mks
Technology for Productivity
Spectra™ Products

Process Eye Professional

Recipe Wizard

Version 5

As part of our continuous product improvement policy, we are always pleased to receive your comments and suggestions about how we should develop our product range. We believe that the manual is an important part of the product and would welcome your feedback, particularly relating to any omissions or inaccuracies you may discover.

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I. Getting Help

We are always pleased to provide assistance where we can. If you are experiencing difficulties or need help, feel free to call your local MKS Spectra facility and ask for the Customer Support Group. Please have the following information ready so that our technical staff may help you quickly and effectively:

The serial numbers of the analyser and control unit, each of these numbers begins with the letters "MKS" or "LM"

The Process Eye software version number, this is written on the software CD ROM and can also be found on screen by selecting **Help | About** from the menu-bar in the Recipe Wizard window.

The operating system used and any Service Packs which have been applied.

Support Contact Telephone Numbers:

United Kingdom
+44 (0) 1270 250150

North America
+1 (408) 778-6060
1-800-VAC CHECK

II. Introduction

Process Eye is a "recipe" driven software platform. These recipes contain all the instructions required to perform the particular task and can range from a simple Bar Chart scan to a complex, fully automated, Semiconductor Tool monitor.

The recipes themselves are self contained Visual Basic scripts. They are stored as text files with a *.SI-r extension and can be edited and created with either a text editor, our stand alone Editor program, or most easily through the Recipe Wizard.

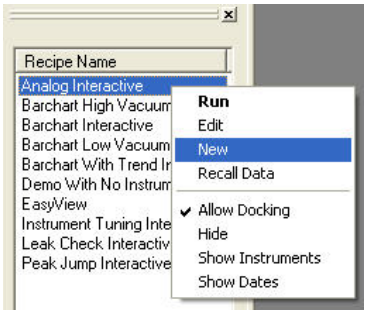
Although it is possible to start with a blank file and manually write all the components of a recipe, we have implemented a wizard to guide you though the most common requirements of a recipe. This wizard then creates the VB script, which can be added to, or edited at a later date.

Chapter 1 – Starting the Recipe Wizard

Recipe Wizard can be started in a number of ways:

From the Windows Start menu select **All Programs | MKS RGA Applications | Recipe Wizard**

From the main Process Eye program by clicking on the **Recipe Wizard** button.



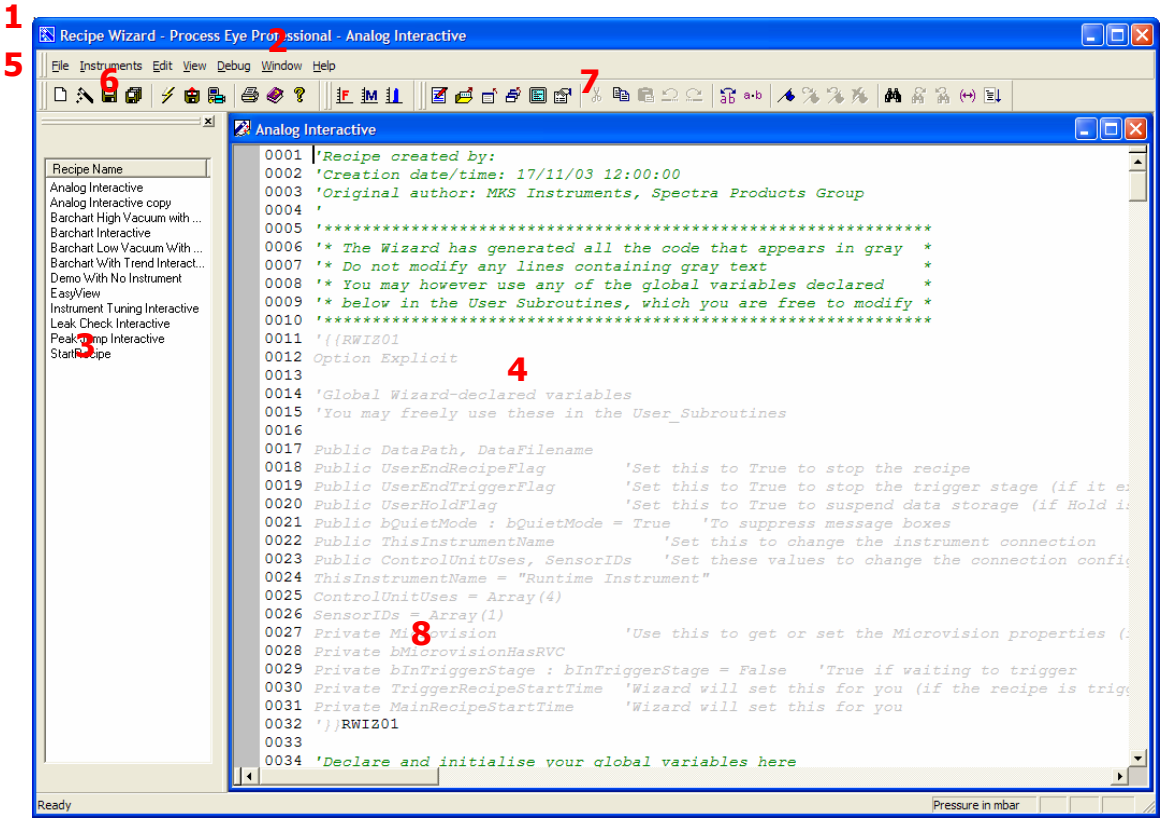
From the main Process Eye program, click on a recipe in the **Recipe List Window** with the right mouse button and select **Edit** to edit that particular program in the recipe wizard, or select **New** to create a new recipe using the recipe wizard.

Finally, you can double click a recipe file in Windows Explorer to launch Recipe Wizard and edit the recipe.

Recipe Wizard has a complete system of **on-line context-sensitive help**. The simplest way of getting help is to press the **F1** function key on your keyboard.

Chapter 2 – The Main Recipe Wizard Screen

The Recipe Wizard's main screen consists of eight parts:



Title Bar
1. The title bar shows the application name and, if applicable, the name of the recipe currently being edited. The close, minimize and maximize buttons on the left work in the normal manner.

Menu Bar
2. Recipe wizard is no different from other Windows applications; all the available functions are available via the menus.

Recipe List
3. The Recipe List contains a list of all the currently available recipes.

Script Edit Window
4. The Script Edit window contains the scripts of the recipes currently open for script editing. To aid in editing, text in the script window is colour coded. You can use Recipe Wizard without getting directly involved in script editing.
Note: Changes to the script are only committed when the open file is saved.

Toolbars
5. The toolbars appear as one row of buttons below the menu bar and immediately above the recipe list. Each toolbar can be may be hidden by selecting **View | Toolbars** from the menu bar and un-checking those you wish to hide.

Default Toolbar
6.

The default toolbar contains thirteen icons for creating and editing recipes:

New Recipe starts the recipe wizard to create a new recipe.

Recipe Wizard starts the Recipe Wizard to edit an existing recipe.

Disk Store saves any changes to the current active recipe to disk.

Multiple Disk Store saves changes for all open recipes to disk.

Start Process Eye icon starts the Process Eye program.

Recall starts the Recall program.

Setup Wizard icon starts the Setup Wizard.

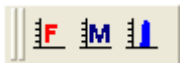
Cut removes the highlighted section of text

Copy copies the highlighted section of text to the clip board.

Paste pastes the contents of the clip board into the recipe.

Print prints the contents of the currently open recipe file.

Help / (F1) opens the online help.



Define Faraday Calibration starts the Faraday calibration wizard.

Define Multiplier Calibration icon starts the multiplier calibration wizard.

Run Calibration starts the calibration process for both Faraday and multiplier calibrations.

Script Edit Toolbar
7.

The script edit toolbar contains nineteen icons used to edit the recipes script code:

Script opens the recipe file of the selected recipe in script edit mode.

Open File opens a recipe file using the standard windows open file dialog.

Close Script closes the currently active script page.

Close all Scripts closes all the currently open script pages.

Toggle Full Screen Edit switches to full screen edit.

Properties displays the script properties for the currently active script.

Undo operates in the normal way.

Redo operates in the normal way.

Transpose Characters transposes the 2 characters either side of the cursor.

Explicitly Show White Spaces causes a "··" to be displayed in each space.

Toggle Bookmark places a bookmark on the current line.

Next Bookmarked Line takes you to the next line with a bookmark.

Previous Bookmarked Line takes you to the previous line with a bookmark.

Delete all Bookmarks removes all current bookmarks.

Find performs text searches within the current script.

Find Next locates the next occurrence of the text.

Find Previous locates the previous occurrence of the text.

Find Matching Brace locates the parenthesis that corresponds to the currently selected.

Go To allows you to jump to a given line number.

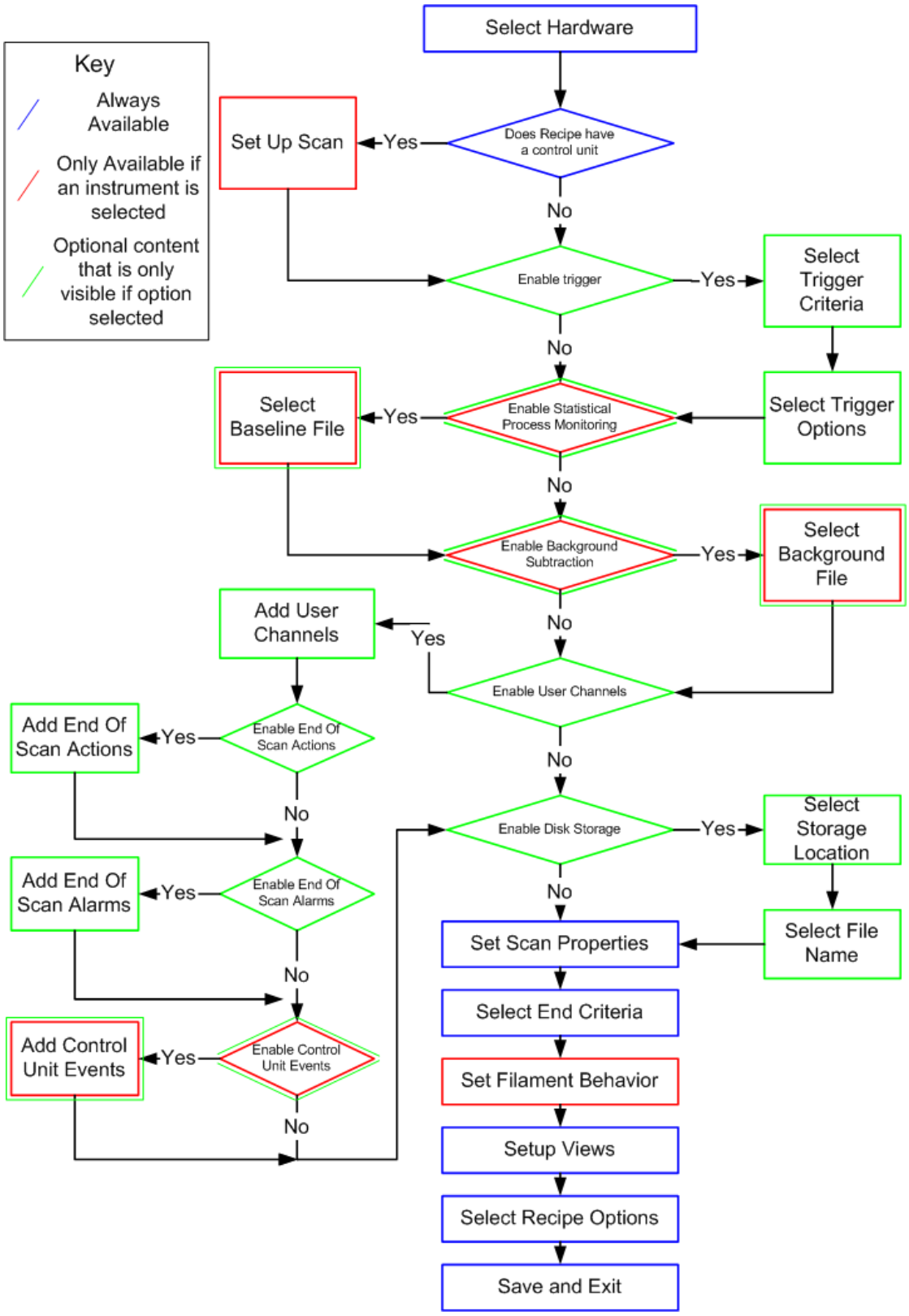
Status Bar
8. The status bar is along the bottom of the screen and displays "mouse over" help information. It can be switched on or off by selecting **Status Bar** from the **View** pull down menu.

You can customize the toolbars as required. You can choose which toolbars are visible or create your own choice of buttons. See the Process Eye Professional manual for instructions on customising Toolbars.

Chapter 3 – Creating a New Wizard Recipe

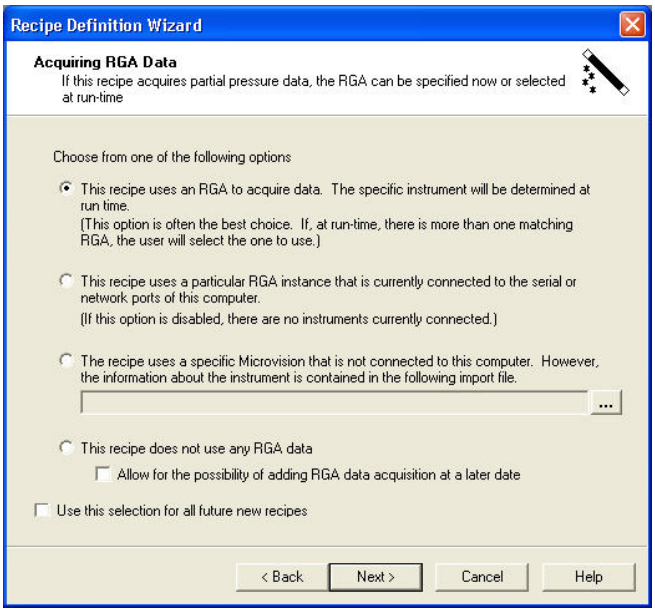
To create a new recipe, click on the **New Recipe** icon

A recipe can be created by working through a set of wizard pages. The number and content of these pages will depend on the options selected:



3.1 Select Hardware

The first step in the Recipe Wizard is to define the hardware to be used by the recipe, this is important because it affects what options and recipe pages are displayed later.

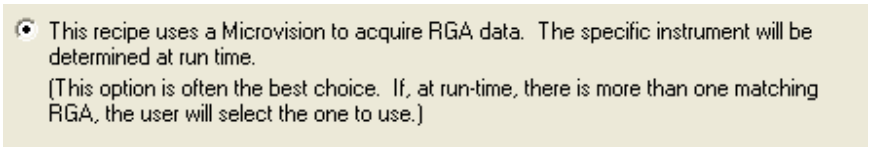


There are four main options that can be selected from the **Acquiring RGA Data** dialog.

To select one of the options, click on its radio button.

You can also choose to make these settings the new default.

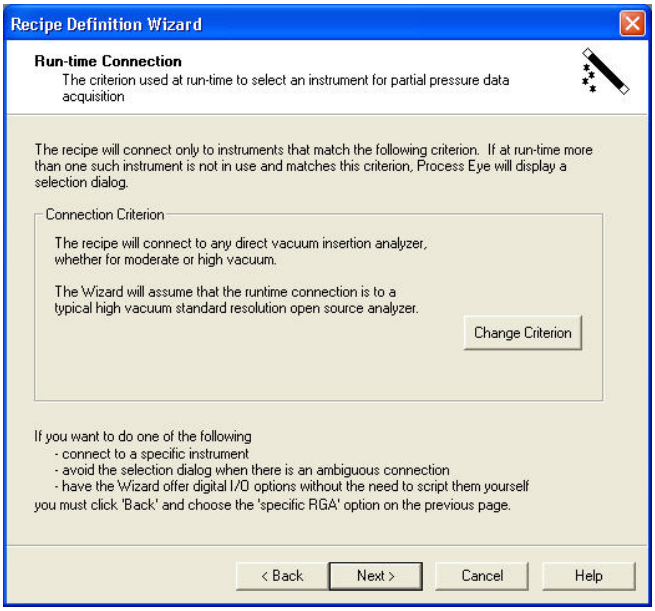
3.1.1 Use a Generic Instrument



This option allows you to postpone the decision on which instrument the recipe will use.

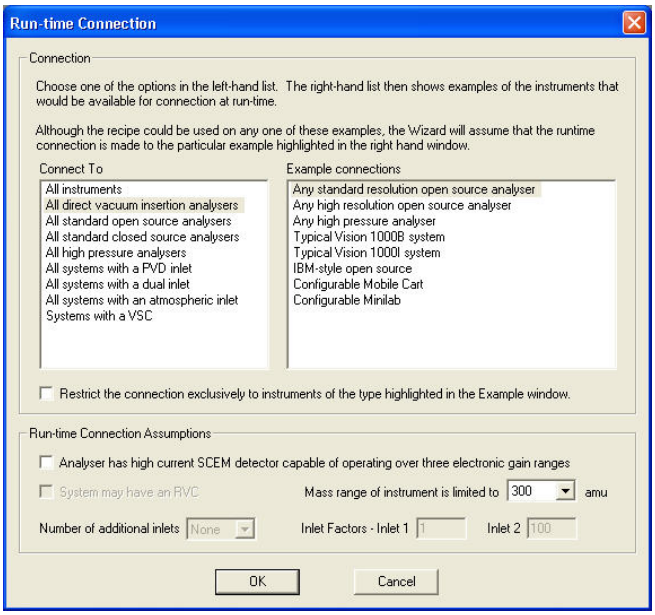
If, at run time, there is more than one instrument connected that matches the selected instrument type, then a list of all matching instruments is displayed and the user must select one instrument before the recipe will run.

Choosing this option and clicking **Next**, causes the **Run-time Connection** dialog to appear.
Here, changes to the instrument type can be made.



You will note that the generic instrument option does not allow you to include any code for digital I/O. If you need digital I/O actions and events in your recipe you must choose the specific RGA option so that the wizard can determine the I/O configuration.

To change the type of instrument that you wish to create a recipe for, click on the **Change Criterion** button.



To select the type of instrument required, first select the **Connect To** option in the left hand column.

The right column will display example connections specific to that set of **Connect To** options.

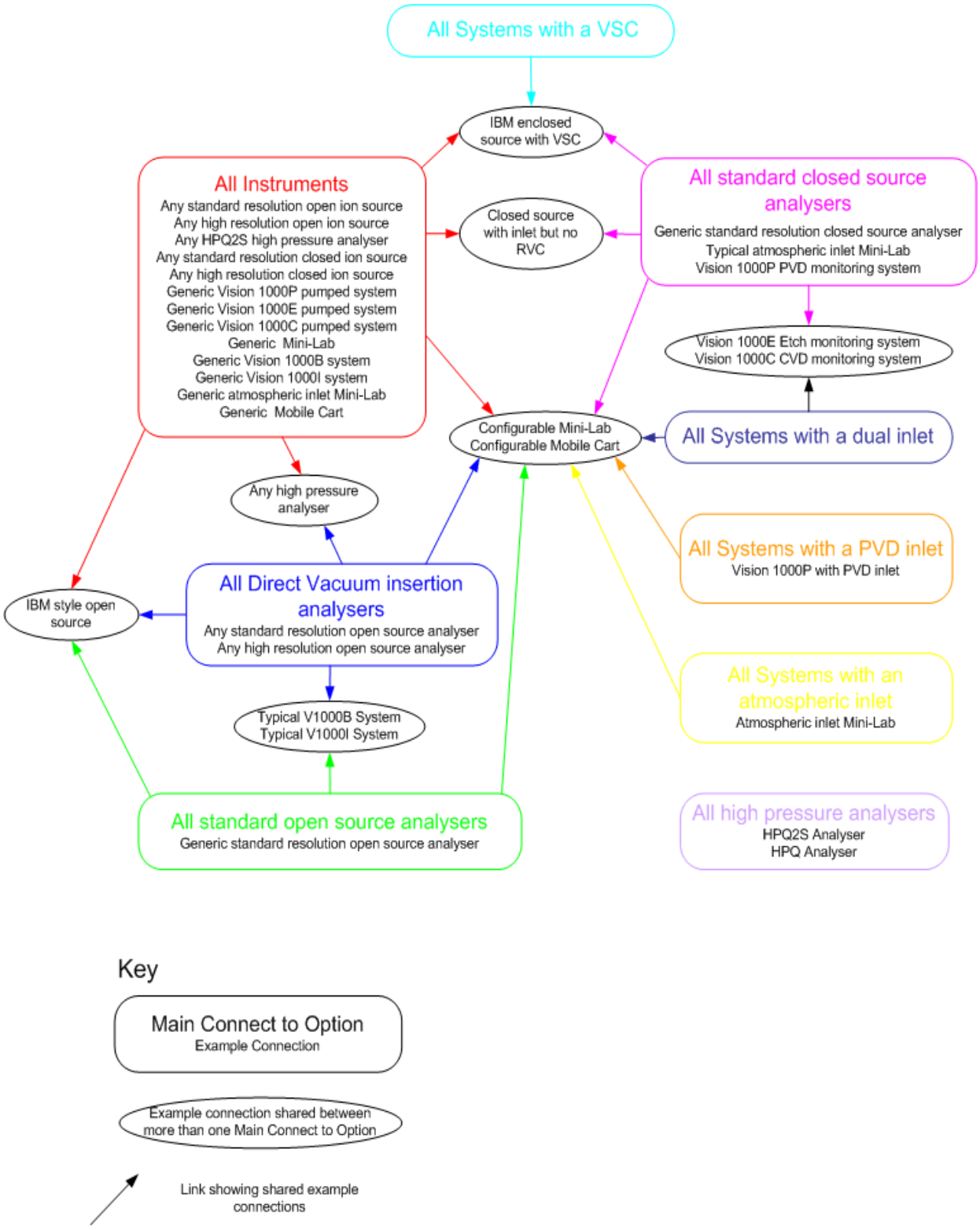
Select one of the choices in the right hand list. This will be the basis for the questions that follow.

Not checking the above option the recipe will connect to all the members displayed in the **Example Connections** list.
Checking the above option permits run-time connection exclusively to the selected example.

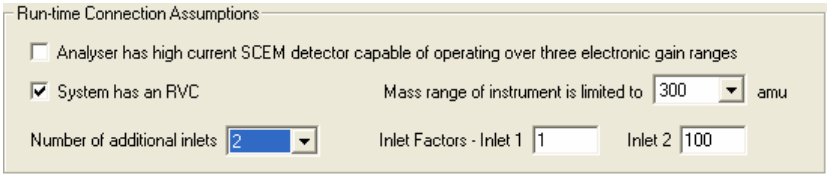
Note: Some examples exist in more than one "connect to" option.

3.1.1.1 The relationship between connection examples

The relationship between specific connection examples and the **Connect To** options are displayed in the diagram below.



3.1.1.2 Run-time connection assumptions



Once the instrument type, or group of instrument types have been selected, you can set the **Run-time Connection Assumptions** at the foot of the **Run-time connections** dialog.

Some options may be unavailable depending on your choice of instrument type.

An atmospheric inlet Mini-Lab for example, does not use an RVC, the option is therefore unavailable.

If your analyser has a high current SCEM detector, ensure the following option is checked.

This provides three gain ranges per detector in the Measurement Properties dialog, instead of the normal two.

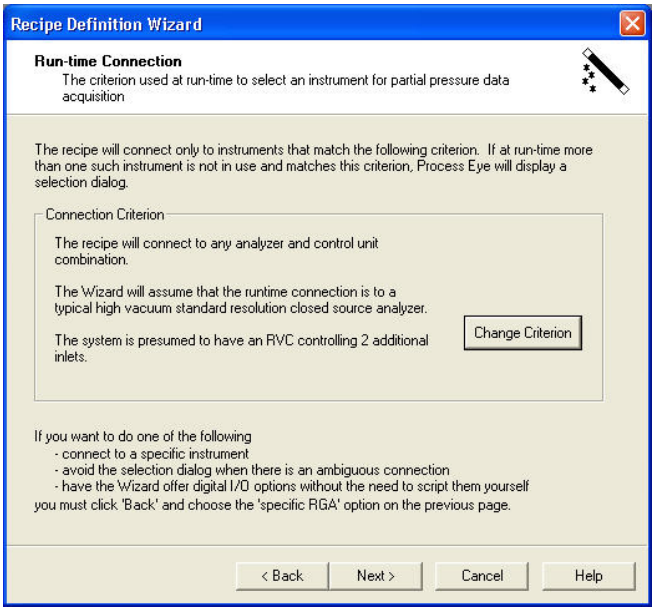
The maximum mass used in the measurement is set here.

The inlet can be configured from the following option. If an RVC is not used, the choice is limited to one inlet, you simply edit the inlet factor that recipe wizard will assume.

If an RVC is used, you can set the number of inlets that you have and the different inlet factors Recipe Wizard will use.

Note: The inlet factors you set in recipe wizard will only be used as a guide for writing recipes.
The actual inlet factors cannot be set in Recipe Wizard. These must be done by either Setup Wizard, or if your inlet is variable, from Calibration.

The connection criterion now reflects the selected criteria.

