PID Server

28/9/05

Table Of Contents

The PID Server PC utility enables you to auto-tune PID loops for both the Vision and M90/91 controller series. Although it is installed as part of the VisiLogic/U90 Setup, PID Server runs independently of other Unitronics software.

How Auto-tune works

The PID Server utility tunes a PID loop by temporarily disabling the PLC's PID function, and tuning the loop while the PC controls the PID output.

To enable a PID loop to be auto-tuned:

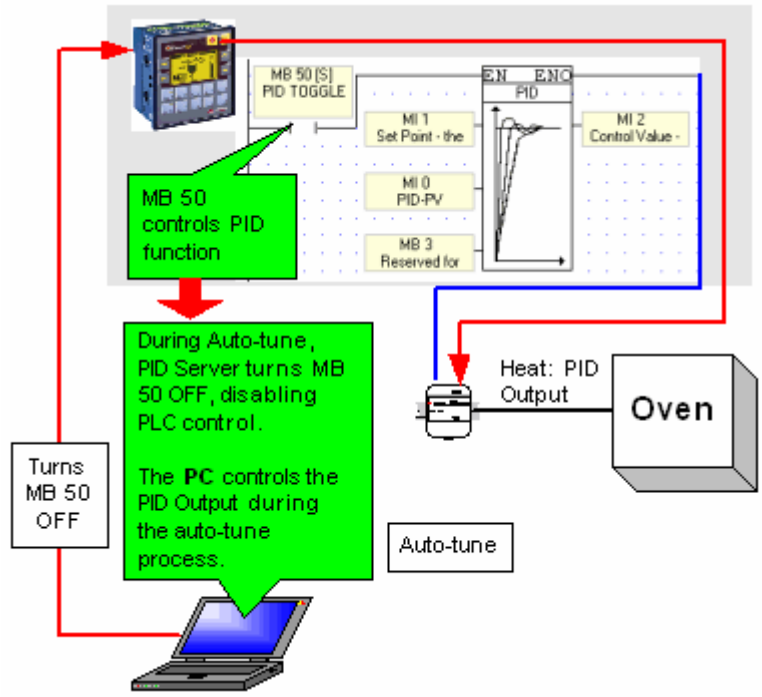
- The controller must be connected to the I/O module whose output feeds energy into PID system.
- The PC running PID Server must have an established communication link to the controller.
- The PID Server parameters must be linked to the same operands linked to the PLC's PID function.

Note ♦ PID Server will only work with Vision 3.73 and U90 3.70 and higher projects saved with the most current version of VisiLogic. To update older projects, open them with the current VisiLogic version and save them.

Vision Auto-tune

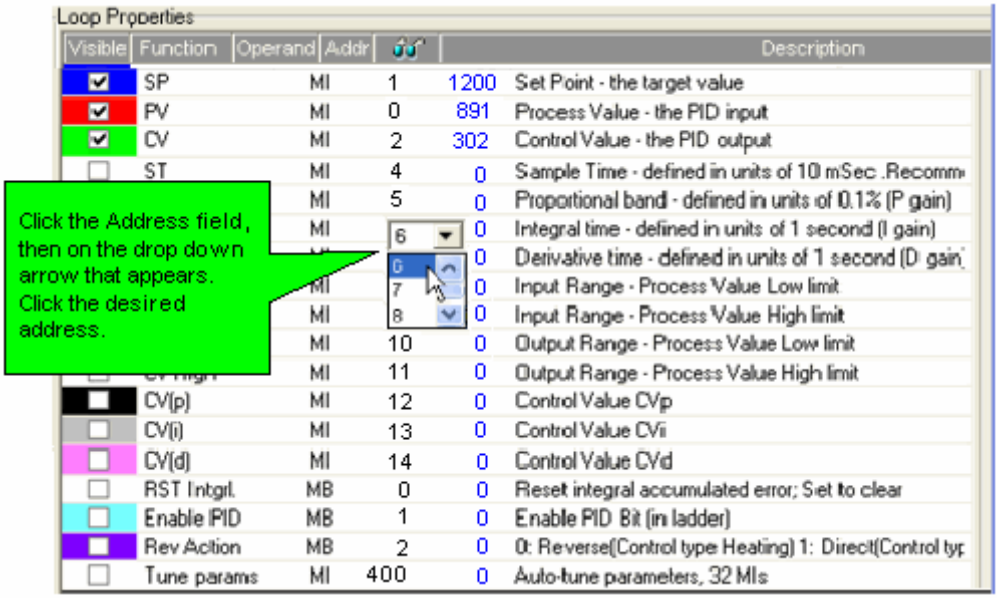
Before a PID loop can be auto-tuned:

