# Touch Switch Type Temperature Controller

## Touch Switch Type Temperature Controller

### ■Features

● Realizes ideal temp. controlling with newly developed PID control algorithm and 100ms high speed sampling

● **Relay output and SSRP output embodied together : SSRP output makes phase control and cycle control possible.**

● Dramatically increased visibility using wide display part

● Mounting space saving with compact design : Approx. 38% reduced size compared with existing model(depth−based)

● SV/PV deviation indicatable

⚠ **Please read "Caution for your safety" in operation manual before using.**

CE c**RU**us

### ■Ordering information

| **T** | **C** | **4** | **S** | **—** | **1** | **4** | **R** |
|---|---|---|---|---|---|---|---|

| | | |
|---|---|---|
| Control output | **N** | Indicator − Without control output |
| | **R** | Relay output＋SSRP output |
| Power supply | **4** | 100−240VAC 50/60Hz |
| Alarm output | **N** | No alarm output |
| | **1** | Alarm1 output |
| (※1) | **2** | Alarm1 output＋Alarm2 output |
| | **S** | DIN W48×H48mm(Terminal block type) |
| (※2) | **SP** | DIN W48×H48mm(Plug type) |
| | **Y** | DIN W72×H36mm |
| Size | **M** | DIN W72×H72mm |
| | **H** | DIN W48×H96mm |
| | **W** | DIN W96×H48mm |
| | **L** | DIN W96×H96mm |
| Digit | **4** | 4Digit |
| Setting type | **C** | Set by touch switch |
| Item | **T** | Temperature controller |

(※1) It is unavailable for TC4SP, TC4Y.
(※2) TC4SP sockets (PG−11, PS−11) are sold separately.

### ■Specifications

| Series | | TC4S | TC4SP | TC4Y | TC4M | TC4H | TC4W | TC4L |
|---|---|---|---|---|---|---|---|---|
| Power supply | | 100−240VAC 50/60Hz | | | | | | |
| Allowable voltage range | | 90~110% of rated voltage | | | | | | |
| Power consumption | | Max. 5VA | | | | | | |
| Display method | | 7Segment(Red), Other display(Green, Yellow, Red LED) | | | | | | |
| Character size | | W7×H15mm | | W7.4×H15mm | W9.5×H20mm | W7×H14.6mm | W9.5×H20mm | W11×H22mm |
| Input type | RTD | DIN Pt100Ω (Allowable line resistance max. 5Ω per a wire) | | | | | | |
| | TC | K(CA), J(IC) | | | | | | |
| Display method | TC, RTD | (★1)　　(PV ±0.5% or ±1℃ higher one) rdg ±1Digit (★2)　　※TC4SP (Plug type) is (PV ±0.5% or ±2℃ higher one) rdg ±1Digit ☞Based on normal temperature(23℃ ±5℃) | | | | | | |
| Control output | Relay | 250VAC 3A 1a | | | | | | |
| | SSRP | 12VDC ±2V 20mA Max. | | | | | | |
| Sub output | | AL1, AL2 relay output : 250VAC 1A 1a(※TC4SP, TC4Y have AL1 only.) | | | | | | |
| Control method | | ON/OFF and P, PI, PD, PID control | | | | | | |

※(★1)(PV ±0.5% or ±2℃ higher one) rdg ±1Digit, except normal temperature range.
※(★2)TC4SP is (PV ±0.5% or ±3℃ higher one) rdg ±1Digit, except normal temperature range.

# TC Series

## ▣ Specifications

| Series | TC4S | TC4SP | TC4Y | TC4M | TC4H | TC4W | TC4L |
|---|---|---|---|---|---|---|---|
| Hysteresis | 1 ~ 100℃(KCA,JIC,PT1) / 0.1 ~ 50.0℃(PT2) | | | | | | |
| Proportional band | 0.1 ~ 999.9℃ | | | | | | |
| Integral time(I) | 9999sec. | | | | | | |
| Derivative time(D) | 9999sec. | | | | | | |
| Control period | 0.5 ~ 120.0sec. | | | | | | |
| Manual reset | 0.0 ~ 100.0% | | | | | | |
| Sampling period | 100ms | | | | | | |
| Dielectric strength | 2000VAC 50/60Hz for 1min.(Between input terminal and power terminal) | | | | | | |
| Vibration | 0.75mm amplitude at frequency of 5~55Hz in each X, Y, Z directions for 2 hours | | | | | | |
| Relay life cycle Mechanical | Mechanical : Min. 10,000,000 operations, Electrical : Min. 100,000 operations(250VAC 3A resistive load) | | | | | | |
| Relay life cycle Electrical | Mechanical : Min. 10,000,000 operations, Electrical : Min. 300,000 operations(250VAC 1A resistive load) | | | | | | |
| Insulation resistance | Min. 100MΩ (at 500VDC mega) | | | | | | |
| Noise | Square shaped 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) | | | | | | |
| Ambient temperature | −10 ~ 50℃(at non−freezing status) | | | | | | |
| Storage temperature | −20 ~ 60℃(at non−freezing status) | | | | | | |
| Ambient humidity | 35 ~ 85%RH | | | | | | |
| Unit weight | Approx. 97g | Approx. 84g | Approx. 127g | Approx. 127g | Approx. 118g | Approx. 118g | Approx. 172g |
| Approval | CE c UL us | | | | | | |

## ▣ Connections

※TC4 series has both Main Out and SSR Out. You may select the model as your needs.

