



Build a Display in PI ProcessBook

1.1 Build a Display in PI ProcessBook

1.1.1 Description

Use PI ProcessBook to build a simple display mimicking a control room workstation.

1.1.2 Objectives

- Learn how to create a PI ProcessBook Display.
- Learn the differences between the *Run* mode and the *Build* mode.
- Build a trend.
- Familiarize yourself with some trend building options.
- Learn to add static elements to your displays.
- Learn how to enhance your displays by adding live elements whose properties change in time, like value of a PI Tag, progress bar and multi-state object.
- Learn how to manipulate a trend display

1.1.3 Problem Description

You are asked to create a new Display to show the level of mixture in the batch reactor. The display must be realistic, represent the batch reactor with live data and have a trending of the last 8 hours of operation.

1.1.4 Suggested Approach

Part A – Create a ProcessBook Display

Create a .pdi file named *PB Batch Reactor*.

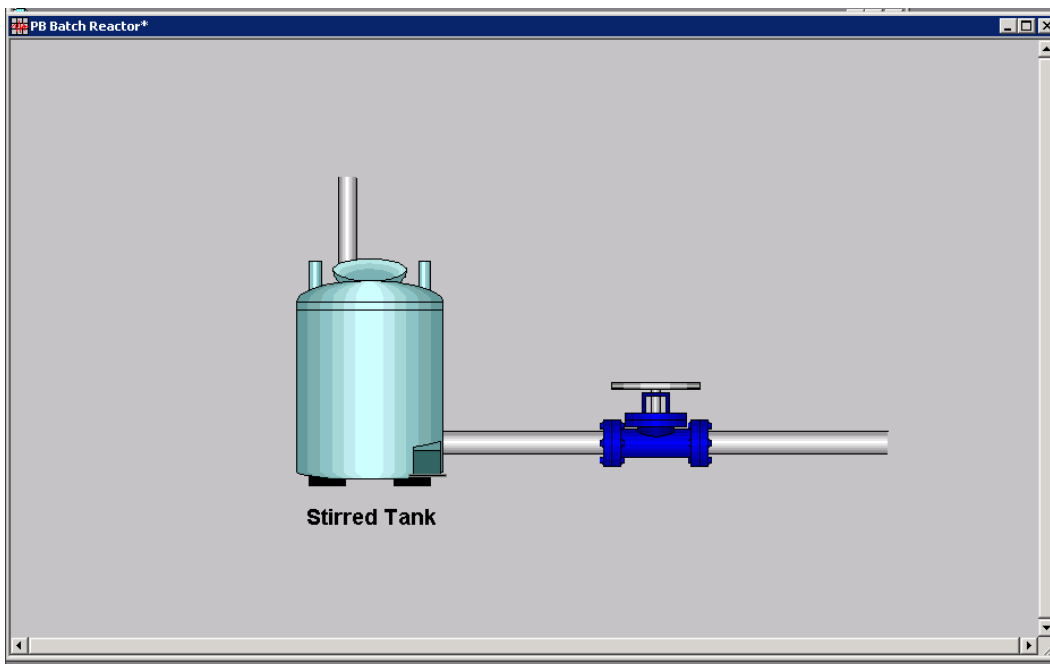
Part B – Insert static elements in the display

Add the following items to the display from the *Symbol Library*:

- One Tank (e.g., Reactor 4)
- One Inlet Pipe (e.g., Short vertical pipe)
- One Outlet Pipe (e.g., Short horizontal pipe)
- One Valve (e.g., Hand valve 2)

Size the pipes accordingly, and use the Arrange (Bring to Front / Send to Back) function to place the Tank and the Valve over the Pipes.

Add the Text label “Stirred Tank” unde the Tank. The result should resemble below.



Part C – Insert dynamic elements in the display

Insert a *Value* object to show the value of PI tag “BA:LEVEL.1” to the left of the Tank. Make sure to include the timestamp below the value.

Add a *Text* label and use the phrase “Level %” to indicate to the user that the number shown is the percent full of the Tank. Set the color of the *Value* and *Text* to black.

