

CHINO

**LT110 series
Digital Indicating Controller**

CHINO

Instruction Manual

To prevent the accident by mis-handling of this controller, please arrange to give this manual into the hands of the operator who actually uses our product.

⚠ Warning

Turn the power supplied to the instrument OFF before wiring or checking. If working or touching the terminal on the power ON status, there is a possibility of Electric Shock which can cause severe injury or death.

1. Name

1.1 Model names

L T 1 1 □ □ 0 0 0 0 - □ 0 A		
Input signal	0 1	Universal input (with 1 event output) Thermocouple multi-input
Control output	1 3 5	On-off pulse type Current output type SSR drive pulse type
Options (Available in universal input type only)	0 1 2	None Setpoint change (DI)...With 2SVs and 1DI Heater disconnection (CT)...With CT

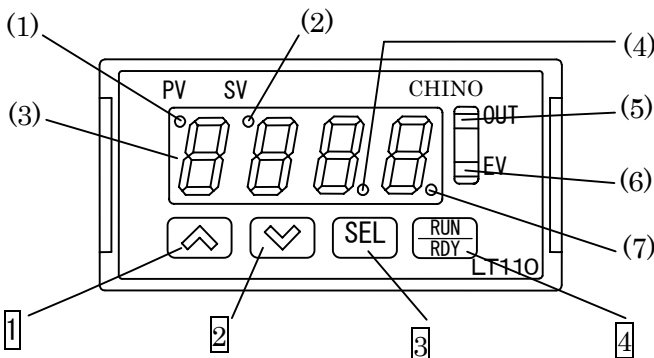
1.2 How to indicate the model name plate

Model name plates are put on the case and the bottom side of the internal assembly.

- (1) L T 1 1 0 1 0 0 0 0 - 0 0 A On-off pulse type output/Universal input
 (2) N o .

- (1): Model No.
 (2): Serial No. (Indicated only on the internal assembly)

2. Name and functions of the section

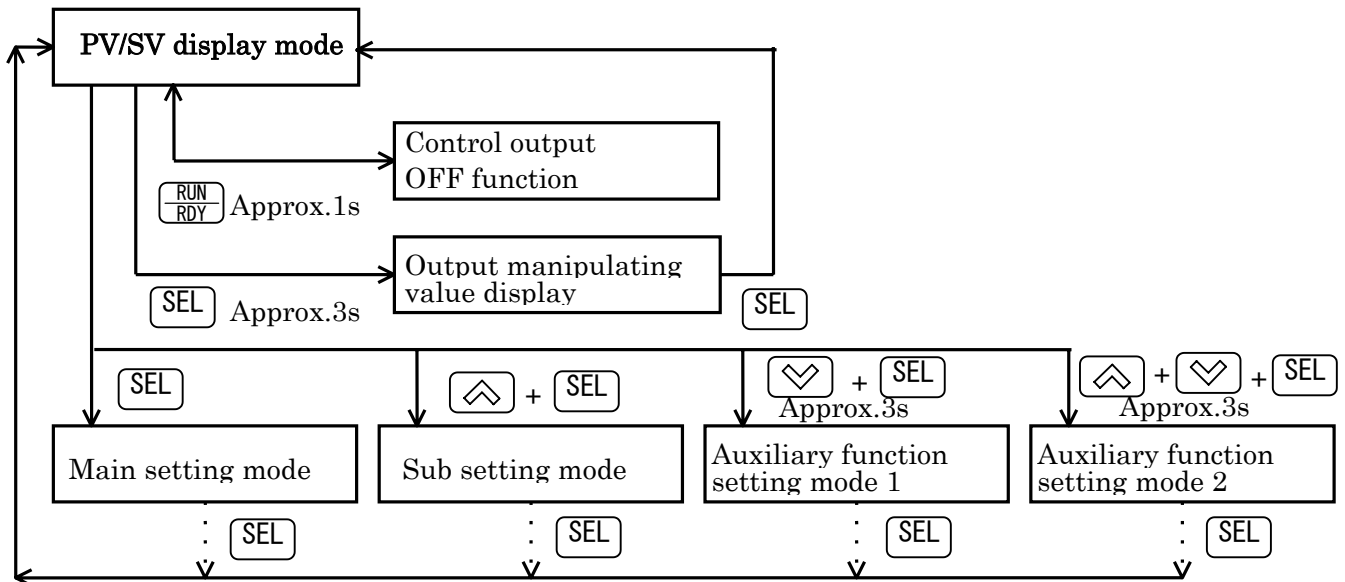


- 1 Increase key : It increases the numeric value.
 2 Decrease key : It decreases the numeric value.
 3 SEL key : It selects the setting mode.
 4 RUN/RDY key : It turns the control output ON or OFF.

- (1) PV indicator : Red LED lights when Process variable is being indicated on the PV/SV display.
- (2) SV indicator : Red LED lights when Setting value is being indicated on the PV/SV display. Besides, it blinks while being controlled with the main setting 2.
- (3) PV/SV display : It indicates the process variable, setting value and characters with red LED.
- (4) Decimal point indicator : Red LED lights when decimal point is designated. Besides, it blinks when Manipulating value (MV) is being displayed.
- (5) Control output indicator : Green LED lights when the control output is ON.
- (6) Event output indicator : Red LED lights when the Temperature alarm, Loop break alarm or Heater disconnection alarm is ON.
- (7) Auto-tuning action indicator : Red LED blinks while the auto-tuning or auto-reset is being performed.

3. Operation

3.1 Procedure of calling each setting mode



It changes the setting item of each setting mode by pressing the **[SEL]** key.

PV/SV display indicates the characters of the sensor type and unit for approx. 2 seconds after the power is turned ON. During this time, all outputs and LED indicators are in their off status. (Refer to the table 3.1-1.)

After that, it indicates actual temperature or the main setting value, and control starts. (If PV display is selected in PV/SV display selection, the actual temperature is indicated. If SV display is selected, the main setting value is indicated.)

