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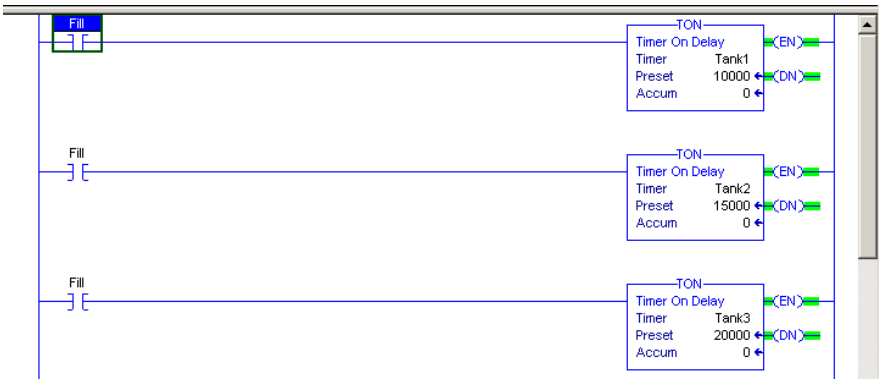
Programmable Logic Controllers 2

(Final Exam)

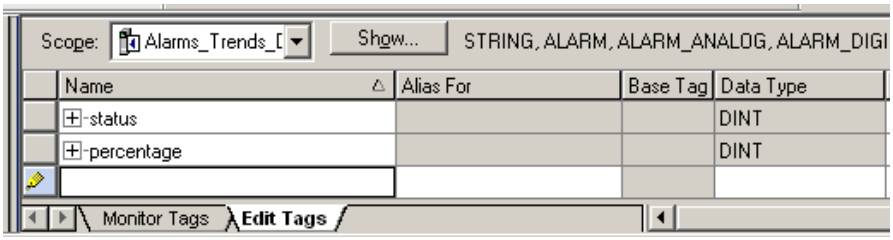
Alarming, Trends, Messaging, Recipes and Run-Time Applications

Factory talk view studio gives the ability to build trends, establish messages, alarm systems and creates recipes sets. Alarms can signal that a device or process is approaching or ceases to operate at the appropriate levels. A trend provides a way to keep track of values or activities in a plant. A recipe is a set of ingredients or values that can be downloaded to a controller to apply to the current operation of equipment. Local messages give operational information while a display is open. The following exercise introduces the procedures for setting up and using the functionality of alarms, messaging, recipes and trends. The example used simulates 3 ingredients being filled in 3 individual tanks before being added and mixed together.

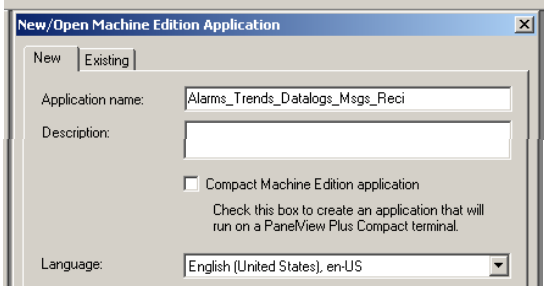
In Rslogix 5000 create a routine to Simulate 3 tanks filling to different levels.



Create 2 DINT Type tags called Status and Percentage. Download the program to the controller.



Open FTA Studio ME and create an application.



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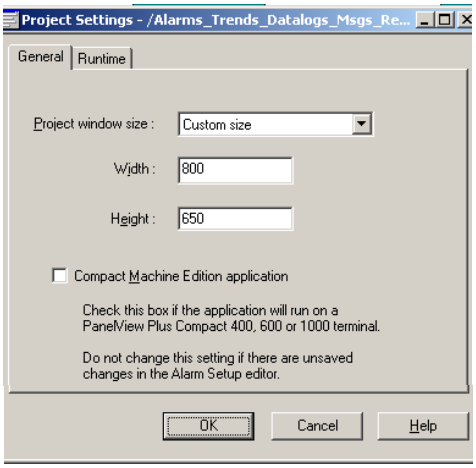
Right Click Project Setting

And **Select Open**

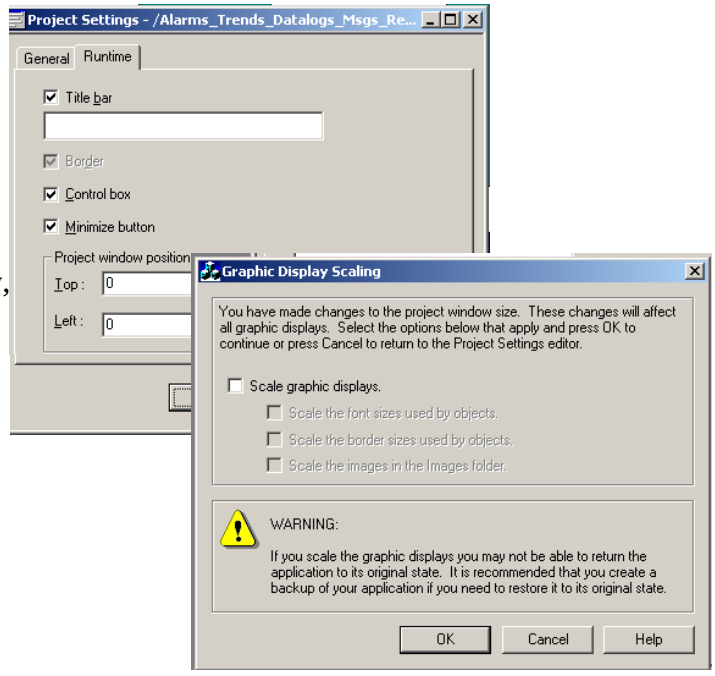
.

In the **General tab**, **Select Customize size** and change the width to **800** and the height **650**

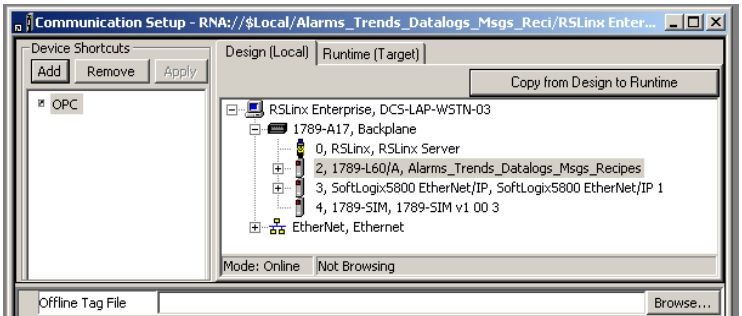


On the **Runtime Tab**, check the **Title bar** box. **Press ok.**

In **Graphic Display Scaling window**, make sure to **Uncheck** the **Scale Graphic Display** box



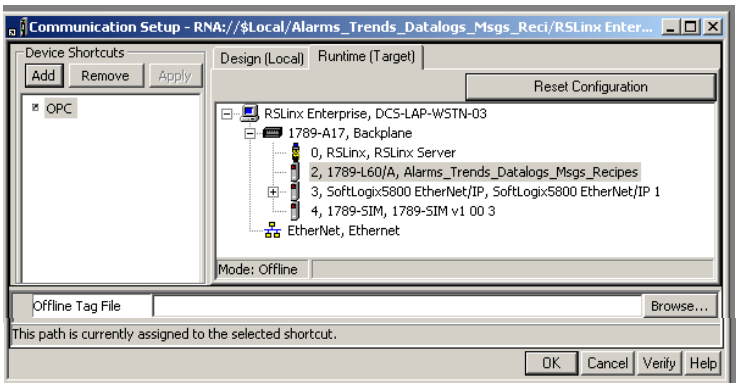
Through Rslinx Enterprise establish



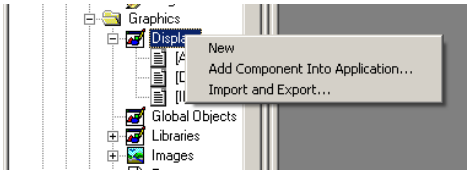
communication by creating a device short (topic)pointing to the controller, with your downloaded application.

Press "Copy from Design to routine."

The runtime target will be the same as design (local) configurations.

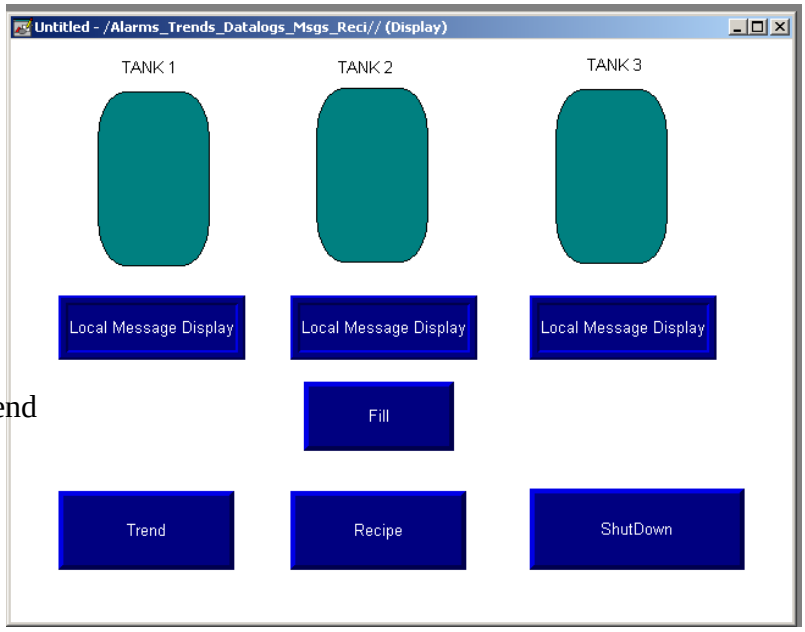


Go to the **Graphics Folder** and **Right Click** the **Display** icon and **Select New**.



