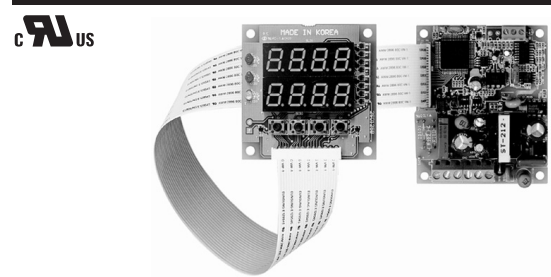


Autonics BOARD TYPE TEMPERATURE CONTROLLER TB42 SERIES

M A N U A L



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

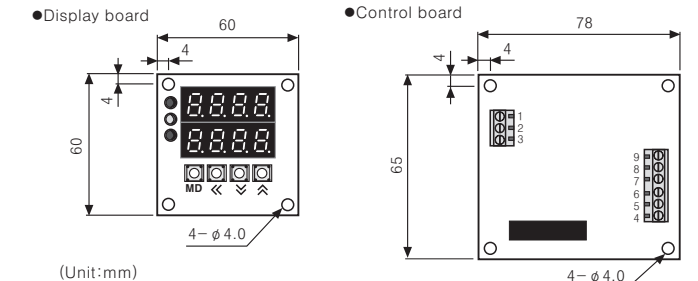
Caution for your safety

- Please keep these instructions and review them before using this unit.
- Please observe the cautions that follow:
 - Warning** 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.
 - Warning**: Injury or danger may occur under special conditions.

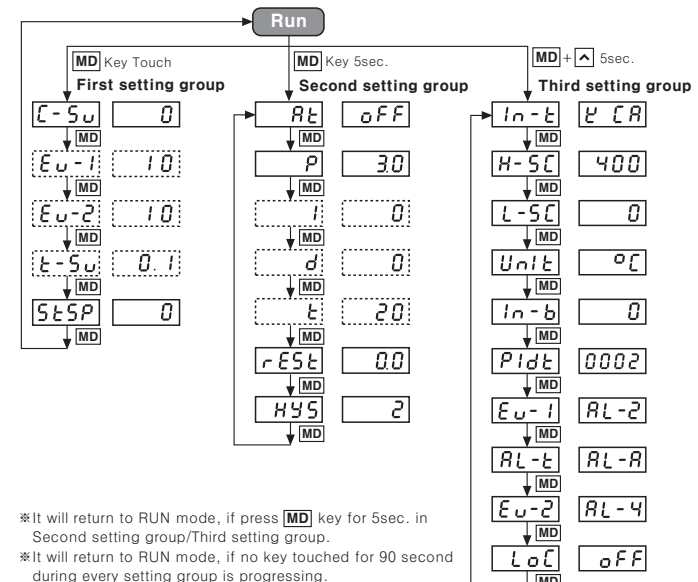
- In case of using this unit with machineries (Nuclear power control, medical equipment, vehicle, train, airplane, combustion apparatus, entertainment or safety device etc.), it requires installing fail-safe device, or contact us for information on type required.**
It may result in serious damage, fire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

- This unit shall not be used outdoors.**
It might shorten the life cycle of the product or give an electric shock.
- Please observe specification rating.**
It might shorten the life cycle of the product and cause a fire.
- Do not use the load beyond rated switching capacity of Relay contact.**
It may cause insulation failure, contact melt, contact failure, relay broken, fire etc.
- 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.
- Do not use this unit at place where flammable or explosive gas, humidity, direct ray of the sun, radiant heat vibration, impact etc.**
It may cause a fire or explosion.
- Do not inflow dust or wire dregs into inside of this unit.**
It may cause a fire or mechanical trouble.
- Please wire properly after checking the polarity of terminals when connect thermocouples.**

