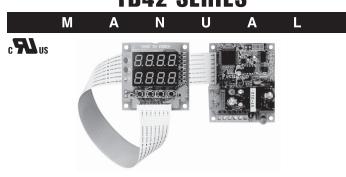
# **BOARD TYPE TEMPERATURE CONTROLLER** TB42 SERIES



Thank you very much for selecting Autonics products. For your safety, please read the following before using.

## Caution for your safety

\*Please keep these instructions and review them before using this unit.

\*Please observe the cautions that follow;

**Marning** Serious injury may result if instructions are not followed. ⚠ Caution Product may be damaged, or injury may result if instructions are not followed.

\*The following is an explanation of the symbols used in the operation manual. ▲ caution:Injury or danger may occur under special conditions.

## 

- In case of using this unit with machineries(Nuclear power control, medical equipment, vehicle, train, airplane, combustion apparatus, entertainment or safety device etc), it requires installing fail-safe device, or contact us for information on type required.
  It may result in serious damage, fire or human injury
- 2. This unit must be mounted on panel.
- 3. Do not repair or checkup when power on
- 4. Do not disassemble and modify this unit.
- Please contact us when it requires.
  It may give an electric shock and cause a fire

# **⚠** Caution

- 1. This unit shall not be used outdoors.
- might shorten the life cycle of the product or give an electric shock 2. Please observe specification rating.
- It might shorten the life cycle of the product and cause a fire.

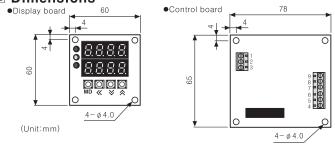
  3. Do not use the load beyond rated switching capacity of Relay contact.

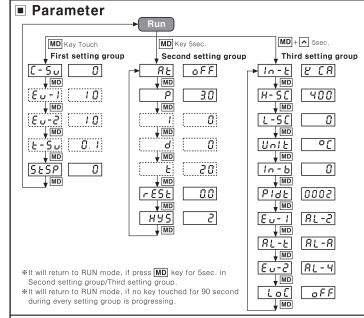
- 4. In cleaning the unit, do not use water or an oil-based detergent.

  It might cause an electric shock or fire that will result in damage to the product.

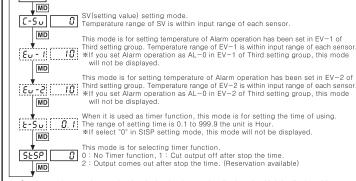
  5. Do not use this unit at place where flammable or explosive gas, humidity, direct ray of the sun, radiant heat vibration, impact etc.
- 6. Do not inflow dust or wire dregs into inside of this unit.
- Please wire properly after checking the polarity of terminals when connect thermocouples.

# Dimensions





# Flow chart for first setting group

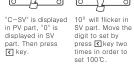


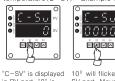
- \*Once enter into setting mode, the decimal point can be displayed, which is displayed by range of using temperature sensor but it doesn't influence on the function.

  \*The value in every setting mode is factory specification.
- ※Entering parameter is not available in transmission output type

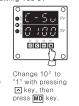












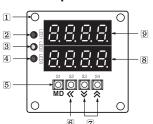


Now SV value is set, then move to EV-1 by pressing MD key again.

