Autonics

TEMPERATURE CONTROLLER
TC4 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.

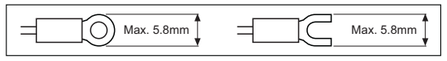
※The following is an explanation of the symbols used in the operation manual.
⚠ caution: Injury or danger may occur under special conditions.

⚠ Warning

1. **In case of using this unit with machinery (Ex: nuclear power control, medical equipment, ship, vehicle, train, airplane, combustion apparatus, safety device, crime/disaster prevention equipment, etc) which may cause damages to human life or property, it is required to install fail-safe device.**
   It may cause a fire, human injury or damage to property.
2. **Install the unit on a panel.**
   It may cause electric shock.
3. **Do not connect, inspect or repair this unit when power is on.**
   It may cause electric shock.
4. **Wire properly after checking terminal number.**
   It may cause a fire.
5. **Do not disassemble the case. Please contact us if it is required.**
   It may cause electric shock or a fire.

⚠ Caution

1. **This unit shall not be used outdoors.**
   It may shorten the life cycle of the product or cause electric shock.
2. **When connect wire, AWG 20(0.50mm²) should be used and screw bolt on terminal block with 0.74N·m to 0.90N·m strength.**
   It may cause a malfunction or fire due to contact failure.
3. **For crimp terminal, select following shaped terminal(M3).**



4. **Please observe the rated specifications.**
   It may shorten the life cycle of the product and cause a fire.
5. **Do not use beyond of the rated switching capacity of relay contact.**
   It may cause insulation failure, contact melt, contact failure, relay broken and fire etc.
6. **In cleaning unit, do not use water or organic solvent. And use dry cloth.**
   It may cause electric shock or a fire.
7. **Do not use this unit in place where there are flammable or explosive gas, humidity, direct ray of the light, radiant heat, vibration and impact etc.**
   It may cause a fire or an explosion.
8. **Do not inflow dust or wire dregs into the unit.**
   It may cause a fire or a malfunction.
9. **Please wire properly after checking the terminal polarity when connecting temperature sensor.**
   It may cause a fire or an explosion.
10. **In order to install the units with reinforced insulation, use the power supply unit which basic insulation level is ensured.**(TC4SP is basic insulation only.)

▣ Ordering information

T C 4 S – 1 4 R

Control output	N	Indicator - Without control output
	R	Relay output+SSRP output(AC power) Relay output+SSR output(AC/DC power)
Power supply	2	24VAC 50/60Hz, 24-48VDC
	4	100-240VAC 50/60Hz
Alarm output	N	No alarm output
	1	Alarm1 output
	2	Alarm1 + Alarm2 output※1
Size	S	DIN W48 X H48mm(Terminal block type)
	SP	DIN W48 X H48mm(11pin plug type)※2
	Y	DIN W72 X H36mm
	M	DIN W72 X H72mm
	H	DIN W48 X H96mm
	W	DIN W96 X H48mm
	L	DIN W96 X H96mm
Digit	4	9999(4 Digit)
Setting type	C	Set by touch switch
Item	T	Temperature controller

※1: It is unavailable for TC4SP, TC4Y.
※2: Socket for TC4SP (PG-11, PS-11) is sold separately.

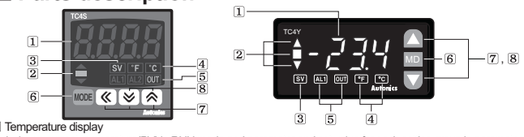
※The above specifications are subject to change without notice.

