SIMULATION PAGE: How to

How simulation features works in our Thermac software

1. Download and install the Thermac Simulator on your computer
2. Open directly a (model example) *.tcs file of a demo application already prepared by us (Model machine sample.tcs) via the file menu and click on open command.
3. Thermac will immediately open the simulation page

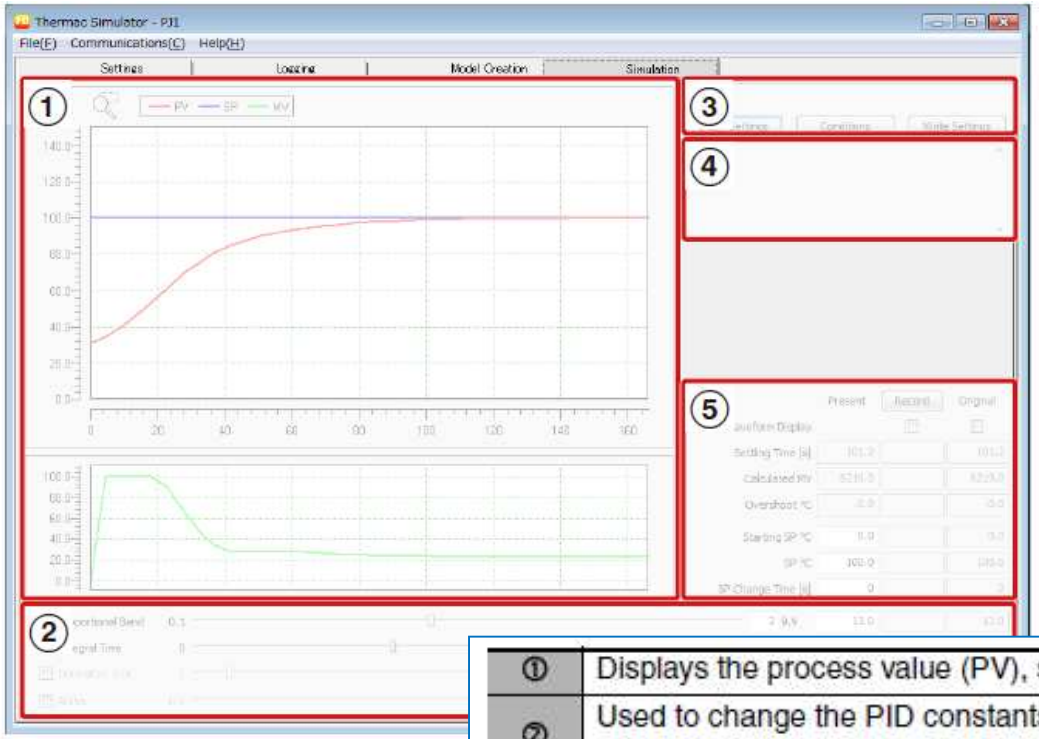
SIMULATION PAGE: Function

Functions of the simulation tab page are as follows.

- Changing the set point
- Adjusting the PID constants
- Adjusting the rising portion of the PV waveform
- Execution AT

SIMULATION PAGE

The simulation tab page is used to simulate a PV waveform. This tab page configuration is shown below.



①	Displays the process value (PV), set point (SP), and manipulated variable (MV).
②	Used to change the PID constants and alpha value. The simulation waveform is updated whenever a value is changed.
③	Used to set the graph scales and simulation conditions. Also used to write the adjusted set values to the Temperature Controller.
④	Displays error messages and other messages during operation.
⑤	Displays information on the simulation waveform and used to change the set point (SP). Can also be used to record the waveform and to compare a recorded waveform with the waveform that is currently being adjusted.

SIMULATION PAGE: SP(set point) changing

(1) Changing the Set Point (SP)