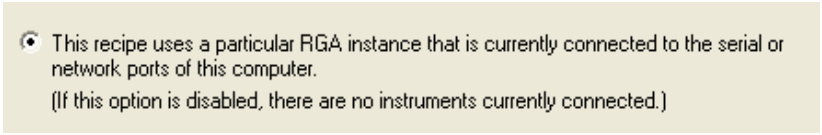


When you connect to a real control unit at run-time the recipe checks that the capabilities of the instrument are sufficient for the recipe that you have written. So, if your data acquisition requires scanning to mass 150 but the runtime analyser has a maximum mass of 100 amu, the recipe will abort with an appropriate message.

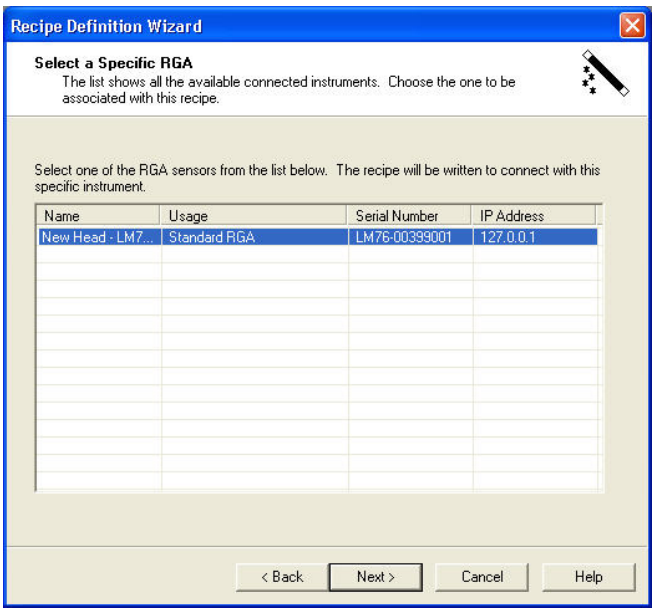
If your system does not have an RVC, the code behind the RVC pages is ignored.

3.1.2 Use a currently connected instrument

This option allows the Wizard to discover all the details about the control unit's configuration. As a result it will always ask for the correct information as you move through the pages of the Wizard.



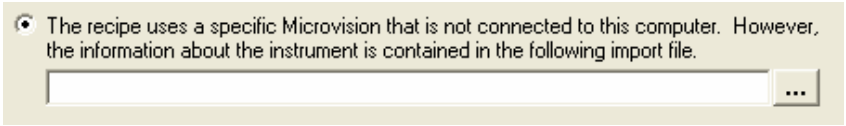
After clicking **Next**, the **Select a Specific RGA** dialog is shown.



From the list, select the RGA that you wish to use and click **Next**. The available options that recipe wizard will allow are based on the current configuration for the type of analyser you have selected.

3.1.3 Use a specific instrument that is not currently connected

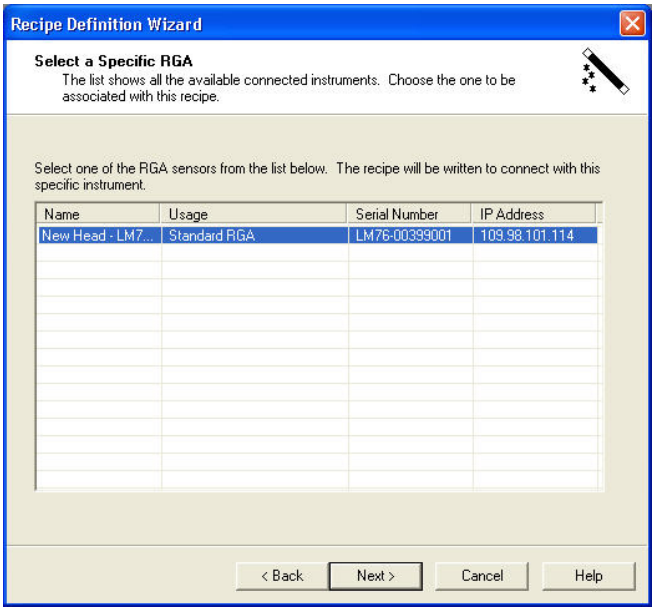
This option allows you to work off-line and write a recipe for a particular control unit whose information is included in a server information file saved from the **Connections Dialog** in Process Eye Professional.



Either enter the file path and name of the stored file, or **Browse** to the file by using the Browse button.

Select the server file that contains the information about the instrument you wish to use and click **Open**.

The list of RGA instruments contained in the file will be displayed on the **Select Specific RGA** page of the wizard that follows.



Select the instrument you wish to use and click **Next.**

3.1.4 Do not use an Instrument

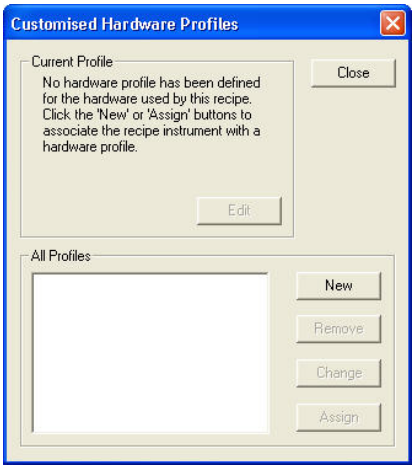
Choose the final option if the recipe you are authoring does not need a control unit.

3.2 Hardware Profiles

If you have any analog or digital I/O associated with your control units you should always set up a suitable hardware profile. If you do not have any I/O you can ignore this section.

The profile will define specific names for I/O channels and in the case of Analog inputs, allow the input voltage to be converted into a meaningful value (for example pressure in the case of an input from an external gauge).

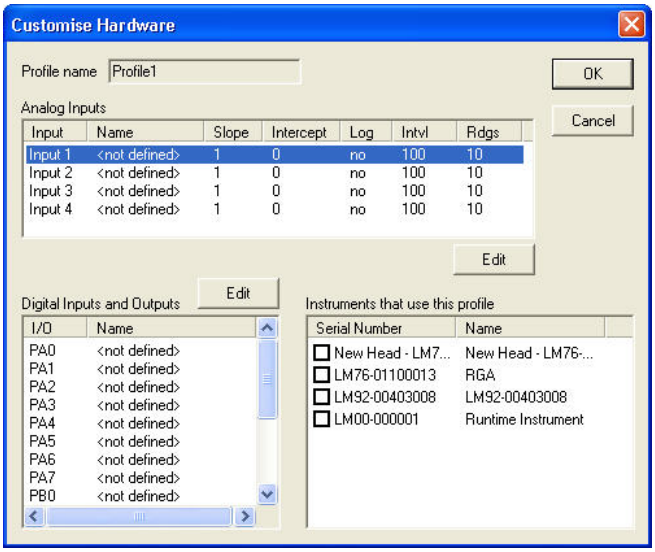
To create, or edit a profile, click on **Customise** in the **Hardware Information** dialog of the recipe wizard.



To create a new profile click **New**.

Enter a name for the profile and click OK.

To assign the profile to the currently selected instrument, click **Yes**.
To create the profile, but not assign any instrument to it, click **No**.

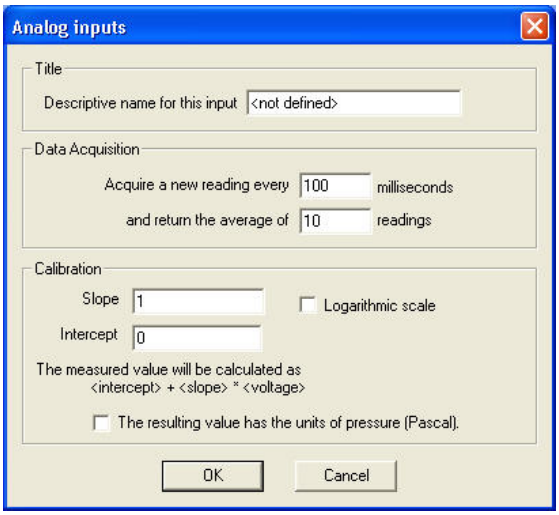


The **Customise Hardware** dialog consists of three parts:

Analog inputs
Digital I/O
Instruments.

3.2.1 Analog Inputs

To edit an Analog input profile, highlight the input from the list and click **Edit**.



To configure an input to be read and displayed, a name must be entered into the **Title** text box. This name will be used as the channel name on your trend views

Linear Example
Input 1 is connected to a 100mTorr Baratron pressure gauge.
Enter "100mTorr Baratron" as the channel name.

The input will be a pressure, therefore check the **The resulting value has units of pressure (Pascal)** check box.

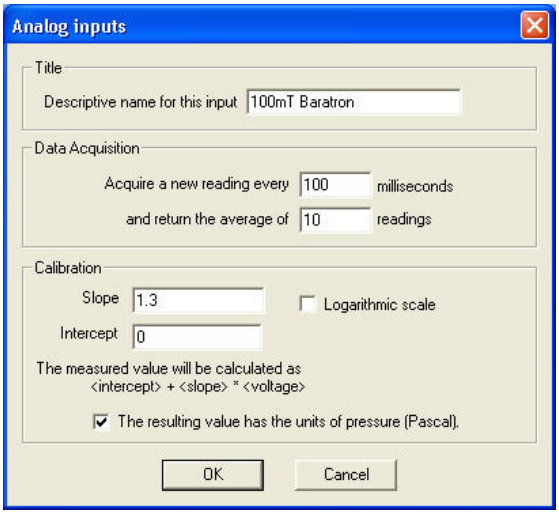
The input voltage needs to be converted to a pressure in Pascal. On a Baratron gauge, the output voltage is a linear representation of the pressure with 10V representing 100mTorr. Therefore the equation for pressure in mTorr is

$$\text{Pressure} = \text{Voltage} \times 10$$

However, the pressure must be calculated in Pascal, therefore;

$$\text{Pressure} = \text{Voltage} \times 10 \times 0.133 = \text{Voltage} \times 1.33$$

For the above example, set the following values in the **Calibration** boxes;
Intercept=0 and slope=1.33.



The data acquisition settings are by default, to take 10 readings every 0.1 seconds, average them and return 1 reading a second.

If a faster response is required, then either reduce the number of readings to average, or decrease the interval between readings.

Logarithmic Example

Input 2 is connected to a 903 cold-cathode pressure gauge.
Enter "903 Gauge" as the channel name.

The input is a pressure so check the **The resulting value has units of pressure (Pascal)** check box.

The input voltage needs to be converted to a pressure in Pascal. On a 903 Gauge, the output voltage is related to the pressure in Pascal by the following equation.

$$\text{Pressure} = 10^{(\text{Voltage}-8.875)}$$

However the pressure must be calculated in the form;

$$\text{Pressure} = \text{intercept} \times e^{(\text{Slope}\times\text{Voltage})}$$

The pressure equation can therefore be written as;

$$\text{Pressure} = \frac{1}{\left(e^{2.3}\right)^{8.875}} \times \left(e^{2.3}\right)^{\text{Voltage}}$$

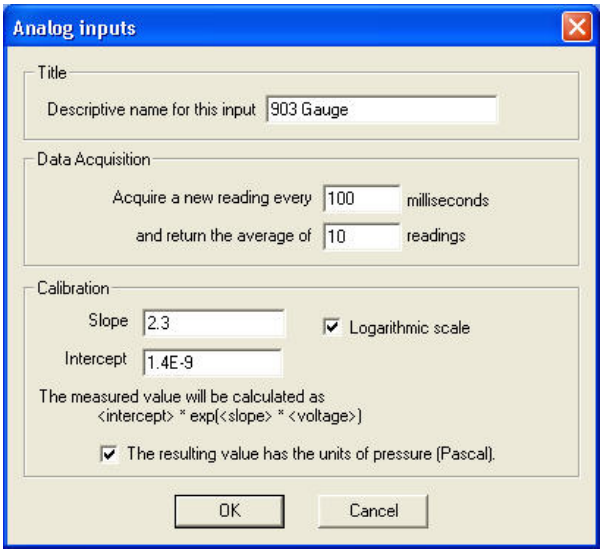
Or,

$$\text{Pressure} = \frac{1}{\left(e^{2.3\times 8.875}\right)} \times \left(e^{2.3\times\text{Voltage}}\right)$$

Or,

$$\text{Pressure} = 1.4E^{-9} \times \left(e^{2.3\times\text{Voltage}}\right)$$

For the above example, set the following values in the **Calibration** boxes;
Intercept=1.4E-9 and slope=2.3.



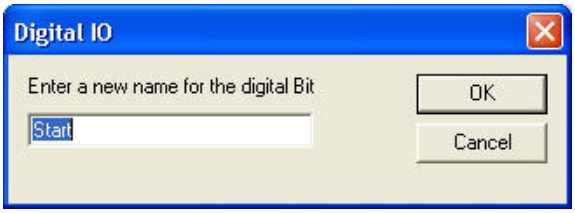
The data acquisition settings are by default, to take 10 readings every 0.1 seconds, average them and return 1 reading a second.

If a faster response is required, then either reduce the number of readings to average, or decrease the interval between readings.

3.2.2 Digital Inputs

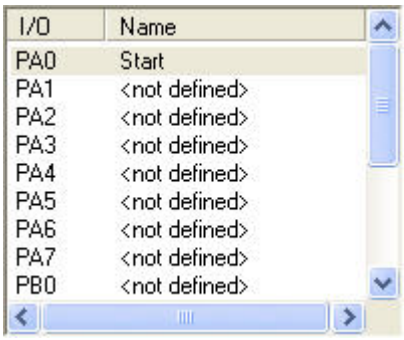
Each digital input can be renamed to aid in identification. Highlight the digital channel you wish to rename and click Edit.

Note: Digital Input definitions are not available for profiles created for generic recipes.



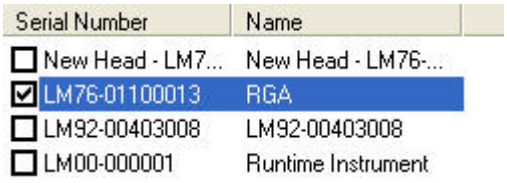
Enter a name for the channel and click **OK**. The name you choose will be used in the recipe to describe the channel on trend views.

The name then appears in the list of digital channels.



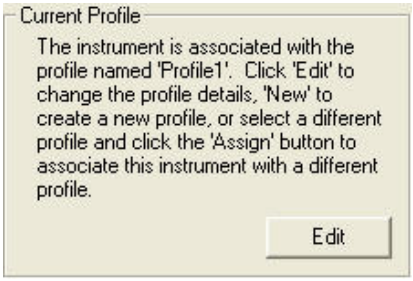
3.2.3 Instruments

The instruments window, displays a list of instruments the computer "knows" about. To apply the profile to an instrument check the box next to the instrument name. You can apply the profile to multiple instruments – indeed this is one of the main advantages of hardware profiles. You apply a consistent convention across all your recipes.



When all channels have been configured click **OK**.

If the current recipe instrument was one of the ones selected, the current profile box will update accordingly.



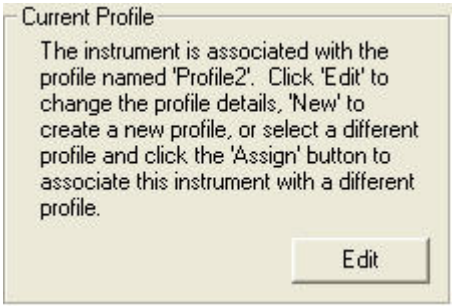
You can always edit the current profile by clicking on **Edit.**

3.2.4 Multiple Profiles

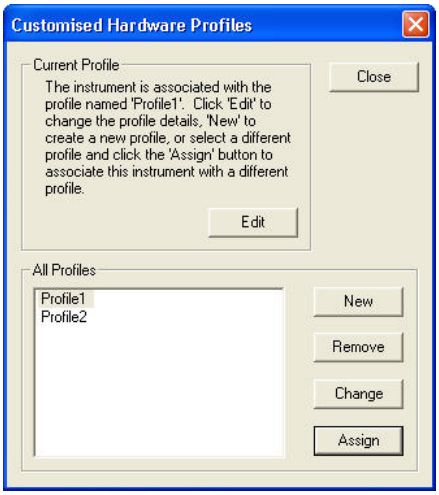
You can define more than one profile, however, only one profile can be applied to a particular instrument at any one time. To add a new profile click **Add**.

Enter a new name for the new profile and click **OK**.

If you want the current instrument to use the new profile, instead of the original click **Yes**. You can then edit the profile in the same way as previously described.

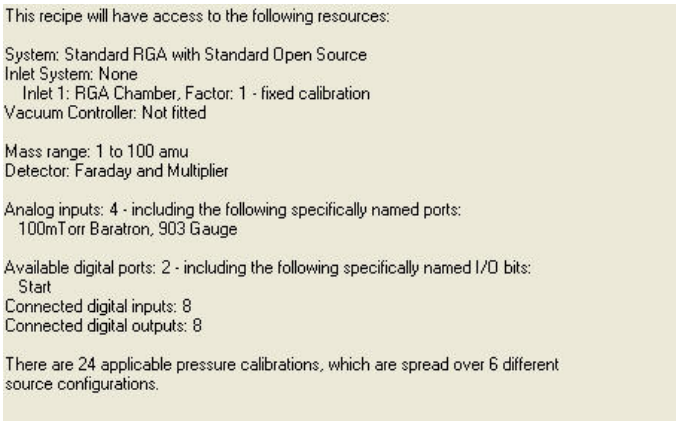


The current profile will now be set to "Profile2" as shown in the **Current Profile** dialog.



You can change the profile assigned to the current instrument by highlighting the profile in the list and clicking **Assign**.

If the profile that was assigned to the instrument is not assigned to any other instruments, you will be asked if you want to delete the old profile.



Once you have set up a profile the information will be displayed on the Information page of the wizard as shown in this example.

When the wizard writes the recipe script the information is coded into the recipe.

```
AnalogInFields = Array("100mTorr Baratron", "903 Gauge", "AI2", "AI3")
AnalogInSlopes = Array(1.30e+000, 2.30e+000, 1.0, 1.0)
AnalogInIntercepts = Array(0.00e+000, 1.40e-009, 0, 0)
AnalogInIntercepts = Array("False", "True", "False", "False")
DigIOFields(0) = Array("Start", "PA1", "PA2", "PA3", "PA4", "PA5", "PA6", "PA7")
DigIOFields(1) = Array("PB0", "PB1", "PB2", "PB3", "PB4", "PB5", "PB6", "PB7")
'06000  Profile1
'06001  ASG1
'06002  Steve Billington
'06003  LM76-01100013
```

The master copy of the settings for the profile is stored on the author's computer. The information is also encoded into the recipe; this means that even if the recipe is authored on one computer, run on a second computer and edited again on a third, the profile information is not lost. If you try to edit the profile information itself on any computer other than the original master,, the wizard will prompt you to accept that you are now becoming the owner of the master copy.

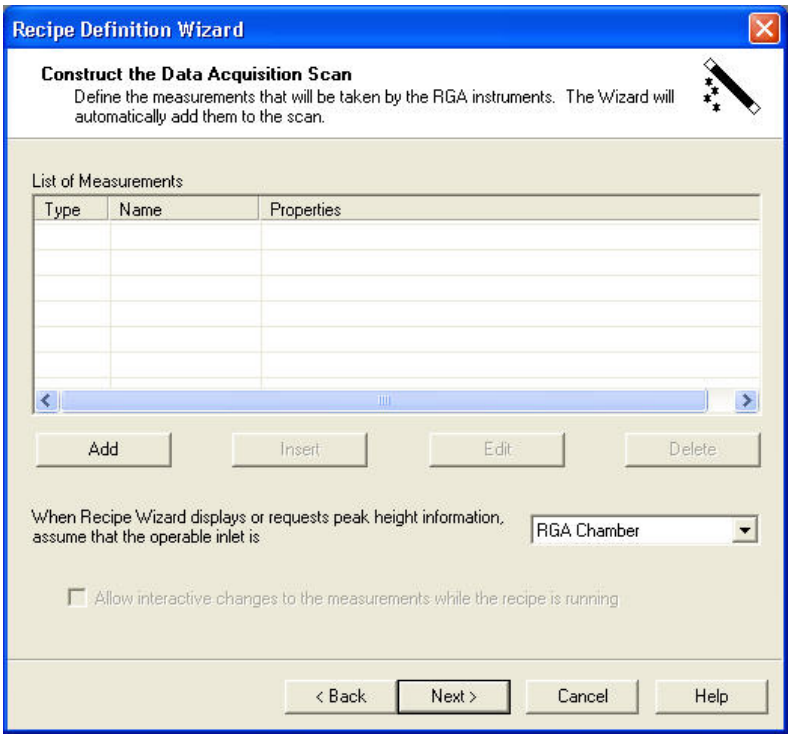
Since the settings for this profile are stored in the recipe, the recipe will work in the same way whichever computer it runs on.

Note: If the recipe is used on a computer with a profile of the same name, the settings used will be those stored on the computer and not those stored in the recipe.

The profile affects the digital and Analog I/O; you should not include any user script code to read these ports along with a profile, otherwise script errors could occur.

3.3 Constructing the Data Acquisition Scan

(Only displayed if hardware resource is selected).



A **scan** is a collection of one or more mass spectrometer measurements. Measurements can be added, removed, or edited from the **Construct the Data Acquisition Scan** dialog shown above.

Most of the measurement types may also be mixed; you may have two different Bar Chart measurements, followed by a Peak jump measurement, followed by an Analog measurement.

Each measurement will be done in turn to compile one scan; then the measurements will be repeated for the next scan.

You cannot mix a Leak Check or Degas measurement with any other measurement.

3.3.1 Scan Definitions

There are four types of scan and a filament degas available:

Bar Chart
A Bar Chart measurement is a scan from one mass to another (for example from mass 5 to mass 25) measuring each whole mass in between and returning one number for each mass.

Analog
An Analog measurement is a scan beginning at one mass and ending at another (for example from mass 5 to mass 25), measuring fractions of a mass (from each ¼ mass to each 1/32 of a mass) in between, and returning between 4 and 32 numbers for each mass, depending on how the scan is setup.
This mode is always used when setting the mass alignment and resolution of the mass spectrometer and also for checking peak shape.

Peak Jump
A Peak Jump measurement is a scan measuring a predetermined number of masses, omitting the masses in between (for example measuring mass 2,18, 28, 32 and 40 and not the masses between them) and returning one number for each mass.

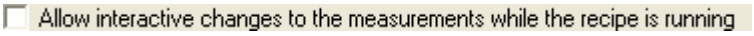
Leak Check
A Leak Check measurement is a scan measuring only one mass and returning one value.

Filament Degas
A Filament Degas measurement does not measure a mass; it simply increases the power in the filament to degas the ion source. Typically this takes a few minutes and during this time the control unit sends back readings that can be displayed on a trend view.

3.3.2 Scan Options

The **Construct the Data Acquisition Scan** dialog also offers two further options for created scans:

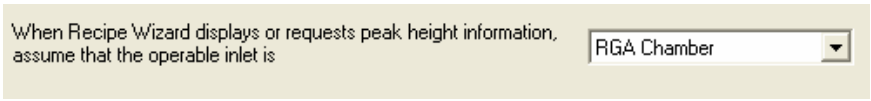
Interactive Scan
An interactive scan allows changes to the measurement properties whilst the recipe is running. To make a scan



interactive put a check in the following option box. The measurement properties are still set in the normal way, but these merely become the initial properties each time you start the recipe.

Operable Inlet
A Process Eye system can be configured to have a number of different inlets. These inlets can have the effect of reducing the pressure in the ion source meaning the measured pressure is less than the real pressure.

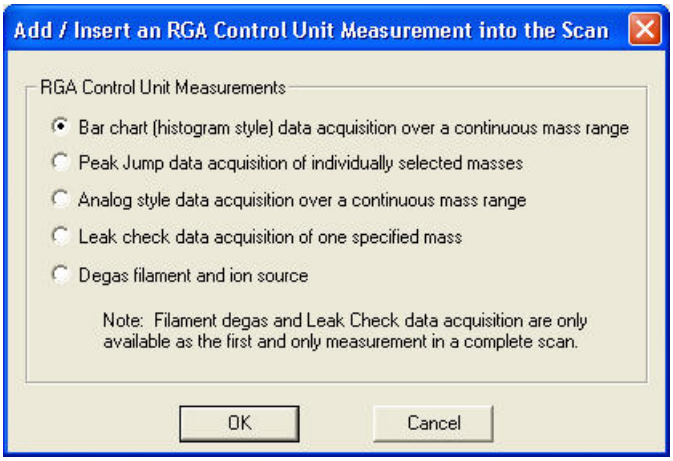
To correct for this, you can configure an "inlet factor"; this is the factor by which the pressure has been reduced. The **operable inlet** in the drop down list selects the inlet factor you wish to apply to all pressures displayed in the scan properties dialog.



The default is **RGA Chamber** which is always an inlet factor of 1. On standard RGA's, there is no inlet configured, so there will not be any other options listed in the drop down list box.

