Pneumatic Hot Stamping Date Coder

ST-351

OPERATION INSTRUCTION

Safety & Notice

| ⚠	# Warning
	Do not assemble, arrange, connect the electronic wires during the electricity transmission.
	For safety reason, do not disassemble this machine and its parts or connect the electric wires if not specialists or our staff.
	Power cord and signal cord could not be connected wrongly.

⚠	# Notice
	As for changing the matrixes, please wait for the matrixes to turn cold to avoid being scalded.
	As for changing the carbon ribbon, please be careful to avoid being scalded when winding around the heads of the matrixes molds.

Winding Ribbon Illustration

<table>
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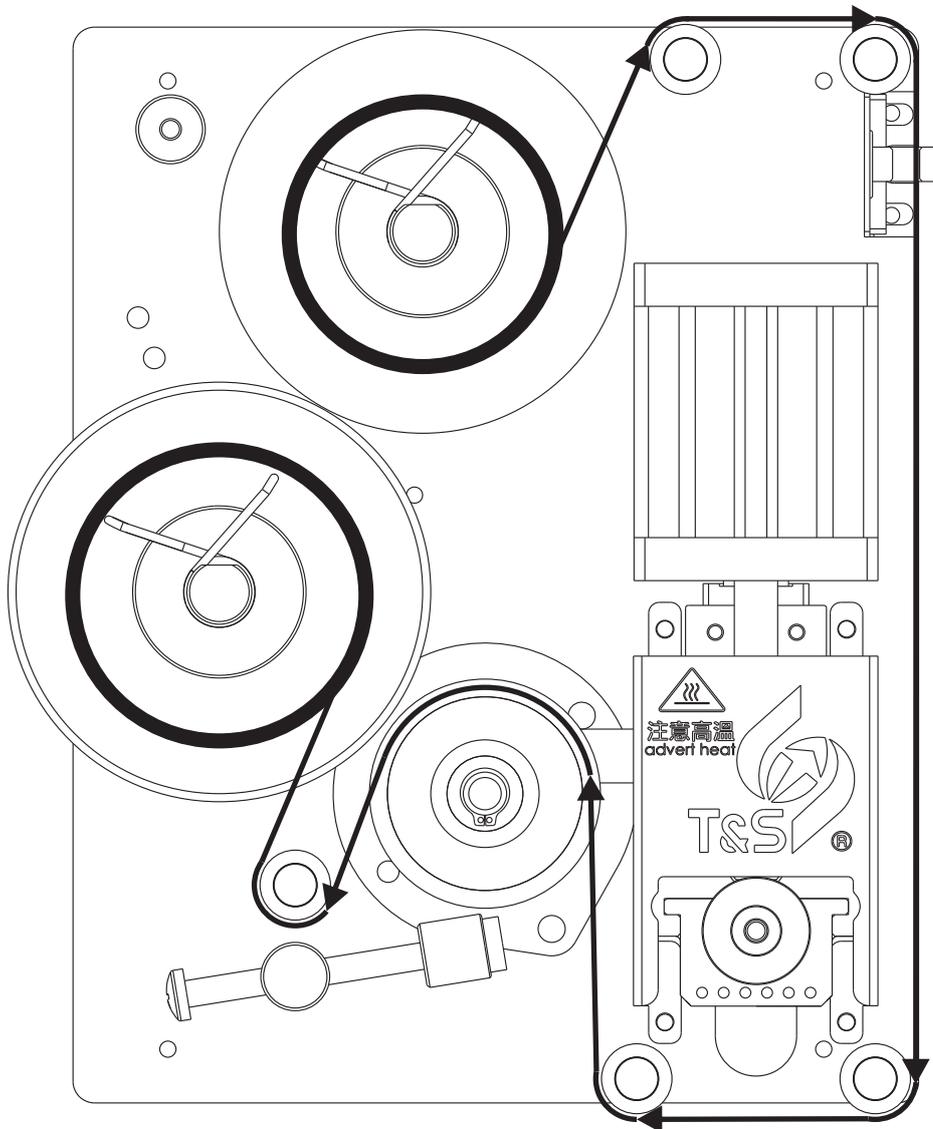
⚠	# Notice

The direction of the carbon ribbon should be correct, and carbon membrane side should be toward the printed objects as label, packing paper or…etc
As for changing the carbon ribbon, please be careful to avoid being scalded when winding around the heads of the matrixes.