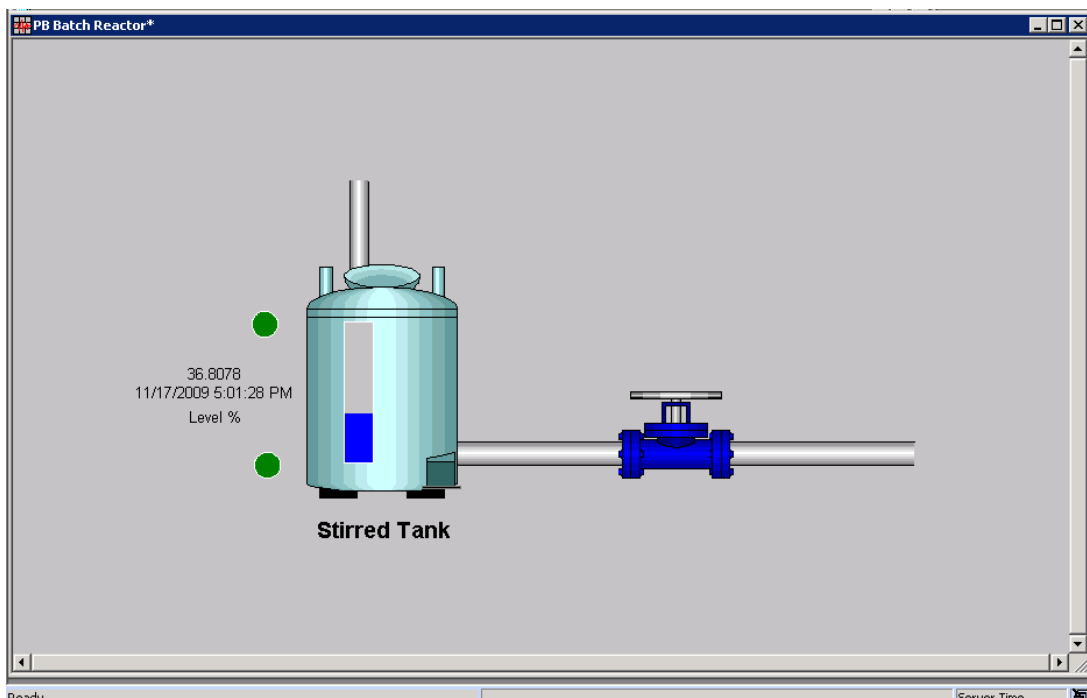
Add the two ellipses to the left of the tank, one above the level value and one below. These will serve as a visual alarm of the tank level conditions if they near the extremes.

Note: Holding the SHIFT key down while you draw will give you a perfect circle).

Convert each of the ellipses into a *Multi-state* symbol, using the following settings:

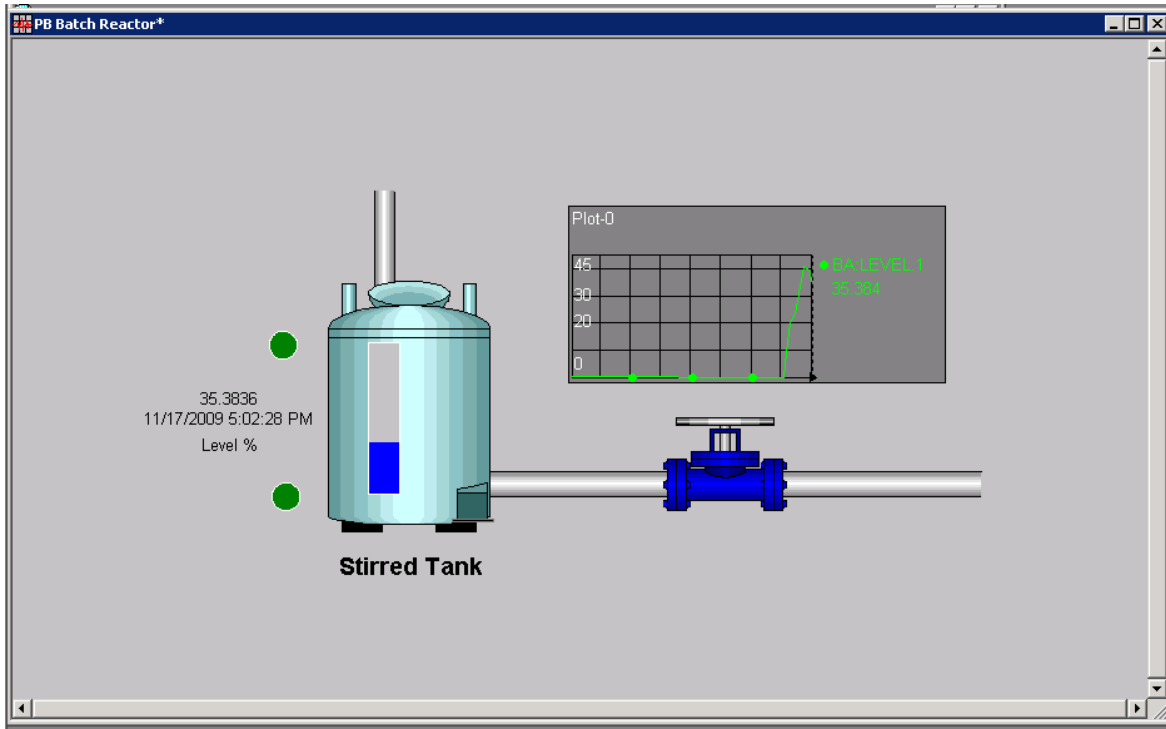
Object	Tag	# of states	Limit of 1 st State	Color of 1 st state	Color of 2 nd state
Top ellipse	BA:Level.1	2	<=90	green	red
Bottom ellipse	BA:Level.1	2	<=10	red	green