### ●TC4S
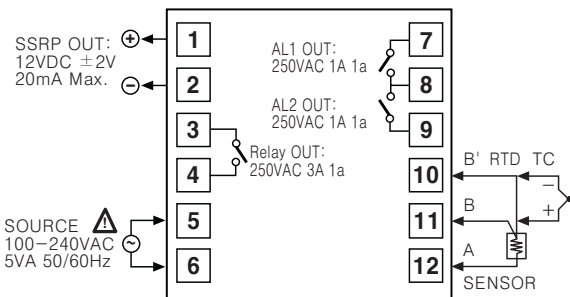


### ●TC4SP
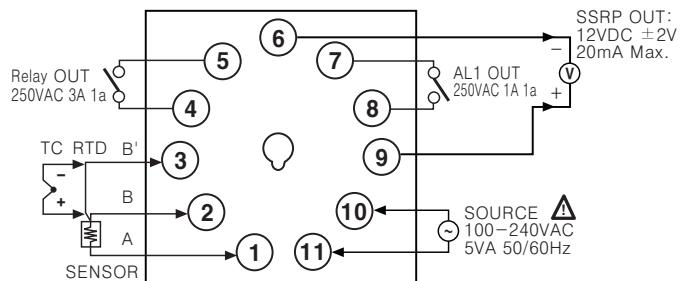


### ●TC4Y
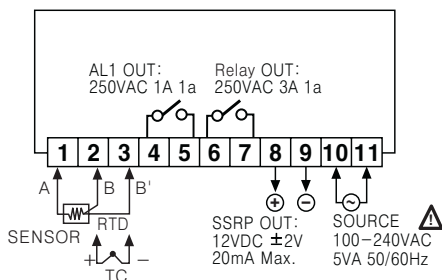


### ●TC4W
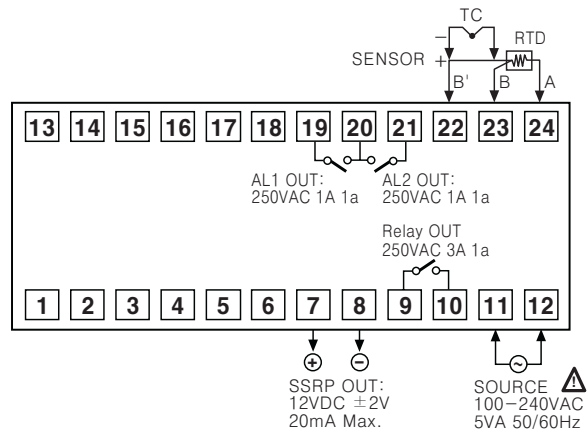
# Touch Switch Type Temperature Controller

(A)
Counter

(B)
Timer

(C)
Temp.
controller

(D)
Power
controller

(E)
Panel
meter

(F)
Tacho/
Speed/
Pulse
meter

(G)
Display
unit

(H)
Sensor
controller

(I)
Switching
power
supply

(J)
Proximity
sensor

(K)
Photo
electric
sensor

(L)
Pressure
sensor

(M)
Rotary
encoder

(N)
Stepping
motor &
Driver &
Controller

(O)
Graphic
panel

(P)
Field
network
device

(Q)
Production
stoppage
models &
replacement

● TC4M



SSRP OUT: 12VDC ±2V 20mA Max. — 4 (+), 5 (−)

Relay OUT 250VAC 3A 1a — 6, 7

SOURCE 100−240VAC 5VA 50/60Hz — 8, 9

AL1 OUT: 250VAC 1A 1a — 13, 14

AL2 OUT: 250VAC 1A 1a — 15

B' RTD  TC — 16

B — 17

A — 18  SENSOR

● TC4H/L



SSRP OUT: 12VDC ±2V 20mA Max. — 7 (+), 8 (−)

Relay OUT 250VAC 3A 1a — 9, 10

SOURCE 100−240VAC 5VA 50/60Hz — 11, 12

AL1 OUT: 250VAC 1A 1a — 19, 20

AL2 OUT: 250VAC 1A 1a — 21

B' RTD  TC — 22

B — 23

A — 24  SENSOR

## ▣ Dimensions

● TC4S

● Bracket
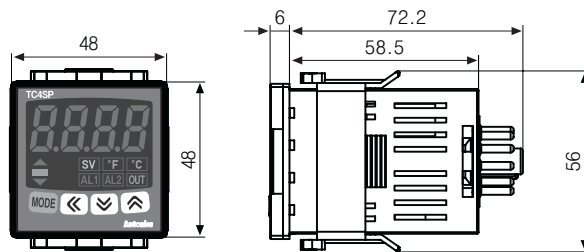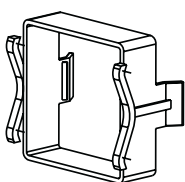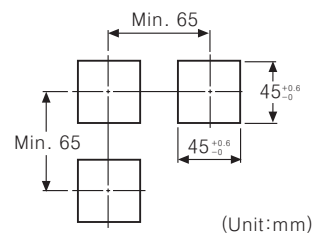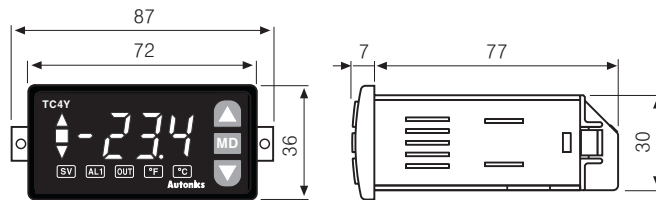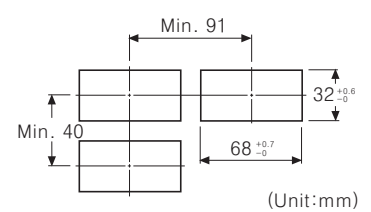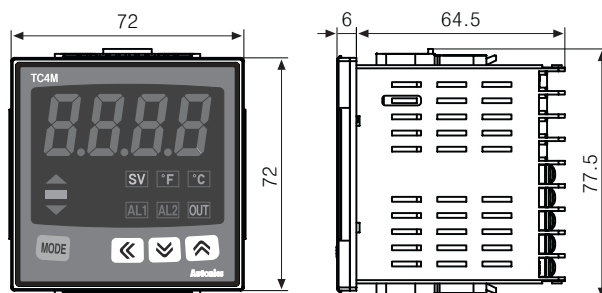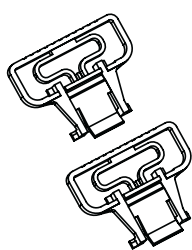


