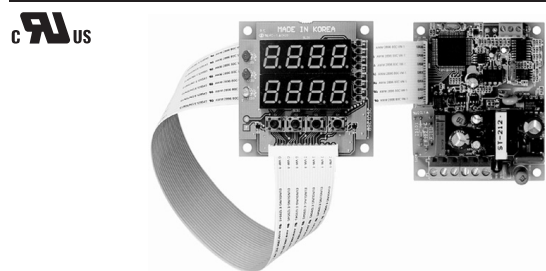


Autonics

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.

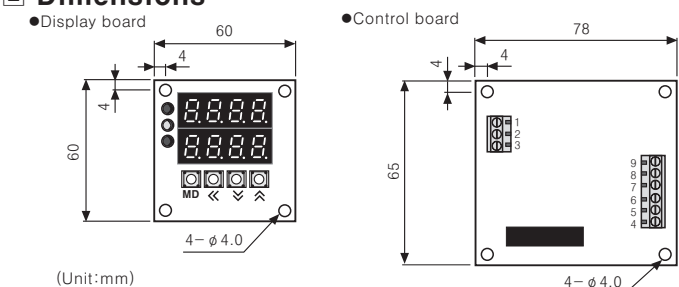
Caution for your safety

- 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.

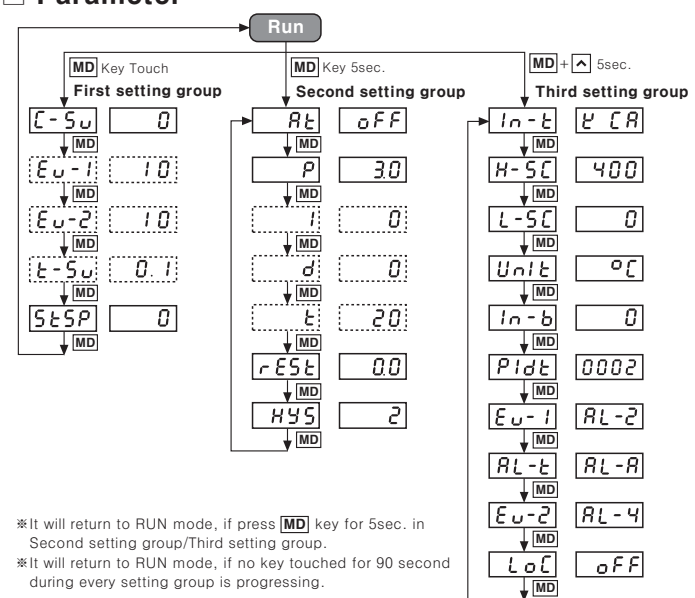
- In case of using this unit with machineries(Nuclear power control, medical equipment, vehicle, train, airplane, combustion apparatus, entertainment or safety device etc), it requires installing fail-safe device, or contact us for information on type required.**
It may result in serious damage, fire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

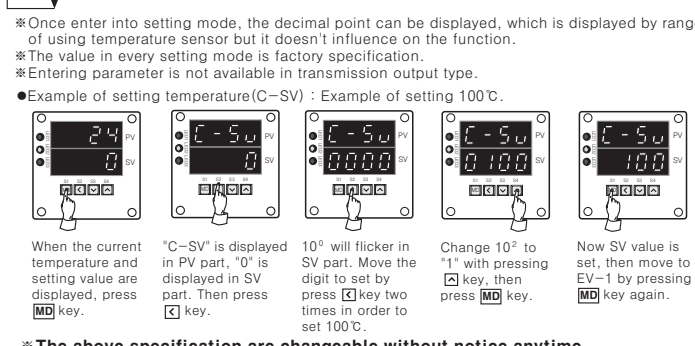
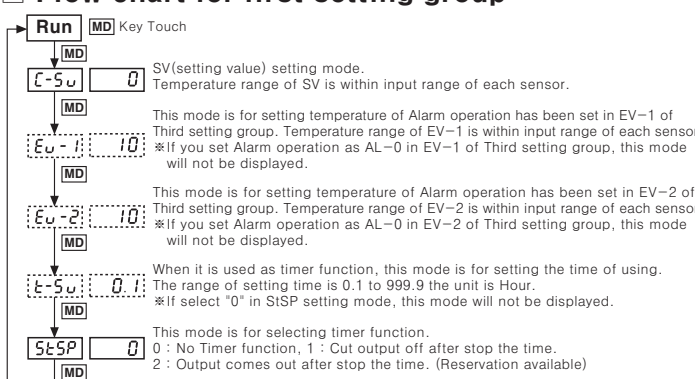
Dimensions