Add a *Bar* item to create a bar graph that sits over the tank. Use the tag “BA:LEVEL.1” for the tag.



Part D – Insert a trend

Add a trend of tag "BA :LEVEL.1" showing the most recent 8 hours, as shown below.



Part E – Using a trend

Use the time forward, time backward, revert, and trend cursor buttons to find when the maximum value of the last day occurred.

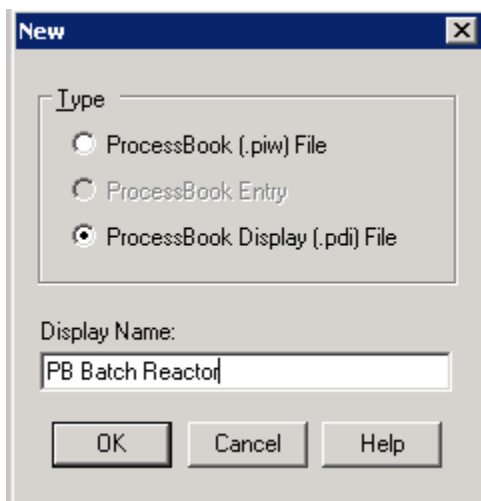


Try to do this exercise on your own before proceeding to the Step-by-Step Instructions.

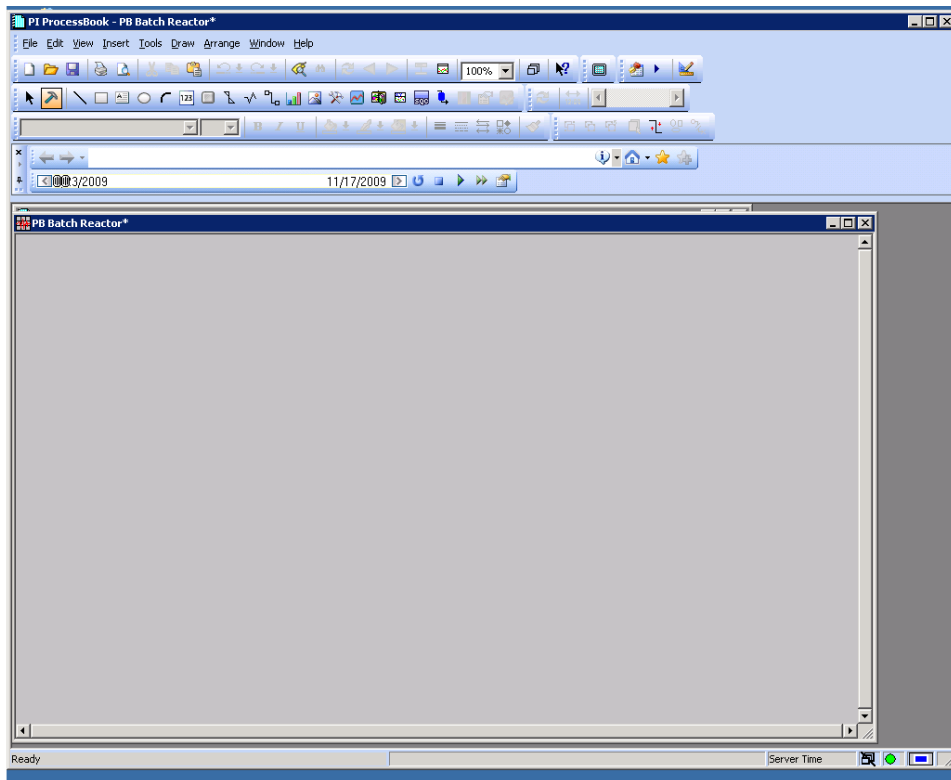
1.1.5 Step-by-Step Instructions

Part A – Create a ProcessBook Display

1. Start PI ProcessBook
2. From the File menu select New
3. A dialog box will appear with three choices:
 - ProcessBook (.piw) File.
 - ProcessBook Entry
 - ProcessBook Display (.pdi) File.



