For less than 3 seconds in the operation mode to set up SV to complete and save the setting.

Selecting parameters:

1. In the operation, regulation or initial setting mode, press for more than 3 seconds to enter the initial setting mode. Press once in the regulation or initial setting mode to return to the operation mode.

Selecting parameters:

1. In the operation, regulation or initial setting mode, press for more than 3 seconds to enter the regulation mode. Press once in the regulation or initial setting mode to return to the operation mode.

Setting up number parameters: Find the parameter to be set and use to modify the settings. The parameter will flash at this time. Press to move to the desired digit to be modified and the digit will flash. Press to complete and save the setting.

Setting up non-number parameters: Find the parameter to be set or modified and use to modify the setting. The parameter will flash at this time. Press to move to the desired digit to be modified and the digit will flash. Press to complete and save the setting.

Regulation Mode

- **Auto-tuning:**
  - Press to set up PID control and RUN.
  - Press to set up PID group (n = 0 ~ 4).
  - Press to set up SV and PID control.
- **PID control:**
  - Press to start setting up patterns (Set up in PID programable control mode).
- **Heating/cooling control:**
  - Press to set up the position of decimal (Not for thermocouple B, R, S type).
- **Cooling system setting:**
  - Press to set up PID control offset (Not displayed when in analog input mode).
- **PID control offset:**
  - Press to set up the PID control offset.

Operation Mode

- **Data check:**
  - Press to set up PID control and RUN.
  - Press to set up SV to complete and save the setting.
- **Set loop RUN/STOP:**
  - Press to start setting up patterns (Set up in PID programable control mode).
- **Heating setting:**
  - Press to set up the position of decimal (Not for thermocouple B, R, S type).
- **Cooling setting:**
  - Press to set up PID control offset (Not displayed when in analog input mode).
- **PID control offset:**
  - Press to set up the PID control offset.

Initial Setting Mode

- **Set up input type:**
  - Press to set up the temperature unit.
  - Press to set up the thermocouple B, R, S type.
- **Set up alarm:**
  - Press to set up the alarm mode.
  - Press to set up alarm mode.
- **Set up system alarm:**
  - Press to set up alarm mode.
- **Enable/disable communication with it:**
  - Press to set up alarm mode.

Types of Temperature Sensors & Temperature Range

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<th>Sensor Type</th>
<th>Regular Value</th>
<th>Display Range</th>
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<td>SV: Set value</td>
<td>AT: Auto-tuning percentage</td>
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<td>%: Output percentage</td>
<td>Manual control indicator</td>
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<td>AL-A/AL-C: Alarm output mode</td>
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Specifications

- **Input power range:**
  - 85% ~ 110%, rated voltage
- **Display:**
  - 2-line, 7-segment LED, 8 bits and 2 bits of valve open/close display
- **Power consumption:**
  - Less than 2W
- **Input temperature sensor:**
  - Platinum resistance (Pt100)
- **Sampling cycle:**
  - Analog input: 15 sec; thermocouple/platinum resistance: 0.4 sec
- **Display scale:**
  - 1 digit after the decimal point, or no decimal point
- **Alarm output:**
  - Analog output: 0 ~ 5V, 0 ~ 10V, 0 ~ 20mA, 4 ~ 20mA, 0 ~ 50mA

Alarm Output

- **Mode:**
  - Alarm output is enabled when the temperature reaches upper and lower limits.
  - Alarm output will be enabled when the PV exceeds SV + AL-H or falls below SV – AL-L.
- **Alarm output will be enabled when the temperature reaches the upper limit.**
  - Alarm output will be enabled when the PV exceeds SV + AL-H.
- **Alarm output will be enabled when the temperature reaches the lower limit.**
  - Alarm output will be enabled when the PV falls below SV – AL-L.
- **Alarm output will be enabled when the PV is between SV + AL-H and SV + AL-L.**
  - Alarm output will be enabled when the PV exceeds SV + AL-H.
- **Alarm output will be enabled when the PV is between SV + AL-H and SV + AL-L.**
  - Alarm output will be enabled when the PV exceeds SV + AL-H.
- **Alarm output will be enabled when the PV is between SV + AL-H and SV + AL-L.**
  - Alarm output will be enabled when the PV exceeds SV + AL-H.
Steady upper/lower limit alarm: Alarm is enabled when the PV reaches SV and exceeds SV + AL-H or falls below SV - AL-L.

Programmable STOP alarm will be enabled when the program is in STOP status.

Programmable RAMP DOWN alarm will be enabled when the program is in RAMP DOWN status.

Programmable SUN alarm will be enabled when the program is in SUN status.

When the variable is set as "On", it refers to "to enable feedback signals" and the following parameters will be displayed:

1. Automatically set the upper/lower limit of the valve feedback. This parameter will only be displayed when the valve feedback signal is ON and the parameter is set as "On". When this parameter is set as "On", the relay will enable the forward and reverse running of the motor in order to calculate the time needed from the valve fully closed to fully open and the feedback signal of fully closed and open. The feedback signal of the valve controller is for the calculation of the valve controller.