Changing Matrixes Illustration

Front View

Side View

Matrixes Set

Block

Block
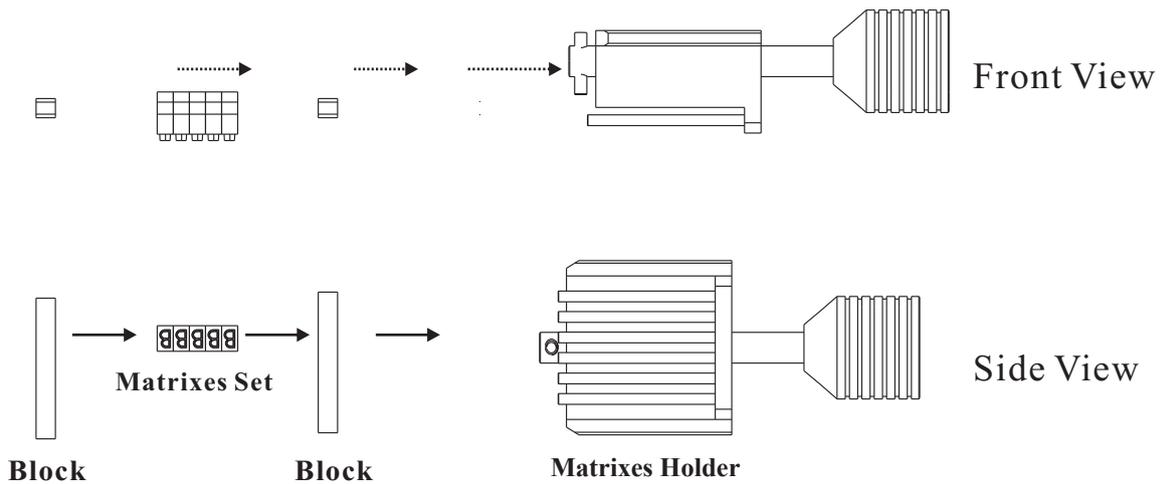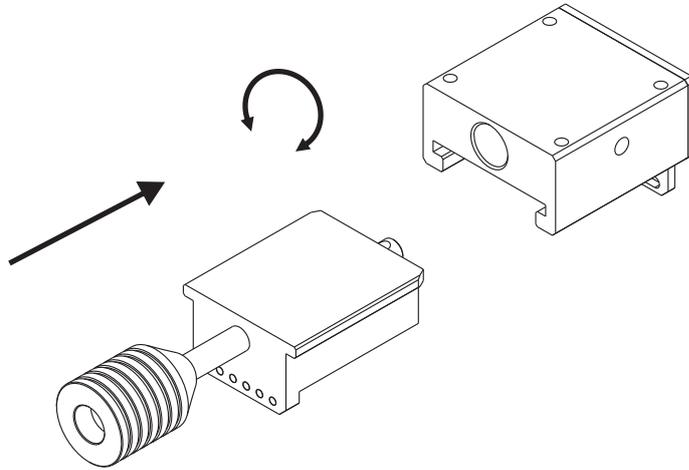
Matrixes Holder

⚠️ # Notice

As for changing the matrixes, please wait for the matrixes and holder to turn cold to avoid being scalded.

The length of block must be based on the matrixes numbers.

Ribbon Load Adjuster
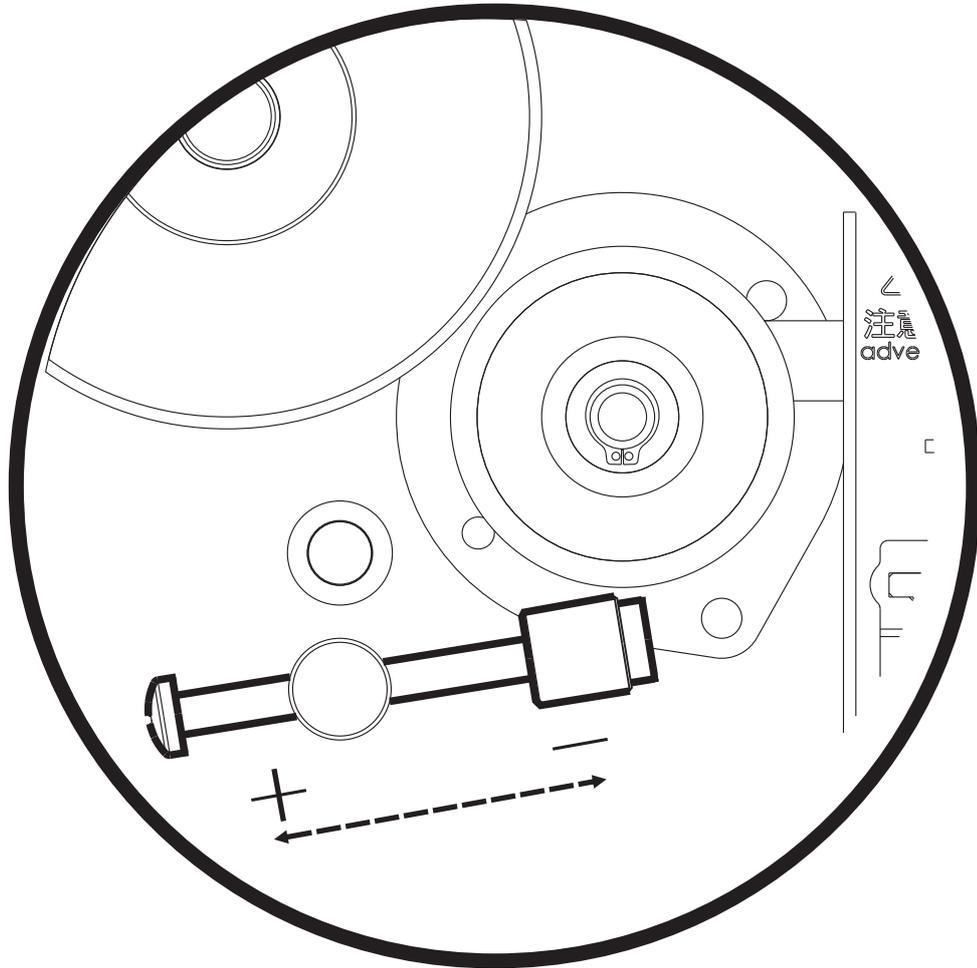
⚠	# Notice
	After adjustment is finished, please remember to screw the screw nut tightly.