4. Select **ProcessBook Display (.pdi) File**, and type in *PB Batch Reactor* for the Display name.
5. Click Ok. You will have a new, blank display (shown below).



6. Click on the *Build* mode button. Build mode permits users to add, edit and delete objects the open display. Once finished you can click on the *Run* mode button (the arrow button left to the *Build* mode button) to quit the design mode.



Note: By default, each time you complete an operation the Run Mode is reactivated, so you must click again on the Build Mode button or change the default settings. This behaviour can be changed by

choosing Tools → Preferences → Start tab and then, uncheck the Run Mode Bias check box. Thereafter, you need to manually switch from one mode to another.

Part B – Insert static elements in the display

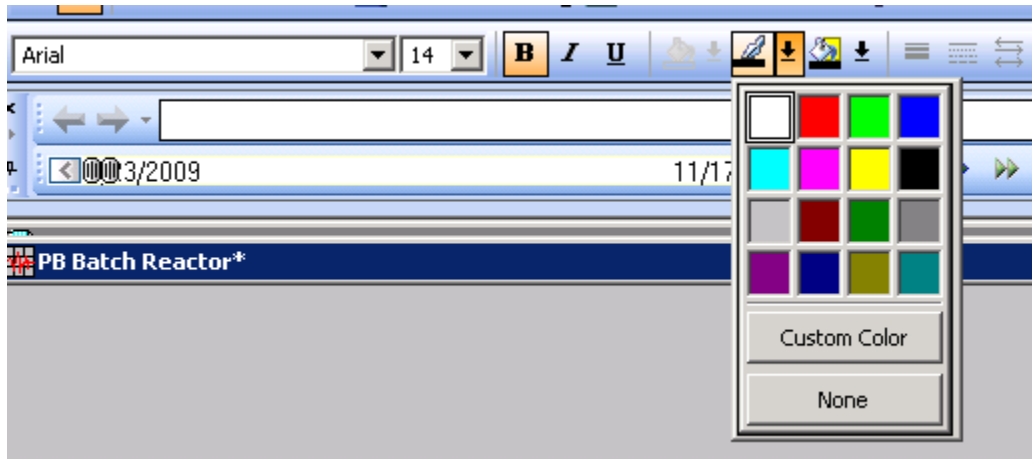
1. (optional) From the *Arrange* menu, activate the *Snap to grid* option. It can be easier to arrange and align objects when the grid is activated.
2. Click on the *Symbol Library* tool (from the toolbar) and drag a rectangle in the display area.



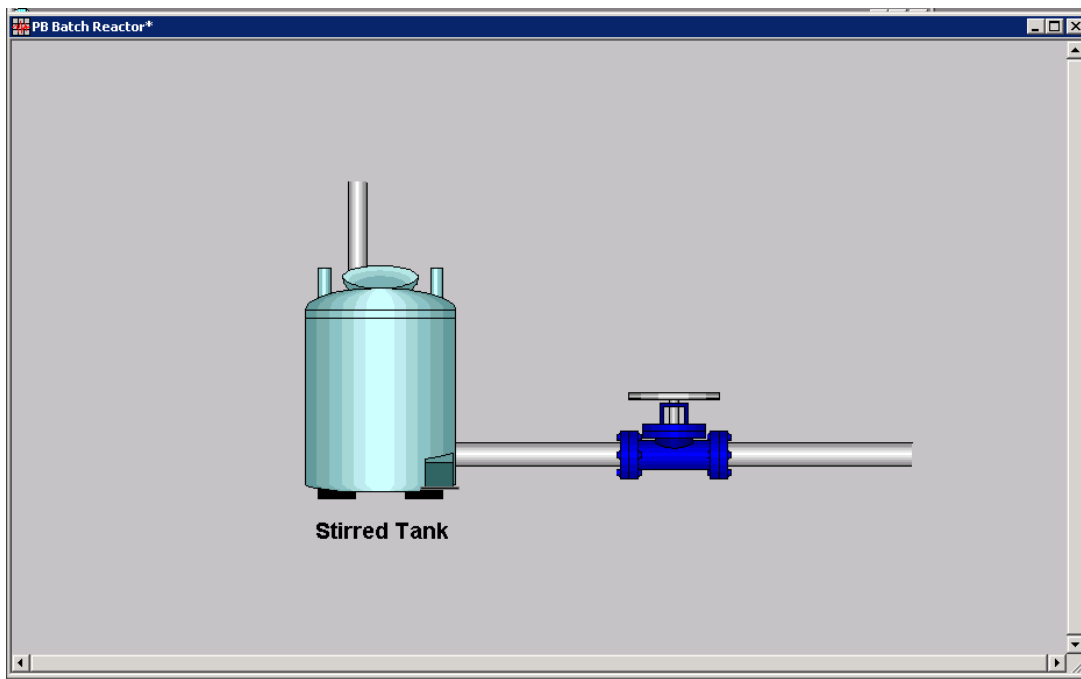
3. A dialog box will appear with all of the items from the *Symbol Library*. In exercise you want to place a Tank on the display. Select the "Tanks" category, then any tank you wish (in our example we selected "Reactor 4"). (At this point you can click on "Options" if you want to change the color or fill pattern of the tank. Note that the color can only be changed if the Fill mode is *Shaded*, *Solid* or *Hollow*.)
4. Resize the Tank as desired by dragging one of the corners.
Repeat the above steps for the one Inlet Pipe, one Outlet Pipe, and a Valve.
5. Select the Tank and from the *Arrange* menu select Bring to Front.
6. Select the Valve and from the *Arrange* menu select Bring to Front.
7. Make any final adjustments to align the items.
8. Select the Text item for mthe toolbar and draw a box under the Tank. Type "Stirred tank" and press the Enter key.



