MRG1 Three-in-one Machine

The Manual V1.0

Thank you for purchasing MRG1 Three-in-one Machine . This manual mainly explains some necessary attention in installation and wiring . Before operation , please read this manual first to fully understand the operation of this product. Please take this manual with you for reference at any time.

1. Attention

Danger 1. Attention!Electrical hazard!
Do not touch the AC power terminal after the controller is electrified to avoid electric shock!When implementing controller power wiring, make sure the power is off first!

Warning
1.Please do not use the product in places where explosive or flammable gases may be present.
2.Please make sure that the load power supply is within the rating and terminal position is correct before supplying 3.Maximum torque of terminal must be within the range such as 8KG.
4.Disassembling, modifying and repairing the product is forbidden.
5.Please do not use the product in the following conditions:
- ●Places where temperature fluctuates dramatically.
- ●Places where humidity is high and condensation may occur.
- ●Places where oscillation is drastic.
- ●Places where there is caustic gases or dust.
- ●Places where there is danger of splashing of water, oil or any chemicals.

6.Wiring should be kept away from high-voltage, high-current power lines to avoid interference.
7.Note that the shell of the body can be eroded by organic solutions, strong acids, strong bases.

2. Functions and Performance

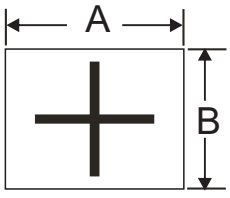
Power Supply	AC85~265V, 50/60Hz(DC power is optional)	Display deviatio	±0.2%FS
Power Consumption	10VA Max	Master Control Input Type	General input(T/C, PT100, analogy signal)
Control Ways	PID、PD、PI、P	Output	Relay, SSR, 4-20mA
Application Environment Temperature	-10-50℃		
Application Environment Humidity	0-85% RH	Sampling Period	150ms

Specification

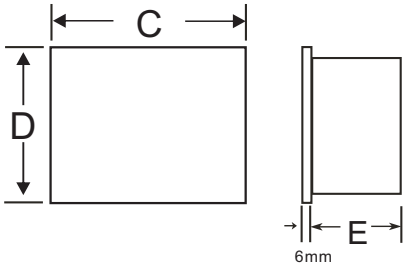
(1) Control, record, customer application three in one, save money, save time, save space.
(2) Signal Input:Thermocouple and thermal resistance can be switched at will (no hardware modification required)
(3) Adopt theslope value to compensate the temperature
(4) Add artificial intelligence OPAD anti-overshoot coefficient
(5) The controller can transmit PV, SV and MV in 6 ways to positive or negative side
(6) The controller has parameter running specifications RUN to choose the Work or Stop.
(7) Temperature and alarm data recording function, real-time temperature curve screen.
(8) With 60 (multi - group multi - section free combination) temperature programming function, can be programmed with one key. When STA=0, the set value controller can be used.