3.3.3 Constructing a Scan

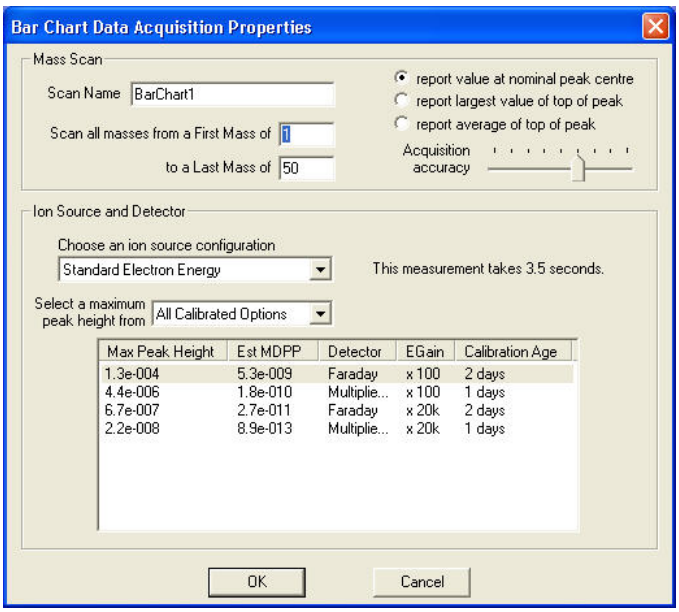
To construct a scan, click **Add** on the **Construct the Data Acquisition Scan** dialog.



The **Add /Insert an RGA control unit measurement into the scan** dialog will appear.

Select the type of measurement you wish to add, by clicking on the relevant radio button and clicking **OK**.

3.3.4 Bar chart Data Acquisition Properties



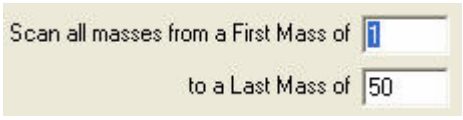
If you select Bar chart, the **Bar chart Data Acquisition Properties** dialog appears. Here you can configure the measurement properties for the scan.

Measurement Name

The wizard will automatically pick a suitable name for the measurement. You can however, choose a name of you own.

Be aware that if you have multiple measurements, an error will occur if you give the same name to more than one of them.

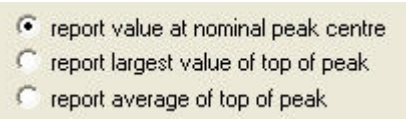
Scan Range



Enter the first mass and last mass in the Mass Scan page

The measurement will start with the fist mass and scan each mass up to and including the last mass. The first mass cannot be less than 1 and the last mass cannot be greater than the mass range of the control unit.

Scan Method



Select the type of scan.

There are currently three options to choose from:

Report value at nominal peak centre;
Takes only one reading per mass and displays it.
This is the fastest method of scanning, it works well if the mass alignment is good and the ambient temperature is stable. Otherwise, one of the other two options may be preferable.

Report largest value of top of peak;
Takes eight readings over +/- 0.25 amu of the mass to be measured, and reports the maximum value of the eight readings.

Report average value of top of peak;
Takes eight readings over +/- 0.25 amu of the mass to be measured, and reports the average value of the eight readings

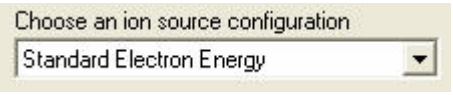
Accuracy

The accuracy is the time taken to do the conversion in the ADC.

Use the slider to select an accuracy between 0 (far left of the scale) and 8 (far right of the scale).

The lower the accuracy the shorter the conversion time and the faster the scan. The trade off is that the faster you scan, the higher the noise floor will be. To see the effect of changing the accuracy you can check the scan time in the dialog

Ion Source Settings



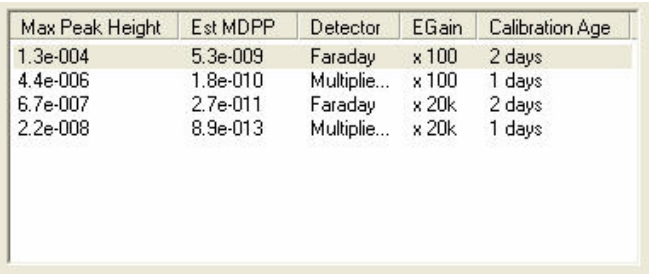
Choose an ion source configuration for the measurement using the pull down list.

There are six configurations that can be stored; the settings for each of these can be viewed from the Process Eye status windows.

Detector and Electronic Gain Settings

Each detector can be separately calibrated, use the pull down list to change the detector table to show either calibrated or un-calibrated detectors

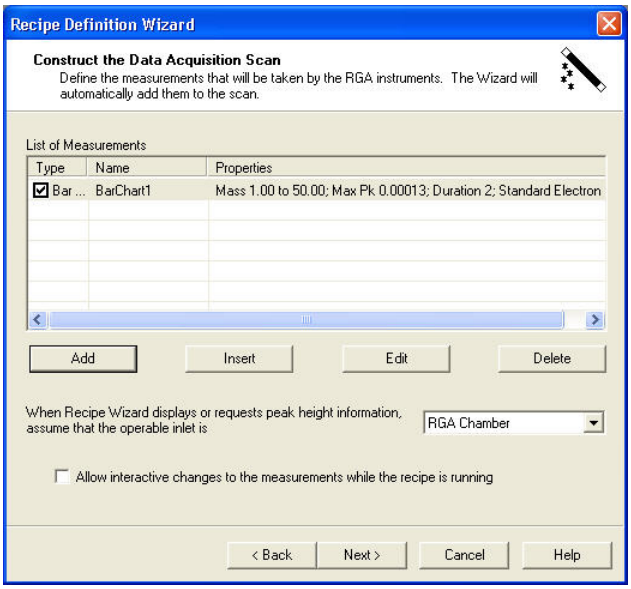
If all calibrated options are selected the table will show all possible detectors that have been calibrated



Max Peak Height	Est MDPP	Detector	EGain	Calibration Age
1.3e-004	5.3e-009	Faraday	x 100	2 days
4.4e-006	1.8e-010	Multiplie...	x 100	1 days
6.7e-007	2.7e-011	Faraday	x 20k	2 days
2.2e-008	8.9e-013	Multiplie...	x 20k	1 days

The table shows the full scale pressure, estimated minimum detectable partial pressure, detector, electronic gain and time since the last calibration for each calibrated detector/gain option.

When the properties have been set click **OK** to save the changes and return to the **Construct the Data Acquisition Scan** dialog.



The configured measurement has now been added to the list, with the set properties listed in the list of measurements.

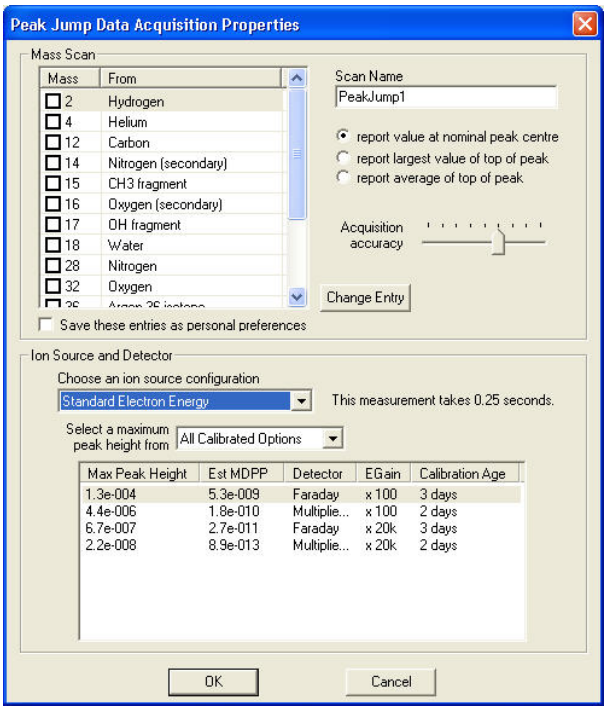
You can edit this scan by clicking on the Edit button. This will return you to the **Scan Properties** dialog.

To temporarily remove the measurement from the scan while preserving the details un-check the box beside it; to remove it from the list completely highlight it and then click the **Delete** button.

To add a new measurement to the end of the list, click the **Add** button.

To insert a measurement into the list, highlight one of the measurements in the list and click **Insert**. This will insert a new measurement above the highlighted one.

3.3.5 Peak Jump Data Acquisition Properties



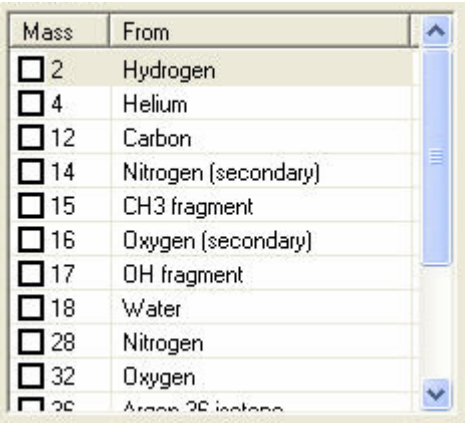
If you select Peak Jump, the **Peak Jump Data Acquisition Properties** dialog appears. You can use this dialog to configure the measurement properties.

Measurement Name

The wizard will automatically pick a suitable name for the measurement. You can however, choose a name of you own.

Be aware that if you have multiple measurements, an error will occur if you give the same name to more than one of them.

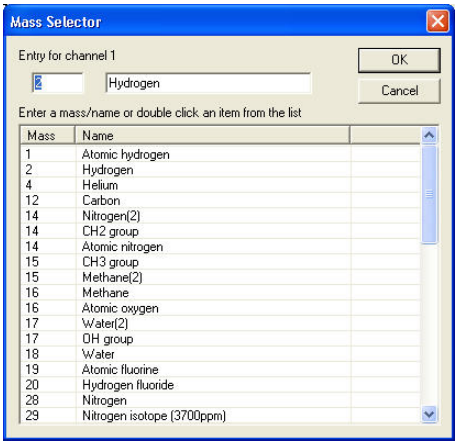
Scan Masses



Up to 15 masses can be scanned in a single PeakJump measurement.

Enable a channel by checking the box next to its mass in the channel selection box.

To edit the channel either double-click it, or highlight it and click on **Change Entry**.



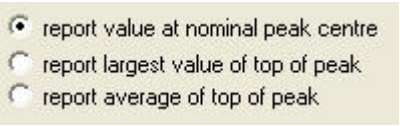
The **Mass Selector** dialog appears.

Either select one of the pre-defined channels, by double-clicking on it, or enter a mass in the first text box and a name in the second text box.

*Note: the content of this dialog is generated from a text file you can edit stored in the workstation folder and titled **common gases.txt**.*

When the entry is complete click **OK.**

Scan Method



Select the type of scan you wish to do. There are currently three options to choose from:

Report value at nominal peak centre
Takes only one reading per mass and displays it.
This is the fastest method of scanning, it works well if the mass alignment is good and the ambient temperature is stable. Otherwise, one of the other two options may be preferable.

Report largest value of top of peak
Takes eight readings over +/- 0.25 amu of the mass to be measured, and reports the maximum value of the eight readings.

Report average value of top of peak
Takes eight readings over +/- 0.125 amu of the mass to be measured, and reports the average value of the eight readings

Accuracy

The accuracy is the time taken to do the conversion in the ADC.

Use the slider to select an accuracy between 0 (far left of the scale) and 8 (far right of the scale).

The lower the accuracy, the shorter the conversion time and the faster the scan. The trade off is that the faster you scan, the higher the noise floor will be.

Ion Source Settings

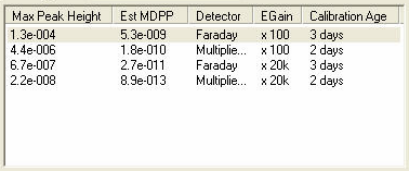
Choose an ion source configuration for the measurement using the pull down list.

There are six configurations that can be stored; the settings for each of these can be viewed from the Process Eye.

Detector and Electronic Gain Settings

Each detector can be separately calibrated, use the pull down list to change the detector table to show either calibrated or un-calibrated detectors

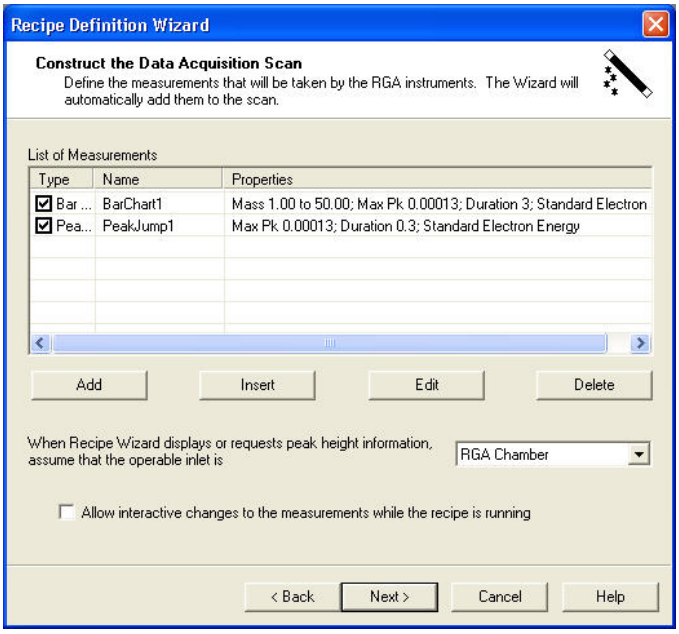
If all calibrated options are selected the table will show all possible detectors that have been calibrated.



Max Peak Height	Est MDPP	Detector	EGain	Calibration Age
1.3e-004	5.3e-009	Faraday	x 100	3 days
4.4e-006	1.8e-010	Multiplie...	x 100	2 days
6.7e-007	2.7e-011	Faraday	x 20k	3 days
2.2e-008	8.9e-013	Multiplie...	x 20k	2 days

The table shows the full scale pressure, estimated minimum detectable partial pressure, detector, electronic gain and time since the last calibration for each calibrated detector/gain option.

When the properties have been set click **OK** to save the changes and return to the **Construct the Data Acquisition Scan** dialog.



The configured measurement has now been added to the list, with the set properties listed in the list of measurements.

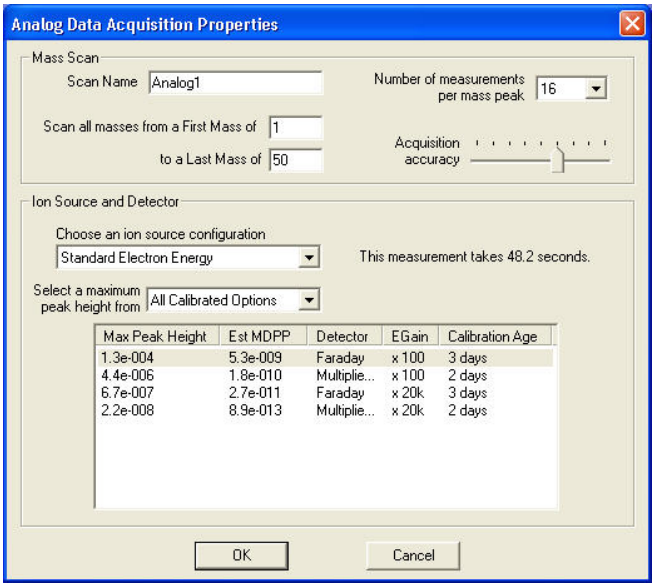
You can edit this scan by clicking on the **Edit** button, this will return you to the **Scan Properties** dialog.

To temporarily remove the measurement from the scan while preserving the details un-check the box beside it; to remove it from the list completely highlight it and then click the **Delete** button.

To add a new measurement to the end of the list, click the **Add** button.

To insert a measurement into the list, highlight one of the measurements in the list and click **Insert**. This will insert a new measurement above the highlighted one.

3.3.6 Analog Data Acquisition Properties



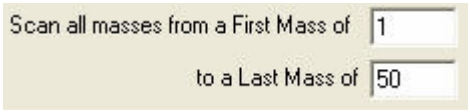
If you select **Analog** the **Analog Data Acquisition Properties** dialog will appear, you can use this dialog to configure the measurement properties.

Measurement Name

The wizard will automatically pick a suitable name for the measurement. You can however, choose a name of you own.

Be aware that if you have multiple measurements, an error will occur if you give the same name to more than one of them.

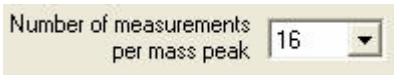
Scan Range



Enter the first mass and last mass in the Mass Scan page

The measurement will start with the fist mass and scan each mass up to and including the last mass. First mass cannot be less than 1 and the last mass cannot be greater than the mass range of the control unit.

Number of Points per Peak



Select the number of readings to be taken per mass from the pull down list.

The allowed options are 4, 8, 16 and 32. The more points chosen the smoother the peaks will look but the longer the scan will take.

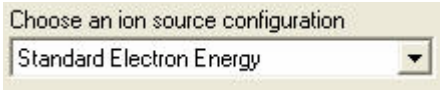
Accuracy

The accuracy is the time taken to do the conversion in the ADC.

Use the slider to select an accuracy between 0 (far left of the scale) and 8 (far right of the scale).

The lower the accuracy, the shorter the conversion time and the faster the scan. The trade off is that the faster you scan, the higher the noise floor will be. To see the effect of changing the accuracy you can check the scan time in the dialog

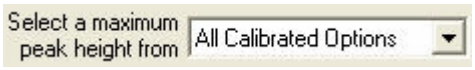
Ion Source Settings



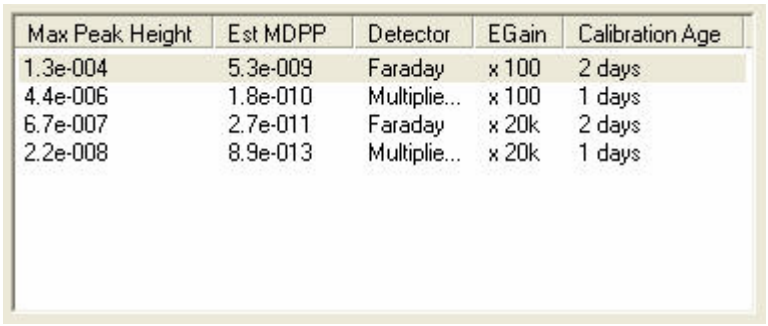
Choose an ion source configuration for the measurement using the pull down list.

There are six configurations that can be stored; the settings for each of these can be viewed from the Process Eye (see section 10 of the Process Eye Professional manual).

Detector and Electronic Gain Settings



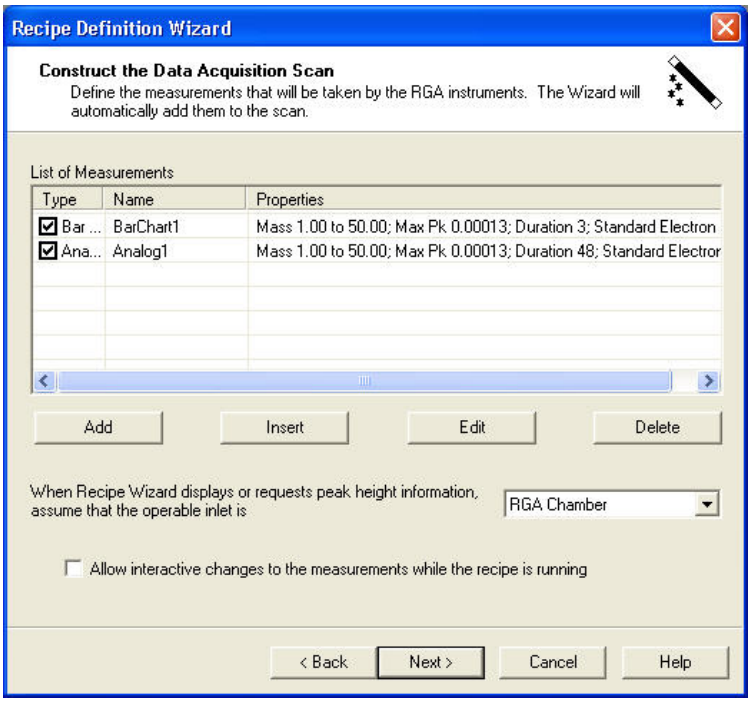
Each detector can be separately calibrated, use the pull down list to change the detector table to show either calibrated or un-calibrated detectors. If all calibrated options are selected the table will show all possible detectors that have been calibrated



Max Peak Height	Est MDPP	Detector	EGain	Calibration Age
1.3e-004	5.3e-009	Faraday	x 100	2 days
4.4e-006	1.8e-010	Multiplie...	x 100	1 days
6.7e-007	2.7e-011	Faraday	x 20k	2 days
2.2e-008	8.9e-013	Multiplie...	x 20k	1 days

The table shows the full scale pressure, estimated minimum detectable partial pressure, detector, electronic gain and time since the last calibration for each calibrated detector/gain option.

When the properties have been set click **OK** to save the changes and return to the **Construct the Data Acquisition Scan** dialog.



The configured measurement has now been added to the list, with the set properties listed in the list of measurements.

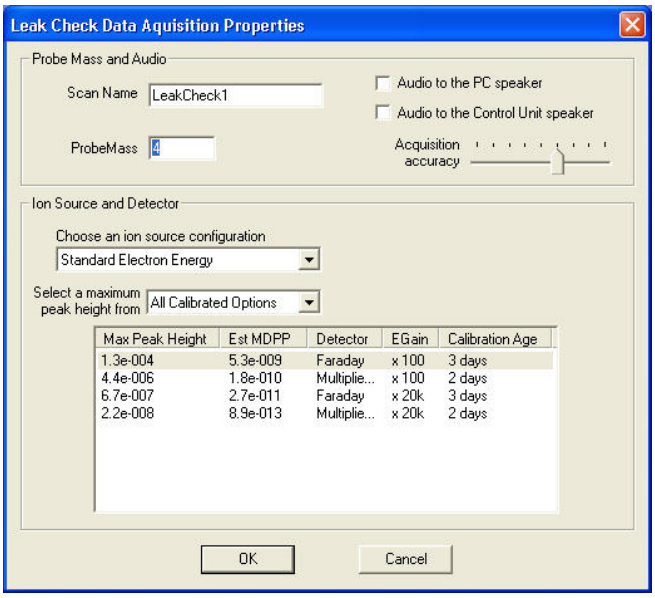
You can edit this scan by clicking on the **Edit** button. This will return you to the scan properties dialog.

To temporarily remove the measurement from the scan while preserving the details un-check the box beside it; to remove it from the list completely highlight it and then click the **Delete** button.

To add a new measurement to the end of the list, click the **Add** button.

To insert a measurement into the list, highlight one of the measurements in the list and click **Insert**. This will insert a new measurement above the highlighted one.

3.3.7 Leak Check Data Acquisition Properties



If you select **Leak Check** as the scan type, the **Leak Check Data Acquisition Properties** dialog will appear. Here you can configure the measurements properties.

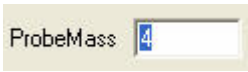
Note: If you already have a measurement in the scan list, you will not be able to add a Leak Check measurement. A leak check measurement must be the first and only measurement.

Measurement Name

The wizard will automatically pick a suitable name for the measurement. You can however, choose a name of you own.

Be aware that if you have multiple measurements, an error will occur if you give the same name to more than one of them.

Probe Mass



Enter the probe mass in the text box.

The measurement is a single peak monitoring recipe and will only measure the Probe mass.

Audio

Leak Check mode has an optional audio output, this is a tone that changes in pitch depending on the partial pressure of the probe mass, the larger the pressure, the higher the pitch.

This enables leak checking without having to watch the PC screen to monitor the pressure of the probe gas.

You can choose to generate this tone from the PC speaker.

Or,

If the PC is located away from the instrument then the instrument's audio output can also be used.

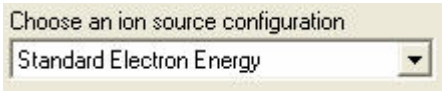
Accuracy

The accuracy is the time taken to do the conversion in the ADC.

Use the slider to select an accuracy between 0 (far left of the scale) and 8 (far right of the scale).

The lower the accuracy, the shorter the conversion time and the faster the scan. The trade off is that the faster you scan, the higher the noise floor will be.

Ion Source Settings



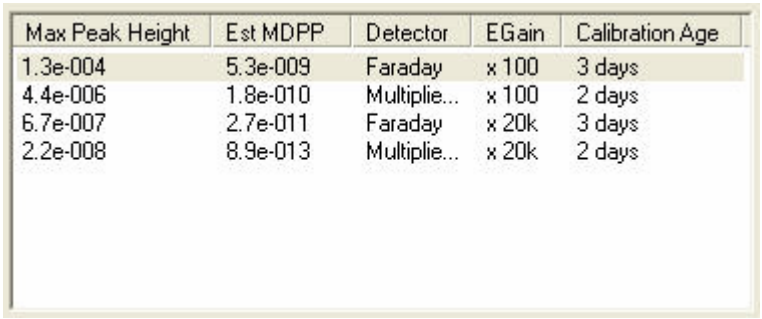
Choose an ion source configuration for the measurement using the pull down list.

There are six configurations that can be stored; the settings for each of these can be viewed from the Process Eye data window.

Detector and Electronic Gain Settings

Each detector can be separately calibrated, use the pull down list to change the detector table to show either calibrated or un-calibrated detectors.