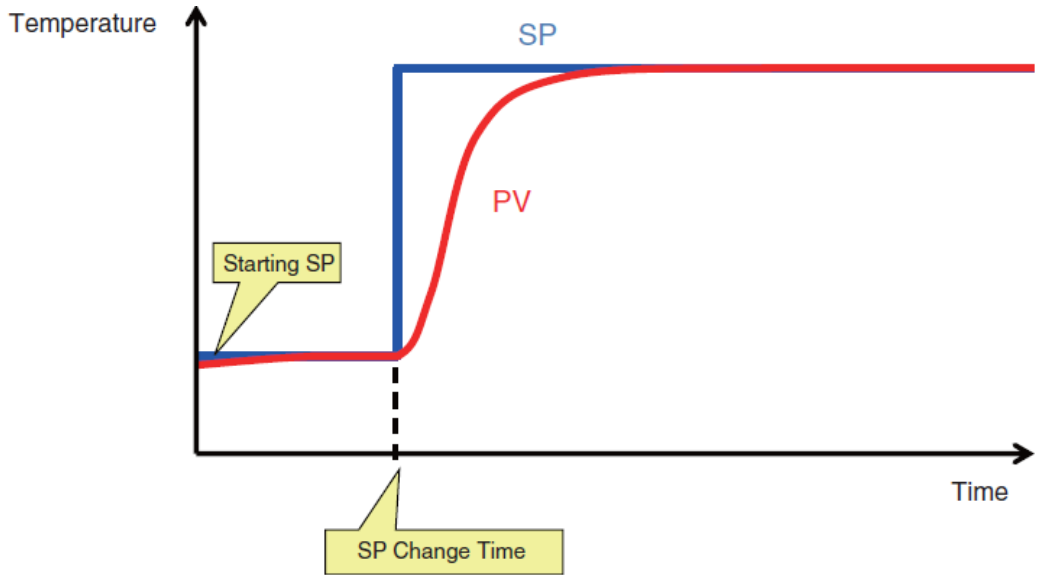
The following text fields are used to change the set point.

Starting SP ℃	25.0		0.0
SP ℃	100.0		100.0
SP Change Time [s]	25		0

(2) Changing the Starting SP

Set the starting SP and the SP change time as required.

Starting SP ℃	25.0		0.0
SP ℃	100.0		100.0
SP Change Time [s]	25		0

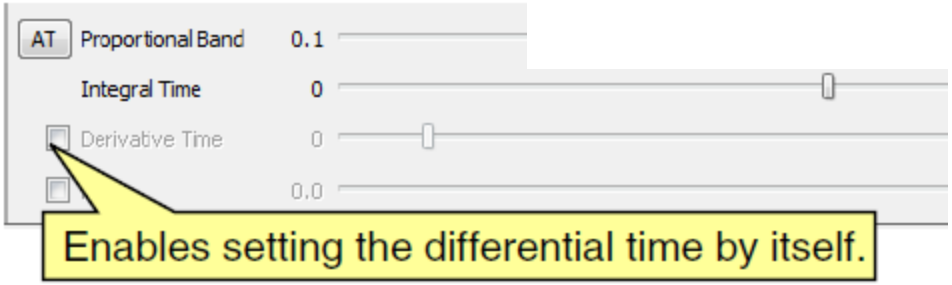


SIMULATION PAGE: PID adjustment

- Changing the proportional band and integral time (I)

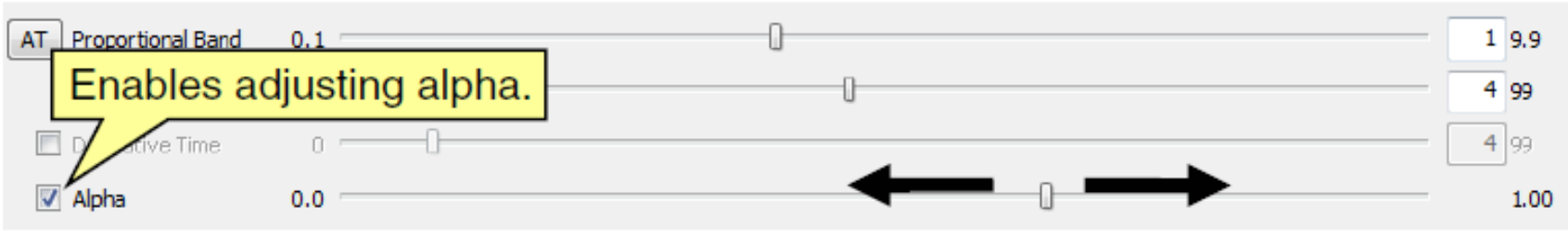
Example: To specify an upper limit of 199.9 for the bar, enter “19”.