48 × 48, 56, 6, 64.5

● Panel cut−out

Min. 65, Min. 65, $45^{+0.6}_{-0}$, $45^{+0.6}_{-0}$

(Unit:mm)

● TC4SP

● Bracket



48 × 48, 56, 6, 72.2, 58.5

● Panel cut−out

Min. 65, Min. 65, $45^{+0.6}_{-0}$, $45^{+0.6}_{-0}$

(Unit:mm)

● TC4Y



87, 72, 36, 7, 77, 30

● Panel cut−out

Min. 91, Min. 40, $32^{+0.6}_{-0}$, $68^{+0.7}_{-0}$

(Unit:mm)

● TC4M

● Bracket



72, 72, 6, 64.5, 77.5

● Panel cut−out

Min. 90, Min. 90, $68^{+0.7}_{-0}$, $68^{+0.7}_{-0}$

(Unit:mm)

# TC Series

● **TC4H**
● Bracket

48

96

6    64.5

101.5

TC4H

SV °F °C
AL1 AL2 OUT

MODE

● Panel cut-out

Min. 65

92 $^{+0.8}_{-0}$

Min. 115

45 $^{+0.6}_{-0}$

(Unit:mm)

● **TC4W**
● Bracket

96

48

6    64.5

TC4W                              MODE

SV °F °C
AL1 AL2 OUT

● Panel cut-out

Min. 115

Min. 65

45 $^{+0.6}_{-0}$

92 $^{+0.8}_{-0}$

(Unit:mm)

● **TC4L**
● Bracket

96

96

6    64.5

101.5

TC4L

SV °F °C
AL1 AL2 OUT

MODE

● Panel cut-out

Min. 115

Min. 115

92 $^{+0.8}_{-0}$

92 $^{+0.8}_{-0}$
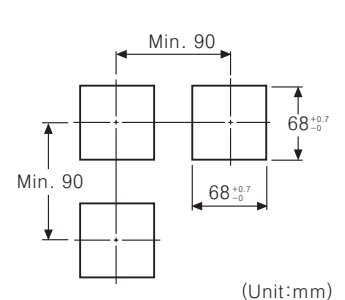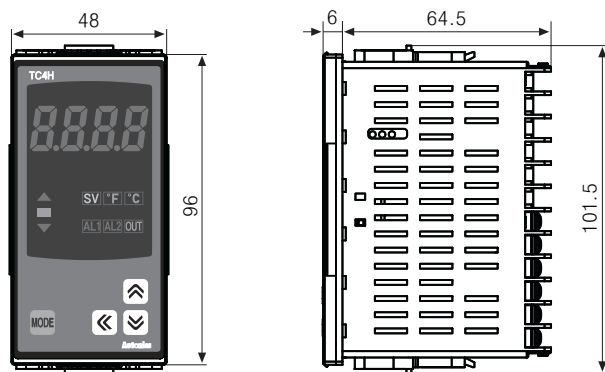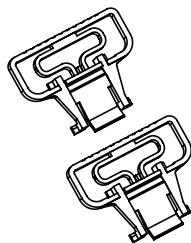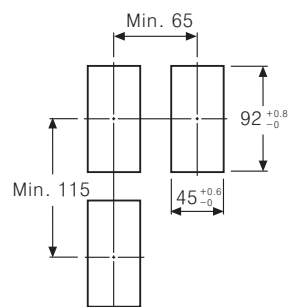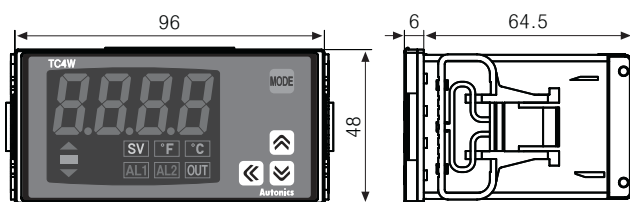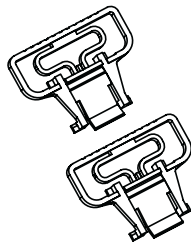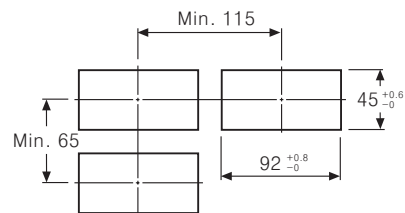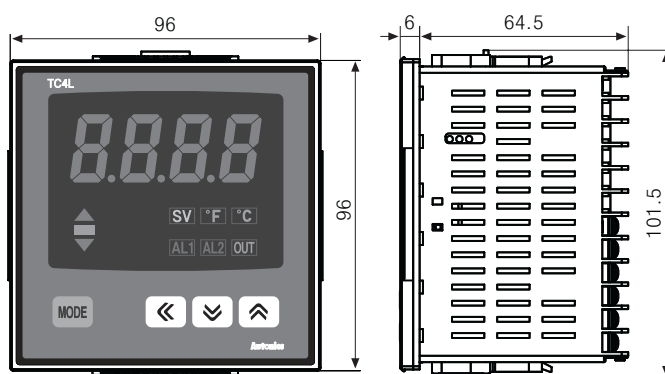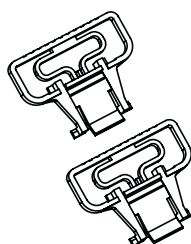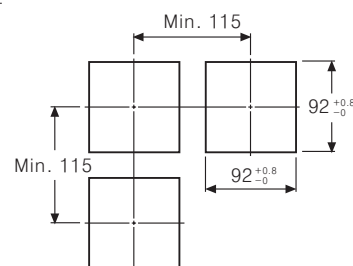
(Unit:mm)