[Table 3.1-1]

Input	PV/SV display	
	°C	°F
K	<i>t C</i>	<i>t F</i>
J	<i>d C</i>	<i>d F</i>
Platinel II	<i>PL2C</i>	<i>PL2F</i>
N	<i>n C</i>	<i>n F</i>
E	<i>E C</i>	<i>E F</i>
Pt100 (With decimal point)	<i>Pt C</i>	<i>Pt F</i>
JPt100(With decimal point)	<i>JPt C</i>	<i>JPt F</i>
Pt100	<i>Pt C</i>	<i>Pt F</i>
JPt100	<i>JPt C</i>	<i>JPt F</i>

3.2 Main setting mode

Character	Name, Description, Setting range	Initial
4	Main setting 1 <ul style="list-style-type: none"> • It sets the 1st Main setting value of the main control. • Main setting low limit value to Main setting high limit value 	0°C (°F)
4 ²	Main setting 2 <ul style="list-style-type: none"> • It sets the 2nd Main setting value of the main control. • This setting item is not available if option [Setpoint change] is not applied. • Main setting low limit value to Main setting high limit value 	0°C (°F)

3.3 Sub setting mode

Character	Name, Description, Setting range	Initial
AI r-4f	Auto-tuning performance/cancellation, or Auto-reset performance <ul style="list-style-type: none"> • It designates auto-tuning performance or cancellation, or auto-reset performance. • Auto-reset will be canceled automatically in approx. 4 minutes. 	----
P	Proportional band value setting <ul style="list-style-type: none"> • It sets the proportional band of control output. • Setting the value to 0 or 0.0, control output acts ON/OFF. • 0 (0.0) to rated scale maximum value 	10°C (20°F)
I	Integral time setting <ul style="list-style-type: none"> • It sets the integral time of control output. • Setting the value to 0 disables the function. • With PD action (I=0), auto-reset can be performed. • 0 to 3600 seconds 	200s
D	Derivative time setting <ul style="list-style-type: none"> • It sets the derivative time of control output. • Setting the value to 0 disables the function. • 0 to 3600 seconds 	50s
C	Pulse cycle setting <ul style="list-style-type: none"> • It sets the pulse cycle value. • This setting item is not available when ON/OFF action or current output type. • 1 to 120 seconds 	On-off pulse: 30s SSR drive: 3s
A	Temperature alarm setting <ul style="list-style-type: none"> • It sets the action point of the temperature alarm output. • This setting item is not available for the LT111. • This setting item is not available if no alarm action is selected in Temperature alarm action selection. • This setting item is not available if the Temperature alarm output function is not selected in Event output function selection. • Refer to the Table 3.3-1. 	0°C (°F)
H	Heater disconnection alarm setting <ul style="list-style-type: none"> • It sets the heater current value of Heater disconnection alarm. • This setting item is not available if option [Heater disconnection] is not applied. • This setting item is not available if the Heater disconnection alarm is not selected in Event output function selection. • Self-holding is not available to the alarm output. • 0.0 to 50.0A 	0.0A

Character	Name, Description, Setting range	Initial
<i>LPI</i>	Loop break alarm action time setting <ul style="list-style-type: none"> • It sets the time to judge for Loop break alarm. • This setting item is not available for the LT-111. • This setting item is not available if the Loop break alarm is not selected in Event output function selection. • 0 to 200 minutes 	0 min.
<i>LPH</i>	Loop break alarm action span setting <ul style="list-style-type: none"> • It sets the span to judge for Loop break alarm. • This setting item is not available for the LT-111. • This setting item is not available if the Loop break alarm is not selected in Event output function selection. • 0 to 150°C (°F), or 0.0 to 150.0°C (°F) 	°C (°F)

[Table 3.3-1]

Alarm action type	Setting range	Setting range (with decimal point)
Deviation high alarm	(-) input range span to input range span	-199.9 to input range span
Deviation low alarm	(-) input range span to input range span	-199.9 to input range span
Absolute value deviation high alarm	0 to input range span	0.0 to input range span
Absolute value deviation low alarm	0 to input range span	0.0 to input range span
Absolute value high alarm	Input range minimum value to input range maximum value	Input range minimum value to input range maximum value
Absolute value low alarm	Input range minimum value to input range maximum value	Input range minimum value to input range maximum value
Deviation high alarm with standby	(-) input range span to input range span	-199.9 to input range span
Deviation low alarm with standby	(-) input range span to input range span	-199.9 to input range span
Absolute value deviation high alarm with standby	0 to input range span	0.0 to input range span
Absolute value deviation low alarm with standby	0 to input range span	0.0 to input range span
Absolute value high alarm with standby	Input range minimum value to input range maximum value	Input range minimum value to input range maximum value
Absolute value low alarm with standby	Input range minimum value to input range maximum value	Input range minimum to input range maximum

3.4 Auxiliary function setting mode 1

Character	Name, Description, Setting range	Initial
<i>PH</i>	PV/SV display change <ul style="list-style-type: none"> • It changes the display PV (<i>PH</i>) or SV (<i>SH</i>). 	PV display
<i>Loc</i>	Setting value lock designation <ul style="list-style-type: none"> • It locks the setting value to prevent error. The setting item to be locked is different by the designation. • PID auto-tuning or auto-reset will not function in case lock 1 or lock 2 is designated. • ---- (Unlock): All setting values can be changed. • <i>Lc 1</i> (Lock 1): All setting values cannot be changed. • <i>Lc 2</i> (Lock 2): Only main setting value is changeable. • <i>Lc 3</i> (Lock 3): All setting values can be changed, however, the value returns to the former value after the power off because the value is not written on the non-volatile memory. 	Unlock
<i>SH</i>	Main setting value high limit setting <ul style="list-style-type: none"> • It sets the high limit value of main setting. • Main setting low limit to input range maximum value 	1370°C

