

JaSim[®] Model J1010

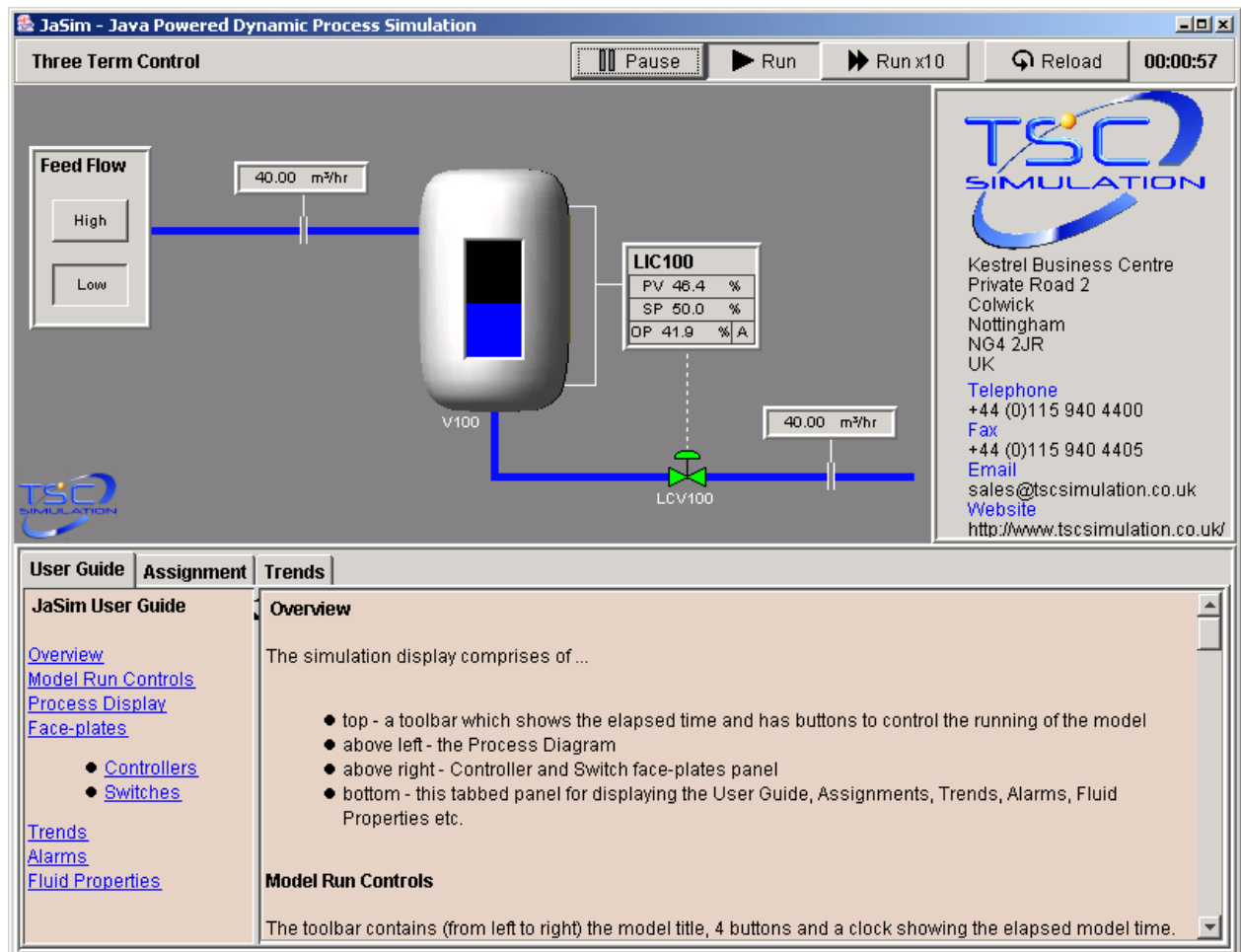
JaSim[®] is a brand-new range of web-enabled Dynamic Process Simulation Models written in Java Software, for training in process and control, using engineering level mathematical algorithms.

Complete with User Guides and Training Assignments, the Models are suitable for both individual and class training. They may be run on most modern computers, including Windows PC's, Mac, Sun, and Linux.

Each model may be installed from a website download or from CD ROM.

