P series Aluminum-Rail Type Temperature Controller Manual (Aluminum-Rail installation)

Note:

1. Please make sure if the terminals are wired correctly and if the input power conforms with the specficiations before power supply is connected.
2. If power supply is connected, do not touch the power terminals to prevent electric shock.
3. Do not mount the controller in a place where is likely to be interfered by radio frequency or where is corrosive of humid.
4. Please select spade terminal cables to do the wiring.
5. If the cable of the thermocouple needs to be extended, please use extension wire of the same type.
6. The conducting wire of platinum resistance (Pt100) should be as shorter as possible, or of low impendence.
7. To avoid interference, signal cable and power lines should be kept away from load power conducting wire.
8. In case hazard should occur if the controller breaks down, breakers or fuses should be fitted

■Model No. Explanation

Pm0 - 1 1 0 2 - A

Model		Control output		Alarm		Input type		Comm. /Re-transmitting		Power	
Pm0	STD	0	Null	1	1set(O.C)	0	TC/RTD	0	Null	A	90~240V
Pm1	program control	1	RELAY	A	HBA(50A)		-		-	D	24~36V
		2	24V(SSR)	D	HBA(100A)		-	2	RS-485		(AC or DC)
		3	4~20mA			3	4~20mA	3	4~20mA		
		4	0~5V			4	0~5V	4	0~5V		
		5	1~5V			5	1~5V	5	1~5V		
		6	0~10V			6	0~10V	6	0~10V		
		7	2~10V			7	2~10V	7	2~10V		

■Specifications

Dimension (WXLXH)mm	22.5X75X101
Power supply	AC90~240V(60/50Hz),DC24V(optional)
Power consumption (Approx.)	5 VA
Net Weight (Approx.)	80g
Storage/Operating ambient	0~65°C/0~50°C, 20~90%RH
Data backup memory	EEPROM,10年
Accuracy	0.3%FS
Display height (mm) PV (red) / SV (green)	PV(red) 8 SV(green) 8
Alarm output	NPN O.C 100mA Max, endure 32VDC
Control output	Relay contacts: 5A,250VAC Logic voltage(to drive SSR):ON=24V(20mA Max) Analog current: 4~20mA(Input impedance 600Ω Max.) Analog voltage: 0~10V(Input impedance 1KΩ Min.)
Input type	Thermocouple, RTD, analog voltage/current. Refer to input type list

■Panel Explanation

OUT(G): Indicator of output
ALM®: Indicator of alarm output
A/M(Y): Flash=Perform AUTO- TUNING
Light on continuously=manual output mode
COM(Y): Indicator of comm.
PV (R) : Present temp. value
SV (G) : Set value

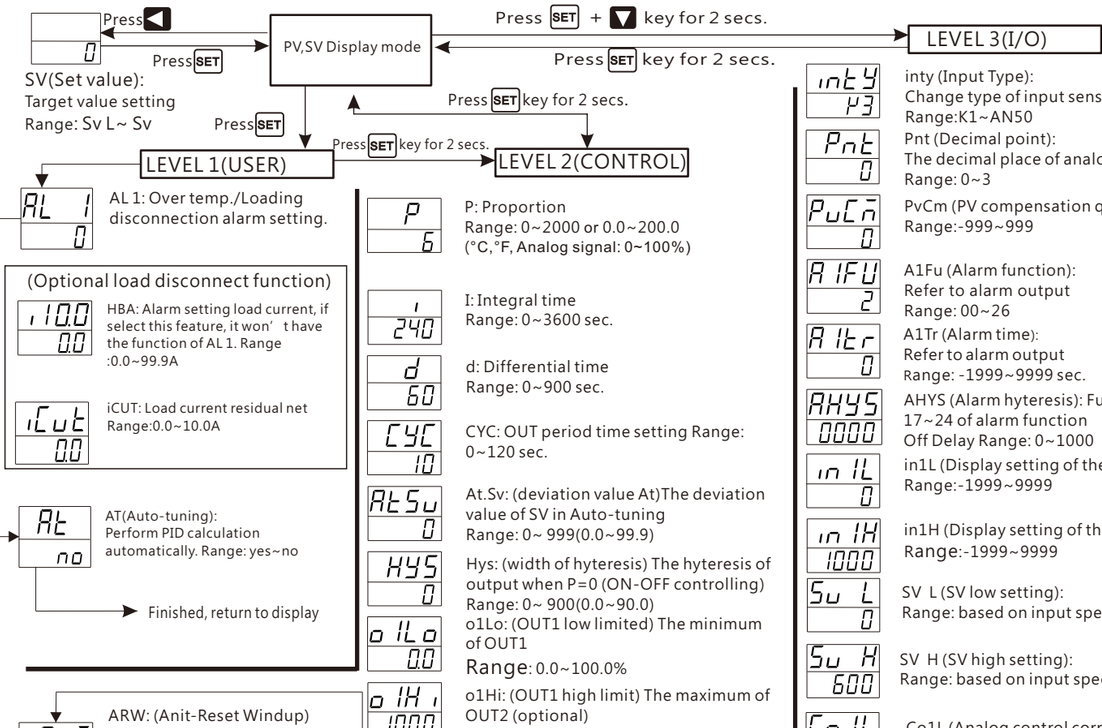
SET : Set key, starts or ends the parameter setting
◀ : Left key, change the parameter set value
▲ : Up key, the parameter value increases 1
▼ : Down key, the parameter value decreases 1