Control Case Introduction

Power Switch

Printing Switch

Printing-Location Adjuster

Temperature Controller

OMRON   E5CSZ

Fuse Socket

8P Socket for connecting Printer

3P Socket for start signal input

FUSE

2P Power Socket (110V/AC220V)

Ribbon broken alarm
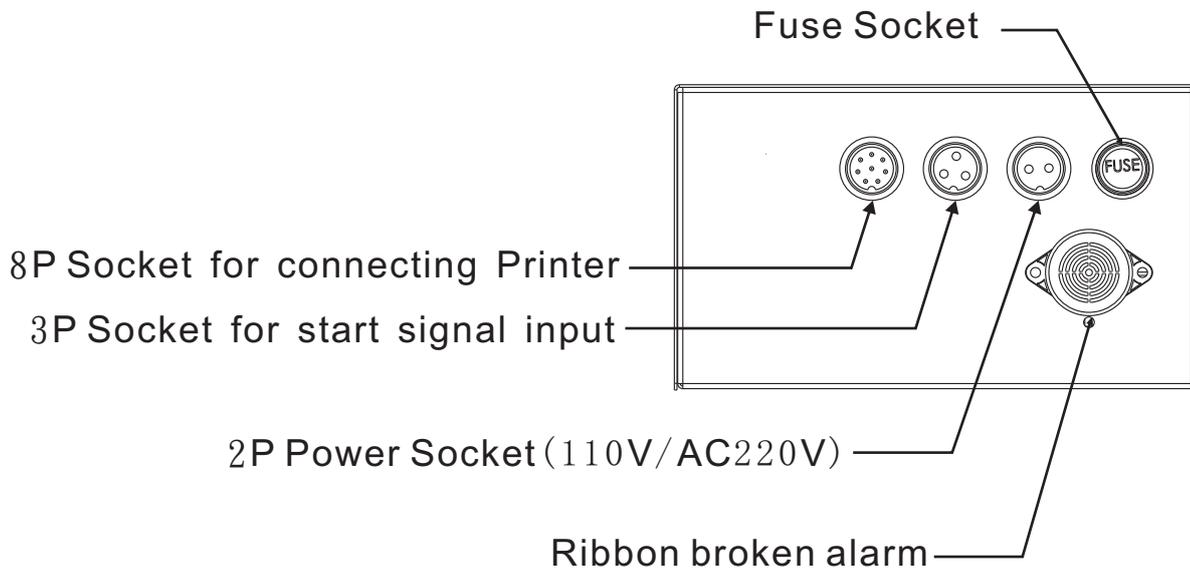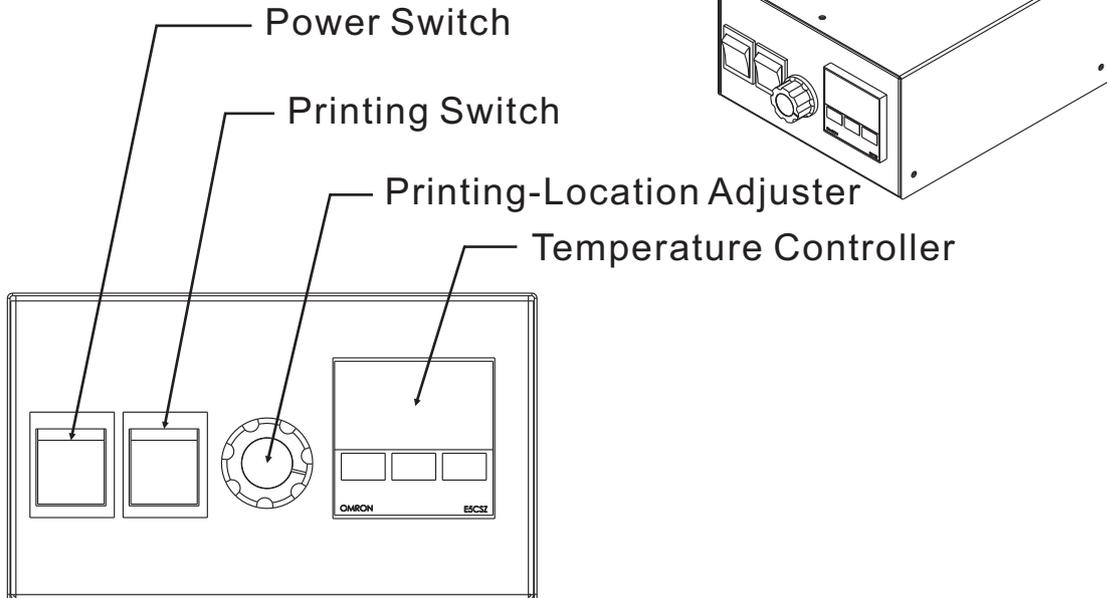
⚠️ **Notice**

All connecting ports and buttons of the drawings on this manual are for standard machine.
For drawing of specific machine, please contact our company.
Suggestion: The temperature of the matrixes should not be too high. Generally, the ribbon printing temperature is around 90℃ 140℃.