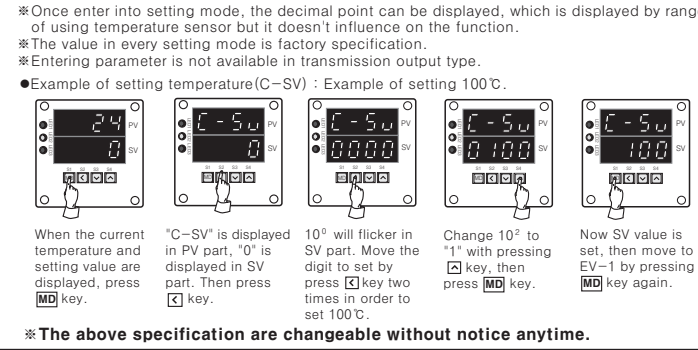
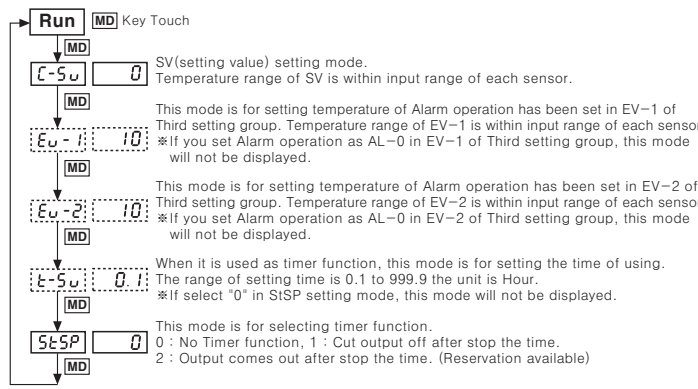
Dimensions



Parameter



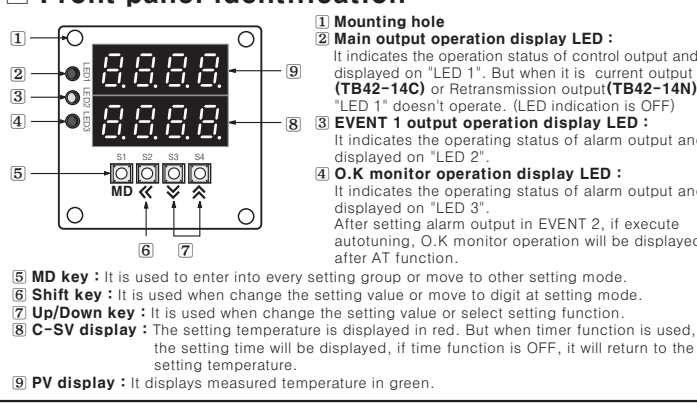
Flow chart for first setting group



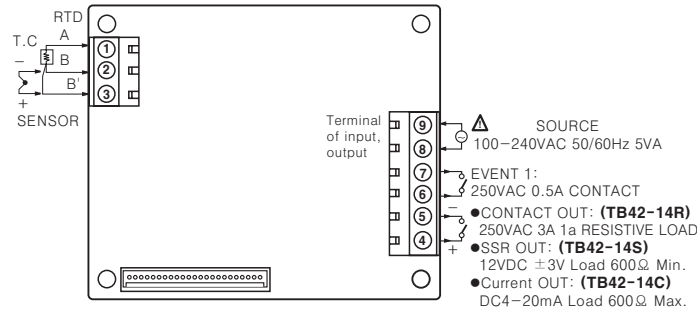
Specifications

Model	TB42
Power supply	100~240VAC 50/60Hz(90 to 110% of rated voltage)
Power consumption	Approx. max. 5VA
Input sensor	• Thermocouple : K(CA), J(IC) (Tolerance of outer resistance is max. 100Ω) • RTD : Pt100Ω 3 wires(Allowable line resistance is max. 5Ω per a wire)
Control method	• ON/OFF control(Hysteresis is adjustable) • P, PI, PD, PIDF, PID
Control output	• Relay contact output:250VAC 3A 1a • SSR output:12VDC ±3V Load 600Ω min. • Current output:4~20mADC, Load 600Ω 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 method	Setting by front push buttons
Display accuracy	±0.3% rdg based on F·S or 3°C Max.
Adjustment sensitivity	Adjustable 1 to 100°C(0.1 to 100.0°C) 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°C
Storage temperature	-20 ~ 60°C
Ambient humidity	35 ~ 85%RH