Create the following graphic display:

- 3 tank using rounded rectangles
- 3 local message displays
- 1 maintained push button to control the fill condition
- 2 Goto Display buttons, one for a trend the other for a recipe
- 1 shut down button



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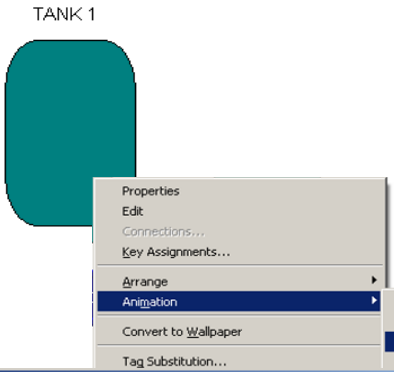
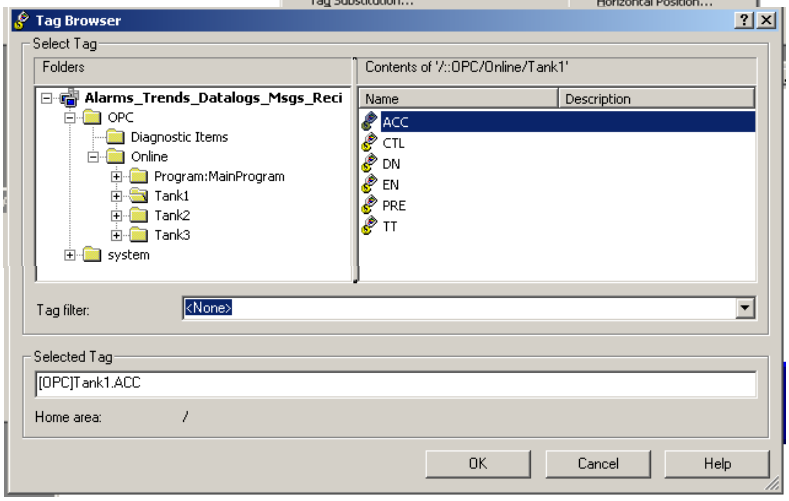
Right Click the tank, **highlight animation** and **Select fill**.

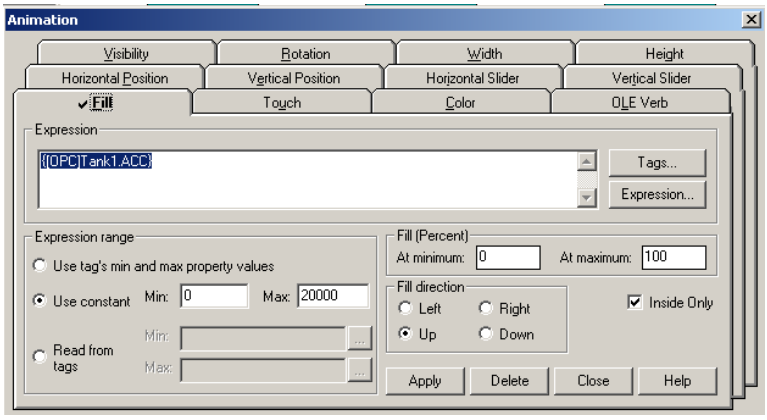


In the animation screen, **Press Tags**. In the Tag browser find your device short cut **Select Tank** folder, then **Select .ACC** value and **Press O.K**

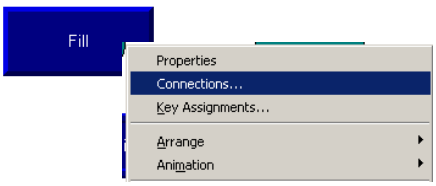


The tag will be displayed in the animation screen. Under the expression text box set the **Expression Range** to constant with a min of **0** and a max of **20000**.

In the fill direction section check inside only.



Right Click the fill button and **Select Connection**



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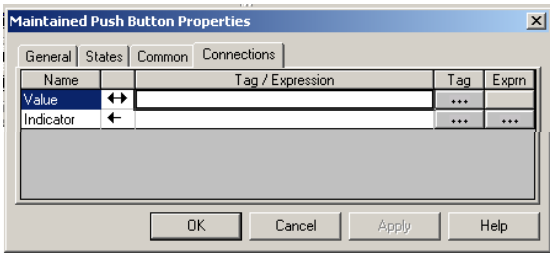
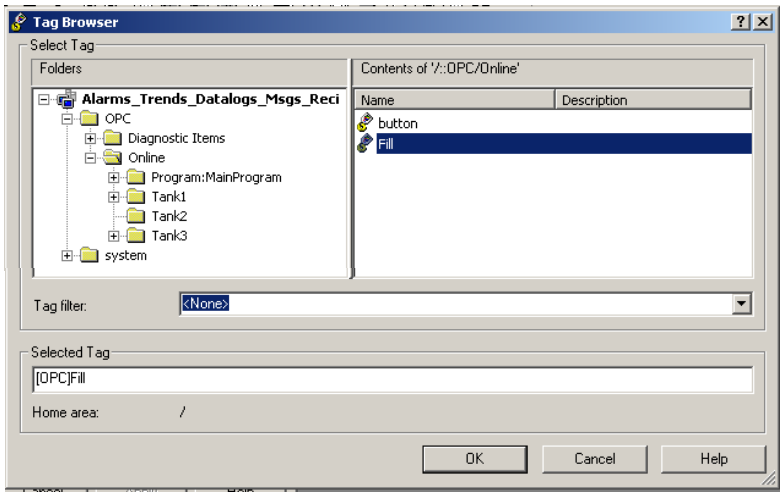
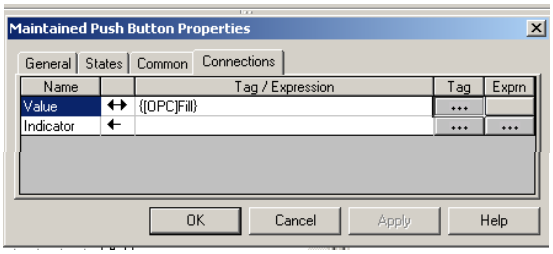
On the **Connection Tab Press ellipse box**  under the Tag column.



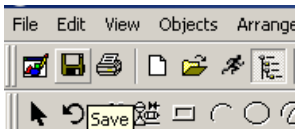
In the Tag Browser, **Select** the **online folder** or the **program folder** and then **Select** the **Fill** tag. **Press OK**.



Under Tag/Expression column, the fill tag will be displayed. You can test display to verify that the tank can be controlled by the fill push button.

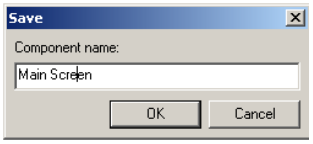


Click on your display to give it focus and then **Press Save** icon under edit item in the main toolbar.



In the Save window Give the component

the name of **Main Screen** When prompted



Alarm Setup

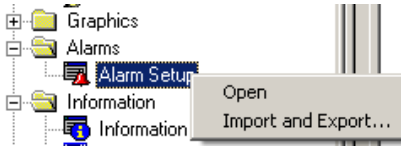
An alarm occurs when something goes wrong or is about to go wrong. Alarms can signal that a device or process has ceased operating within acceptable, predefined limits, and can indicate breakdown, wear, or process malfunctions. Alarms are also used to indicate the approach of a dangerous condition.

Alarms are an important part of most plant control applications because an operator must know the instant something goes wrong. It is often equally important to have a record of the alarm and whether the alarm was acknowledged.

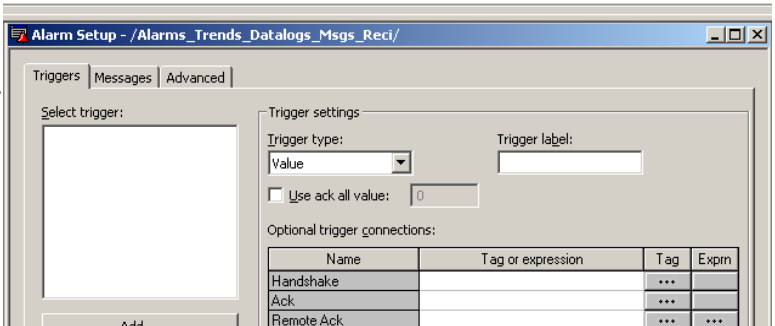
From the Project explore Expand the **Alarms Folder** and

Right Click and **Press Open** or **double click** on **Alarms Setup**

Icon.

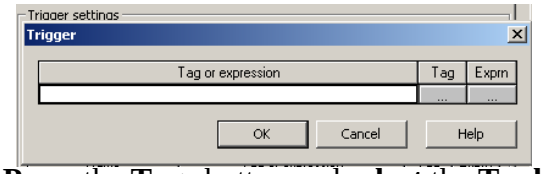


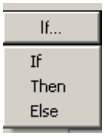
On the Trigger Tab, **Press** the **Add** button.



On **Trigger** screen press the grey

Ellipse … underneath the tag column

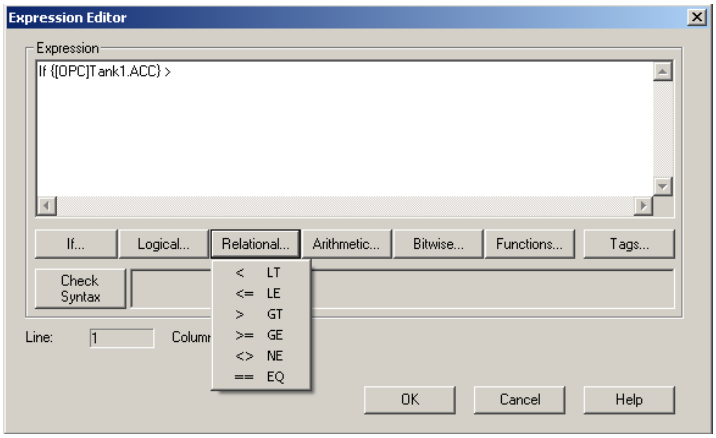


From the "**If**" menu select if, 

then **Press** the **Tags** button and **select** the **Tank1.ACC** value from the tag browser.

Then press the **Relational** button and

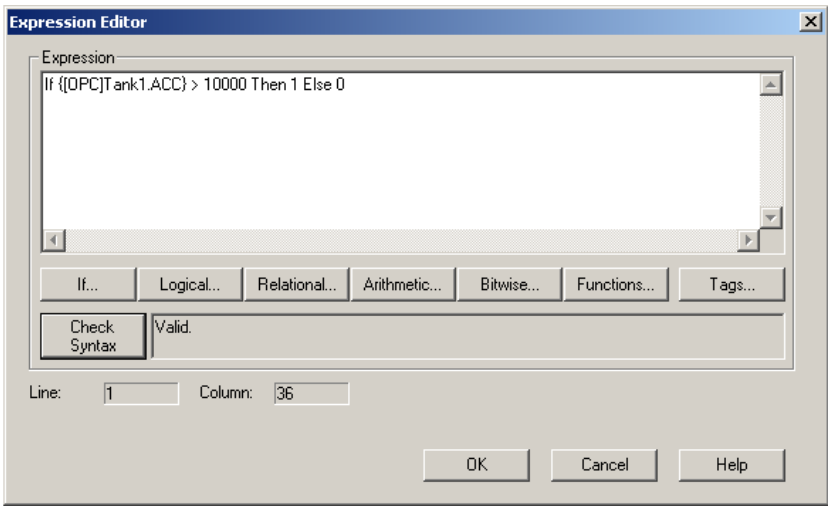
Select the **"> GT"** symbol.



