XMT7100 Series Intelligent PID Temperature Controller

- Input type can be RTD input (Pt100, Cu50) or Thermocouple input (T, R, J, B, S, K, E, WRe3-WRe25)
- The instrument has automatic function to self adapt to different systems
- Instrument can be degrees Celsius, degrees Fahrenheit temperature
- Five control optional:
  0. One alarm relay
  1. Relay contact PID output
  2. One alarm relay output; SSR all the way non-contact level PID output
  3. One alarm relay output; SSR-level all the way back to poor control output
  4. Backlash relay control output

### Specifications
- Power supply: AC/DC85~260V (50Hz/60Hz)
- Contact capacity: AC 250V/3A
- Contact life: 1×10^6
- SSR-level: 8V (Open-circuit voltage); 30mA (short-circuit current)
- Temperature precision: 0.2%FS
- Environment: 0~+50℃; ≤85%RH
- Outline Dimension: 48×24×75
- Panel Dimension: 45×22

### Panel description

1. Indicator Lamp
   - AL: Relay output lamp: Lights when output is turned on
2. Up key: Used for selecting next parameter or increase numerals
3. Down key: Used for selecting previous parameter and used to increase numerals
4. Shift key: Used to shift the digital when the setting is changed and used to perform autotuning function
5. Set key: Used for parameter registration/calling up
6. Measured value (PV) display unit
7. Output control output indicator
   - AT: Autotuning lamp: Flashes during autotuning execution

### Parameter setting guide

1. Details of parameters
   - Symbol | Description | Range | Factory value
   - inty | Input type | Table | P10.0
   - outy | Control output type | 0, 1, 2, 3, 4 | 2
   - Hy | Autotuning PV bias | 0~9999 | 0.3
   - Psb | PV bias | -1000~1000 | 0.0
   - rd | Control action type | 0: heat; 1: cool | 0
   - CorF | Engineering unit selection | 0: °C; 1: °F | 0
   - End | End | | |

2. Parameters of the initial functional description

#### 1) inty: Temperature sensor type list

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Name</th>
<th>Sensor type</th>
<th>Temperature range</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>T</td>
<td>Pt100 RTD</td>
<td>-200~400</td>
<td></td>
</tr>
<tr>
<td>R</td>
<td>R</td>
<td>Pt100 RTD</td>
<td>-50~1600</td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>J</td>
<td>Pt100 RTD</td>
<td>-200~1200</td>
<td></td>
</tr>
<tr>
<td>WRE</td>
<td>WRE TC</td>
<td>-2300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>B</td>
<td>Pt100 RTD</td>
<td>350~1800</td>
<td></td>
</tr>
<tr>
<td>S</td>
<td>STC</td>
<td>Pt100 RTD</td>
<td>-50~1600</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>K</td>
<td>Pt100 RTD</td>
<td>-200~1300</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>E</td>
<td>Pt100 RTD</td>
<td>-200~900</td>
<td></td>
</tr>
<tr>
<td>P10.0</td>
<td>P100</td>
<td>Cu50 RTD</td>
<td>-199.9~600.0</td>
<td></td>
</tr>
<tr>
<td>P100</td>
<td>Cu50</td>
<td>Cu50 RTD</td>
<td>-199~600</td>
<td></td>
</tr>
<tr>
<td>Cu50</td>
<td>Cu50</td>
<td>Cu50 RTD</td>
<td>-50.0~150.0</td>
<td></td>
</tr>
</tbody>
</table>

#### 2) outy: Control output type

0. Relay alarm output (see Figure 1);
   - SSR output is invalid, used for Constant temperature control, the target value for the SV

#### 3) End

(See Figure 2)

### Three-panel description

#### (二) Indication Lamp

AL: Relay output lamp: Lights when output is turned on

#### (三) Up key

Used for selecting next parameter or increase numerals

#### (四) Down key

Used for selecting previous parameter and used to increase numerals

#### (五) Shift key

Used to shift the digital when the setting is changed and used to perform autotuning function

#### (六) Set key

Used for parameter registration/calling up

#### (七) Measured value (PV) display unit

#### (八) Out-control output indicator

#### (九) AT: Autotuning lamp

Flashes during autotuning execution

### Three-panel description

1. Indication Lamp
   - AL: Relay output lamp: Lights when output is turned on
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7. Out-control output indicator
8. AT: Autotuning lamp: Flashes during autotuning execution
### Wiring diagram

![Wiring Diagram](image)

**Start AT function**: In the constant temperature control, constant or if they can not over-temperature phenomena, can activate the self-tuning instrument functions, more appropriate instrument calculates the PID parameters. Long press > keys, flashing lights until the AT, instrument to enter a state of self-tuning; AT lamp goes out, the end of self-tuning, instrument set by self-tuning PID parameter adjustment.

**Ending AT function**: a long three seconds by the > key, AT light is off, the end of self-tuning, the parameters do not change.

- Self-tuning from time to time, there will be a significant over-temperature, please lower SV values appropriate to prevent the accident.
- Must be properly connected to the corresponding sensor, heater, otherwise self-tuning unable to complete.
- Self-tuning system response time depends on speed, ranging from a few minutes to several hours.
- Self-tuning is a function of time on the start line, do not need to start every time.

**Note 6(Filt):** 0 means the Pvdigital filter is turned off; 1, 2 and 3 are weak, medium and strong respectively.

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### Parameters settings procedure

**Self-tuning from time to time, there will be a significant over-temperature, please lower SV values appropriate to prevent the accident.**

- Must be properly connected to the corresponding sensor, heater, otherwise self-tuning unable to complete.
- Self-tuning system response time depends on speed, ranging from a few minutes to several hours.
- Self-tuning is a function of time on the start line, do not need to start every time.

### SV and alarm parameters (Log in by inputting password “0001’ after pressing set key)

**1. Detail of SV and alarm parameters**

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Range</th>
<th>Factory value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ssv</td>
<td>set value</td>
<td></td>
<td>80.0</td>
</tr>
<tr>
<td>RH1</td>
<td>AH1</td>
<td>Relay J1 pull-in set value</td>
<td>80.0</td>
</tr>
<tr>
<td>RL1</td>
<td>All</td>
<td>Relay J1 release set value</td>
<td>90.0</td>
</tr>
<tr>
<td>End</td>
<td>End</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** In normal display mode, the SV is increased by using the Up and Down key.

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### PID parameter setting guide

**Symbol**

- P : Proportional’ band
- I : Integral time
- D : Derivative time
- Ssv : overshoot suppression factor
- ot : Proportional cycle
- Filt : Digital filter factor
- End : End

**Description**

- 0.1~99.9%
- 2~1999(minute)
- 0~399(minute)
- 0.0~1.0
- 2
- 0~3
- End

**Range**

- 0.1~99.9%
- 2~1999(minute)
- 0~399(minute)
- 0~1.0
- 2
- 0~3
- End

**Factory value**

- 5.0
- 100
- 20
- 0.2
- 2
- 0

**Note 1:** the temperature oscillation is inverse proportion of P value and proportion of the response speed.

**Note 2:** Set the time of integral action which eliminate the offset occurring in proportional control.

**Note 3:** Set the time of derivative action which prevents ripples by predicting output change and thus improves control stability.

**Note 4:** Overshooting and under shooting are restricted by the Souf and increase of the parameter can suppress the overshooting.

**Note 5:** In general, control cycle is 2 when output type is voltage pulse output, and is 5-15 when output type is relay.