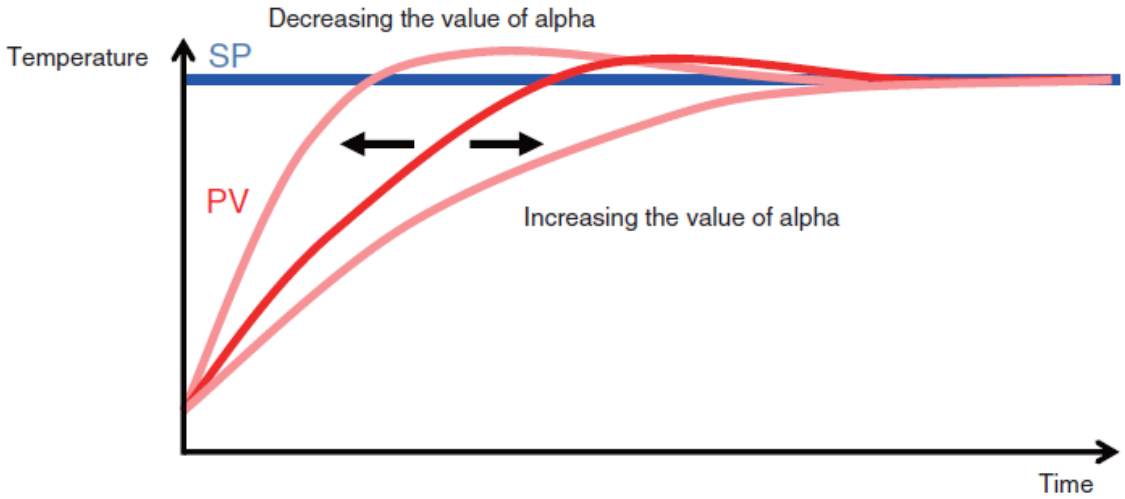
- Changing the derivative time (D)



SIMULATION PAGE: Adjust PV (process value) waveform

You may be able to improve the rising portion of the process value (PV) waveform by tuning ‘alpha’.





SIMULATION PAGE: AT (autotuning) execution

You can perform autotuning during a simulation.

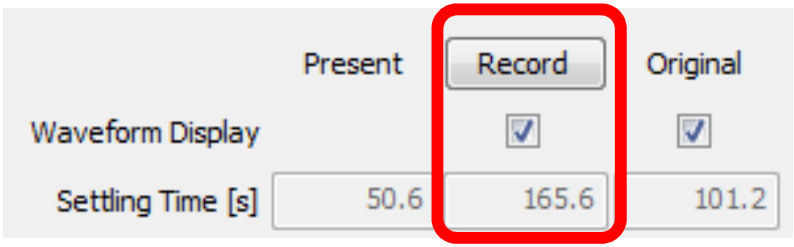
SIMULATION PAGE: Comparing waveforms

(1) Temporarily Saving a Waveform

Click the record button to temporarily save the present waveform.

(2) Comparing the temporarily saved waveform

Select the check box below the record button to display the temporarily saved waveform.