■List of input type

Input type		Code	Detecting range	Code	Detecting range	Code	Detecting range
Thermocouple	K	K1	0.0~200.0°C/0.0~392.0°F	K2	0.0~400.0°C/0.0~752.0°F	K3	0~600°C/0~1112°F
		K4	0~800°C/0~1472°F	K5	0~1000°C/0~1832°F	K6	0~1200°C/0~2192°F
	J	J1	0.0~200.0°C/0.0~392.0°F	J2	0.0~400.0°C/0.0~752.0°F	J3	0~600°C/0~1112°F
		J4	0~800°C/0~1472°F	J5	0~1000°C/0~1832°F	J6	0~1200°C/0~2192°F
	R	R1	0~1700°C/0~3092°F				
	S	S1	0~1700°C/0~3092°F				
	B	B1	0~1820°C/0~3308°F				
	E	E1	0~800°C/0~1472°F				
	N	N1	0~1300°C/0~2372°F				
	T	T1	0.0~200.0°C/0.0~392.0°F	T2	0.0~400.0°C/0.0~752.0°F		
	W	W3	0~2300°C/0~4172°F	W5	0~2000°C/0~3632°F		
	PL-II	PL2	0~1390°C/0~2534°F				
Platinum Resistance	Pt100 DIN	PT1	-199.9~200.0°C/-199.9~392.0°F	PT2	-199.9~400.0°C/-199.9~752.0°F	PT3	-199.9~600.0°C/-199.9~1112.0°F
		PT4	0~200°C/0~392°F	PT5	0~400°C/0~752°F	PT6	0~600°C/0~1112°F
	Pt100 JIS	JP1	-199.9~200.0°C/-199.9~392.0°F	JP2	-199.9~400.0°C/-199.9~752.0°F	JP3	-199.9~600.0°C/-199.9~1112.0°F
		JP4	0~200°C/0~392°F	JP5	0~400°C/0~752°F	JP6	0~600°C/0~1112°F
Analog Signal	10mV	An10	-1999~9999/10mV				
	20mV	An20	-1999~9999/20mV				
	50mV	An50	-1999~9999/50mV				
	Other	USER	-1999~9999/(4~20mA,1~5V,0~10V,....)				

■Parameter setting

The interior parameters of the controller can be divided into 3 groups according to their properties (LEVEL1~LEVEL3) so as to make settings more convenient. The setting authorities of groups are restricted with the parameter LOCK. LEVEL1 is User's Parameter Group, the group of parameter that are changed most often. LEVEL2 is controlling Parameter Group. Parameters about auto controlling are gathered up there. LEVEL3 is I/O Group (input/output), such parameters are the change of sensor, adjustment of analog output, and communication are gathered here.



