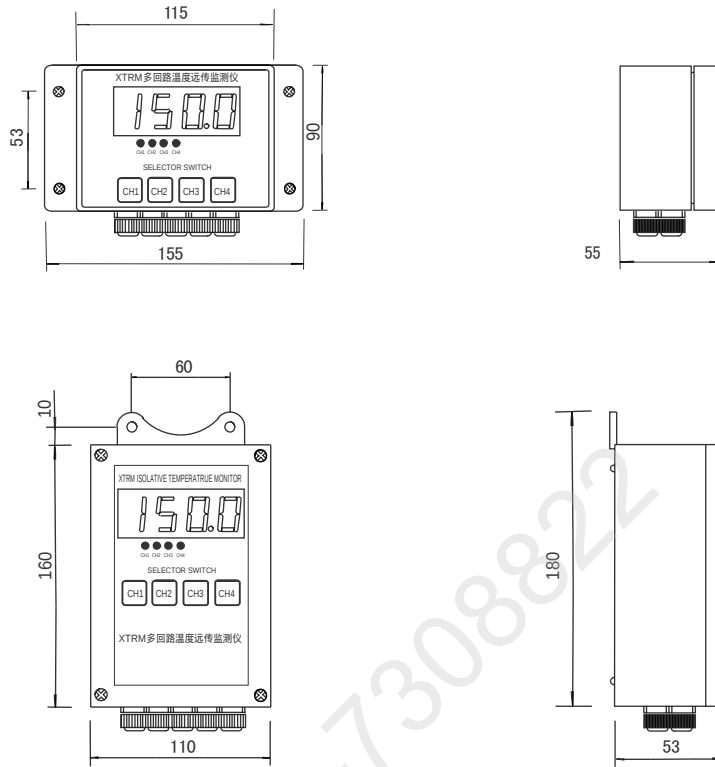


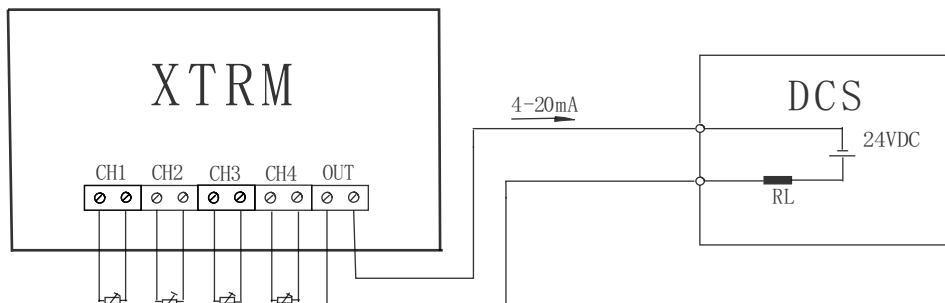
Figure 2.

## 5 Dimensioned drawing



## 6 Terminal connection diagrams

For the wiring of the instrumentation and external thermal resistance it is necessary to open the instrument cover. Input and output terminals are on the floor with a total of eight input terminals, as shown:



## 7 Operating Instructions

It is necessary to preheat for 10 minutes after boot. The installation of instruments should be close to the measuring points. This can make full use of the advantages of second-line system. The advantages are as follows:

1. High anti-interference ability, because the signal is transmitted in the high case, to restrain the effect of noise and interference.
2. Simple wiring, that is, from the site control room, instrument can be connected using twisted-pair wire, which reduces wiring costs.

Enter by thermal resistance, in order to avoid measurement error, the sensor wire resistance values must be guaranteed, where for each Pt100 sensor, lead resistance is fixed at 0.35ohm, 0.35ohm corresponding cross-section and length of wire as follows:

|    | Wire length | Cross-sectional area |
|----|-------------|----------------------|
|    | 2×15m       | 1.5mm                |
| or | 2×10m       | 1.0mm                |

Can also take any cross-sectional area of the wire, but the lead must ensure that the total resistance of 0.35ohm. Otherwise, the error will be generated leads, cases of lead resistance 0.35ohm each change will cause a temperature error of 1. When using thermocouple input, thermocouple input connection must be used with the appropriate compensation wire input leads to consider the external magnetic field shielding. Instrument the size of the load resistor  $R_L$ , depends on the instrument's power supply, power supply ripple  $V_R$  size and whether the use of input and output isolation.

The LED display, the formula is as follows

$$R_{L\max} = \frac{V_S - (0.5V_R + 12)}{0.02} (\Omega)$$

The LED display (isolated), the formula is as follows

$$R_{L\max} = \frac{V_S - (0.5V_R + 15)}{0.02} (\Omega)$$

Example: If  $V_S = 24V$ ,  $V_R = 2V$ , then  $R_L = 550\Omega$  (LED display)

$R_L = 400\Omega$  (Isolated LED display)

3. For the time being not to use the loop is less than 100ohm input termination resistors, or enter with a lead. If you enter the open-meter does not work.
4. In normal circumstances, the instrument also measured the temperature of the four, but only display and output the highest temperature along the signal.

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## 8 maintenance/adjustment

1. Press  and  same time, hold on 6S, then display .
2. Press  Meter display range limit.
3. Press  Lower range Increase; Press  Lower range reduce.
4. Press  then display .
5. Press  Upper range Increase; Press  Upper range reduce.
6. Press  Back and save.

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