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TH500A-1 PID FIX-CONTROL Guide

The TH500A-1 is capable of outputting SSR and SCR signals for PID temperature and humidity control.
Fix-Control is capable of measuring the current temperature/humidity, then comparing to a set value. The SSR or SCR PID outputs will react to the corresponding difference in temperature in an attempt to reach the set-value.
Hence, if your current temperature is 20C and the set value is 30C – the PID output running to your heating element will be powered on, until the TH500A considers it close enough to the set value temperature, in which case it will turn off.
The PID functions are completely tunable, so temperature overshoots, steady-state error and proportional adjustment can be manipulated by the user to fit a relevant application.
The simplest way to initiate this functionality is on the main display screen (figure 1). You can see, circled in red, the TEMP.SV and HUMI.SV. These are the set-values as mentioned. By default, the PID control mode is SSR – the PID output is located in the output pins on the back of the device, labelled TEMP.OUT and HUMI.OUT respectively. These are the outputs that will drive your heating/humidifying elements.

PID Quick Start

To run PID in fix control mode without changing any tuning settings;

1. Wire your TEMP/HUMI.out to relevant heating elements. (figure 2)
2. Write a set-value into the TH500A by clicking on them on the relevant screen (figure 1)
3. Ensure the device is in run mode by clicking run on the same screen.
4. To check the PID control is active – navigate to the graphing screen, eventually the device should get to the desired set-value and remain there.

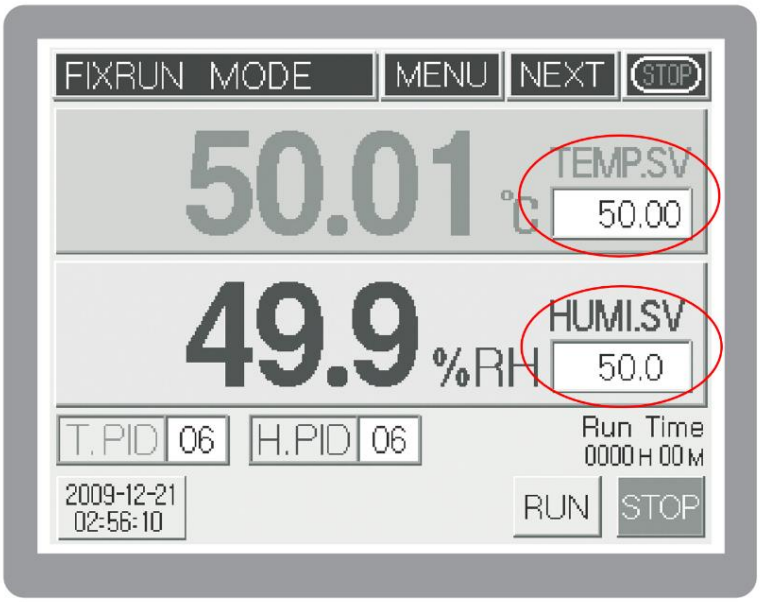

Figure 1

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PID Tuning Guide

For particular applications the PID components will require tuning to work efficiently or within margins. The TH500A-1 is capable of automatic (recommended) and manual tuning.
To navigate to the PID control menu, you must firstly go to the main menu (menu button on temperature/humidity screen) and then touch the top left portion of the screen to access the back-end controls. See figure 3 on the next page for a display screen progression.
Keep in mind the TH500A must be in 'RUN' mode for any PID outputs to be working correctly. You may want to get an electrician to test the PID outputs with an oscilloscope or Multimeter.

