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ARTIFICIAL INTELLIGENCE TEMPERATURE CONTROLLER

User Manual

AI-5097

Version 7.6

(Panel design may be slightly different to real products)

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I. Model Code Symbol

The type of AI-5097 is made up of 5 parts:

AI-5097	A	G	L2	L2
1	2	3	4	5

1. Basal function of instrument

AI-5097 Economical Intelligent Temperature Controller 0.3%FS ± 0.1℃ (0.0 Decimal)

2. Front panel dimension

Size	Front Panel width×height	Cut Out width×height	Depth Behind Mounting Surface
A	96×96mm	92×92mm	100mm
D	72×72mm	68×68mm	95mm
D2	48×48mm	45×45mm	95mm
D6	48×48mm	45×45mm	95mm
E	48×96mm	45×92mm	100mm
F	96×48mm	92×45mm	100mm

3, 4 and 5 indicate the module installed in OUTP, ALM and AUX sockets. Allowed modules in each socket are as below:

Allowed Type / Module Socket	N	L1	L2	L5	G	G5	W1	W2	W5	K1	K3
3. OUTP (main output)		√	√		√		√	√		√	√
4. ALM (Alarm)	√	√	√	√		√			√		
5. AUX (Auxiliary output)	√	√	√	√		√			√		

N (or none) no module installed

L1 Relay contact output module (Capacity: 2A/250VAC, normal open and close terminal)

L2 Relay contact output module (Capacity: 1A/250VAC, normal open and close terminal)

L5 Output module of dual normal open relay contact (Capacity: 2A/250VAC, support ALM1 and ALM2 alarm output)

G SSR voltage output module (30mA/12VDC)

G5 Dual SSR voltage output module (30mA/12VDC)

W1 TRIAC no contact normal open discrete output module, suitable for AC contactors up to 80A, and has low interference and long life.

W2 TRIAC no contact normal close discrete output module, suitable for AC contactors up to 80A, and has low interference and long life.

K1 TRIAC zero crossing trigger output module. One loop output, suitable for single-phase power.

K3 Three phases TRIAC zero crossing trigger output module (For 100~380VAC), will plug in **OUPT** slot and **MIO** slot at same time.

Note1: For instrument of dimension D2, because of the volume limit, when L1 or L5 module is installed in ALM, L1 can't be installed in OUPT, but L2, which is smaller and able to be installed instead.

Note2: K3 can't be installed in instrument with dimension D or D2. There isn't AUX slot in D2 instruments. L5 module can't be installed in ALM slot of instrument with dimension D.

II. Technical Specifications

Input Type	Thermocouple					
	K	S	T	E	J	N
Range ℃	-50~1300	-50~1700	-50~350	0~800	0~1000	0~1300

Input Type	RTD	
	PT100	Cu50
Range ℃	-200~+600	-50~+150

Input Type	Linear Voltage (Not for D2 panel)	Linear Current (external resistor required)
	0~5V, 1~5V, 0~1V, 0~100mV, 0~20mV, 0~500mV and etc	0-10mA, 0~20mA, 4~20mA or etc

Accuracy	
AI-5097	0.3%FS ± 1℃

Temperature Display Resolution	
AI-5097	0.1℃/0.1℉

Control Method	ON / OFF Control
	AI PID Control with Auto Tuning (AT)

Output Type (Modularization)	Relay Output
	Voltage Ouptut for SSR
	Triac switch output
	Triac zero crossing trigger Output (1 or 3 phase)
	Current output 0-20mA or 4-20mA

Alarm (Modularization)	Limit High / Low
	Deviation High/ Deviation Low

Power Supply	100~240VAC (-15%, +10%)

