**Safety Information**

Please read safety information carefully before use and then use this product properly. Safety information described in this manual contains important contents related with safety. So please follow the instructions accordingly. Safety information is composed of DANGER, WARNING and CAUTION.

**DANGER**

- Do not touch or contact the input/output terminals because it may cause electric shock.

**WARNING**

- If there is a possibility of an accident caused by errors or malfunctions of this product, install external protection circuit to prevent the accident.
- This product does not contain an electric switch or fuse, so the user needs to install a separate electric switch or fuse externally. (Fuse rating : 250 V 0.5 A)
- To prevent detection or malfunction of this product, supply proper power voltage in accordance with the rating.
- To prevent electric shock or devise malfunction of this product, do not supply the power until the wiring is completed.
- Since this product is not designed with explosion-protective structure, do not use it at any place with flammable gas or explosive gas.
- Do not decompose, modify, revise or repair this product. This may cause malfunction, electric shock or fire.
- Reassemble this product while the power is on. Otherwise, it may cause malfunction or electric shock.
- If you use the product with methods other than specified by the manufacturer, there may be bodily injuries or property damages.
- Due to the danger of electric shock, use this product installed onto a panel while an electric current is applied.

**CAUTION**

- The contents of this manual maybe changed without prior notification.
- Before using the product you have purchased, check to make sure that it is exactly what you ordered.
- Check to make sure that there is no damage or abnormality of the product during delivery.
- The ambient temperature is 0 ~ 50 °C and the ambient humidity is 35 ~ 85 % R.H. (No icing).
- Do not use this product at any place with corrosive (especially noxious gas or ammonia) or flammable gas.
- Do not use this product at any place with direct vibration or impact.
- Do not use this product at any place with liquid, oil, medical substances, dust, salt or iron contents. (Use at Pollution level 1 or 2)
- Do not polish this product with substances such as alcohol or benzene.
- Do not use this product at any place with excessive induction trouble, static electricity or magnetic noise.
- Do not use this product at any place with possible thermal accumulation due to direct sunlight or heat radiation.
- Install this product at under 2,000 m in altitude.
- When the product gets wet, the inspection is essential because there is danger of electric leakage or fire.
- Use a compensating cable with thermocouple.
- For R.T.D input use a cable which is a small lead wire resistance and without iron contents. (Use at Pollution level 1 or 2)
- When the power is on, the preparation period of contact output is required. In case of proper use.
- When changing this unit to spare unit, please check again all parameters.
- Write down on a label that the operation of circuit breaker or switch disconnects the power since the devise is installed.
- For the continuous and safe use of this product, the periodical maintenance is recommended.
- Some parts of the product have limited life span, and others are changed by their usage.
- The warranty period for this product including parts is one year if this product is properly used.
- When the power is on, the preparation period of contact output is required. In case of use for signals of external interlock circuit, use with a delay relay.
- When changing this unit to spare unit, please check again all parameters.

**Suffix Code Structure**

<table>
<thead>
<tr>
<th>Model Name</th>
<th>Suffix code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP</td>
<td></td>
<td>Temp. controller (Control temperature and display voltage and current)</td>
</tr>
</tbody>
</table>

**Function and name of each parts**

1. Process Value indicator (Red)
2. Setting Value indicator (Red)
3. Voltage indicator (Green)
4. Current indicator (Red)
5. SET key
6. Setting digit shift key
7. Setting value decrement key
8. Setting value increment key
9. Alarm1 (AL1) indicating lamp (Red)
10. Alarm2 (AL2) indicating lamp (Red)
11. Alarm3 (AL3) indicating lamp (Red)
12. Auto tuning (AT) indicating lamp (Red)
13. Control out/OUT indicating lamp (Red)
14. Setting value decrement key
15. Setting value increment key
16. Setting digit shift key
17. SET key

4 : In case of CP7 : Green

**Operation method**

**Operation Screen**

<table>
<thead>
<tr>
<th>Display</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process value (PV)</td>
<td>Displays process-value.</td>
</tr>
<tr>
<td>Setting value (SV)</td>
<td>Display setting value. Enter into SV setting mode by pressing key. Set the target value that want to control by pressing , and key.</td>
</tr>
</tbody>
</table>

**Menu**

- Enter into the MENU by pressing key for 3 seconds in operation screen.
- Return to the operation screen by pressing key more than 3 seconds in the MENU.
- Move to the each of other groups by pressing and key.
- Press to move sub menu of each groups

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**Temp. Controller & Voltage, Current meter**

