SonicWise Ultrasonics

Instruction Manual -Model SW-288H

Ultrasonic Cleaning

Ultrasonic cleaning is based on the phenomenon known as cavitations. In an ultrasonic tank, cavities (or bubbles) are formed by piezoelectric transducers attached to the bottom or sides of a cleaning tank. The piezoelectric effect occurs in a certain group of crystalline solid materials, which have no center of symmetry. When these materials are mechanically stressed, they produce an electric charge, and when an electric field is applied across two poles, the dimensions change. By applying high frequency (20-80Khz) and high voltage, these elements expand and contract rapidly at a rate proportional to the frequency of the applied voltage. As a result of the contraction and expansion, the pressure inside the liquid changes from negative to positive with respect to atmospheric pressure. During the contraction, the pressure in the liquid is negative, allowing the cavities inside the liquid to grow in size, subsequently at the next phase of expansion the pressure in the liquid becomes positive, which causes the cavities to explode internally. The creation and the implosion of cavities cause an intense scrubbing action upon a submerged object. The sizes of the bubbles are microscopic, and can therefore penetrate the smallest cracks and holes to loosen the contaminants and remove them.

All ultrasonic cleaners have three main components:

- Ultrasonic generator or power supply that converts electrical energy from the wall (120VAC/60Hz) to high voltage and high frequency, which is then applied to ultrasonic transducers.

- Ultrasonic transducers convert high voltage and frequency to mechanical vibration.

- A cleaning tank that receives the mechanical energy and causes the cleaning media pressure to rise above and bellow the atmospheric pressure, thereby causing the formation and collapse of bubbles in the liquid. This process produces an intense scrubbing action that removes sediments from the submerged parts.

Q and A

What is "cavitation"?
"Cavitation" is the rapid formation and collapse of millions of tiny bubbles (or cavities) in a liquid. Cavitations is produced by the alternating high and low pressure sound waves .During the low-pressure phase, these bubbles grow from microscopic size until, during the high-pressure phase, they are compressed and implode.

What is "degassing", and why should it be done?
"Degassing" is the initial removal of gases present in the solution. Useful cavitations occur after gasses have been removed from the cleaning solution, leaving a vacuum in the formed bubble.

When the high-pressure wave hits the bubble wall, the bubble collapses; it is the energy released by this collapse that will assist a detergent in breaking the bonds between parts and their soils.

How do I get the best ultrasonic cleaning?
There are many considerations important to ultrasonic cleaning. Optimizing these variables will produce the best cleaning. The most important decisions to be made are choosing the proper cleaning solution, cleaning at the right temperature for the correct amount of time, and choosing the right size and type of ultrasonic cleaner.

Can ultrasonic cleaning damage my parts?
With certain cautions, ultrasonic cleaning is considered safe for most parts. While the effects of thousands of implosions per second are very powerful, the cleaning process is safe since the energy is localized at the microscopic level. The most important cautionary consideration is the choice of cleaning solution. Potentially adverse effects of the detergent on the material being cleaned will be enhanced by the ultrasonics.

Why is a special solution required for cleaning?
Soils adhere to the parts... if they didn't, the soil would just fall off the parts! The purpose of the solution is to break the bonds between parts and their soils. Water alone has no cleaning properties. The primary purpose of the ultrasonic activity (cavitations) is to assist the solution in doing its job. An ultrasonic cleaning solution contains various ingredients designed to optimize the ultrasonic cleaning process. For example, increased cavitations levels result from reduced fluid surface tension. An ultrasonic solution will contain a good wetting agent or surfactant.

What cleaning solution should I use?
Modern ultrasonic cleaning solutions are compounded from a variety of detergents, wetting agents and other reactive components. A large variety of excellent formulations are available, designed for specific applications. Proper selection is crucial for acceptable cleaning activity and to preclude undesirable reactivity with the part being cleaned.