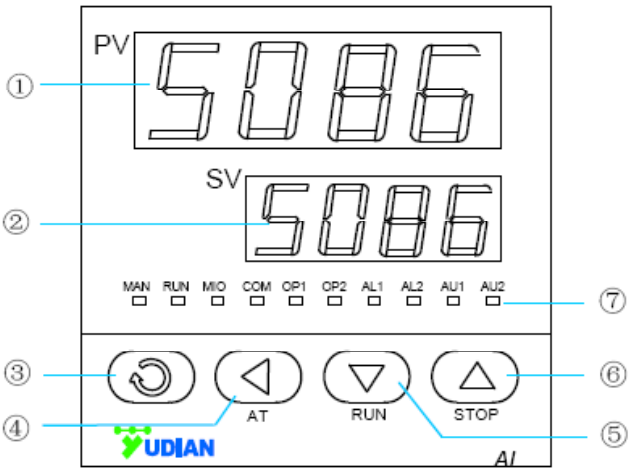
	24 VDC (On request)
	50~60Hz

Power Consumption	≦ 5W

Operating Environments	Temperature: -10~+60℃ / 14~140℉ humidity: 0~90RH%

Electromagnetic compatibility (EMC)	IEC61000-4-4: ± 4KV/5KHz IEC61000-4-5: 4KV

DISPLAY AND OPERATIONS



① Upper display window, displays PV, parameter code, etc.
② Lower display window, displays SV, parameter value, or alarm
③ Setup key, for accessing parameter table and conforming parameter modification.
④ Data shift key, and auto tuning.
⑤ Data decrease key (Run/Hold)
⑥ Data increase key (Stop)
⑦ 10 LED indicating lamps.
MAN and COM lamps is non-applicable.
RUN shows the control status.
MIO, OP1, OP2, AL1, AL2, AU1 and AU2 indicate I/O operation of the corresponding module..

Basic display status:

When power on, the upper display window of the instrument shows the process value (PV), and the lower window shows the set-point (SV). This status is called basic display status.

When the input signal is out of the measurable range (for example, the thermocouple or RTD circuit is break, or input specification sets wrong), the upper display window will alternately display “orAL” and the high limit or the low limit of PV, and the instrument will automatically stop output. If the lower display window alternately display “HIAL”, “LoAL”, “HdAL” or “LdAL”, it means high limit alarm, low limit alarm, deviation high alarm, and deviation low alarm happening.

OPERATION DESCRIPTION

- **Set Value Setting:**
  In basal display status, if the parameter lock “Loc” isn't locked, we can set setpoint (SV) by pressing  、  or  . Press  key to decrease the value,  key to increase the value, and  key to move to the digit expected to modify. Keep pressing  or  , the speed of decreasing or inscreasing value get quick. The range of setpoint is between the parameter SPL and SPH. The default range is 0~400.

- **Parameter Setting:**
  In basal display status, press  and hold for about 2 seconds can access Field Parameter Table. Pressing  can go to the next parameter; pressing  、  or  can modify a parameter. Press and hold  can return to the preceding parameter. Press  (don't release) and then press  key simultaneously can escape from the parameter table. The instrument will escape auomatically from the parameter table if no key is pressed within 30 seconds. Setting Loc=808 and then press  can access System Parameter Table.

- **AI artificial intelligence control and auto tuning**
  When AI artificial intelligence control method is chosen (CtrL=APId), the PID parameters can be obtained by running auto-tuning. In basal display status, press  for 2 seconds, the “At” parameter will appear. Press  to change the value of At from “oFF” to “on”, then press  to active the auto-tuning process. During auto tuning, the instrument executes on-off control. After 2-3 times of on-off action, the instrument will obtain the optimal control parameter value. If you want to escape from auto tuning status, press and hold the key for about 2 seconds until the "At" parameter appear again. Change “At” from “on” to “oFF”, press  to confirm, then the auto tuning process will be cancelled.

Note 1: If the setpoint is different, the parameters obtained from auto-tuning are possible different. So you’d better set setpoint to an often-used value or middle value first, and then start auto-tuning. For the ovens with good heat preservation, the setpoint can be set at the highest applicable temperature. Depending on the system, the auto-tuning time can be from several seconds to several hours.

Note 2: Parameter Ctl (on-off differential, control hysteresis) has influence on the accuracy of auto-tuning. Generally, the smaller the value of Ctl, the higher the precision of auto tuning. But Ctl parameter value should be large enough to prevent the instrument from error action around setpoint due to the oscillation of input. Ctl is recommended to be 2.0.

Note 3: The instrument has the function of self-learning. It is able to learn the process while working. The control effect at the first run after auto tuning is probably not perfect, but excellent control result will be obtained after a period of time because of self-learning.