**CP series**

**INSTRUCTION MANUAL**

Thank you for purchasing HANYOUNG NUX CO., Ltd. Product. Please check whether the product you purchased is the exactly same as you ordered. Before using product, please read instruction manual carefully.
1) Temperature group setup

<table>
<thead>
<tr>
<th>Process value display unit</th>
<th>Parameter</th>
<th>Setting description</th>
<th>Initial value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Temperature group</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High alarm</td>
<td>Within input range</td>
<td>1300</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low alarm</td>
<td>Within input range</td>
<td>-50</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Proportion band</td>
<td>-100 ~ 100 % of F.S</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Prevent over integral</td>
<td>AUTO, 0.1 ~ 100.0 %</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Integral time</td>
<td>1 ~ 6000 sec</td>
<td>240</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Derivative time</td>
<td>1 ~ 6000 sec</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Loop Break Alarm</td>
<td>OFF, 1 ~ 7200 sec</td>
<td>480</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cycle time</td>
<td>1 ~ 1000 sec</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Hysteresis</td>
<td>0 ~ 10 % of F.S</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Set data lock</td>
<td>OFF, ON</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*P (proportion band) only when performing proportion control. Set to 0 if will convert to ON/OFF control.
*A (anti-reset wind up) prevents overshoot and undershoot by integral effectiveness.
*D (derivative time) predicts change of output so it prevents ripple and improves control safety.
*LBA (Loop break alarm) displays cycle setting value of control loop break alarm. OFF setting cancels control loop break alarm.
*CT (proportional cycle) displays cycle (sec) of control output. Initial value is changed depends on control output.
*HYS (hysteresis) sets adjustment sensitivity of control output (with ON/OFF control)
*LOC (Set data lock) turn ON/OFF set data lock function.

2) Voltage group setup

<table>
<thead>
<tr>
<th>Process value display unit</th>
<th>Parameter</th>
<th>Setting description</th>
<th>Initial value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Voltage group</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Voltage input compensation</td>
<td>-100 ~ 100 % of F.S</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alarm 2 type</td>
<td>1 ~ 4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alarm 2 setting value</td>
<td>0 ~ 100 % of F.S</td>
<td>500</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alarm 2 hysteresis</td>
<td>0 ~ 10 % of F.S</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

*Input type : AC voltage input (apply only to sine wave)
*Input range : 0 ~ 500 V a.c

3) Current group setup

<table>
<thead>
<tr>
<th>Process value display unit</th>
<th>Parameter</th>
<th>Setting description</th>
<th>Initial value</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Current group</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Current input compensation</td>
<td>-100 ~ 100 % of F.S</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High current display</td>
<td>0 ~ 300</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low current display</td>
<td>A-H &gt; A-L</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alarm 3 type</td>
<td>1 ~ 4</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alarm 3 setting value</td>
<td>0 ~ 100 % of F.S</td>
<td>300</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Alarm 3 hysteresis</td>
<td>0 ~ 10 % of F.S</td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

*Input type : AC voltage input (apply only to sine wave) due to CT
*Input range : CT Secondary side 0 ~ 5 A a.c
*Voltage input and current input are not insulated. Must use CT.

**Selection of Initial Set Mode**

1. Enter into initial setting mode by pressing key and key for 3 seconds at the same time.
2. Return to PV/SV setting mode by pressing key and key for 3 seconds or more

**Main Functions**

**Loop Break Alarm (LBA function)**

1. **How to set**
Set the set value of LBA about twice as Integral Time (I). Also, it is possible to set LBA by auto tuning (AT). In this case, it is going to be set twice as integral time (I) automatically.

2. **Operation description**
LBA function starts to measure the time from the moment when PID computed value becomes 0 % or 100 %. Also, LBA ON/OFF will be determined according to the changes of process value under the LBA setup time.

   ① When 100 % of P.I.D computed value continues on more than the LBA setup time and process value does not rise more than 2 °C then LBA will become ON. (with proper operation, LBA will become ON if PV does not get dropped more than 2 °C)
   ② When 0 % of P.I.D computed value continues on more than the LBA setup time and process value does not drop more than 2 °C then LBA will become ON. (with proper operation, LBA will become ON if PV does not get raised more than 2 °C)
**Cautions for LBA function**

1. LBA function activated only when PID computed value is 0 % or 100 %. Therefore, the time (from trouble occurrence to LBA activation) equals to the time of computed value of PID becomes 0 % or 100 % plus (addition) LBA setup.
2. LBA function is not activated while Auto Tuning function is being operated.
3. LBA function might be operated even though there are no troubles in the control system and the reason for that is because LBA is influenced by disturbances such as other heat sources and etc.
4. There are cases when LBA setup time has to be set slightly longer. Such cases are time is short or control object does not match, LBA might be ON/OFF or LBA does not get turn ON.