- The OPLC must be connected to the I/O module whose output feeds energy into the PID-controlled system.
- The OPLC must be installed with a Ladder application that **contains a PID function; the function must be activated by an MB that is used only for that purpose.** When the loop is auto-tuned, the PID Server utility uses this MB to disable the PLC's PID function.
- The PC running PID Server must have an established communication link to the controller.
- The PID Server parameters must be linked to the same operands linked to the OPLC's PID function.

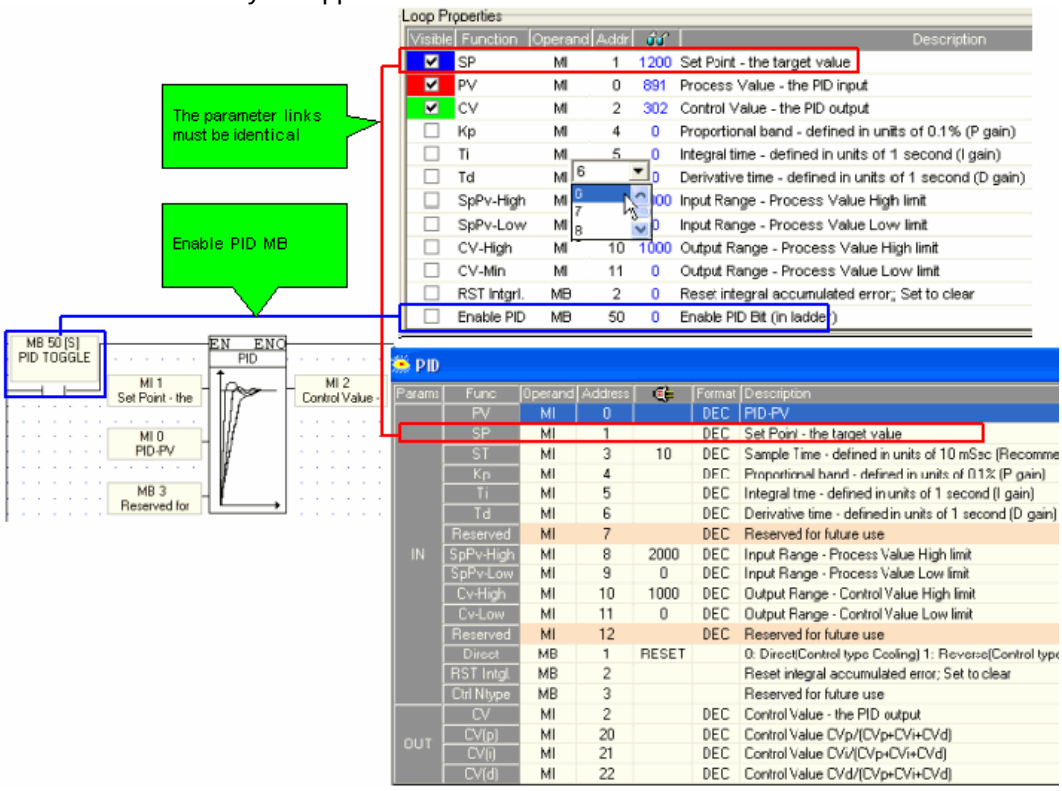


Auto-tuning with PID Server (Vision)

1. Start PID Server from:
   - within VisiLogic via the menu bar, Tools> PID Server,
   or
   - within Windows via Start>Programs>Unitronics> PID Server.
2. Click on the New File icon to create a new PID loop Auto-tune file.
3. Locate Loop Properties in the lower right-hand part of the screen.
   Link all of the parameters to the same operands used in the PID function within the Ladder application. To link a parameter, click on the Address field and select the desired address.
   You can also import operand addresses.