III. PARAMETER AND SETTING

Field parameter table (Primary parameters)

<table>
<tr><th>Code</th><th>Description</th><th>Remarks</th><th>Setting Range</th><th>Default</th></tr>
<tr><td>HIAL</td><td>High limit alarm</td><td>Alarm on when PV>HIAL
alarm off when PV<HIAL-AHYS
Set to maximum to disable
This can acts as deviation alarm, see “AF” parameter</td><td>-999—+3200</td><td>3200</td></tr>
<tr><td>LoAL</td><td>Low limit alarm</td><td>Alarm on when PV<LoAL;
alarm off when PV>LoAL+AHYS
Set to minimum to disable
This can acts as deviation alarm, see “AF” parameter</td><td>-999—+3200</td><td>-999</td></tr>
<tr><td>HdAL</td><td>Deviation high alarm</td><td>Alarm on when PV-SV>HdAL;
alarm off when PV-SV<HdAL-AHYS
Set to maximum to disable</td><td>-999—+3200</td><td>3200</td></tr>
<tr><td>LdAL</td><td>Deviation high alarm</td><td>Alarm on when PV-SV>HdAL;
alarm off when PV-SV<HdAL-AHYS
Set to minimum to disable</td><td>-999—+3200</td><td>-999</td></tr>
<tr><td>Loc</td><td>Parameter Lock</td><td>
<table>
<tr><th>Loc</th><th>Auto Tuning</th><th>SV</th><th>Primary Parameter</th><th>Secondary Parameter</th><th>Field Parameter</th></tr>
<tr><td>0</td><td>√</td><td>√</td><td>√</td><td>X</td><td>√</td></tr>
<tr><td>1</td><td>X</td><td>√</td><td>√</td><td>X</td><td>√</td></tr>
<tr><td>2</td><td>X</td><td>X</td><td>√</td><td>X</td><td>√</td></tr>
<tr><td>3</td><td>X</td><td>X</td><td>X</td><td>X</td><td>√</td></tr>
<tr><td>4~255</td><td>X</td><td>X</td><td>X</td><td>X</td><td>X</td></tr>
<tr><td>PASd</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
</table>
√ : allow to modify data or execute AT
X : not allow to modify data or execute AT

Initial password “PASd” is “808”. Password can be changed to numbers between 256~9999.</td><td>0—9999
Initial 808</td><td>0</td></tr>
</table>

System parameter table (Secondary parameters)

Set the parameter 'Loc'=808 to enter:

<table>
<tr><td>AHYS</td><td>Alarm Hysteresis</td><td>Avoid frequent alarm on-off action because of the fluctuation of PV</td><td>0—2000</td><td>2</td></tr>
<tr><td>AdIS</td><td>Alarm display</td><td>oFF : Will not display alarm message in the lower display window when alarming;
on : Alternately display alarm message in the lower display window when alarming.</td><td>oFF / on</td><td></td></tr>
<tr><td>AOP</td><td>Alarm output assignment</td><td>
<table>
<tr><th>Alarm Output</th><th>LdAL (x1000)</th><th>HdAL (x100)</th><th>LoAL (x10)</th><th>HIAL (x1)</th></tr>
<tr><td>None</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>AL1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr>
<tr><td>AL2</td><td>2</td><td>2</td><td>2</td><td>2</td></tr>
<tr><td>AU1</td><td>3</td><td>3</td><td>3</td><td>3</td></tr>
<tr><td>AU2</td><td>4</td><td>4</td><td>4</td><td>4</td></tr>
</table>
eg: AOP=101 means HdAL and HIAL are outputted to AL1 and LoAL and LdAL has no output.</td><td>0—4444</td><td>1111
Or according to fixed module</td></tr>
<tr><td>CtrL</td><td>Control mode</td><td>onoF: on-off control. For situation not requiring high precision
APId: advanced artificial intelligence PID control. (Recommended)
nPId: standard PID algorithm with anti integral-saturation function (no integral when PV-SV > proportional band)
POP: Transmit PV. The instrument works as a temperature re-transmitter.
SOP: Transmit SV. The instrument works program generator.</td><td>onoF
APId
nPId
POP
SOP</td><td>APId</td></tr>
<tr><td>Srun</td><td>Running Status</td><td>run: Control or program was running, "RUN" led light on
StoP：Control or program was stopped. Lower display keep flashing "StoP" and "RUN" led light off.
HoLd: This only functioned on AI-518P, this will keeping temperature when this HoLd was appeared. If the parameter Pno=0(Non timing limitation mode), controller will functioning same at AI-518, if Pno>0 (in program mode),and Srun was set as "HoLd", means the timer</td><td>StoP /
run /
HoLd</td><td>run</td></tr>
</table>