\* The above specifications are subject to change and some models may be

Model		TB42		
Power supply		100-240VAC 50/60Hz(90 to 110% of rated voltage)		
Power consumption		Approx. max. 5VA		
Input sensor		<ul> <li>Thermocouple: K(CA), J(IC) (Tolerance of outer resistance is max. 100 Ω)</li> <li>RTD: Pt100 Ω 3 wires (Allowable line resistance is max. 5 Ω per a wire)</li> </ul>		
Control method		ON/OFF control(Hysteresis is adjustable)    P, PI, PD, PIDF, PIDS		
Control output		• Relay contact output:250VAC 3A 1a • SSR output:12VDC ±3V Load 600 \( \Omega\$ min. • Current output:4-20mADC, Load 600 \( \Omega\$ max.		
Retransmission output		4-20mADC, Load 600Ω max. for PV		
Sub output		EVENT 1 output : Relay contact output(250VAC 0.5A 1a)     EVENT 2 output : OK monitor operation display by LED		
Setting m	ethod	Setting by front push buttons		
Display accuracy		±0.3% rdg based on F⋅S or 3℃ Max.		
Adjustment sensitivity		Adjustable 1 to 100℃(0.1 to 100.0℃) at ON / OFF control		
Proportional band(P)		0.0 ~ 100.0%		
Integral time(I)		0 ~ 3600sec		
Derivative time(D)		0 ~ 3600sec		
Control cycle(T)		1 ~ 120sec		
Sampling time		0.5sec. fixed		
Relay life cycle	Main output	Mechanical:Min.10,000,000 times Electrical:Min.100,000 times(250VAC 3A resistive load)		
	Sub output	Mechanical:Min.20,000,000 times Electrical:Min.200,000 times(250VAC 0.5A resistive load)		
Memory retention		10 years		
Ambient temperature		-10 ~ 50℃		
Storage temperature		-20 ~ 60°C		

## Front panel identification



Ambient humidity

Specifications

# Mounting hole Main output operation display LED:

It indicates the operation status of control output and displayed on "LED 1". But when it is current output (TB42-14C) or Retransmission output (TB42-14N), "LED 1" doesn't operate. (LED indication is OFF)

S EVENT 1 output operation display LED:
It indicates the operating status of alarm output and displayed on "LED 2".

O.K monitor operation display LED:

It indicates the operating status of alarm output and displayed on "LED 3".

After setting alarm output in EVENT 2, if execute 6 7 autotuning, O.K monitor operation will be displayed after AT function.

5 MD key: It is used to enter into every setting group or move to other setting mode.

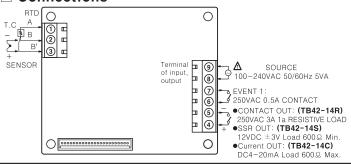
6 Shift key: It is used when change the setting value or move to digit at setting mode

To Up/Down key: It is used when change the setting value or involve to digit at setting mode.

C-SV display: The setting temperature is displayed in red. But when timer function is used, the setting time will be displayed, if time function is OFF, it will return to the setting temperature.

PV display: It displays measured temperature in green.

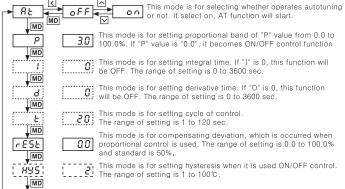
### Connections



# Alarm output

Mode	Operation	Function		
AL-A	General Alarm	No optional alarm output.		
AL-P	Alarm Latch	When alarm output turns on once, the output will keep ON continuously.		
AL-E	Standby Alarm	It doesn't output at first operation. (When it reaches to first object value)		
AL-4	Alarm Latch & Standby Alarm	It operates Alarm Latch & Standby Alarm at the same time.		

# Flow chart for second setting group

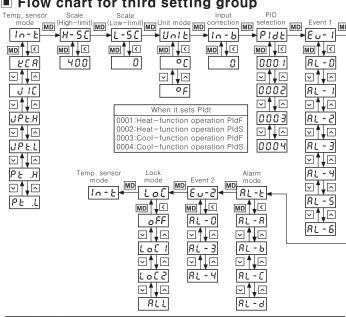


- #Only P mode and HyS mode will be displayed at ON/OFF control
- \*HyS mode will not be displayed when P, Pl, PD, PID control is used.

  \*Values in every setting mode is factory specification.