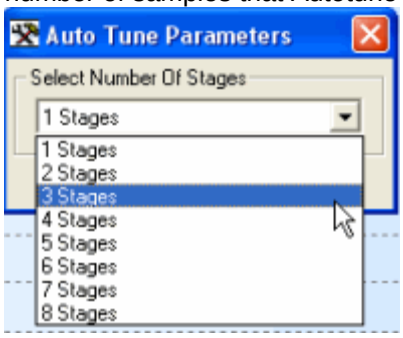


Note that the Enable PID bit must be the same MB used to activate the PID function within the Ladder application.
In addition, note that PID Server uses the 32-bit Auto-tune Parameter vector to store values. Do not allow your application to overwrite the vector.

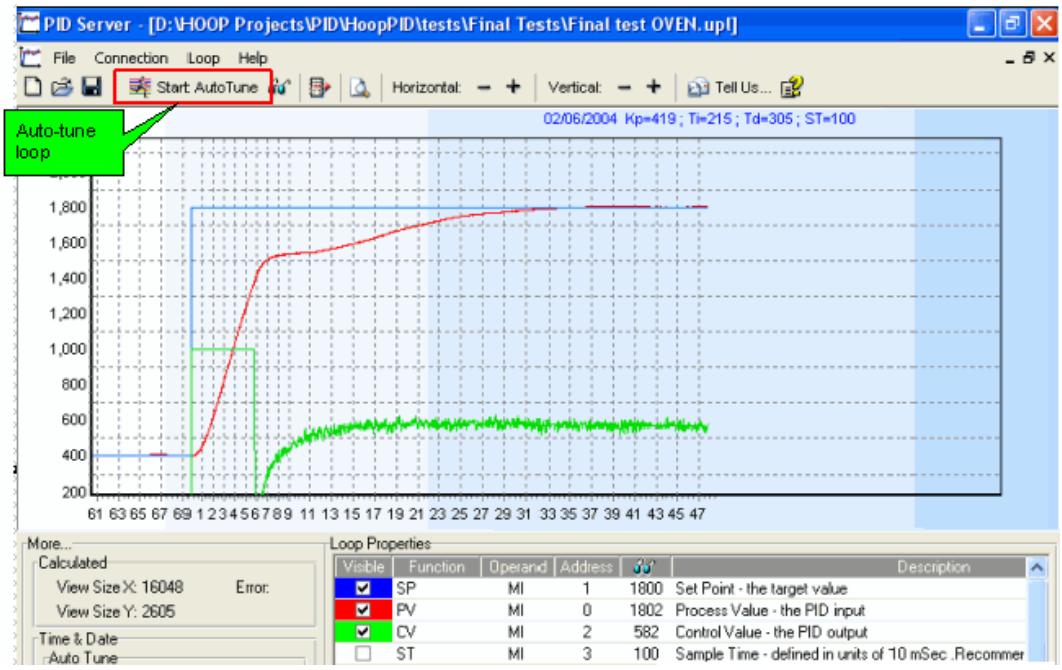


4. From the Connection menu, click OPLC model, and then select your controller type.
5. From the Connection menu, click Communication - PC Settings, and select the appropriate settings.

6. Click the Auto-tune icon. The Stages box opens.
7. Click on the drop-down arrow to select the number of desired Stages, which is the number of samples that Autotune will use in order to analyze the system.



