General features:

- Dual display,4 digits,7 segments LED display
- TC/RTD, analog true universal input
- NPID,APID,Autotune,ON-OFF control mode artificial intelligence fuzzy logic PID control algorithem
- 0.25%F.S measuring accuracy
- Bar graphic display indication for 1/4 DIN and 1/8 DIN(optional)
- ^{0}C/^{0}F display selectable
- Alarm standby function
- 0.01 maximum resolution, even for K/J/PT100 input
- Fast sampling rate at 50ms
- 100~240Vac, 24VDC/AC source, lighting strike proof
- 60 seconds protection against 380Vac in case user connect the controller to 380Vac power supply
- Very small temperature drift,<0.03%FS/^{0}C
- RS-485 communication, PV/SV re-transmission 24VDC/AC auxiliary power supply available on request
- Ultra low power consumption less than < 5W

Unique features

- Touch button, feedback beep sound when you tap on the buttons this is a very useful features for user to track the operation not only visually, but aslo auditory.
- Fully sealed housing for greater protection, rubber gasket can be attached to the inside and outside of controller, the controller will be IP65, protection against water splash
- Ultra high brightness LED, excellent readability under direct sunlight
- DIN rail clamps available for 1/8 DIN size(horizontal and vertical) 1/8 DIN controller can be converted to din rail mount controller
- Event input, can remotely Run/Stop the program via an external switch
- Event output, controller can pull-in or release a relay at certain point during the process, event output can be used to trigger other device
- Dual output heating+cooling available for ramp and soak controller
- Multiple patterns can be programmed, different patterns can be executed according to different application
- "Wait" and "PV startup" function to ensure that the profile will be executed efficiently
- Free PC software for programming purpose,the configuration package is designed to simplify instrument set up, run time parameter settings and program construction. The capability to store a complete profile set, offers a quick and reliable configuration system and deletes maintenance time loss.

Ordering Information

PU90-48(48mm*48mm)
PU90-49(48mm*96mm)Vertical
PU90-94(96mm*48mm)Horizontal
PU90-96(96mm*96mm)
PU90-49B(48mm*96mm)
PU90-96B(48mm*96mm)

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |

| 9 |

Remark: PU90-49B is 48mm*96mm with LED bar graphic display
PU90-96B is 96mm*96mm with LED bar graphic display

1:Input

Blank	No code in this position means standard model, Standard version support TC/RTD and some analog inputs, such as 0-5V, 1-5V for a 4-20mA input signal, a 250 Ω resistor can be parallel connected to the input terminals and convert the 4-20mA into 1-5V.
A	Code "A" means TC/RTD and analog 0-5V,1-5V,0-20mA,4-20mA. no need to parallel connect a resistor, mA signal be input to the controller directly. at the same time, a 24VDC auxiliary power supply are embedded as well, can be used for transmitters
B	Code "B" means TC/RTD and analog 0-5V,1-5V,0-10V, 0-20V.

2:Output 1(Reverse control/heating)

R	Relay output
V	SSR Drive/Voltage pulse output
D	4-20mA output
E	0-10Vdc output

3:Output 2(Direct control/cooling)

N	Not available with cooling output
R	Relay output
V	SSR Drive/Voltage pulse output
D	4-20mA output
E	0-10Vdc output

4:Number of Alarms

1	1 alarm
2	2 alarms
3	3 alarms
4	4 alarms

5:Power Source

96	85~265Vac 50/60HZ
24	24Vdc/ac

6:PV/SV Re-transmission output

N	Without Re-transmission
P42	Process value Re-transmitted as 4-20mA
P010	Process value Re-transmitted as 0-10Vdc
S42	Setting value Re-transmitted as 4-20mA
S010	Setting value Re-transmitted as 0-10Vdc

7:RS-485 Communication

N	Without Communicaiton
K	With Modbus RTU RS-485 communication

8:24VDC Auxiliary power supply

N	Without Communicaiton
24	24VDC auxiliary power supply to power sensor

### 9:Event input

N	Without Communicaiton
E	Event input(remotely RUN/STOP the profile controller)

Example: PU90-96B-V-N-1-96-N-K-N-N
96mm*96mm with LED bar graphic display
TC/RTD/analog(0-5V,1-5V,4-20mA)
SSR Drive output
Without cooling output
1 alarm
With RS-485 communication

Panel Layout

PV

SV

1: Upper display
2: Lower display
3: Set key
4: Shift key(Auto/manual transfer key),PU90 not available.
5: Decrease key
6: Increase key
7:10 LED indicators, MAN indicator off means auto control mode
   MAN on means manual control mode, PRG means ramp and soak
   control mode, MIO, OP1,OP2,AL1,AL2,AU1,AU2, indicates
   respective function,COM indicates the communication status