What cleaning solution shouldn't I use?
Flammables or solutions with low flash points should never be used. The energy released by cavitations is converted to heat and kinetic energy, generating high temperature gradients in the solution, and can create hazardous conditions with flammable liquids. Acids, bleach and bleach by-products should generally be avoided, but may be used with indirect cleaning in a proper indirect cleaning container, such as a glass beaker, and appropriate care. Acid and bleach will damage stainless steel tanks, and/or create hazardous conditions.

When should solutions be changed?
Cleaning solutions should be replenished when a noticeable decrease in cleaning action occurs, or when the solution is visibly dirty or spent. A fresh batch of solution at each cleaning session is usually not required.

What is the length of cleaning time?
Cleaning time will vary, depending on such things as soil, solution, temperature and the degree of cleanliness desired.

WARNING!

1. Use a three-prong outlet with proper grounding and proper voltage.
2. Do not immerse this unit in liquid.
3. **Do not operate without liquid.** Always use <u>at least</u> **FOUR** inches of liquid.
4. Do not use flammable liquids with this cleaner.
5. Do not use corrosive chemicals, which are not compatible with the cleaning tank material (stainless steel, grade 304/316).
6. **DO NOT drop or set heavy objects on the bottom of cleaning tank.** Doing so may cause permanent damage to transducer elements. Instead, use a basket, a tray or other means of suspending the parts to be cleaned.
7. Use adequate ventilation. Keep the area around your cleaner dry and clean.
8. Do not disassemble the cleaner. There is high voltage inside the cleaner.
9. Do not place your fingers in the ultrasonic cleaning tank when it is in operation.

OPERATING INSTRUCTIONS

1) Place your ultrasonic cleaner in a well-ventilated and level surface.
2) Fill in the tank with water or your cleaning solution. Make sure that the level of cleaning liquid is at least **4** inches above the bottom of the tank.
3) Plug in the unit to a properly grounded power outlet (120VAC 50/60Hz).
4) Push the ultrasonic switch to ON position. To start the time cycle, press RST (far right black button). The timer is set for 15 minutes. To change the time, use the RIGHT black arrow button to position for no of minutes and seconds and then press the UP-yellow arrow button. (Refer to digital timer instruction manual).
5) There is a separate ON/OFF switch provided for the heater. Temperature is set for 140 degree Fahrenheit. To change the setting, simply press the "AT" button and use the UP and DOWN arrow to set your desired temperature. (Refer to digital temperature instruction manual).
6) When starting with fresh solution, allow 3-5 minutes for the liquid to degas before submerging the basket or other parts. Degassing times vary based on the temperature level and the type of liquid being used. For maximum cleaning efficiency the cleaning liquid must contain as little dissolved gas as possible. When bubbles of gas no longer rise to the surface of the liquid, the degassing process is completed. Using appropriate detergents or chemicals may speed up the degassing process and create better cleaning results. Selecting the right cleaning liquid is very important to the overall cleaning process. There are cleaning chemicals, which are specially formulated for use with ultrasonic cleaners. Upon request, *SonicWise* will suggest a suitable cleaning solution for a particular cleaning application.

7) Place the item to be cleaned into a basket and slowly lower it into the cleaning tank. When the items are clean, slowly remove the basket from the tank and rinse the parts with clean water and dry them if necessary.

8) The cleaning time may vary depending on the following: A) the type of contamination, B) the type of solution being used, C) the temperature of the liquid, D) the density of the parts, E) the material the parts are made of, and F) the load of parts being cleaned. Cleaning time could range from one to several minutes.

9) Overloading the cleaning tank with parts will reduce the cleaning intensity and efficiency. For maximum cleaning results, it is recommended not to load the tank with more than half the volume of the cleaning liquid. It is more efficient to run several small loads than one big load.