Introduction

Present temperature

Temperature Setting

Setting Key

Optionation Key (pattern switch）

Digital & Setting adjuster

Digital & Setting adjuster

OUT1
OUT2
AL1
AL2
AT
MAN
COM

SET A/M ∨ ∧
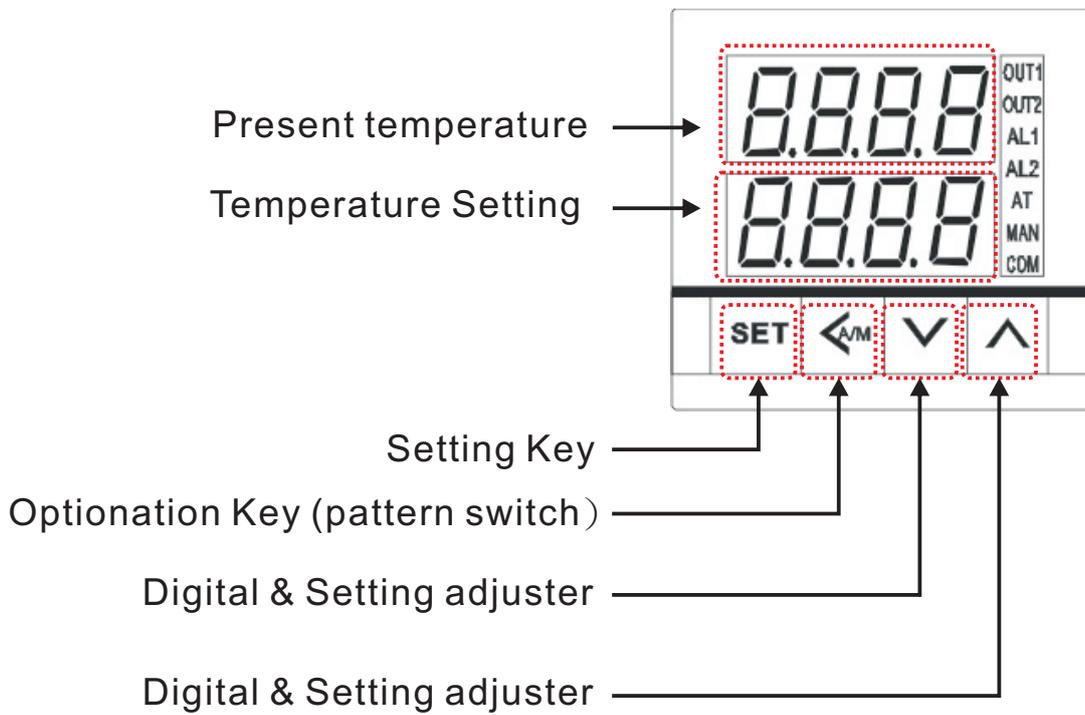
AT: Auto Tuning
OUT: Output Signal
ALM1: Alarm Output Signal 1
ALM2: Alarm Output Signal 2

User's Manual P series PID Temperature controller

Precaution:

1. Please make sure if the terminals are wired correctly and if the input power conforms with the specifications 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 or 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 impedance.
7. To avoid interference, signal cable and power line 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 prior to the power of the controller.

■ Model No. EXplanation

P10 - 1 0 1 0 - 0 0 0 A

Model	Output 1	Output 2	Alarm	Input Type	Remote SV	Transmitting Output	Communication	Power supply

Model
- P10 48X48mm
- P20 48X96mm
- P30 96X48mm
- P50 72X72mm
- P60 96X96mm

Procedure Control
- P11 48X48mm
- P21 48X96mm
- P31 96X48mm
- P51 72X72mm
- P61 96X96mm

Output 1
- 0 Null
- 1 Relay
- 2 Logic Voltage (SSR)
- 3 4~20mA
- 4 0~5V
- 5 1~5V
- 6 0~10V
- 7 2~10V
- 8 Proportional Valve Control

Output 2
- 0 Null
- 1 Relay
- 2 Logic Voltage (SSR)
- 3 4~20mA
- 4 0~5V
- 5 1~5V
- 6 0~10V
- 7 2~10V

Alarm
- 0 Null
- 1 1
- 2 2
- 3 3
- A HBA
- B HBA+AL2
- C HBA+AL2,3

Input Type
- 0 Thermocouple
- 1 RTD
- -
- 3 4~20mA
- 4 0~5V
- 5 1~5V
- 6 0~10V
- 7 2~10V

Remote SV
- 0 Null
- -
- -
- 3 4~20mA
- 4 0~5V
- 5 1~5V
- 6 0~10V
- 7 2~10V

Transmitting Output
- 0 Null
- -
- -
- 3 4~20mA
- 4 0~5V
- 5 1~5V
- 6 0~10V
- 7 2~10V

Communication
- 0 Null
- 1 RS232
- 2 RS485

Power supply
- A AC90~240V
- D DC24V

■ Specifications

Model	P10	P20	P30	P50	P60
Dimension	48X48mm	48X96mm	96X48mm	72X72mm	96X96mm
Power Supply	AC90~240V(60/50Hz), DC24V(optional)				
Power Consumption (Approx.)	4 VA	4 VA	4 VA	5 VA	5 VA
Net Weight (Approx.)	130g	200g	200g	200g	280g
Storage / Operating Environment	0~65°C/0~50°C, 20~90%RH				
Data Backup Memory	EEPROM,10 years				
Accuracy	0.3%FS				
Display Height (mm) PV(red)	8	8	7	14	14
SV(green)	8	8	7	10	10
Alarm Output	Relay contact 8A, 250VAC				
Controlling Output	Relay contact: 8A, 250VAC Logic Voltage (to drive SSR):ON=24V,OFF=0V(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