■ Connection of Temp / Humidity control output

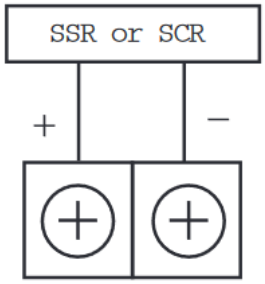

Figure 2

T.Out type	Select and use S.S.R or S.C.R (4 – 20 ㎃ d.c). Select according to the equipment (Initial value : S.S.R)
T.SSR out period	You can set up when you select S.S.R output. Output cycle means On/Off working time in the proportional band. (Initial Value : 1 seconds)
T.Out direct	Select cooling control (direct movement) or heating control (inverse movement) (Initial Value : Inverse movement)
T.Out range	You can control output and selection range : –5 %(3.2 ㎃ d.c) · · · 105 %(20.8 ㎃ d.c) (Initial Value : 100 %)

Table 1

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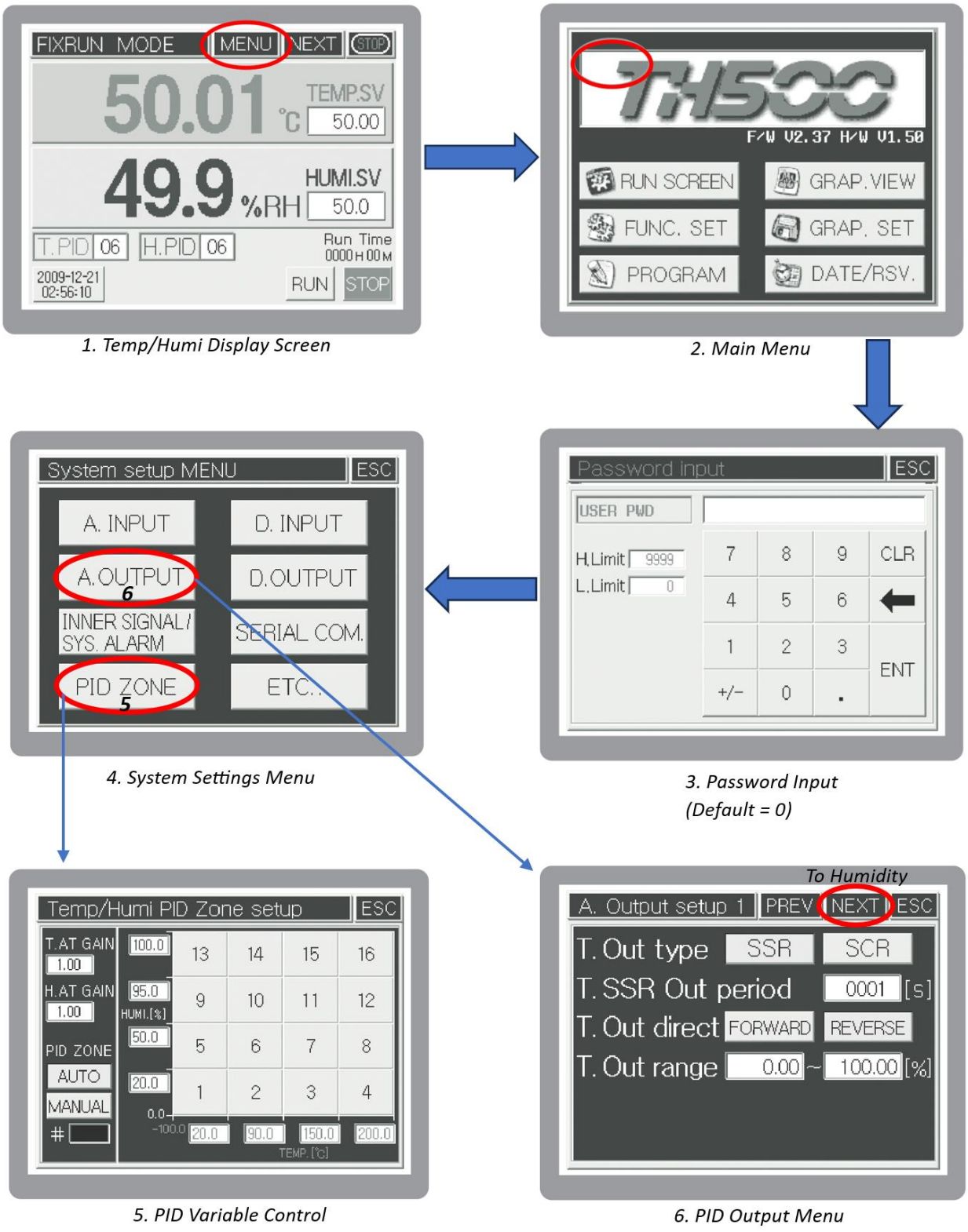