3. Panel cutout and Dimension

● Panel cutout



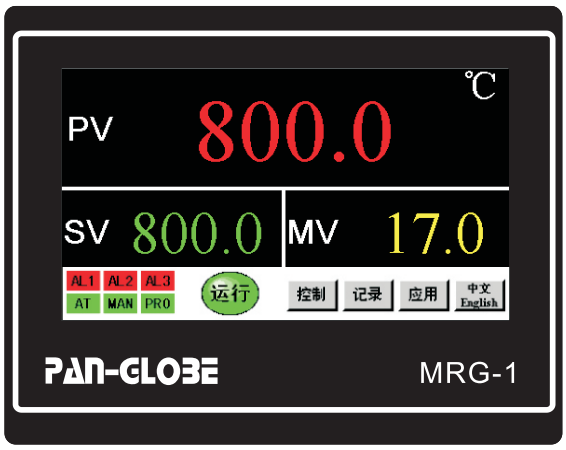
● Dimension



Unit: mm

Model \ Size	A	B	C	D	E
MRG1	119±0.5	93±0.5	129	103	53

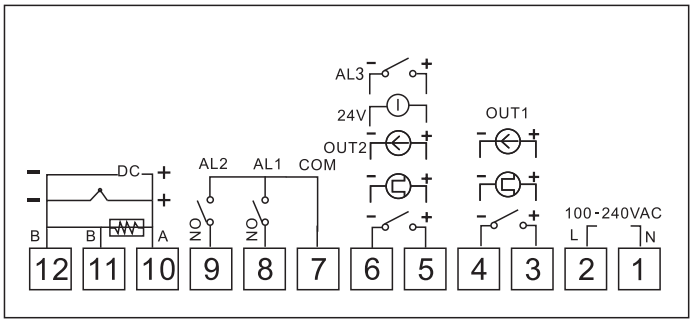
4. Operation Instruction



Symbol	Name	Function
PV	PV/Parameter display	1.Display PV 2.Display parameter name when parameter setup
SV	SV/Parameter display/	1.Display SV 2.Display parameter settings for parameter setup
MV	Output Value	Output/percentage
AL1	Alarm1 indicator	Alarm1perform
AL2	Alarm2 indicator	Alarm2 perform
AL3	Alarm3 indicator	Alarm3 perform
PRO	Program indicator	Program running
MAN	Manual indicator	When lit Run indicator ,it indicates meter running
AT	AT indicator	When lit AT indicator ,it indicates Auto-tuning

5. Connecting (Screws functions are subject to the label on the back of the controller)

5. 1,Connecting



5.2、Connecting Instruction

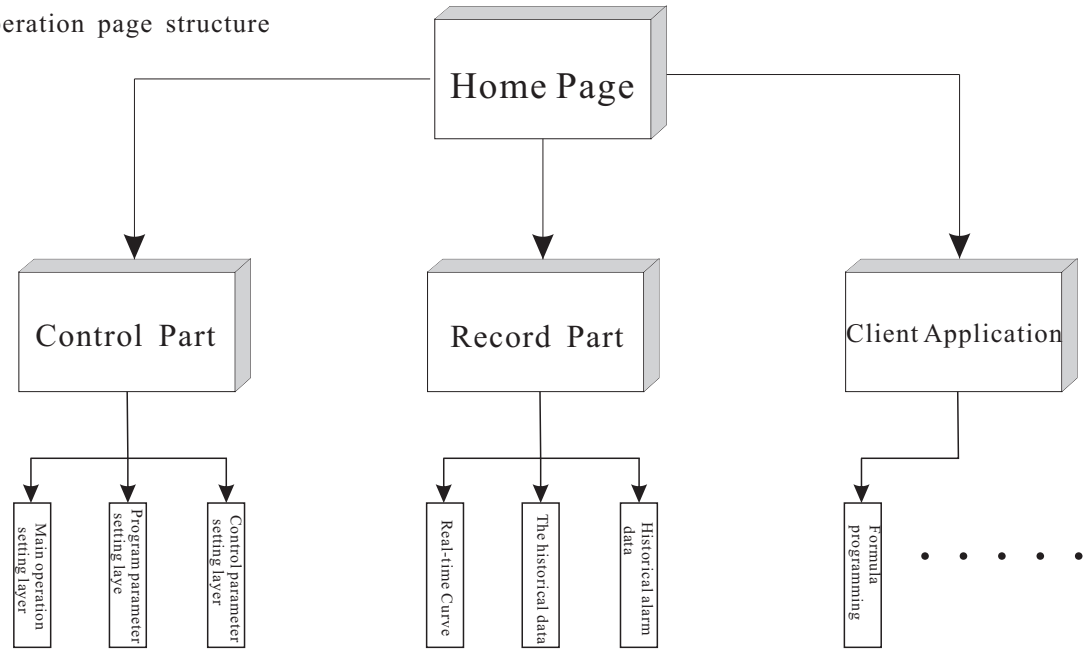
⚠Attention

- Power must be off before wiring,or else, electric shock may occur.
- Do not touch terminal or other electric parts after wired,or else , electric shock may occur

