# DIGITAL TEMPERATURE CONTROLLER CN-40 USER'S MANUAL

Thank you for purchasing Digital Temperature Controller CN-40.
Please go through carefully this instruction manual and use the unit in proper manner.

## 1. NOTICE/WARNING BEFORE OPERATION USE

- When having the purchased controller at hand, please be sure that its unit is a correct model (See "Model Configuration #2")
- The following symbol marks are being used in this user's manual for safety operation.

**⚠ WARNING** Due to mishandling, serious dangers may occur to the operator such as death, electrocution and a skin burn.

**⚠ CAUTION** Owing to mishandling, it may cause some damage to the unit or the operator getting slight injury.

**CAUTION**

- For prevention of its malfunction, do not push the front key with sharp points such as pencil or metal needle.

**⚠ WARNING**

- Make sure the correct wiring connection before turning on electricity. Miss-wiring may cause malfunction of the unit and fire.
- Never modify the unit to prevent damage or incident such as malfunction and fire etc.

- Kindly check the following accessory being contained in that carton box.
- This user's manual: 1copy · Installation attachment
- Please be careful that types of input can not be changed after receipt of the unit at customer's end (Input of thermocouple and RTD can be changed by parameter setting.)
- Please deliver this user's manual to the operator.
- Copy or reprint of this manual, wholly or partially, is not allowed.
- The contents of this manual may change without notice in future.
- Please be aware that we shall not be responsible to all of the defaults resulted by using of the unit.

## 2. MODEL CONFIGURATION

CN-40□

| Symbol | Output type |
|---|---|
| Non | Relay contact output |
| P | SSR drive voltage output |

## 3. Parts indication

3.1 LED lamp
a) OUT:control output indication · · · Lights On when output turn On.
b)EV1:event output indication · · · · Lights On when output turn On.

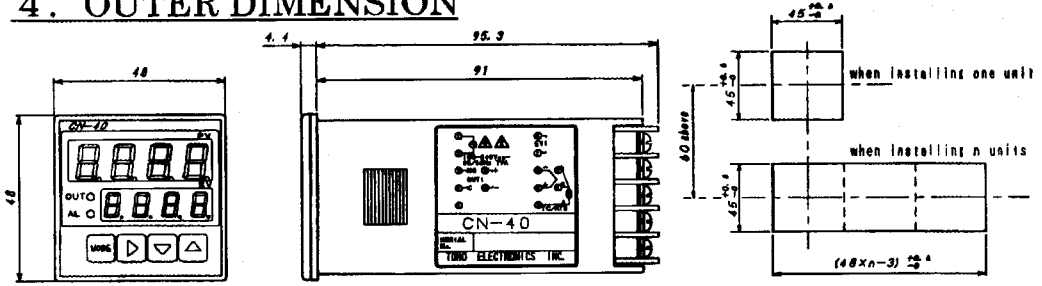
3.2 Operation key
a)Mode key · · · For change of each mode/parameters.
b) ▷ key · · · For action of function setting(sift figures · Auto-tuning start/stop)
c) △ key · · · Up key or changing setting
d) ▽ key · · · Down key or changing setting

3.3 ABOUT LOCATION OF INSTALLATION

Install the unit at the following proper location

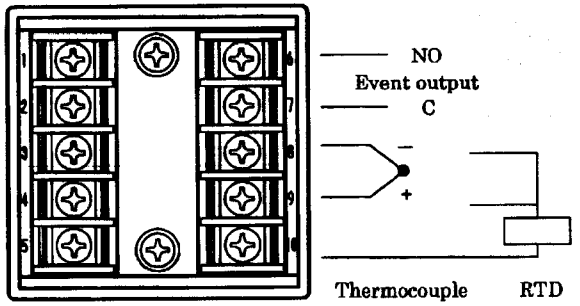
- Less dust and oily smoke.
- Less mechanical vibration and shock.
- Away from splash water.
- Away from the gas of sulfide and corrosion.
- Away from the influence of electromagnetic field.
- Away from the direct sunshine.
- Away from the equipments using high-voltage ignition devices.
- Away from high-voltage wire, welding machine and generator of electric noise.
- Temperature and humidity are within the limit of operation environment.

## 4. OUTER DIMENSION




## 5. WIRING

5.1 Termnal arrangement




5.2 NOTICE OF WIRING

**⚠ WARNING**

- For prevention of electric shock, please do wiring after turning power off.