Character	Name, Description, Setting range	Initial
4L	Main setting value low limit setting <ul style="list-style-type: none"> It sets the low limit value of main setting. Input range minimum to main setting high limit 	0°C
40	Sensor correction setting <ul style="list-style-type: none"> It sets sensor correction value of the sensor. -100.0 to 100.0°C (°F) 	0.0°C (°F)

3.5 Auxiliary function setting mode 2

Character	Name, Description, Setting range	Initial																																																																																																																																												
4En	<p>Sensor selection</p> <ul style="list-style-type: none"> With universal input type, input type and unit (°C or °F) are selectable from 5 types of thermocouple and 4 types of RTD. With thermocouple multi-input type, input type and unit (°C or °F) are selectable from 5 types of thermocouple. <hr/> <p>• In case of universal input type</p> <table border="0"> <tr><td>K</td><td>0 to</td><td>1370°C:</td><td>t</td><td>l</td></tr> <tr><td>J</td><td>0 to</td><td>1000°C:</td><td>u</td><td>l</td></tr> <tr><td>Platinel II</td><td>0 to</td><td>1390°C:</td><td>PL</td><td>2l</td></tr> <tr><td>N</td><td>0 to</td><td>1300°C:</td><td>n</td><td>l</td></tr> <tr><td>E</td><td>0 to</td><td>800°C:</td><td>e</td><td>l</td></tr> <tr><td>Pt100</td><td>-199.9 to</td><td>850.0°C:</td><td>Pt</td><td>l</td></tr> <tr><td>JPt100</td><td>-199.9 to</td><td>500.0°C:</td><td>JPt</td><td>l</td></tr> <tr><td>Pt100</td><td>-200 to</td><td>850°C:</td><td>Pt</td><td>l</td></tr> <tr><td>JPt100</td><td>-200 to</td><td>500°C:</td><td>JPt</td><td>l</td></tr> <tr><td>K</td><td>0 to</td><td>2500°F:</td><td>t</td><td>f</td></tr> <tr><td>J</td><td>0 to</td><td>1800°F:</td><td>u</td><td>f</td></tr> <tr><td>Platinel II</td><td>0 to</td><td>2500°F:</td><td>PL</td><td>2f</td></tr> <tr><td>N</td><td>0 to</td><td>2300°F:</td><td>n</td><td>f</td></tr> <tr><td>E</td><td>0 to</td><td>1500°F:</td><td>e</td><td>f</td></tr> <tr><td>Pt100</td><td>-199.9 to</td><td>999.9°F:</td><td>Pt</td><td>f</td></tr> <tr><td>JPt100</td><td>-199.9 to</td><td>900.0°F:</td><td>JPt</td><td>f</td></tr> <tr><td>Pt100</td><td>-300 to</td><td>1500°F:</td><td>Pt</td><td>f</td></tr> <tr><td>JPt100</td><td>-300 to</td><td>900°F:</td><td>JPt</td><td>f</td></tr> </table> <p>• In case of thermocouple multi-input type</p> <table border="0"> <tr><td>K</td><td>0 to</td><td>1370°C :</td><td>t</td><td>l</td></tr> <tr><td>J</td><td>0 to</td><td>1000°C :</td><td>u</td><td>l</td></tr> <tr><td>Platinel II</td><td>0 to</td><td>1390°C :</td><td>PL</td><td>2l</td></tr> <tr><td>N</td><td>0 to</td><td>1300°C :</td><td>n</td><td>l</td></tr> <tr><td>E</td><td>0 to</td><td>800°C :</td><td>e</td><td>l</td></tr> <tr><td>K</td><td>-320 to</td><td>2500°F :</td><td>t</td><td>f</td></tr> <tr><td>J</td><td>-320 to</td><td>1800°F :</td><td>u</td><td>f</td></tr> <tr><td>Platinel II</td><td>0 to</td><td>2500°F :</td><td>PL</td><td>2f</td></tr> <tr><td>N</td><td>0 to</td><td>2300°F :</td><td>n</td><td>f</td></tr> <tr><td>E</td><td>0 to</td><td>1500°F :</td><td>e</td><td>f</td></tr> </table>	K	0 to	1370°C:	t	l	J	0 to	1000°C:	u	l	Platinel II	0 to	1390°C:	PL	2l	N	0 to	1300°C:	n	l	E	0 to	800°C:	e	l	Pt100	-199.9 to	850.0°C:	Pt	l	JPt100	-199.9 to	500.0°C:	JPt	l	Pt100	-200 to	850°C:	Pt	l	JPt100	-200 to	500°C:	JPt	l	K	0 to	2500°F:	t	f	J	0 to	1800°F:	u	f	Platinel II	0 to	2500°F:	PL	2f	N	0 to	2300°F:	n	f	E	0 to	1500°F:	e	f	Pt100	-199.9 to	999.9°F:	Pt	f	JPt100	-199.9 to	900.0°F:	JPt	f	Pt100	-300 to	1500°F:	Pt	f	JPt100	-300 to	900°F:	JPt	f	K	0 to	1370°C :	t	l	J	0 to	1000°C :	u	l	Platinel II	0 to	1390°C :	PL	2l	N	0 to	1300°C :	n	l	E	0 to	800°C :	e	l	K	-320 to	2500°F :	t	f	J	-320 to	1800°F :	u	f	Platinel II	0 to	2500°F :	PL	2f	N	0 to	2300°F :	n	f	E	0 to	1500°F :	e	f	K
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FILF	PV filter time constant setting <ul style="list-style-type: none"> It sets PV filter time constant setting value. If the value is set too large, it affects control result owing to the delay of response. 0.0 to 10.0 seconds. 	0.0s																																																																																																																																												
oLH	Output high limit setting <ul style="list-style-type: none"> It sets output high limit value. This setting item is not available for the ON/OFF action. -5 to 105% (Setting greater than 100% is effective to the current output type only.) 	100%																																																																																																																																												
oLL	Output low limit setting <ul style="list-style-type: none"> It sets output low limit value. This setting item is not available for the ON/OFF action. -5 to 105% (Setting less than 0% is effective to the current output type only.) 	0%																																																																																																																																												
H44	Output ON/OFF hysteresis setting <ul style="list-style-type: none"> It sets the ON/OFF action hysteresis of control output. This setting item is available only for the ON/OFF action. 0.1 to 100.0°C 	1.0°C																																																																																																																																												