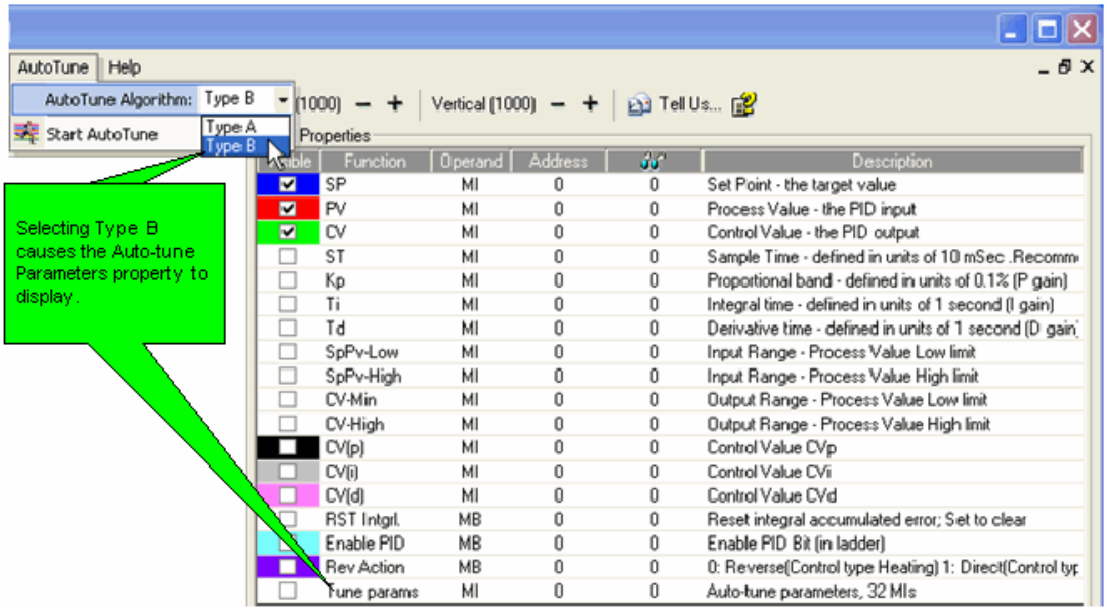
8. Click OK; the PID Server utility begins to run.
Note that by checking the Visible option in Loop Properties, you cause PID Server to display a color-coded graphical representation of the Auto-tune process.



Older PID Server Applications

AutoTune Algorithm is a feature added with PID Server V4.00.

- Type A
  Previous to V 4.00, PID Server used Type A to tune all PID loops.
- Type B (default)
  When this algorithm runs, PID server uses a vector 32 MIs long to store Auto-tune Parameters. Do not overwrite this vector in your application.

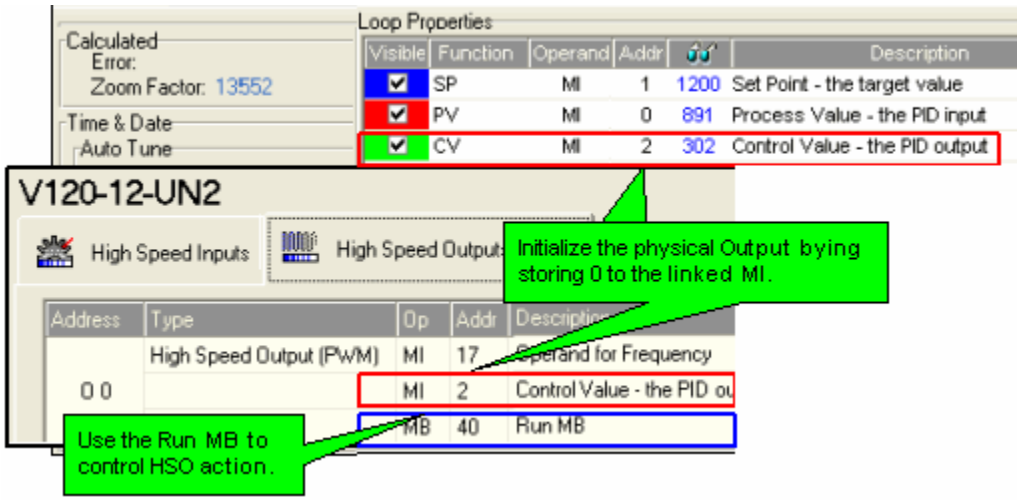


Note ♦ If the system you are tuning has critical limits that are close to the setpoint, you

may need to avoid drastically overshooting the setpoint during autotune. To accomplish this in, for example, a heating system, run an initial autotune procedure using a setpoint temperature lower than that the desired, final temperature. You can then observe the system temperature reaction, and repeat autotune, gradually increasing the setpoint temperature until the system reaches the desired temperature.