- **Full engineering level algorithms**
- **Suitable for e-learning or whole class teaching**
- **Dynamic simulation for the most memorable process training**
- **May be used for both theoretical and practical training in plant and process**

JaSim[®] Model J1010 – Three Term Control



Three Term Control [Pause] [Run] [Run x10] [Reload] 00:00:57

Feed Flow

High

Low

40.00 m³/hr

V100

LIC100

PV	46.4	%
SP	50.0	%
OP	41.9	% A

40.00 m³/hr

LCV100

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User Guide | **Assignment** | **Trends**

JaSim User Guide

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Overview

The simulation display comprises of ...

- top - a toolbar which shows the elapsed time and has buttons to control the running of the model
- above left - the Process Diagram
- above right - Controller and Switch face-plates panel
- bottom - this tabbed panel for displaying the User Guide, Assignments, Trends, Alarms, Fluid Properties etc.

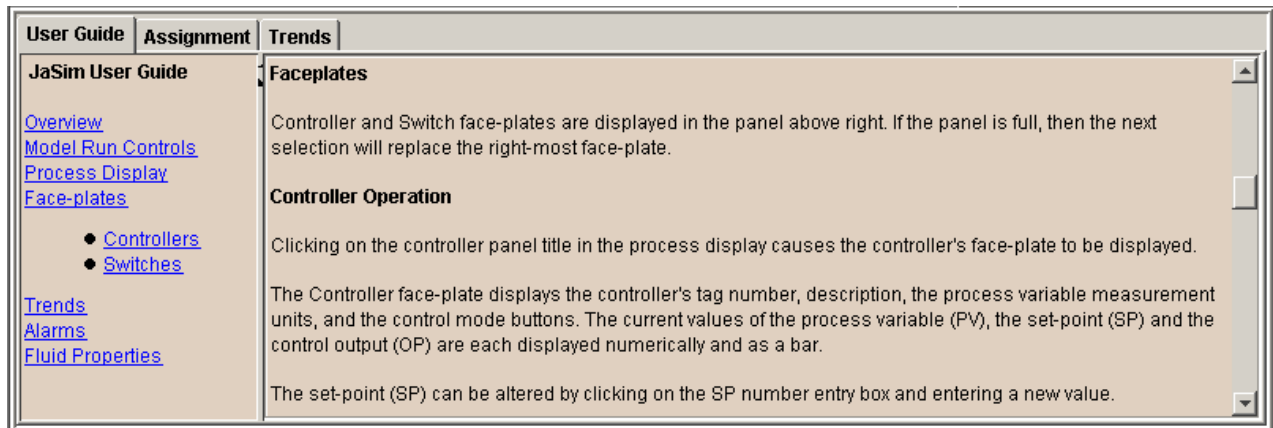
Model Run Controls

The toolbar contains (from left to right) the model title, 4 buttons and a clock showing the elapsed model time.

The JaSim® display comprises:

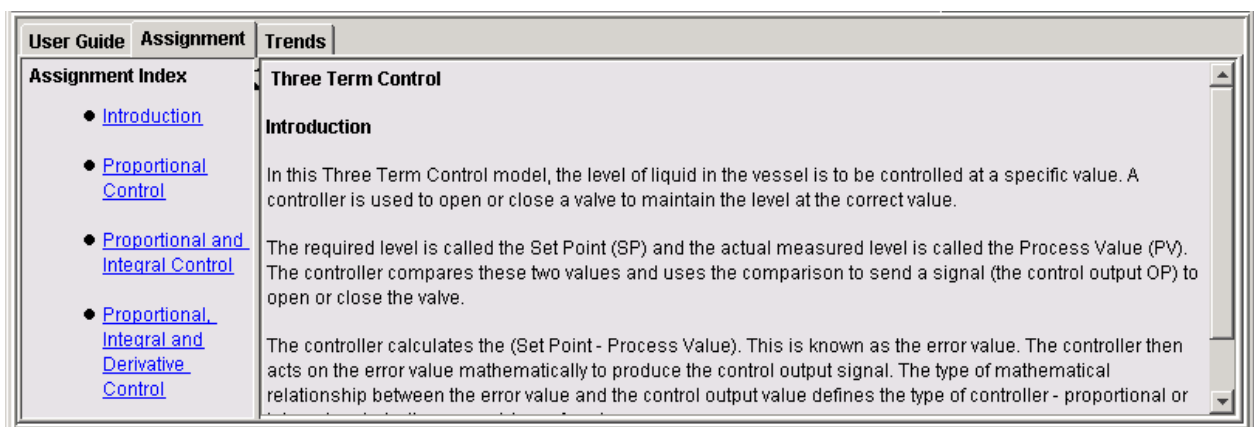
- Top - a toolbar which shows the elapsed time and has buttons to control the model to run at real time, or at a higher speed, and to pause. The start-up conditions may also be reloaded from this toolbar.
- Above left - the Process Display, laid out as a modern DCS Graphic Screen.
- Above right - Controller and Switch scratch-panel (Shows the TSC logo on start-up)
- Bottom - a tabbed panel for displaying the User Guide, Assignments, and Trend Charts. More advanced models include tabs for Alarms, ESD systems, Fluid Properties etc.