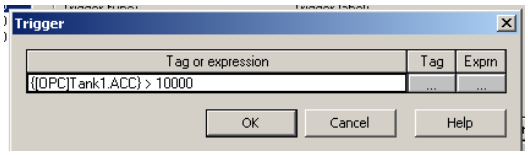
Finish the expression by using

"If Menu", so that it looks Like the

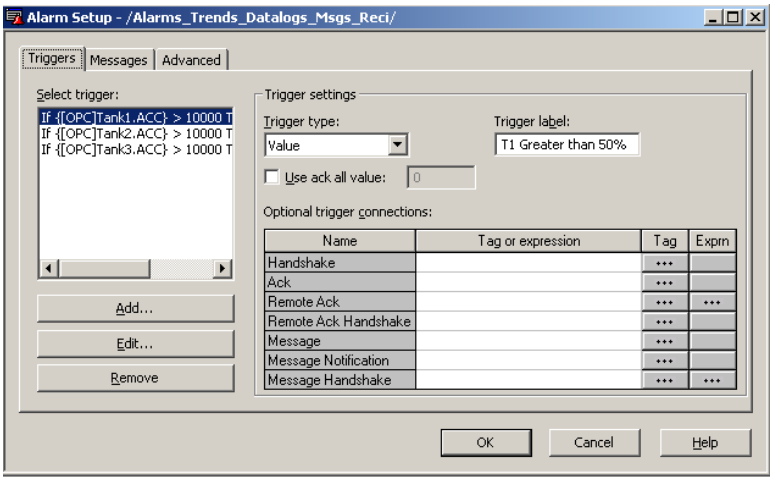
following and **Press Ok**.



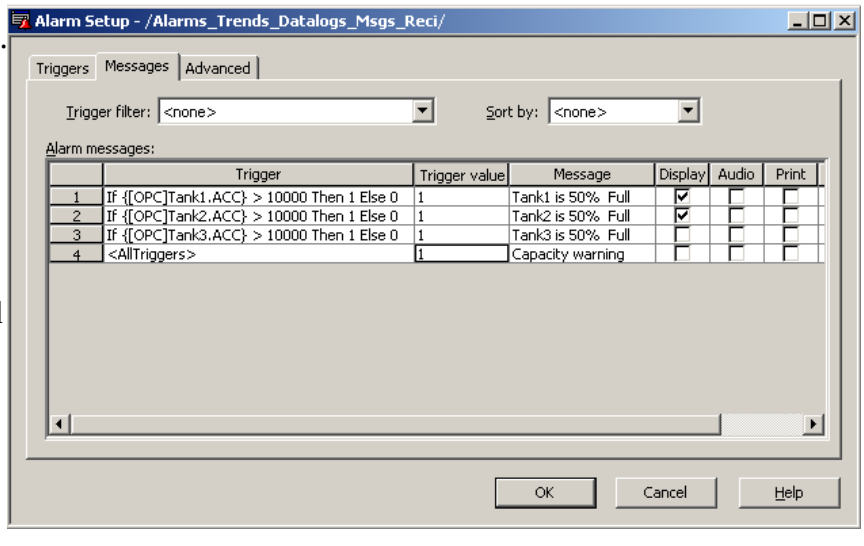
The expression that was built will show in the Trigger screen. Press ok



From the trigger type drop down Box. Select value and in the Trigger label box give the trigger A title. Follow the same procedure for Tank2 and 3 .ACC values



ON the message tab, In the Alarm Message Section, under the trigger column select the Individual triggers for Tank 1,2,and 3. Then enter 1 under the trigger value column and enter" Tank is 50% full " under the message column. Under trigger column, select all triggers and



make the message “Capacity warning

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Trend

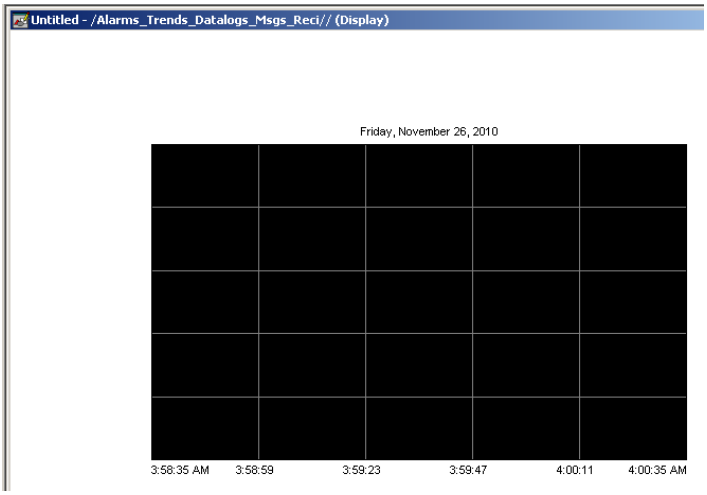
A trend is a visual representation, or chart, of current or historical tag values. A trend provides an operator with a way to track plant activity as it is happening.

You can:

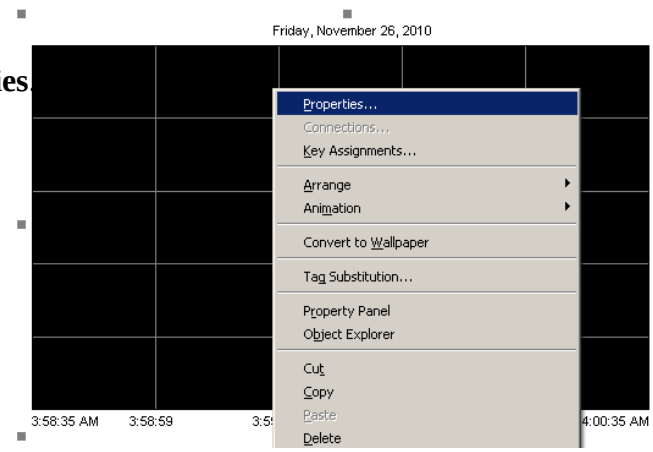
- Plot data for as many as eight tags or expressions on one trend.
- Create a trend that is part of a graphic display or acts as the entire graphic display.
- Plot data over time, or plot one variable against another in an XY Plot chart to show the relationship between them.
- Display isolated or non-isolated graphs. Isolated graphing places each pen in a separate band of the chart. With non-isolated graphing, pen values can overlap.
- create buttons to allow the operator to pause, scroll, and print the trend data

Create a New display. In the object toolbar drag and size a **Trend** in to the Display

.

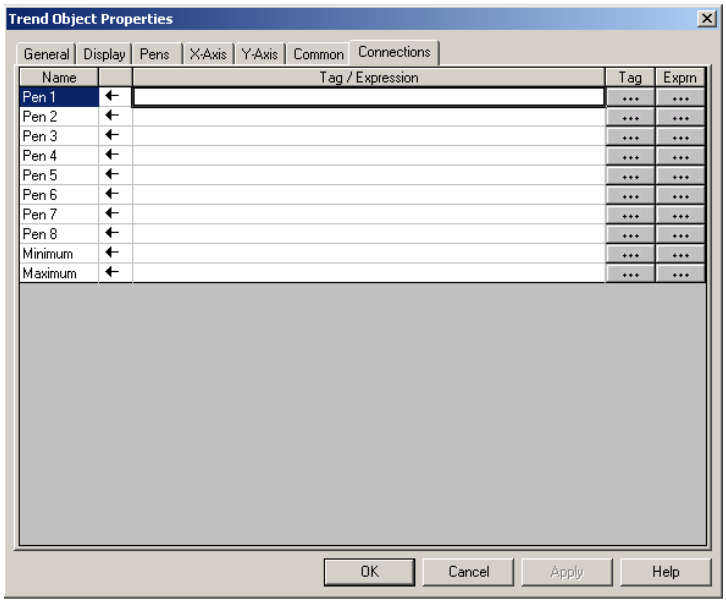


Right click in side the **display** and **Select Properties**



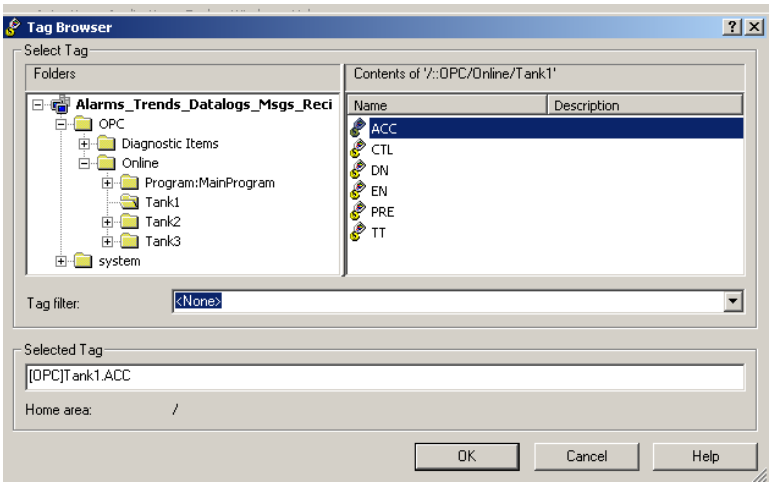
In the **Connection** Tab, press the **Tag Elispe**

In the Pen 1 row.



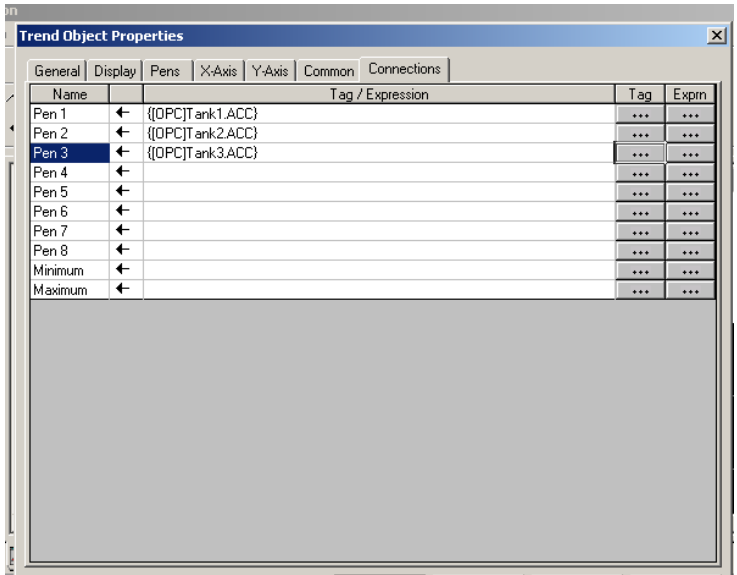
In the tag browser **Select Tank1.ACC**

Value and press OK.