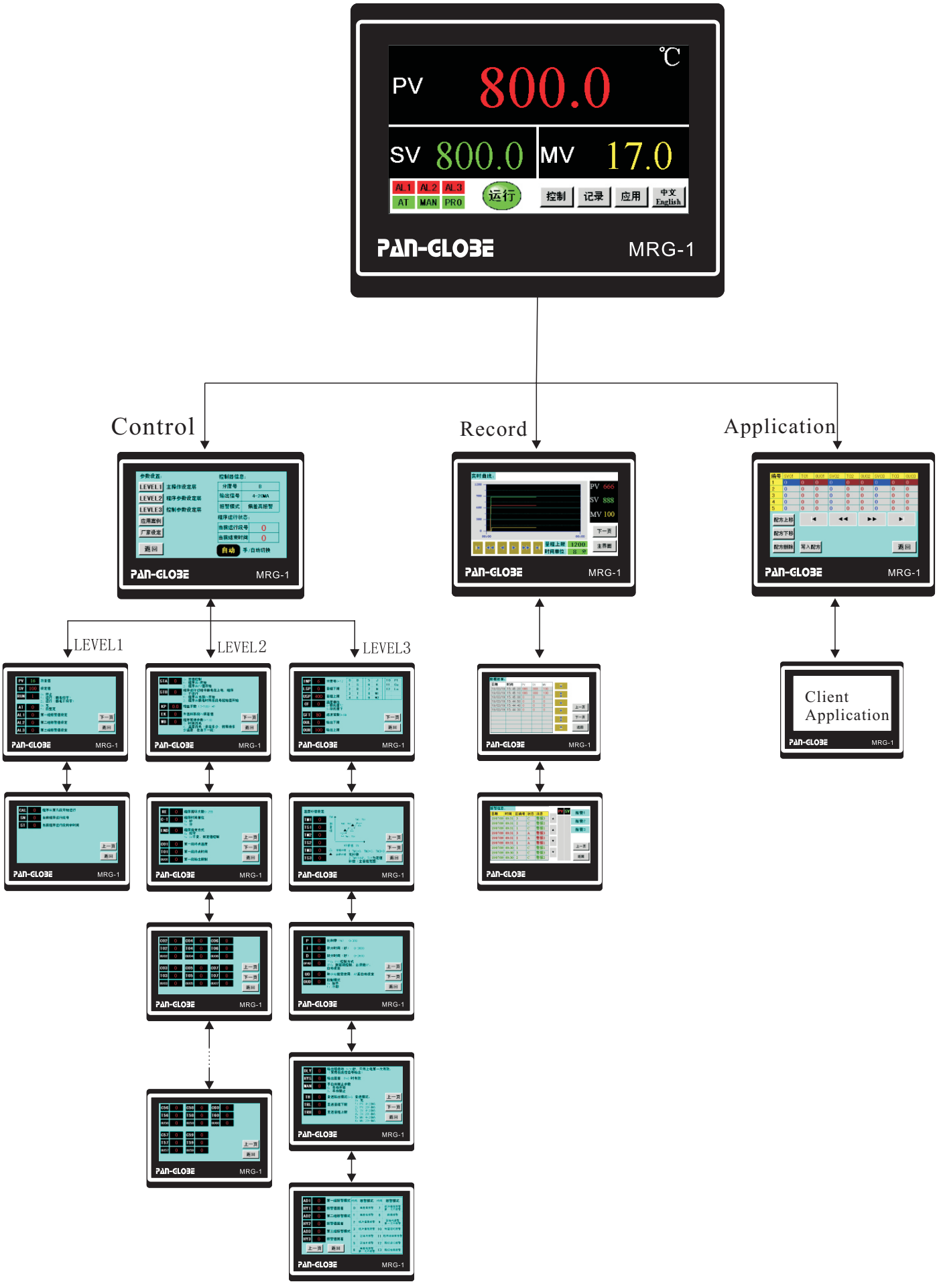
(1)Check carefully and ensure wiring is correct according to the terminal arrangement on the temperature controller.
(2)For thermal couple input, use correct compensation lead that matches the thermal couple.
(3)For platinum resistance input, each lead resistance should be less than 5ohm,and three leads should have the same resistance.
(4)Input signal should not be connected to the heavy current within the same lead or cable.
(5)Shieled cable(single-point grounding)is effective in resistance static induction noise.
(6)For power supplies, use a 600V insulated conductor with a cross-sectional area greater than 1mm