10) The parts could be cleaned in two ways. The first way is to place the parts in a perforated basket and place the basket into the cleaning tank filled with the cleaning solution. The second is to place the parts in a separate solid tray or beaker filled with the cleaning solution and place it into the cleaning tank filled with water.

11) Ultrasonic action may damage delicate instruments and certain materials. *SonicWise* will not be responsible for any damages, which are caused by using ultrasonic action or the overall ultrasonic process.

Please email us any questions you may have on using your ultrasonic cleaner. Email address is: tech@sonicwise.com

Maintenance

1. Check the tank for contamination whenever you change solution. If necessary, remove contaminants with a nonabrasive cloth and water.

2. Always unplug the cleaner before emptying the tank. Empty the solution into a waste disposal unit.

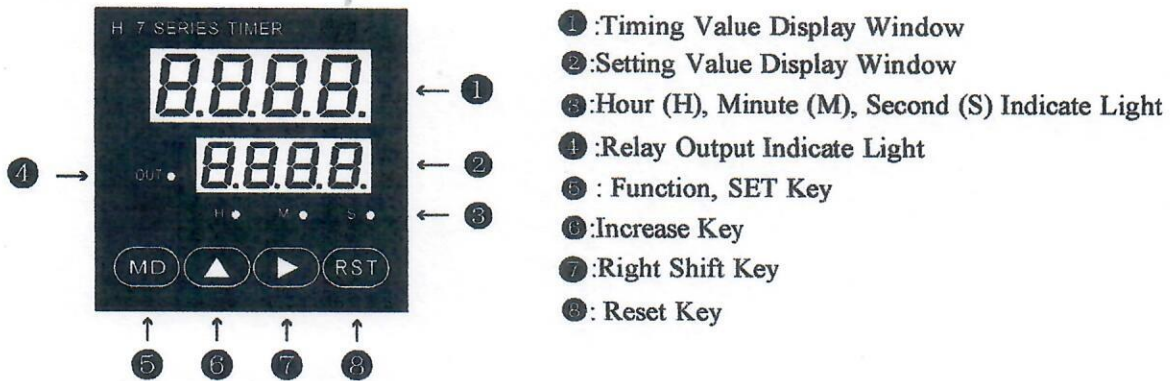*3.* Always unplug the line cord before filling the tank. Fill the cleaner to the operating level

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Digital Timer Technical Specification

Power Supply	220/110VAC±10% 50/60Hz (HP4 just for 220V power supply)
Power Consumption	≤3VA
Mounting Mode	Panel Mount
Timing Range	0.01-99.99S、0.1-999.9S、1-9999S、1-99M59S、0.01-99.99M、0.1-999.9M、
	1-9999M、1-99H59M、0.01-99.99H、0.1-999.9H、1-9999H
Timing Accuracy	±0.1%±0.05sec
Reset Mode	Panel reset, External Connection reset, Auto Reset or Power OFF Reset can be chosen
Input Signal	low level effective
Terminal Capacity	3A/250VAC or 6A/30VDC
Pulse Interference (AC)	±1.8KV
Dielectric	AC 1500V 1min
Insulation Impedance	DC 500V ≥ 100MΩ
Ambient Humidity	≤85% RH
Ambient Temperature	0~50℃

Panel Indication

①:Timing Value Display Window
②:Setting Value Display Window
③:Hour (H), Minute (M), Second (S) Indicate Light
④:Relay Output Indicate Light
⑤: Function, SET Key
⑥:Increase Key
⑦:Right Shift Key
⑧: Reset Key