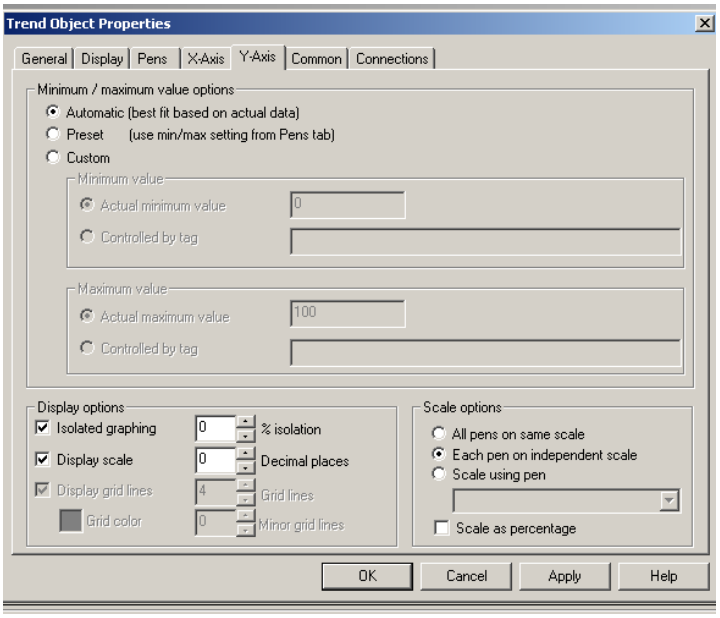


Follow the same step and select Tank 2 and 3

.ACC value for pen 2 and 3

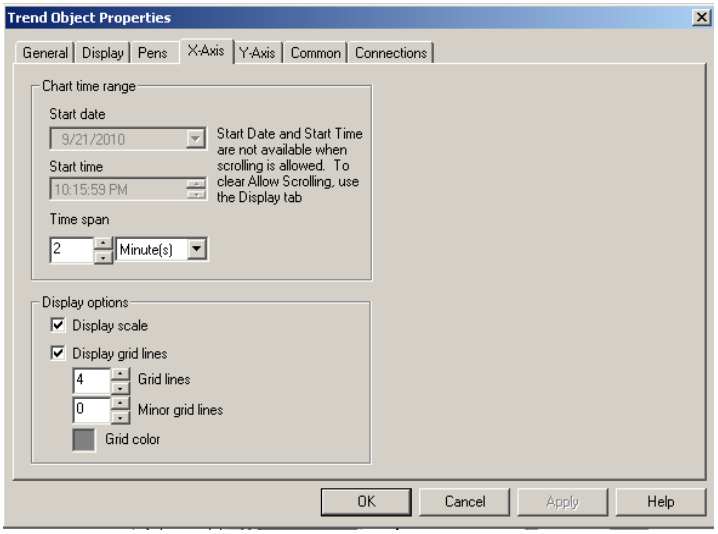


In the **Y – Axis** Tab under the “Minimum/ maximum value options”, **Select Automatic** .

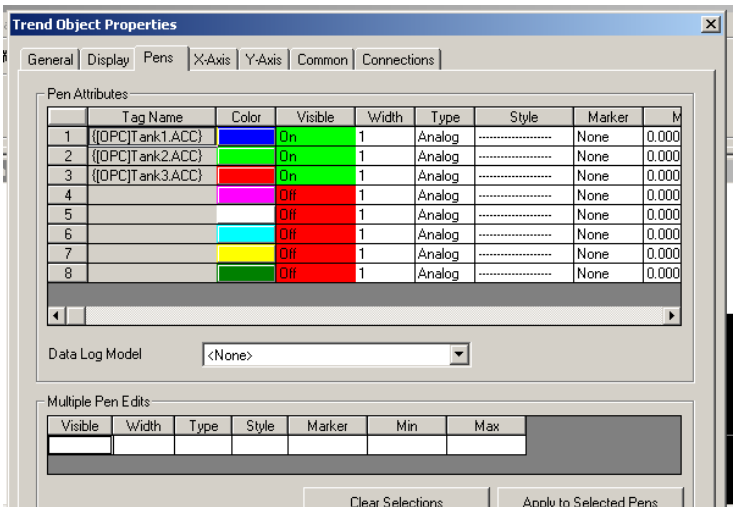


In the Display options **Select Isolate graphing.**

In the **X-Axis** Tab, under the “Chart time Range”. Set the **Time Spans** to **2 Minutes**.



In the Pens tab, Notice the tags that were selected from connection tab.



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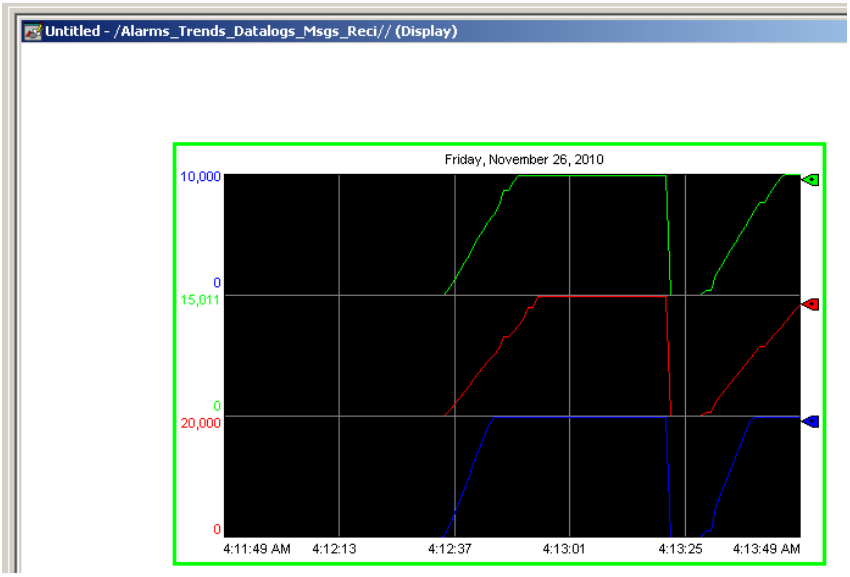
Test the display.

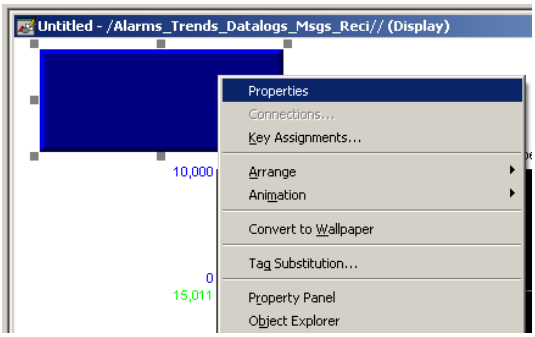


In the Object tool bar drag and size a **Goto Display** button

In the trend display.

Right Click the Trend Goto Display Button

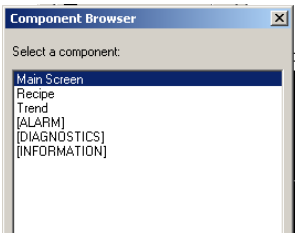
and **Select Properties** .

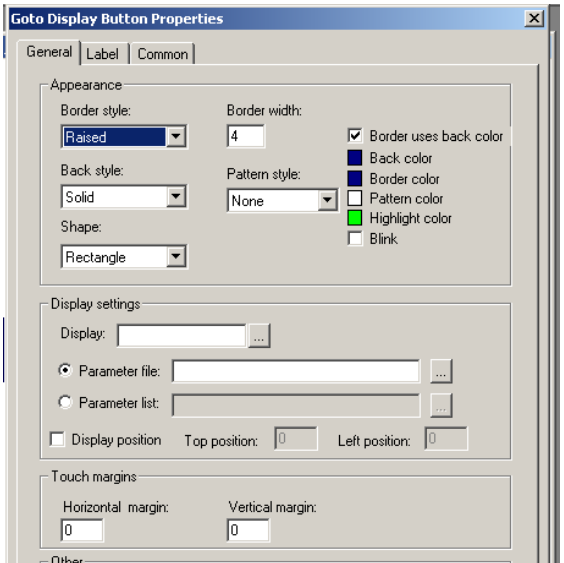


In the general tab, under the Display setting Section,

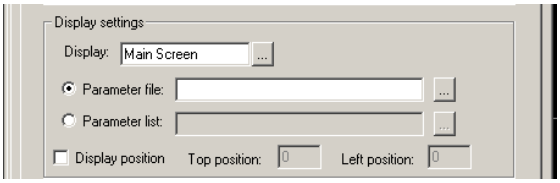
Press the display **Ellipse**. ...

Select the **Trend** Display from the Component browser.



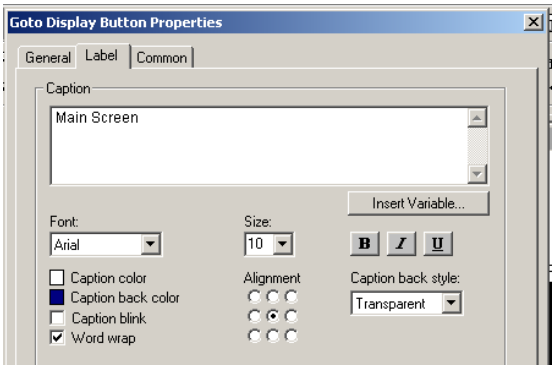


The Display Setting should look like the following:



Go to the **Label** Tab and **enter Main Screen**

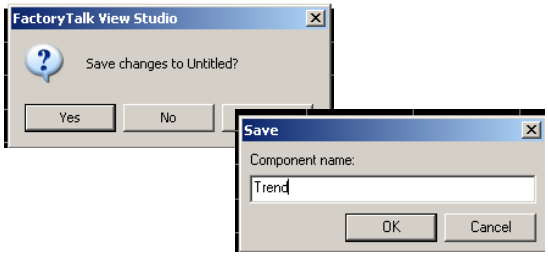
In the Caption Box and Press Apply and OK.