6. Operation page structure

6. 1,Operation page structure



6. 2,Overall Page



7. Parameters of the process

LEVEL1 Program setup level(Engineer operation level)

power ON

PV / SV — PV/SV value (Set sv value)

RUN 0-2 — 0:Stop
1:Run(when power off and then power on return to "0", when running set"1")
2:Run(Not return to "0"when power off and then power on ,still as "2"

AT 1/0 — Auto Tuning
1:Auto setting
0:None

AL1 LSP-USP — Alarm 1 setting

AL2 LSP-USP — Alarm 2 setting

AL3 LSP-USP — Alarm 3 setting

CAL 0-60 — Pattern select

Sn 0-60 — Running segment 0-60

St 0-999 — Segment time 0-999

LEVEL0

LEVEL2 Control Program setup level (Engineer operation level)

STA 0-2 — 0: Constant value control
1: Programmed SV starts from "0"
2: Programmed SV starts at PV

STB 0-2 — Power off and then power on
0: The program does not start
1: Programmed starts fromthe current PV value
2: Program start from the initial value of current running segment when power failure

WB 0.1-10 — Program waiting parameter(time/temperature priority)
0:time priority
X:temperature priority
(SV-X<PV<SV+X) program runs to the next section

RE 0-255 — Programmed cycle number setting

C-T 0-1 — Program segment time unit
0: second
1:minute

END 0-1 — program control ending method:
0: SV set0,stop operation
1:program control ends, the last SV value stay and continueto control the fixed value

C01 0-USP — Segment 1 temperature set 0-USP

T01 0-999 — Segment 1 time set 0-999

OU01 0-100.0 — Segment 1 output limit set

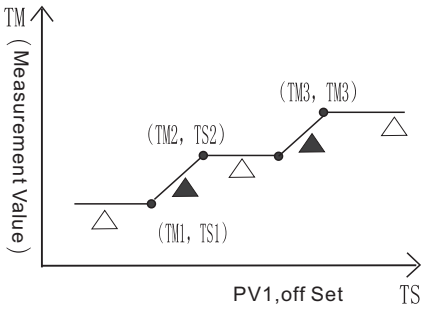
OU60 0-100.0 — Segment 60 output limit set

LEVEL0

LEVEL3 — Control parameter setup level (Engineer operation level)

Input

- INP (b-w2) — set input type, please refer to "Input Type Table"
- LSP (-1999-9999) — PV1 lower limit
- USP (-1999-9999) — PV1 upper limit
- SVHL (LSP-USP) — SV1 upper limit
- DP (0-3) — decimal Set
- CF (0/1) — Temperature unit 0:℃ 1:℉
- SFT (80) — Input filtering constant (0-99)
- OUL (0) — Output lower
- OUH (100) — Output upper
- TM1 (LSP-USP)
- TS1 (-200-1000)
- TM2 (LSP-USP)
- TS2 (-200-1000)
- TM3 (LSP-USP)
- TS3 (-200-1000)



Constant Value
Consumption Value
△ 1.TM1=0,TM2=0 TM=3 none compensation
▲ 2.When TM1=USP,TS1 is constant consumption(whole measurement range)

- P (4.0) — Proportional band(%) 0.1-300.0%
- I (180) — Integral time(second) I set to 0 is the integration close 0-3600
- D (36) — Differential time(second) D set to 0 is the different close 0-900

output

- OPAD (0-300) — 0:PID contol 1:fuzzy control. Notice: When the PV is the same as the temperature or lower than it, the AT mode must be initiated to automatically gaining the best fuzzy control value
- UO (10.0) — System working point output percentage screen value (At ending and automatically build up)
- OUD (0) — 0: heating 1: cooling
- HYS (0) — Output Hys(Only P=0)
- DLY (0-30) — Output soft timing setting(second) Power on the first output effective
- MAN (0-1) — 0:Manual Open 1:Manual prohibit
- TH (0-6) — Transmission output mode 0: No transmission 1:PV 4-20MA transmission 2:PV 20-4MA transmission 3:SV 4-20MA transmission 4:SV 20-4MA transmission 5:MV 4-20MA transmission 6:MV 20-4MA transmission
- TRL (LSP/USP) — lower limit of transmission range
- TRH (LSP/USP) — Upper limit of transmission range