**⚠ CAUTION**

- The unit does not make control action for 4 second after turning On. (No output action) Please be careful that when the unit is used as interlock circuit.
- For prevention of miss-wiring, please check with user's manual.

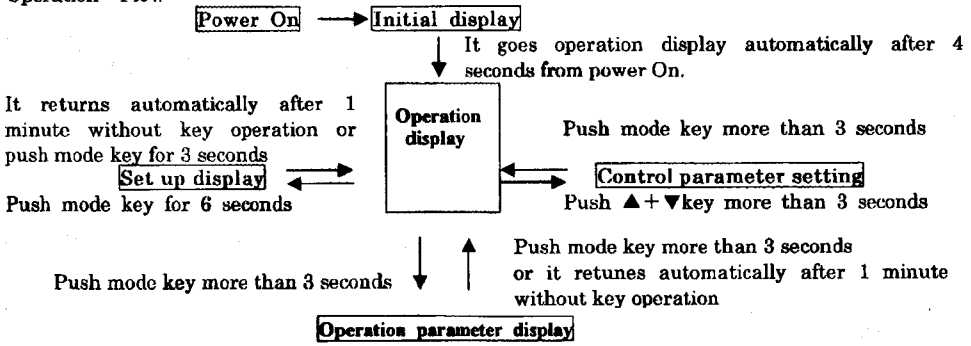
- Use wire material with wire resistance value below 5Ω/ per wire for connecting RTD with the unit.
- Use specified compensation wire or element itself for connecting thermocouple with the unit.
- Use shield wires in operation of near noise generator. Also do not wire the input output lines within same duct or power pip.
- Keep away input output signal wires more than 50 cm from power line or load line.

※ Kind of error

| | |
|---|---|
| Err 0 : Setting data abnormal. | Err 4 : RAM abnormal. |
| Err 1 : A/D converter abnormal. | Err 5 : Calibration data abnormal. |
| Err 2 : Auto-tuning error. | Err 6 : Non-volatile memory abnormal. |
| Err 3 : ROM abnormal. | Err 7 : cooling contact compensation circuit abnormal. |

# 6 .OPERATION FLOW AND PARAMETER INSTRUCTION

## 6.1 Operation Flow




## 6.2 Parameter instruction

a) Operation parameter display

| Character | Item | Setting range & instruction | | Initial value |
|---|---|---|---|---|
| | Setting value | SLL~SLH | | SLL |
| A | Event output Setting value | Absolute value : SLL~SLH<br>Deviation value : −(SLH−SLL)~(SLH−SLL) | Without await sequence<br>1) High limit absolute value : SLH<br>2) Low limit absolute value : SLL<br>3) High limit deviation : 0<br>4) Low limit deviation : 0<br>5) High limit deviation non excitation : 0<br>6) Low limit deviation non excitation : 0<br>7) High & Low limit deviation : 0<br>8) High & Low limit deviation rang : 0<br>9) High limit absolute value non excitation : SLH<br>10) Low limit absolute value non excitation : SLL<br>With await sequence<br>11) High limit absolute value : SLH<br>12) Low limit absolute value : SLL<br>13) High limit deviation : 0<br>14) Low limit deviation : 0<br>15) High limit deviation non excitation : 0<br>16) Low limit deviation non excitation : 0<br>17) High & Low limit deviation : 0<br>18) High & Low limit deviation rang : 0<br>19) High limit absolute value non excitation : SLH<br>20) Low limit absolute value non excitation : SLL | |
| tYPE | Control type | oFF : TYPE A<br>on : TYPE B (Overshoot protection function) | | oFF |
| At | Auto-tuning | oFF : Auto-tuning action OFF<br>on : Auto-tuning action ON | | oFF |
| P | Proportional band | 1~3000.0% (SLL-SLH) against | | 3.0 |
| I | Integral time | 0~3600 seconds | | 0 |
| d | Derivative time | 0~3600 seconds | | 0 |
| Pbb | Manual reset | 0.0~100.0% | | 0.0 |
| t | Proportional cycle | 1~120 seconds | | 20 |
| C | Control sensitivity | 0~(SLH−SLL) ℃ | | Thermocouple : 0<br>RTD : 0.0 |
| PuS | PV correction | −(SLH−SLL)~(SLH−SLL) ℃<br>When (SLH-SLL) value is exceeded certain value<br>thermocouple: limit : -1999~9999℃<br>RTD: limit : -199.9~999.9℃ | | Thermocouple : 0<br>RTD : 0.0 |