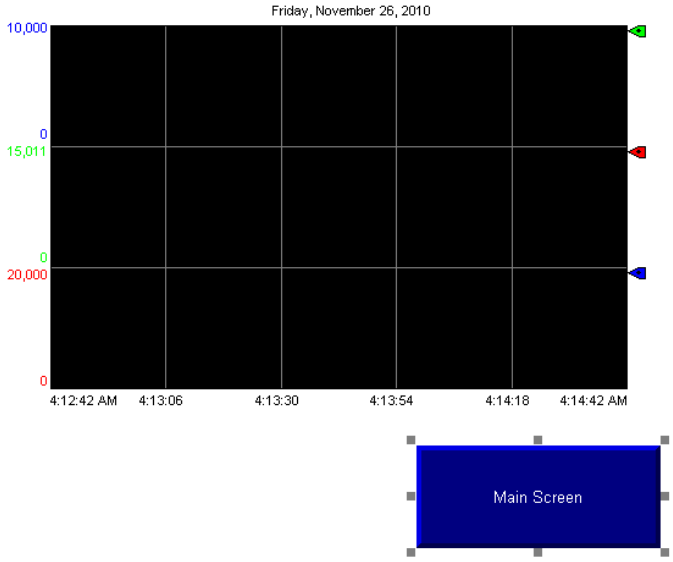


Press the **Close Icon** in the top right hand

Corner. Save the change and Name the

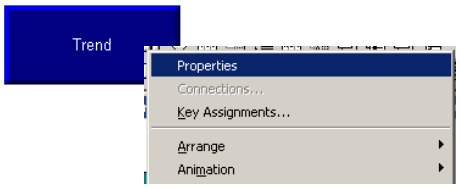
Component "Trend





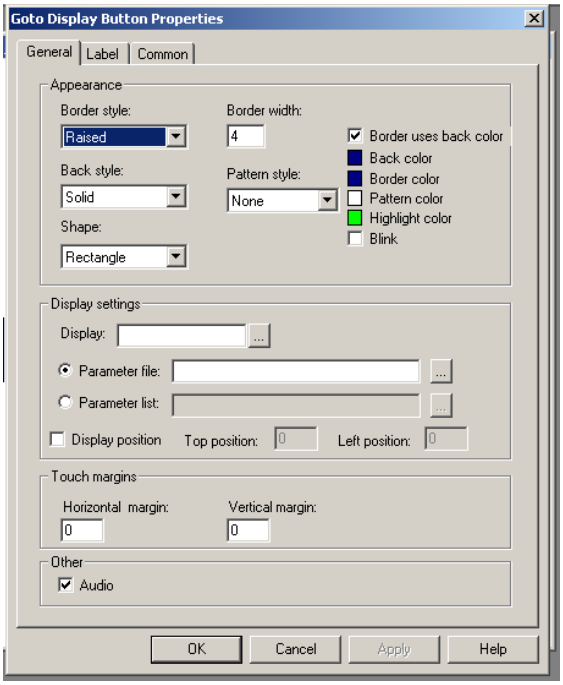
Return to the **Main Screen** display and **Right Click** the **Trend**

Goto Display Push Button and **Select Properties**.

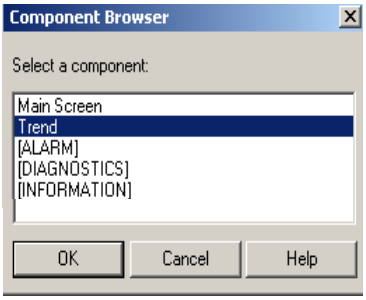


In the **General** Tab, under the **Display Setting** Section,

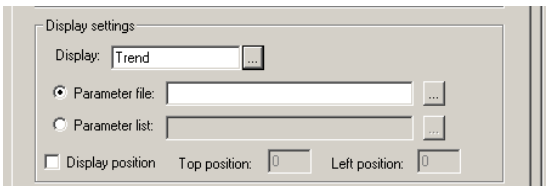
Press the display **Ellipse**. ...



Select the Trend Display from the Component browser.



The Display Setting should look like the following:

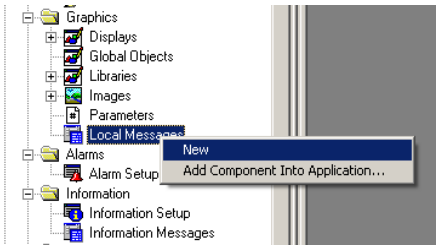


Press Apply and OK.

Messaging

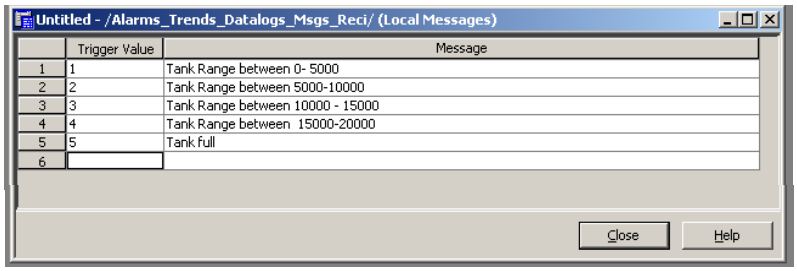
Use information messages to give the operator messages about the process, prompts or instructions, and information about current states. Local messages are used to give the operator information in a specific graphic display while the display is open.

In the **Graphic** folder, **Right Click** the **Local Message** icon and **Select New**.

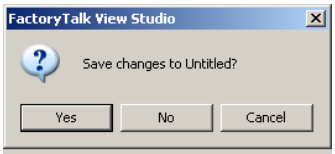


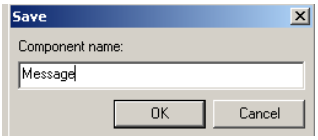
Set the Trigger Value and give the appropriate message description .

Press **Close**.



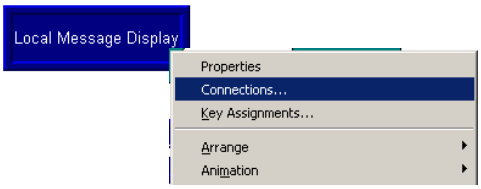
It will prompt you to save the changes. **Press Yes**.





Give the new message component an appropriate name

In the Main screen, **Right Click** the "local message Display" and **Select Connection**.



In the **Connection** Tab Press the Exprn Ellipse.

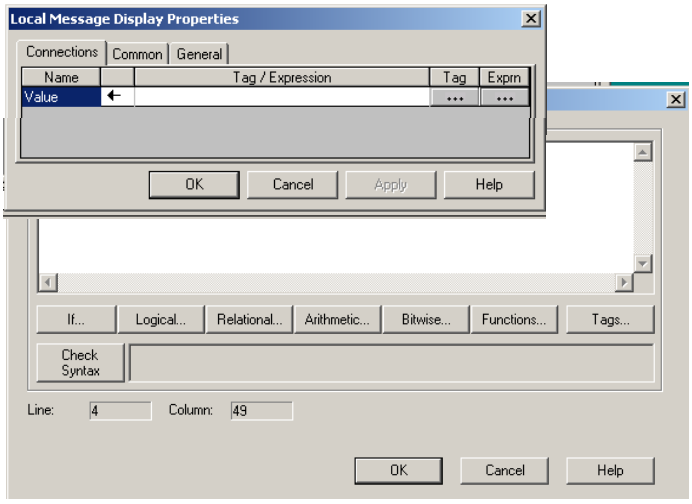
Enter the following Statements in the Expression Editor:

If {[OPC]Tank1.ACC} <= 5000 Then 1

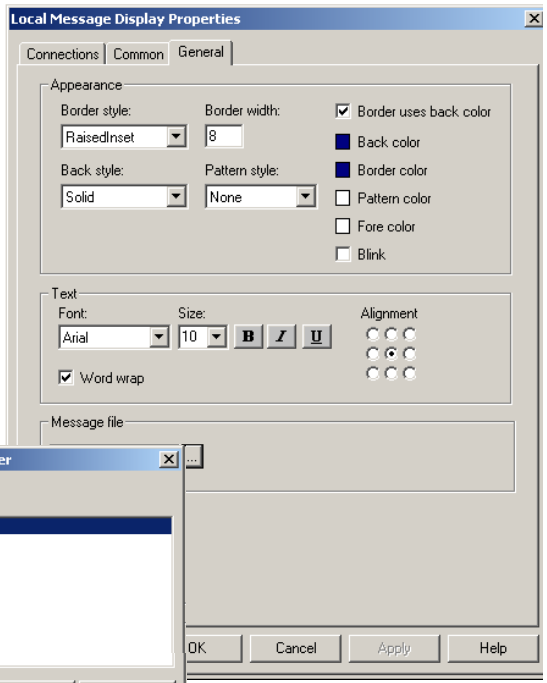
Else If {[OPC]Tank1.ACC} <= 10000 Then 2

Else If {[OPC]Tank1.ACC} <= 15000 Then 3

Else If {[OPC]Tank1.ACC} < 20000 Then 4 else 5

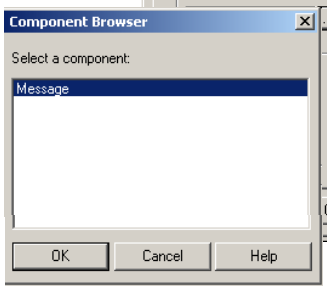


Go to the **General** tab, and in the message file section Press the Ellipse. ...