Operation Sequence

● Function Menu

Menu Sequence	Menu Function	Setting Range
Timing Status — Press MD 3S	Under the condition of timing status, press (MD) more than 3S to enter into function menu, after parameter modification, press (MD) for a long time to back to timing status. If there is no any operation for more than 10S, the meter will return back to the timing status automatically (the modification will not be saved)	
r An 1 / 99.99 / MD	**r An 1** : Timing value range choose menu, lower line LED display Max timing value, H,M,S indicate light seperately to show the relative units.	99.99S → 999.9S → 9999S → 99M59S → 99.99M ↓ 9999H ← 999.9H ← 99.99H ← 99H59M ← 9999M ← 999.9M
r An2 / 99.99 / MD	**r An2** : Delay time range choose menu, lower line LED display Max delay time value, H,M,S indicate light seperately to show the relative units. (F,N mode without this menu)	99.99S → 999.9S → 9999S → 99M59S → 99.99M ↓ 9999H ← 999.9H ← 99.99H ← 99H59M ← 9999M ← 999.9M
U - d / U / MD	**U - d** : Timing mode choose menu	**U** Add Timing Mode: Timing count value increase from 0 to setting value **d** Minus Timing Mode: Timing count value decrease from setting value to 0
ı nt / 20 / MD	**ı nt** : Effective pulse width of Input signal choose menu.	**ı** : 1mS **20** : 20mS
oUt / n / MD	**oUt** : Output Mode choose menu	**n** : N Mode → **F** : F Mode **C** : C Mode ← **r** : R Mode
StA / no / MD	**StA** : Start function	**YES** : With start function, after power should press ▲ or short connect PAUSE terminal, the meter start to work. **no** : Without start function, the meter will work after power on.
Hold / YES / MD	**Hold** : Power OFF data save choose menu	**YES** : Power Off Data save function **no** : Without Power Off Data save function
LoCk / L-0 / MD	**LoCk** : Lock key menu	**L-0** : Without Lock function **L-1** : Lock Panel reset **L-2** : Lock setting value menu + function menu **L-3** : Lock panel reset + setting value menu + function menu

● Setting Value Modify Menu

Menu Sepuence	Menu Function	Setting Range
Timing Status ⏵	Under the condition of Timing status, press ⏵ to enter into setting value modify menu.	
t.oFF 8888 MD	t.oFF :Relay Timing value setting menu When Timing value≥T.off setting value, Relay ON.	The parameter can be setting freely between 0.01S-9999H according to the differnet timing range that you choosed in function menu rAn1
t.on 8888 MD	t.on : Output delay setting menu, relay will reset after Relay OFF time≥T.on setting value. (N,F mode without this menu)	The parameter can be setting freely between 0.01S-9999H according to the differnet timing range that you choosed in function menu rAn2

MYPIN

TD Series Temperature Controller

Instruction Manual

Thanks a lot for selecting the product!

Before operating this instrument, please carefully read this manual and fully understand its contents. If any probroms please contact our sales or distributors whom you buy from.

This manual is subject to change without prior notice.

▣ Warning

Please do not turn on the power supply until all of the wiring is completed. Otherwise electrical shock, fire or malfunction may result.

Do not wire when the power is on. Do not turn on the power supply when cleaning this instrument. Do not disassemble, repair or modify the instrument. This may cause electrical shock, fire or malfunction.Use this instrument in the scope of its specifications. Otherwise fire or malfunction may result.The use life of the output relay is quite different according to is capacity and conditions. If uйput of its scope, fire or malfunction may result.

Caution

This instrument should be installed in a domestic environment.

Otherwires electricla shock, fire or malfunction may result. To avoid using this instrument in environment full of dust or caustic gas.

To avoid using this instrument in environment of strong shock or concussion.

To avoid using this instrument in environment of overflow water or explosive oil.

The power supply wire should not put together with large-current wire to avoid electromagnetic radiation, If it must to put together, we suggest to use a individual pipe.

In case the instrument is used in environment of strong noise, (such as motor, transformer, solenoid, etc.) A current suppresser orныise filter should be used.

Applications

TA series of temperature controller is available for many TC or RTD input, adopt some advanced technology such multi digital filter circuit, autotune PID, fuzzy PID that make it is very precise, stable, strong anti-interfence and simple operation. The instrument is widely applied to automation systems of mechanism, chemical industrial, chinaware, light industrial, metallurgy and petroleum chemical industrial. It is also applied to the production line of foodstuff, packing, printing, dry machine, metal heat process equipment to control the temperature.