**Set data locking function**

'Set data locking function' prevents front key to change the set value and validate auto-tuning. Use it for preventing malfunction after setting up.

**Auto - Tuning (AT) function**

Auto-Tuning function measures, computes and sets the most proper integer to P.I.D automatically.

1. Run Auto-Tuning after setting P.I.D and ARW
2. Pressing key and key at the same time will make AT indicating lamp to flickers and begins Auto-Tuning function.
3. Once Auto-Tuning is finished, A.T indicating lamp will be turned off automatically and when checking for the integer created by Auto-Tuning in consecutive order, please press key
4. When changing integers which set by Auto-Tuning automatically, please change each integer according to the each parameter setup method.
5. If users want to stop operating auto-tuning while it is operating, press the key and key at the same time, then A.T lamp will be turned off and auto-tuning will be finished. In this case, each integers of P.I.D does not get changed.
6. When changing SV (set value) during auto-tuning, auto-tuning will stop operating and control P.I.D (P.I.D which before operating auto-tuning) will be finished. In this case, each integers of P.I.D does not get changed.

**Alarm Function**

1. Alarm 1

   - Hysteresis
   - High and Low alarm
   - Alarm within range

   This is setting method that alarm will start to operate when temperature is higher than certain degree or lower than certain degree regarding SV. For example, if main temperature setting is 200 °C and want to operate within high alarm (ALH) 205 °C and low alarm (ALL) 190 °C, then set 5 °C with ALH and 10 degree Celsius with ALL. At this moment, changing main temperature setting to 300 °C will make alarm to operate when high alarm temperature is 305 °C and low alarm temperature is 290 °C.

2. Alarm 2

   - Each alarm could be set as below table

<table>
<thead>
<tr>
<th>AL2</th>
<th>Alarm type</th>
<th>operation</th>
<th>standby operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>absolute high voltage</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>absolute low voltage</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>absolute high voltage</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>absolute low voltage</td>
<td>O</td>
<td></td>
</tr>
</tbody>
</table>

3. Alarm 3

   - Each alarm could be set as below table

<table>
<thead>
<tr>
<th>AL2</th>
<th>Alarm type</th>
<th>operation</th>
<th>standby operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>absolute high current</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>absolute low current</td>
<td>O</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>absolute high current</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>absolute low current</td>
<td>O</td>
<td></td>
</tr>
</tbody>
</table>

**Control Direction**

Select control direction from SL9
1) REV: Used when controlling reverse operation and heater
2) DR: Used when controlling forward operation and refrigerating machine.

**Input Filter**

Select input filter operation time from Filt of temperature group. When indicating value becomes unstable due to effects of noise, the filter helps to eliminate unstable status.

**Input Scale**

In case of DCV input, it sets range of displaying inputted voltage. For example, if input is SL1=0000 (1-5 V d.c) and SL12=100.0 and SL13=0.0 then input scale is as follows.

<table>
<thead>
<tr>
<th>Input voltage</th>
<th>Display</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 V</td>
<td>0.0</td>
</tr>
<tr>
<td>3 V</td>
<td>50.0</td>
</tr>
<tr>
<td>5 V</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Alarm Delay Time**

Delay time of high alarm and low alarm can be set from SL14 and SL15. Even though it has condition that alarm may occur, if delay time is set in SL14 and SL15 then alarm will operate after delay time is passed. However, alarm cancellation does not have anything to do with delay time.