The JaSim® User Guide includes a hotlink index, for example clicking on the “Controllers” index will scroll the Guide to the correct heading:

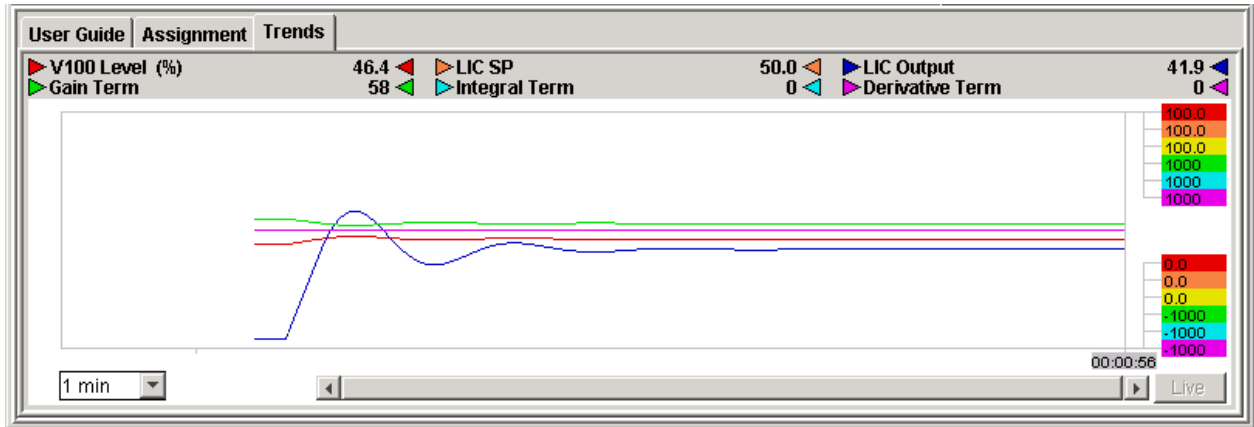


An **Assignments** page is also selected by a tab, scrolls down in the lower half of the display screen, and also includes a hotlink index.

For JaSim® Model J1010 Three Term Control, the Assignments guide the Trainee to determine the Ultimate Gain and Ultimate Period, and to calculate the optimum P I and D settings using the Zeigler Nichols formulae. The settings are able to be made on the pop-down controller.