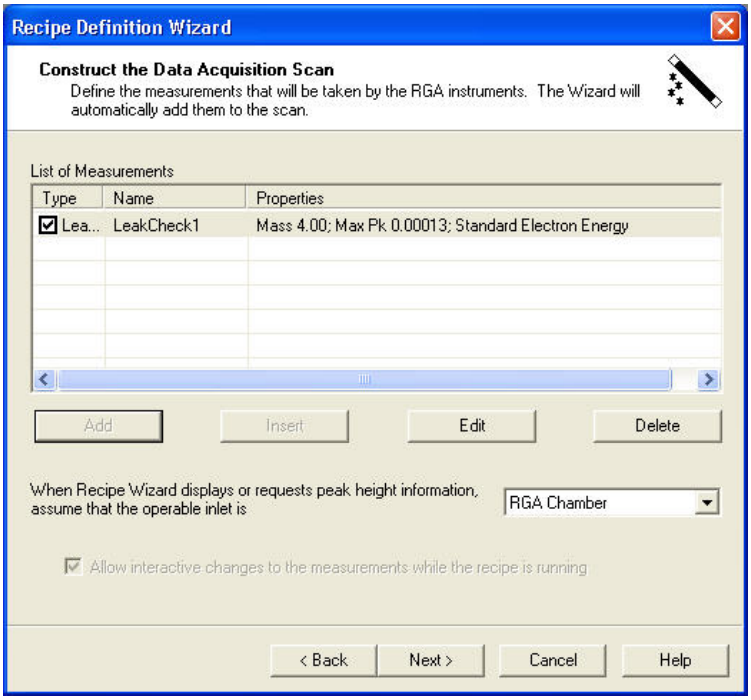
If all calibrated options are selected the table will show all possible detectors that have been calibrated



Max Peak Height	Est MDPP	Detector	EGain	Calibration Age
1.3e-004	5.3e-009	Faraday	x 100	3 days
4.4e-006	1.8e-010	Multiplie...	x 100	2 days
6.7e-007	2.7e-011	Faraday	x 20k	3 days
2.2e-008	8.9e-013	Multiplie...	x 20k	2 days

The table shows the full scale pressure, estimated minimum detectable partial pressure, detector, electronic gain and time since the last calibration for each calibrated detector/gain option.

When the properties have been set click **OK** to save the changes and return to the **Construct the Data Acquisition Scan** dialog.



The configured measurement has now been added to the list, with the set properties listed in the list of measurements.

You can edit this scan by clicking on the **Edit** button, this will return you to the **Scan Properties** dialog.

To remove the measurement, highlight it and then click the **Delete** button.

Note: If you add a leak check measurement to a scan, it must be the first and only measurement in the scan. The Add and Insert buttons will be unavailable.

3.3.8 Filament Degas Properties

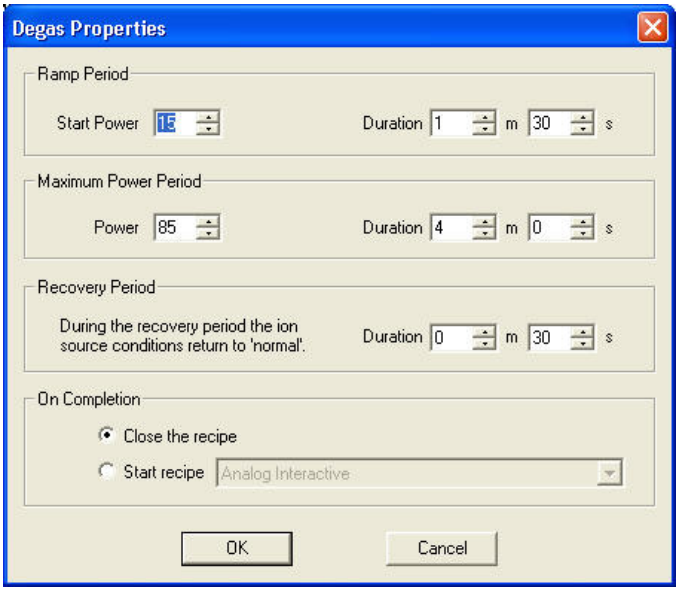
Filament degas is normally only used on standard, open ion source analysers operating at high vacuum (Pressures below 1E-7 mBar). It should not be used on closed ion sources, or high-pressure Quadrupoles, as damage may be caused to the ion source.

At 100% degas power, the electron energy is increased to 350eV and the filament emission is increased to 5mA. This has the effect of bombarding the ion source with a large number of high-energy electrons. The source will get much hotter and cause any material on the surface of the ion source to be removed and pumped away. When the degas process has finished, the surface of the ion source will be much cleaner and hence the degas rate from the source itself will be much reduced.

The two purposes of degassing the ion source are

- to lower the out-gassing rate of the source, enabling lower vacuum pressures to be maintained in the system
- to try to recover sensitivity on a contaminated source by removing the surface contaminants

Care should be exercised when attempting this procedure however as some contaminants can be baked on by the degas process making them much more difficult to remove by conventional cleaning.



The standard practice is to ramp the power to a high level over a period of time and to apply a recovery period at the end while the ion source cools.

The **Degas Properties** dialog enables control of the degas power profile during the degas operation.

Ramp Period

Enter the start power and ramp duration in the box.

The **Start Power** is a percentage between 0 and 100 and is the initial starting power. The **Duration** is the time taken to ramp from the start power to maximum power. This can be any time period between 0 secs. and 15 min 59 secs.

The start power can be set higher than the maximum power, simply meaning the power will ramp down.

Max Power Period

Enter the maximum power and steady state duration in the box.

The **Power** can be any number between 0 and 100 and will be held stable for the time entered in the duration box. The duration can be between 0 secs and 20 min 59 secs.

Recovery Period

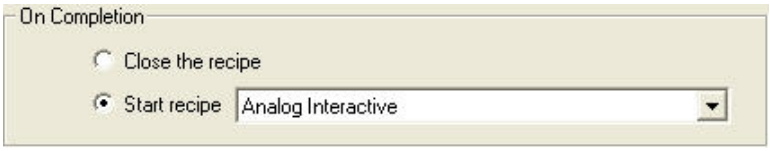
Enter the recovery period in the box.

This is the time period the system will wait, after setting the ion source parameters back to normal, before running the **On Completion** code. The time can be set to any duration between 0 secs and 15 min 59 secs.

On Completion

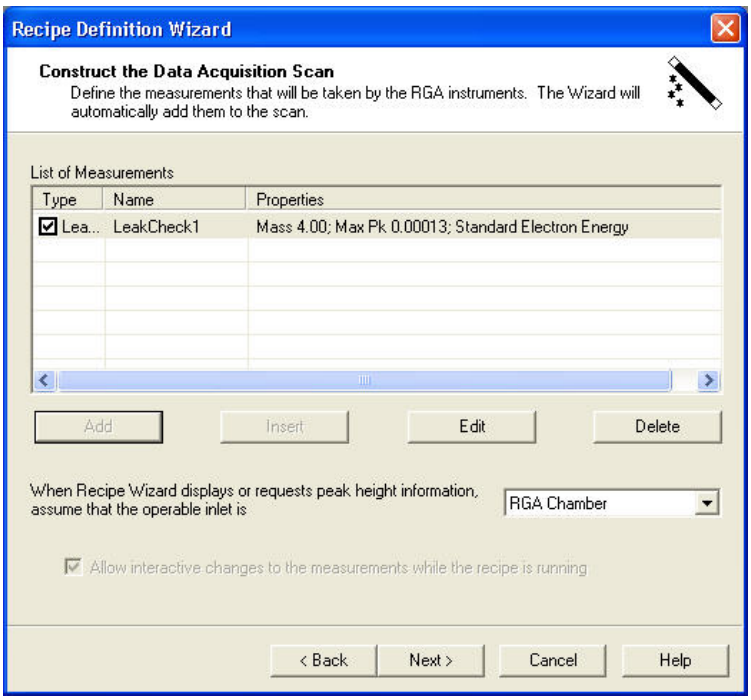
You have two options available for events after degas is complete.

The first option is simply to allow the recipe to end.



The second is to start a recipe selected from the drop down list box which lists all the recipes in the recipe list.

When the properties have been set, click **OK** to save the changes and return to the **Construct the Data Acquisition Scan** dialog.



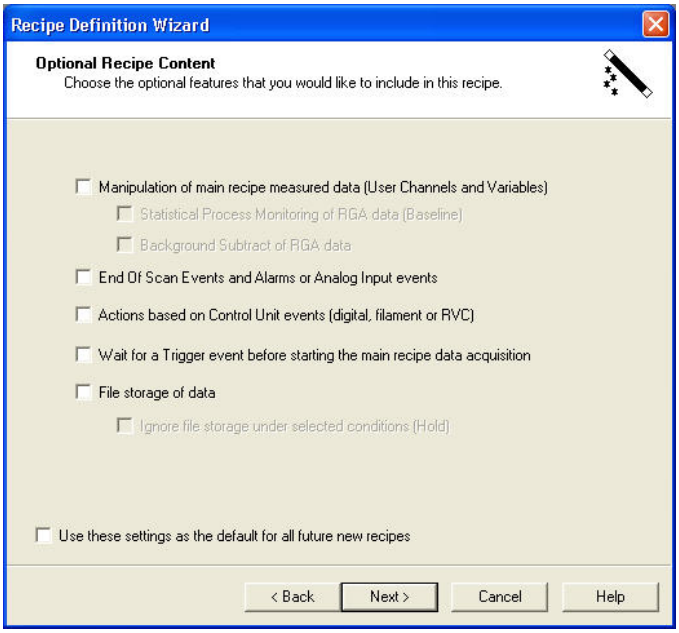
The configured measurement has now been added to the list, with the set properties listed in the list of measurements.

You can edit this scan by clicking on the **Edit** button. This will return you to the scan properties dialog.

To remove the measurement, highlight it and then click the **Delete** button.

Note: If you add a degas measurement to a scan, it must be the first and only measurement in the scan. The Add and Insert buttons will be unavailable; the scan will only be available as a non- interactive measurement.

3.4 Optional Recipe Content



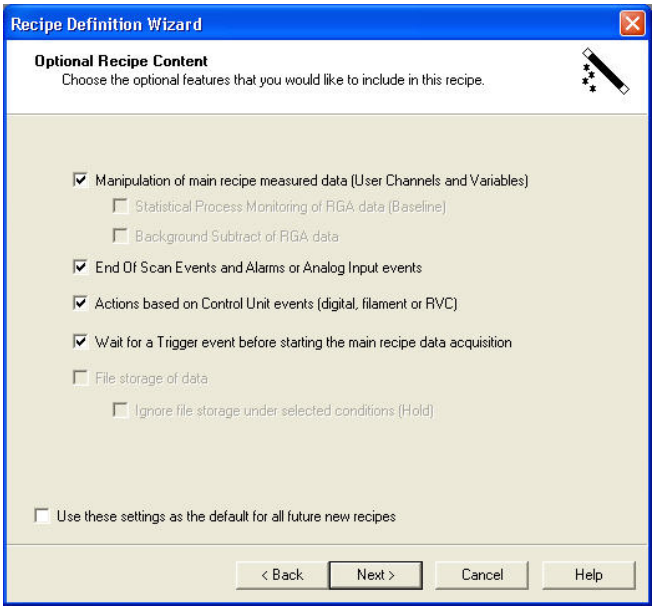
Use this dialog to enable various features in the wizard.

To enable a feature, check the box next to that feature.

Depending on the option chosen, the number and order of steps in the wizard will change.

If you do not have an instrument, any scan measurements or if the scan is interactive, various options may not be available.

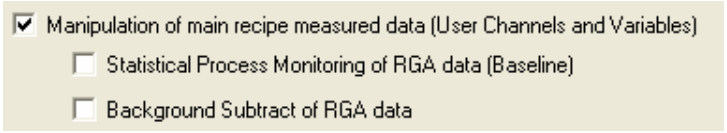
For example, if you have an interactive scan.



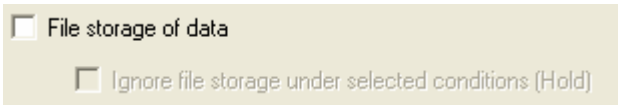
File storage of data, **Statistical process monitoring of RGA data** and **Background subtract of RGA data**, are no longer available.

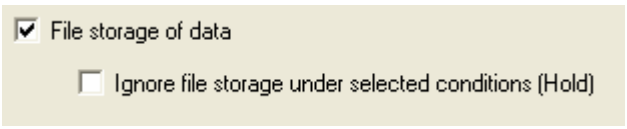
Some features are dependant on other option choices.

For example, **Statistical process monitoring of RGA data** and **Background subtract of RGA data** are only available if the **Manipulation of main recipe measured data** option is chosen.



Likewise, **Hold** is only available if the **File storage of data** option is chosen.





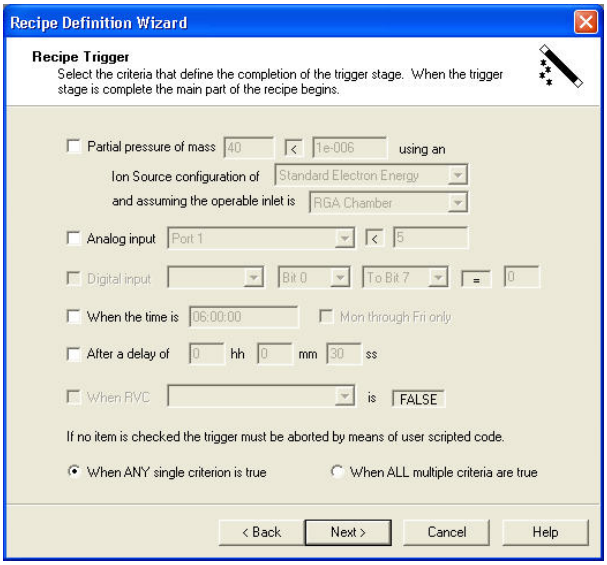
Once the options required have been chosen, you can save this as a template for all future recipes.

Detailed descriptions of each option available in the **Optional Recipe Content** dialog are given in the following sections.

Chapter 4 – Triggered Recipes

4.1 The Recipe Trigger

A recipe trigger function can be added to a recipe, preventing the recipe from scanning until defined criteria have been satisfied.



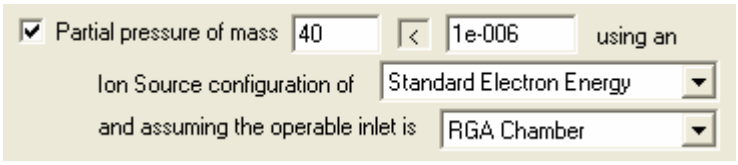
The recipe is started normally, but the scan and disk storage is not started until the trigger condition has been met.

If the **Wait for a Trigger event before starting the main recipe data acquisition** option was selected in the optional content dialog, then the **Recipe Trigger** dialog is displayed.

There are currently six types of trigger supported by the recipe wizard:

You can choose to trigger when any one of the trigger events are true, or when all of the selected trigger events are true.

4.1.1 Partial Pressure



The **Partial pressure trigger** can be used to monitor a partial pressure and trigger when this pressure goes above or below a pre-set value.

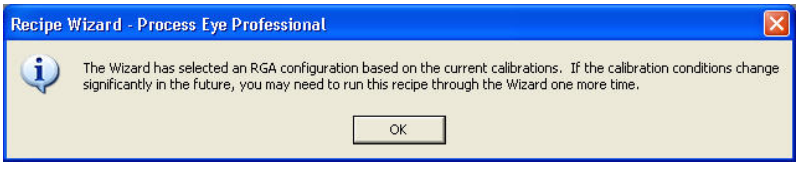
The "partial pressure of mass" monitored can be any mass within the instruments range.

The pressure is the pressure limit in the currently selected pressure units. Clicking on the operator will toggle between **<** and **>** to enable the trigger to be set on a low pressure going high, or a high pressure going low.

The **Ion source configuration** is selected from the pull-down list and can be any one of the six allowed ion source settings. The pressure limit set in the box can be either the ion source pressure, assuming the operable inlet is the RGA Chamber with an inlet factor of 1.

Alternatively, if you have a configured a **Pressure reducing inlet**, you can enter the actual chamber pressure and the system will calculate the ion source pressure using the inlet factor for the selected operable inlet.

If you select to trigger on a partial pressure, you will see the following message when you click Next.



This is because the measured pressure is dependant on the calibration.

4.1.2 Analog Input

The "analog input" can be used to monitor an analog input and trigger when this input goes either above or below a pre-set value.

In this case the analog input to be used is any one of the available analog inputs on the control unit. Normally there are four available analog inputs labelled port 1 to port 4.

Clicking on the operator will toggle between < and > to enable the trigger to be set on a low analog input going high or a high analog input going low. If you defined a hardware profile, the number to compare is in your calibrated units; otherwise it is the raw input voltage. In either case enter the value in the text box.

4.1.3 Digital Input

A "digital input trigger" can be used to monitor a selected digital input, or number of digital inputs, and trigger when a pre-set level is reached..

There are normally two ports of eight digital lines on a control unit, either Port A or Port B can be selected to use for the trigger.

To select a particular digital line to trigger on digital line PA1 going high for example, the options would be set as follows.

To create a trigger based on a combination of digital line values, you can select a range of bits and the decimal equivalent of the byte value. To trigger on PA0, PA1 and PA7 going high, with the rest low for example, the binary value would be 10000011, 131 in decimal. Therefore, the trigger would be set as follows.

Note: even if you have a hardware profile for your digital I/O the wizard still shows the bits in the format shown here; however you can hold the mouse over the drop down list controls to see the profile and pin information.

4.1.4 Actual Time

An "actual time trigger" uses the PC's clock to trigger an event.

4.1.5 Time Delay

A "time delay trigger" can be used to trigger an event, when the specified elapsed time from recipe start has been reached. The delay can be between 1 second to 23 hours 59 minutes and 59 seconds.

4.1.6 RVC Event

An "RVC event trigger" can be used to trigger an event based on the RVC's status.

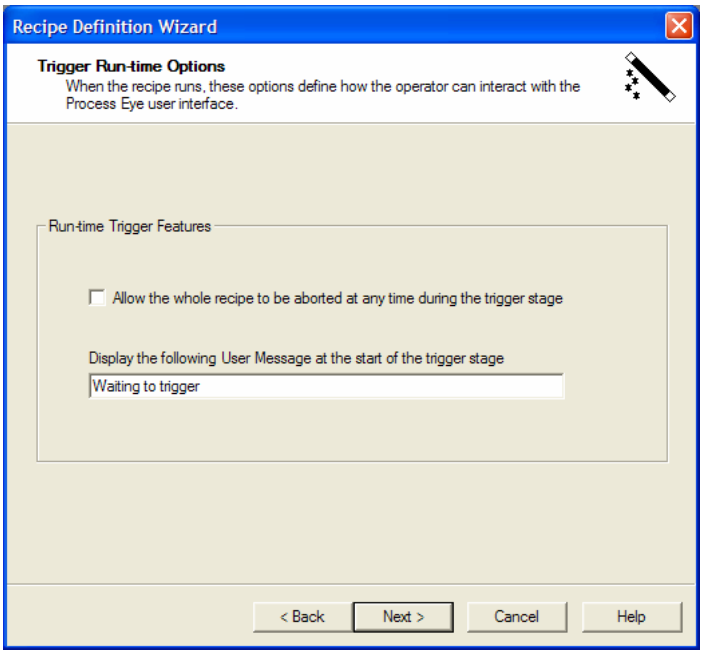
Any one of the available RVC trigger parameters can be selected from the list box. The currently allowed parameters are: -

Status 1
Status 2
Digital Input 1
Digital Input 2
Valve 1 Open
Valve 2 Open
Turbo Pump at speed

The **FALSE** and **TRUE** option can be toggled by clicking on the button.

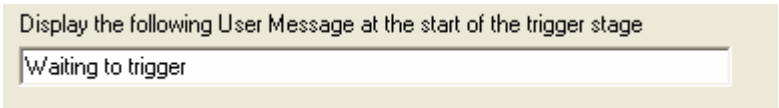
Click the **Next** button once a Trigger has been set up to view the **Trigger runtime options** dialog.

4.2 Trigger Runtime Options



To allow the recipe to be aborted during the trigger stage, check the following box.

If this option has not been selected, the only way to abort the recipe will be to close Process Eye.

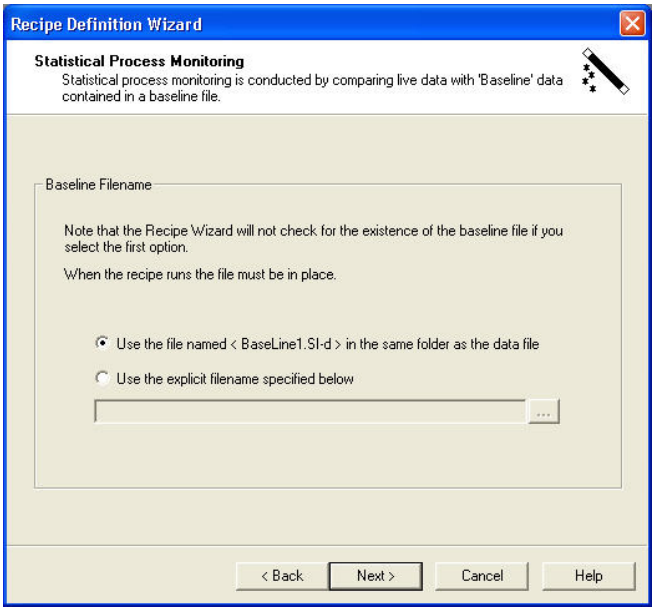


A message can be displayed in the recipe information window during the trigger stage, by entering the message text in the following box.

5.1 Statistical Process Monitoring

Statistical Process Monitoring is the ability to compare live data from a process, to a "fingerprint" file. It allows the data to be displayed (on a trend) and alarms set on standard deviations from an average.

In order to do this you need to load a Baseline file to compare the live data to. This Baseline file contains information about the average peak height and standard deviation of that peak height over a number of previous process runs. The file is created in Recall.



You use the **Statistical Process Monitoring** dialog to select the Baseline file required.

There are 2 choices on the dialog.

The first is to use the file **Baseline1.SI-d** in the same directory as the recipe data files, the other is to use the **Browse** button to select an explicit file from the disk.

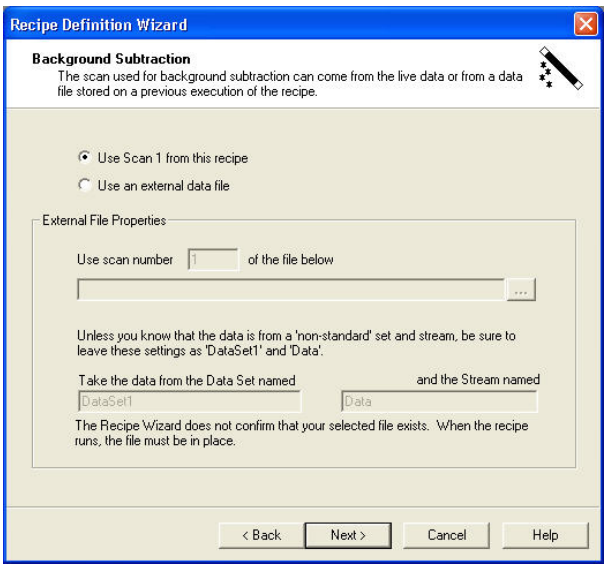
Once a baseline file has been selected the option to use the mean and standard deviation data stored within it in the calculation of derived data is enabled.

Note: The baseline file must be created in Recall before this feature can be used in the recipe wizard.

5.2 Background Subtraction

Background subtraction is a common feature of RGA software. It involves subtracting one spectrum from another. The smaller readings are perceived to represent the 'internal system background' and the difference between the two to represent the 'true' measurement. However it is rarely as simple as that because the two sets of measurements are rarely obtained under identical pumping conditions, which renders the result meaningless, at least for most of the mass fragments that occur in both spectra.

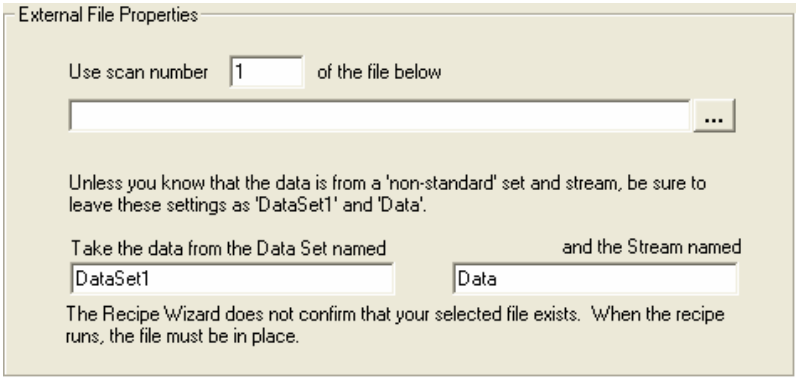
For this reason Process Eye Professional offers the facility to perform selective background subtraction on the peaks that genuinely can be subtracted by performing the subtractions within the recipe and assigning the results to your own user defined channels.



There are a number of options for selecting the data to be used and these can be set in the **Background Subtraction** dialog.

The first option is to use scan number one from the current run and subtract that scan from all subsequent scans.

Alternatively, use a previously stored data file. Selecting this radio button will enable the **External File Properties** dialog



From here you can select the scan number you wish to use.