Controlling the Physical Output

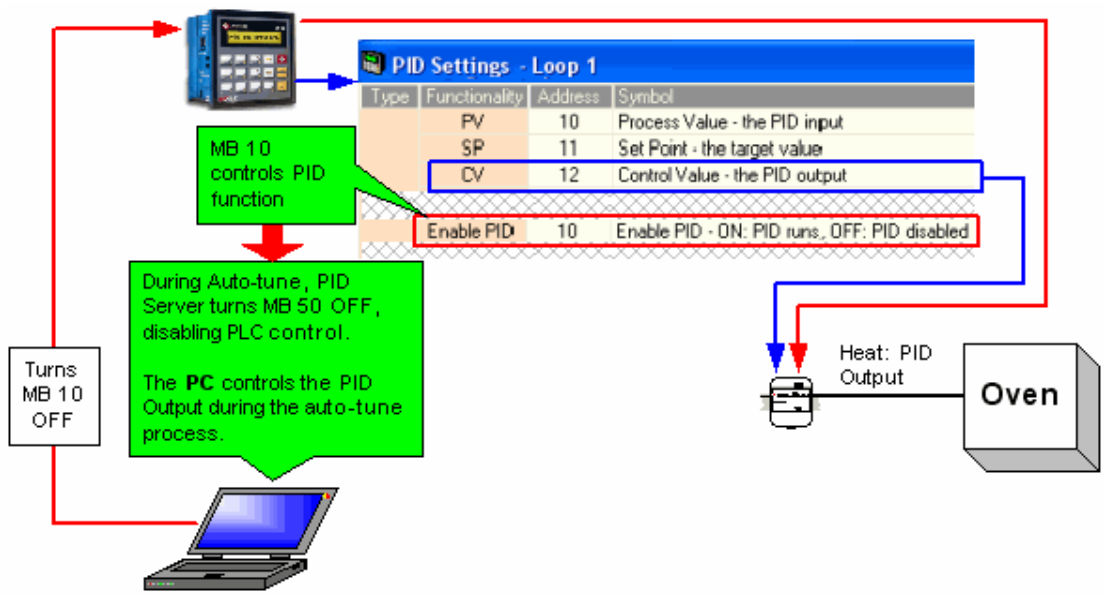
Before beginning auto-tune, you may want to control and initialize the actual physical output that feeds energy into the PID-controlled system. If, for example, you are using a V120-12-UN2, you can suspend the action of a high-speed output by using Ladder Logic to turn off the Output's Run MB, and initialize the output by storing 0 into the linked MI in the Ladder program.



M90/91 Auto-tune

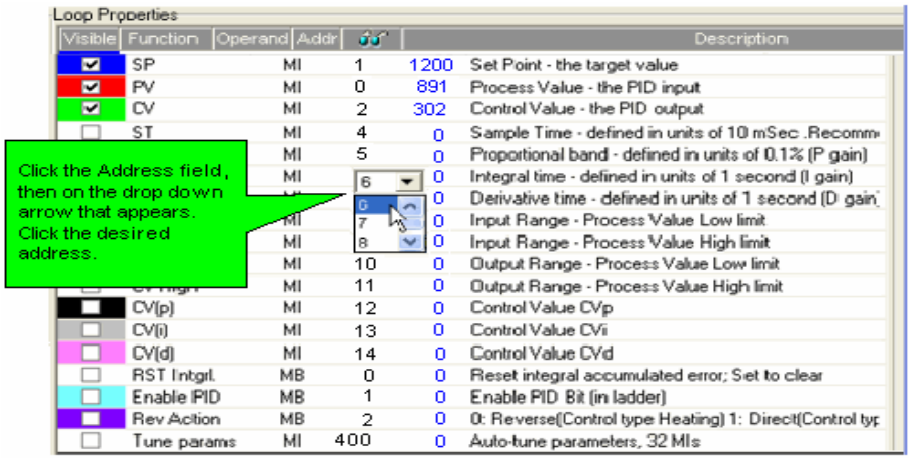
Before a PID loop can be auto-tuned:

- The OPLC must be connected to the I/O module whose output feeds energy into the PID-controlled system.
- The OPLC's Ladder application must **contain a PID function that is activated by an MB that is used only for that purpose.** When the loop is auto-tuned, the PID Server utility uses this MB to disable the PLC's PID function.
- The PC running PID Server must have an established communication link to the controller.
- The PID Server parameters must be linked to the same operands linked to the PLC's PID function.