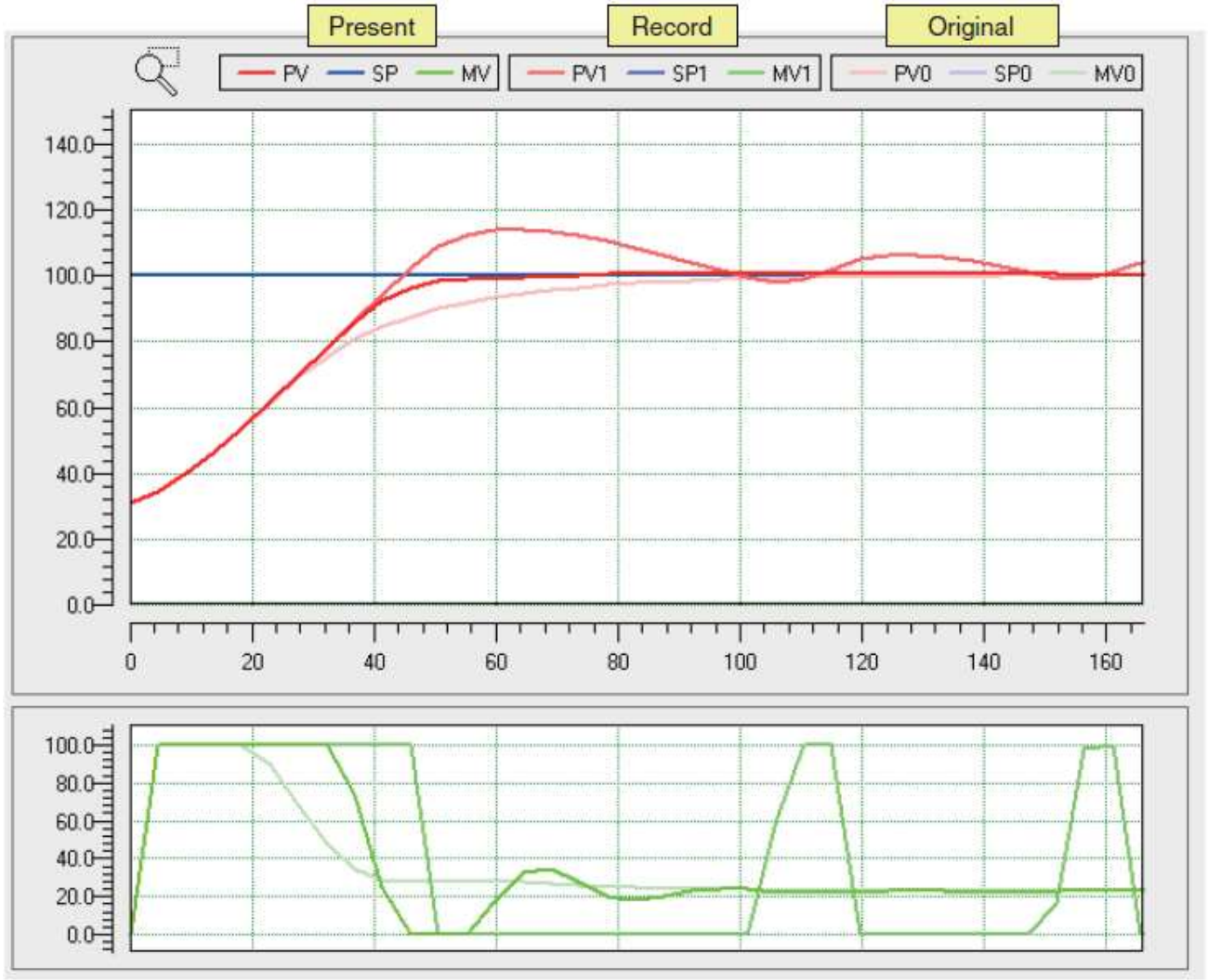


(3) Comparison with the original waveform

Select the check box below the original label to display the original waveform from the start of simulation.

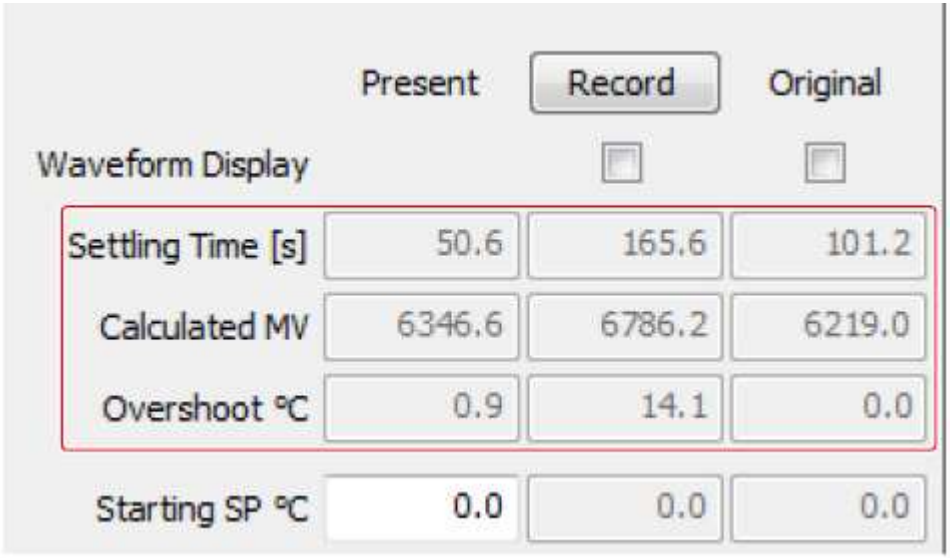
SIMULATION PAGE: Comparing waveforms

This figure shows a comparison of waveforms



SIMULATION PAGE: Comparing waveforms

You can check the settling time and overshoot from the following fields.



Item	Description
Settling Time	The settling time is the time required for the PV to stabilize within the settling width of the SP.
Calculated MV	The calculated value of the MV in the MV waveform is given. You can also specify converting the value to the power consumption.
Overshoot	The amount by which the PV overshoots the SP in the rising portion of the PV waveform is displayed.