Click the **Browse** button to select a data file. You also need to enter the **Data Set** and **Data Stream** names in the relevant text boxes.

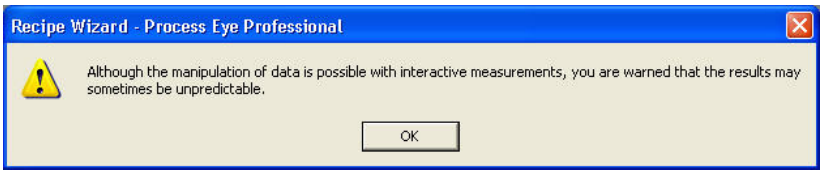
If you only have one data set, the default name is DataSet1 and if you are using RGA data, the stream is normally Data.

To view the properties of a particular file use the **Recall** program. You will be able to assess the particular scan that best describes the background spectrum.

5.3 Adding User Channels and User Variables for End of Scan Actions

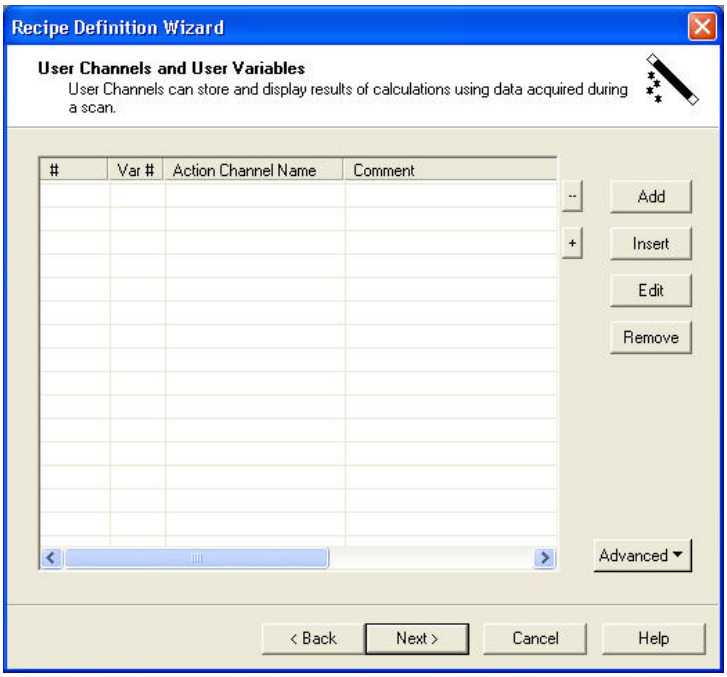
User Channels and User Variables are where you can perform live calculations in a recipe at the end of every scan. The results of calculations can be displayed on trends, or used to trigger end of scan alarms.

If you have an interactive scan, then the following warning will be displayed if the use of User Channels and User Variables is enabled.

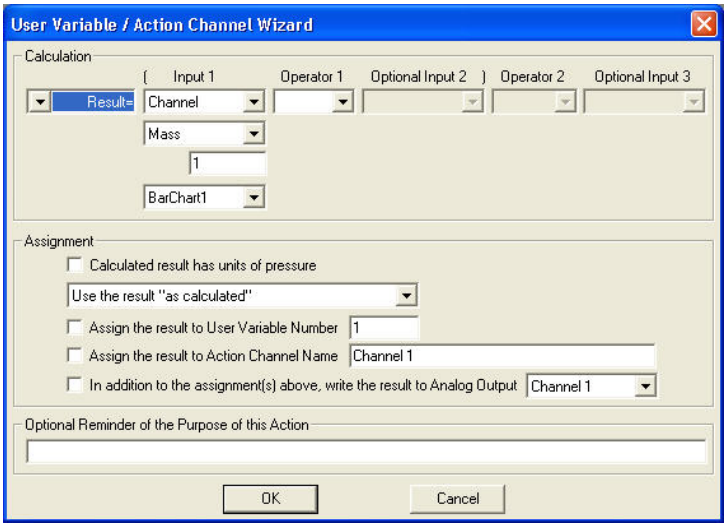


This is because you could set up an action using a mass and then whilst the recipe is running, change the scan parameters so that the mass is no longer measured.

If you click **OK** you will see the **User Channels and User Variables** dialog.



To add a new wizard end of scan action, click on Add. This will bring up the **User Variable/Action Channel Wizard** dialog.



There are 3 parts to this dialog:

The Calculation;
This is where a calculation is defined to get a "Result".

The Assignment;
This is the location of the stored "Result".

The Optional Reminder;
A comment so that the purpose of the calculation is known

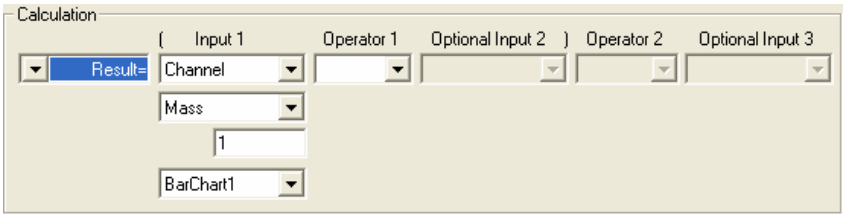
5.2.1 The Calculation

The calculation is an arithmetic expression to assign some result to the parameter **Result**.
The result can either be a number value, or a logical value.

For example, the result might be the number 10, or the value "True", depending on the calculation performed. The calculation can have 1 or 2 steps; calculations requiring more steps than this can be broken down into smaller steps, with the result being stored to a user defined recipe variable and then used in the next step.

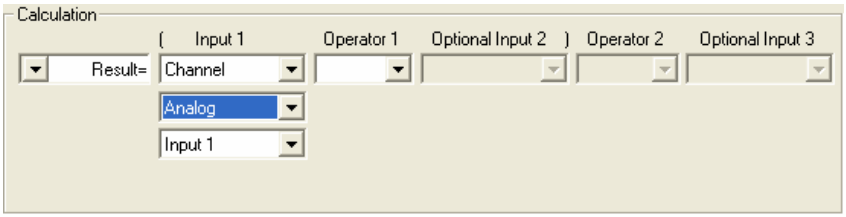
5.2.1.1 Inputs

There are a number of pre-defined inputs that can be used in the calculation, the type of input required is selected from the drop down list. The most common input is a peak height from a measurement.

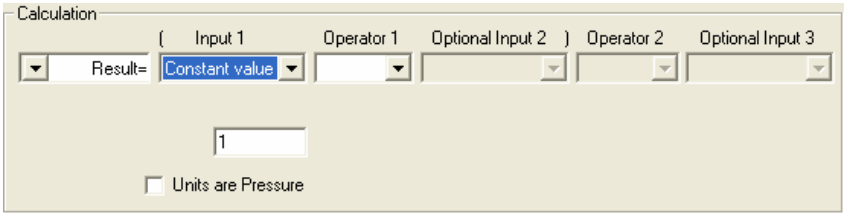


Here **Result** is assigned the value of the mass 1 peak height from Barchart1.
The main input type is **Channel**, the sub type is **Mass**, the number is "1" and measurement is "Barchart1".

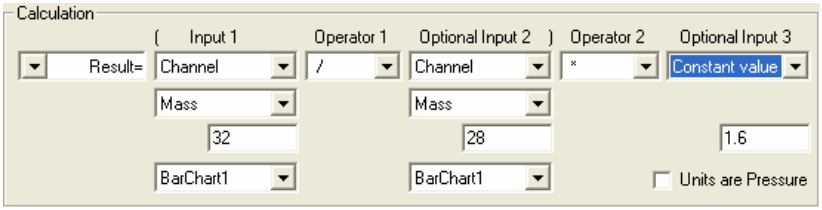
To read an analog input, select **Channel** as the main input type, **Analog** as the sub type and "Input 1" as the location.



To set the result equal to a constant number, select **Constant Value** as the main input and type a number as the value.



You can then build up more complicated expressions, such as the one below, where the result is the peak height of mass 32, divided by the peak height of mass 28, with the resultant ratio multiplied by a constant value of 1.6



The allowed input types are listed in the following table:

Main Input Type	Sub Types	Value	Location	Description
Channel	Mass	Any Scanned Mass	Any Measurement	The peak height of the selected mass from the selected measurement in current pressure units
	Total	N/A	Any Measurement	The sum of partial pressures of the selected measurement in current pressure units
	Analog	N/A	Input 1 Input 2 Input 3 Input 4	The input voltage on the selected analog input channel
Constant Value	N/A	Any number	N/A	A constant number
User Variable #	N/A	The ID of one of the user variables	N/A	The value of one of the user variables
Seconds Timer #	N/A	The ID of one of the timers	N/A	The value of one of the timers in seconds
Polled VID #	N/A	The ID of one of the status variables	N/A	The value of the named status variable. Can be either a value or a pressure in the local pressure units
Total Duration	N/A	N/A	N/A	Total elapsed time in seconds from the start of the recipe
Scan Duration	N/A	N/A	N/A	Total time taken in seconds for each scan
Scan Number	N/A	N/A	N/A	The current scan number
Function	N/A	N/A	N/A	Allows an additional set of arithmetic operators to be selected

5.2.1.2 Additional Inputs if Statistical Process Monitoring Enabled

In addition to the inputs listed above, there are three inputs that are only available if you have selected Statistical Process Monitoring.
These are:

Mean (Linear)
Mean (Log)
Std Dev

Mean (Linear)
Returns the linear mean of any scanned mass, sum of partials, or analog input stored in the baseline file. The linear mean is the simple average of the values. For example, the linear mean of 1E-5 and 1E-7 is 5.05E-6

Mean (Log)
Returns the log mean of any scanned mass, sum of partials, or analog input stored in the baseline file. The log mean is the average of the log values. For example the log mean of 1E-5 and 1E-7 is 1E-6

Std Dev
Returns standard deviation of any scanned mass, sum of partials, or analog input stored in the baseline file.

5.2.1.3 Setting Inputs to Pressures

If you want the input to be read as a pressure, check the box shown below. This will mark the value as a pressure in the current pressure units.

5.2.1.4 Operators

The standard arithmetic operators are listed in the pull-down list box. The options are listed in the following table

Operator	Description
+	Sum 1st and 2nd Input
-	Subtract 2nd input from 1st input
*	Multiply 1st and 2nd input
/	Divide 1st input by 2nd input
And	Result is true if 1st and 2nd input is true, otherwise result is false
Or	Result is true if 1st or 2nd input is true, otherwise result is false
Xor	Result is true if 1st and 2nd input are different, otherwise result is false
>	Result is true if 1st input is greater than 2nd input, otherwise result is false
<	Result is true if 1st input is less than 2nd input, otherwise result is false
>=	Result is true if 1st input is greater than or equal to 2nd input, otherwise result is false
<=	Result is true if 1st input is less than or equal to 2nd input, otherwise result is false
=	Result is true if 1st input is equal to 2nd input, otherwise result is false
<>	Result is true if 1st input is not equal to 2nd input, otherwise result is false

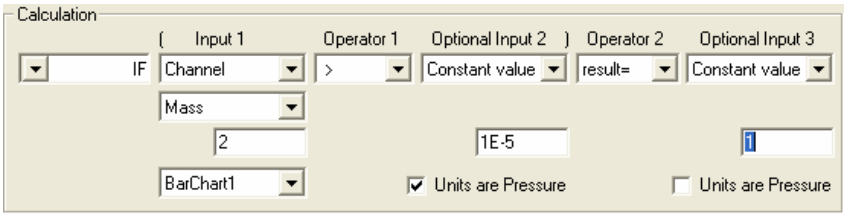
If **Input 1** is set to **Function**, then the operator list is different, in this case the options are listed in the following table.

Operator	Description
LOG 10	Returns the log to base 10 of Input 2
10^	Returns 10 to the power of Input 2
LN	Returns the log to base e of Input 2
EXP	Returns e to the power of Input 2
NOT	Returns the logical inverse of input 2
ABS	Returns absolute value of Input 2

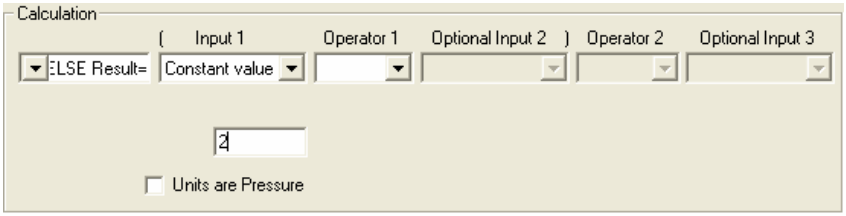
5.2.1.5 If…Then…Else Statement

To create an **If / Then / Else** statement, select **If** instead of **Result** in the first drop-down list box. This will change the calculation order to the following.

In this case, the calculation is "If Mass 2 Peak Height is greater than 1E-5mBar then set Result equal to 1".
If you have already added an "If" statement, you can add an "Else" statement.
Selecting Else result from the first drop down list box changes the calculation dialog.



In this case the statement is "Else set result equal to 2".



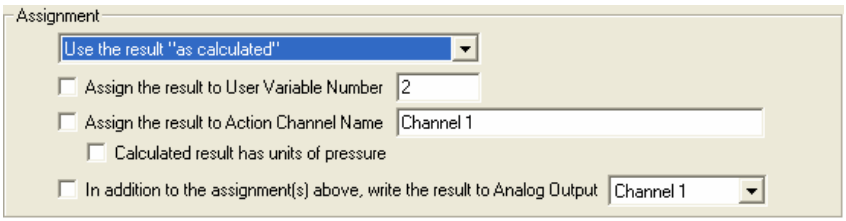
In code, the 2 steps together read:

If (Mass 2 Peak Height) > 1E-5 (mBar) Then
    Result = 1
Else
    Result = 2
End If

In order to have an Else statement, you must have already added an If statement.

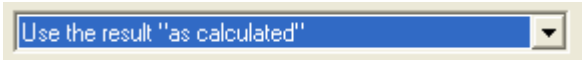
5.2.2 The Assignment

Once you have calculated a **Result**, you need to store the value somewhere where it can be displayed and stored to disk. To do this there is a separate section on the **User Variable/Action Channel Wizard** dialog.

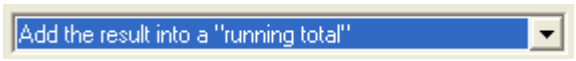


There are a number of options that can be set in this window. The first is what number you want to store. The assignment pull down list box has 3 options.

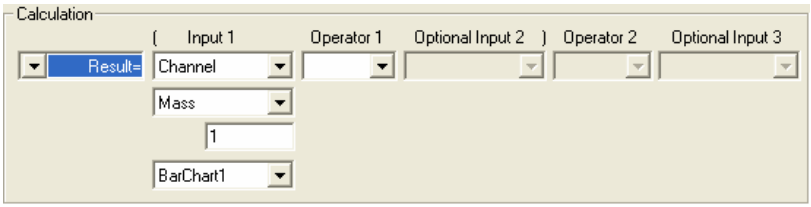
The first simply uses the result calculated in the calculation part of the form.



The second will store the running total of results from scan to scan.

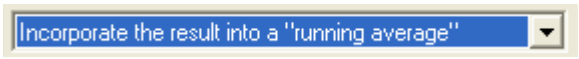


If you have a calculation:



At the end of scan 2, the result from scan 2 will be added to the value of the result calculated at the end of scan 1 and so on for each further scan.

The third option will create a running average from scan to scan.



Instead of simply working out the running total as described above, the total is divided by the scan number to work out an average.

Once the number to store has been defined, there are 2 options for places to store the number.
They are user variables, or action channels, you can choose to store the result in either, or both of these places.
There is a crucial difference between them however, in that a user variable is for internal storage for use in later end of scan actions. This value is not stored to disk and you cannot display it on a trend.
An action channel however, is stored and can be displayed.

You also have the option to give an action channel a meaningful name.

To store the value to a user variable, check the box and enter the variable number you want to use, variable numbers do not have to be sequential.

To store the value to an action channel, check the box and type the required name in the text box.

If the result is a pressure that you want to display, check the box.

In addition, the result can be output as an analog voltage.

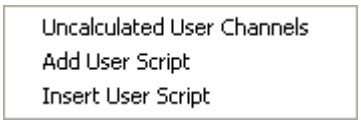
The analog output must be in the range -10 volts to + 10 volts.

5.2.3 Optional Reminder of Purpose of Action

As a reminder to what each step of the end of scan action does, you have the option to enter a comment.

5.2.4 Advanced Options

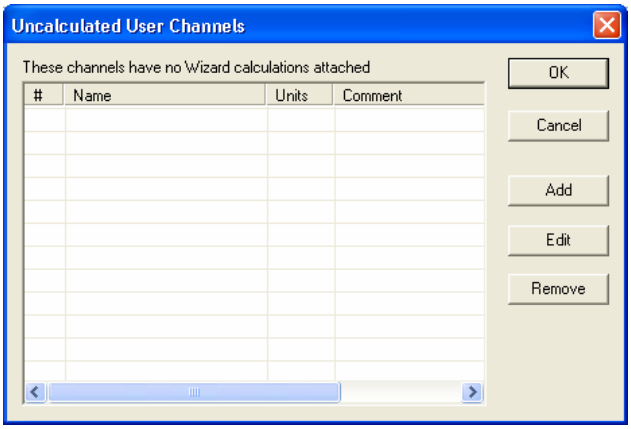
In addition to the above, there are a number of options available from the Advanced pull-down menu.



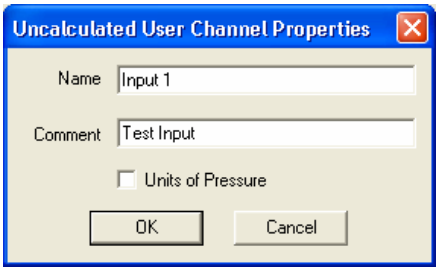
5.2.4.1 Uncalculated User Channels

Uncalculated User Channels are variables created in the recipe that can be stored and displayed on trends. They are similar to the action channels created above but they are not assigned a value by the recipe wizard.

Instead, they are used to allow you to save and display information from the user script code.
Selecting Uncalculated User Channels will bring up the **Uncalculated User Channels** dialog.



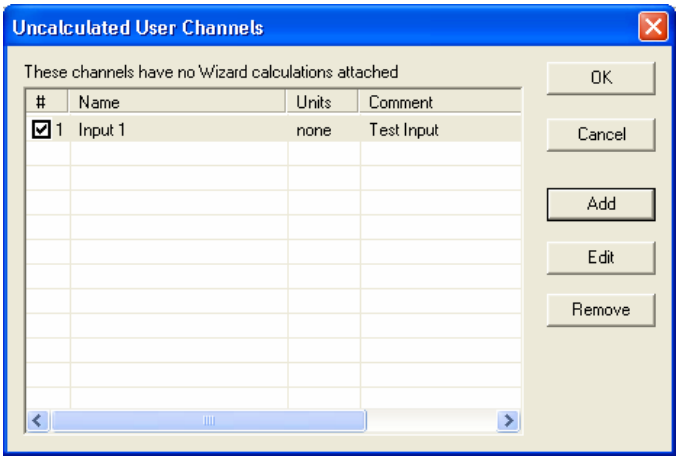
To create an Uncalculated User Channel, click on **Add**.



Enter a channel and any comment that you want to add to describe the contents.

If you want the contents to be treated as a pressure then check the box.

Clicking **OK** adds the channel to the list.

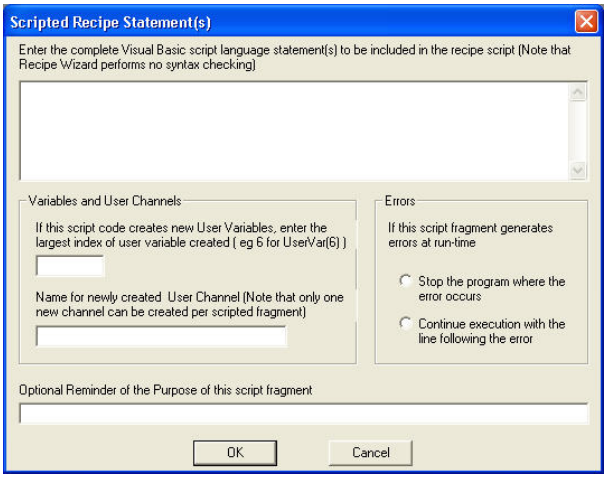


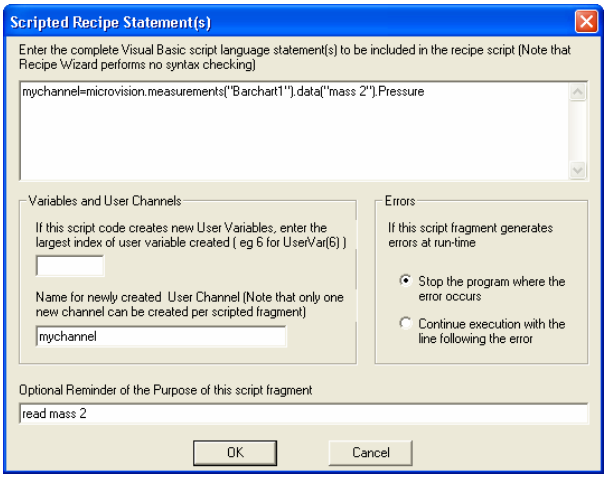
To edit an existing channel, highlight the action and click **Edit**, this will return you to the **Uncalculated User Channel Properties** dialog.

To delete a channel, highlight the channel and click **Remove**.

5.2.4.2 Add User Script and Insert User Script

You can add script code directly from the wizard by selecting the **Add User Script** option.





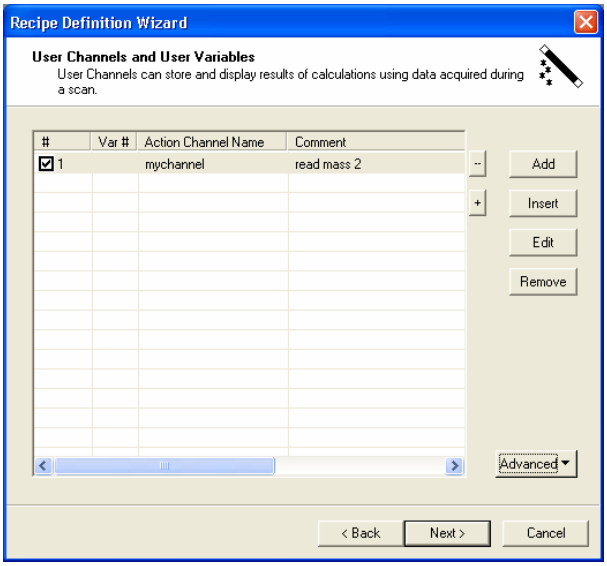
For example, you could add code to read mass 2 from a Barchart measurement and write it to an action channel as follows:

Note: this is not a good example because it is easier to do this action using the wizard's own built in functionality.

Note also that embedding your own script inot end of scan actions will usually require knowledge of the VB script language and the Process Eye Object Model.

This adds the VB script code to the recipe when you click **OK**.

The code fragment then appears in the list.

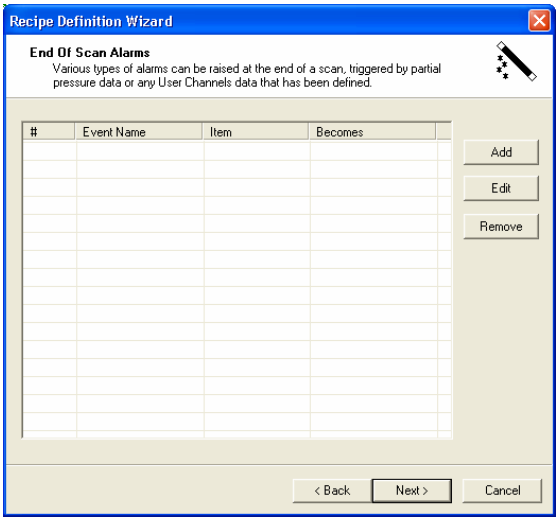


5.3 End of Scan Alarms and Actions

An end of scan alarm is an action that you wish to trigger when certain criteria have changed.

This criterion is evaluated at the end of every scan and there are a number of events that can be configured to "trip" the alarm or action. You can also configure the action that you wish to happen when this event occurs. You can apply deglitch rules to wizard end of scan alarms.

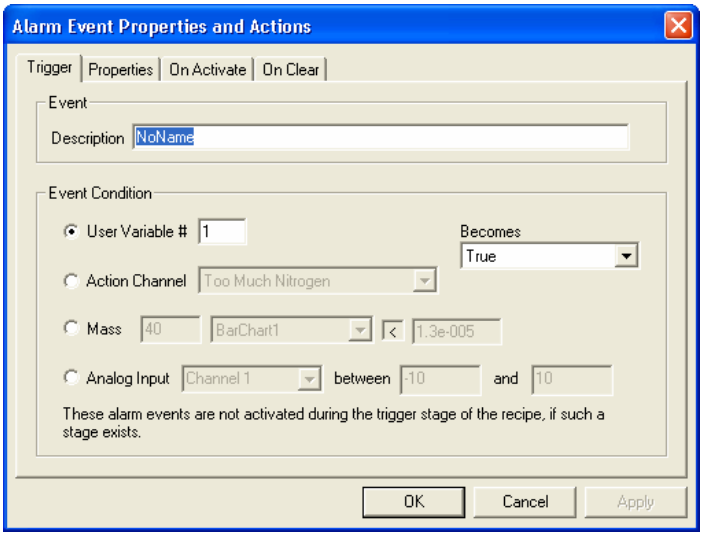
When the **End of Scan Alarms** option is selected from the **Recipe Wizard Options** page, the following dialog is displayed.



