



## AI-751 high-performance intelligent alarm measuring instrument

user's guidance  
(V8.3)



### 1. Main features

- Programmable modular input, to support a thermocouple, RTD, voltage, current, and wire transmitter input; a plurality of physical quantities for temperature, pressure, flow, level, humidity measurement and display; measurement accuracy up 0.2 level.
- A display panel using the five pairs, more intuitive set parameters and alarm values.
- It supports up to four alarm functions, including Road Road upper and lower limit alarm may be shared independent output one relay output.
- Comprising digital correction, digital filtering and automatic thermocouple cold junction compensation, maintenance-free and easy to use.
- stand by RS485 Communication interface function, installation S or S4 Module can communicate with the host computer, communication protocol MODBUS-RTU .
- Support temperature transmitter output, new generation X3 Precision ( 0.2 Stage) current output module can be used as 0.3 Temperature transmitter with accuracy level.
- "Fever" level hardware design, a large number of tantalum or ceramic capacitors replace electrolytic capacitor, comprising a lower power consumption than comparable products, higher reliability, stability and a broader temperature range; and its power supply I / O By terminals are 4KV / 5KHz The group pulse interference experiments.
- Globally 100 – 240VAC A switching power supply or the input range 24VDC Power supply, and includes a lightning 10 S anti-misconnection 380VAC Power protection.

### 2. Technical Specifications

- Input Specifications (one meter can be compatible):

**Thermocouple:** K , S , R , T , E , J , B , N , WRe3 – WRe25 , WRe5 – WRe26

**Thermal resistance:** Pt50 , Pt100

**Linear Voltage:** 0 – 5V , 1 – 5V , 0 – 1V , 0 – 100mV , 0 – 60mV , 0 – 20mV Wait , 0 – 10V (In need MIO Installation location I31 Module)

**Linear resistance:** 0 – 80 Europe, 0 to 400 Europe (gauge used to measure the resistance remote)

- Measuring range:

**K** (-100 – + 1300 °C), **S** (0 – 1700 °C), **R** (0 – 1700 °C), **T** (-200 – 390 °C),

**E** (0 – 1000 °C), **J** (0 – 1200 °C), **B** (600 – 1800 °C), **N** (0 – 1300 °C),

**WRe3 – WRe25** (0 – 2300 °C), **WRe5 – WRe26** (0 – 2300 °C), **Cu50** (- 50 – -150 °C),

**PT100** (-200 – + 800 °C) Linear Input: - + 32 000 9990 Defined

by the user

- measurement accuracy: 0.2 level( 0.2% FS ± 0.1 °C)
- Resolution: 0.1 Or °C 0.01 Deg.] C (when INP = 17,18,22 When, as 0.01 °C resolution, dPt = 0.00)
- Temperature drift: ≤ ± 0.01% FS / Deg.] C (typical value of about ± 50ppm / °C)
- Electromagnetic Compatibility: IEC61000-4-4 (Electrical Fast Transient Burst), ± 4KV / 5KHz ; IEC61000-4-5 (surge), 4KV
- Transmission output: in OUTP Installation location X3 After the current module measurements may PV Transmission as standard

Output current, maximum load resistance 500 Europe

- Alarm function: Upper limit, lower limit, a second upper and a second lower limit alarm, the relay module installation optional alarm signal output
- Isolation voltage: Between the power source terminal, signal terminal and another relay contact ≥ 2300VDC ; Weak signal between the ends of the isolated ≥ 600VDC
- power supply: 100 – 240VAC - 15% + 10% / 50 – 60Hz ;or 24VDC / AC - 15% + 10%
- Power consumption: ≤ 5W
- Use of the environment: Temperature - 10 + 60 °C ; Humidity ≤ 90% RH
- Panel size: 96 × 96mm , 48 × 96mm
- Size of the opening: 92 × 92mm , 45 × 92mm
- Insertion depth: ≤ 100mm