▣ Panel
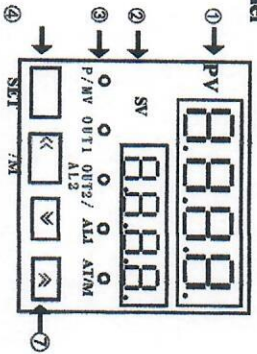
① PV / parameter symbols
② SV / parameters preset value
③ Indication lamps
OUT1: Heating/Main control output lamp
On: Output   Off No output
OUT2/AL2: Colling/Alarm 2 output lamp
On: Output Off: No output
AT/M: On: manual operation Off: auto operation
Flash: under autotuning estate
P/MV: SV/MV display setting
On: MV manual output Off: SV setting
AL1: Alarm 1 lamp   On: Alarm Off: No Alarm
AL2: Alarm 21 lamp On: Alarm Off: No Alarm
④ Set Key Parameter Setting/Changing
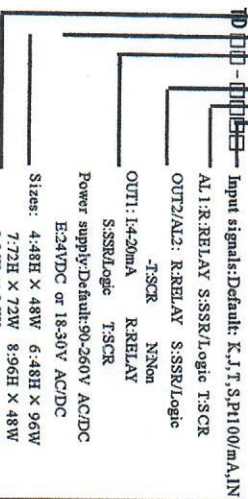⑤.Shift/Autotune Key   Press this key to shift digit of parameter value setting. Or hold this key for more than 3 seconds can enter/quit autotune estate. When enter autotune estate, AT lamp on. When quit autotune estate, AT lamp off.
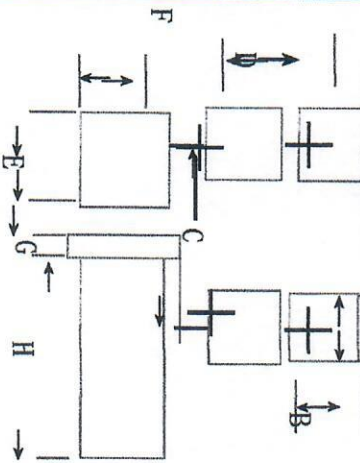⑥. Up key   ⑦. Down key

Models

TD□□ - □□□□□

Input signals:Default: K,J,T,S,Pt100,mA,IN
AL1:R:RELAY S:SSR/Logic T:SCR
OUT2/AL2: R:RELAY S:SSR/Logic
OUT1:I:4-20mA   -T:SCR
S:SSR/Logic   -T:SCR
Power supply:Default:90-260V AC/DC
E:24VDC or 18-30V AC/DC
Sizes: 4:48H × 48W 6:48H × 96W
7:72H × 72W 8:96H × 48W
9:96H × 96W

TA series of temperature controller

▣ Specifications

Power supply	90-260V AC/DC 50/60Hz		
Consumption	≤5VA		
Display range	-199~1800°C		
Accuracy	0.3%F. S ± 2digit		
Sampling cycle	≤300ms		
Main output	RELAY: normal open AC 250V/3A DC 30V/3A COS ¢ =1 SSR/LOGIC: 24V DC · 12V/30mA		
Alarm	RELAY: normal open AC 250V/3A DC 30V/3A COS ¢ =1 SSR/LOGIC : 24V DC 12V/30mA		
Input	T/c	K	0~999°C /0~1200°C
		J	0~999°C /0~1200°C
		T	-150~400°C (Special order)
		S	0~1600°C
		E	0~1000°C
	Rt	Pt100	-199~600°C
		Cu50	-50~150°C
	mA	mA	4~20mA
	mV	mV	0~75mV
	Withstand voltage strength	1500V rms (Between power terminal and the housing)	
	Insulation resistance	Min 50M Ω (500V DC)(Between power terminal and the housing)	
	Environment temperature	0~50°C	
	Environment humidity	-35~85%RH	
	Save temperature	-10~60°C	
Weight	≤350g		