To create a new Alarm Action click **Add** to open the **Alarm Event Properties and Actions** dialog.

When you have added an alarm it is added to the list of alarms.

5.3.1 Alarm Trigger Events



The first step is to configure the trigger event; this is the event that will cause the alarm or action to be activated.

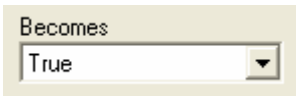
You must give the alarm a name in the "Event" description box.

This should be a comment to remind you what the alarm does.

You can then configure the event condition.

User Variable Trigger

Select the User Variable radio button and enter the user variable number in the text box.



You can then select on what basis you wish the event to be activated. This is done from the drop-down list box.

The options are as follows:

- Greater Than
- Less Than
- True
- False
- Greater Than 1
- Less Than 1
- Equal To 1
- Greater Than 0
- Less Than 0
- Equal To 0

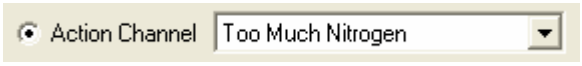
If Greater Than or Less Than is selected, then an additional text box is made visible.

Enter the value that the "User Variable" is to be compared against.

The "On Activate" action will be triggered when the condition becomes true (subject to the de-glitch rules in Properties).

The "On Clear" action will be triggered when the condition becomes false.

Action Channel Trigger

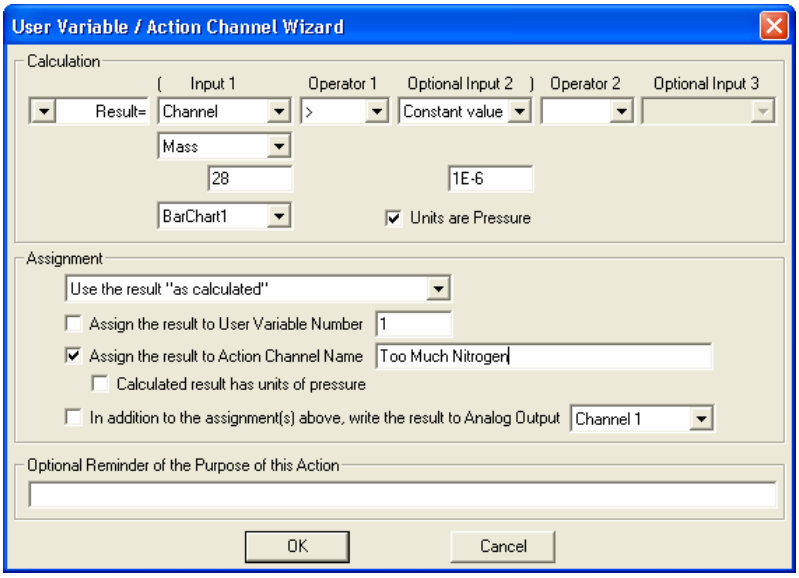


Select the Action Channel radio button and select the pre-defined action channel that you wish to use as the trigger.

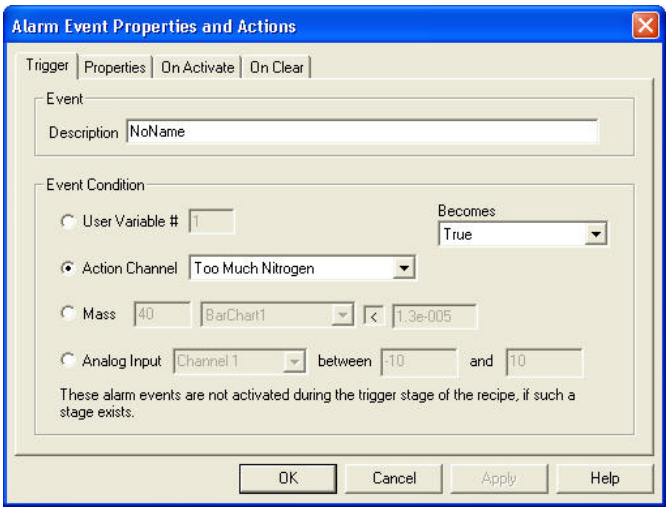
You can then select on what basis you wish the event to be activated. This is done from the drop-down list box as before.

The options are the same as for the user variable trigger.

The action channel must be pre-defined, for example:



The Channel "Too Much Nitrogen" as defined above can be used to trigger the alarm when it becomes true.



The "On Activate" action is triggered when the condition is becomes true (subject to the de-glitch rules in Properties).

The "On Clear" action is triggered when the condition becomes false.

Partial Pressure Trigger

You may set an alarm trigger on any mass you are currently measuring by selecting the Partial Pressure radio button

You can then enter any current mass, from any measurement you have. Type the mass number in the text box and select the measurement from the drop down list box.

You can toggle between greater than and less than, by clicking on the following icon.

The pressure is then entered as a number in decimal or scientific format. The pressure will be in the currently selected pressure units.

The "On Activate" action is triggered when the condition is becomes true (subject to the de-glitch rules in Properties).

The "On Clear" action is triggered when the condition becomes false.

Analog Input Trigger
You may set an analog input trigger on any available analog input voltage by selecting the Analog Input radio button.

You can select the analog input channel to trigger on from the Channel drop-down list box and then enter the voltage range you wish to trigger the action on.

For example, to trigger on analog input channel 2, on any voltage above 5 volts, set the trigger as shown.
Note: If you defined a hardware profile, the value will be expressed in your calibrated units.

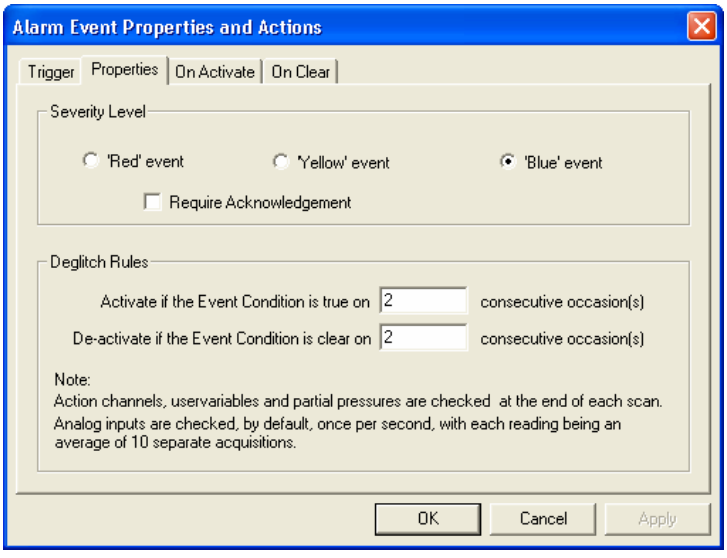
The "On Activate" action is triggered when the condition is becomes true (subject to the de-glitch rules in Properties).

The "On Clear" action is triggered when the condition becomes false.

5.3..2 Trigger Properties

Here you set the alarm severity and set up the de-glitch rules to prevent false alarms.

In the "Alarm Event Properties and Actions" dialog, click on the Properties tab to bring up the properties dialog.



Alarm Severity Level
There are three levels of alarm configured in Process Eye:

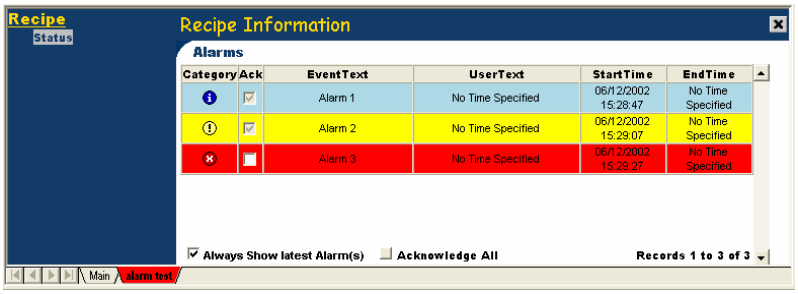
Blue Event is for information.
For example, you may have a blue event informing when a valve opens, but that it is not something out of the ordinary.

Yellow Event is a warning alarm.
This informs you that a condition is out of specification, but not critical. For example, you may use this if your water level is higher than normal, but is not high enough to affect your process.

Red Event is a critical alarm.
Something is so far out of specification that you need to do something about it.

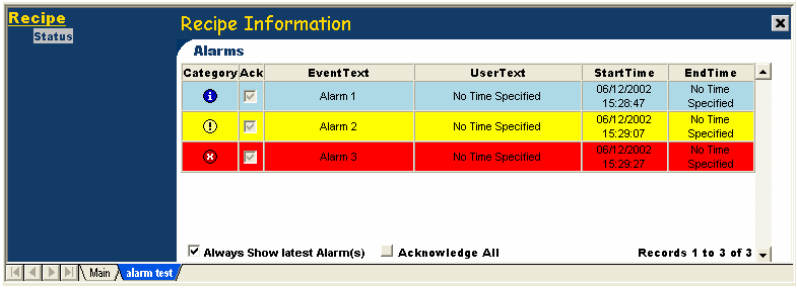
The severity of the alarm is selected using the radio button.

The following screen shows the three levels of alarms displayed in the main Process Eye window.



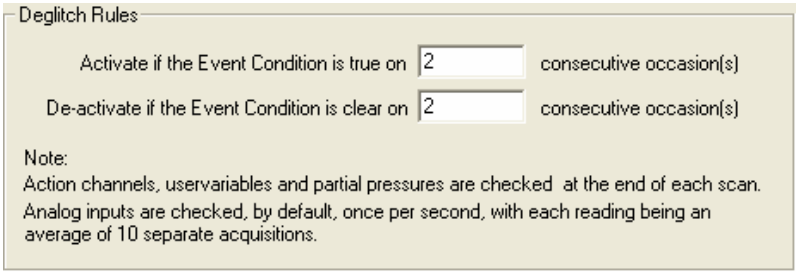
If you checked the Require Acknowledgement check box:

The recipe tab will flash with the relevant alarm colour, until the alarm is acknowledged by checking the box on the alarm.



5.3.3 De-Glitch Rules

De-glitch rules are used to minimize the number of false alarms.



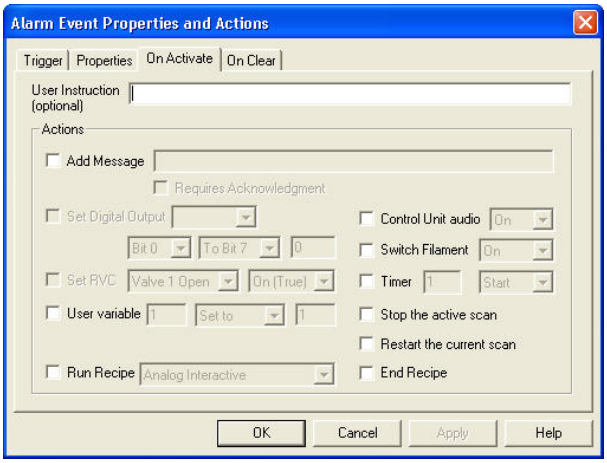
You can set the number of consecutive times the condition must be "true", before the alarm is either triggered or cleared.

The default value is 2, this means that 2 consecutive scans have to trigger the event, before the alarm is triggered, and 2 consecutive scans have to not trigger the event, before the alarm is cleared.

If the number is set to 1 then the alarm will trigger on the first scan.

5.3.4 On Activate Properties

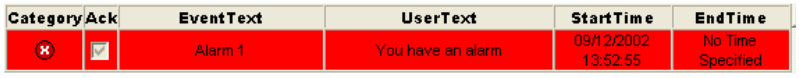
When the alarm is triggered the **On Activate** action is performed.
This action can be set using the **On Activate Properties** dialog.



User Instruction

You may add user text to the alarm message.

In this example, the text was added as an action to the red alarm.



Category	Ack	EventText	UserText	StartTime	EndTime
		Alarm 1	You have an alarm	09/12/2002 13:52:55	No Time Specified

The text appears in the **UserText** column of the alarm. If no text is added then the text **No Time Specified** is displayed.

Add Message

You may add a separate alarm message when an alarm is triggered.
Check the Add Message box and add your text in the box.

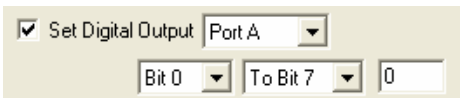
In the above example the message was added to a critical alarm, with no user instruction.

		Alarm 1	No Time Specified	09/12/2002 14:04:57	No Time Specified
		Message	Alarm Message	09/12/2002 14:04:58	No Time Specified

In addition to the red alarm message, there is an additional blue message containing the text "Alarm Message".

Set Digital Output

You may set digital lines to change state on an alarm. You can do this by checking the Set Digital Output box.



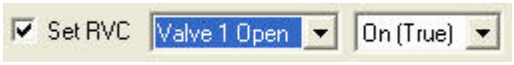
Note: If you do not have any Digital Outputs configured, this box will be greyed out.

You can select to set digital lines on either Port A or Port B using the drop-down list box. You can then select the lines you wish to set.

If you want to set an individual Bit line, for example Bit 3, then select "Bit 3" "To Bit 3" from the Bit drop-down lists. You can then enter a 0 or 1 to set it low or high.
You may also set a range of Bit lines, such as Bit 0 to Bit 7, as shown in the above dialog.

Set RVC Parameter

If your unit is configured to use an RVC, you may set the alarm to switch one of the RVC parameters.



The allowed parameters are:

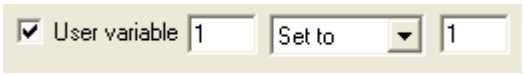
- Valve 1 Open
- Valve 2 Open
- Alarm
- Pumps

The parameters can be either "On" (True) or "Off" (False), chosen from the second drop-down list box.

Note: If your unit does not have an RVC, this option will be greyed out.

Set User Variable

You can choose to make a User Variable a number, check the User Variable option.



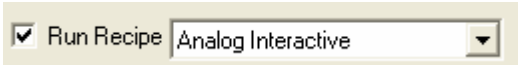
Enter the number of the user variable you wish to change and then select the action you want to perform on it.

The action options are:
Set to
Increment by
Decrement by

You can then enter the number that you want to use in the third text box.

Run Recipe

You can choose to run, or end the current recipe and start a new recipe.



You can select any Recipe Name from the pull-down list box. The list box will contain the names of all the recipes in your current recipe list. Selecting the Run Recipe option will disable the End Recipe option.

Control Unit Audio

To switch the control unit audio on, put a check in the Control Unit Audio box

Select "On" from the pull-down list box to set a continuous tone at 2000 Hz, select "Off" to switch the tone off.

Switch Filament

To switch the currently active filament off or on, put a check in the switch filament check box

Select either "On" or "Off" from the list box.

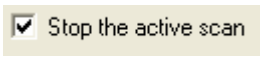
Timer

To select a timer and either start or stop it, check the Timer box.

Enter the timer number and either "Start" or "Stop" from the pull-down list box, selecting "Stop" also resets the timer to zero.

Stop Active Scan

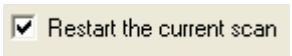
To stop the current scan, check the Stop the Active Scan box.



This stops the current scan measurement, although the recipe will continue to run.
No further end of scan actions will be performed, although timers and control unit events will still be enabled.

Restart the Active Scan

To restart the current scan after you have stopped it, check the Restart the Current Scan box.



The scan will restart with scan number 1.

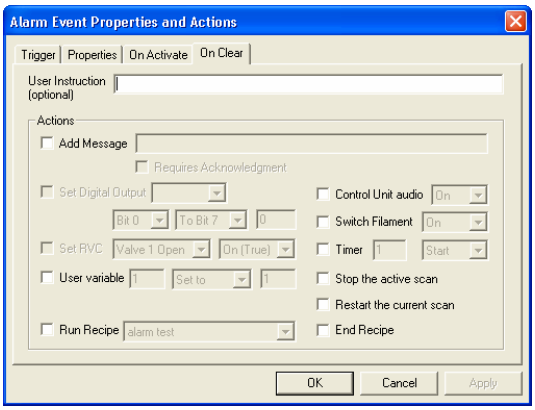
End Recipe

To end the current recipe, check the End Recipe box.

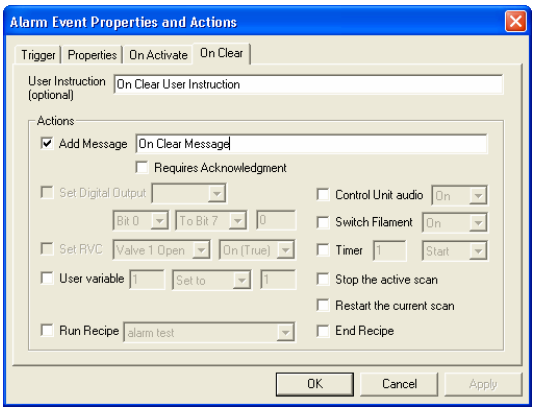
This ends the current recipe and returns to the Process Eye main page.

5.3.5 On Clear Properties

You can also set up actions to occur when the alarm condition becomes false. The actions that can be set can be edited in the **On Clear** tab.



These actions are the same as those in the **On Activate** action. The only slight difference is in the alarm message, if you add a user instruction and a message by setting the following:



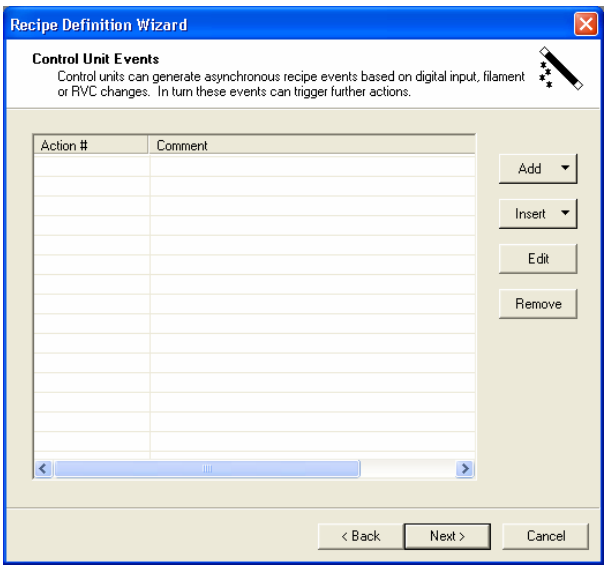
When the **On Clear** event occurs the following messages will appear in the recipe status window.

Category	Ack	EventText	UserText	StartTime	EndTime
⊗	☑	Alarm 1	On Clear User Instruction	09/12/2002 16:48:00	09/12/2002 16:48:02
ⓘ		Message	On Clear Message	09/12/2002 16:48:02	No Time Specified

This is very similar to the **On Activate** messages, except that in the "Alarm 1" message the "Start Time" is the time that the alarm was activated and the "End Time" is the time that the **On Clear** event occurred.

5.4 Control Unit Events

Control unit events are the events generated by the control unit. Unlike End of Scan Actions they can be triggered at any time and do not have to be polled at the end of each scan.



There are three different types of end of scan actions based either on filament, digital inputs, or RVC events. They are configured in the Control Unit Events dialog.

To add an event click the Add button, there are three options:

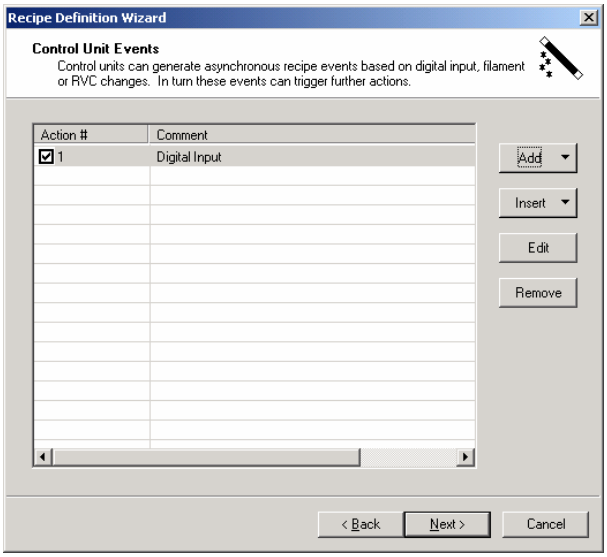
Digital Input Event
Filament Event
RVC Event

The Digital Input Event option is only available if you have at least one digital input configured on your control unit.

The Filament Event option is only available if you have a control unit selected in Hardware resources.

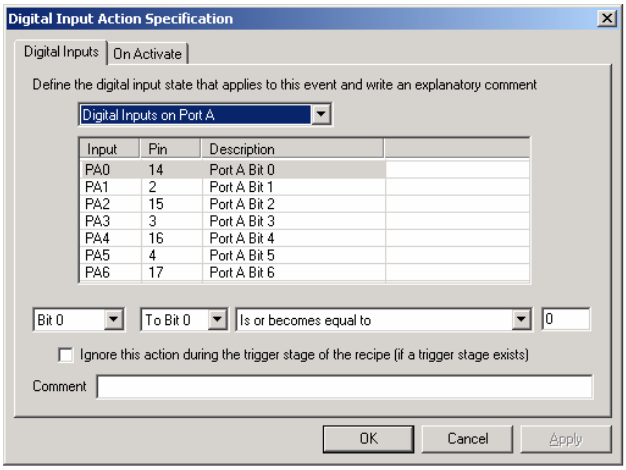
The RVC Event is only available if your instrument is configured to have an RVC connected.

Click on one of the options to bring up the Action Specification page for that event. When an action has been added, it appears in the list of actions.



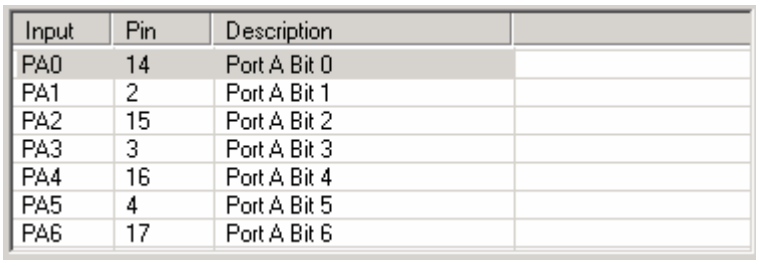
5.4.1 Digital Input Action

The digital input action occurs when a specified digital input, or combination of inputs change state. The action event will be triggered as soon as the event takes place.
The trigger for the action is configured on the **Digital Inputs** page of the **Digital Input Action Specification** dialog.



You can choose to configure the action to be triggered either by the inputs on Port A or on Port B.

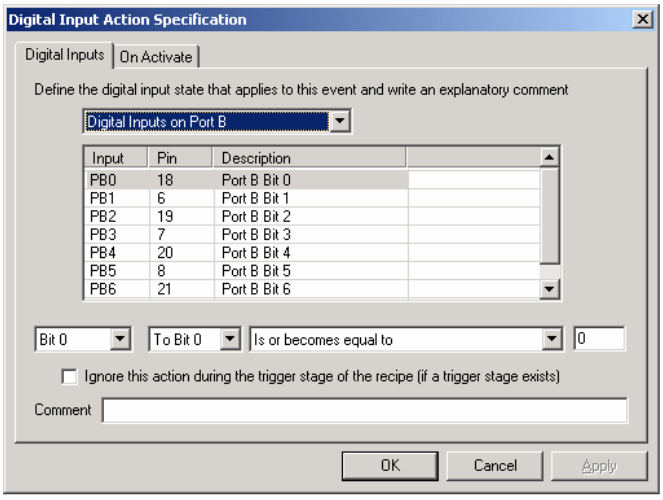
When you select a port, the inputs on that port are listed in the table.



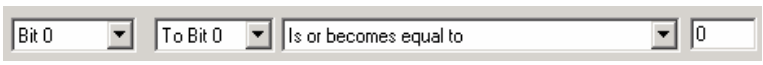
Input	Pin	Description
PA0	14	Port A Bit 0
PA1	2	Port A Bit 1
PA2	15	Port A Bit 2
PA3	3	Port A Bit 3
PA4	16	Port A Bit 4
PA5	4	Port A Bit 5
PA6	17	Port A Bit 6

Note: If you defined a hardware profile the description will display your profile name.

The table contains the configured description of that input, its bit address and the pin on the digital I/O connector that the input is connected to.



Changing to Port B, changes the grid to list the digital inputs on Port B. Once the Port has been selected, you can, setup the digital lines you wish to use as the action trigger.



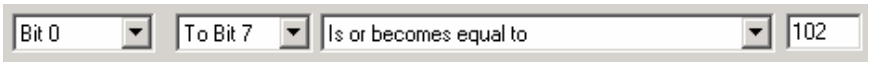
You may choose to select a single digital line such as Bit 0, by selecting to trigger on "Bit 0" "to Bit 0" and the action triggered by Bit 0 being equal to 0 as shown above.