▣ Specifications

Series		TC4S	TC4SP	TC4Y	TC4M	TC4H	TC4W	TC4L
Power supply	AC power	100-240VAC 50/60Hz						
	AC/DC Power	24VAC 50/60Hz, 24-48VDC						
Allowable voltage range		90 to 110% of rated voltage						
Power consumption		Max. 5VA(100-240VAC 50/60Hz, 24VAC 50/60Hz)						
		Max. 3W(24-48VDC)						
Display method		7Segment(Red), Other display(Green, Yellow, Red LED)						
Character size	Height	15.0mm		15.0mm	20.0mm	14.6mm	20.0mm	22.0mm
	Width	7.0mm		7.4mm	9.5mm	7.0mm	9.5mm	11.0mm
Input type	RTD	DPt100Ω, Cu50Ω (Allowable line resistance max.5Ω per a wire)						
	TC	K(CA), J(IC), L(IC)						
Display accuracy	RTD	(PV ± 0.5% or ± 1℃ higher one) rdg ± 1Digit※1 ※TC4SP(Plug type) is (PV ± 0.5% or ± 2℃ higher one) rdg ± 1Digit※2 - Based on room temperature(23℃ ± 5℃)						
	TC							
Control output	Relay	250VAC 3A 1a						
	SSR	12VDC ± 2V 20mA Max.						
Alarm output		AL1, AL2 Relay: 250VAC 1A 1a(※TC4SP, TC4Y have AL1 only.)						
Control method		ON/OFF and P, PI, PD, PID control						
Hysteresis		1 to100℃/℉[KCA, JIC, LIC, DPT.H, CU5.H] / 0.1 to 50.0℃/℉[dPt.L, CU5.L]						
Proportional band(P)		0.1 to 999.9℃/℉						
Integral time(I)		9999 sec.						
Derivative time(D)		9999 sec.						
Control period(T)		0.5 to 120.0 sec.						
Manual reset		0.0 to 100.0%						
Sampling period		100ms						
Dielectric strength	AC power	2,000VAC 50/60Hz for 1min.(Between input terminal and power terminal)						
	AC/DC Power	1,000VAC 50/60Hz for 1min.(Between input terminal and power terminal)						
Vibration		0.75mm amplitude at frequency of 5 to 55Hz in each X, Y, Z directions for 2 hours						
Relay life cycle	Control output	Mechanical: Min. 5,000,000 operations, Electrical: Min. 200,000 operations (250VAC 3A resistive load)						
	Alarm output	Mechanical: Min. 5,000,000 operations, Electrical: Min. 300,000 operations (250VAC 1A resistive load)						
Insulation resistance		Min. 100MΩ (at 500VDC megger)						
Noise immunity		Square-wave noise by noise simulator(pulse width 1μs) ±2KV R-phase and S-phase						
Memory retention		Approx. 10 years (When using non-volatile semiconductor memory type)						
Environment	Ambient Temperature	-10 to 50℃, Storage: -20 to 60℃						
	Ambient humidity	35 to 85%RH, Storage: 35 to 85%RH						
Insulation type※3		⊡						
Approval		CE cULus (Except for AC/DC power type)						
Unit weight		Approx. 97g	Approx. 84g	Approx. 127g	Approx. 128g	Approx. 118g	Approx. 118g	Approx. 172g

※1: In case of out of room temperature range: (PV ± 0.5% or ± 2℃ higher one)rdg ± 1 Digit
L(IC) and RTD CU50: (PV ± 0.5% or ± 3℃ higher one)rdg ± 1 Digit
※2: In case of out of room temperature range for TC4SP: (PV ± 0.5% or ± 3℃ higher one)rdg ± 1 Digit
L(IC) and RTD CU50: (PV ± 0.5% or ± 4℃ higher one)rdg ± 1 Digit
※3: "⊡" Mark indicates that equipment protected throughout by double insulation or reinforced insulation.
※Environment resistance is rated at no freezing or condensation.

▣ Parts description



① Temperature display
It shows current temperature(PV) in RUN mode and parameter and set value for each setting group in parameter change mode.

② Deviation indicator
It shows current temperature(PV) deviation based on set temperature(SV) by LED.

No	PV deviation temp.	Deviation display
1	Over 2℃	▲ lamp on
2	Below ± 2℃	■ lamp on
3	Under -2℃	▼ lamp on

② Auto-tuning indicator
Deviation indicator(▲, ■, ▼) is flashed by every 1sec when operating auto tuning. Set [oFF] to stop auto tuning operation, it maintains previous P, I, D setting values. If error [oPEn] occurs during operation, auto tuning stops.
Auto tuning completion: Deviation indicators operate normally and it returns to RUN mode.
※Auto tuning operates continuously if error [HHHH], [LLLL] occurs. If it is satisfied with the condition, it finishes auto tuning normally.

③ Set temperature(SV) indicator: Press any front key once to check or change current set temperature(SV).
SV indicator will be ON and preset SV value will be flashing.

④ Temperature unit indicator(℃/℉): It shows current temperature unit.

⑤ Control/sub output indicator
-OUT: It will light up when control output(Main Control Output) is on.
※In case of CYCLE/PHASE control, it will light up when MV is over 3.0%.(Except for AC/DC power type)
-AL1/AL2: It will light up when alarm output AL1/AL2 is on.

⑥ MODE Key: Used when entering into parameter setting group, returning to RUN mode, moving parameter and saving setting values.

⑦ Adjustment: Used when entering into set value change mode, Digit moving and Digit Up/down.

⑧ FUNCTION key: Press ▽+△keys for 3 sec to operate function(RUN/STOP, alarm output cancel) set in inner parameter [dI-U].
※Press ▽+△keys once in set value operation to move digit.(Only for TC4Y)

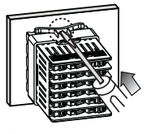
▣ Input sensor and temperature range[In-t]

Input sensor		Display	Temperature range(℃)	Temperature range(℉)
Thermo Couple	K(CA)	K.CA	-50 to 1200	-58 to 2192
	J(IC)	J.IC	-30 to 500	-22 to 932
	L(IC)	L.IC	-40 to 800	-40 to 1472
RTD	DPt100Ω	dPt.H	-100 to 400	-148 to 752
		dPt.L	-100.0 to 400.0	-148.0 to 752.0
	CU50Ω	CU5.H	-50 to 200	-58 to 392
		CU5.L	-50.0 to 200.0	-58.0 to 392.0