Alarm

- AD1 (0-17) — Alarm 1 mode selection
- HY1 (LSP/USP) — Alarm 1 HYS setting
- ALT1 (0-3600) — Alarm 1 action duration 0:Continuous motion X:Action lasts X minutes
- AD2 (0-17) — Alarm 2 mode selection
- HY2 (LSP/USP) — Alarm 2 HYS setting
- ALT2 (0-3600) — Alarm 2 action duration 0:Continuous motion X:Action lasts X minutes
- AD3 (0-17) — Alarm 3 mode selection
- HY3 (LSP/USP) — Alarm 3 HYS setting
- ALT3 (0-3600) — Alarm 3 action duration 0:Continuous motion X:Action lasts X minutes

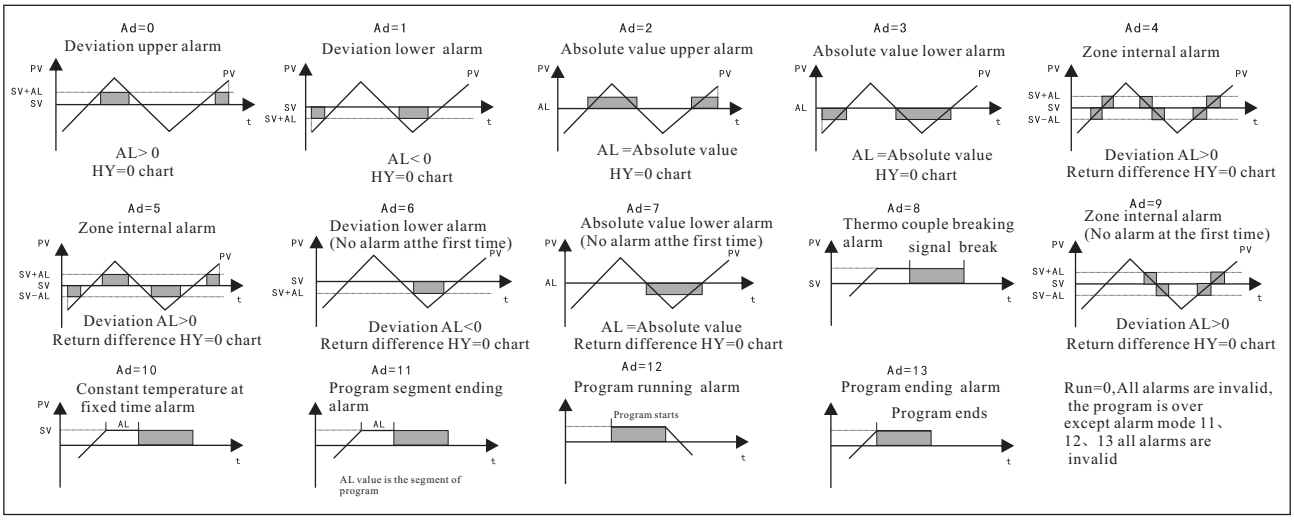
LEVEL0

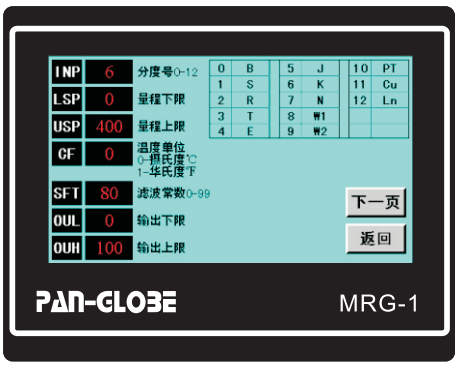
8. Input Type/Alarm Mode

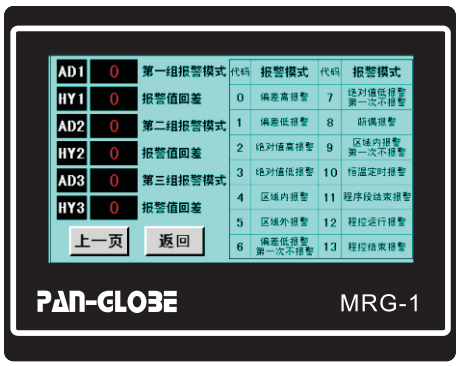
Type	Measurement Range
K	-270-1370℃/0-2498℉
J	-210-1200℃/0-2192℉
R	-50-1760℃/0-3216℉
S	-50-1760℃/0-3216℉
B	0-1820℃/0-3308℉
E	-200-1000℃/0-1832℉
T	-270-600.0℃/0-1112℉
PT100	-199.9-600.0℃/-327.8-1112℉
Cu50	0-150.0℃/0-302.0℉
LN	Linear analog signal 4-20MA, 0-1V, 0-50MV, 0-5V
N	-270-1300.0℃/0-2372.0℉
W1	0-2000.0℃/0-3632.0℉
W2	0-2320.0℃/0-4208.0℉

Code	AL1、AL2、AL3 Mode
0	Deviation upper alarm
1	Deviation lower alarm
2	Absolute value upper alarm
3	Absolute value lower alarm
4	Zone internal alarm
5	Zone external alarm
6	Deviation lower alarm(No alarm at the first time)
7	Absolute value lower alarm(No alarm at the first time)