		stops and the temperature remains; user can resume the timer by pressing the "**Hold"** from panel.		
Act	Acting Method	rE: Reverse acting. Increase in measured variable causes an decrease in the output, such as heating control. dr: Direct acting. Increase in measured variable causes an increase in the output, such as refrigerating control. rEbA: Reverse acting with low limit alarm and deviation low alarm blocking at the beginning of power on. drbA: Direct acting with high limit alarm and deviation high alarm blocking at the beginning of power on.	rE / dr rEbA/drbA	rE
At	Auto tuning	oFF: Auto tuning function was off. on: Active auto turning function to calculate the values FoFF : Auto tuning function was off, cannot activate again by pressing key from panel .	oFF / On / FoFF	oFF
P	Proportion band	Proportion band in PID with unit □ or □	1—3200	30
I	Time of Integral	No integral effect when I=0	1—9999 Sec	100 s
d	Time of Derivative	No derivative effect when d=0	0—999.9 Sec	50.0s
CtI	Control period	Small value can improve control accuracy. For SSR, thyristor or linear current output, it is generally 0.5 to 3 seconds. For Relay output or in a heating/refrigerating dual output control system, generally 15 to 40 seconds, because small value will cause the frequent on-off action of mechanical switch or frequent heating/refrigerating switch, and shorten its service life. CtI is recommended to be 1/5 – 1/10 of derivative time. (It should be integer times of 0.5 second.) When the parameter OPt or Aut = rELy, CtI will be limited to more than 3 seconds. Auto tuning will automatically set CtI to suitable value considering both control precision and mechanical switch longevity. When the parameter CtrL = onoF, CtI will used as timer to make delay time to avoid the power restart in short period. It suit for compressor protection.	0.2～300.0 Sec	2 s Or 20 s
CHYS	Control Hysteresis	CHYS is used for on-off control to avoid frequent on-off action of relay. For a reverse acting (heating) system, when PV > SV, output turns off; when PV<SV-CHYS, output turns on. For a direct acting (cooling) system, when PV<SV, output turns off; when	0—2000	2

<table>
<tr><td></td><td></td><td>PV>SV+CHYS, output turns on.</td><td></td><td></td></tr>
<tr><td>InP</td><td>Input specification</td><td>
<table>
<tr><th>InP</th><th>Input spec.</th><th>InP</th><th>Input spec.</th></tr>
<tr><td>0</td><td>K</td><td>20</td><td>Cu50</td></tr>
<tr><td>1</td><td>S</td><td>21</td><td>Pt100</td></tr>
<tr><td>2</td><td>R</td><td>22</td><td>Pt100 (-80 ～ +300.00℃) *</td></tr>
<tr><td>3</td><td>T</td><td>25</td><td>0~75mV voltage input</td></tr>
<tr><td>4</td><td>E</td><td>26</td><td>0 ～ 80ohm resistor input</td></tr>
<tr><td>5</td><td>J</td><td>27</td><td>0 ～ 400ohm resistor input</td></tr>
<tr><td>6</td><td>B *</td><td>28</td><td>0～20mV voltage input</td></tr>
<tr><td>7</td><td>N</td><td>29</td><td>0 ～ 100mV voltage input</td></tr>
<tr><td>8</td><td>WRe3-WRe25</td><td>30</td><td>0～60mV voltage input</td></tr>
<tr><td>9</td><td>WRe3-Wre26</td><td>31</td><td>0 ～ 500mV voltage input</td></tr>
<tr><td>10</td><td>Extended input specification</td><td>32</td><td>100 ～ 500mV voltage input</td></tr>
<tr><td>12</td><td>F2 radiation type pyromter</td><td>33</td><td>1 ～ 5V voltage input</td></tr>
<tr><td>15</td><td>4 ～ 20mA (installed I4 module in MIO)</td><td>34</td><td>0 ～ 5V voltage input</td></tr>
<tr><td>16</td><td>0 ～ 20mA (installed I4 module in MIO)</td><td>35</td><td>0～10V</td></tr>
<tr><td>17</td><td>K (0～300.00℃) *</td><td>36</td><td>2～10V</td></tr>
<tr><td>18</td><td>J (0～300.00℃) *</td><td>37</td><td>0～20V</td></tr>
</table>
</td><td>0—21</td><td>0</td></tr>
<tr><td>dPt</td><td>Display Resolution</td><td>Four formats (0, 0.0, 0.00, 0.000) are selectable
Note 1: For thermocouples or RTD input, only 0 or 0.0 is selectable, and the internal resolution is 0.1. When S type thermocouple is used, dPt is recommended to be 0. If Inp= 17,18 or 22, resolution will support display 0.0</td><td>0 / 0.0 / 0.00 / 0.000</td><td>0.0</td></tr>
</table>