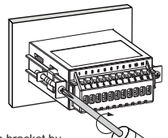
Factory default : [K.CA]

▣ Installation

●TC4S/SP(48 X 48mm) series



●TC4Y(72 X 36mm) series



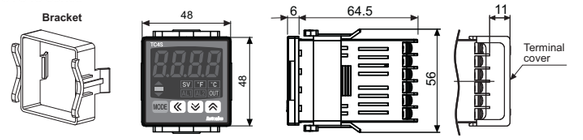
●Other series

※Insert product into a panel, fasten bracket by pushing with tools as shown above.
(In case of TC4Y, fasten bolts for bracket.)

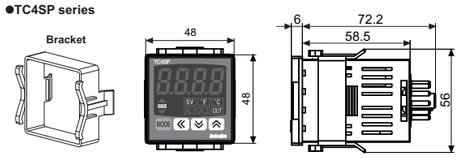
▣ Dimensions

(Unit:mm)

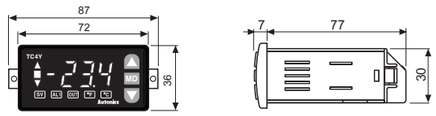
●TC4S series



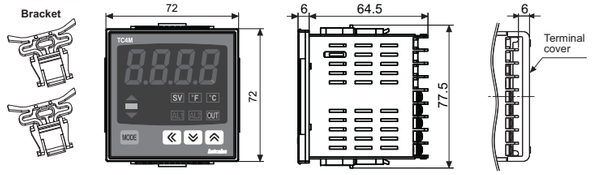
●TC4SP series



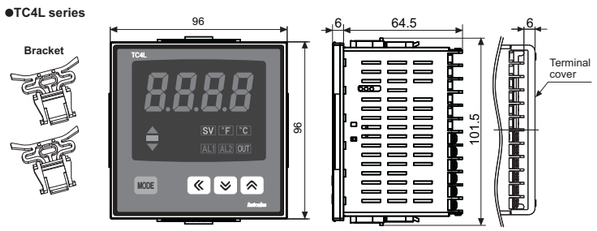
●TC4Y series



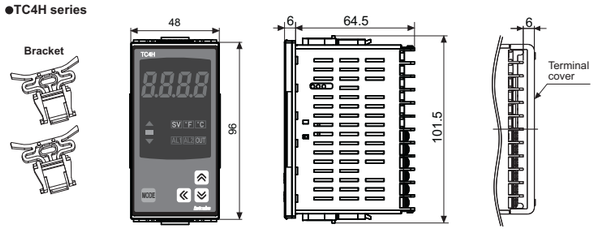
●TC4M series



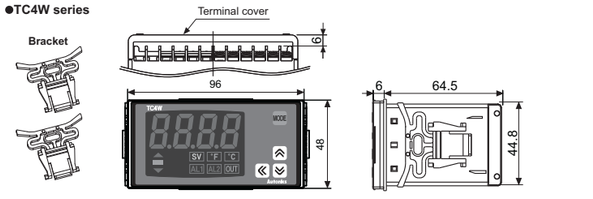
●TC4L series



●TC4H series

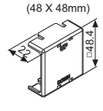


●TC4W series

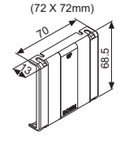


●Terminal cover(Sold separately)

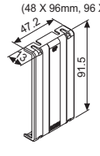
· RSA-COVER (48 X 48mm)



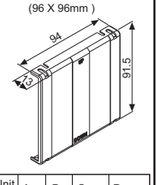
· RMA-COVER (72 X 72mm)



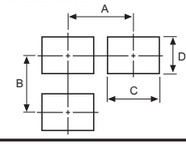
· RHA-COVER (48 X 96mm, 96 X 48mm)



· RLA-COVER (96 X 96mm)



●Panel cut-out



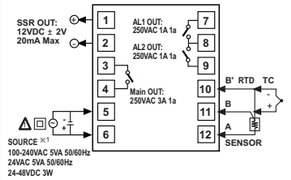
Model \ Unit	A	B	C	D
TC4S	65	65	$45^{+0.6}_{0}$	$45^{+0.6}_{0}$
TC4SP	65	65	$45^{+0.6}_{0}$	$45^{+0.6}_{0}$
TC4Y	91	40	$68^{+0.7}_{0}$	$31.5^{+0.5}_{0}$
TC4M	90	90	$68^{+0.7}_{0}$	$68^{+0.7}_{0}$

Model \ Unit	A	B	C	D
TC4H	65	115	$45^{+0.6}_{0}$	$92^{+0.8}_{0}$
TC4W	115	65	$92^{+0.8}_{0}$	$45^{+0.6}_{0}$
TC4L	115	115	$92^{+0.8}_{0}$	$92^{+0.8}_{0}$

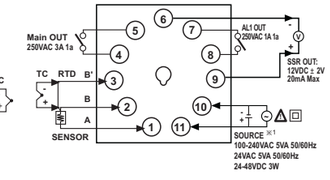
▣ Connections

※TC4 series has selectable control output; Relay output, and SSRP output. AC/DC power type has Relay output and SSR output and it is selectable.