[1]. PV(Process Variable): Displays detected value or menu in setting mode.
[2]. SV(Set Value): Display target value or values of parameters in setting mode.
[3]. Status Index Lamps:
   OUT1(green)=OUT1, OUT2(green)=OUT2, AL1~AL3(red)=alarms, AT(yellow)=Auto-Tuning,M AN(yellow)=Manual mode, COM(yellow)=Communication
[4]. Percentage light bar of OUT1

[5]. [SET] key: starts or ends parameter setting.
[6]. [Left] key (Auto/Manual switching key): In setting mode: Shifts the cursor to change the parameter value in setting mode. In display mode, switch Auto/Manual mode (2 sec.), or stops Auto-Tuning.
[7]. [Down] key: decreases the parameter value in setting mode.
[8]. [Up] key: increases parameter value in setting mode.

(P10) (P20) (P30) (P50,P60)

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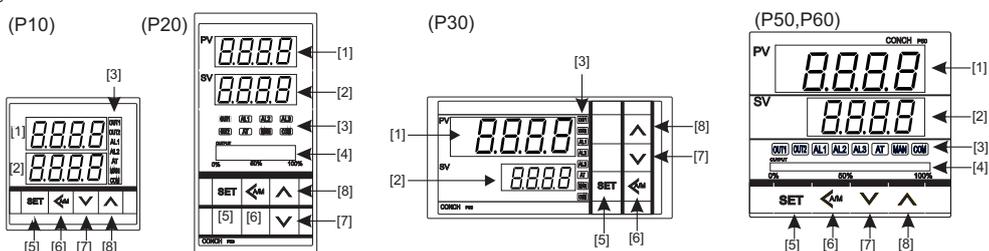
Temperature Controller Instructions

■ Parameter Settings

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 parameters that are changed most often. LEVEL2 is Controlling Parameter Group. Parameters about auto controlling are gathered up here LEVEL3 is I/O Group (input/output), such parameters as the change of sensor, adjustment of analog output, and communication are gathered here.

PV, SV Display Mode — Press [SET] + [∨] for 2 sec. → **LEVEL 3(I/O)** — Press [SET] for 2 sec.

0 — Press ⇐ / Press [SET] to PV, SV Display Mode

SV(Set value):
Setting of target value
Range: Sv L~ Sv H

Press [SET]

LEVEL 1(USER) — Press [SET] for 2 sec. → **LEVEL 2(CONTROL)** — Press [SET] for 2 sec.

LEVEL 1 (USER)

AL 1 / 0 — AL 1(Alarm1,HBA):
Setting of Alarm 1
Range: based on specs.

AL 2 / 0 — AL 2(Alarm2)(optional):
Setting of Alarm 2
Range: based on specs.

AL 3 / 0 — AL 3(Alarm3) (optional) :
Setting of Alarm 3
Range: based on specs.

At / no — AT(Auto-tuning):
Perform PID calculation automatically
Range: yes / no

→ Finished, return to Display

HYS / 0 — Hys: (width of hyteresis)
The hyteresis of output when P =0 (ON-OFF controlling)

o1Lo / 0.0 — o1Lo:(out1 Low Limit)
The minimum of OUT1.
Range: 0.0~30.0%

o1Hi / 100.0 — o1Hi:(out1 High Limit)
The maximum of OUT1.
Range:50.0~100.0%

o2Lo / 0.0 — o2Lo:(out2 Low Limit)
The minimum of OUT2 (optional)
Range: 0.0~30.0%

o2Hi / 100.0 — o2Hi:(out2 High Limit)
The maximum of OUT2 (optional)
Range: 50.0~100.0%

Soft / 0 — Soft:(output soften)
Buffered output setting
The greater the value, the slower will the output reach 100%.

Arw / 100 — ARW: (Anit-Reset Windup)
Integration stop preventing setting. Minimize the integral area to reduce overshoot.
Range: 0~100%

SELF / no — SELF(Self-tuning):
Self-tuning of OUT1
Range: yes / no

Parameter Protection

Press[SET] + [∧] 2 sec.

LoCH / 4 — Lock:
0: Disable all parameter settings.
1. Only SV can be set.
2: Only LEVEL 1 is opened.
3: Open LEVEL1 & 2

→ Finishes and returns to display mode.

LEVEL 2 (CONTROL)

P1 / 6 — P1: Proportion 1(for out1)
Range: 0~2000(°C,°F) or 0.0~200.0(°C,°F)
=0,ON-OFF controlling

I / 240 — I: Integral time
Range: 0~3600 sec.

d / 60 — D: Differential time
Range: 0~900 sec.

CYC1 / 10 — CYC1: Out1 period time
Range: 0~120 sec.

P2 / 6 — P2: Proportion 2(for out2, optional)
Range: same with P1
=0,ON-OFF controlling

CYC2 / 10 — CYC2:Out2period time optional)
Range: 0~120 sec.

dbnd / 0 — dbnd: (dead band, optional)
For 2-output model. To set dead band of OUT2. Range:-999~ 999

AtSu / 0 — At,Sv: (deviation value AT)
The deviation value of SV in Auto-tuning.