Front panel identification



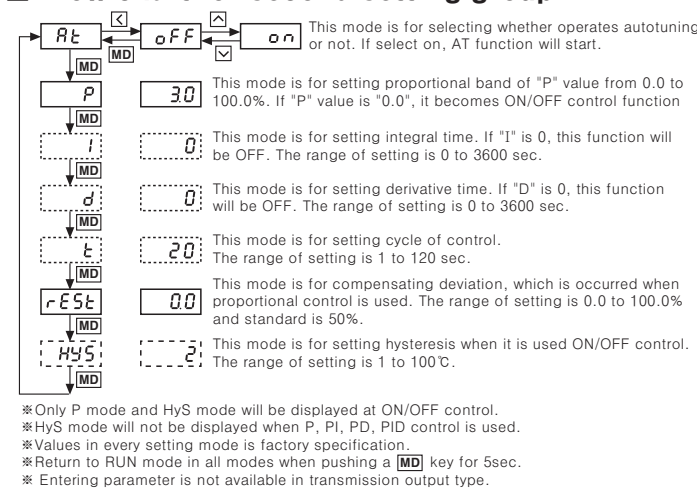
Connections



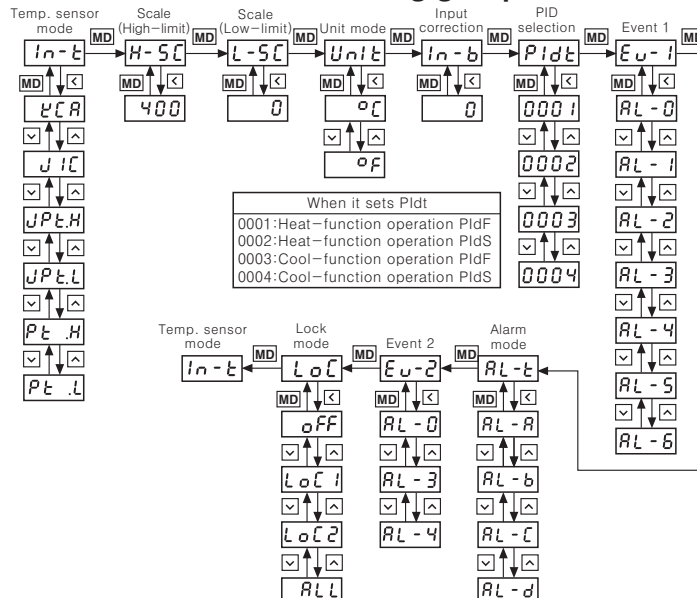
Alarm output

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

Flow chart for second setting group

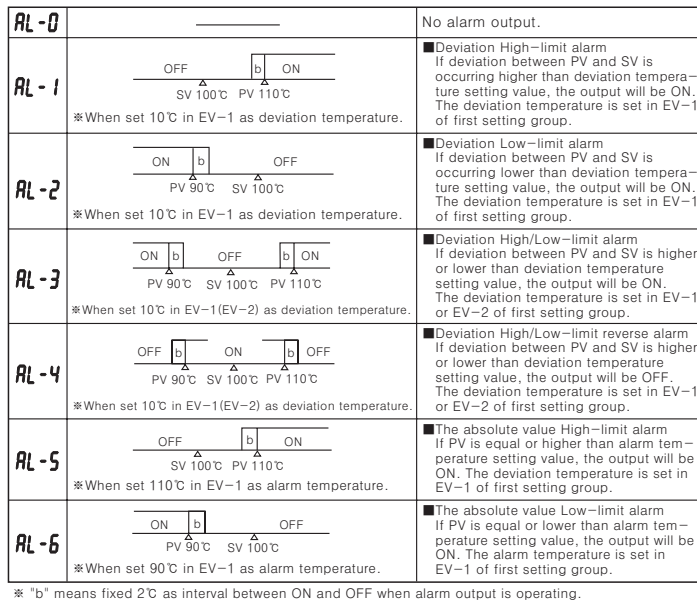


Flow chart for third setting group



In-t	℃/℉	Select one input sensor among 6 kinds.
H-SC	400	Setting High-limit of temperature. Setting range is within input range of each sensor.
L-SC	0	Setting Low-limit of temperature. Setting range is within input range of each sensor.
Unit	℃/℉	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).
PIdt	2	Select PID control type among 4 kinds.
Ev-1	RL-1	Select Alarm output function of EVENT1 among 7 kinds.
RL-t	RL-A	Select Alarm output option function among 4 kinds.
Ev-2	RL-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.

Operation chart for alarm output



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 RL-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.
- Dual 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 will be minimized.
 - 1)PIDF(PID fast) : This mode is applied at the machines or systems which require stop fast response speed, and allowable a little overshoot which require.
 - 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)
- Error indication**
 - If an error is occurred while the controller is operating, it will be displayed as follow.
 - "LLLL" is flickering when measured input temperature is lower than input range of the sensor.
 - "HHHH" is flickering when measured input temperature is higher than input range of the sensor.
 - "oEn" is flickering when the input sensor is not connected or its wire is cut.
- Manual reset(rEST)**
 - 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 in this unit.
 - "oFF" : All modes can be changed.