  \*Return to RUN mode in all modes when pushing a MD key for 5sec.
- Entering parameter is not available in transmission output type

# Flow chart for third setting group

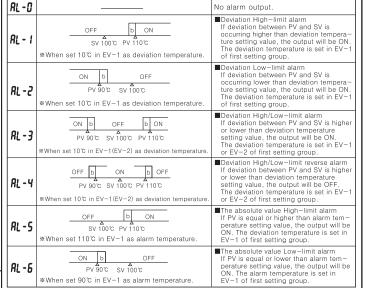


In-E	F.C.B.	Select one input sensor among 6 kinds.			
H-50	400	Setting High-limit of temperature. Setting range is within input range of each sensor.			
L-5E	0	Setting Low-limit of temperature. Setting range is within input range of each sensor			
Unit	٥.	Setting the unit of temperature and select between °C or °F.			
In-b	0	It is compensating the allowance occurred in input sensor. The range of setting is -50 to 50°C (Decimal type: -50.0 to 50.0°C).			
PIdE	5	Select PID control type among 4 kinds.			
€ ∪-1	AL- I	Select Alarm output function of EVENT1 among 7 kinds.			
AL-E	RL-R	Select Alarm output option function among 4 kinds.			
€0-2	AL-4	Select Alarm output function of EVENT2 among 3 kinds.			
LoC	oFF	Set whether it is locked or not of setting value among 4 kinds.			

★It will return to RUN Mode by pressing MD + Key for 5second in each setting Mode le to set the value by pressing 🔼 , 💟 key then press

When SV is flickered by pressing key, it is able to set the value by pressing key and move to other Mode by pressing key again.
 If no key touched for 90sec. in each setting mode, it will return to RUN Mode.

## Operation chart for alarm output



### ■ "b" means fixed 2°C as interval between ON and OFF when alarm output is operating

#### Functions

#### **○EVENT** function This function can execute as main control output and sub function as well.

EVENT1 output is relay contact consisted of 250VAC and 0.5A 1a.

There are 7 setting mode include deviation alarm and absolute alarm.
The operation of EVENT1 output is displayed on LED2 at front.

There is no terminals for EVENT2 output, it is operating as O.K monitor operation at

AL-3, AL-4 displayed in LED 3 at front.

Autotuning function

PID Autotuning function is automatically to measure thermal characteristics and response of the control object and then execute its value under high response & stability after calculating the time constant of PID required to control optimum temperature. When AT function is started, LED3 will flicker and when LED3 is OFF this operation will stop.

### ODual PID control function

One is that PV is reached at SV with fast response speed, but a little of overshoot is occurred, the other is that PV is reached at SV with slow response speed, but overshoot

1)PIDF(PID fast): This mode is applied at the machines or systems which requite stop fast response speed, and allowable a little overshoot which requite 2)PIDS(PID slow): This mode is applied at the machine which overshoot must not be occurred, because the fire can be and allowable low response time.

# ○Retransmission output(PV)

This function is to transmit the current value(PV) to external equipment such as PC or recorder etc. the output is 4-20mADC and cannot be used with control output at the same time. It will output 20mA, when PV reaches to the temperature in H-SC, and output 4mA, when PV reaches to the temperature in L-SC. Resolution is 16,000 division. (TB42-14N)

# 

If an error is occurred while the controller is operating, it will be displayed as follow. 1)"LLLL" is flickering when measured input temperature is lower than input range of the sensor. 2) "HHHH" is flickering when measured input temperature is higher than input range of  $\frac{1}{2}$ 

3) "oPEn" is flickering when the input sensor is not connected or its wire is cut.

## Proportional control has an offset because rising time is not the same as falling time, even if the unit operates normally. This function is to correct offset.

○Lock function Setting value cannot be changed by unauthorized person. There are 4kinds of lock mode

Setting value cannot be changed by unauthorized person. There are 4kinc in this unit.

1) "OFF": All modes can be changed.

2) "Loc1": All modes except Second setting group, Third setting group.

3) "Loc2": All modes except C-SV.