		or 0.00		
SCL	Signal scale low limit	Define scale low limit of input. It is also the low limit of transmitter output (CtrL=POP or SOP) and light bar display.	-9990～ +32000	0
SCH	Signal scale high limit	Define scale high limit of input. It is also the high limit of retransmission output (CtrL=POP or SOP) and light bar display.	-9990～ +32000	100
Scb	Input Shift	Parameter Sc is used to make input shift to compensate the error produced by sensor or input signal itself. PV-after-compensation= PV-before-compensation + Scb.	-200—+400	0
FILt	PV input filter	The value of FILt will determine the ability of filtering noise. When a large value is set, the measurement input is stabilized but the response speed is slow. Generally, if great interference exists, then you can increase parameter “FILt” gradually to make momentary fluctuation of measured value less than 2 to 5. When the meter of the instrument is being examined at laboratory, “FILt” should be set to 0 or 1 to short the response time.	0—40	1
Fru	Selection of power frequency and temperature scale	50C: 50Hz, □ 50F: 50Hz, □ 60C: 60Hz, □ 60F: 60Hz, □	50C, 50F, 60C, 60F	50C
OPt	Main output type	SSr: Output SSr drive voltage or thyristor zero crossing trigger signal. G, K1 or K3 module should be installed. The output power can be adjusted by the on-off time proportion. The period (Ctl) is generally 0.5～4 seconds. rELy: for relay contact output or for execution system with mechanical contact switch. To protect the mechanical switch, the output period (Ctl) is limited to 3～120 seconds, and generally is 1/5 to 1/10 of	SSr rELy 0-20 4-20 PHA	SSr

		derivative time. 0-20: 0～20mA linear current output. X3 or X5 module should be installed in OUTP slot. 4-20: 4～20mA linear current output. X3 or X5 module should be installed in OUTP slot. (Not applicable for heating/refrigerating bidirectional control.) PHA: Single-phase phase-shift output. K5 module should be installed in OUTP slot. PHA is only for 50Hz power supply, and don't support bidirectional control system.		
OPL	Output low limit	0～100%: OPL is the minimum output of OUTP in single directional control system. -1～-110%: The instrument works for a bidirectional system, and has heating/refrigerating dual output. When ACt=rE or rEbA, OUTP (main output) works for heating, and AUX (Auxiliary output) works for refrigerating. When Act=dr or drbA, OUTP works for refrigerating, and AUX works for heating. In a bidirectional system, OPL for define the limitation of maximum cooling output. So, when the OPL= -100%, means no limitation on cooling output. If set OPL=-110%, it can made current output excess 10% on maximum output. When the output type is SSR output or relay output, maximum of cooling output should not set more than 100%	-110～+110%	0%
OPH	Output upper limit	OPL limits the maximum of OUTP (main output) when PV<OEF. OPH should be greater than OPL.	0～110%	100%
OEF	Work range of OPH	When PV<OEF, the upper limit of OUTP is OPH; when PV>OEF, the upper limit of OUTP is 100%. For example, to avoid that the temperature raises too quickly, under 150℃, a heater can work only under 30% of power, then we can set OEF=150.0 (℃), OPH=30 (%)	-999～+3200	3200
AF	Advanced function	AF is used to select advanced function. The value of AF is calculated as below: AF=Ax1 + Bx2 + Cx4 + Dx8 + Ex16 + Fx32 + Gx64 A=0, HdAL and LdAL work as deviation high and low limit alarms; A=1, HdAL and LdAL work as high and low limit alarms, and the instrument can have two groups of high and low limit alarms.	0～255	0