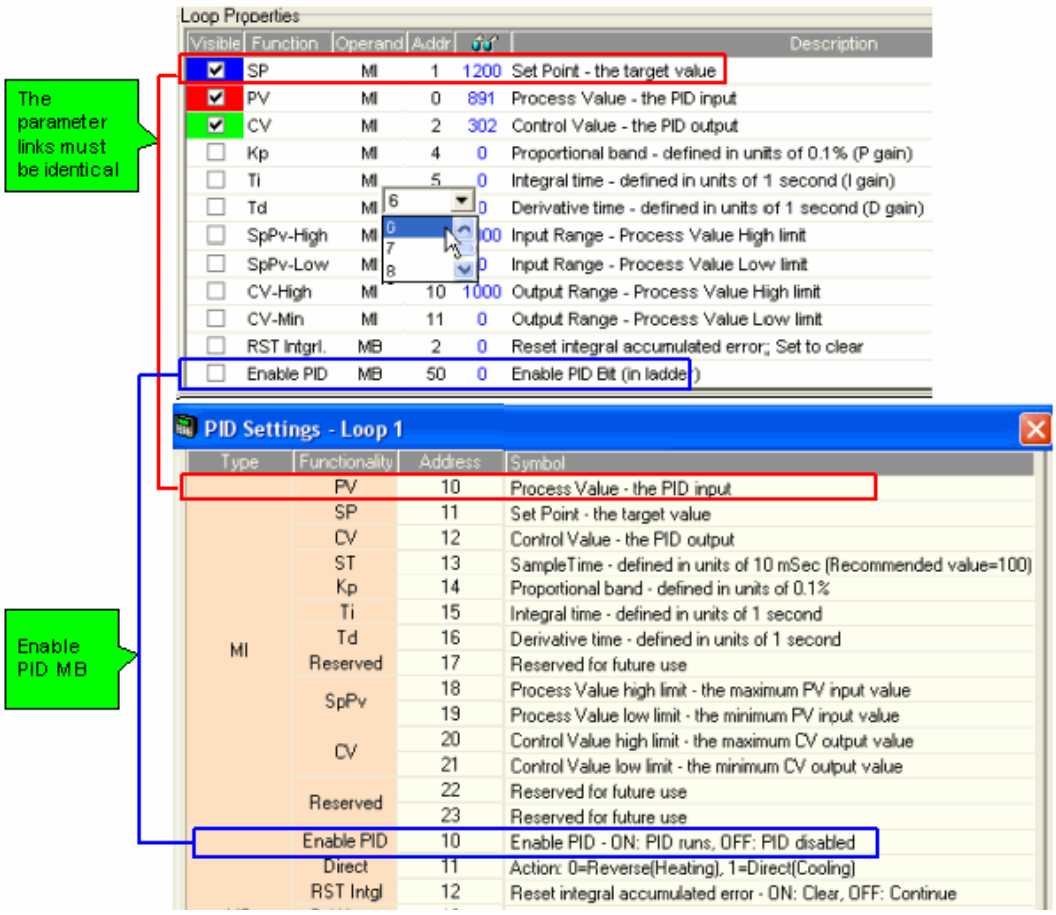


Auto-tuning with PID Server (M90/91)

1. Start PID Server from:
   - within VisiLogic via the menu bar, Tools> PID Server,
   or
   - within Windows via Start>Programs>Unitronics> PID Server.
2. Click on the New File icon to create a new PID loop Auto-tune file.
3. Locate Loop Properties in the lower right-hand part of the screen.
   Link all of the parameters to the same operands used in the PID function within the U90Ladder application. To link a parameter, click on the Address field and select the desired address.