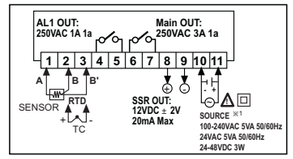
●TC4S series



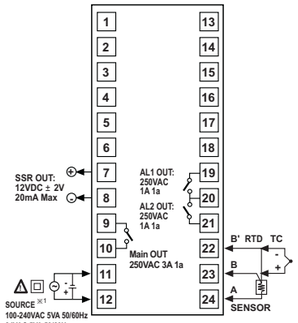
●TC4SP series



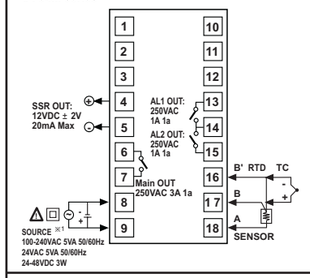
●TC4Y series



●TC4H, TC4W, TC4L series



●TC4M series

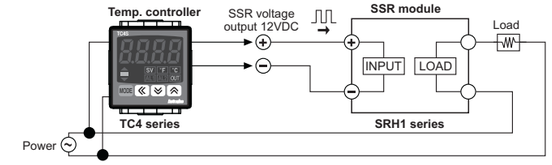


※1 AC Power: 100-240VAC 5VA 50/60Hz
AC/DC Power: 24VAC 5VA 50/60Hz
24-48VDC 3W

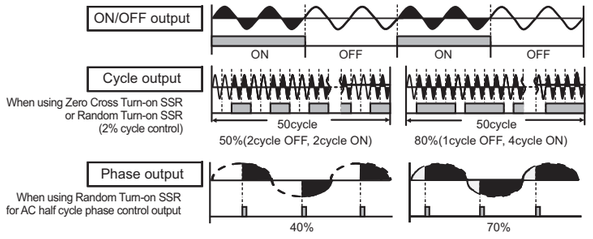
▣ SSRP voltage output function

※AC/DC power type supports ON/OFF output only when selecting control output [55r].
(Not support to select SSRP output method function. [55r.M])

- SRP is a user selectable output type which phase control and cycle control are added to standard SSR drive output.
- Standard SSR output is still available by internal parameter setting [SSR.M]; in addition, "cycle control" with connecting Zero cross turn-on type SSR or Random turn-on type SSR and "phase control" with connecting Random turn-on type SSR are also available.
- Realizing high accuracy and cost effective temperature control with both current output (4-20mA) and linear output (cycle control and phase control)



※You can select the functions with parameter settings.



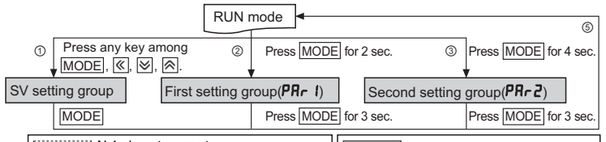
- Standard control mode[5tnd]
  A mode to control the load in the same way as Relay output type.
  (ON: output level 100%, OFF: output level 0%)

- Cycle control mode[CYCL]
  A mode to conrol the load by repeating output ON / OFF according to the rate of output within setting cycle.
  Having improved ON / OFF noise feature(Zero Cross type).

- Phase control mode[PHAS]
  A mode to control the load by controlling the phase within AC half cycle.
  Serial control is available.
  RANDOM Turn-on type SSR must be used for this mode.

※When selecting phase or cycle control mode, the power supply for load and temperature controller must be the same.
※In case of selecting PID control type and phase [PHAS] / cycle[PHAS] control output modes, control cycle[t] is not allowed to set.

Flow chart for setting group



④

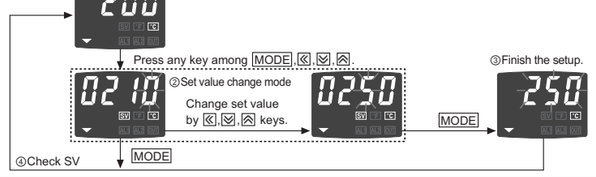
AL 1	AL1 alarm temperature (Deviation/absolute value) setting
AL2	AL2 alarm temperature (Deviation/absolute value) setting
At	Auto tuning ON/OFF
P	Proportional band
I	Integral time setting
d	Derivative time setting
rESt	Manual reset(Normal deviation correction) setting
HYS	ON/OFF control hysteresis setting