1. Temp/Humi Display Screen

2. Main Menu

3. Password Input
(Default = 0)

4. System Settings Menu

5. PID Variable Control

6. PID Output Menu

Figure 3

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Screen 5 shows the 16 programmable PID options. **Except for very specific applications AUTO PID control is recommended.** You can manipulate the strength of the auto-tuning feature by changing the T.AT and H.AT GAIN, as shown in screen 5. In other cases, you may select the manual option. If manual is selected, you can individually change the Proportional Integral and Differential components of the control.
Screen 6 is the output type. You have the selection of SSR or SCR depending what you are driving. SSR out period is the frequency of the SSR output. T.OUT DIRECT is essentially active high or low for the output.

Enable Auto-Tuning

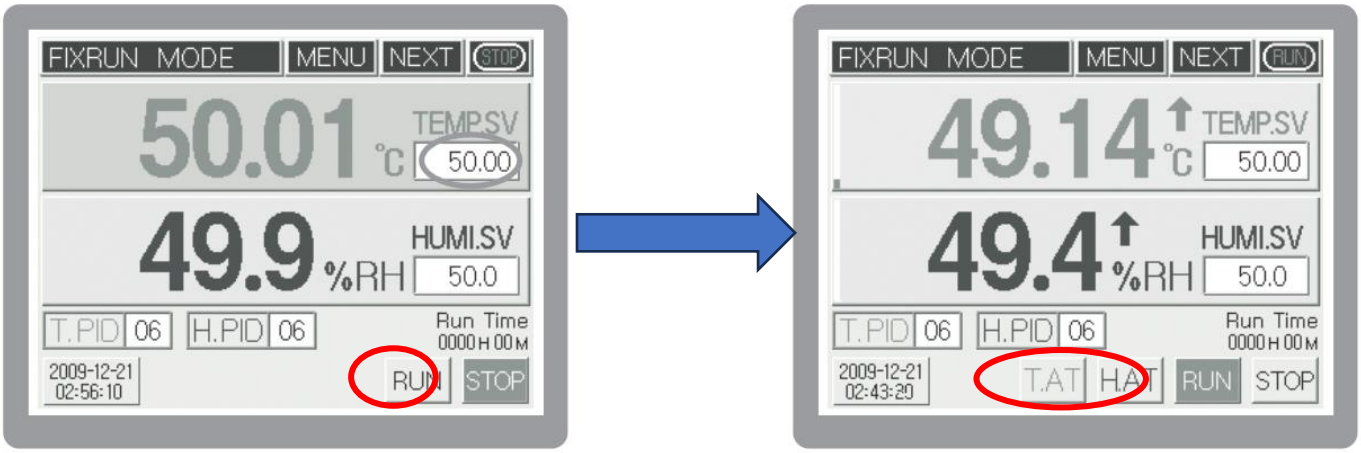

Figure 4

Shown in the above screens – the PID control has been configured as desired and displayed in the flow chart, figure 3. On the left screen – the system is in STOP mode. On the right screen the system is in RUN mode.
Once you have engaged RUN mode, press the T.AT or H.AT buttons (circled in red) to engage the auto tuning functionality for the temperature and humidity respectively.
If the T.AT or H.AT buttons are left un-pressed, the initial PID values will be used for the entire process. This can lead to sub-optimal performance. Hence, it is recommended you always use the auto-tuning feature unless you understand advanced PID control.

For further understanding – refer to pages 30 to 34, & 85 to 90 of the product manual.