Wiring diagram
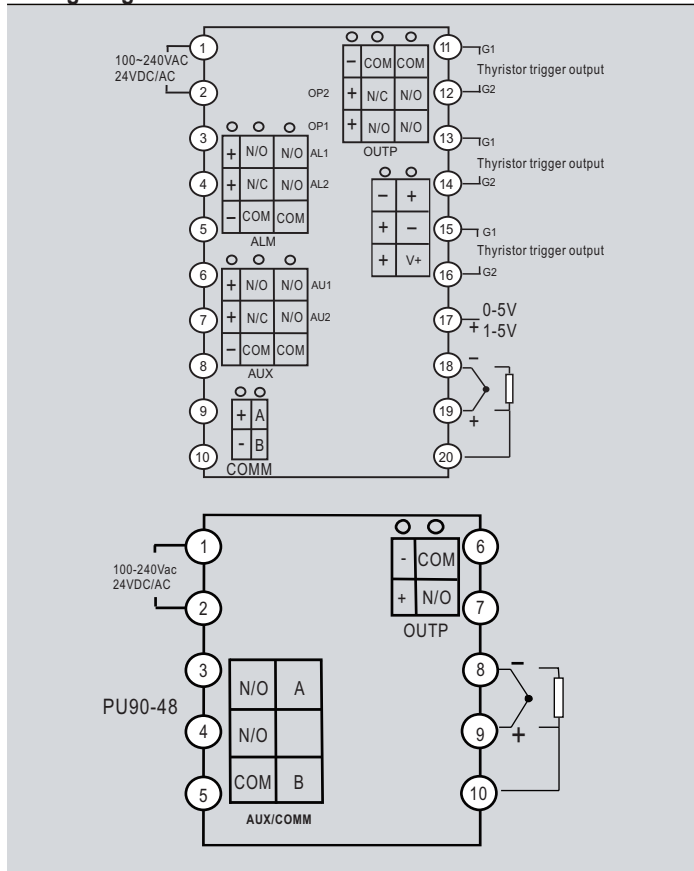
Display

Digits	4 digits 7 segments LED,Dual display
LED Indicators	MAN,PRG,MIO,OP1,OP2,AL1,AL2,AU1,AU2
LED bar	48mm*96mm(vertical), 96mm*96mm

Input Specifications

Inputs	Thermocouple(K,S,R,T,E,J,B,N,WRe3-25, WRe5-26)RTD(PT100,Cu50) DC Analog Inputs(2-10Vdc,1-5Vdc,4-20mA) (0-10Vdc,0-5Vdc,0-20mA) (0-50mV,0-20mV) Resistance(0-80 Ω ,0~400 Ω)
Sampling time	50ms
Input Filter(FTC)	0 to 40(1-20 normal, 20-40 enhanced)
Resolution	1/0.1^0/0.01^0 for TC/RTD only Decimal point position selectable: 1/0.1/0.01/0.001 for analog input
Temperature Unit	^{0}C/^{0}F Selectable
Indication Accracy	0.25%FS. ± 0.1digit (F.S.=Full Scale)

Output Specifications

Relay output(Main output)	Main output, heating or cooling selectable
Contact Rating(SPST)	5A @ 250Vac Resistive Load(Main Output) 2A @ 250Vac Resistive Load(Alarm output)
Current	0/4 to 20mA DC(loop impedence: 500 Ω max.)
SSR Drive	12V DC(50mA)
Retransmission	
Current	4 to 20mA DC(loop impedence: 500 Ω max.)
Voltage	0 to 10Vdc(Load resistance: 10K Ω Min)

Supply Voltage

Supply Voltage	100~240Vac 50/60HZ, or 24VDC/AC
Power Consumption	5VA max @230Vac

Environmental Specifications

Temperature	Operating: -10 to 60^{0}C(14 to 142^{0}F)
Humidity(non-condensing)	90%RH
Weight	0.17kg(48mm*48mm) 0.3kg(48mm*96mm,96mm*48mm) 0.38kg(96mm*96mm)
Protection	Dust proof for standard model IP65 with rubber gasket

Dimensions

Item no	Panel size	Panel cut size	Depth
PU90-48	48mm*48mm	45mm*45mm	78mm
PU90-49	48mm*96mm	44mm*92mm	92mm
PU90-49B	48mm*96mm	44mm*92mm	92mm
PU90-94	96mm*48mm	44mm*92mm	92mm
PU90-96	96mm*96mm	92mm*92mm	92mm
PU90-96B	96mm*96mm	92mm*92mm	92mm

Compliance

IEC/EN 61326(EMI/EMC)
IEC/EN 61010 Revision 3 2010 Edition(Safety)
RoHs compliant optional, specify when order

Free PC software for programming

USB to RS-485 converter

The programming of ramp and soak can be a little bit challenge, to reduce customer's workload, we designed a free PC software for the programming purpose. all you need is a USB to RS-485 cable, the software is designed to simplify instrument set up, run time parameter settings and program/pattern construction, the capability to store a complete pattern allows you put your recipe somewhere on your PC, and you can import the recipe to the controller whenever you want. to run the software, one have to choose the controller with RS-485 feature.