## ▣ Product mounting

● TC4S/SP (48×48mm) series
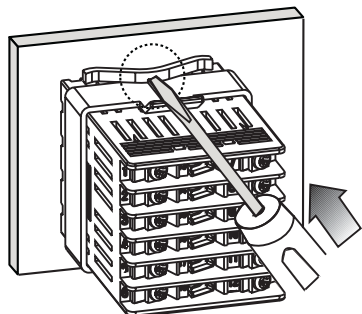
● TC4Y (72×36mm) series
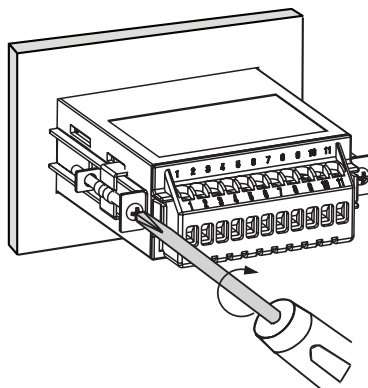
● Other series
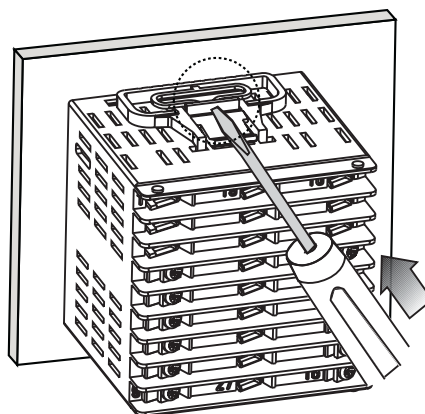
※ Insert product into a panel, fasten bracket by pushing with tools as shown above.
(In case of TC4Y, fasten the bracket bolts.)

Autonics

# Touch Switch Type Temperature Controller

(A)
Counter

(B)
Timer

(C)
Temp.
controller

(D)
Power
controller

(E)
Panel
meter

(F)
Tacho/
Speed/
Pulse
meter

(G)
Display
unit

(H)
Sensor
controller

(I)
Switching
power
supply

(J)
Proximity
sensor

(K)
Photo
electric
sensor

(L)
Pressure
sensor

(M)
Rotary
encoder

(N)
Stepping
motor &
Driver &
Controller

(O)
Graphic
panel

(P)
Field
network
device

(Q)
Production
stoppage
models &
replacement

## ■SSRP(Solid State Relay Phase Output) output function[ 55r.ñ ]

- ●SSRP is a user selectable output type which phase control and cycle control are added to standard SSR drive output.
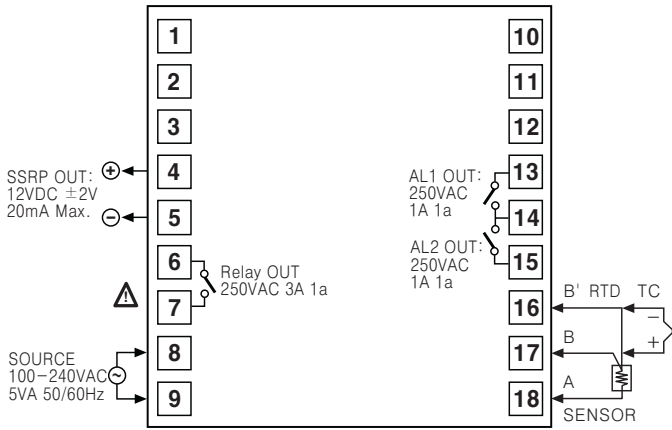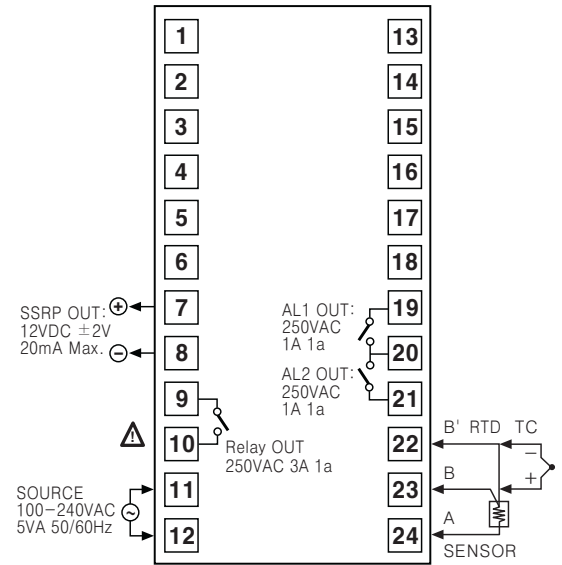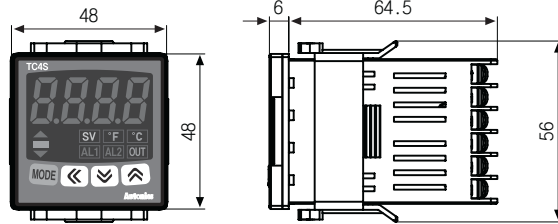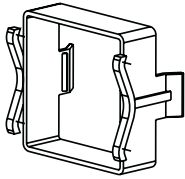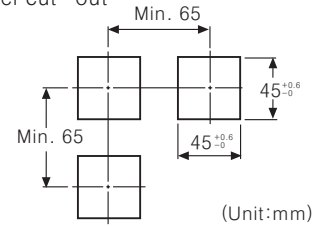- ●Standard SSR output is still available by internal parameter setting [55r.ñ]; in addition, "cycle control" with connecting Zero cross turn-on type SSR or Random turn-on type SSR and "phase control" with connecting Random turn-on type SSR are also available.
- ●Realizing high accuracy and cost effective temperature control with both current output(4-20mA) and linear output(cycle control and phase control).