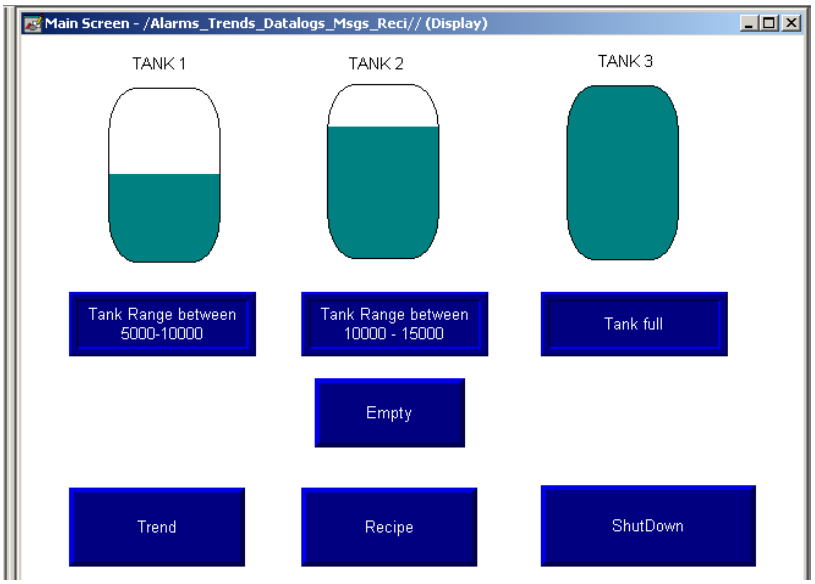


From the component browser,

Select the local **Message** component.



Test the Main Screen Display.

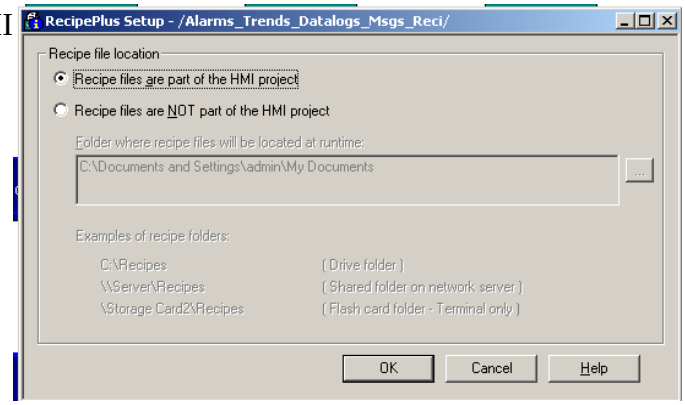


Recipes

A recipe is a set of numeric and string data values (ingredients) that can be downloaded to their associated tags at the data source. Each ingredient has a pre-set data value assigned to it. The set of data values for all the ingredients in a recipe is called a data set. The set of numeric and string tags assigned to the ingredients in the recipe is called a tag set. The ingredients, data sets, and tag sets are stored together in a recipe file.
You can create different pairs of data sets and tag sets for the same set of ingredients. Each pairing of data set with tag set is called a unit. Each unit is like a unique recipe. At run time, the operator can select the unit (recipe) that applies to the current operation.

Expand (+) the **RecipePlus** Folder .
Double click on the **RecipePlus Setup** Icon.

Make sure the “Recipe files are part of the HMI projecct “ is Selected.



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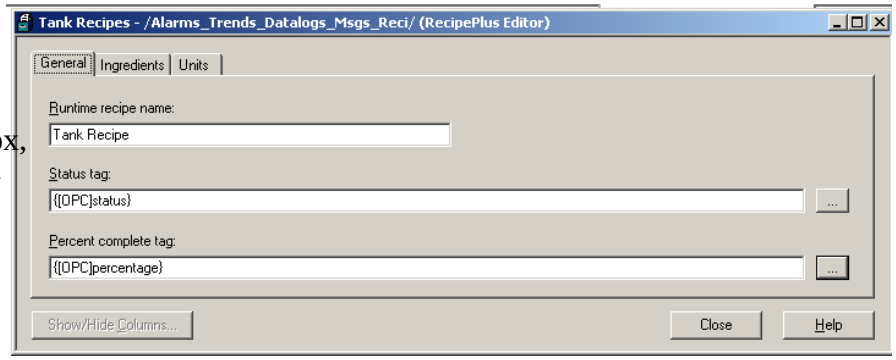
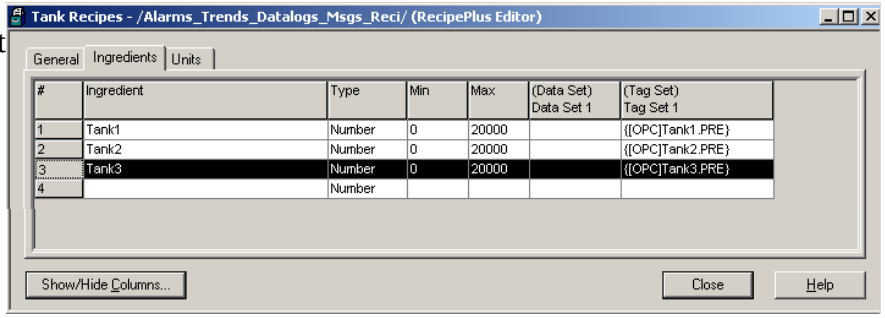
Right Click the **RecipePlus Editor** and **Select New**. Under the **General** Tab, give the recipe an approriate name. To the right of **Status tag** textbox, click **Elisple** and **select {[OPC]status}** from the tag browser. Do the same for the **{[OPC]percentage}** under the **Percentage Complete tag** box.

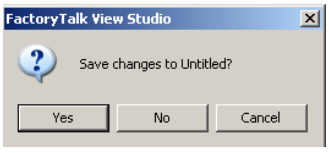


In the **Ingredients** tab, list the ingredient and their min /max value. Under the Tag Set **Right Click** and Select Tag Browser and choose the tag needed to be substitiutted in the recipe

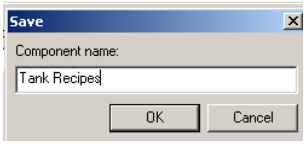


Click Close

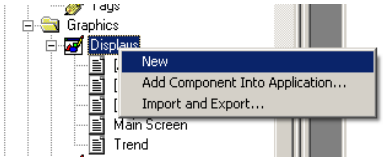
.
Click Yes to save changes.



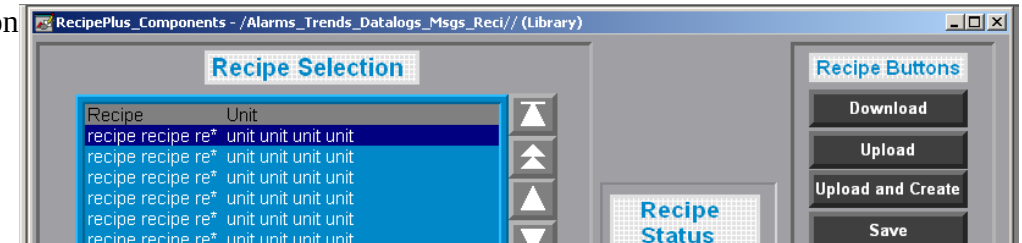
Give the recipes component an approriate name and Press ok



Create an new display by Right Clicking the Display Icon and Selecting New.

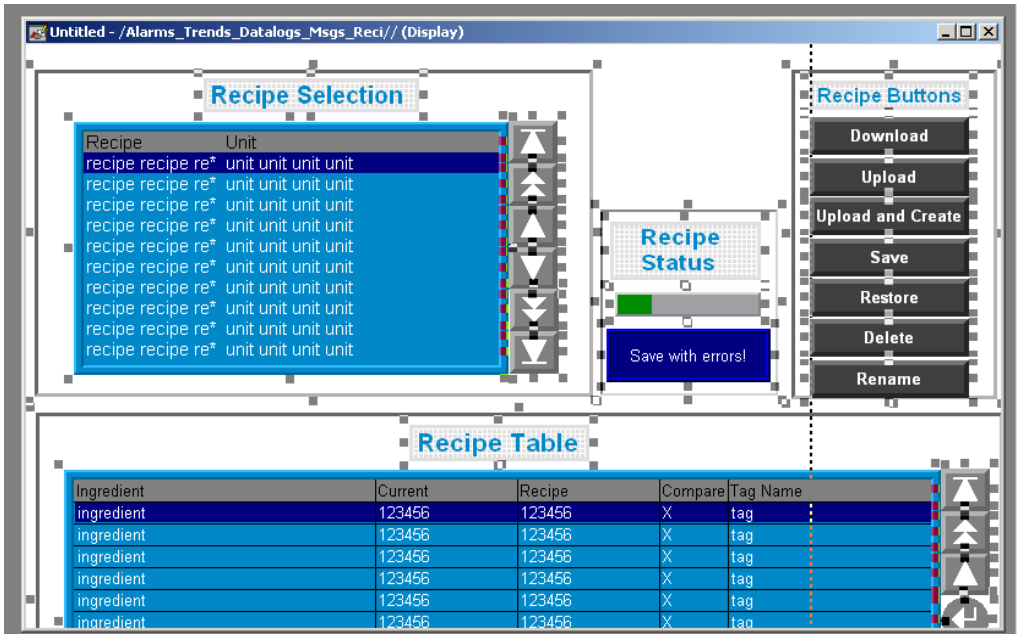


Expand (+) the Library Icon

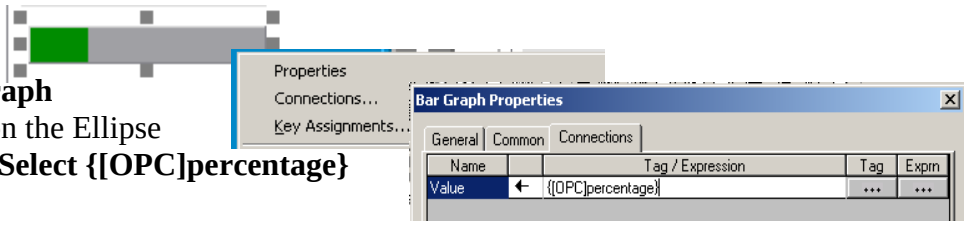


and **Double Click** on the **RecipePlus component**.

Click on the **RecipePlus** component screen and press **Crtl-A** (to select All) and drag and drop the items to the new display.