		B=0, Alarm and control hysteresis work as unilateral hysteresis; B=1, As bilateral hysteresis. C=0, The light bar indicates the output value; C=1, The light bar indicates the process value (for instruments with light bar only). D=0, Loc=808 can access the whole parameter table; D=1, Loc=PASd can access the parameter table. E=0, Normal application on HIAL and LoAL; E=1, HIAL AND LoAL will become to deviation high alarm and Deviation low alarm F=0, Fine control mode, internal control resolution was demonstration's 10 times. When on linear input mode, biggest display value is 3200 units F=1, Wide range display mode, when the value is bigger than 3200 ,chooses this option G=0, When the thermocouple or RTD input is burnt out, PV value will increase and trigger the high limit alarm. G=1, When the thermocouple or RTD input is burnt out, PV value will increase and **NOT** trigger the high limit alarm. After it was sets, High Limit alarm will have 30 sec. delay for trigger in normal usage. Note: AF=0 is recommended.		
PASd	Password	When PASd=0～255 or AF.D=0, set Loc=808 can enter the whole parameter table. When PASd=256～9999 and AF.D=1, only Loc=PASd can access the whole parameter table. **** Please set PASd cautiously, if the password is lost, you can't access the parameter table again.**	0～9999	808
SPL	Low limit of SV	Limit minimum SV value	-999—3000	0
SPH	Upper limit of SV	Limit maximum SV value	-999—3000	400
SP1	Setpoint 1	When Pno=0 or 1, then SV=SP1	SPL～SPH	{SV}
SP2	Setpoint 2	When I2 module installed in MIO slot, SP1 and SP2 can be switched by an external switch. If the switch is off, SV=SP1; if the switch is on, SV=SP2.	SPL～SPH	100
EP1 ~EP8	Field parameter definition	Define 0～8 of the parameters as field parameters. If the number of the field parameters is less than 8, the first idle EP parameter should be set to "nonE". The initial values of EPs and Loc are EP1=HIAL, EP2=LoAL, EP3=HdAL, EP4=LdAL, EP5=nonE, EP6=nonE, EP7=nonE,	nonE and all parameter codes	

		EP8=nonE and Loc=0. You can redefine field parameters and Loc to change operation style. For example, you can execute auto tuning from field parameter instead of by pressing ⟨ in basic display status, and only take HIAL and HdAL as field parameter. The EP paramters and Loc should be set as follows: EP1=HIAL, EP2=HdAL, EP3=At, EP4=nonE, Loc=1		

Additional Remarks of Special Functions

3.3.1 Single-phase phase-shift trigger output

When OPt is set to PHA, installing a K5 or K6 module in OUTP slot can single-phase phase-shift trigger a TRIAC or 2 inverse parallel SCRs. It can continuously adjust heating power by control the conduction angle of thyristor. With non-linear power adjustment according to the characters of sine wave, it can get ideal control. The trigger adopts self-synchronizing technology, so it can also work even when the power supplies of the instrument and the heater are different. Phase-shift trigger has high interference to the electric power, so user should pay attention to the anti-interference ability of other machines in the system. Now the K5 or K6 module can be only used in 50Hz power supply.

3.3.2 Alarm blocking at the beginning of power on

Sometimes the fault alarm may occur at the beginning of power on. In a heating system, at the beginning of power on, its temperature is much lower than the set point. If low limit and deviation low limit are set and the alarm conditions are satisfied, the instrument should alarm, but there is no problem in the system. Contrarily, in an refrigerating system, the unnecessary high limit or deviation high limit alarm may occur at the beginning of power on. Therefore, AI instruments offer the function of alarm blocking at the beginning of power on. When Act is set to rEbA or drbA, the corresponding low or high alarms are blocked until the alarm condition first clears. If the alarm condition is satisfied again, the alarm will work.

3.3.3 Setpoints switch

If an I2 module is installed in MIO slot (or bAud=1 and I2 installed in COMM slot). User can connect external on off switch to realize some control function. Set Et = rest, can switching program run and stop. For AI-518, or AI518P when its Pno=0, set Et = SP1.2, can switching between setpoint 1 and setpoint 2.