**Anti-Reset Windup (ARW)**

Set the over integral prevention function within A parameter of control group

1) A = in case of AUTO control

2) In case of set-value is set in A
Input types

<table>
<thead>
<tr>
<th>classification</th>
<th>SL1</th>
<th>Input types</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermocouple</td>
<td>0000</td>
<td>K</td>
<td>-50 ~ 1300 °C</td>
</tr>
<tr>
<td></td>
<td>0101</td>
<td>J</td>
<td>-50 ~ 600 °C</td>
</tr>
<tr>
<td></td>
<td>1100</td>
<td>E</td>
<td>-199 ~ 999 °C</td>
</tr>
<tr>
<td></td>
<td>1101</td>
<td>T</td>
<td>-50 ~ 400 °C</td>
</tr>
<tr>
<td></td>
<td>0100</td>
<td>R</td>
<td>0 ~ 1700 °C</td>
</tr>
<tr>
<td></td>
<td>0110</td>
<td>B</td>
<td>0 ~ 1800 °C</td>
</tr>
<tr>
<td></td>
<td>1111</td>
<td>S</td>
<td>0 ~ 1700 °C</td>
</tr>
<tr>
<td></td>
<td>1000</td>
<td>L</td>
<td>-199 ~ 900 °C</td>
</tr>
<tr>
<td></td>
<td>1001</td>
<td>N</td>
<td>-199 ~ 1300 °C</td>
</tr>
<tr>
<td></td>
<td>1010</td>
<td>U</td>
<td>-50 ~ 400 °C</td>
</tr>
<tr>
<td></td>
<td>1011</td>
<td>W</td>
<td>0 ~ 2300 °C</td>
</tr>
<tr>
<td></td>
<td>1110</td>
<td>PL2</td>
<td>0 ~ 1300 °C</td>
</tr>
<tr>
<td>RTD</td>
<td>0010</td>
<td>KP100</td>
<td>-199 ~ 900 °C</td>
</tr>
<tr>
<td></td>
<td>0011</td>
<td>PI100</td>
<td>-199 ~ 640 °C</td>
</tr>
<tr>
<td>DCV</td>
<td>00000</td>
<td>1 - 5 V</td>
<td>-1999 ~ 9999</td>
</tr>
<tr>
<td></td>
<td>1111</td>
<td>0 - 10 V</td>
<td>-1999 ~ 9999</td>
</tr>
</tbody>
</table>

Accuracy = ±0.5 % of F.S
* When using 4 - 20 mA input, please connect given 250 Ω resistor to voltage input terminal (+) and (-) and select SL1 = 0000 (1 - 5 V d.c input)
* 1 : within range of 0 ~ 400 °C ±10 % of F.S
* 2 : Range of less than 0 °C ±1 % of F.S
* 3 : ±1 % of F.S

Input error and solution

- List
  - OVER
  - M.OVR
  - RUC
  - EEPROM
  - AD
  - SYSTEM
  - B.OUT

Reference

- Display model when power is supplied

- Indicates the exceeded max range of voltage/current

- If the measured value of voltage and current rise and exceed max range (108 % of F.S) of voltage/current then measured value of voltage/current will flicker

- Display model when power is supplied

- * Model display
  - Example) CP3 CP7

- * output display
  - Example) RLY relay SSR: voltage pulse SCR: current

- * version display
  - Example) 1.1  Version 1.1

- CP3 (96x48)

- DCP7 (72x72)

- Specification

- Power supply 100 - 240 V a.c, 50 - 60 Hz

- Power consumption Max. 6W

- Temperature Part
  - Type: Please refer to input chart
  - Sampling Cycle: 250 ms
  - Permissible voltage: ±0.5 % (Please refer to input chart)
  - Permissible voltage: 20 V d.c for 1 minute

- Standard junction temperature: ±3.5 °C (0 ~ 50 °C)

- Input disconnection: Up Scale

- Reflection output
  - NO : 5 A 250 V a.c, 5 A 30 V d.c (Resistive load)
  - Off voltage : Min. 0.1 V d.c
  - ON voltage : Min. 12 V d.c
  - Resistor load : More than 600 Ω

- Current
  - Range : 4 - 20 mA
  - Accuracy : ±0.2 mA
  - Resistor load : Less than 600 Ω

- A.C voltage input part
  - Type: CN/Off PID control
  - Direction: Reverse action, Forward action
  - Switching Life : 1 million times (No load)

- A.C current input part
  - Input range: Detect by CT sensor (secondary part 0 - 5 A a.c)
  - Display range: 0 - 300

- Alarm output part
  - Output: 1 A a.c

- Control resistance
  - Over 20 Ω between primary terminal and secondary terminal
  - Over 20 Ω between primary terminal and FG terminal
  - Over 20 Ω between secondary terminal and FG terminal

- Dielectric strength
  - 2200 V a.c between primary terminal and secondary terminal for 1 minute
  - 1500 V a.c between primary terminal and FG terminal
  - 500 V a.c between secondary terminal and FG terminal

- Measuring category: CAT II

- Operating environment
  - Temp. and humidity: 0 ~ 50 °C, 35 ~ 85 % R.H. (Without condensation)

- Please refer to safety information