Some of customers may need to change the SV remotely, log the PV, monitor the alarm output, change the settings of the controller remotely. or put multiple controllers together. this software is capable of doing that in a reasonable cost.
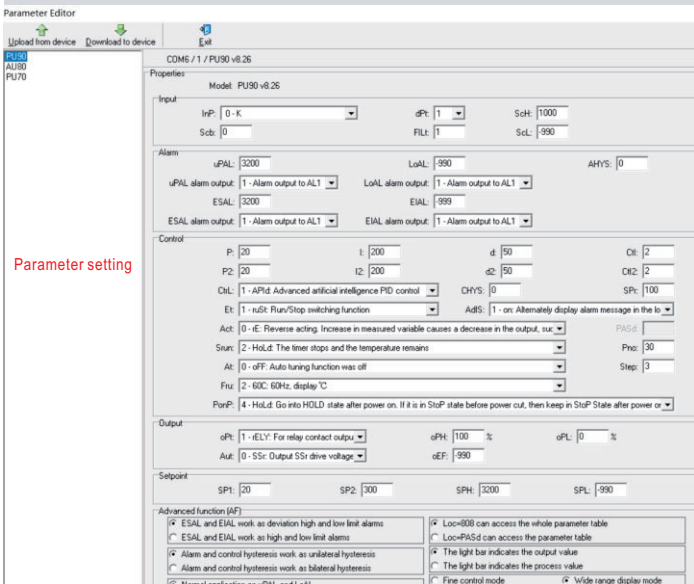
Parameter setting
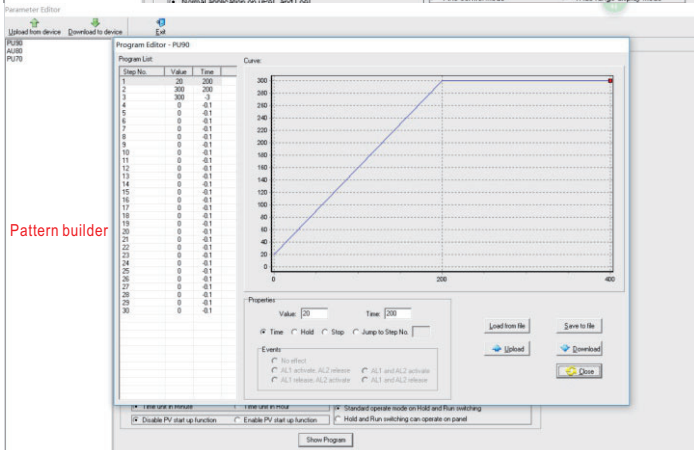
Pattern builder

DIN Rail clamps(DR-001), order separately

A Din rail clamps can be attached to the back of the 1/8 Din(48mm*96mm,96mm *48mm), this offers easy solution for someone who need DIN Rail mount controller
Part number: **DR-001**

Water proof gasket(GS-001), order separately

Waterproof gasket for all sizes except 48mm*48mm, unit will be IP65 protection with the gasket in place
Part number:**GS-001**

Example of a pattern

The following example includes 6 steps: ramp up, maintaining the temperature ,ramp down, jump cycling,hold and event output. in the following example, it is assumed that the deviation high/low alarm ESAL=EIAL=50^0C
Step 1: SP 1=100, t-1=30.0, temperature heating up from 100^0C. start linear temp-erature heating up from 100^0C to 400^0C in a time period of 30 minutes(ramp up speed is 10^0C/minute).
Step 2: SP 2=400, t-2=60.0,Maintain 400^0C for 60 minutes.
Step 3: SP 3=400, t-3=120.0,Reduce the temperature from 400^0C to 160^0C in 120 min. so the ramp down speed is -2^0C/minute
Step 4: SP 4=160, t-4=-0.1, active the relay AL1 and go to next step 5.
Step 5: SP 5=160, t-5=0.0, hold(pause) the program at step 5. operator/user needs to press the DOWN arrow key to resume running the program.
Step 6: SP 6=100, t-6=-1.4 Switch off AL1 and jump back to step 1.

Note 1:When the program jumps back to step 1 (SP 1=100, t-1=30.0), the oven temperature is still at 160^0C, the program will pause until the temperature drops within the deviation alarm range of the new set point. as the deviation high alarm is set to 5^0C, the program will resume(from the beginning) as soon as the tempera-ture drops below 105^0C.
Note 2: the current step 5 can be omitted, i.e; we can change the step 5 to SP 5= 160 and t-5=-5.0. when two jumps steps are programmed next to each other, the program will pause

The temperature control block is shown below.