Under the recipe Status label **Select** and **Right Click Bar Graph** And select connections. Click on the Ellipse underneath the tag column and **Select {[OPC]percentage}** from the Tag browser



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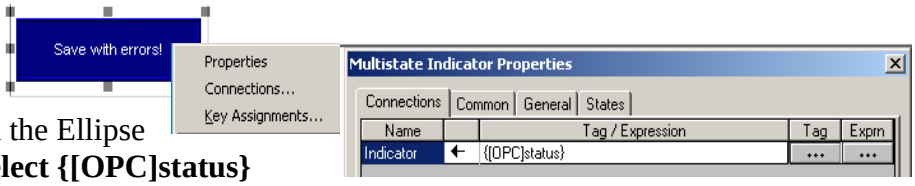
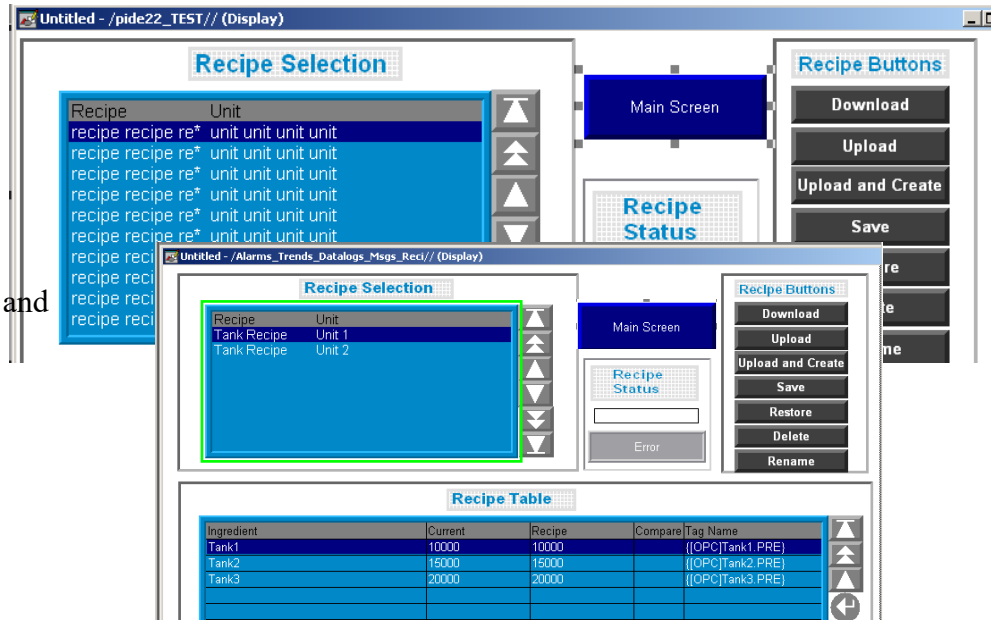
Under the bar graph Select and **Right Click Multistate Indicator** And **Select Connections**. Click on the Ellipse underneath the Tag column and **Select {[OPC]status}** from the Tag browser

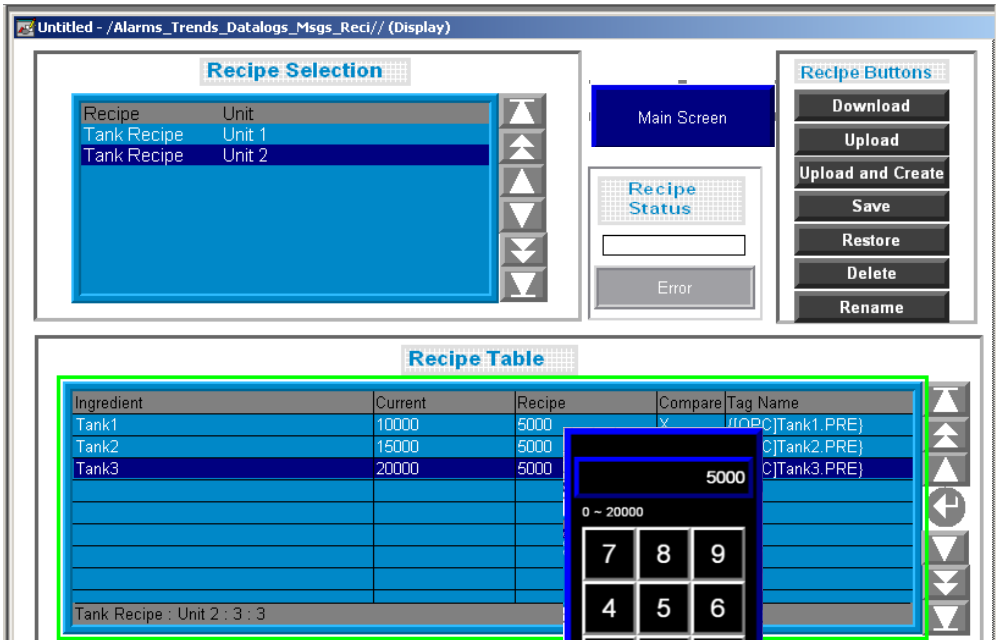


Add and Configure a **Goto Display Button** for the Main Screen , put it above the Recipe Status Indicator

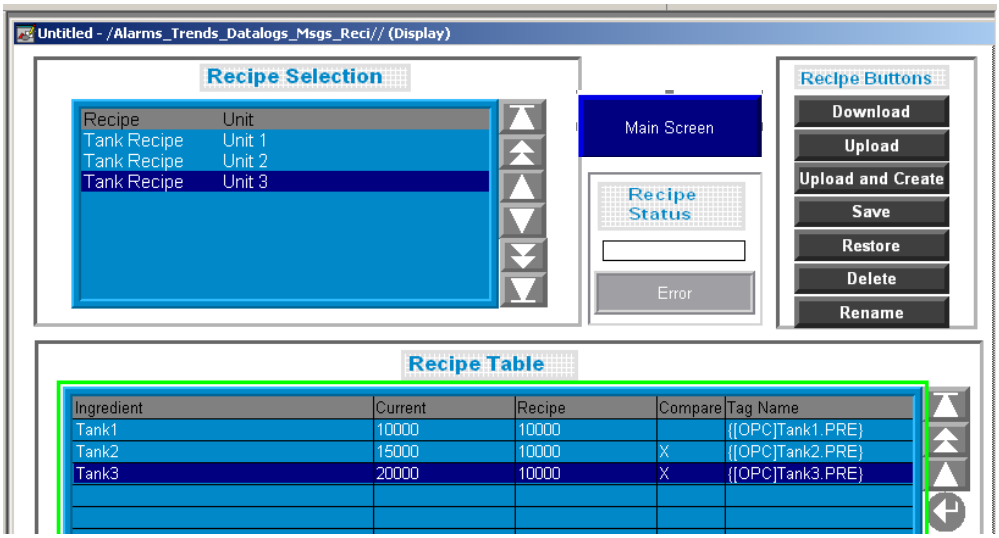
Test Recipe Display:
Select “Unit 1” and Upload and then Save.



Upload and Create “Unit 2”. In the recipe table press the enter symbol to set a recipe value
The values are follows:
Tank 1 -> 5000
Tank 2 -> 5000
Tank 3 -> 5000

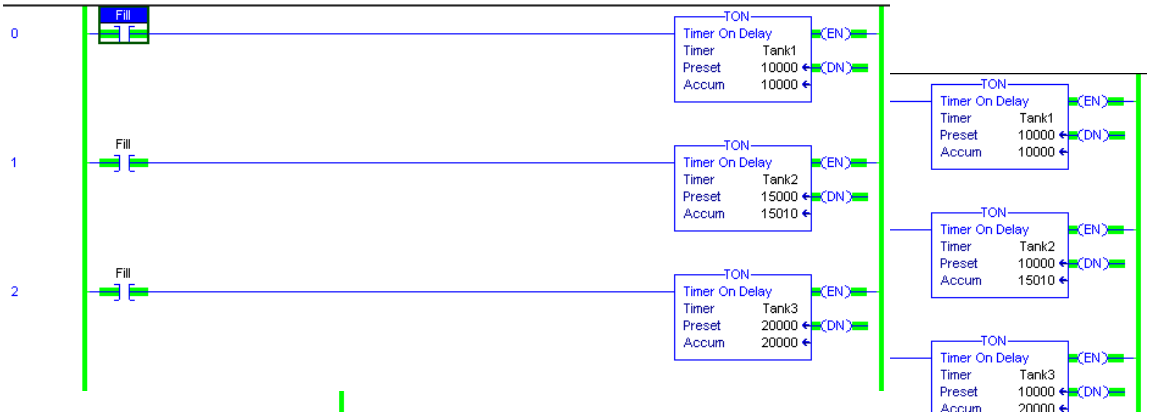


Follow the same steps for unit 3 as for unit 2. The values should be:
Tank 1 -> 10000
Tank 2 -> 10000
Tank 3 -> 10000



Select the different recipes and download

Verify that the values changed in the controller



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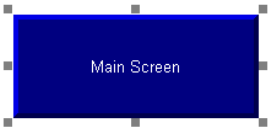
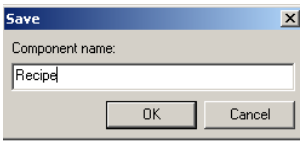
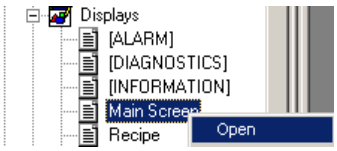
Create a **Goto Display** button for the **Main Screen**.



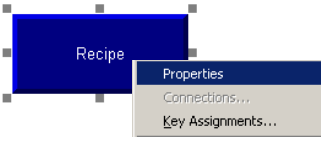
Close the recipe Screen and save the component with the appropriate Name



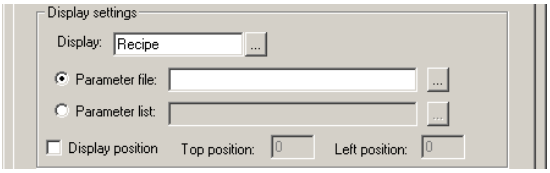
Goto the Main Screen



Right click the Goto display Button for the recipe screen and Select Properties.