-
9. While the Text is selected change the font size to 14, activate BOLD, and the color to Black.

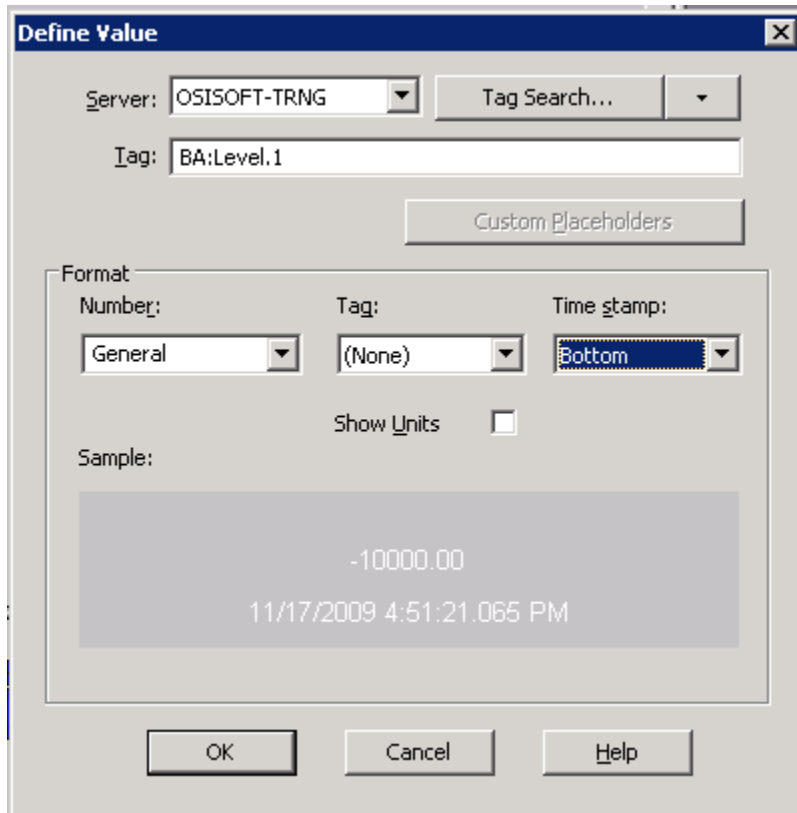


10. Center the text under the Tank by selecting both the Tank and the Text and from the Arrange menu Align and Center. (Or you can just drag it into position under the Tank).