In-t	Input sensor
Unit	Temperature unit
In-b	Input correction
nAuF	Input digital filter
L-Su	SV low-limit value
H-Su	SV high-limit value
o-Ft	Control output operation
C-nd	Control type
oUt	Control output type
SSr.n	SSRP output method※1
t	Control cycle
AL-1	AL1 alarm operation mode
AL-2	AL2 alarm operation mode
AHYS	Alarm output hysteresis
LbAt	LBA monitoring time
LbAb	LBA detection range
di-E	Digital key operation
Er.nu	Control output MV in case of input break error
LoC	Lock setting

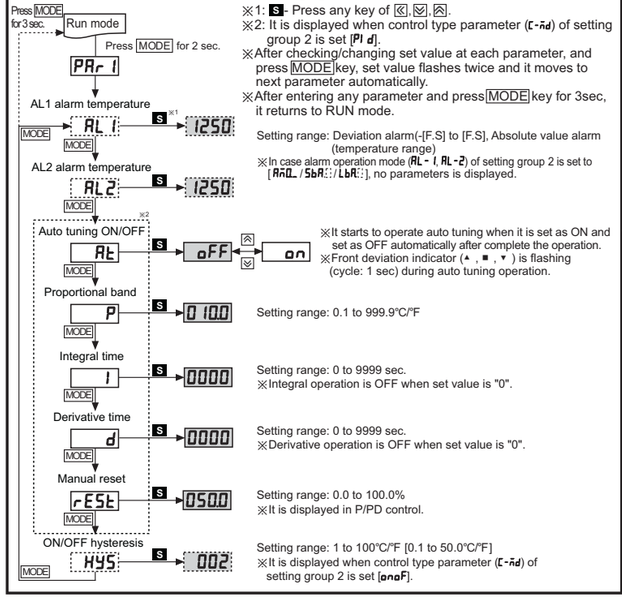
※1: It is not displayed for AC/DC power type.
※If no key entered for 30 sec, it returns to RUN mode automatically and the set value of parameter is not be changed.
※Parameter marked in ⬚ might not be displayed depending on other parameter settings.
①Press any key once in RUN mode, it advances to set value setting group.
②Press MODE key over 2 sec in RUN mode, it advances to setting group 1.
③Press MODE key over 4 sec in RUN mode, it advances to setting group 2.
④First parameter will be displayed on viewer when it advances to the setting group.
⑤Press MODE key over 3 sec any setting group, it returns to RUN mode.
(Exception: Press MODE key once in setting group of set value, it returns to RUN mode.
- Press MODE key again within 1 sec after return to RUN mode by press MODE key over 3 sec, it advances to the first parameter of previous setting group.
- Parameter setup
  Setting group2 → Setting group1 → Setting group of set value
  • Set parameter as the above considering parameter relation of each setting group.
  • Check parameter set value after change parameter of setting group2.

※Indicator type displays shaded parameter of setting group 2.
※Alarm operation mode (AL-1, AL-2) of setting group2 is decided whether to display according by alarm output type.
※If alarm operation mode (AL-1, AL-2) of setting group2 is set to [AnQ_/5bA.⬚/LbA⬚], [AHY5.5] parameter is not displayed.

Flow chart for SV setting group(※In case of changing set temperature from 210℃ to 250℃.)



Flow chart for first setting group



※1: S - Press any key of ▽, △, ▷.
※2: It is displayed when control type parameter (C-nd) of setting group 2 is set [PI d].
※After checking/changing set value at each parameter, and press MODE key, set value flashes twice and it moves to next parameter automatically.
※After entering any parameter and press MODE key for 3sec, it returns to RUN mode.

Setting range: Deviation alarm(-[F.S] to [F.S], Absolute value alarm (temperature range)
※In case alarm operation mode (AL-1, AL-2) of setting group 2 is set to [AnQ_/5bA.⬚/LbA⬚], no parameters is displayed.

※It starts to operate auto tuning when it is set as ON and set as OFF automatically after complete the operation.
※Front deviation indicator (▲, ■, ▼) is flashing (cycle: 1 sec) during auto tuning operation.