CY t / 20 — Cy t: (3-line proportional valve time) (Optional)
Range: 5~100 sec.

dir / HEAt — dir (controlling direction):
Range: heat, cool

P Hz / 60 — P Hz (power frequency):
Range: 50, 60Hz。

Filr / 200 — Filr (parameter of digital filter):
Range: 0.01~9.99
The greater, the slower PV changes

id / 1 — id (communication ID):
Range:0~99

bAUd / 96 — Baud (Baud rate):
Range:2.4, 4.8, 9.6, 19.2, 38.4 (kb/s)

dAtA / 8n1 — data (serial communication data format):
Range: 8n1,8n2,8e1,8o1

nodE / rtU — Mode (modbus communication mode):
Range: RTU, ASCII

toUt / 10 — tout (communication timing out):
Range: 5~99 sec.

LEVEL 3 (I/O)

intY / H3 — Inty (Input Type):
Change type of input sensor. Range: K1~AN50

Pnt / 0 — Pnt (Decimal Point):
The decimal place of analog inputs. Range: 0 ~ 3.

SSEL / rSu — SSEL (Sv Select)(optional):
To select the panel SV or RSV as the target value.

SuCm / 0 — SvCm (SV Compensation Quantity):
Range: -999 ~ 999

PuCm / 0 — PvCm (PV Compensation Quantity):
Range: -999 ~ 999

A1FU / 2 — A1Fu (Alarm1 Function):
Refer to Alarm Output. Range: 00 ~ 24

A1tr / 0 — A1T (Alarm1 Time):
Refer to Alarm Output . Range: -1999 ~ 9999 (sec.)

> For models with multiple alarm outputs, there are still settings for A2Fu, A2Tr, A3Fu, and A3Tr, whose functions are the same with the above. Descriptions are omitted.

AHYS / 0000 — AHYS: (Alarm Hyteresis): Functions at single side 17 ~ 24 of alarm function
Off Delay Range: 0~1000

in1L / 0 — in1L (Display Setting of the Low of Analog Input):
Range: -1999~9999

in1H / 1000 — In1H (Display Setting of the High of Analog Input):
Range: -1999~9999

Su L / 0 — Sv L (SV Low Setting):
Range: based on input specs of K1 ~ An50.

Su H / 600 — Sv H(Sv High Setting):
Range: based on input specs of K1 ~ An50.

in2L / 0 — in2L: [Setting of the low of analog input 2 (RSV, CT)]:
Range: -1999 ~ 9999

in2H / 1000 — In2H [Setting of the high of analog input 2 (RSV, CT)]:
Range:-1999~9999

Co1L / 2 — Co1L (Correction of Out1 Low):
Range: 2 ~ 9000

Co1H / 4000 — Co1L (Correction of Out1 High):
Range :0~4000

Co2L / 2 — Co2L (Correction of Out2 Low):
Range: 2~9000

Co2H / 4000 — Co2H (Correction of Out2 High):
Range: 0~4000

o3tY / Pu — o3ty (Target of Out3 Retransmission):
Range: Pv, Out1, Out2

Co3L / 0 — Co3L (Correction of Out3 Low):
Range: 0~9000

Co3H / 4000 — Co3H (Correction of Out3 High):
Range: 0~4000

o3 L / 0 — o3 L (Low Display Setting of Out3):
Range: -1999~9999

o3 H / 1000 — o3 H (High Display Setting of Out3):
Range: -1999~9999

Unit / C — Unit (unit setting):
Range:C~F。

■ Alarm Output

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 disabled. 25 & 26 are exclusive alarm output for process control. [*1]

Code 01,02: Relative high alarm		Code 03, 04: Relative deviation high
ON / OFF — SV-ALM, SV, SV+ALM		ON / OFF — SV, SV+ALM
Code 05,06: Deviation low alarm	Code 07, 08: Relative deviation low	
ON / OFF — SV-ALM, SV, SV+ALM	ON / OFF — SV-ALM, SV	
Code 09,10: Band alarm	Code 11, 12: Low alarm	Code 13, 14: High alarm
ON / OFF — SV-ALM, SV, SV+ALM	ON / OFF — SV-ALM, SV	ON / OFF — SV, SV+ALM
Code 15,16: Deviation high/low	Code 17,18: Deviation low alarm	Code 19, 20: Deviation high alarm
ON / OFF — SV-ALM, SV, SV+ALM	ON / OFF — SV-ALM, SV	ON / OFF — SV, SV+ALM
Code 21, 22: Process low alarm	Code 23, 24: Process high alarm	Code 25, 26: Process Control
ON / OFF — ALM (*2)	ON / OFF — ALM	(*3)

*1.
The control can provide at most 2~3 alarms. Each alarm has settable parameters of alarm modes and output time.
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 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: −5 ~ -1999 sec.

*3. For models with process control, if AL1~AL3 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~AL3 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.

Auto-Tuning employs the measure of Relay ON-OFF to detect the dynamic characteristics of the Process, and compute the best collocation of P.I.D. parameters 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 ◀A/M for 2 sec. (forcing to Manual mode).