Character	Name, Description, Setting range	Initial
<i>EBnF</i>	Event output function selection <ul style="list-style-type: none"> • One of the functions is selectable from Temperature alarm, Loop break alarm or Heater disconnection alarm. • This setting item is not available for the LT-111. • Heater disconnection alarm cannot be selected if option [Heater disconnection] is not applied. • Temperature alarm output : <i>ALn</i> • Loop break alarm output : <i>LP</i> • Heater disconnection alarm output (option) : <i>Hb</i> 	<i>ALn</i>
<i>AL_F</i>	Temperature alarm action selection <ul style="list-style-type: none"> • It selects temperature alarm action. • No alarm : <i>----</i> • Deviation high alarm : <i>H</i> • Deviation high alarm w/standby : <i>H <u>̄</u></i> • Deviation low alarm : <i>L</i> • Deviation low alarm w/standby : <i>L <u>̄</u></i> • Absolute value deviation high alarm : <i>HL</i> • Absolute value deviation high alarm w/standby : <i>HL <u>̄</u></i> • Absolute value deviation low alarm : <i>LD</i> • Absolute value deviation low alarm w/standby : <i>LD <u>̄</u></i> • Absolute value high alarm : <i>AL</i> • Absolute value high alarm w/standby : <i>AL <u>̄</u></i> • Absolute value low alarm : <i>rAL</i> • Absolute value low alarm w/standby : <i>rAL <u>̄</u></i> 	No alarm
<i>AL_E</i>	Temperature alarm energized/de-energized selection <ul style="list-style-type: none"> • It selects the status energized or de-energized for the temperature alarm output. • This setting item is not available for the LT-111. • This setting item is not available if Temperature alarm output is not selected in Event output function selection, or No alarm is selected in Temperature alarm action selection. • Energized : <i>ALn</i> • De-energized: <i>rAL</i> 	Energized
<i>ALHY</i>	Temperature alarm deadband setting <ul style="list-style-type: none"> • It sets deadband value for temperature alarm. • This setting item is not available for the LT-111. • This setting item is not available if Temperature alarm output is not selected in Event output function selection, or No alarm is selected in Temperature alarm action selection. • 0.1 to 100.0°C (°F) 	1.0°C (°F)
<i>ALdY</i>	Temperature alarm delayed timer setting <ul style="list-style-type: none"> • It sets the action delayed timer for temperature alarm. Alarm output works when passed the setting time after the input value entered the alarm output range. • This setting item is not available for the LT-111. • This setting item is not available if Temperature alarm output is not selected in Event output function selection, or No alarm action is selected in Temperature alarm action selection. • 0 to 9999 seconds 	0s
<i>rALU</i>	Main setting value rising rate setting <ul style="list-style-type: none"> • It sets the rising rate of main setting value. (Rising value per minute) • 0 to 9999°C/min. (°F/min.) • With decimal point, 0.0 to 999.9°C/min. (°F/min.) 	0°C/min.

Character	Name, Description, Setting range	Initial
<i>r-f-f-d</i>	Main setting value falling rate setting <ul style="list-style-type: none"> It sets the falling rate of main setting value. (Falling value per minute) 0 to 9999°C /min. (°F/min.) With decimal point, 0.0 to 999.9°C/min. (°F/min.) 	0°C /min.
<i>c-n-r</i>	Output Direct/Reverse change <ul style="list-style-type: none"> It changes the output action Reverse (Heating) or Direct (Cooling). Reverse (Heating) action: <i>H E A T</i> Direct (Cooling) action : <i>C O O L</i> 	Reverse (Heating) action
<i>Pf_b</i>	Auto-tuning bias setting <ul style="list-style-type: none"> It sets PID auto-tuning bias value. 0 to 50°C (0 to 100°F) With decimal point, 0.0 to 50.0°C (0.0 to 100.0°F) 	20°C (40°F)

Sensor correction function

It corrects the input value from the sensor. When a sensor cannot be set at a location where control is desired, the sensor measuring temperature may deviate from the temperature in the controlled location. When controlling with plural controllers, the accuracy of sensors have influence on the control. Therefore, sometimes measuring temperature (input value) does not accord with the same setting value. In such a case, the control can be accorded with desired temperature by shifting the input value of sensors.

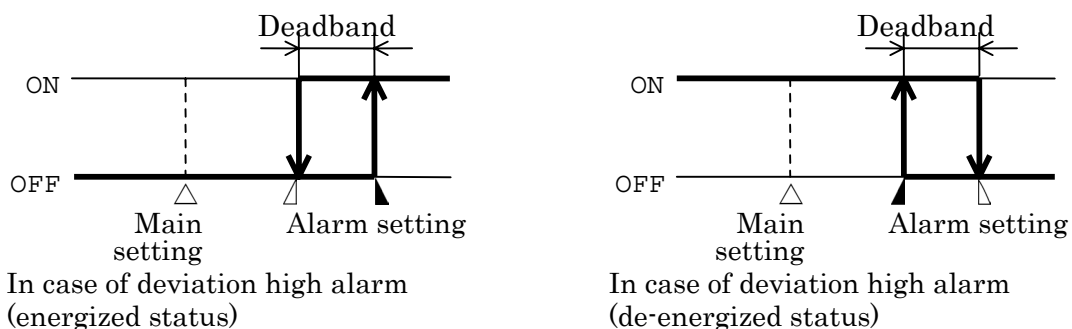
Loop break alarm

The alarm will be output when the process variable (PV) does not rise as much value as the span or greater within the time to judge for loop break alarm after the manipulating value reaches to 100% or output high limit value.