### 3. Type definitions

AI-751 AN X3 L3 N S4 - 24VDC

This means that one instrument: ① basic functions AI-751 Type instrument; ② panel size is A type( 96 × 96mm ); ③ auxiliary input ( MIO ④ main output ( ) module is not installed OUTP ) installation X3 Linear current output module; ⑤ alarm ( ALM ) installation L3 Dual relay contact output module; ⑥ auxiliary output ( AUX ⑦ communication ( ) module is not installed COMM ) Comes equipped with optical isolation isolated power supply RS485 Communication Interface S4 ; ⑧ power supply for meter 24VDC power supply. Instrument models

8 Meaning parts as follows: ① means

the instrument basic functions:

**AI-751 Five alarm display type measuring instrument comprising a thermocouple, RTD, mV , 0 – 5V , 1 – 5V**

And other linear voltage input, measurement accuracy 0.2 level.

② It means the instrument panel Dimensions:

AI-751	Panel Size Width × high	Wide opening size × high	Insertion depth
A	96 × 96 mm	92 × 92 mm	100mm
E	48 × 96 mm	45 × 92 mm	100mm

③ indicates auxiliary input instrumentation ( MIO ) Installed modules:

**V24 or V10 24V or 10V Output voltage, maximum output current 50mA Available for external transmitter,**

The use of weighing sensors.

**I4 expansion 0 – 20mA or 4 – 20mA Linear input current, and comprises 24V / 25mA Power Output,**

Wire transmitter can be directly connected.

**I31 increase 0 – 10V or 2 – 10V Linear voltage input, and comprising 24V / 25mA Power Output,**

Transmitter or sensor for external use.

④ indicates instrument main output (OUTP) module installed: Can be installed X3 Current output modules as the current Transmission output.

⑤ denotes meter alarm (ALM) module installed: Can be installed L0 , L2 , L4 Single modules or other relay L3 Alarm output module for dual relay.

⑥ a block meter auxiliary output (AUX) installation: Can be installed L0 , L2 , L3 , L4 And other relay As an alarm output module.

⑦ indicate instrument communication module (COMM) installed: Can be installed S , S1 , S4 Other means for RS485 communication.

⑧ indicates Instrument Power supply: Do not write indication 100 – 240VAC power supply, 24VDC indication 20 – 32VDC or AC power supply. Note 1 : If the input is 4 – 20mA / 0 – 20mA Standard current signal, an optional external 250 Ω resistor is converted to 1 – 5V / 0 – 5V Voltage signal or MIO Installation location I4 Module to solve, which also contains

24VDC Power output, two-wire transmitter may be directly connected.

Note 2 : This instrument is the use of auto-zeroing and maintenance-free digital calibration instrument without calibration maintenance. If the ultra-poor, usually within the instrument for cleaning and drying can solve the problem verification.

In case accuracy can not be recovered dry and clean, this instrument shall be deemed a failure instrument back to the factory overhaul.

Note 3 : Instrumentation to provide free maintenance during the warranty period, where the need to repair the instrument, please be sure to specify the reason for the failure phenomenon and to ensure access to accurate and comprehensive repair.

Note 4 : If OUTP Location has been installed X3 Current output modules, and need COMM Installation location RS485 When the interface, to implement input, output, and current transmission tripartite isolated communication port,

COMM Mounting location should own isolated power supply S4 Module.

### 4. Panel Description

① on the display, display of measured values

PV The display window under the parameter name ②, the display unit symbol,

③ parameter setting keys for entering

parameter setting

Status, parameter modification confirmation data shift key ④

OP1 , OP2 Indicates current transmission output size, only OUTF



Module, OP1 Light it and OP2 Synchronization bright; AL1 , AL2 , AU1 , AU2 Output modules, respectively, corresponding to operation. NOTE: After powering the instrument on an instrument display window displays the measured value ( PV ). The display state of the basic meter display state. When the measurement signal exceeds the input range ( broken thermocouple, heat resistance and the disconnection or short circuit may occur when the input size setting error), is alternately displayed on the display window \* orAL "Words and measuring the upper or lower limit.