▣ Mounting and Sizes

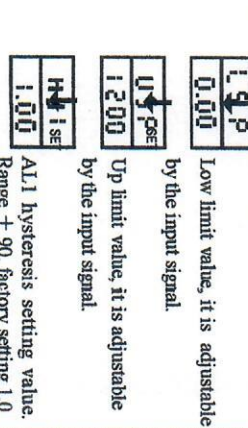| size Model	A	B	C	D	E	F	G	H
TD4	44.5±0.5	45±0.5	65	65	48	48	8	80
TD6	43.5±0.5	91±0.5	115	65	48	96	12	80
TD7	91±0.5	91±0.5	115	115	96	96	12	100
TD8	91±0.5	43.5±0.5	65	115	96	48	12	80
TD9	67.5±0.5	67.5±0.5	95	95	72	72	12	100

▣ Parameter Setting &Autotuning

☆ Parameters setting:
A: In display estate, press SET,P,MV lamp on means SV setting, while off means MV manual output seting,but only on manual operation & input connect do MV settable. B: Press the <</ M key to select the digit you want to modify; D: Press ∧ and ∨ key to modify the numerals; D: Press SET key to confirm.
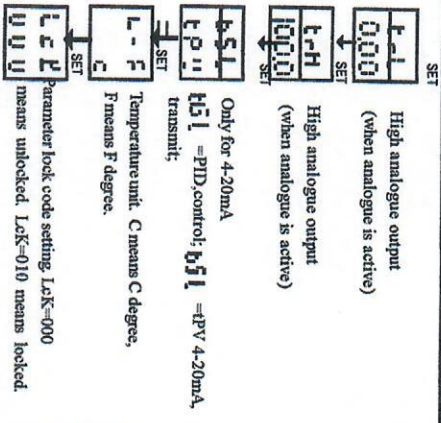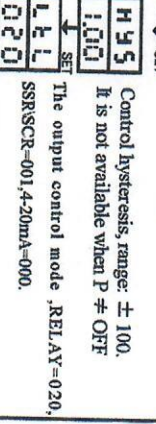☆ In autotuning estate,output value modification is impossible.
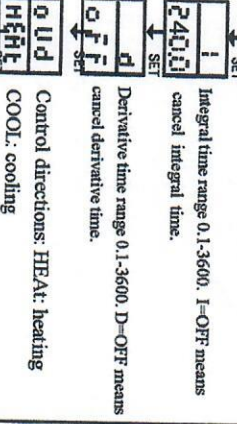☆ Autotuning operation.

In display estate,press SET and <</M key at the same time until AT/M lamp flahses. Then the instrument is under autotuning estate.Press again to quite.

Power on → Self-check

8.8.8.8.
8.8.8.8.

All LED on

1.2.0.0.s   Input type

0.0   Input up limit

1:00.0   Input low limit

100.0   Measured displaying

2.4.0   Set displaying

2 5.0.s   SET Shift and flashes

100.0   Stop flashing
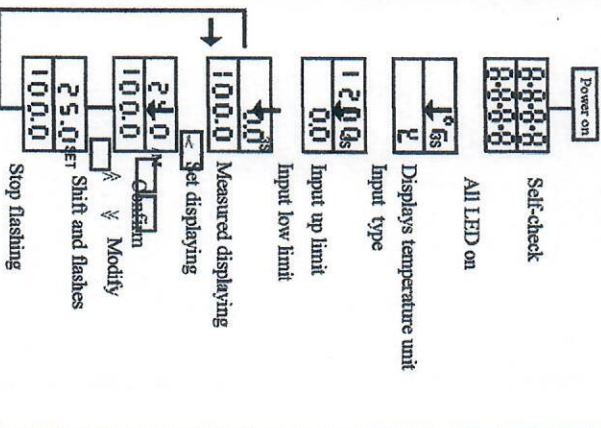
In Manual operation/Non-autotune estate, press and hold ∧/∨ key for more than 3 seconds to enter/quit the below menu for display range settings.