In the general Tab, under the Display setting Section, Press the display ellipse. Select the Recipe Display from the Component browser



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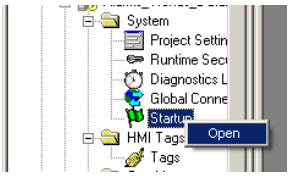
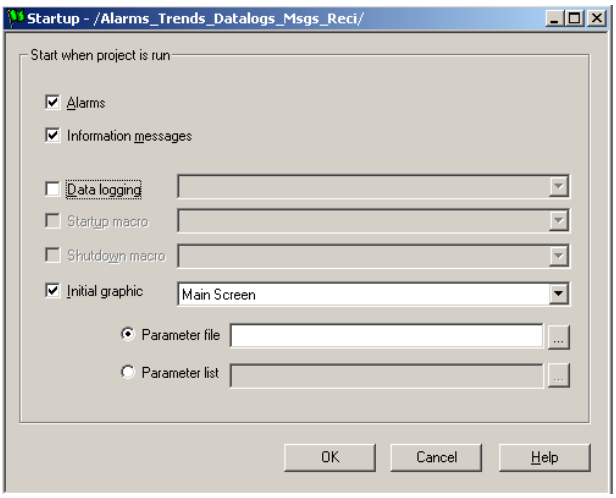
Expand (+) the system folder and **Right Click** the **Start up** folder and **Select Open**

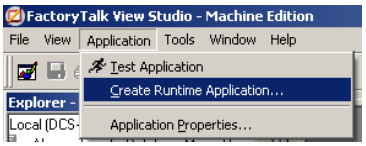


Select the Alarms, Information messages, and Initial graphic Check Boxes. In drop down list for Initial graphic select Main Screen

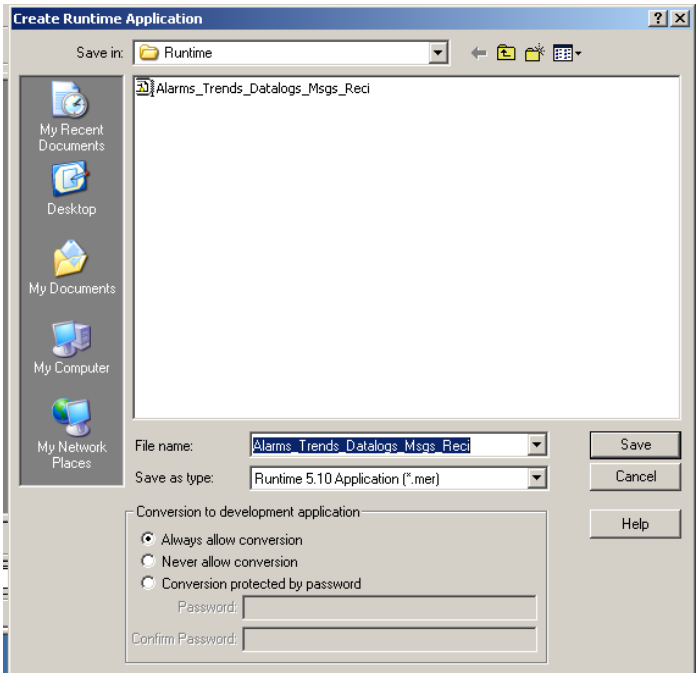


Creating a run-time application

In the Application menu, click Create Runtime Application.



On the left hand side menu, Select Desk top Location and enter a runtime file name for the application. And press save.



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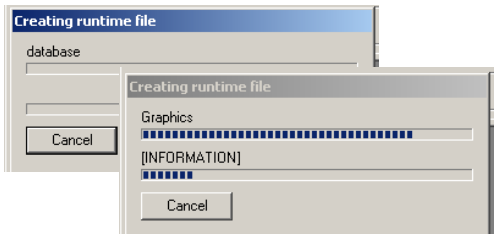
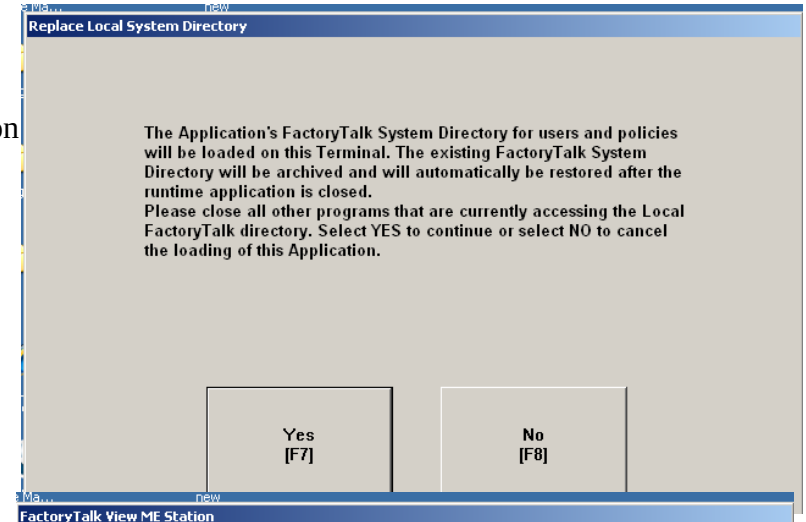
A “creating runtime file” pop up window will Appear updating the status of the process.



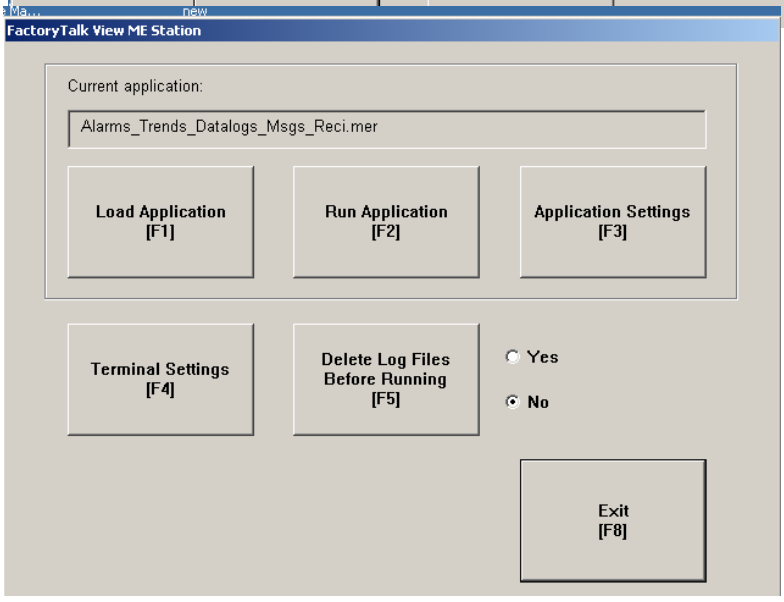
A .MER Icon should appear on the desktop.

Press the Icon to Start the runtime application

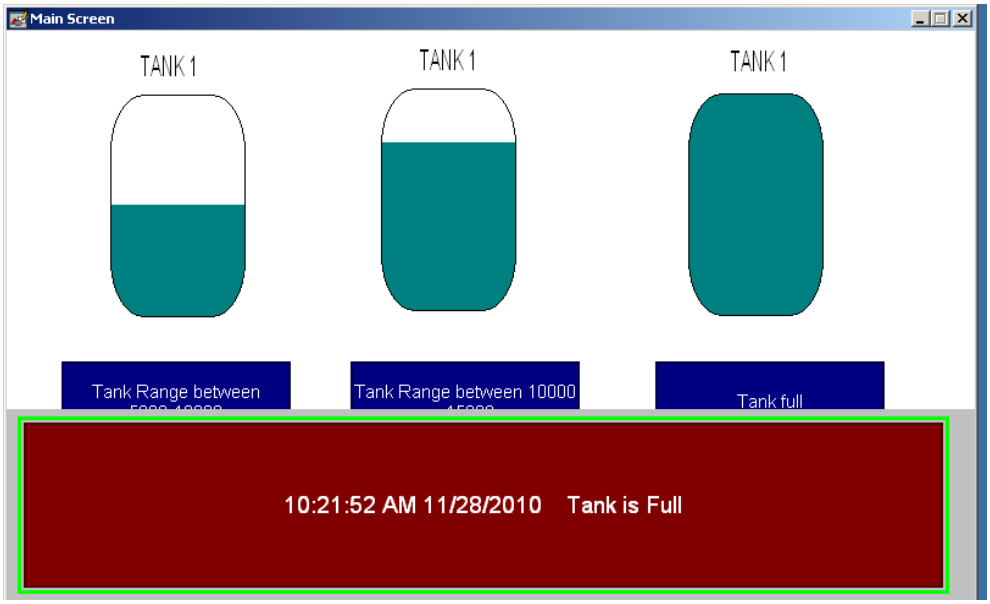


A prompt will request to close all programs That are using the FT Directory. Make sure that FT View Studio is closed. Press Yes to Continue loading the application.

Press Run Application.



Test Application.



Summary of Steps Alarming, Trends, Messaging, Recipes and Run-Time Applications

Summary of Steps To Configure Alarms

Follow these steps to set up alarms:

1. In the Alarm Setup editor, set up alarm triggers (the tags or expressions to monitor), define the alarm messages and their trigger values, and specify the graphic display to open when alarms occur (if any).

Also use this editor to specify trigger types, “Acknowledge all” values, the maximum alarm log file size, the hold time, and optional connections.

2. In the Startup editor, ensure that the Alarms box is checked (it is checked by default).
3. If desired, in the Graphics editor modify the default [ALARM] display, or create your own graphic display to use for alarms. For example, if you won’t be using audible alarm signals, edit the default display to remove the silence alarms button.
4. Test alarms on the run-time system

Summary of Steps To Configure Trend

These are the steps for creating a trend:
1. To plot historical data, create a data log model in the Data Log Models editor. 2. Create a trend graphic object in the Graphics editor.
3. Set up the trend in the Trend Object Properties dialog box. 4. If desired, create a next pen button, a pause button, or key buttons in the same graphic display, to allow the operator to switch between pens, pause the trend, or scroll the trend.
5. To keep a printed record of the trend data, provide a way for the operator to print the graphic display.

Summary of Steps to Configure Local Messages

Follow these steps to set up local messages:
1. In the Local Messages editor, set up the messages and their trigger values.
2. In the Graphics editor, create local message display objects in the graphic displays in which you want the messages to appear at run time. For each local message display, assign a tag or expression to the Value connection and specify the file of messages to display.

Summary of Steps Recipeplus

These are the steps for creating a recipe system:
1. In the RecipePlus Setup editor, specify the run-time location for recipe files. The files can be stored with the application or in a separate location.
2. In the RecipePlus Editor, set up ingredients, data sets, tag sets, and units. You can also specify a percent complete tag and a status tag for the recipe..
3. Create a display in the Graphics editor, containing a RecipePlus selector, table, and buttons.
4. If desired, create key buttons in the same graphic display, to allow the operator to use the selector and table without a keyboard.

To Create a Run-Time Application

1. In FactoryTalk View Studio, with the application open, on the Application menu, click Create Runtime Application.
2. Specify the folder and file name for the run-time application.
3. In the Save as type box, specify the version of FactoryTalk View ME Station for which to create the .mer file.
4. For version 5.00 and later .mer files, if you don't want to allow the run-time application to be converted to a development application, click Never allow conversion.
5. For version 5.00 and later .mer files, if you require that the user enter a password to convert the application, click Conversion protected by password. Type the password in the two boxes. The password can be up to 100 characters long. The password is case sensitive.
6. Click Save.