Parameter



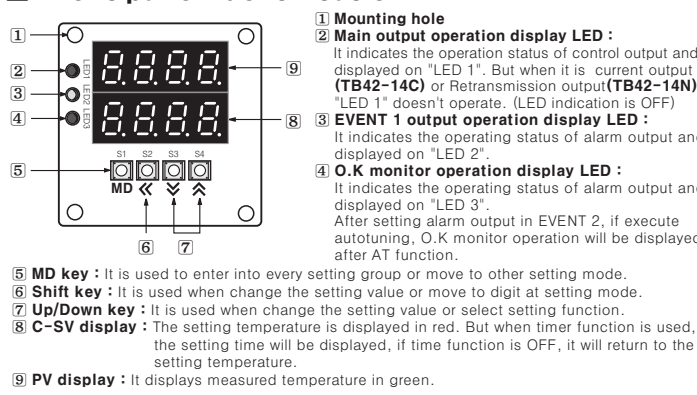
Flow chart for first setting group



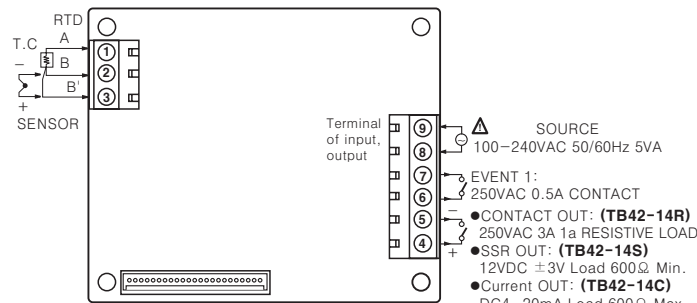
Specifications

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, PIDS
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