L 5.P   Low limit value, it is adjustable by the input signal.

U 5 P   Up limit value, it is adjustable by the input signal.

AL 1   AL1 hysteresis setting value. Range ± 90, factory setting 1.0

HYS i.UU — AL2 hysteresis setting value. Range ± 90, factory setting 1.0

dP 0 — Decimal point setting: 0: No decimal 1: One decimal

SiS 5.i.5 — Password setting Factory setting 015

AL2 2 — AL1 mode: 0: Deviation HI alarm 1: Deviation LO alarm 2: Absolute value LO alarm 3: Absolute value HI alarm 4: Section inside alarm 5: Section outside alarm 6: TC broken

ALL1 900 — AL1 set range: –1999-9999

inP 0.00 — AL2 set range: –1999-9999.

PVF 0.00 — Range: ± 100.Display value PV = Measured value - PVF

P 30.0 — Input signal selection TC: K, J, I, E, S RTD: Pt100, Cu50 The factory setting is K

I 240.0 — Proportional band (%)range 0.1-3600. If P=OFF, it means ON/OFF control

d OFF — Integral time range 0.1-3600. I=OFF means cancel integral time.

oud HEAt — Derivative time range 0.1-3600. D=OFF means cancel derivative time.

HYS i.00 — Control directions: HEAt: heating COOL: cooling

LLL 020 — Control hysteresis, range: ± 100. It is not available when P ≠ OFF

The output control mode , RELAY=020, SSR/SCR=001,4-20mA=000.

Note:

Manual/Auto Convertion: In display estate,press <</M to

Parameter lock code setting: LcK=000 means unlocked. LcK=010 means locked.

tSi =PID control, **tSi** =rPV 4-20mA,

Temperature unit. C means C degree, F means F degree.

Only for 4-20mA

High analogue output (when analogue is active)

High analogue output (when analogue is active)

means autotuning.

For the very first time, please press SET and <</M key until AT/M lamp flash to enter autotuning estate.In the future,if the load/control temp. point changes in small value changes within ± 30℃), the user no need to let it autotuning again. Because the instrument has recorded the previous PID parameters. When the instrument is used for huge capacity heating equipments, the user should set autotuning value lower 5%-10% than the normal control value, in order to decrease the exceed-tuning caused by control.

Normally, the control cycle of the heating equipment should be 20-30 seconds. For huge capacity heating equipments, the value should be 30-120 seconds, in order to longer the use life of the relay. For non-contact output, such as SSR control output, the value should be 1-3.

■ Terminal configurations
(If any changed, please refer to the product showing.)