■ Self-Tuning

Self-Tuning function adjusts the output itself to reduce overshoot according to the change of the dynamic characteristics of the Process (time-varying system). During Self-Tuning, Parameters of P.I.D. will not be changed. Yet, the parameters of P, I, D and ARW can not be set as 0.
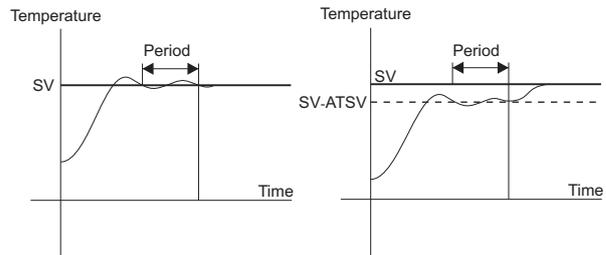
■ Heating/Cooling Control (applicable to models with 2 outputs)

Out1(heating) and Out2(cooling) can be set for the controlling of gap or overlap through the parameter "dbnd".
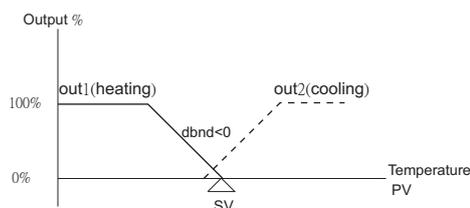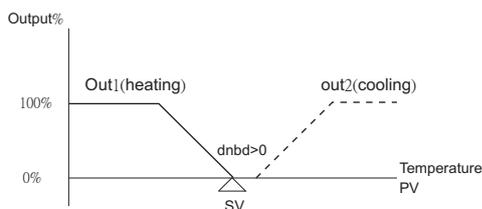
■ Adjusting Output Manually

Hold ◀A/M for 2 sec. to enter Manual mode, and then press ◀A/M to start adjusting.
Range: 0.0 ~ 100.0% (or 0.0 ~ -100.0% for Out2)

```
noUt
100.0
```

# Temperature Controller Instructions

■List of Input Types

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,....)				

■Cut-out and Mounting (Unit: mm)

P10 CUT OUT — 30 — 45.0+0.2 — 45.0+0.2 — 30

P20,P30 CUT OUT — 30 — 44.3+0.2 — 90.3+0.2

P50 CUT OUT — 30 — 68.0+0.2 — 68.0+0.2 — 30

P60 CUT OUT — 30 — 90.5+0.2 — 90.5+0.2 — 30

8   86
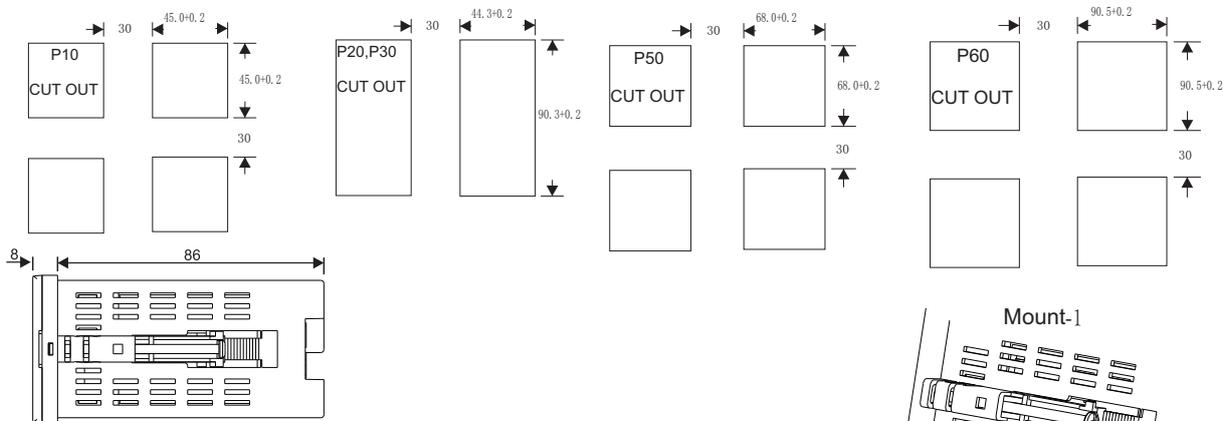
Mount-1

Mount-2

There are 2 methods to mount the controller:
1. (Figure Mount-1) First, mount the controller to the (ready cut) panel, then, insert the fixing racks to the side gaps of the controller. Last, push the rack forward till fixed. (Or, rotate the screw till it reach the panel, and then use the screwdriver to tighten it.)
2. (Figure Mount-2) Push the fixing rack backward, and then tighten it forward with the screwdriver.