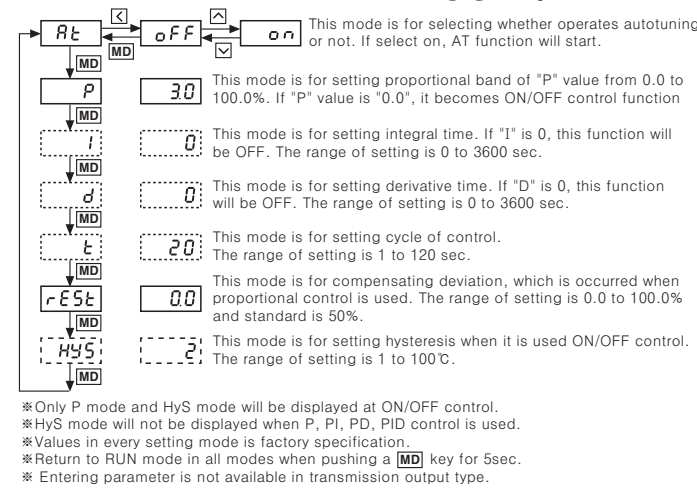
Connections



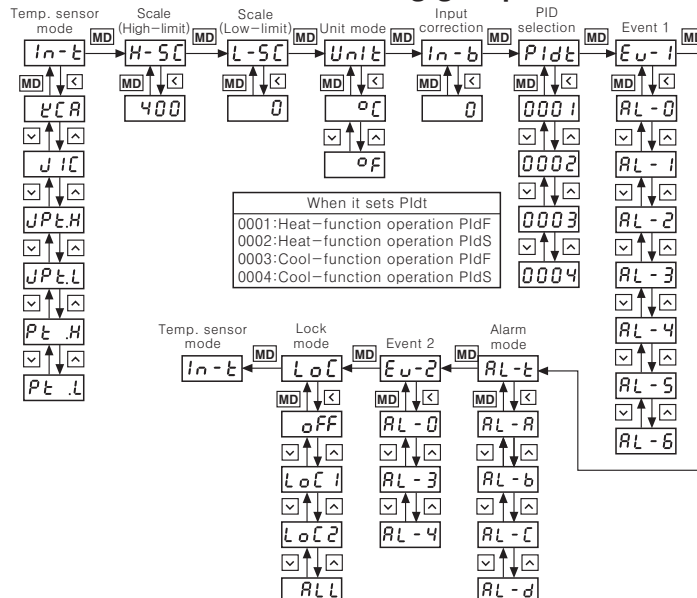
Alarm output

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



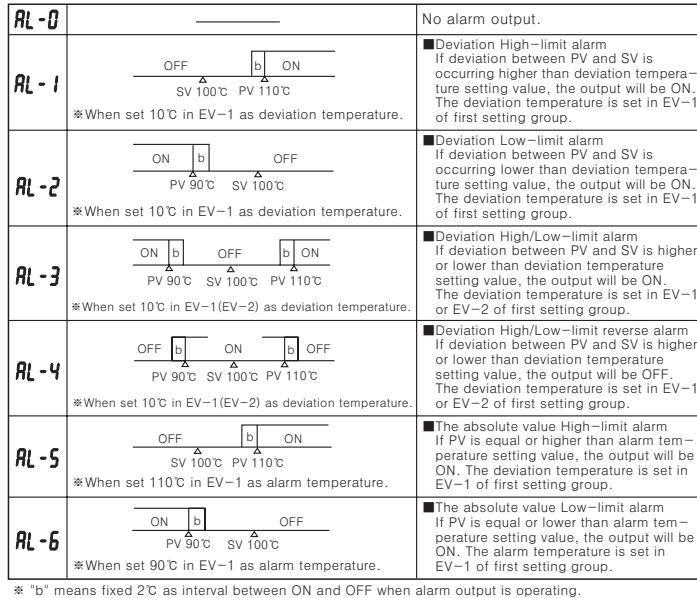
Flow chart for third setting group



In-t	4CA	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	0C	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.
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.

*It will return to RUN Mode by pressing MD + ▲ Key for 5second in each setting Mode
*When SV is flickered by pressing MD key, it is able to set the value by pressing MD key then press MD key and move to other Mode by pressing MD key again.
*If no key touched for 90sec. in each setting mode, it will return to RUN Mode.

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)	4CA	-100 ~ 1300 °C	-148 ~ 2372 °F
J(IC)	JIC	0 ~ 800 °C	32 ~ 1472 °F
JPH	JPH	0 ~ 500 °C	32 ~ 932 °F
JPL	JPL	-199.9 ~ 199.9 °C	-199.9 ~ 392.0 °F
DPH	PH	0 ~ 500 °C	32 ~ 932 °F
DPL	PL	-199.9 ~ 199.9 °C	-199.9 ~ 392.0 °F

Factory default

First setting group	Second setting group	Third setting group	
C-Sv	0	In-t	4CA
Ev-1	10	H-Sc	400
Ev-2	10	L-Sc	0
StSP	0	Unit	0C
		In-b	0
		Pidt	0001
		Ev-1	RL-0
		Ev-2	RL-1
		LoC	OFF
		Ev-1	RL-1
		Ev-2	RL-4
		LoC	OFF

*When it is SSR output, control cycle(t) of second setting group is 2.

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)

Autonics Corporation
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