### 5. Instructions

Button in the display state and substantially held for about 2 Second, that enter the scene parameter table. in case

Parameter is not locked ( Loc = 0 ). The key data is reduced, the key data increases, bit values can be modified simultaneously flashing decimal (like cursor). Button and hold, can be rapidly increased or decreased value, and the speed will automatically accelerate to the right of the decimal point over ( 3 Level speed). Button can also move the position of the modified data (cursor) directly. Button to display the next parameter, and hold the button, display may return a parameter. Hold followed the first key to exit the setup parameter button state. If no buttons are pressed about 30 It will automatically exit the setting parameter status after seconds. Set up

Loc = 808 , Enter the system parameter table.

#### 5.1 Parameters scene

Parameter	Meaning	Explanation	Setting range
HiAL	Limit alarm	Measurements PV more than the HiAL When the value of the meter will generate an alarm limit; Measured PV Less than HiAL-AHYS Value, the meter will lift alarm limit.	
LoAL	Lower limit alarm	when PV Less than LoAL Limit alarm is generated when PV more than the LoAL + AHYS Released when the lower limit alarm.	--9990 -
HdAL	The second upper limit	when PV more than the HdAL When generating HdAL Alarm, when PV Less than HdAL-AHYS When the alarm is released.	+32 000 unit
LdAL	The second limit	when PV Less than LdAL When generating LdAL Alarm, when PV more than the LdAL + AHYS When the alarm is released.	

Note: Each alarm can be freely defined to control AL1 , AL2 , AU1 , AU2 Other output port operation, may be without any action, see hereinafter defined alarm output parameter AOP instruction of.

Loc Parameter modification level	Loc = 0-3 Allow modification of field parameters Loc = 4 ~ 255 Not to be modified Loc Any other parameters other than. Set up Loc-808 Press Confirmation, enter the system parameter table.	0 to 255
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## 5.2 System parameter list