 - "LoC1" : All modes except Second setting group, Third setting group.
 - "LoC2" : All modes except C-SV.
 - "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
 - When set "0000" in StSP mode : It will not be the Timer function. In this case it doesn't display t-SV mode.
 - When set "0001" in StSP mode : It is controlling temperature during the time is set in t-SV. Ex) If set 5.0 to t-SV, it will stop after controlling for 5 hours.
 - When set "0002" in StSP mode : After set the time in "t-SV", it starts to control 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

Input sensor	Display	Selectable temperature range °C	Selectable temperature range °F
K(CA)	℃/℉	-100 ~ 1300 °C	-148 ~ 2372 °F
J(IC)	℄ ℄	0 ~ 800 °C	32 ~ 1472 °F
JPH	℄℄℄.℄	0 ~ 500 °C	32 ~ 932 °F
JPL	℄℄℄.℄	-199.9 ~ 199.9 °C	-199.9 ~ 392.0 °F
DPH	℄℄.℄	0 ~ 500 °C	32 ~ 932 °F
DPL	℄℄.℄	-199.9 ~ 199.9 °C	-199.9 ~ 392.0 °F

Factory default

First setting group	Second setting group	Third setting group
C-SV	oFF	In-t ℄/℉
Ev-1	P 3.0	H-SC 400
Ev-2	I 0	L-SC 0
StSP	D 0	Unit ℄
	t 20	In-b 0
	rEST 00	PIdt 2
		Ev-1 RL-1
		RL-t RL-A
		Ev-2 RL-4
		LoC oFF

Caution for using

- Installation environment
 - It shall be used indoor.
 - Altitude Max. 2000m.
 - Pollution Degree 2.
 - Installation 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.
- 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.
- 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.
- 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

- COUNTER
- TIMER
- TEMPERATURE CONTROLLER
- PANEL METER
- TACHO/LINE SPEED/PULSE METER
- DISPLAY UNIT
- PROXIMITY SENSOR
- PHOTOELECTRIC SENSOR
- FIBER OPTIC SENSOR
- PRESSURE SENSOR
- ROTARY ENCODER
- SENSOR CONTROLLER
- POWER CONTROLLER
- STEPPING MOTOR & DRIVER & CONTROLLER
- LASER MARKING SYSTEM(CO₂, Nd:YAG)

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