■Error Message

OPEn: Sensor input terminal disconnected
OL,-oL: Input overloaded
CJER: Cooling / heating compensation error
AdEr: Interior circuit error
M Er: Memory error

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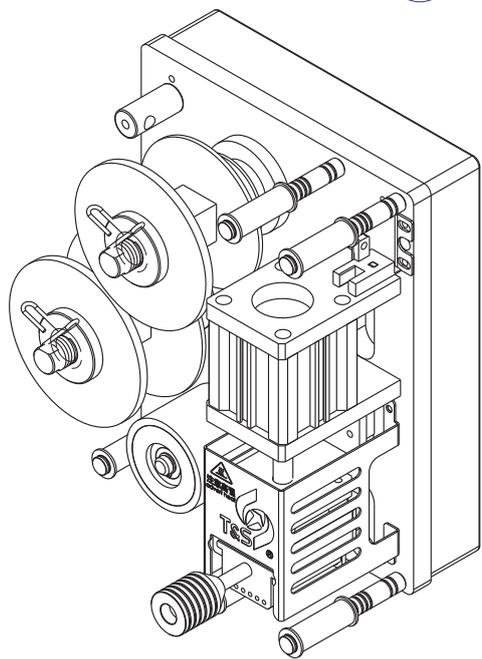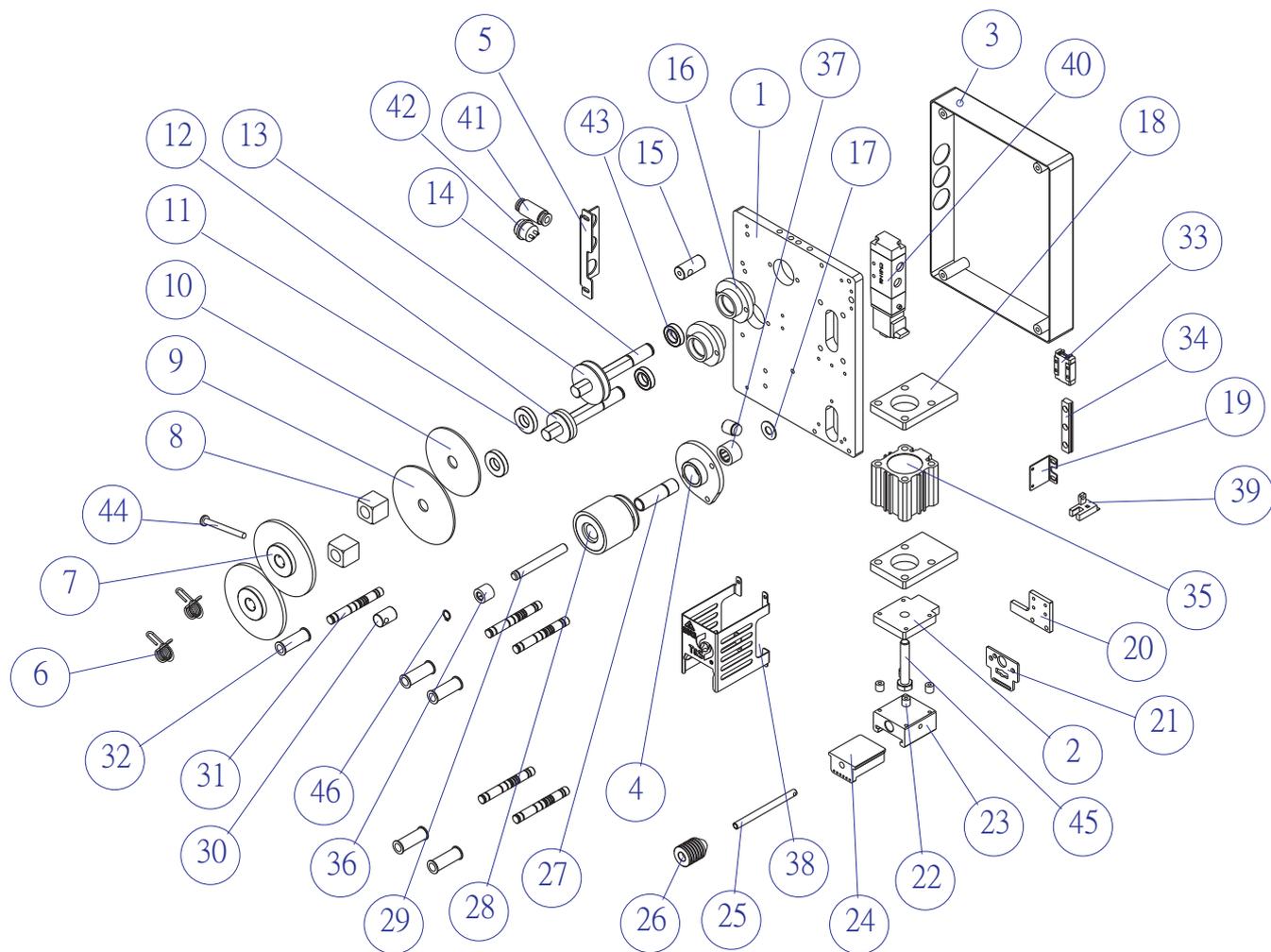
Exploded Part Chart

Electrical schematic

HOST

(8P Connector)

8P-1	(R1)Heater
8P-2	(S2)Heater
8P-3	(+)K Type Temperature
8P-4	(−)K Type Temperature
8P-5	(11)SolenoidValve
8P-6	DC24V Share Point
8P-7	(3)Belt detector signal
8P-8	DC0V Share Point

Solenoid Valve

Start Signal input

Belt detector (OMRON EE-SX672)

Control case

K Type Temperature

Heater

Thermostat

Control Unit

SW1 set up
110V
220V
SW1

JP1

CN2

CN6

CN7

CN8

CN9

CN3

CN5

CN4

CN1

VR

Buzzer

Adjustable Resistance

3P-3
3P-2
3P-1

8P-7
8P-8
8P-6