Parameter	Meaning	Explanation	Setting range																																		
AHYS Alarm hysteresis		Also known as the dead zone, hysteresis. Hysteresis value to avoid measurement fluctuations caused by input type regulator output on and off frequently generated malfunction. For temperature control, it is generally recommended 0.5-2 °C.	0 ~ 2000 unit																																		
AoP Alarm Output definition		<p>AoP of 4 Digit bits, ten, one hundred and one thousand, respectively, for defining HIAL, LoAL, HdAL with LdAL. Wait 4 Alarm output position, as follows:</p> <p>AOP = 3    3    0    1 ;</p> <p>LdAL HdAL LoAL HIAL</p> <p>Values range 0-4, 0 It indicates that the alarm is not output from any port, 1, 2, 3, 4 The alarm respectively by the AL1, AL2, AU1, AU2 Output.</p> <p>Such as setting AOP = 3301, It represents the upper limit alarm HIAL by AL1 Output limit alarm LoAL. No output, HdAL and LdAL. By AU1 Output, that is, HdAL or LdAL. All contribute to an alarm AU1 action.</p> <p>If you need to use AL2 or AU2 Available in ALM or AUX Installation location LS Dual relay module.</p>	0 ~ 4444																																		
INP Input Specifications		<table border="1"> <tr><td>0 K</td><td>20 C<sub>50</sub></td></tr> <tr><td>1 S</td><td>21 P 100</td></tr> <tr><td>2 R</td><td>22 P 100 (-100 to + 300.00 °C)</td></tr> <tr><td>3 T</td><td>25 O ~ 75mV Voltage input</td></tr> <tr><td>4 E</td><td>260 ~ 80 Ohm input</td></tr> <tr><td>5 J</td><td>270 to 400 Ohm input</td></tr> <tr><td>6 B</td><td>28 O ~ 20mV Voltage input</td></tr> <tr><td>7 N</td><td>29 O ~ 100mV Voltage input</td></tr> <tr><td>8 WRe3-WRe25</td><td>30 O ~ 60mV Voltage input</td></tr> <tr><td>9 WRe5-WRe26</td><td>31 O ~ 1V</td></tr> <tr><td>10 Customer-defined</td><td>32 O.2 ~ 1V</td></tr> <tr><td>12 F2 Radiation pyrometer 33 1 - 5V</td><td>Voltage input</td></tr> <tr><td>15 4-20mA (In need MIO installation I4)</td><td>34 O ~ 5V Voltage input</td></tr> <tr><td>0-20mA (In need MIO installation I4)</td><td>35 -20 ~ + 20mV</td></tr> <tr><td>0-10V (In need MIO installation I31)</td><td>36 -100 ~ + 100mV</td></tr> <tr><td>17 K (0 ~ 300.00 °C)</td><td>37 -5 ~ + 5V</td></tr> <tr><td>18 J (0 ~ 300.00 °C)</td><td></td></tr> </table>	0 K	20 C <sub>50</sub>	1 S	21 P 100	2 R	22 P 100 (-100 to + 300.00 °C)	3 T	25 O ~ 75mV Voltage input	4 E	260 ~ 80 Ohm input	5 J	270 to 400 Ohm input	6 B	28 O ~ 20mV Voltage input	7 N	29 O ~ 100mV Voltage input	8 WRe3-WRe25	30 O ~ 60mV Voltage input	9 WRe5-WRe26	31 O ~ 1V	10 Customer-defined	32 O.2 ~ 1V	12 F2 Radiation pyrometer 33 1 - 5V	Voltage input	15 4-20mA (In need MIO installation I4)	34 O ~ 5V Voltage input	0-20mA (In need MIO installation I4)	35 -20 ~ + 20mV	0-10V (In need MIO installation I31)	36 -100 ~ + 100mV	17 K (0 ~ 300.00 °C)	37 -5 ~ + 5V	18 J (0 ~ 300.00 °C)		0 ~ 37
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dPt Decimal point position		Choose 0, 0.0, 0.00, 0.000 Four display formats. Note: When the general thermocouple or RTD input, select 0 or 0.0 Both formats. Even if you choose 0 Format, remained inside 0.1 °C resolution for control calculation, using S, R, B When the thermocouple type, recommended to choose 0 Format when INP = 17, 18, twenty two When internal meter is 0.01 °C resolution, select 0.0 or 0.00 Two display formats.	
SCL Enter the lower limit Display value		The lower limit of the input signal is used to define the linear scale value. Such as the need to 1-5V Input signals are shown as 0 to 200.0 Should be set dIP = 1, dIL = 0, dH = 200.0. When the value of the current for measuring the transmission output, and output lower limit value defined scale.	-9990 - + 32 000 unit
SCH Enter the upper limit Display value		A linear scale display value defines the upper limit of the input signal. Such as the need to 0-5V Input signals are shown as 1000-2000 Should be set dP = 0, dIL = 1000, dH = 2000. When used in transmission, and an output upper limit value defined scale.	0-5V unit
Scb Main input level Shift correction		Scb Parameter is used to shift input corrected. To compensate for a sensor or meter automatic cold junction compensation error. For example: Assuming that the input signal remains unchanged, Scb Set as 0.0 When °C, measurement temperature meter 500.0 °C, then when the meter Scb Set as 10.0 When, the meter displays the measurement temperature 510.0 °C.	-9990 - + 4000 unit
FILt type in data Filtering		FILt Decision digital filtering strength, the stronger the greater the filter is provided, but the response speed of the measurement data is also slower. When subject to greater interference measurement, may be gradually increased FILt The displayed value is stable so far. When the meter to meter verification, should FILt Set as 0 or 1 To improve the response speed.	0 ~ 40
OPI Output Type		0-20, 0-20mA Linear current transmission output. 4-20, 4-20mA Linear current transmission output.	
SPSL Transmission range Lower limit		Used to define the transmission output lower limit.	-9990 - + 32 000 unit
SPSH Transmission range High Limit		Used to define the upper limit value of transmission output.	unit
Addr Address used to define the communication address, the same RS485 Each device on the bus Table address must be different.			0 ~ 80
bAud Baud Rate		It used to define the communication baud rate can be set to 4800, 9600 and 19.2K (19200).	0 ~ 19.2K

## 6. The measurement value correcting multistage

When setting parameters INP Plus 64 (Such as: 1-5V Entry INP Yes 33, Is set INP = 97) Can be set multistage correcting the measured value, setting method is: Loc Parameter is set to 3698, You can enter the set state table (if the original Loc = 808, You need to first Loc Set as 0 To leave the parameter setting mode, and then re-enter the parameter state Loc Set as 3698).