Setting range: 0.1 to 999.9℃/℉

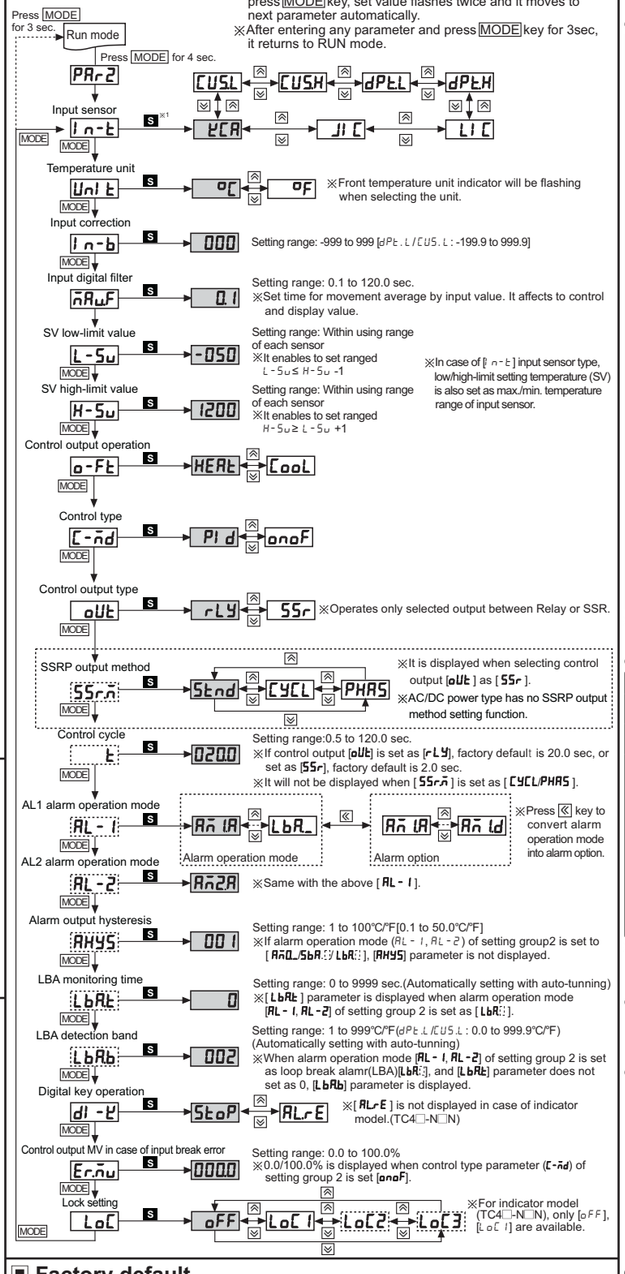
Setting range: 0 to 9999 sec.
※Integral operation is OFF when set value is "0".

Setting range: 0 to 9999 sec.
※Derivative operation is OFF when set value is "0".

Setting range: 0.0 to 100.0%
※It is displayed in P/PD control.

Setting range: 1 to 100℃/℉ [0.1 to 50.0℃/℉]
※It is displayed when control type parameter (C-nd) of setting group 2 is set [onoF].

Flow chart for second setting group



Factory default

●SV setting group

Parameter	Factory default
-	0

●First setting group

Parameter	Factory default
AL1	1250
AL2	
At	oFF
P	0100
I	0000
d	
rESt	0500
HYS	002

●Second setting group

Parameter	Factory default	Parameter	Factory default
In-t	ECA	t	0200
Unit	oC	AL-1	AnIA
In-b	0000		
nAuF	000.1	AL-2	An2A
L-Su	-050	AHYS	0001
H-Su	1200	LbAt	0000
o-Ft	HEAt	LbAb	002
C-nd	PId	di-E	StoP
oUt	rLY	Er.nu	0000
SSr.n	Stnd	LoC	oFF

※AC/DC power type has no SSRP output method setting function and supports only ON/OFF output when selecting [SSr] in control output setting function[oUt].

Alarm[AL-1/AL-2]

There are two alarms which operate individually. You can set combined alarm operation and alarm option.
Use digital input key (set as ALrE) or turn OFF power and re-start this unit to release alarm operation.

●Alarm operation

Operation	Name	Alarm operation	Description
AnO.-	-	-	No alarm output
An1.□	Deviation high-limit alarm	OFF H ON / ON H OFF; Alarm (Deviation) temperature: 10℃ (PV 100℃, SV 110℃) / Alarm (Deviation) temperature: -10℃ (PV 90℃, SV 100℃)	If deviation between PV and SV as high-limit is higher than set value of deviation temperature, the alarm output will be ON.
An2.□	Deviation low-limit alarm	ON H OFF / OFF H ON; Alarm (Deviation) temperature: 10℃ (PV 100℃, SV 110℃) / Alarm (Deviation) temperature: -10℃ (PV 90℃, SV 100℃)	If deviation between PV and SV as low-limit is higher than set value of deviation temperature, the alarm output will be ON.
An3.□	Deviation high/low limit alarm	ON H OFF H ON; Alarm (Deviation) temperature: 10℃ (PV 90℃, SV 100℃, PV 110℃)	If deviation between PV and SV as high/low-limit is higher than set value of deviation temperature, the alarm output will be ON.
An4.□	Deviation high/low-limit reverse alarm	OFF H ON H OFF; Alarm (Deviation) temperature: 10℃ (PV 90℃, SV 100℃, PV 110℃)	If deviation between PV and SV as high/low-limit is higher than set value of deviation temperature, the alarm output will be OFF.
An5.□	Absolute value high limit alarm	OFF H ON / OFF H ON; Alarm temperature (Absolute): 90℃ (PV 90℃, SV 100℃) / Alarm temperature (Absolute): 110℃ (SV 100℃, PV 110℃)	If PV is equal to or higher than the absolute value of alarm temperature, the output will be ON.
An6.□	Absolute value low limit alarm	ON H OFF / ON H OFF; Alarm temperature (Absolute): 90℃ (PV 90℃, SV 100℃) / Alarm temperature (Absolute): 110℃ (SV 100℃, PV 110℃)	If PV is equal to or lower than the absolute value of alarm temperature, the output will be ON.
5bA.□	Sensor break alarm	-	It will be ON when it detects sensor disconnection.
LbA.□	Loop break alarm	-	It will be ON when it detects loop break.