■Parameter protection setting

Press SET + ▲ key for 2 secs.
Lock parameter protection:
0: all parameter can't be set
1. only SV can set
2: only LEVEL 1, manual/auto switch open
3: only LEVEL1, 2 open
4. all open
End, back to the display mode

■Manual/Auto switch

A/M
press ◀ 2 secs. to enter manual mode, (A/M light on, repress ◀ for 2 secs. to return back to auto control mode. When enter manual mode, upper row will dispplay PV value, lower row will display "Mout". Can adjust the output via the panel keys as follows.
Press ◀ to start to adjust output
Range: 0.0~100.0% Re-press SET key to complete the adjustment

■Anomalies and troubleshooting

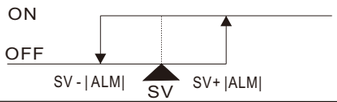
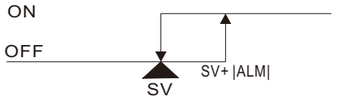
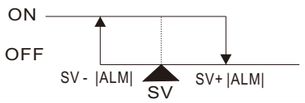
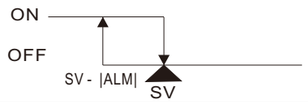
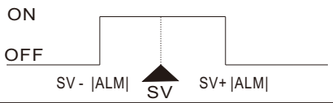
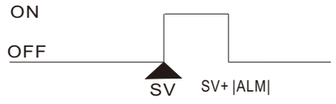
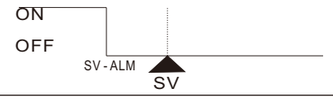
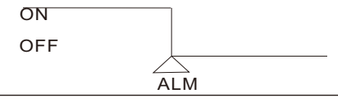
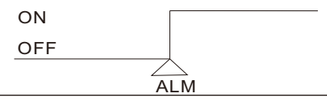
Exception code	Description	Disposal
oPEn	Temperature sensor disconnection	1. If connection terminal and wire has no problem, please remove the wire end. If the controller input short circuit (thermocouple is suitable for this method), please check the PV value. If it's displayed as room temperature value, it should be temperature sensor failure. 2. Or on the input end to across 100 OHM (PT100 is suitable for this method), observe the display value to see if displays 0
oL	Input signal over + display value	
-oL	Input signal over - display value	
CJEr	Diode temperature compensation failure	Repair
AdEr	Internal circuit failure	Repair

tout (time out) Communication timing out: Range: 5~99 sec.

Mode (Modbus communication mode): Range: RTU, ASCII

■Alarm output features

There are 26 types of alarm outputs, represented with codes 00~26. 00 represents alarm disabled; odd numbers represents that the first output after start up is disable. 25 & 26 are exclusive alarm output for process control.

Code: 01, 02 Relative high alarm		Code: 03,04 Relative deviation high
		
Code: 05, 06 Relative low alarm	Code: 07, 08 Relative deviation low	
		
Code: 09, 10 Band alarm	Code: 11, 12 Low alarm	Code: 13, 14 High alarm
		
Code: 15, 16 Deviation hihg/low	Code: 17,18 Deviation low alarm	Code: 19, 20 Deviation high alarm
		
Code: 21, 22 Process low alarm	Code: 23, 24 Process high alarm	Code: 25, 26 Process control
		

Alarm output time setting:

Parameter A1Tr sets the duration of alarm output. Its ranging from -1999 sec. to +9999 sec. Time of+/- setting has different meaning on output.

1. If set minus value ex. -9, represents alarm will be **delayed** 9 second output.
2. If set 0 second, alarm will immediate output.

1. This control can provide 1 alarm setting (can set 3 sets through communication, see communication spec.).
   The operations of alarm of High & Low are as follows: (taking function 02 with ALM set as 0 as example)
   High (Right) condition: (SV+ALM) > PV
   Low (Left) condition: (SV-ALM) < = PV

2. If the feature code is set in 1~16, alarm value will be calculated as absolute value (turn minus to positive to calculate)

3. If the controller is equipped with HBA (broken-line alarm) function, then Al1 is HBA output, and function code is forced as 22. Users can not change. Only delay time (A1Tr) is reserved for setting. Range: -1 ~ -1999 sec.

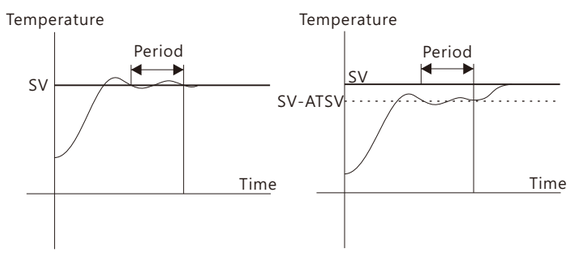
4. For models with process control, if AL1 need to be assigned to make alarm output when the program completes each level, the alarm parameter can be set as 25, and set the value of AL1 to designate level numbers (0~15).
   Note: For non-process-control models, if the function code is set as 25 & 26, the alarm will be invalid.