**Temp. controller**

TC4 series

SSRP voltage output 12VDC

SSR module

Load

INPUT    LOAD

SRH1 series

Power
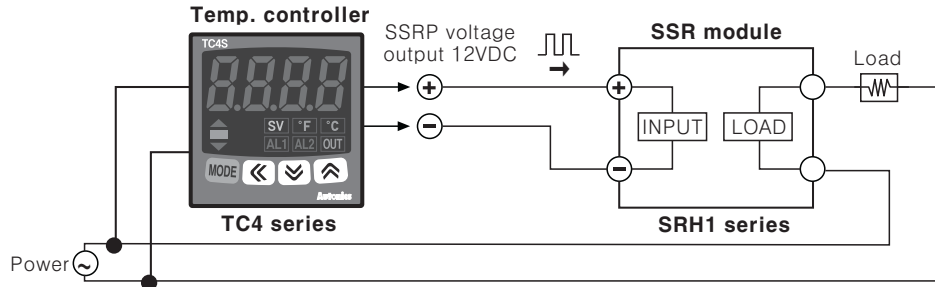
### ※You can select the functions with parameter settings.



ON/OFF output

ON    OFF    ON    OFF

Cycle output

When using Zero Cross Turn-on SSR or Random Turn-on SSR (2% cycle control)

50cycle
50%(2cycle OFF, 2cycle ON)

50cycle
80%(1cycle OFF, 4cycle ON)

Phase output

When using Random Turn-on SSR for AC half cycle phase control output

40%    70%
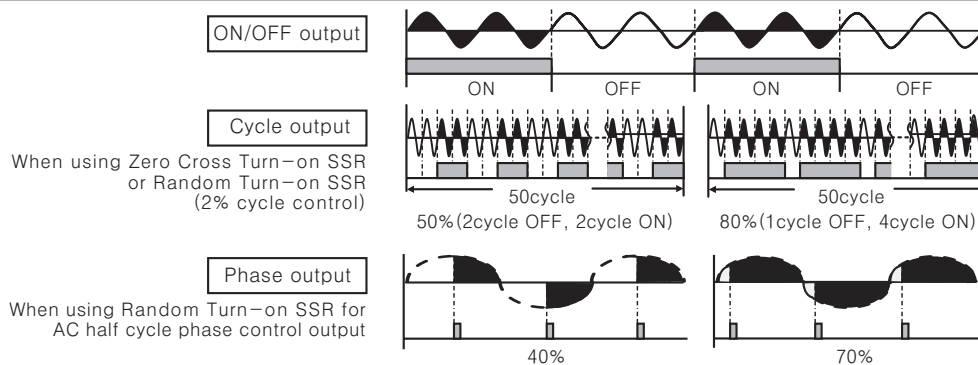
- ●Standard control mode[ 5tnd ]
  A mode to control the load in the same way as RELAY output type.(ON: output level 100%, OFF: output level 0%)
- ●Cycle control mode[ CYCL ]
  A mode to control the load by repeating output ON / OFF according to the rate of output within setting cycle
  Having improved 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 / cycle control output modes, control cycle (t) is not allowed to set.**

## ■Parts description
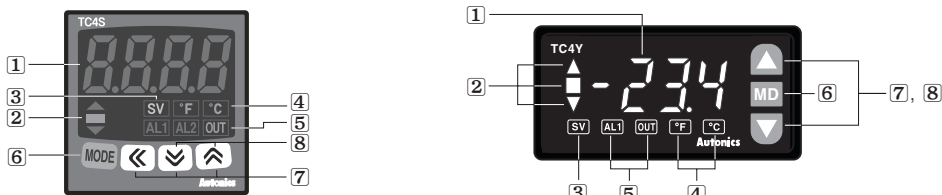


① Temperature display
  It shows current temperature(PV) in RUN mode and parameter and set value for each setting group in parameter change mode.

② Deviation and Auto-tuning indicator
  It shows current temperature(PV) based on set temperature(SV) by LED.
  Deviation indicators(▲, ■, ▼) are flashed by every 1sec when operating auto-tuning.

③ Set temperature(SV) indicator
  Press any front key once to check or change current set temperature(SV), set temperature(SV) indicator is on and preset set value is flashed.