b)Set up display

| Character | Item | Setting rang & instruction | Initial value |
|---|---|---|---|
| EuF | Event function | 0 : Event Non<br>Without await sequence<br>1 : High limit absolute value　2 : Low limit absolute value<br>3 : High limit deviation　4 : Low limit deviation<br>5 : High limit deviation non excitation　6 : Low limit deviation non excitation<br>7 : High & Low limit deviation　8 : High & Low limit deviation rang<br>9 : High limit absolute value non excitation<br>10 : Low limit absolute value non excitation<br>With await sequence<br>11 : High limit absolute value　12 : Low limit absolute value<br>13 : High limit deviation　14 : Low limit deviation<br>15 : High limit deviation non excitation　16 : Low limit deviation non excitation<br>17 : High & Low limit deviation　18 : High & Low limit deviation rang<br>19 : High limit absolute value non excitation<br>20 : Low limit absolute value non excitation | 0 |
| EuC | Event sensitivity | 0~(SLH−SLL) ℃ | Thermocouple : 0<br>RTD : 0.0 |
| SLH | SV limiter High limit setting | Thermocouple: (SLL+50) ℃~Setting Rang max<br>RTD : (SLL+5.0) ℃~500.0℃ | Thermocouple : Maximum value of setting range<br>RTD : 500.0 |
| SLL | SV limiter Low limit setting | Thermocouple: Setting Rang min~(SLH−50) ℃<br>RTD : -199.9℃~(SLH−5.0) ℃ | Thermocouple : Minimum value of setting range<br>RTD : -199.9 |
| OLH | Manipulated value limiter High limit setting | OLL~100.0% | 100.0 |
| OLL | Manipulated value limiter Low limit setting | 0.0~OLH% | 0.0 |

c) Control parameter display

| Character | Item | Setting range & instruction | nitial value |
|---|---|---|---|
| Cnt | Control type | 0 : ON/OFF Control　1 : PID Control | 1 |
| dIr | Control action | 0 : Normal action (cooling control)　1 : Reverse action (heating control) | 1 |
| InP | Input type | 00 : K thermocouple　01 : J thermocouple<br>02 : T thermocouple　03 : E thermocouple<br>04 : R thermocouple　05 : N thermocouple<br>06 : S thermocouple　07 : W5Re/W26Re<br>10 : Pt100　11 : JPt100 | 00 |
| CnF | ℃/F switch | C : ℃　F : ℉ | C |
| FU | FUNC key function | 0 : Non　1 : Figure shift of setting value　2 : Auto-tuning start /stop | 0 |
| LoC | Key Lock | oFF : Without key lock　on : with key lock | oFF |

# 7 . INDICATION · SETTING RANG & SPECIFICATION

| Input type | Indication range | Setting range |
|---|---|---|
| K Thermocouple | Thermocouple & R.T.D<br>It is possible to indicate from −5 to 105% of the setting range for all Kind of inputs.<br>But,it must be within −1999(-199.9) ~9999(999.9)of the setting range. | 0~1200℃ ( 0~2200 ° F) |
| J Thermocouple | | 0~800℃ ( 0~1450 ° F) |
| T Thermocouple | | -200~400℃ (-330~750 ° F) |
| E Thermocouple | | 0~800℃ ( 0~1450 ° F) |
| R Thermocouple | | 0~1700℃ ( 32~3100 ° F) |
| N Thermocouple | | 0~1300℃ ( 32~2350 ° F) |
| S Thermocouple | | 0~1700℃ ( 32~3100 ° F) |
| W5Re/W26Re | | 0~2300℃ ( 32~4200 ° F) |
| Pt100 | | -199.9~500.0℃ (-199.9~950.0 ° F) |
| JPt100 | | -199.9~500.0℃ (-199.9~950.0 ° F) |

Sensor wire break indication: Over indication 「SErr」 (PV indication side)　Sampling cycle : 500mS

Input accuracy : Thermocouple : ±(0.5%+1digit) of process value or±4℃(8 ° F), either of bigger numerical value is taken.
RTD: ±(0.5%+1digit) pf process value or±1.2℃ (2.4 ° F), either of bigger numerical value is taken.

Control output : Relay contact output: Contact form 1a contact　Contact capacity AC250V3A
Minimum load 5V　(Same as Event output)

SSR drive voltage output: Output voltage12VDC Output accuracy ±1V(ambient temperature)　Load resistance : 600Ω

Power voltage : AC85~264V　50/60Hz (Power consumption : Below7VA)

Operating condition : 0~50℃(without condensation) Humidity35~85%RH(without condensation)