8	Thermo couple breaking alarm
9	Zone internal alarm(No alarm at the first time)
10	Constant temperature at fixed time alarm
11	Program segment ending alarm
12	Program running alarm
13	Program ending alarm

Alarm mode Index







8. 1 Degree Selection.

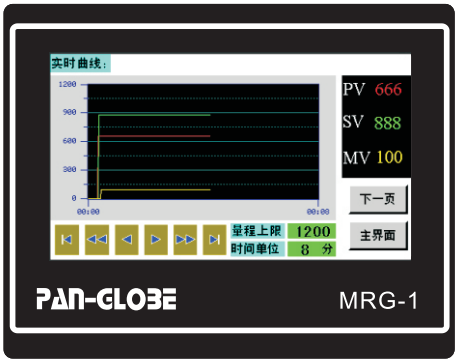
In the control interface, enter LEVEL3.The first parameter, INP, prompts the table to select the value that matches the sensor.

You can also click on the characters in the table.(Linear signal, range display range can be set by yourself)

8. 2 Alarm Selection.

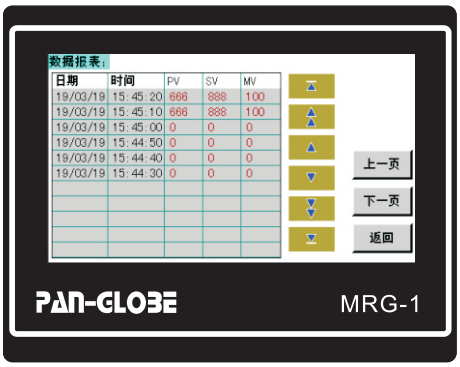
In the control interface, enter LEVEL3.Click the button on the next page, on the last page, for alarm mode parameters, select according to your own needs.After the selection, return to the control interface, enter LEVEL1, and set the alarm value AL.

9、Records: Real-time curves and data tables



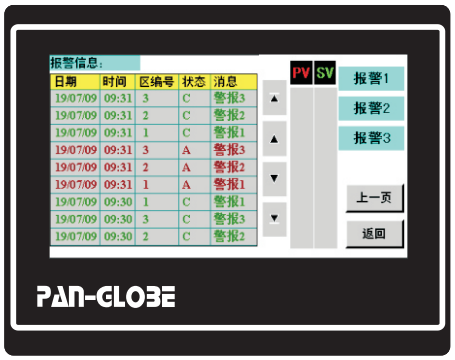
9. 1 Real time curve

On the main interface, click the record button to enter the real-time curve screen.
PV, SV and MV are recorded in this screen. Appropriate values can be entered at the upper limit of the range and unit of time to make the screen
It's more intuitive. At the same time there is a move button to make the screen pan.