TD4
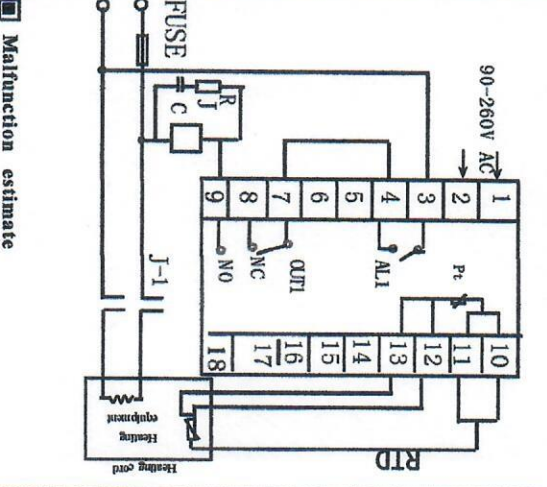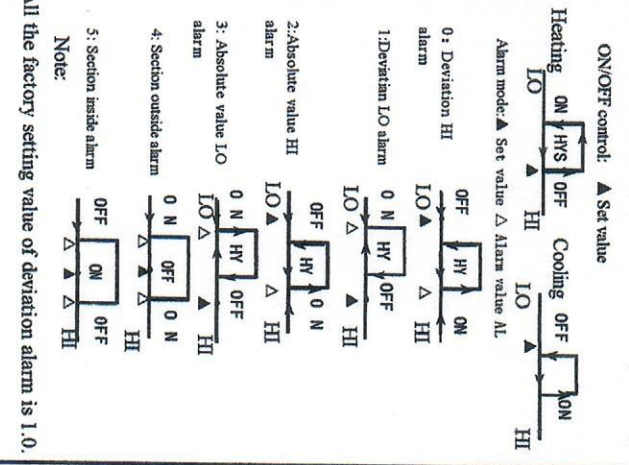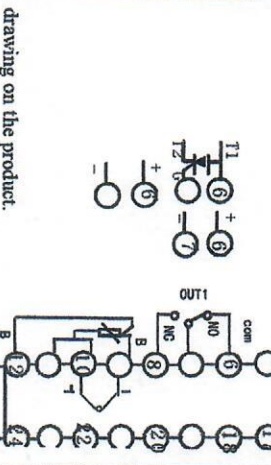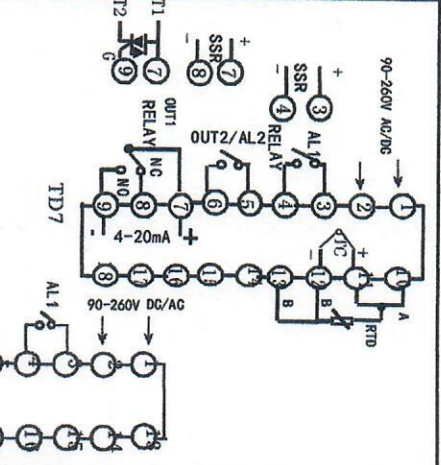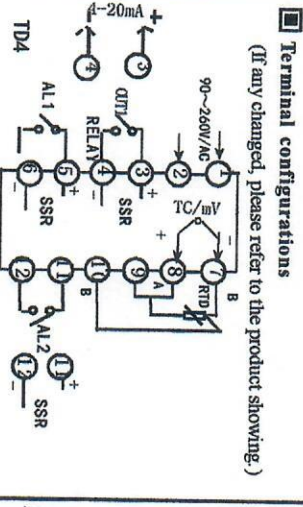
■ Application examples

1.Relay output control (for TA9)

■ Malfunction estimate

correct. Specially pay attention to the power supply terminals and signal input terminals.

② Incorrect Display: Check if the input signal is conformity with the selected symbol.
For TC input, please use the relative compensation cable.
For RTD input, please use low impedence cable. The 3 wires should at the same length.
If all above mentioned is collect, please use parameter PVF to modify.

③ Incorrect Control : If the instrument has been used for a long time, the user find the temperature is hard to rise up to the set value, meanwhile the outsidesystem running well, there must be something wrong with the parameters of the instrument.
The user need to re-autotuning the instrument. If the instrument lost control, please check if the connection of the control is correct. If external load is shorted, broken, wrong connection or compo-nents is damaged, it will cause lost control as well. When it is necessary, please push out the PCB to check the if the output terminals is damaged and not available.
④ Display malfunction: "UUU": The input signal exceed the measured HI range .

ON/OFF control: ▲ Set value

Heating

Alarm mode: ▲ Set value △ Alarm value AL

0: Deviation HI alarm

1:Deviation LO alarm

2:Absolute value HI alarm

3: Absolute value LO alarm

4: Section outside alarm

5: Section inside alarm

Note:
All the factory setting value of deviation alarm is 1.0.