The alarm will also be output when the process variable (PV) does not fall as much as the span or greater within the time to judge for loop break alarm after the manipulating value reaches to 0% or output low limit value. When the control action is Direct (Cooling), the alarm acts the opposite.

Energized/De-energized



If the status of temperature alarm action is selected energized, event output [between terminal (11) and (12)] is conducted (ON) status while the event output indicator is being lit. Event output is not conducted (OFF) status while the event output indicator is being unlit. If the status of temperature alarm action is selected de-energized, event output [between terminal (11) and (12)] is not conducted (OFF) status while the event output indicator is being lit. Event output is conducted (ON) status while the event output indicator is being unlit.





Setpoint change function

In case the option DI is applied, the setting value number can be selected by external operation. (However, selectable setting value number is No. 2 only.) To select the setting value number 2, connect the terminals between (8) and (9). When the setting value number 2 is selected by external operation, the number cannot be selected by front key operation. Number cannot be changed during setting mode and PID auto-tuning.

3.6 Control output OFF function

Character	Name, Descriptions
OFF	<p>Control output OFF function</p> <ul style="list-style-type: none"> • It is the function to make the control output OFF even the power to the instrument is supplied. The function is used when required to halt the control action or the LT110 is not used in plural controllers. It indicates "OFF" on the PV/SV display. • This function can be selected from any mode or any setting item by pressing the key  for approx. 1 second. • Once the function works, the function cannot be released even if the power to the instrument is turned OFF and ON again. To cancel the function, press the key  again for approx. 1 second.

3.7 Output manipulating value display

Character	Name, Descriptions
	<p>Output manipulating value display</p> <ul style="list-style-type: none"> • In PV/SV display mode, press the  key for approx. 3 seconds. The display will be changed to main setting mode on the process, however, keep pressing until the output manipulating value is displayed. (Manipulating value is indicated on the PV/SV display blinking the decimal point.) If the  key is pressed again, the mode returns to PV/SV display.

4. Running

After the completion of the mounting to the control panel and wiring connections, start running in the following manner.

(1) Turn the power supplied to the LT-110 ON

For approx. 2 seconds after the power ON, the type of sensor and the unit designated in Sensor input designation are indicated on PV/SV display. (Refer to the table 4-1.)

[Table 4-1]

Input	PV/SV display	
	°C	°F
K	K C	K F
J	J C	J F
Platinel II	PL2C	PL2F
N	n C	n F
E	E C	E F
Pt100 (With decimal point)	Pt.C	Pt.F
JPt100 (With decimal point)	JPt.C	JPt.F
Pt100	Pt C	Pt F
JPt100	JPt C	JPt F

During this time, all outputs and LED indicators are in their OFF status. After that, PV/SV display indicates the present temperature. If SV display is selected in PV/SV display change, the setting value is indicated. In the status the control output OFF function is working, it indicates "OFF" on the PV/SV display.

(2) Input the setting value

Referring to item “3. Operation”, input each setting value.

(3) Turn the load circuit power ON.

It starts the control action so as to maintain the controlling object at the main setting value.

5. Other functions

(1) Input burnout

(Upscale)

When the thermocouple or RTD is burnt out or the input value rises to the [Rated scale maximum value +50°C (100°F)] or greater, it makes the control output OFF, and indicates [] blinking on the PV/SV display. However, in case the rated scale maximum value is 999.9, if the input value exceeds 999.9, PV/SV display indicates [] blinking, and the control is performed to 999.9 + 1% of rated scale span.

(Downscale)

In case of thermocouple input, if the input value falls to -50°C (-100°F) or less, it makes the control output OFF, and indicates [] blinking on the PV/SV display. In case of RTD input, if the input value falls to the [Rated scale minimum value - 1% of rated scale span] or less, it makes the control output OFF, and indicates [] blinking on the PV/SV display. However, in case the rated scale minimum value is -199.9, if the input value falls to -199.9 or less, PV/SV display indicates [] blinking, and the control is performed to -199.9 - 1% of rated scale span. Even in SV display mode, the indication of [] in upscale and of [] in downscale have priority over all displays.

(2) Self-diagnostic function

It watches the CPU by watchdog timer, and when any abnormal status is found on the CPU, it makes the controller warm-up status.

(3) Automatic cold junction temperature compensation (thermocouple input type)

It detects the temperature at the connection terminal between thermocouple and instrument, and always makes it the same status at which the reference junction is located at 0°C (32°F).