Part C – Insert dynamic elements in the display

1. Insert a level indicator by using the *Value* option from the *Draw* menu to insert the “BA:LEVEL.1” tag value.

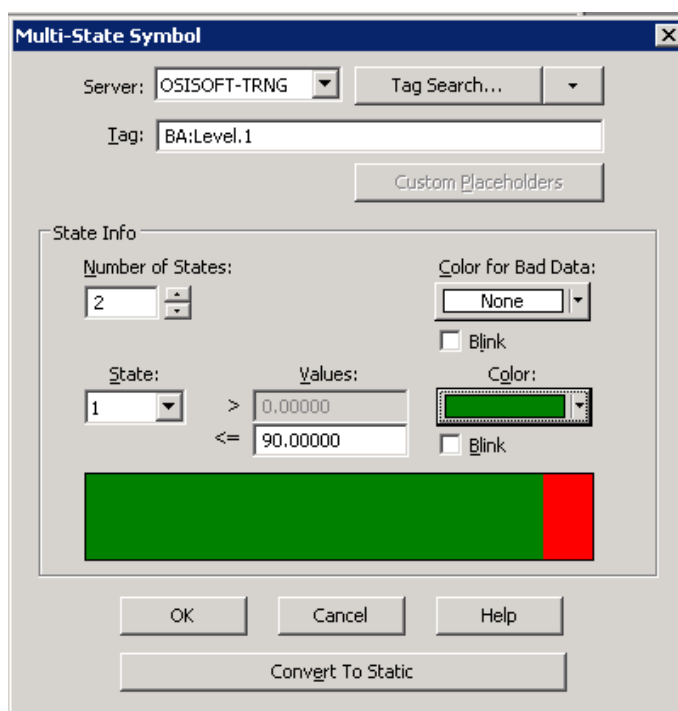


2. Click OK.
3. Select the Text item from the toolbar and draw a box under the Value. Type “Level %” and press enter.
4. Set the color of the *Value* and *Text* to black.
5. Select the *Ellipse* item from the *Draw* menu and drag a small circle above the *Value*. Hold the SHIFT key and drag until it is a Circle of a size similar to the image below.
6. Copy the first Circle and paste it below the *Value*.

7. Select the upper Circle circle and then click on *Multi-State* button . Convert the Circle into a *Multi-state* symbol, using the following settings:

Object	Tag	# of states	Limit of 1 st State	Color of 1 st state	Color of 2 nd state
Top ellipse	BA:Level.1	2	<=90	green	red

This is illustrated below:



8. Click OK.
9. Convert the lower Circle into a *Multi-state* symbol, using the following settings:

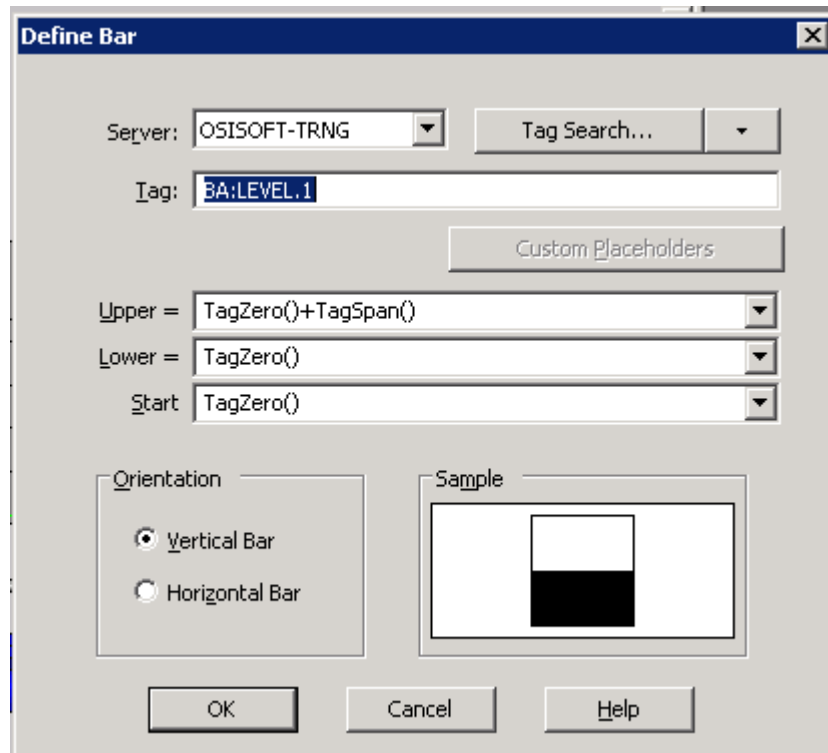
Object	Tag	# of states	Limit of 1 st State	Color of 1 st state	Color of 2 nd state
Bottom ellipse	BA:Level.1	2	<=10	red	green

10. Select the *Bar* item from the *Draw* menu. Draw a rectangle over the tank body.

Note: This might be easier if the *Snap to Grid* option of the *Arrange* menu is not activated.