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

⑤ Control/alarm output indicator
  -OUT : It will light up when control output(Main Control Output) is on.
   ※It will light up over 3.0% of operation in CYCLE/PHASE control.
  -AL1/AL2 : It will light up when alarm output AL1/AL2 are 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 -Ł].
  ※Press ⊻+⊼ keys once in set value operation to move digit.

# TC Series

## ▣ Flow chart for setting group

```
                                    RUN mode ◄──────────────────────────────────┐
                                                                           ⑤
① Press any key among        ② Press [MODE] for 2sec.        ③ Press [MODE] for 4sec.
  [MODE], [≪], [∨], [∧]
     │                              │                              │
     ▼                              ▼                              ▼
┌──────────────┐         ┌─────────────────────┐      ┌──────────────────────────┐
│SV setting group│       │First setting group(PAr1)│   │Second setting group(PAr2)│
└──────────────┘         └─────────────────────┘      └──────────────────────────┘
   [MODE]                   Press [MODE] for 3sec.        Press [MODE] for 3sec.
```
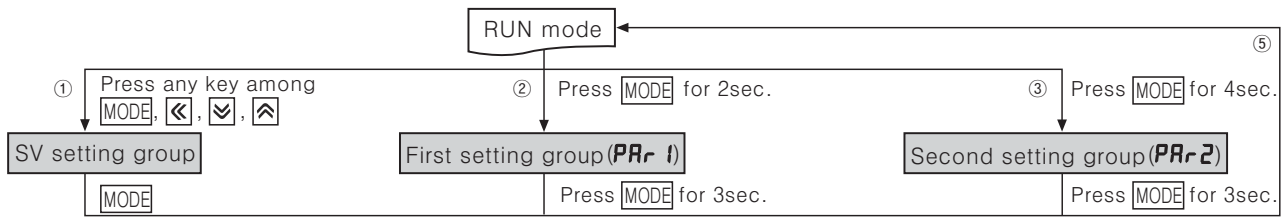
④
| | |
|---|---|
| **AL1** | Alarm1 setting value |
| **AL2** | Alarm1 setting value |
| **At** | Auto−tuning execute |
| **P** | Proportional band |
| **I** | Integral time |
| **d** | Derivation time |
| **rESt** | Manual reset |
| **HYS** | Hysteresis |

| | |
|---|---|
| **In-t** | Input type |
| **Unit** | Temperature unit |
| **In-b** | Input bias |
| **mAuF** | Input digital filter |
| **L-Su** | SV low limit |
| **H-Su** | SV high limit |
| **o-Ft** | Control operating type |
| **C-md** | Control method |
| **oUt** | Control output type |
| **SSr.m** | SSRP output method |
| **t** | Control time |
| **AL-1** | Alarm1 mode |
| **AL-2** | Alarm2 mode |
| **AHYS** | Alarm hysteresis |
| **LbAt** | LBA monitoring time |
| **LbAS** | LBA detection setting value |
| **LbA.b** | LBA detection band |
| **dl-Y** | Function key operation |
| **Er.mu** | Input error MV |
| **LoC** | Lock |

※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 2sec in RUN mode, it advances to setting group 1.
③Press [MODE] key over 4sec 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 3sec in the setting group, it returns to RUN mode.
 [※Exception : Press [MODE] key once in setting group of set value, it returns to
  RUN mode.]

※If no key touched for 30sec, it will return to RUN mode automatically and the set
  value of parameter will not be changed.
※Press [MODE] key again within a sec after return to RUN mode by press [MODE] key
  over 3sec, 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.
  •  Parameter marked in [.....] would not be displayed by another parameter setting.
※Indicator type displays colored parameter of setting group2.
※AL2 and AL-2 parameter display is available with only "Alarm output 1 + Alarm output 2" model.
※AHYS parameter will not be displayed when AL-1 or AL-2 is set to LBA or HBA.

## ▣ Flow chart for SV setting group (※To change preset temperature 210℃ into 250℃.)



① RUN mode(display a current temperature)

Press any key among [MODE], [≪], [∨], [∧].

② Set value change mode
Change set value by [≪], [∨], [∧] keys.

③ Finish the setup.

④ To check a SV  [MODE]

[MODE]
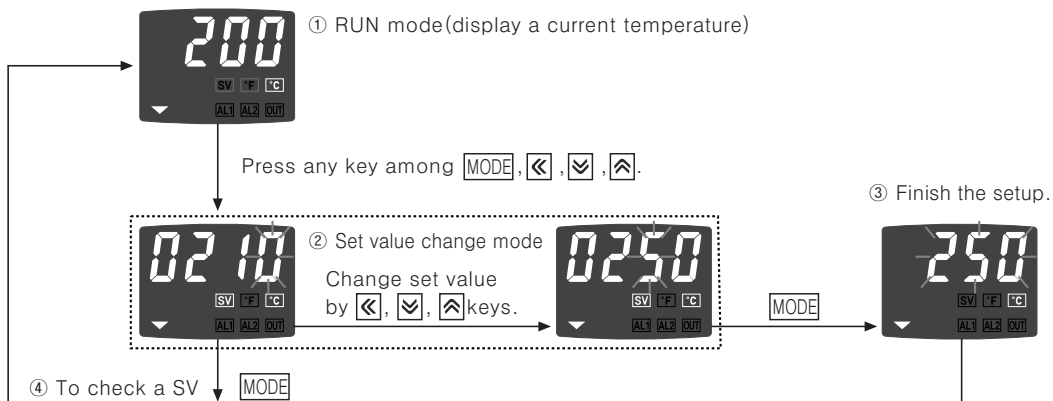
# Touch Switch Type Temperature Controller

## ■Flow chart for first setting group

Press MODE for 3sec. → **Run mode**

**PAr 1** Press MODE for 2sec.

※ S : Press any key among 《, ⋁, ⋀.
※After checking or changing setting value in each parameter, press MODE key to save and move to next parameter setting.