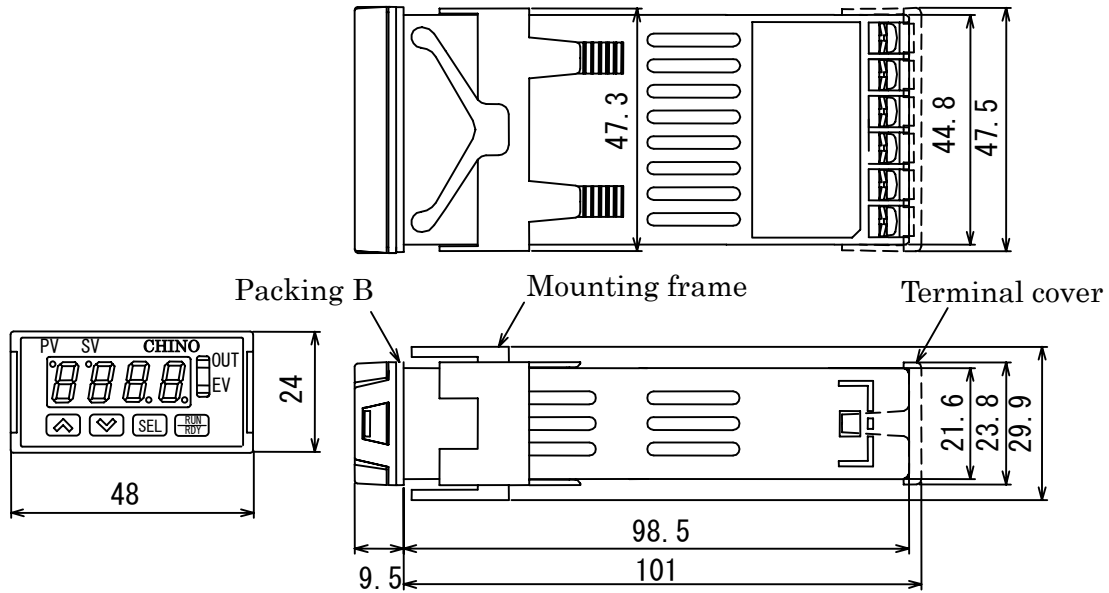
6. Mounting to the control panel

6.1 Site selection

Mount the controller in a place with:

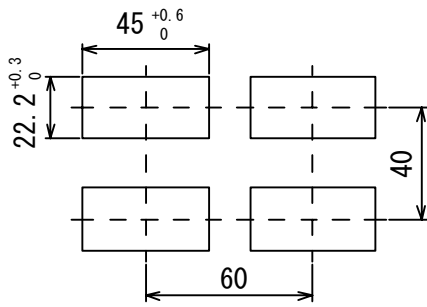
- (1) A minimum of dust, and an absence of corrosive gases.
- (2) No mechanical vibrations or shocks.
- (3) No exposure to direct sunlight, an ambient temperature is 0 to 50°C (32 to 122°F) and it does not change suddenly.
- (4) An ambient humidity is 85%RH or less, and non-condensing.
- (5) The controller should be away from the electromagnetic switch of large capacity or cables through which large current flows.
- (6) No water, oil or chemicals and their vapor directly splash.

6.2 External dimension drawing



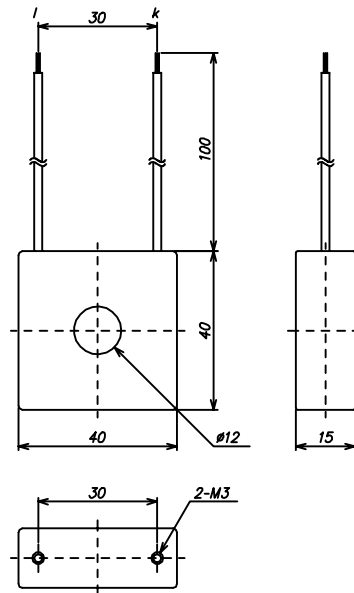
[Fig. 6.2-1]

6.3 Panel cutout drawing



[Fig. 6.3-1]

6.4 CT (current transformer) dimension drawing

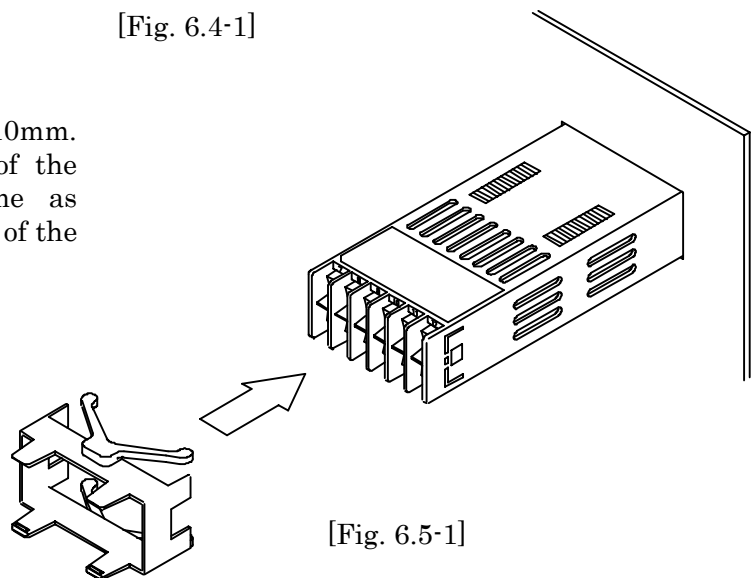


CTL-12-S36-10L1 (50A)

[Fig. 6.4-1]

6.5 Mounting

Mounting panel thickness is 1 to 10mm. Insert the LT110 from the front of the panel. Insert the mounting frame as shown [Fig. 6.5-1] until the four tips of the frame touch the front panel.

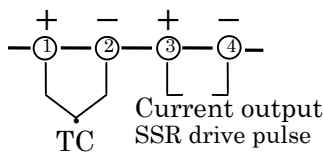
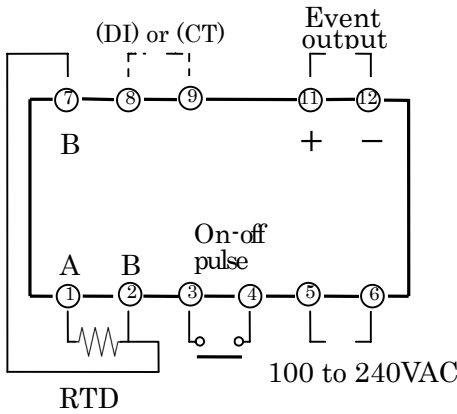


[Fig. 6.5-1]

7. Terminal arrangement

⚠ Warning

Turn the power supplied to the instrument OFF before wiring or checking. If working or touching the terminal on the power ON status, there is a possibility of Electric Shock which can cause severe injury or death.