■PID(Auto-Tuning)

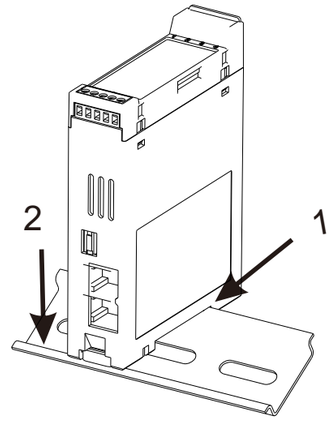
Auto-Tuning employs the measure of Relay ON-OFF to detect the dynamic characteristics of the Process, and compute the best collaction of P.I.D. parameter based on the data.
During Auto-Tuning, the operation must be under the situation where the Process is not interfered. When Auto-Tuning is completed, (AT lamp goes off), the three parameters, P.I.D. will renew themselves, and enter the new P.I.D. Auto-Tuning mode.

If any of the following situation occurs, Auto-Tuning will stop and enter Manual mode, but PID values will not be changed:

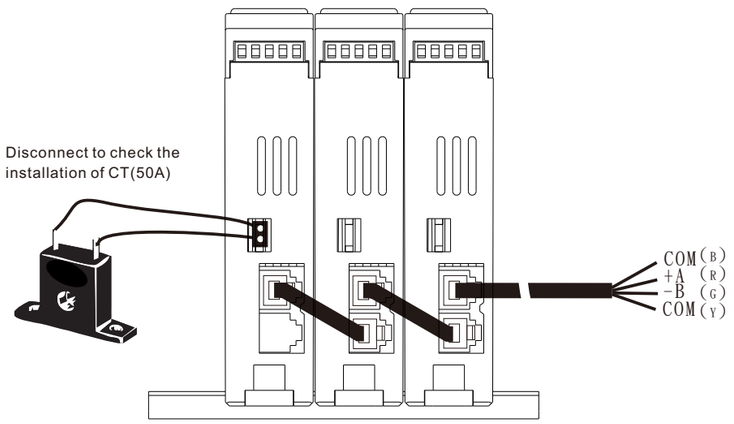
- Any exception occurs (including power failure)
- The half-period of the Process is over 2 hours.
- Hold ◀ for 2 sec. (forcing to Manual mode)



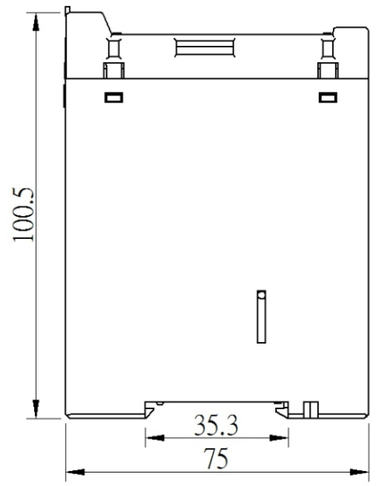
■Dimension and Mounting (Unit: mm)

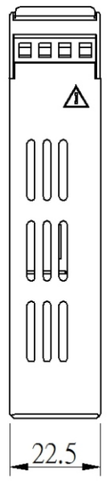


First, put the groove of controller back-end into the aluminum rail (as arrow 1). And then press the controller to connect to the aluminum rail (as arrow 2) until hearing the click sound.

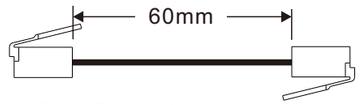


Installation for RS-485 communication wire, which can connect with at most 31pcs temperature controllers





Optional communication wire:



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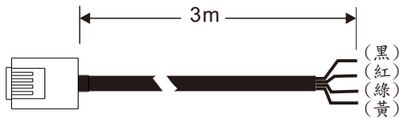

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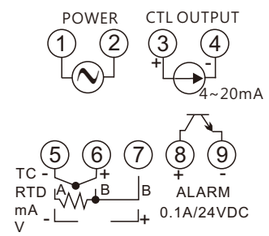
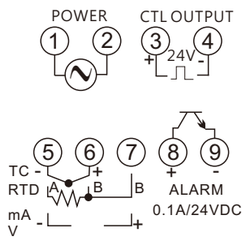
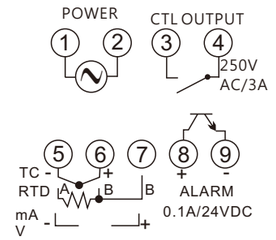
■Wiring diagram







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