4) "All": All modes can not be changed.

## ○Timer function(t-Sv)

•There is no output terminal in this function, it controls main output by setting of Timer function.

Timer function

temperature. Ex)If set 5.0 to t-SV, it will start to control after 5 hours.

•When need to stop timer during operation, move to StSP mode and set "0000".

•When timer function is used, the time has been set in "t-SV" will be displayed in SV display of RUN mode.

# Input specification and temperature range

Display		Selectable temperature range °C	Selectable temperature range °F
۲	<i>[ R</i>	-100 ~ 1300 °C	−148 ~ 2372 °F
J	10	0 ~ 800 ℃	32 ~ 1472 °F
J	P.H.	0 ~ 500 ℃	32 ~ 932 °F
J	P.L	−199.9 ~ 199.9 °C	-199.9 ~ 392.0 °F
PE	: .Н	0 ~ 500 ℃	32 ~ 932 °F
Pξ	: .L	-199.9 ~ 199.9 °C	-199.9 ~ 392.0 °F
	ب ل ع ا ا	У (Я Ј I( ЈРЕ.Н ЈРЕ.L	ピ [R] -100 ~ 1300 °C  U I[ 0 ~ 800 °C  UPŁH 0 ~ 500 °C  UPŁL -199.9 ~ 199.9 °C  PŁ .H 0 ~ 500 °C

# Factory default

■ First setting group E-50 Eu- 1 10 E u - 2 10 SESP 0

Second setting group Rt off 3.0 1 ď 20 E r85E \*When it is SSR output, control cycle(t) of second setting

0 0 Un IE

H-50 400 1-50 0 ٥٢ 10-6 0 PIdE Eu-1 AL-I 8L-E 8L-8 LoC oF F

■ Third setting group

1n-E

R CB

# Caution for using

stallation environment @Pollution Degree 2 ①It shall be used indoor. ②Altitude Max. 2000m

②Altitude Max. 2000m. ③Installation Category II.

Please use separated line from high voltage line or power line in order to avoid inductive noise.

Please install power switch or circuit—breaker in order to cut power supply off.

The switch or circuit-breaker should be installed near by users.

5. Do not use this product as Volt-meter or Ampere-meter, this is a temperature controller

Be sure to use compensating wire when extends wire from controller to thermocouple, otherwise the temperature deviation will be occurred at the part where wires are connected to each other.

 In case of using RTD sensor, 3wire type must be used.

If you need to extend the line, 3wires must be used with the same thickness as the line.

It might cause the deviation of temperature if the resistance of line is different. 8. In case of making power line and input signal line close, line filter for noise protection should be installed at power line and input signal line should be shielded.

9. Keep away from the high frequency instruments. (High frequency welding machine & sewing machine, big capacitive SCR controller)

\*It may cause malfunction if above instructions are not followed.

# Main products

Photoelectric sensors Temperature controllers
Fiber optic sensors SRP/Power controllers
Door side sensors
Area sensors
Proximity sensors
Pressure sensors
Tachometer/Pulse(Rate)meters
Rodary enorgies
Testing various ■ Rotary encoders ■ Display units ■ Connector/Sockets ■ Sensor controllers ■ Switching mode power supplies

■ Control switches/Lamps/Buzzers ■ I/O Terminal Blocks & Cables Stepper motors/drivers/motion controllers

■ Laser marking system(Fiber, CO₂, Nd:YAG)
■ Laser welding/soldering system

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■ HEAD QUARTERS: 13beon-gil, Haeundae-gu, Busan, Korea

18, Bansong-ro 513beon-gil, Haeundae-gu, Busan, Korei OVERSEAS SALES: #402-404, Bucheon Techno Park, 655, Pyeongcheon-ro, Wonmi-gu, Bucheon, Gyeongji-do, Korea TEL: 82-32-610-2730 / FAX: 82-32-229-0728 ■ E-mail: sales@autonics.com

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