[Fig. 7-1]

On-off pulse	:	Relay contact output
SSR drive pulse	:	Non-contact voltage output
Current output	:	Current output
DI	:	Setpoint change (External selection)
CT	:	Heater disconnection alarm
Event output	:	Temperature alarm, Loop break alarm or Heater disconnection alarm output

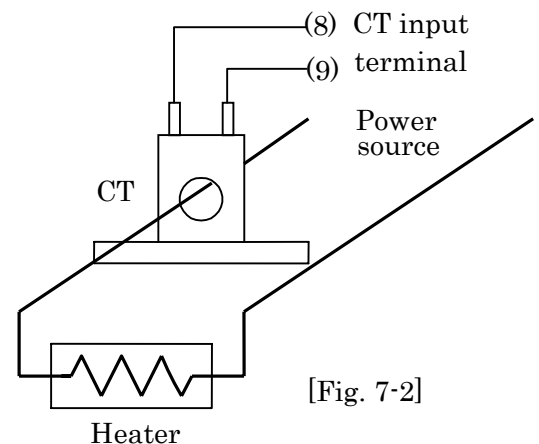
- Dotted line: Option (Designation required)
- When wiring, use the solderless terminal adapted to the M3 terminal screw.
(It is recommended to use the solderless terminal 1.25Y-3 of Nichifu Terminal Industries CO., LTD. or 1.25-YAS3 of Fuji Terminal Industry CO., LTD.)

⚠ Notices

- Use a thermocouple and compensating lead wire applicable to the input specifications of this controller.
- Use a 3-wire system of RTD applicable to the input specification of this controller.
- This controller has no built-in power switch nor fuse. It is therefore recommended that the units be provided in the circuit near the external controller.
- With the relay contact output type, use an auxiliary electromagnetic switch externally to protect the built-in relay contact.
- When wiring, keep input wire (Thermocouple, RTD, etc.) away from AC source and load wire to avoid external interference.

Option: Heater disconnection alarm output

- (1) **This alarm is not available for detecting current under phase control.**
- (2) Use current transformer (CT) an accessory one, and pass a lead wire of heater circuit into the hole of the CT.
- (3) When wiring, keep CT wire away from AC source and load wire to avoid external interference.



[Fig. 7-2]

8. Specifications

8.1 Standard specifications

Mounting method : Flush

Setting : Input system by using membrane sheet key

Display

PV/SV display : Red LED display 4 digits, size, 8(H)×4(W)mm

Accuracy (Setting and indicating)

Thermocouple : Within ±0.3% of input range full scale ± 1 digit, or 2°C (4°F) whichever is greater

RTD : Within ±0.2% of input range full scale ± 1 digit or 1°C (2°F) whichever is greater

Scaling range

In case of universal input and thermocouple multi-input types

K : 0 to 1370°C (0 to 2500°F)

J : 0 to 1000°C (0 to 1800°F)

E : 0 to 800°C (0 to 1500°F)

Platinel : 0 to 1390°C (0 to 2500°F)

N : 0 to 1300°C (0 to 2300°F)

*Pt100 : -199.9 to 850.0°C (-199.9 to 999.9°F), -200 to 850°C (-300 to 1500°F)

*JPt100: -199.9 to 500.0°C (-199.9 to 900.0°F), -200 to 500°C (-300 to 900°F)

*: Pt100 and JPt100 are not available for thermocouple multi-input type.

Input sampling period : 0.25 seconds

Input

Thermocouple : K, J, E, Platinel II, N
External resistance, 100Ω or less
When input burnout, Upscale

RTD : Pt100, JPt100 3-wire system
Allowable input lead wire resistance, 10Ω or less per wire
When input burnout, Upscale

Control output

Relay contact : 1a
Control capacity,
250VAC 3A (resistive load)
250VAC 1A (inductive load $\cos \phi = 0.4$)

Non-contact : For SSR drive
voltage 12⁺₀VDC Maximum 40mA (short circuit protected)

Current : 4 to 20mADC
Load resistance, maximum 550Ω

Supply voltage : 100 to 240VAC, 50/60Hz

Allowable voltage : 85 to 264VAC

fluctuation

Temperature alarm output

In case the temperature alarm energized is selected, deviation setting by ± to the main setting (excepting Absolute value alarm), and when the input exceeds the range the output turns ON or OFF. In case the temperature alarm de-energized is selected, the output acts the opposite.

• Setting accuracy

Thermocouple : Within ±0.3% of input full scale ± 1 digit,
or ±2°C (4°F) whichever is greater

RTD : Within ±0.2% of input full scale ± 1 digit,
or ±1°C (2°F) whichever is greater

• Action : ON/OFF action
Deadband, 0.1 to 100.0°C (°F)

• Output : Open collector
Control capacity, 24VDC 0.1A (maximum)

Loop break alarm output

When manipulating value is in its maximum or minimum status, the alarm works in case the process variable does not change more than the setting span within the setting time. It detects Heater disconnection, Sensor burnout and Abnormality at operation end.

Output: Open collector

Control capacity, 24VDC 0.1A (maximum)

Control action

PID action (with auto-tuning function)

Proportional band : 0 (0.0) to rated scale maximum value

Integral time : 0 to 3600s (off when set to 0)

Derivative time : 0 to 3600s (off when set to 0)

Pulse cycle : 1 to 120s

ARW : Automatic

Output limit : 0 to 100% (Current output type, -5 to 105%)

PD action (with auto-reset function)

Proportional band : 0 (0.0) to rated scale maximum value

Derivative time : 0 to 3600s (off when set to 0)

Pulse cycle : 1 to 120s

Reset : Proportional band value (maximum)

Output limit : 0 to 100% (Current output type, -5 to 105%)

ON/OFF action (If P value is set to 0 or 0.0, it becomes ON/OFF action mode.)