2. Upper limit of the valve feedback signal. Set the valve feedback as "On", can be set automatically or manually.

3. Upper/lower limit of the valve feedback signal. Set the valve feedback as "On", can be set automatically or manually.

Auto/Manual Mode Switch

AOM indicator ON refers to manual mode. AOM indicator OFF refers to auto mode. Besides ON/OFF, PID, programmable and digital inputs all have on-off controls, the valve control is also able to transition to manual control (fixing the openness of the valve, unit: % from valve fully closed to fully open) when in PID control mode. You simply need to press in PID control mode to switch to manual mode and AOM indicator will be OFF. Press again to return to PID control and AOM indicator will be ON.

Upper/Lower Limits of Valve Openness

Assume we would like the maximum openness of the valve to be 80% and the minimum to be 20%, set the parameter as 80 and 20 as, and the valve openness of PID controller, programmable control and manual control will fall within this range.

PID Programming Control

Functions and Parameter Setting:

The PID programmable controller includes 8 patterns (Pattern 0 ~ 7). Each pattern contains 8 steps (Step 0 ~ 7) and parameters: link pattern, cycle and the number of steps.

Start Pattern

This parameter can be set in the operation mode. The user can set up which pattern is the start pattern for the programmable controller. This function is only available when the program is not in STOP status.

Step:

Includes the settings of the two parameters, set point X and execution time T, indicating that the set point (SV) has its own time. The set point X serves as a reference for the execution time T. The result of the set point X is the same as the previous setting, the process is called Soak, otherwise, it is called Ramp. Therefore, the programmable controller is also known as RampController.

The default setting of the first step program is Soak control. The temperature will first rise to the set point X and remain at this temperature until the next step is executed.

Link Pattern:

For example, if the parameter is set as 0, it refers to the execution of pattern 0 will follow the execution of pattern 1. If the link pattern is set as 0, it refers to the pattern after another one after the execution of the whole pattern is completed and the SV for the last step is fixed in the program.

Cycle:

The additional number of cycles for a pattern. For example, if the parameter is set as 2, it refers to pattern 4 has to execute twice in total, totaling the executions to 3 times including the original one.

The Number of Steps:

The number of steps in each pattern (range: 0 ~ 7). For example, if the parameter is set as 2, it refers to pattern 7 will execute step 0 ~ step 2 and other steps will not be executed.

The Execution:

1. When the parameter is set as 0, the program will start execution from step 0 of the start pattern.
2. When the parameter is set as 1, the program will stop and the control output will be disabled.
3. When the parameter is set as 2, the program will stop and the program will be stopped before the start pattern before the parameter desire to execute by the remaining time.
4. When the parameter is set as 3, the program will stop and the program will be stopped before the start pattern before the parameter desire to execute by the remaining time.

Display:

In PID programmable control, some SVs are set as P-V-P. P refers to the current parameter and XX refers to the current parameter. Press [ESC] to modify the display.

Select [P], and press [SET] to display the target temperature for the current step.

Select [S], and press SET] to display the remaining time of the current step.

PID Control

In PID control, you can select any one of the 4 groups of PID parameter (P, I, D, PF). After auto-tuning, the PID value and the temperature SV will be stored into the selected PID parameter.

PID = 4/3 * PDI, n = 0 ~ 4, 0 ~ 3 are the corresponding selected PID parameter.

1. Auto-tuning: auto-select PID, and the program will automatically select a useful PID parameter based on the current SV display value, corresponding [n] = 0, 3.

2. The SV for the selected PID parameter, can be set by the user or auto-generated by auto-tuning.

Valve Control

Heaters and coolers can be used to control the temperature and the openness of the valve in order to control the flow of the medium. Current and voltage can control the openness of the valve, however, the direct drive and control of the openness of the valve is the relay. To control the valve by voltage and current, you can use the B series analog output controller. If you tend to use relay for the control output, you have to choose the value of relay series. The two control outputs are relay output for the forward/reverse running of the motor to drive the opening and closing of the valve, and relay output for the forward and reverse running of the motor control output 2 in order to adjust the position of the valve. In order to detect the position of the valve, 49/8V is able to receive "feedback signal" and "no feedback signal". When there is no feedback signal and the valve is fully open and closed, the output will continuously. If at the moment the value is fully closed, output will be 0% continuously. If you use both with feedback signal, you can connect the input of the feedback signal to the relay input of your choice to On precisely control the openness of the valve. If there is no feedback signal or the feedback signal is incorrect, and the pre-set openness of the valve is not reached after twice as long as the time set in the parameter, the program will automatically switch back to no feedback state. To ensure the correctness of the valve control, please make sure that you have the following parameters:

1. Time required from the valve fully closed to fully open. This parameter has to be correct when the valve is without feedback signal, otherwise, the accuracy for the temperature will be affected. The PID control will not be able to open the openness of the valve according to the setting of this parameter.

2. Deadband: assuming the Deadband is 4%, PID control will correspond to the openness of the valve within 4% and the valve will not move within the range unless the value is accumulated and exceeds 4%. If the Deadband value is too small and the valve is set to have feedback signals, moving back and forth of the valve will shorten the life of the valve motor.

3. Address and content of the bit register (read bits are started storing from start address and within data is PT08), set the bit 1 as 0.00000 corresponds the bit date as 0.