Alarm1 setting value
**AL 1** S → **1250**

Setting range : Deviation alarm(−[F.S]~[F.S], Absolute value alarm(Input range)
※In case alarm operation mode (AL-1) is set to [ Ano_/SbA. :/LbA_ ], no parameters will be displayed.

Alarm2 setting value
**AL2** S → **1250**

Setting range : Deviation alarm(−[F.S]~[F.S], Absolute value alarm(Input range)
※In case alarm operation mode (AL-2) is set to [ AnO_/SbA. :/LbA_ ], no parameters will be displayed.

Auto−tuning execute
**At** S → **oFF** ↔ **on**

※It starts to operate auto−tuning when it is ON and set as OFF automatically after finish the operation.
※**Front deviation indicator(▲, ■, ▼)** will be flickering(cycle:1 sec) during auto tuning function.

Proportional band
**P** S → **010.0**

Setting range : **0.1 ~ 999.9℃**

Integral time
**I** S → **0000**

Setting range : **0 ~ 9999sec.**
※Integral operation will be OFF when set value is "0".

Derivation time
**d** S → **0000**

Setting range : **0 ~ 9999sec.**
※Derivative operation will be OFF when set value is "0".

※It will be displayed only if control method parameter(C-md) is set as [ PI d ].

Manual reset
**rESt** S → **050.0**

Setting range : **0.0 ~ 100.0%**
※It will be displayed in P/PD control and not in ON/OFF and PI/PID control.

Hysteresis
**HYS** S → **002**

Setting range : **1 ~ 100℃ [0.1~50.0℃]**
※It will be displayed in ON/OFF control.

## ■Flow chart for second setting group

Press MODE for 3sec. → **Run mode**

**PAr2** Press MODE for 4sec.

※ S : Press any key among 《, ⋁, ⋀.
※After checking or changing setting value in each parameter, press MODE key to save and move to next parameter setting.

Input type
**In-t** S → **YCA** ↔ **JIC** ↔ **Pt 1** ↔ **Pt2**

Temperature unit
**Unit** S → **℃** ↔ **℉**

※Front temperature unit indicator will be flickering when selecting the unit.

Input bias
**In-b** S → **000**

Setting range:**−999 ~ 999℃[※Pt2 : −199.9 ~ 999.9℃]**

Input digital filter
**mAuF** S → **0.1**

Setting range:**0.1 ~ 120.0sec.**

# TC Series

**SV low limit**

`L-5u` ⬛S → `-050`

⬛MODE    ⬛MODE

Setting range : Within using range of each sensor(KCA sensor)
※It enables to set ranged [ `L-5u` ≤ `H-5u` ] −1

**SV high limit**

`H-5u` ⬛S → `1200`

⬛MODE

Setting range : Within using range of each sensor(KCA sensor)
※It enables to set ranged [ `H-5u` ≥ `L-5u` ] +1

**Control operating type**

`o-Ft` ⬛S → `HEAt` ⇄ `CooL`

⬛MODE

**Control method**

`C-ñd` ⬛S → `PId` ⇄ `onoF`

⬛MODE

**Control output type**

`oUt` ⬛S → `rLY` ⇄ `55r`

※Preset output will be operated as control output.

**SSRP output method**

`55rñ` ⬛S → `5tnd` ⇄ `CYCL` ⇄ `PHA5`

⬛MODE

※It will be displayed when selecting [ `oUt` ] as [ `55r` ].

**Control time**

`t` ⬛S → `020.0`

⬛MODE

Setting range : **0.5 ~ 120.0sec.**
※In case of [ `rLY` ] output mode default value is 20.0 sec.(2.0sec in case of [ `55r` ] mode)
※It will not be displayed when [ `55rñ` ] is set as [ `CYCL/PHA5` ].

**Alarm1 mode**

`AL-1` ⬛S → `Añ1.A` ⇄ `LbA_` ← 《 → `Añ1.A` ⇄ `Añ1.d`

⬛MODE

※Select alarm operation mode    ※Select alarm option

※Press 《 key to convert alarm operation mode into alarm option.

**Alarm2 mode**

`AL-2` ⬛S → `Añ2.A`

⬛MODE

※Same with the above [ `AL-1` ].

**Alarm hysteresis**

`AHY5` ⬛S → `001`

⬛MODE

Setting range : **1 ~ 999℃[0.1 ~ 50.0℃]**
※`AHY5` parameter will not be displayed when set value is set as [ `AñQ_/5bA.⣿/LbA_` ].

**LBA monitoring time**

`LbAt` ⬛S → `0`

Setting range : **0 ~ 9999sec.**
※[ `LbAt` ] parameter will be displayed when alarm operation mode(`AL-1`, `AL-2`) is set as [ `LbA_` ].

**LBA detection setting value**

`LbA5` ⬛S → `008`

Setting range : **1 ~ 999℃**
※When setting [ `AL-1`, `AL-2` ] to [ `LbA_` ] and [ `LbAt` ] setting value is 0, [ `LbA5` ] parameter is not displayed.

**LBA detection band**

`LbAb` ⬛S → `003`

Setting range : **1 ~ 999℃**
※[ `LbAb` ] parameter will be displayed when alarm operation mode(`AL-1`, `AL-2`) is set as [ `LbA_` ] and [ `LbAt` ] is not 0.