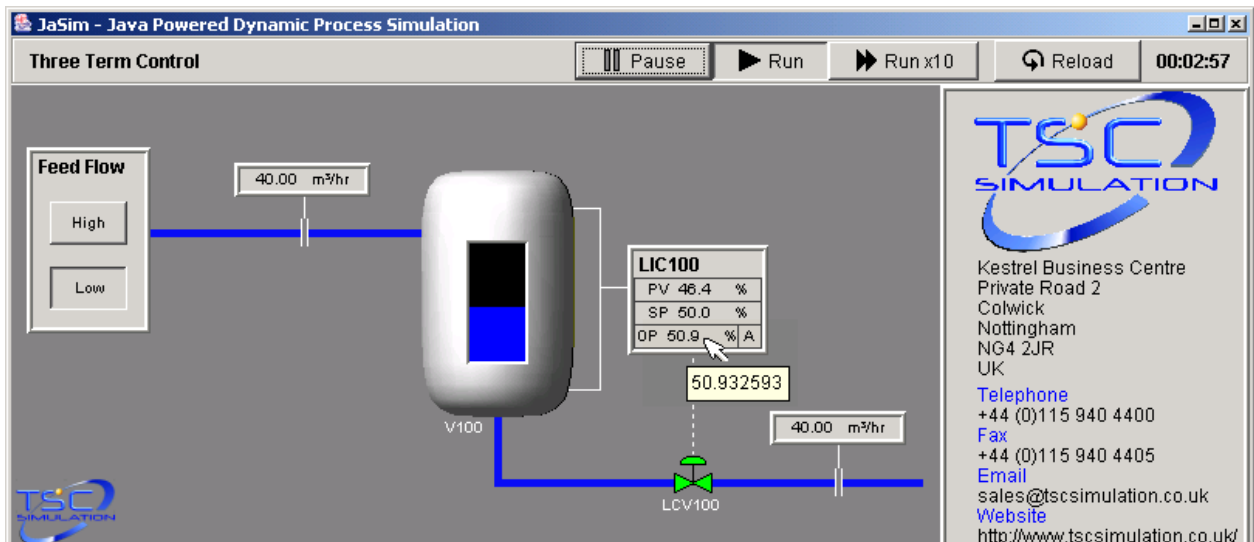


A comprehensive **JaSim® Trends Display** is also supplied, selected by a tab, and is displayed in the lower half of the screen. The Trend Display allows both Time-base and Channel selection, Channel ranging, and full historical value recording. This display shows the settling of the J1010 model during the first few minutes:



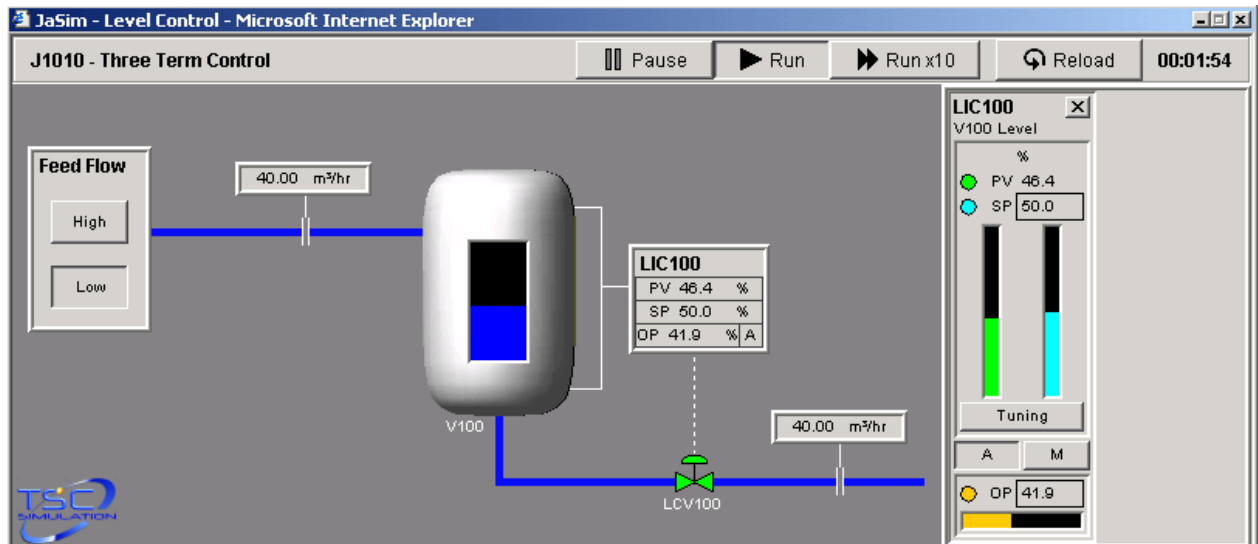
The models use **Full Engineering Level Mathematical Analysis**.

With this advantage, increased fidelity displays may be selected by holding the cursor on a variable value. This automatically brings up a greater precision display of the value, as shown below:

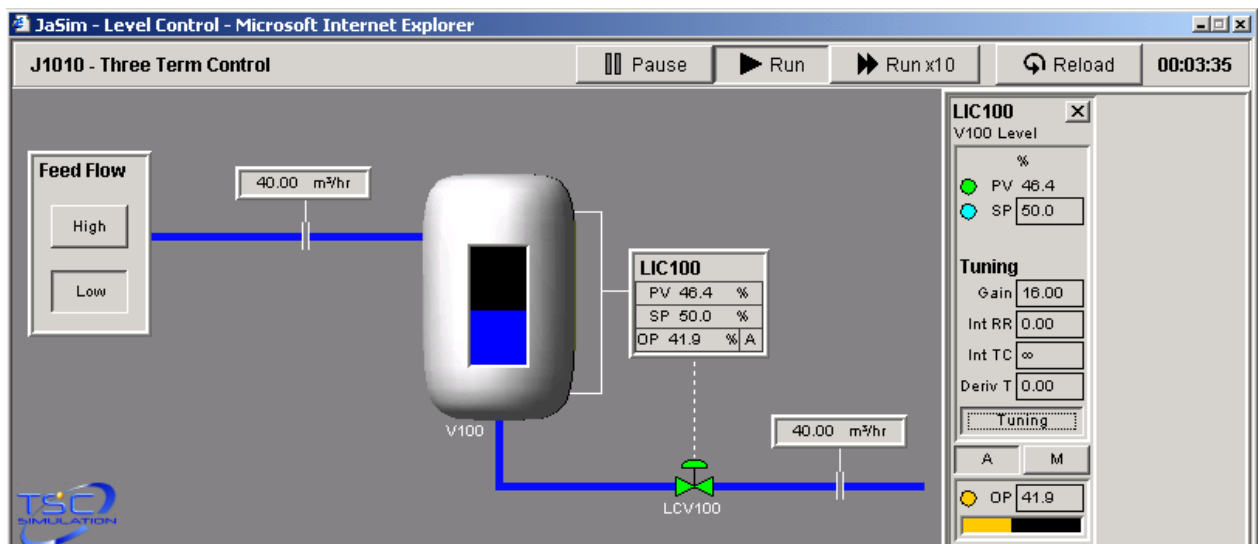


JaSim® Controller

Clicking on a **Controller** label brings up a generic style controller on the scratchpad faceplate area to the right. The controller Set Point and Output are adjusted by selecting and replacing the value shown. The faceplate also allows Manual or Auto selection, and a visual bar graph of the three variables:



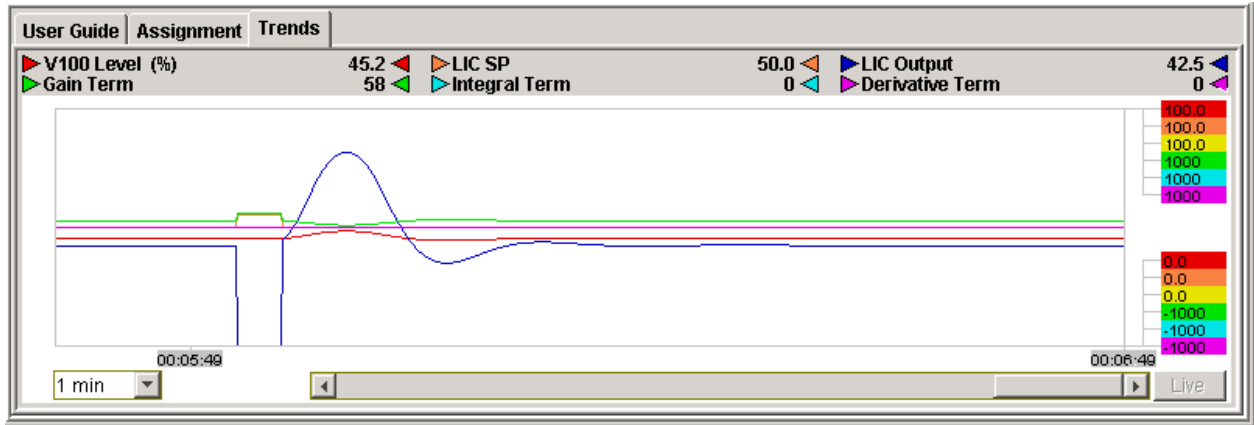
Within the controller faceplate, clicking on the **Tuning** button allows the P I and D values to be displayed and changed:



Changing the Gain, the Integral Time Constant (or the Reset Rate) and the Derivative Time Constant is as simple as entering a new value through the keyboard.

Assignments from J1010 - example

As an example, for a Proportional Gain only system, if the gain is reduced to 12, a disturbance is made, and the system is allowed to settle, the response will be shown on the Trend Chart: Notice the steady state error and dynamic performance of the control system



Now if the gain is increased to 20, the Trend Chart shows a reduction in the steady state error at the expense of stability of response,