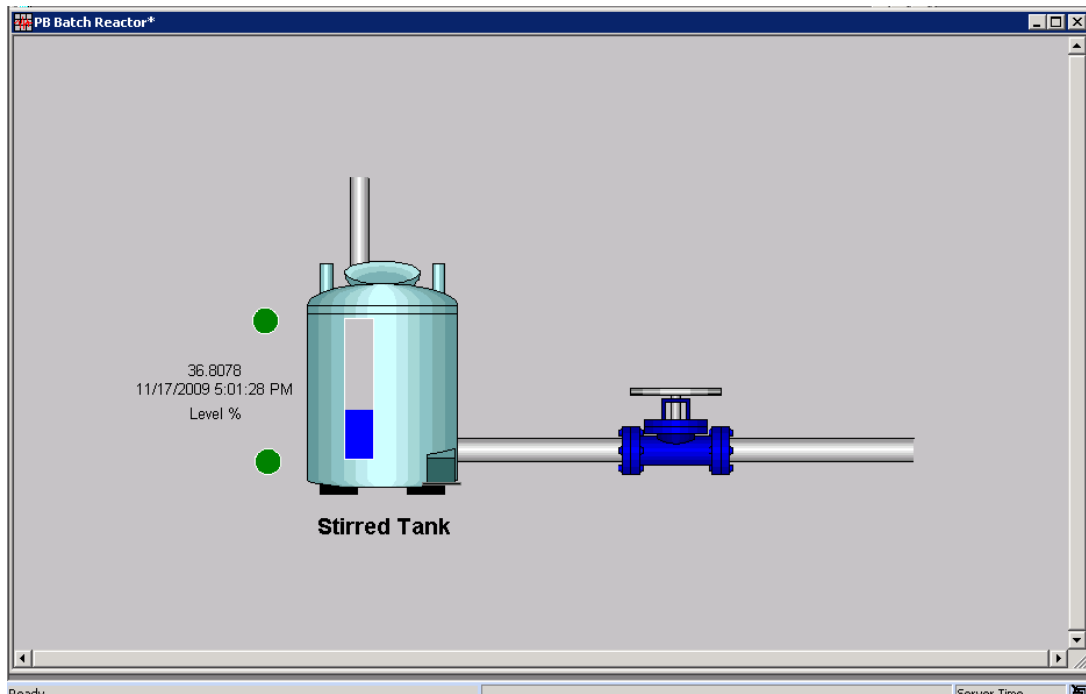


This will place a Bar graph over the Tank. Use the tag “BA:Level.1” as the Bar Graph’s reference tag.




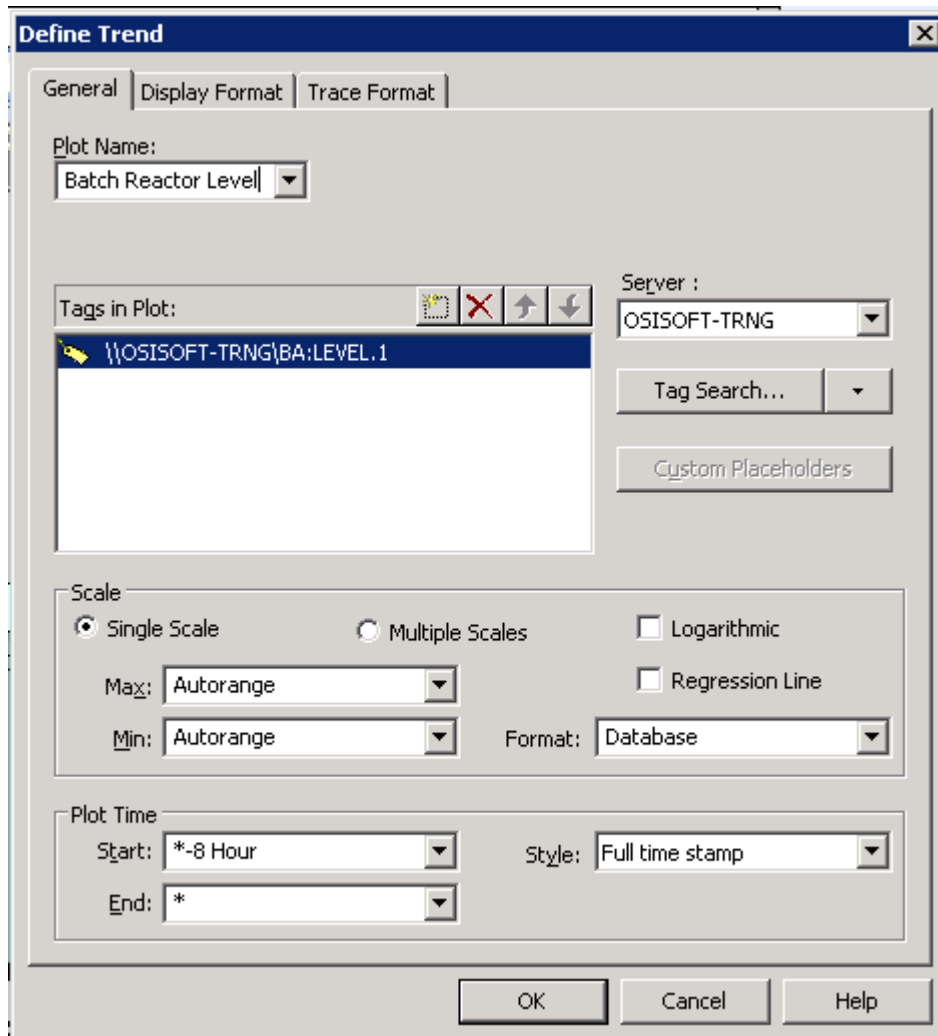
11. Click OK.