※H: Alarm output hysteresis[AHY5]
It displays alarm output ON and OFF interval and hysteresis is applied to both AL1 OUT and AL2 OUT.
Setting range[PCA, JIC, LIC, dPtH, CU5H]: 1 to 100(Factory default: 1), [dPtL, CU5L]: 0.1 to 50.0

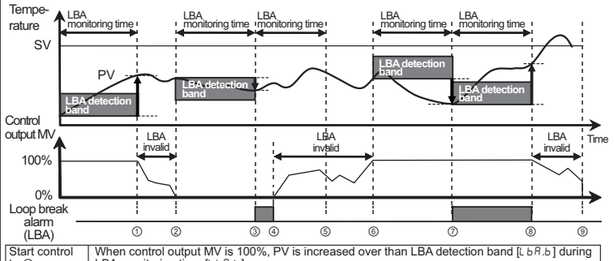
●Alarm option

Option	Name	Description
An□.A	Standard alarm	If it is an alarm condition, alarm output is ON. If it is a clear alarm condition, alarm output is OFF.
An□.b	Alarm latch	If it is an alarm condition, alarm output is ON and maintains ON status. (Alarm output HOLD)
An□.C	Standby sequence 1	First alarm condition is ignored and from second alarm condition, standard alarm operates.
An□.d	Alarm latch and standby sequence 1	If it is an alarm condition, it operates both alarm latch and standby sequence. When power is supplied and it is an alarm condition, this first alarm condition is ignored and from the second alarm condition, alarm latch operates.
An□.E	Standby sequence 2	First alarm condition is ignored and from second alarm condition, standard alarm operates. When re-applied standby sequence and if it is alarm condition, alarm output does not turn ON. After clearing alarm condition, standard alarm operates.
An□.F	Alarm latch and standby sequence 2	Basic operation is same as alarm latch and standby sequence1. It operates not only by power ON/OFF, but also alarm setting value, or alarm option changing. When re-applied standby sequence and if it is alarm condition, alarm output does not turn ON. After clearing alarm condition, alarm latch operates.

※Condition of re-applied standby sequence for standby sequence 1, alarm latch and standby sequence 1: Power ON
Condition of re-applied standby sequence for standby sequence 2, alarm latch and standby sequence 2: Power ON, changing set temperature, alarm temperature (AL1, AL2) or alarm operation (AL-1, AL-2), switching STOP mode to RUN mode.

●Sensor break alarm
The function that alarm output will be ON when sensor is not connected or when sensor's disconnection is detected during temperature controlling. You can check whether the sensor is connected with buzzer or other units using alarm output contact.
It is selectable between standard alarm [5bA.A] or alarm latch [5bA.b].

●Loop break alarm(LBA)
It checks control loop and outputs alarm by temperature change of the subject.
For heating control(cooling control), when control output MV is 100%(0% for cooling control) and PV is not increased over than LBA detection band [LbA.b] during LBA monitoring time [LbA.t], or when control output MV is 0%(100% for cooling control) and PV is not decreased below than LBA detection band [LbA.b] during LBA monitoring time [LbA.t], alarm output turns ON.



Start control to ①	When control output MV is 100%, PV is increased over than LBA detection band [LbA.b] during LBA monitoring time [LbA.t].
① to ②	The status of changing control output MV (LBA monitoring time is reset.)
② to ③	When control output MV is 0% and PV is not decreased below than LBA detection band [LbA.b] during LBA monitoring time [LbA.t], loop break alarm (LBA) turns ON after LBA monitoring time.
③ to ④	Control output MV is 0% and loop break alarm (LBA) turns and maintains ON.
④ to ⑥	The status of changing control output MV (LBA monitoring time is reset.)
⑥ to ⑦	When control output MV is 100% and PV is not increased over than LBA detection band [LbA.b] during LBA monitoring time [LbA.t], loop break alarm (LBA) turns ON after LBA monitoring time.
⑦ to ⑧	When control output MV is 100% and PV is increased over than LBA detection band [LbA.b] during LBA monitoring time [LbA.t], loop break alarm (LBA) turns OFF after LBA monitoring time.
⑧ to ⑨	The status of changing control output MV (LBA monitoring time is reset.)

※When executing auto-tuning, LBA detection band[LbA.b] and LBA monitoring time are automatically set based on auto tuning value. When alarm operation mode [AL-1~AL-2] is set as loop break alarm(LBA)[LbA.⬚], LBA detection band [LbA.b] and LBA monitoring time [LbA.t] parameter is displayed.