The comparison options on the Bit or Bit range are selected from the drop-down list. The available options are:

Is or becomes equal to
Is or becomes not equal to
Is or becomes less than or equal to
Is or becomes greater than or equal to
Changes to
Changes

If you select a range of digital inputs, the value entered in the text box is the decimal equivalent of the binary bit map that you want to trigger on.

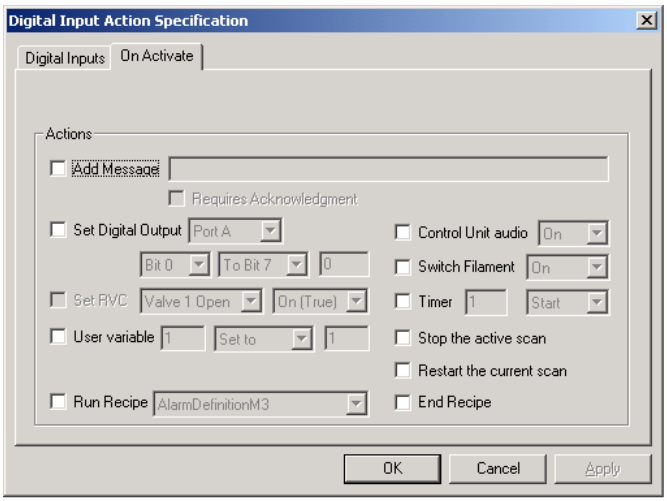
For example if you want to trigger on all 8 digital lines of Port A becoming 01100110, then the decimal equivalent of 01100110 is 102 and the trigger condition is as shown.



If you do not want the action to be active during the trigger event, check in the Ignore this action during the trigger stage of the recipe box.

All digital input events during the trigger stage except those defined in the trigger event itself will be ignored.

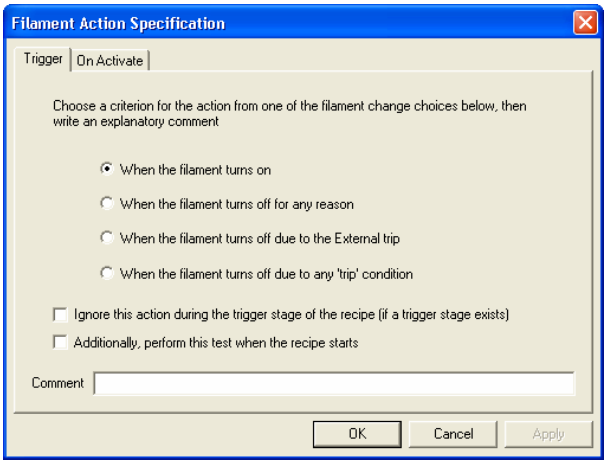
Once the trigger event has been configured, click on the **On Activate** tab to configure the On-Activate actions.



The On-Activate options are the same as those described in End of Scan actions and alarms.

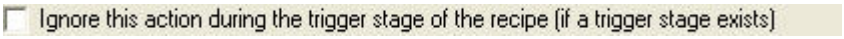
5.4.2. Filament Event Action

The filament action event is triggered when a specified filament event occurs.
The trigger event is configured in the **Filament Action Specification** dialog.



Select the required filament action by checking one of the radio buttons.

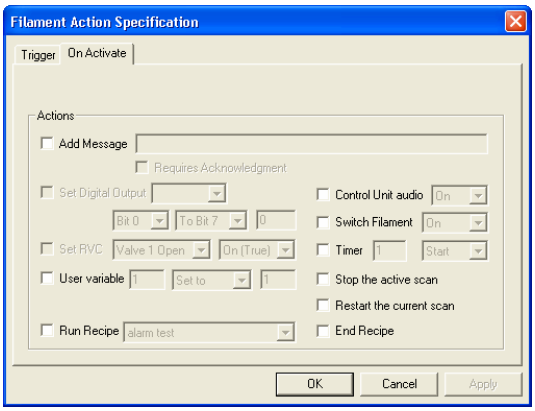
If you do not want the action to be active during the trigger event, check in the Ignore this action during the trigger stage of the recipe box



All filament events during the trigger stage except those defined in the trigger event itself will be ignored.

If you want the filament test to be performed at the start of the recipe, so if the filament is already X-Tripped the **When the filament turns off due to the External trip** trigger would be activated at the start of the recipe, check the **Additionally, perform this test when the recipe starts** box.

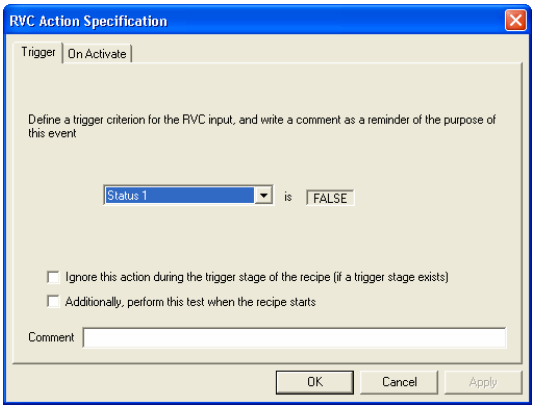
Once the filament event has been defined, you can configure the **On Activate action** by clicking on the **On Activate** tab.



The On-Activate options are the same as those described in End of Scan actions and alarms.

5.4.3 RVC Event Action

The RVC action event is triggered when a specified RVC event occurs. The trigger event is configured in the **RVC Action Specification** dialog.



From the pull-down list, select the RVC event that you wish to trigger an event on. The options are as follows:-

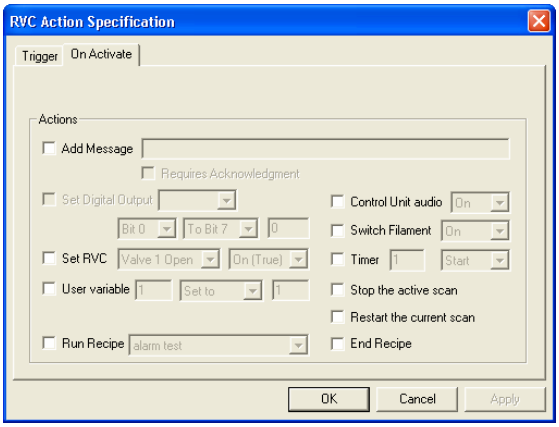
Status 1
Status 2
Digital Input 1
Digital Input 2
Valve 1 Input
Valve 2 Input
Turbo Pump at Speed
Heater On

Clicking on **FALSE** will toggle the value to **TRUE**.

If you do not want the action to be active during the trigger event, check in the **Ignore this action during the trigger stage of the recipe** box.

All RVC events during the trigger stage, except those defined in the trigger event itself will be ignored.

If you want the RVC test to be performed at the start of the recipe, so if the RVC condition is already fulfilled the action would be activated at the start of the recipe, check the **Additionally, perform this test when the recipe starts** box.



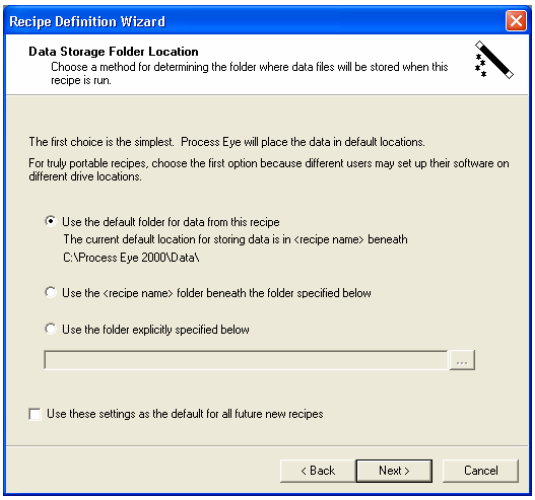
Once the RVC event has been defined, you can configure the **On Activate action** by clicking on the **On Activate** tab.

The **On Activate** options are the same as those described in End of Scan actions and alarms.

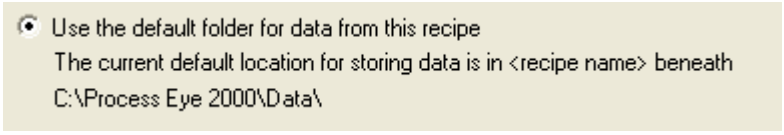
In addition to the interactive disk store, a recipe can be configured to store to disk automatically.

Select the File Storage of Data option from the **Optional Recipe Content** dialog.

6.1 Storage Folder Location



There are 3 options for the folder location:



This option will use (or create if it doesn't exist) the default data path, plus the recipe name. So if the recipe is Called Analog1, the path used will be:
\..\Process Eye\Data\Analog1\

This option will use (or create if it doesn't exist) the specified path, plus the recipe name.

The specified path can be either manually entered in the text box

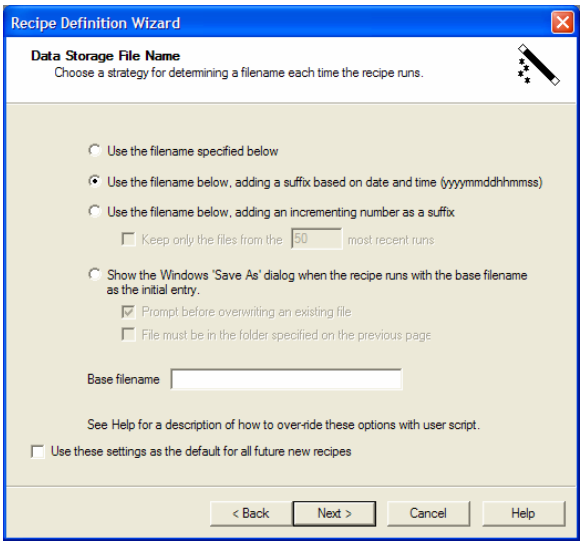
Or you can browse to a directory by clicking the browse button.

The last option is similar to the above except the recipe name will not be added to the selected path.

Once the selection has been made you can make this the default setting for all future recipes by checking the box.

6.2 Storage File Name

After selecting the storage folder location, the next dialog box allows the selection of the file name.



There are four options for naming the file:

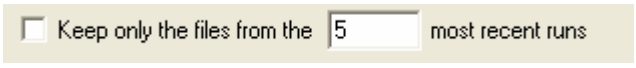
All the options use a **Base Filename** defined in the edit box.

Explicit File Name
This option always uses the **Base Filename**, overwriting it each time the recipe runs.

Date and Time
This option appends the time that the recipe starts to the **Base Filename**. If the file storage starts on 25th December 2002 at 13:20:35 the file name will be Basename_20021225132035.SI-d.

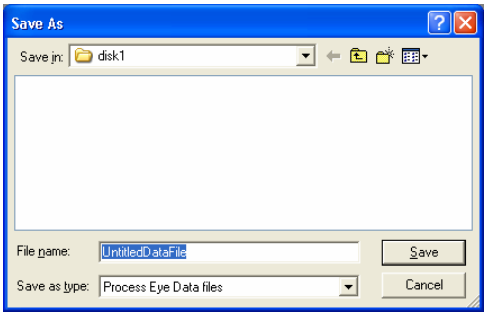
Incrementing File Name
This option appends the next available number in an ascending sequence to the **Base Filename**.
So, for example, the folder specified on the previous page would contain "Basename_0000.SI-d" followed by a file "Basename_0001.SI-d".

With an incrementing file name you have the option to keep only a certain number of files.



Check the box and enter the number of files you wish to keep. If the number is only 5 then when file "Basename_0005.SI-d" is created, file "Basename_0000.SI-d" will be deleted.

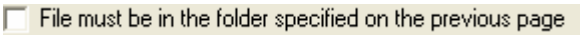
User Specified File Name
To specify the file name when the recipe runs, check the fourth radio button.



When the recipe runs a "Save As" dialog button will be displayed with the **Base Filename** as the initial selection.

Here you can select the path and name for the stored data.
By default the path will be folder defined in the **Data Storage Folder Location** dialog.

Options: In addition to the option to prompt before overwriting an existing file there is an option to restrict the folder to the folder specified on the previous page.

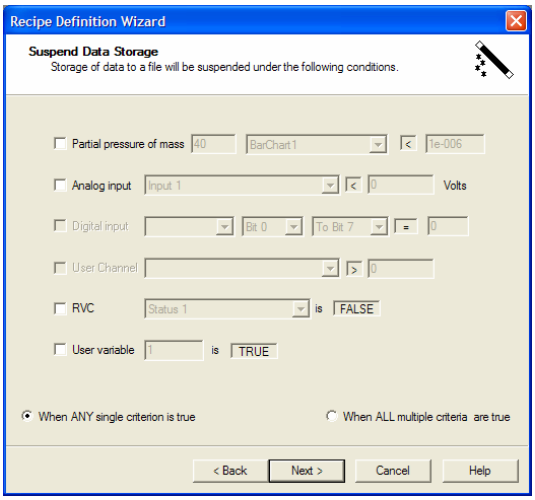


The location cannot be changed in the dialog, only the file name.

Once the settings for the file name have been made then these can be made the default settings for future recipes by checking the box

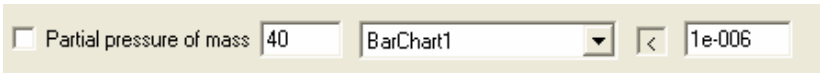
6.3 Suspend Disk Storage

You can choose to suspend storage to disk from the **Optional Recipe Content** dialog.
Select an action to halt disk storage from the dialog box.



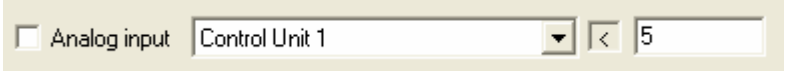
There are 6 options:

Pause on a Partial Pressure
To pause on a partial pressure check the box.
Enter the mass of the partial pressure you wish to use and the pressure level at which you wish to trip.



In the above example, disk store would pause if mass 40 was below 1E-6 and restart when the partial pressure of mass 40 went above 1E-6.

Pause on an Analog Input
To pause on an analog input, check the box.
Select the input you wish to use and enter the voltage at which you wish to trip.



In the above example, disk store would pause if analog input 1 was less than 5 volts and resume if analog input 1 was above 5 volts.
Note: If you have defined a hardware profile the value will be in your calibrated units.

Pause on Digital Input
To pause on a digital input, check the box.
Select the input and bit pattern you wish to use from the pull-down lists.

Pause on User Channel
To pause on a user channel, check the box.
Select the channel you wish to use from the pull-down list. Enter the value at which you wish to pause.

In the above example, disk store would pause if Channel 1 was less than 0.

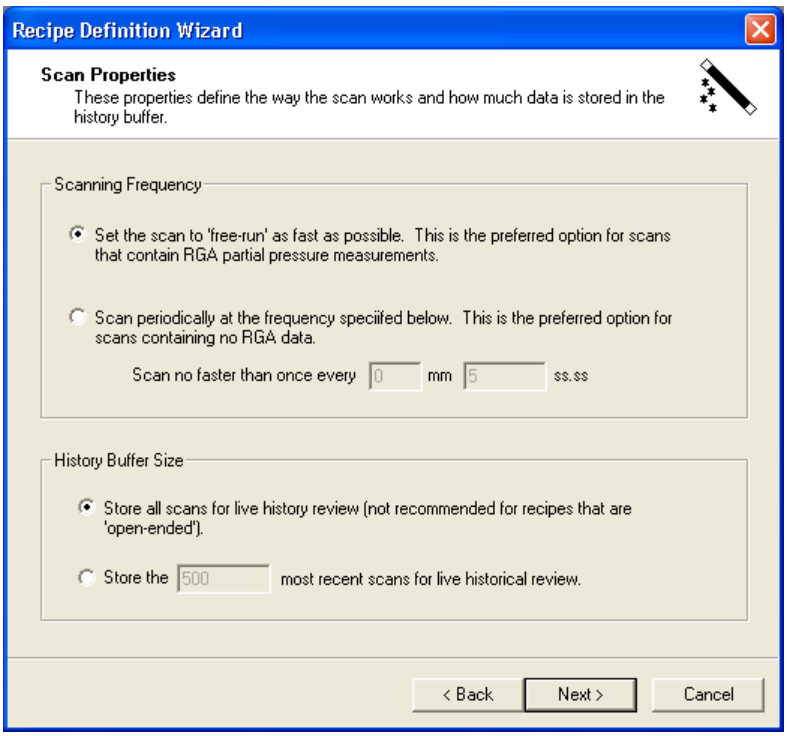
Pause on RVC
To pause on the RVC, check the box.
Select which event you wish to use. Then select **TRUE** or **FALSE** to select the trip condition.

In the above example, disk storage would pause if the "Status 1" event was FALSE.

Pause on User Variable
To pause on a User Variable, check the box.
Enter the name of the user variable, and select either **TRUE** or **FALSE** as its trip condition.

In the above example, the variable number (ID) is 1, and the disk store would pause if it were TRUE.

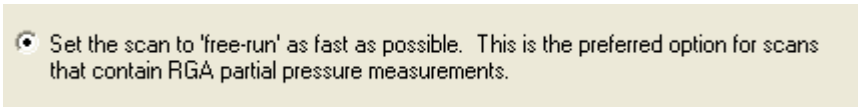
Set the scan frequency and buffer history size in the Scan Properties dialog



7.1 Scanning Frequency

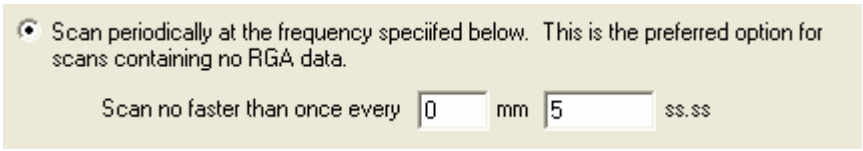
There are 2 options for the scan frequency depending on the radio button selected.

The first is to "Free run"



This means that as soon as a scan finishes the next one starts

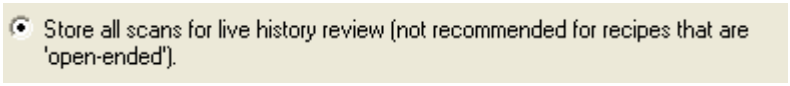
The second is scan at set time intervals



You can enter the interval in the text box, up to 59 min 59.99 sec, and the scan will only resume after this interval. The delay is not the time between scans but the time delay from starting one scan to starting the next. If you enter a time that is less than the time taken to do one scan then the scan will simply start at the end of the previous scan.

7.2 History Buffer Size

Scan data is normally stored in a large array in memory; as each scan is completed a new line is added to the stored array. This allows you to scroll back through previous scans whilst the recipe is still running independently of whether you are storing to disk. If you select the option



Then all the scans from the start of the recipe will be stored in memory so that you scan scroll back through them.

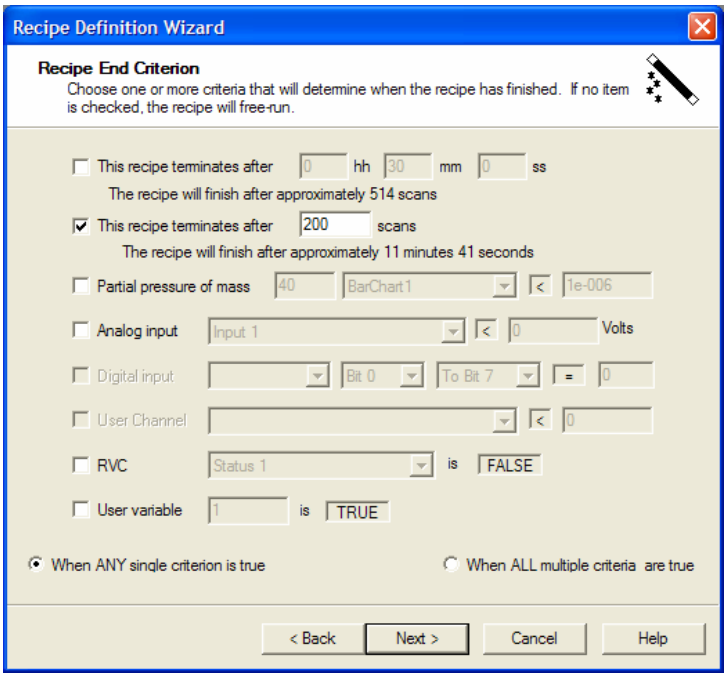
However recipes can be open-ended or be set to have large numbers of scans. If all scans are held in memory then eventually all the physical memory will be used and the system will start to use virtual memory on the hard disk. This slows the system down and can cause problems. Therefore if recipes with large numbers of scans are to be used it is recommended that a cap on the number of scans held in memory is made. Select the radio button.

Enter the number of scans to be stored. By default the number will be 500.

Note: This only refers to scans stored in memory and does not affect the ability to store large numbers of scans to disk.

Chapter 8 – Recipe End Criteria

A recipe can be terminated in a number of different ways, in addition to the various methods available in the End of Scan alarms (see chapter 5). The Recipe End Criteria dialog allows you to configure when the recipe will end. If no end criteria are specified the recipe will run indefinitely until the user manually ends the recipe.



You can set either none, one or many end criteria and then choose to "and" or "or" them.

To "and" the criteria so the recipe will end when all selected criteria are true.

To "or" the criteria so the recipe will end when any single criteria is true.

8.1 Elapsed Time

Check the box

Enter the time that you wish the recipe to run for. The software will work out the approximate number of scans that will be taken in this time, based on the current scan configuration. In the above example the recipe will end after 30 minutes has elapsed from the start of the first scan, time spent waiting for a trigger is not counted.

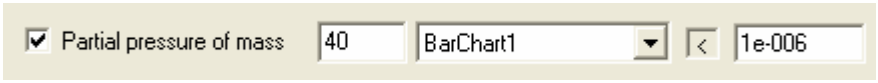
8.2 Number of Scans

Check the box

Enter the number of scans you want the recipe to perform. The wizard will display the approximate time that these number of scans will take based on the current scan configuration. In the above example the recipe will do 200 scans and this will take approximately 16 minutes 42 seconds.

8.3 Partial Pressure

Check the box



Enter the mass you wish to use to end the recipe, select the measurement that you want to use to measure this mass from the drop down list and the pressure in the current pressure units that you wish to use. Click on the < symbol to toggle to >.
In the above example the recipe will end if the partial pressure of mass 40 as measured by Barchart1 is less than 1E-6 in the current user's pressure units.

8.4 Analog Input

Check the box

Select the analog input you wish to use from the drop down list and enter the voltage level you wish to trigger at. Click on the < symbol to toggle to >. In the above example the recipe would end if analog input one was less than 0 volts.

Note: If you defined a hardware profile the value should be entered in your calibrated user units.

8.5 Digital Input

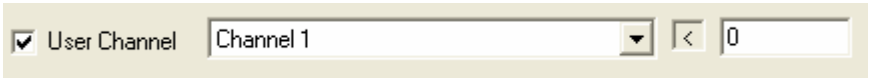
Check the box

Select the digital port you wish to use from the drop down list, enter the bit range you wish to check and the value of these inputs that will trigger the end of the recipe. In the above example the recipe will end if all the bits on Port A are low. If you want to trigger on the digital inputs on Port A being 01100110 then you would enter the value 102. Click on = to toggle between <>, <=, >=, --> and <-->. The operators =, <>, <= and >= are straight forward tests on the value of the digital inputs and are checked at the start of the recipe and every time the digital inputs change. The --> operator means "Changes to" so if the line was Bit 0 to Bit 7 -->0 and the value at the start of the recipe was 0 the recipe would not end until the level of at least one of the inputs changed and then changed back. The operator <--> means "Changes" so if this operator is selected the value box is greyed out.

Hold the mouse over any control in the digital section to see a tool tip describing the connected digital I/O.

8.6 User Channel

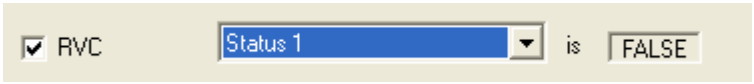
Check the box



Select the user channel from the pull down list and enter the value you wish to trigger at. Click on the < symbol to toggle to >. In the above example the recipe would end if the value of Channel 1 is less than 0.

8.7 RVC

Check the box



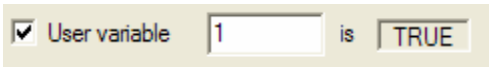
Select the RVC event from the pull down list, the options are as follows:-

Status 1
Status 2
Digital Input 1
Digital Input 2
Valve 1 Input
Valve 2 Input
Turbo Pump at Speed
Heater On

Clicking on **FALSE** will toggle the value to **TRUE**. In the above example the recipe would end if "Status 1" becomes False.