9. 2 Data report

In the real-time curve, click on the next page to enter the data report.
This report records PV,SV and MV data at an interval of 10 seconds.
There is a move button that turns the screen up and down.



9. 3 Historical alarm information

In the data report, click on the next page to enter the historical alarm information.
This form records the alarm information that occurs. State A -- trigger alarm;
Status C -- Disarming the alarm. This interface, real-time display PV, SV numerical comparison.
Also shows which set of alarms are currently being triggered.

10. Application Example Illustration

Example1:Program control

The controller is pre-installed with the program setting methods of 60 segments and muti-pattern freely combination temperature,which has multiple start methods,multiple pattern running ways(skipping pattern is possible)and the manually clock changing privilege.It can be used as a constant controller when the STA=0 .Curve control value:STA、STB、C-T、CAL、SN、ST、C01、T01、WB

STA
0:Constant value
1:Program control run from 0
2:Run from the current PV

STB
Power off and the power on
0:The program does not start
1:The program start from the current PV value
2:Program start from he initation valur of current running segment when power failure

C-T
Program segment time unit
0:second
1:minute

CAL Choose the first group number

Sn Current run segment number

St Current run segment countdown

C01 Pattern 1 ,segment1 Temp

T01 Pattern 1 ,segment1 time

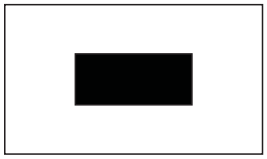
WB Time/Temp priority

Because of its high PV value tracking SV may have a negative deviation that could PV value and SV negative deviation is bigger, constant temperature period of design has already been started, the real constant temperature period of running time is greatly reduced, thus set WB waiting area, the slope of warming PV value must be (SV temperature value - PV) WB or less value when the constant temperature period of running clock is allowed to start, to ensure the accuracy of the temperature period of the execution time

Program curve setting

Application: Recipe programming
The instrument contains formula components.Can be preset 5 recipes, free to write.

Example 2:Temperature offset



Blank area: surface temperature (practical application area)
Black area: T/C measure temperature (actual heating area)

There is a temperature difference between blank area: surface temperature and T/C measure temperature. Take the customer's equipment as an example, what the customer needs is the actual surface temperature (the actual application area), which is the blank area in the figure above. And T/C can only be placed in the actual heating area, which is the black area in the figure above .And there's some temperature error between them, because T/C can't be measured on the surface, how do you do that?

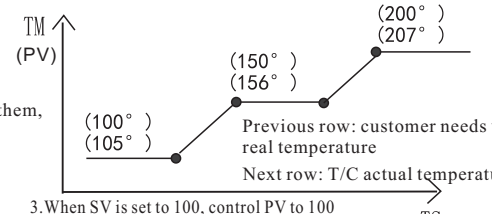
Assuming the customer's required surface temperature is between 100° 150° 200° please resolve

1.First the relation between surface temperature and T/C measure temperature are following:

T/C measure temperature	Surface temperature	Relation
105°	100°	Temperature is 5° higher than the actual
156°	150°	Temperature is6° higher than the actual
207°	200°	Temperature is 7° higher than the actual

2.Using the PVOS three point complement function, set(TM=100° TS=-5°), (TM2=150° TS=-6°), (TM3=200° TS=-7°),

T/C measure temperature	Surface temperature	Relation
105°	100°	T/C temperature is 5° higher than the actual
156°	150°	T/C temperature is 6° higher than the actual
207°	200°	T/C temperature is 7° higher than the actual



3.When SV is set to 100, control PV to 100
Although the actual heating temperature control zone (T/C measured temperature) is 100+5=105°
However, the PV of 100° is the actual application area (surface temperature), which meets the customer's requirements.
Note: TS is not positive when the above conditions are reversed

Example 3: Output soft starting

1. Press control button
2.Under LEVEL3,find DLY
3.Set the value X, that is, the actual output percentage of the instrument after X seconds

Note: This effect is only valid for the first power