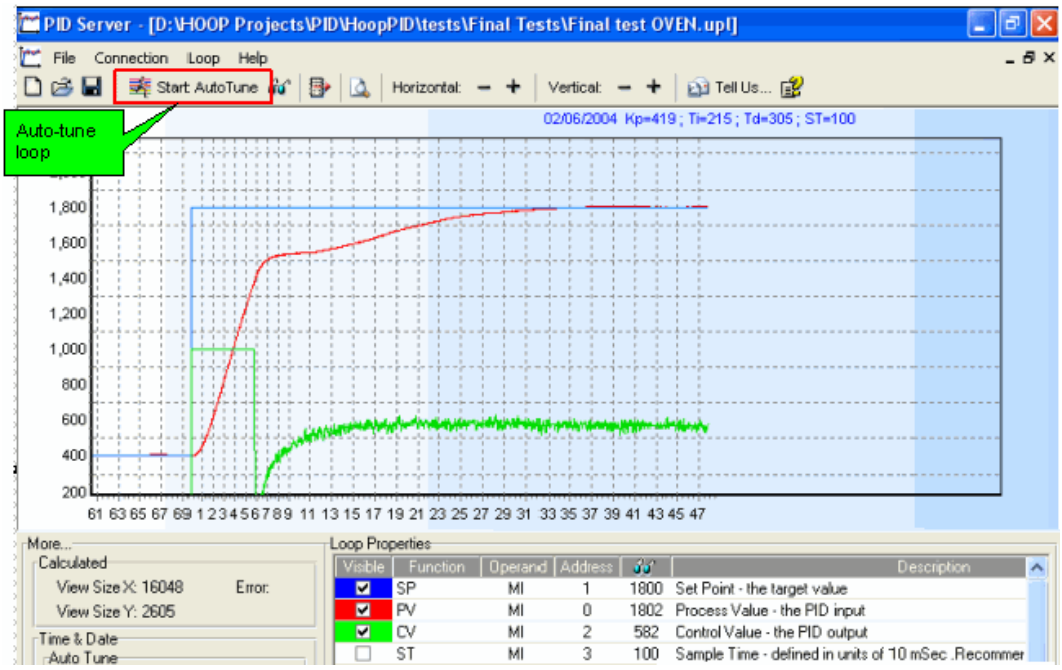


The last parameter is the Enable PID bit, which must be the MB used to activate the PID function within the U90Ladder application.



4. From the Connection menu, click OPLC model, and then select your controller type.
5. From the Connection menu, click Communication - PC Settings, and select the appropriate settings.

6. Click the Auto-tune icon. The PID Server utility begins to run.
   Note that by checking the Visible option in Loop Properties, you cause PID Server to display a color-coded graphical representation of the Auto-tune process.



Note ♦ If the system you are tuning has critical limits that are close to the setpoint, you may need to avoid drastically overshooting the setpoint during autotune. To accomplish this in, for example, a heating system, run an initial autotune procedure using a setpoint temperature lower than that the desired, final temperature. You can then observe the system temperature reaction, and repeat autotune, gradually increasing the setpoint temperature until the system reaches the desired temperature.

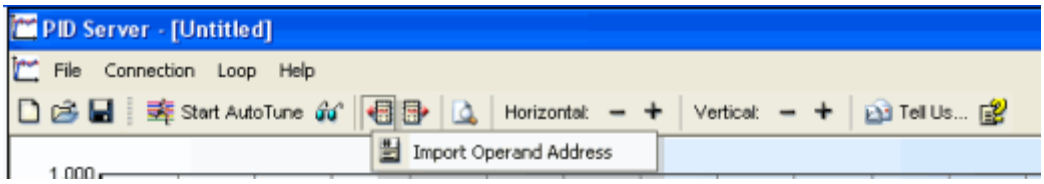
Controlling the Physical Output

Before beginning auto-tune, you may want to control and initialize the actual physical output that feeds energy into the PID-controlled system. If, for example, you are using an M91-12-UN2, you can suspend the action of a high-speed output by using Ladder Logic to turn off the Output's HSO Enable MB, and initialize the output by storing 0 into the linked MI in the Ladder program.

PID Server Features

Import Operand Addresses

The PID function in VisiLogic enables you to export the PID operand addresses in a text file. You can then use the Import operand Address feature to import the text file; the PID operand addresses in the text file will be automatically addresses entered into PID server.