**Function key operation**

`dI-Y` ⬛S → `5toP` ⇄ `AL.rE`

※[ `AL.rE` ] will not be displayed in case of no alarm output models.

**Input error MV**

`Er.ñu` ⬛S → `000.0`

Setting range : **0.0 ~ 100.0%**
※0.0/100.0% will be displayed in ON/OFF control.

**Lock**

`LoC` ⬛S → `oFF` ⇄ `LoC1` ⇄ `LoC2` ⇄ `LoC3`

⬛MODE

# Touch Switch Type Temperature Controller

(A) Counter

(B) Timer

(C) Temp. controller

(D) Power controller

(E) Panel meter

(F) Tacho/ Speed/ Pulse meter

(G) Display unit

(H) Sensor controller

(I) Switching power supply

(J) Proximity sensor

(K) Photo electric sensor

(L) Pressure sensor

(M) Rotary encoder

(N) Stepping motor & Driver & Controller

(O) Graphic panel

(P) Field network device

(Q) Production stoppage models & replacement

## ▣ Factory default

### ● First setting group

| Mode | Setting value | Mode | Setting value | Mode | Setting value | Mode | Setting value |
|------|---------------|------|---------------|------|---------------|------|---------------|
| AL 1 | 1250 | At | oFF | i | 0 | rESt | 50.0 |
| AL2 | 1250 | P | 10.0 | d | 0 | HYS | 2 |

### ● Second setting group

| Mode | Setting value | Mode | Setting value | Mode | Setting value | Mode | Setting value | Mode | Setting value |
|------|---------------|------|---------------|------|---------------|------|---------------|------|---------------|
| In-t | KCA | L-Su | -50 | oUt | rLY | AL-2 | An2A | LbAb | 3 |
| Unit | ℃ | H-Su | 1200 | SSrm | Stnd | AHYS | 1 | di-t | StoP |
| In-b | 0 | o-Ft | HEAt | t | 20.0 | LbAt | 0 | Er.mu | 0.0 |
| mAuF | 0.1 | C-md | PId | AL-1 | An1A | LbAS | 8 | LoC | oFF |

## ▣ Input sensor and range[ In-t ]

● Select proper input sensor type by user application.

| Input sensor | | Display | Input range ℃ | Input range °F |
|---|---|---|---|---|
| ThermoCouple | K(CA) | KCA | −50 ~ 1200℃ | −58 ~ 2192°F |
| | J(IC) | JIC | −30 ~ 500℃ | −22 ~ 932°F |
| RTD | DIN rated Pt 1 | Pt1 | −100 ~ 400℃ | −148 ~ 752°F |
| | Pt 2 | Pt2 | −100.0 ~ 400.0℃ | −148.0 ~ 752.0°F |

## ▣ Function

See C−25 page for TC / TD common features.

### ◎ SV / PV deviation display function

A function to display SV / PV deviation on front lamp
● When PV is higher than SV over +2℃(+2.0℃), ▲(RED) lamp is ON. (PV > SV + 2.0℃)
● When PV / SV deviation is ±2℃(±2.0℃), ■(GREEN) lamp is ON.(SV + 2.0℃ ≥ PV ≥ SV − 2.0℃)
● When PV is lower than SV over −2℃(−2.0℃), ▼ (RED) lamp is ON.(PV < SV − 2.0℃)

### ◎ Control output type selection[ oUt ]

● A function to select control output type; Relay output(rLY), SSRP voltage output(SSr).
※ In case of selecting SSRP voltage output, SSRP output method(SSrm) selection parameter is displayed.

### ◎ Lock setting[ LoC ]

● It locks set value and parameter change of the group.
● It enables to check parameter set value of locked setting group.

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

※ oFF, LoC1 are available only for indicator(TC4□− N□N).

### ◎ Error

● Error mark will flash(every 1sec) 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. |

● It will operate normally, if input sensor is connected or returned to normal range under error oPEn / HHHH / LLLL status.

### ◎ Output connections

● Application of relay output type
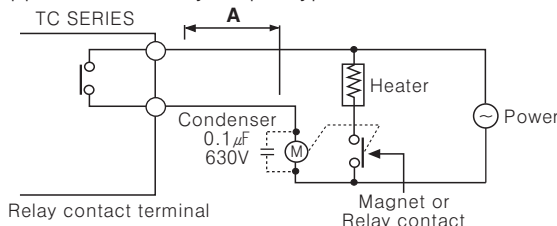


Keep power relay as far away as possible from temperature controller. If wires length of **A** is short, electromotive force occurred from a coil of magnet switch & power relay may flow in power line of the unit, it may cause malfunction. If wires length of **A** is short, please connect a mylar condenser 104(630V) across coil of the power relay " Ⓜ " to protect electromotive force.

● Application of SSRP output method
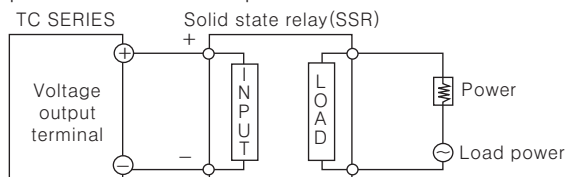


※ SSR should be selected by the capacity of load, otherwise, it may short−circuit and result in a fire. Indirect heated should be used with SSR for efficient working.
※ Please use a cooling plate or it may cause the capability deterioration, breakdown of SSR for a long usage.
※ Refer to C−12 page for phase / cycle control connections.