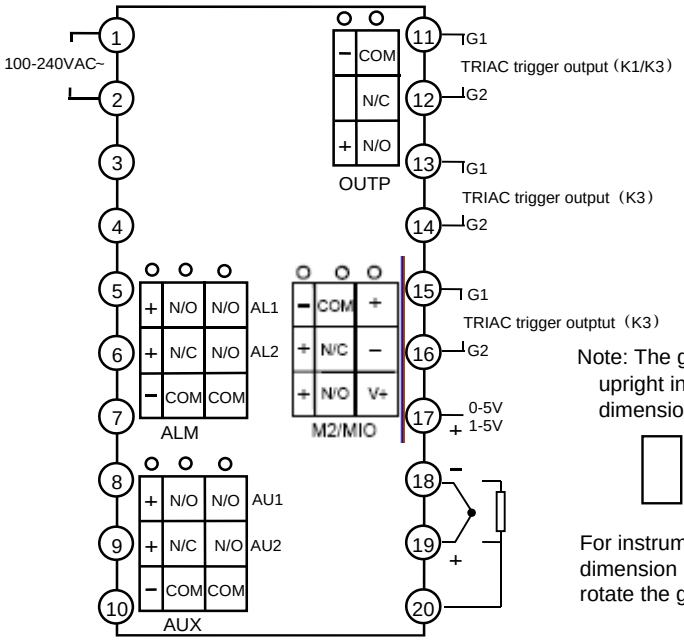
IV. Symbol Description

	Description
orAL	Input specification setting is incorrect Or Input wiring is disconnected Or Short circuited
HIAL	High limit alarm
LoAL	Low limit alarm
HdAL	Deviation high alarm
dLAL	Negative deviation alarm
EErr	IC Software error
8888	IC Software error

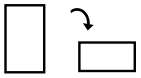
V. INSTRUMENT INSTALLATION AND WIRING

Wiring graph for instruments with dimension A, B or F

Note: The compensation wires for different kinds of thermocouple are different, and should be directly connect to the terminals. Connecting the common wire between the compensation wire and the terminals will cause measurement error.

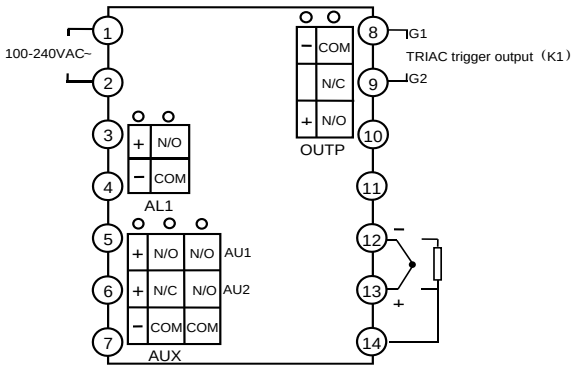


Note: The graph suits for upright intruments with dimension A or E

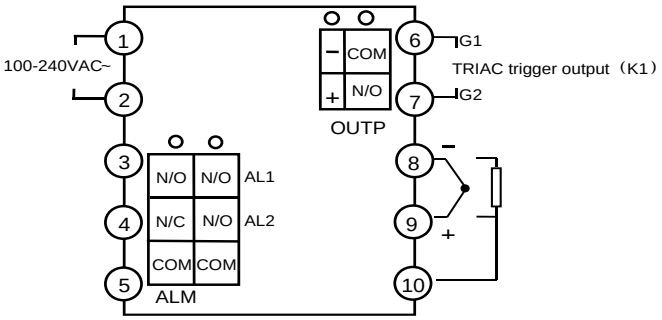


For instrume nts with dimension F, just clockwise rotate the graph 90 degree.

Wiring graph for D dimension（72mmX72mm）instruments



Wiring graph for D2 dimension（48X48mm）instruments：



For 0-5V, 1-5V and 0-10VDC input, please request during order to have external precise resistor equipped. The input terminal are 8,9. Choose correct INP parameter as 0-500mV or 100-500mV.

For 0-20mA or 4-20mA input, please request during order to have external 25ohm resistor equipped. The input terminal are 8,9. Choose correct INP parameter as 0-500mV or 100-500mV.