Hysteresis : 0.1 to 100.0°C (°F)

Dielectric strength

Between input terminal and ground 1.5kVAC for 1 minute

Between input terminal and power terminal 1.5kVAC for 1 minute

Between power terminal and ground 1.5kVAC for 1 minute

Between output terminal and ground 1.5kVAC for 1 minute

Between output terminal and power terminal 1.5kVAC for 1 minute

Power consumption : Approx. 5VA

Ambient temperature : 0 to 50°C (32 to 122°F)

Ambient humidity : 35 to 85%RH (non-condensing)

Weight : Approx. 100g

External dimension : 48×24×110mm (W×H×D)

Material : Base and case, Flame resisting resin

Color : Base and case, Gray

Attached functions : Power failure compensating function

Self-diagnostic function

Automatic cold junction temperature compensating function

Abnormal input indicating function (upscale, downscale)

Accessories : Mounting frame 1 piece

Instruction manual 1 copy

Terminal cover 1 piece (option)

Current transformer (CTL-12-S36-10L1) · 1 piece (option)

8.2 Optional functions

Heater disconnection alarm

It watches the heater current with CT (current transformer), and detects the burnout. This option cannot be applied to the current output type.

Rating : 50A

Setting range : 0.0 to 50.0A (off when set to 0.0)

Setting accuracy : ±5%

Input resolution : 1/200 of each rated value

Action : ON/OFF action

Output : Open collector

Control capacity, 24VDC 0.1A (maximum)

Setpoint change (external selection)

If this option is applied, the main setting value 1 or 2 can be changed by the external contact.


Terminal cover

Electrical shock protecting terminal cover





9. When troubled

When troubled, refer to the following items after checking the power and the wiring.

<Indication>

Phenomenon	Presumed cause and the action
If PV/SV display is indicating [FF] or no indication	<ul style="list-style-type: none">Control output OFF function is working. ⇒ Press the  key for approx. 1s to release the function.
If [----] is blinking on PV/SV display	<ul style="list-style-type: none">Thermocouple or RTD is burnt out. [In case of Thermocouple] If the input terminal of the instrument is connected, and if nearby room temperature is indicated, the instrument should be normal and sensor may be burnout. [In case of RTD] If approx. 100Ω of resistance is connected to the input terminal between A-B of the instrument and between B-B is connected, and if nearby 0°C (32°F) is indicated, the instrument should be normal and sensor may be burnout.Lead wire of thermocouple or RTD is not surely mounted to the instrument terminal.
If [----] is blinking on PV/SV display	<ul style="list-style-type: none">Polarity of thermocouple or compensating lead wire is reverse.Codes (A, B, B) of RTD does not agree with the instrument terminal.
If indication of PV/SV display is abnormal or unstable.	<ul style="list-style-type: none">Designation of the Sensor input is improper.Temperature unit (°C or °F) is mistaken.Sensor correcting value is unsuitable. ⇒ Set the value suitably.Specification of the Thermocouple or RTD is improper.AC leaks into thermocouple or RTD circuit.There is an equipment to send out inductive interference or noise near the controller.

<Key operation>

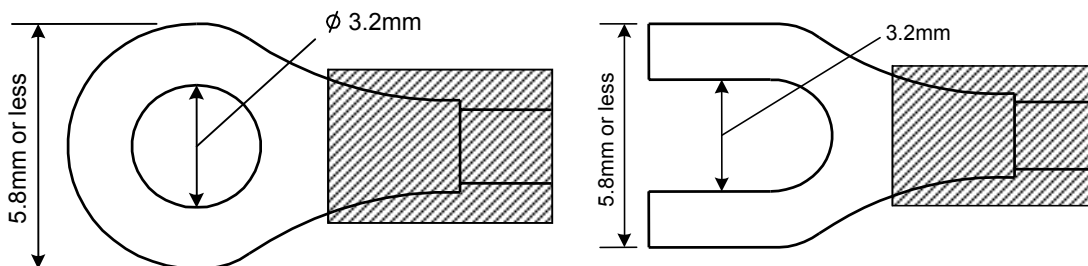
Phenomenon	Presumed cause and the action
If settings are impossible. If the value does not change by the  ,  keys.	<ul style="list-style-type: none">Setting value lock (mode 1 or 2) is designated. ⇒ Release the lock designation.During PID auto-tuning or auto-reset. ⇒ In case of PID auto-tuning, cancel the tuning if necessary. In case of Auto-reset, it takes approx. 4 minutes until the auto-reset is completed.
If the setting indication does not change in the rated scale range even if the  ,  keys are pressed, and settings are impossible.	<ul style="list-style-type: none">Main setting value high limit or low limit may be set at the point the value does not change. ⇒ Set it again by Auxiliary function setting mode 1.

<Control>

Phenomenon	Presumed cause and the action
If process variable (temperature) does not rise.	<ul style="list-style-type: none"> Thermocouple or RTD is burnt out. [In case of Thermocouple] If the input terminal of the instrument is connected, and if nearby room temperature is indicated, the instrument should be normal and sensor may be burnt out. [In case of RTD] If approx. 100Ω of resistance is connected to the input terminal between A-B of the instrument and between B-B is connected, and if around 0°C (32°F) is indicated, the instrument should be normal and sensor may be burnt out. Lead wire of thermocouple or RTD is not surely mounted to the instrument terminal.
If the main output remains ON status.	<ul style="list-style-type: none"> Main output low limit setting value is set to 100% or greater in Auxiliary function setting mode 2. ⇒ Set the value properly.
If the main output remains OFF status.	<ul style="list-style-type: none"> Main output high limit setting value is set to 0% or less in Auxiliary function setting mode 2. ⇒ Set the value properly.

● Recommended terminal

Use a solderless terminal with insulation sleeve to fit to M3 screw as shown below.



Solderless terminal	Manufacturer	Model name	Tightening torque
Y type	Nichifu Terminal Industries CO., LTD.	1.25Y-3	0.6N·m Max. 1.0N·m
	Japan Solderless Terminal MFG CO., LTD.	VD1.25-B3A	
Round type	Nichifu Terminal Industries CO.,LTD.	1.25-3	
	Japan Solderless Terminal MFG CO., LTD.	V1.25-3	

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