Input correction[In-b]

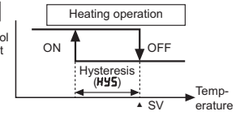
Controller itself does not have errors but there may be error by external input temperature sensor. This function is for correcting this error.
Ex) If actual temperature is 80℃ but controller displays 78℃, set input correction value [In-b] as '002' and controller displays 80℃.
※As the result of input correction, if current temperature value (PV) is over each temperature range of input sensor, it displays 'HHHH' or 'LLLL'.

Digital filter[nAuF]

If current temperature (PV) is fluctuating repeatedly by rapid change of input signal, it reflects to MV and stable control is impossible. Therefore, digital filter function stabilizes current temperature value. For example, set input digital filter value as 0.4 sec, and it applies digital filter to input values during 0.4 sec and displays this values. Current temperature may be different by actual input value.

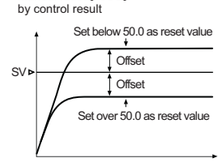
ON/OFF control hysteresis[HYS]

In case of ON/OFF control, set between ON and OFF intervals as hysteresis.
If hysteresis is too small, it may cause control output hunting (takeoff, chattering) by external noise, etc.



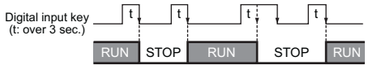
Manual reset[rESt]

When selecting P/PD control mode, certain temperature difference exists even after PV reaches stable status because heater's rising and falling time in inconsistent due to thermal characteristics of controlled objects, such as heat capacity, heater capacity.
This temperature difference is called offset and manual reset [rESt] function is to set/correct offset.
When PV and SV are equal, reset value is 50.0%. After control is stable, PV is lower than SV, reset value is over 50.0% or PV is higher than SV, reset value is below 50.0%.



Digital input key(▽ + △ 3sec.) function[di-E]

●RUN/STOP function[5toP]



It is available to pause on control output and auxiliary output (except loop break alarm, sensor break alarm) except control output operates normally as set. Press digital input key for 3sec to re-start the operation.

●Clear alarm output function[ALrE]
It is available to clear alarm output by force. (It is only when alarm option is alarm latch, standby sequence.)
Clear alarm is able to only for out of alarm operation range. Alarm operates normally right after clear alarm.

Control output MV for open error[Er.nu]

The function to set control output MV in case of open error. Users are able to set by ON/OFF setting or MV setting. It executes control output by set MV regardless of ON/OFF or PID control output.

Lock setting[LoC]

A function to prevent changing SV and parameters of each setting group.
Parameter setting values are still possible to check while Lock mode is ON.

Display	Description
oFF	Lock off
LoC1	Lock setting group 1
LoC2	Lock setting group 1, 2
LoC3	Lock setting group 1, 2, SV setting group

Setting range: [oFF / LoC1 / LoC2 / LoC3] (Default: [oFF])
※[oFF], [LoC1] are available only for indicator(TC4□-N□N).

Error

Error mark will flash(every 1 sec.) in PV viewer when error is occurred during the control operation.

Display	Description
oPEn	If input sensor is disconnected or sensor is not connected.
HHHH	If measured sensor input is higher than temperature range.
LLLL	If measured sensor input is lower than temperature range.

As soon as error causing factors get solved (by connecting input sensors / by making sensor input within the rated range), error mark [oPEn / HHHH / LLLL] will be disappeared and returning to normal operation mode.

Caution for using

1. Please install power switch or circuit-breaker in order to cut power supply off.
2. Install power switch or circuit-breaker to supply or cut off the power.
3. Switch or circuit-breaker should be installed near by users for convenient control.
4. Do not use this product as Volt-meter or Ampere-meter, this is a temperature controller.
5. In case of using RTD sensor, 3 wire type must be used. If you need to extend the line, 3 wires must be used with the same thickness as the line. It might cause the deviation of temperature if the resistance of line is different.
6. In case of making power line and input signal line closely, line filter for noise protection should be installed at power line and input signal line should be shielded.
7. Keep away from the high frequency instruments.(High frequency welding machine & sewing machine, large capacity SCR controller)
8. Installation environment
   ①It shall be used indoor. ②Altitude Max. 2000m.
   ③Pollution Degree 2. ④Installation CategoryII .

※It may cause malfunction if above instructions are not followed.

Major products

- Proximity sensors
- Photoelectric sensors
- Area sensors
- Fiber optic sensors
- Door/Door side sensors
- Pressure sensors
- Counters
- Timers
- Rotary encoders
- Display units
- Power controllers
- Sensor controllers
- Panel meters
- Graphic/Logic panels
- Temperature controllers
- Field network devices
- Switching power supplies
- Temperature/Humidity transducers
- Tachometer/Pulse(Rate) meters
- Stepping motors/drivers/motion controllers
- Laser marking system(CO_2, Nd:YAG)
- Laser welding/soldering system

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