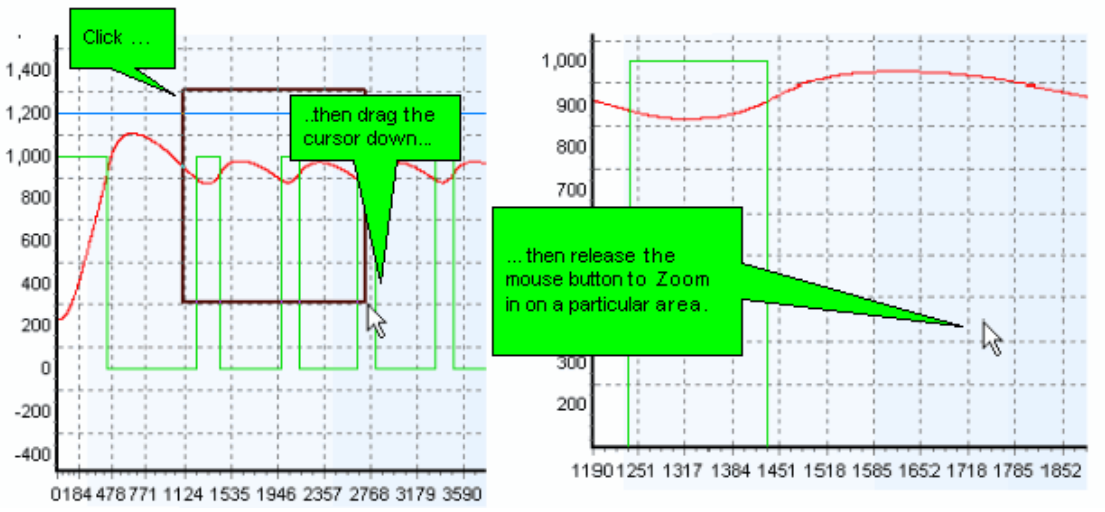


Saving File Parameters

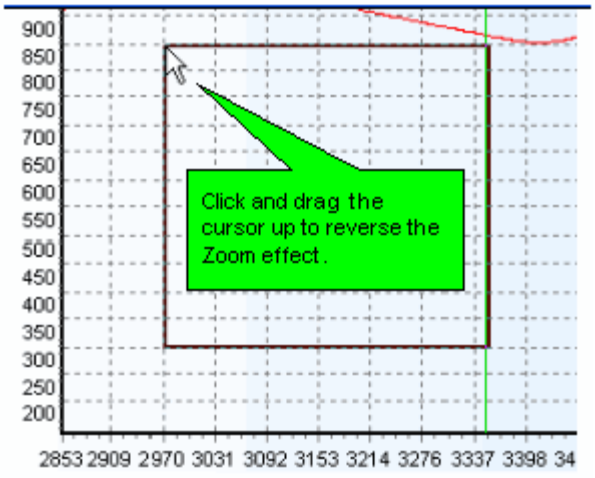
Whenever you click the Save icon, the file is saved as a .upl file. This file may be opened by any PC running PID Server. .upl files include the Loop Properties parameter links, comments, and PID auto-tune data up to the time that you click Save. If you wish to save only the Loop Properties without the data, by creating them, clicking Save, and storing the file.

Zoom

Click, then drag the cursor down, then release the mouse button to Zoom in on a particular area.



Click and drag the cursor up to reverse the Zoom effect.



Increase/Decrease Display View Size

Click the **+** icon on the toolbar to increase the graph sample size; click the**-** icon to decrease it.

Export

Located on the Loop menu, Export enables you to either export the auto-tune data to Excel, or to save a .bmp file of the auto-tune graph.

Comments

The Comment field is located in the lower left-hand corner of the PID server window. Any text you enter here is saved together with the .upl file.

What's this ?

Our mission is to make automation simple and efficient. Unitronics' R&D has developed and field-tested PID Server in order to provide you with fast, easy loop tuning.

To enable us to fine-tune PID Server to suit a broad range of PID applications, we would appreciate your using the 'Tell Us' feature. Clicking 'Tell us' will create an email with an attached copy of your auto-tune and PID process.

If possible, before you send the email, please take a moment to put the details of your application in the body of the email.

Note that in Windows XP, Windows will display the following dialog box; simply click yes to send the message to Unitronics.