SIMULATION PAGE: changing simulation conditions

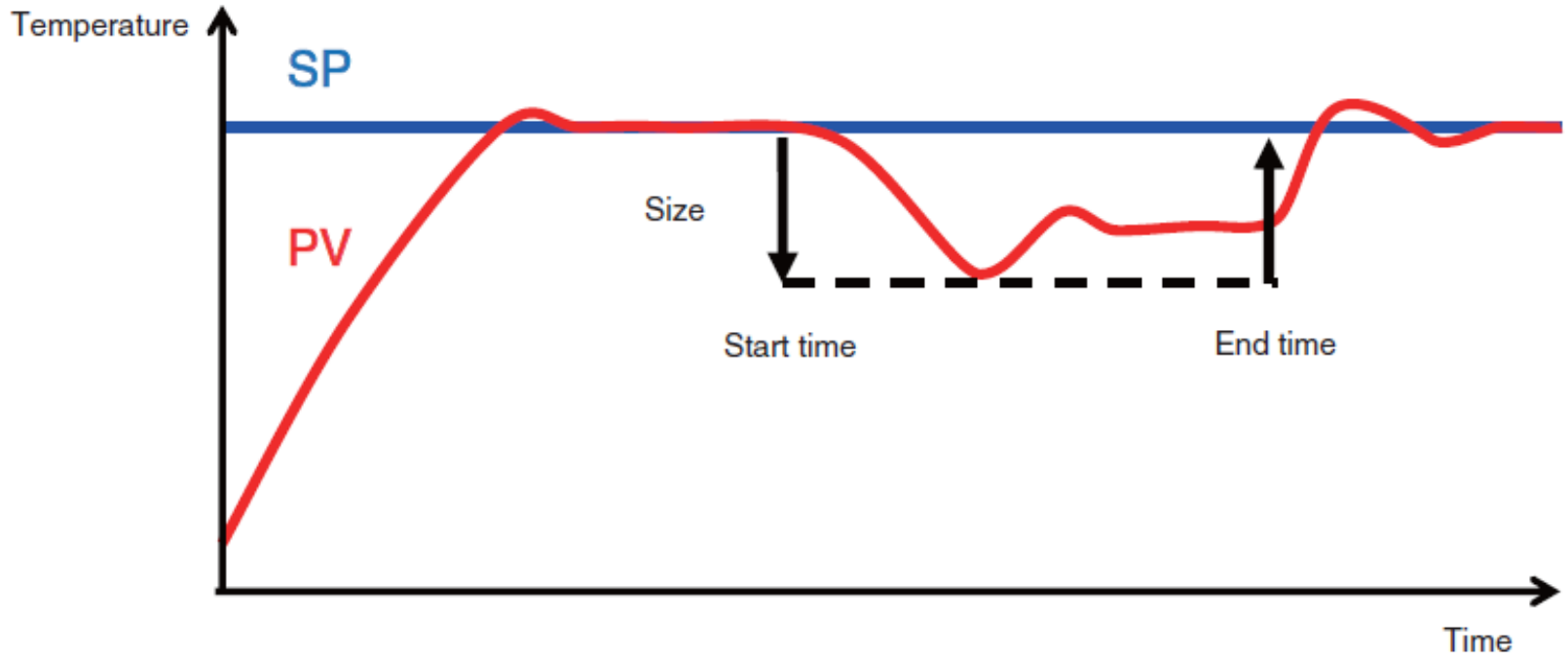
You can change settings in the following dialog box.

Conditions

	Present	Record	Original	Setting Range
MV				
Upper Limit %	100.0	100.0	100.0	0.1 to 100.0
Lower Limit %	0.0	0.0	0.0	0.0 to 99.9
SP Ramp				
Time Unit	EU/min	EU/min	EU/min	
Set Value °C/min	0.0	0.0	0.0	0.0,0.1 to 999.9
Fall Value °C/min	-0.1	-0.1	-0.1	-0.1,0.0,0.1 to 999.9
Stepwise Disturbance				
Size [%]	0.0	0.0	0.0	-100.0 to 100.0
Start Time [s]	0	0	0	0 to 99999
End Time [s]	99999	99999	99999	0 to 99999
Settling Width °C	1.0	1.0	1.0	0.1 to 100.0
Simple Simulation	Disabled	Disabled	Disabled	
Power Display				
Heater Capacity [W]	0	0	0	0 to 100000
Factor	1.0	1.0	1.0	0.1 to 10.0
Heater Capacity × Factor [W]	0.0	0.0	0.0	

SIMULATION PAGE: Changing simulation conditions

- Stepwise disturbance area



The above diagram is merely an illustration. “size,” “start time,” and “end time” are not actually displayed on the waveform.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