12. The display at this point should look like the figure below:



Part D – Insert a trend

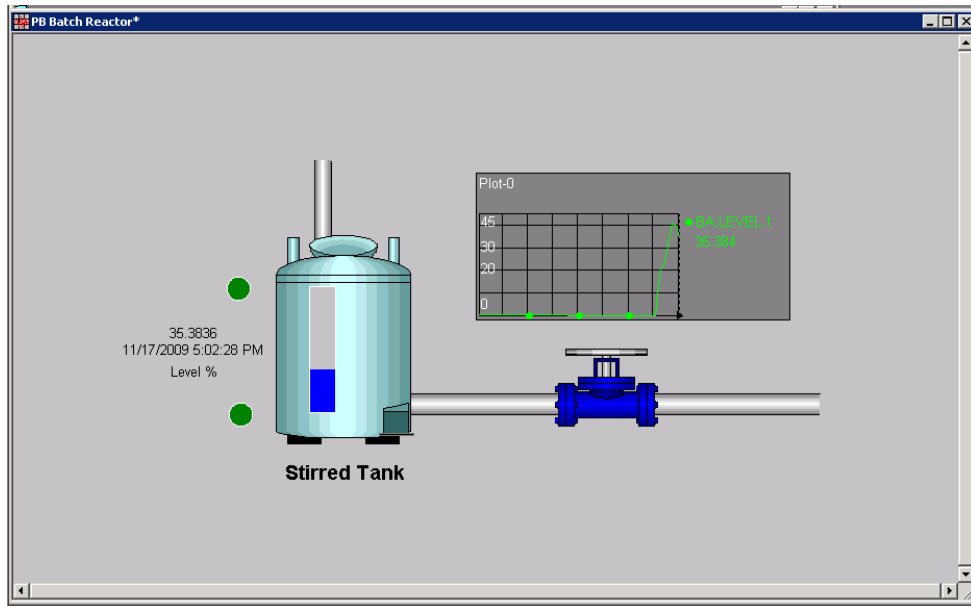
1. In *Build* mode, use the *Trend* tool.  Drag diagonally to create a rectangular area to contain the trend. When you release the mouse button, the Trend definition dialog box is displayed.



2. Enter the following information in the General tab:


- Type the trend name in the Plot box : Batch Reactor Level
- Use the Tag Search button to locate and select the “BA:LEVEL.1” tag.
- Specify the time range to display the last 8 hours in the Plot Time section.
- Style: **Full time stamp**.
- Start: ***-8 hour**
- End: *****



3. Click OK.
4. Move your trend object next to the reactor picture, the final display should look like the figure below



5. Click on *Run* mode button.
6. If the *Run* Mode Bias was activated just uncheck this option to keep this mode.
7. Save the Display by choosing File → Save

Part E – Using a trend

1. With the *Run* mode pointer, display a section of the trend display. Drag the pointer diagonally to draw a rectangle. This area will be magnified when you release the mouse button. To return to the original time scale, use the View option in the menu bar, then Revert or use this button  .

-
2. With the Run mode pointer, expand the trend on the entire display window. Double-click within the trend. To return at the original time scale, double-click within the trend again.
 3. Use the time forward and backward buttons to scroll the time range forward or backward on a trend . To modify the time range, use the **View > Time Range**. Change the time scale to 1 day.
 4. Use a **trend cursor** to find when the maximum value of the last day occurred. .
 5. Return to the original time scale. (see step 1).
 6. Alter the y-axis scale of a trend by double clicking on the y-axis. Use the *Trend Scale* dialog box to change the vertical scale for the tag in the trend. You do not have to be in *Build* mode to edit the trend.

1.1.6 Executive Overview

You can find the solution in C:\Labs\Visuals\Build a Display in PI ProcessBook\solution. Simply open the file "solution_PB Batch Reactor.