Where the parameter A 00 Use definition table, set 0, Parameters AD1 ~ AD4 and d00 ~ d60, Are provided as follows:

- A \*\* Parameters used to define the type of signal
- A 00 = 0
- A 01 Input type is defined, its value is defined as follows:

$$A 01 = A \times 1 + E \times 16 + G \times 64$$

among them A Representation range of the instrument, A = 0 : 0 ~ 20mV (0-80 Europe); A = 1 : 0 ~ 60mV (0-240 Europe);

A = 2 : 0 ~ 100mV (0-400 Europe); A = 3 : 0 ~ 1V; A = 4 : 0 ~ 5V; A = 10 : 0 ~ 20mA

or 0 ~ 10V (MIO Installation location I4 or I31 Module)

E Display an input signal, E = 0 : Table linear output value when the input signal indicates a need Sch / Scl. Re-calibration parameters. E = 1 : The table output value is the display value.

G It indicates that the input signal is a category, G = 0 : Thermocouple; G = 1 : Thermal resistance; G = 2 : Linear voltage (current); G = 3 : Linear resistance such as: signal 1-5V Input voltage, the output value by the need to Sch / Scl. Then calibration parameters, then let

$$A 01 = 4 \times 1 + 0 \times 16 + 2 \times 132 = 64$$

- A 02 It is used to define the lower limit of the input signal, the signal limit \* 20,000 / Range, for example, 1-5V Input signals can be provided A02 = 1 \* 20,000 / 4000 = 5.

- A 03 An input signal range, e.g. 1-5V Input, range 5-1 = 4V Should be set

$$A 03 = 4 \times 20,000 / 16,000 = 5$$

- A 04 An input signal pitch correction table, A04 = A03 / Curve number of stages, as amended 2 Section, respectively, 1 ~ 3V with 3 ~ 5V, then A04 = A03 / 2 = 8000.

- d \*\* Display represents the correction value, 2000 Corresponding to full scale, according to the pitch rate linearity correction table
- d00 : Graph form the starting point value which corresponds to the input signal A02 When the output value. Examples can be set 0.

- d01 : Represents the curve table 1 Segment value, which corresponds to the input signal A02 + A04 When the correction value, as may be set 1000 Representing the input signal 1 ~ 3V This measurement is not corrected.

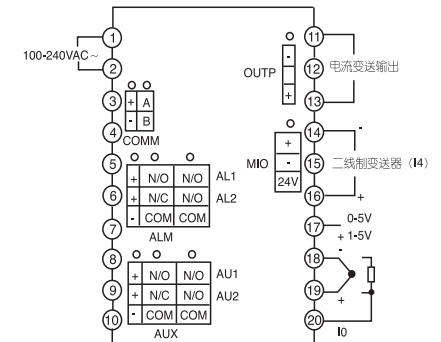
- d02 : Represents the curve table 2 Segment value, which corresponds to the input signal A02 + A04 \* 2 When the correction value, such as may be provided 2100 Expressed 3 ~ 5V increasing slope measurement 5%.

- d03-d60: It represents the curve table 3-60 Segment value, if necessary, the correction period may be set more d03 After parameters.

## 7. Wiring

Different thermocouple wire of different types of thermocouple used, the compensation wire should be connected directly to the terminals of the meter cover, the intermediate is not common wire, it will cause measurement errors.

A, E-type instrument terminals is as follows:



NOTE: In the linear voltage range 500mV By the following 19 + 18 Ended input, 0 ~ 5V / 1 ~ 5V Signal from the 17+, 18 Ended input, 4 ~ 20mA Current can be connected 250 From the European precision shunt resistor 17+, 18 An input terminal; in MIO Installation location I4 After the module, a current signal may be 14+, 15 Input may also be directly from 16+, 14 Then two-wire transmitter. 0 ~ 10V When the input voltage to be installed I31 Modules from 14+, 15 Input.