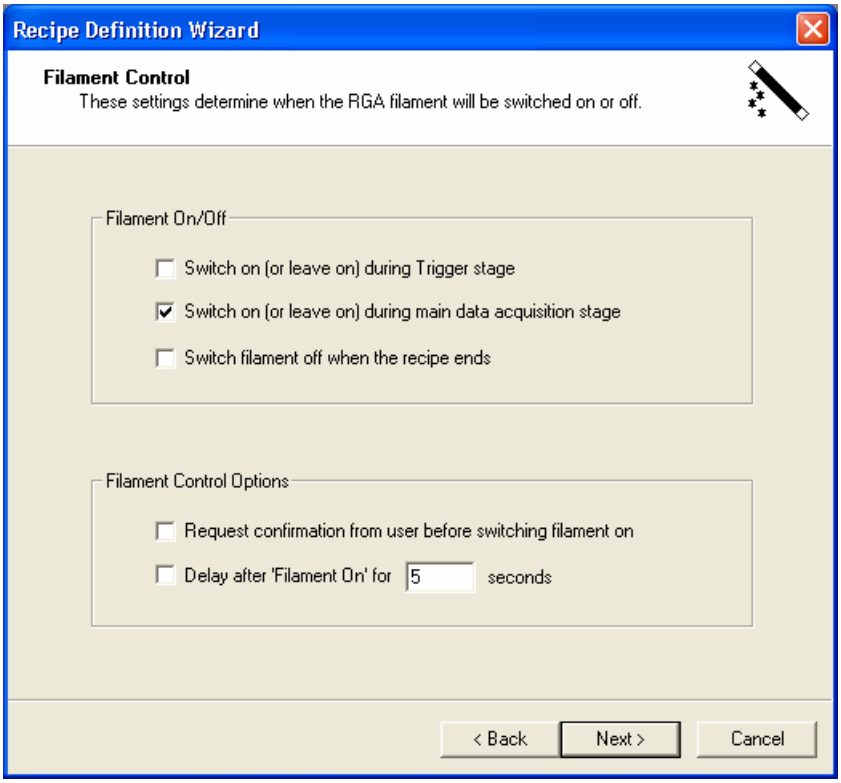
8.8 User Variable

Check the box



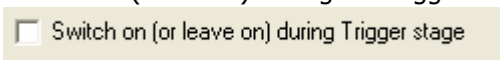
Enter the ID (number) of the variable and select the logic condition. Clicking on **TRUE** will toggle to **FALSE** and vice versa. In the above example the recipe would end if the user variable with an ID of "1" was set to TRUE.

Configure the recipe control of the filament in the filament control dialog



The three options for switching On/Off the filament are

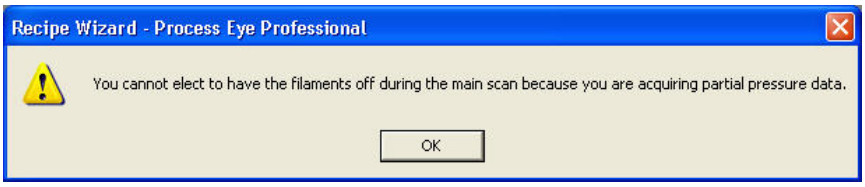
Switch On (leave on) during the trigger stage



Simply check the box to make sure the filament is on during the trigger.

Switch On (leave on) during the main data acquisition stage

Simply check the box to make sure the filament is on during the main scan. If you choose to uncheck this box but have an RGA measurement you will get the following warning



You will not be able to proceed until you check this box.

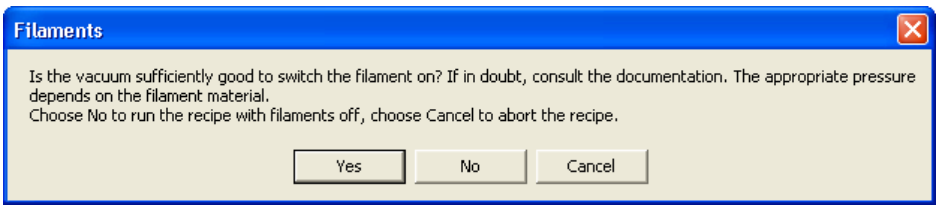
Switch filament off when the recipe ends

Simply check the box to switch the filament off when the recipe end

There are two further control options

Request confirmation from user before switching filament on

Simply check the box, then when the recipe is run, before switching on the filaments the user will be shown the following dialog



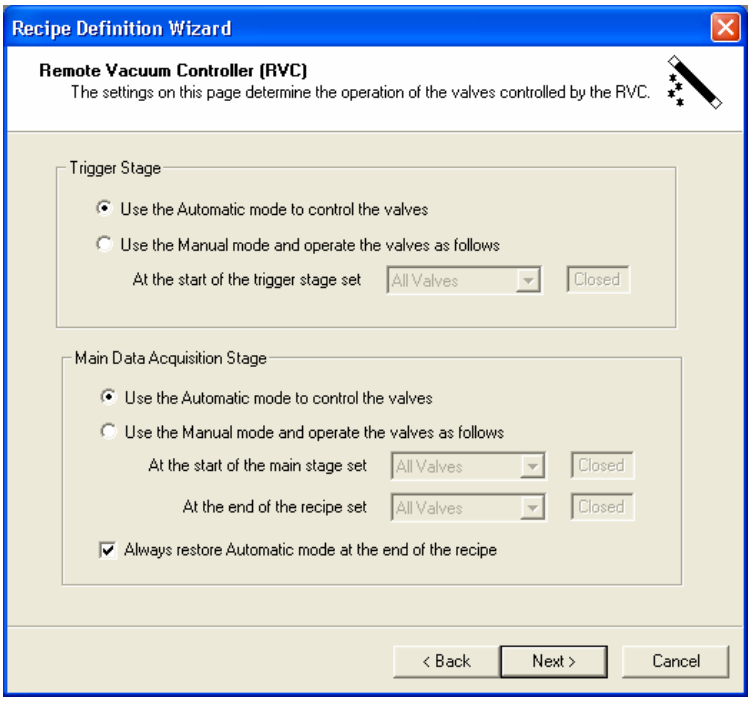
Before the recipe continues the user must select one of the options.

Delay After Filament On

Simply check the box and enter the delay in the box. When the recipe runs it will wait for the specified time after switching the filament on to allow the RGA to stabilise.

Chapter 10 – RVC Control

If the recipe is being written for a unit that is configured to have an RVC, and you have a scan defined, then the RVC control dialog will be shown.



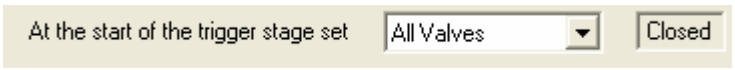
You can define the RVC operation for three parts of the recipe

The trigger stage
The main data acquisition stage
The end of the recipe

To use automatic control of the valve select the appropriate radio button;

To return the RVC to automatic control at the end of the recipe check the box

To run in manual mode either in the trigger, data acquisition or at end of recipe stage select the appropriate radio button and then select the valve option from the pull down menu.

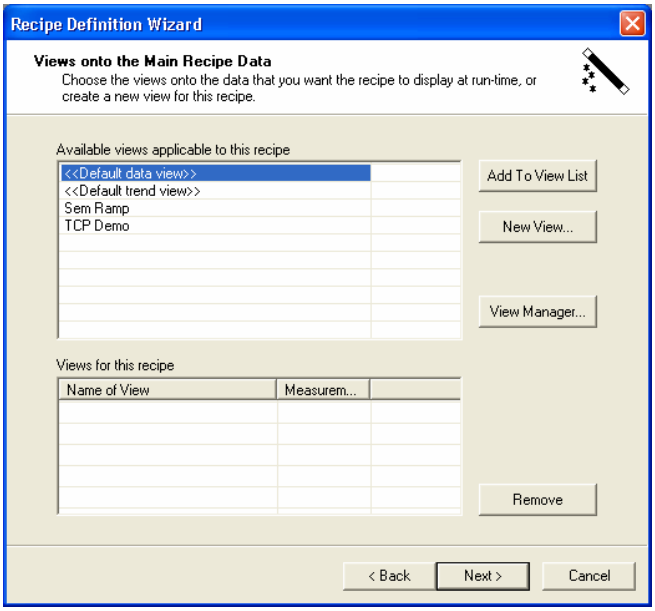


The allowed options are

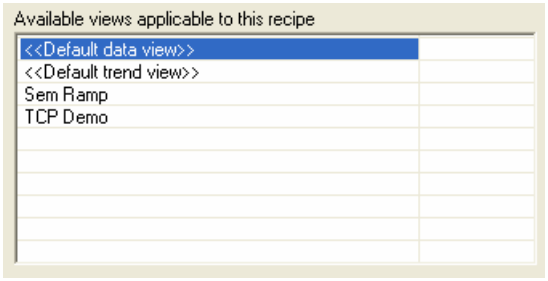
All Valves Closed
Valve 1 Open
Valve 2 Open

Chapter 11 – Recipe Views

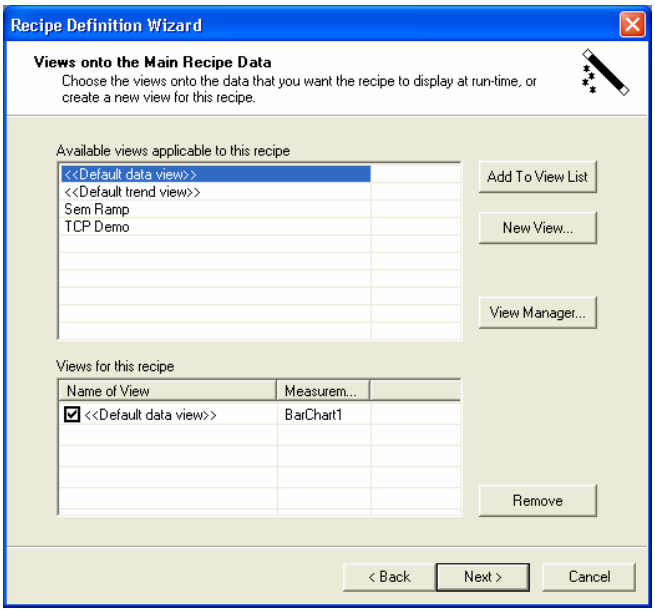
Once the scan has been configured you can define the views that will display the data taken. More information on Views and View Manager can be found in the Process Eye manual. Views are added to the recipe using the Views onto the main recipe data dialog.



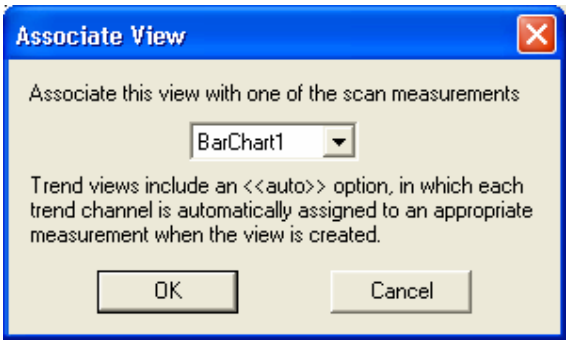
The registered views that you already have available will be listed in the Available Views list



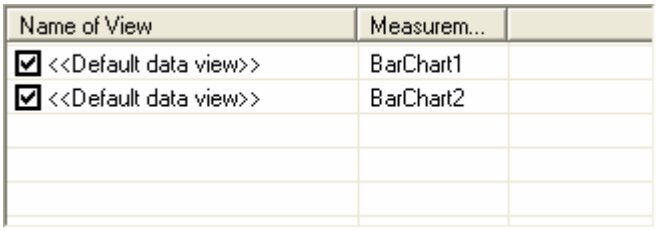
To add one of the available views to the list of views used by the recipe simply highlight the view that you wish to add and click **Add to View List**. The selected view will then be added to the Views for this recipe list as shown below.



In this case a default data view has been added and will display the data from Barchart1. If the recipe contains more than one measurement then when you add a view you will be asked to associate it with a measurement. When you click **Add to View List** the following dialog will appear.



The drop down list will contain a list of all the measurements; select the one you wish to associate with this view. If you select "auto" then the first measurement that contains the data to be displayed will be used. For example, if you have two Barchart measurements both 1 to 50 but on two different gains and you add a default trend set to auto, all the data on the trend will be from Barchart1 as this will be the first measurement that contains the data. It does not matter is the peak is off full scale or if the peak is so small it is lost in the noise it will still be the data from Barchart1 that is used. If however you have a Barchart from mass 1 to 30 and a second Barchart from mass 31 to 60, your trend mass 28 will be the data from Barchart 1 and mass 32 will be the data from Barchart 2 because the data source is unambiguous.



When you add a new view the measurement that is associated with it is shown in the Views for this recipe list. In the above example there is a default data view associated with Barchart1 and another with Barchart2.

To remove one of the views from the Add to view list, highlight it and then click **Remove**. You can temporarily remove a view from the run-time display by un-checking its box. It will still be associated with the recipe and you can re-enable it again by re-checking the box.

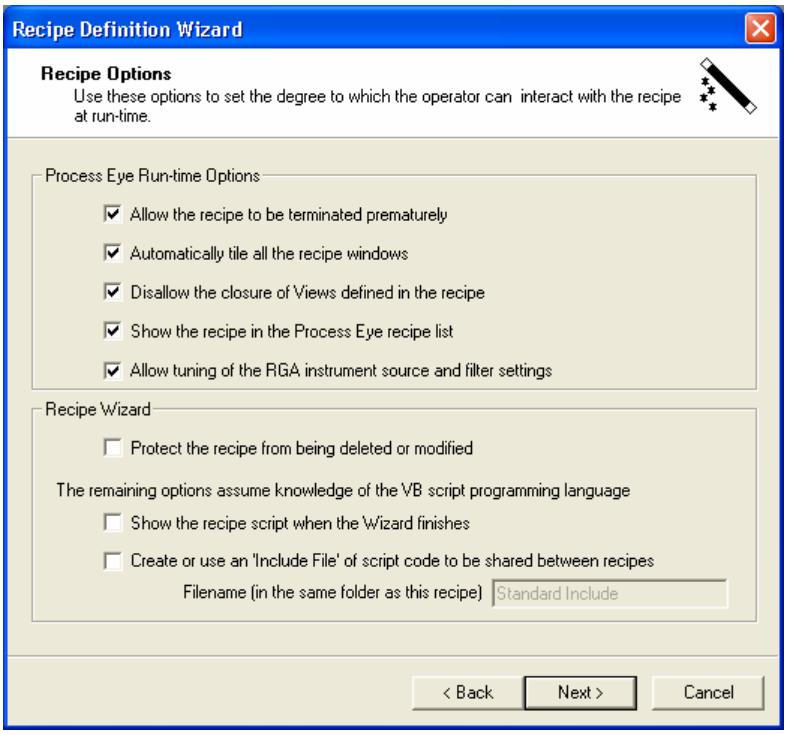
To create a new view click **New View** this will take you to the first page in the new view wizard.

To import or edit a view go to the view manager by clicking **View Manager** this will take you to the manage views dialog described in chapter 17.

Refer to the Process Eye manual for a full explanation of View Management and a description of how to define your own default view styles.

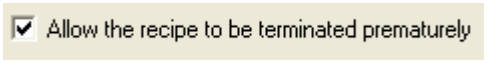
Chapter 12 – Recipe Options

There are a number of options that can be selected in the wizard which affect how the operator can interact with the recipe, both when the recipe is running and when editing the recipe in the Recipe Wizard program. The options can be selected by checking the appropriate box on the options dialog.



12.1 Allow the recipe to be terminated prematurely

Simply check the box



The recipe abort button will then be active and the recipe can be ended by the user before the recipe completion criteria have been met. If this option is not enabled then the only way to abort a recipe prematurely is to close Process Eye. Typically this option is un-checked if the recipe has its own means of termination or it launches another recipe.

12.2 Automatically tile all the recipe windows

Simply check the box

When the recipe runs all the views will be tiled.

12.3 Disallow the closure of views

Simply check the box

When enabled users will not be allowed to close views defined in the recipe, although they will still be able to resize them.

12.4 Show the recipe in the Process Eye recipe list

Simply check the box

When enabled the recipe name will appear in the Process Eye recipe list so the recipe can be started manually. When not enabled the recipe name will not appear, the recipe can still be started from an alarm action in another recipe or from script. This can be useful if automating a process using a number of linked recipes. Only the recipe to start the automatic process needs to shown in the list, the component recipes can be hidden from the user for ease of use. The recipe will always appear in the Recipe Wizard list however

12.5 Allow tuning of the RGA instrument source and filter settings

Simply check the box

This option is only available if one of the measurements is an analog type measurement. If selected the ion source settings and filter alignment settings can be changed from the recipe information page. See the Process Eye manual for more details.

12.6 Protect the recipe from being deleted or modified

Simply check the box

When enabled the recipe file will be marked as read only on the disk. This means that no changes can then be made to this file. Any changed that need to be made to the recipe will have to be saved under a different name.

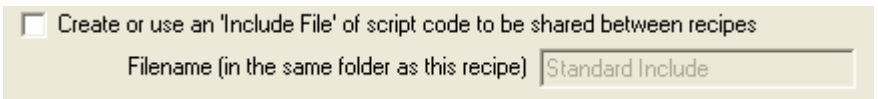
12.7 Show the recipe script when the wizard finishes

Simply check the box

When the wizard finishes the completed recipe script file will be displayed for editing in the script editor window. Typically you will leave this box un-checked.

12.8 Use or create an Include File

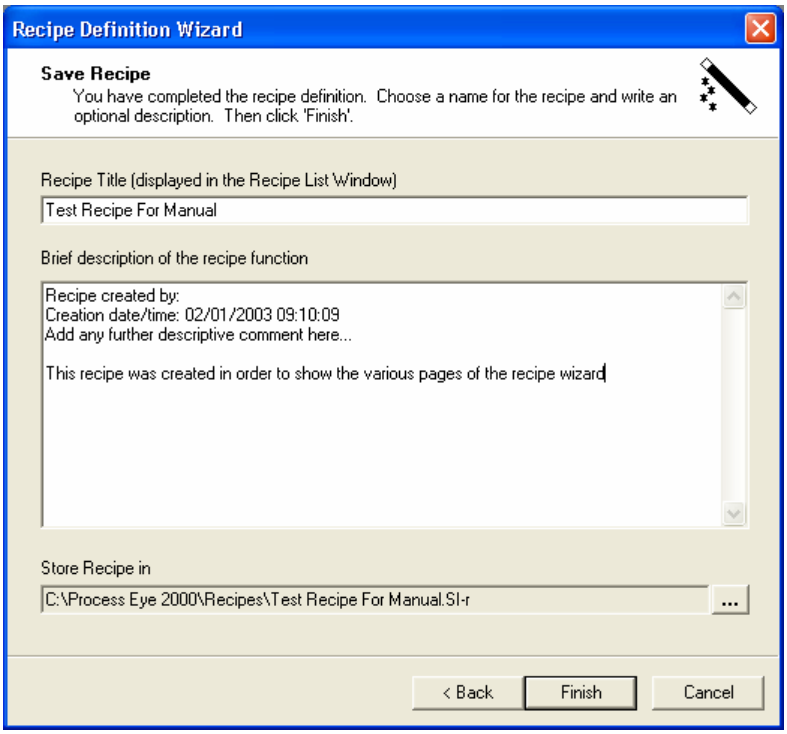
An include file is a file that contains Script code that may be used by more than one recipe. To use a script include file check the box and type the name that you wish to use for the include file.



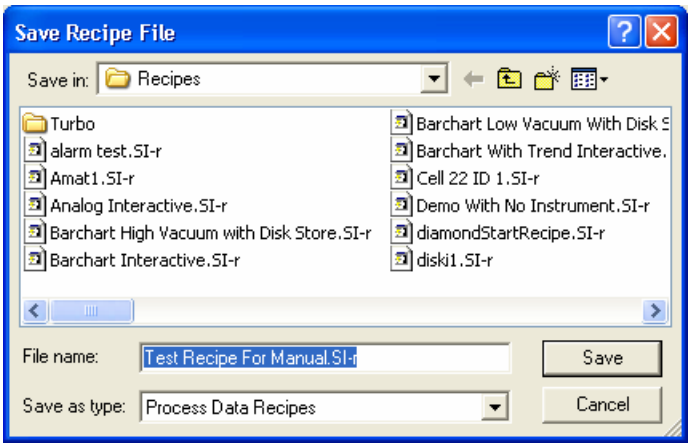
Include files have the extension .SI-i and must be in the same directory as the recipe that calls them. If the file does not already exist then one will be created. If one does exit then that file will be used.

Chapter 13 – Save the Recipe

Once all the settings for the recipe have been made the final step is to save the recipe.



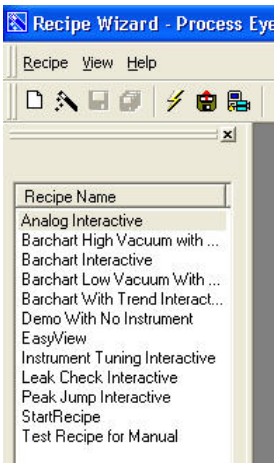
In the save recipe dialog you can enter a name for the recipe and also a comment. It is important to realize that the name that appears in the recipe list and the name of the recipe file do not have to be the same. By default when you type a name into the recipe title text box the same name will be given to the recipe file name. In the above example the recipe title is "Test Recipe For Manual" and the recipe file name is the default name of "C:\Process Eye 2000\Recipes\Test Recipe For Manual.SI-r". To change the recipe file name click on the browse button to bring up the Save recipe file dialog.

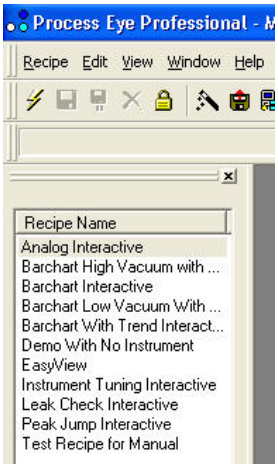


You can then enter a new recipe file name.

Note: If you edit an existing recipe and change the recipe title, the recipe file name does not change automatically. If you then click on save you will end up with two recipes appearing in the list with the settings stored to the same file. Editing one recipe will automatically change the settings in the other recipe and visa versa. You will also lose the original settings. You must click on the browse button and manually change the file name for the modified recipe.

The recipe is now complete and will appear in both the Recipe Wizard and Process Eye Professional recipe list





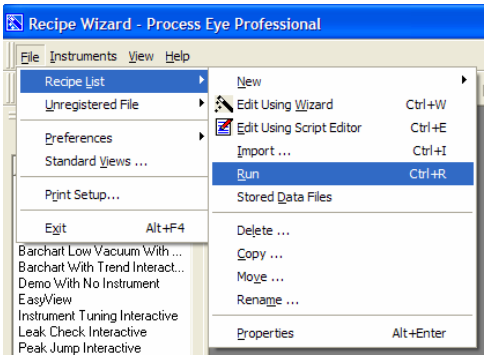
Chapter 14 – The Recipe Development Cycle

Overview

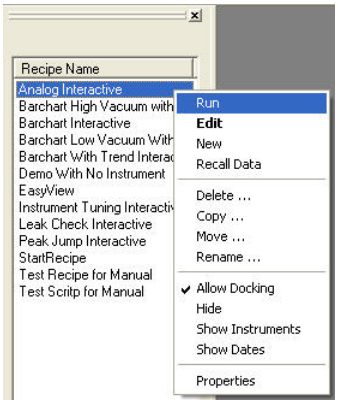
A typical recipe development cycle will involve several iterations. You will run the Wizard to define the recipe then try it out in the Process Eye application. Almost always you will find that it could be improved or enhanced and so you will edit it again and run it again and so on.

14.1 Running a Recipe from Recipe Wizard

It is possible to run a recipe from recipe wizard



Highlight the recipe to be run in the **Recipe List;** then from the Recipe pull down menu select **Recipe List | Run**



Alternatively click in the recipe to be run with the right mouse button and select **Run** from the list

Alternatively you could highlight the recipe in the recipe list and use the keyboard shortcut **Ctrl + R.**

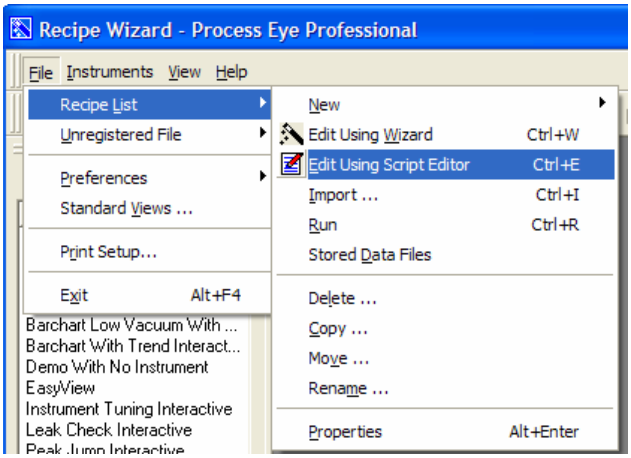
Finally you can right click on the recipe file name in Windows Explorer and choose **Run**.

If Process Eye is not currently running then it will start and the recipe will then be run automatically. If Process Eye is running then the recipe will run immediately.

14.2 Editing a Recipe Using Recipe Wizard

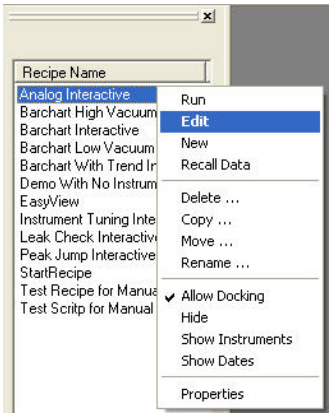
To edit a wizard recipe using the wizard, highlight the recipe in the recipe list, then click on the Wizard icon.

Alternatively, highlight the recipe to be edited



From the Recipe pull down menu select the **Recipe List | Edit Using Wizard** item.

For a script recipe you can also go to script edit from the recipe list



Simply click on the recipe name with the right mouse button and select **Edit.**

Finally you could highlight the recipe in the recipe list and use the keyboard shortcut **Ctrl + W**

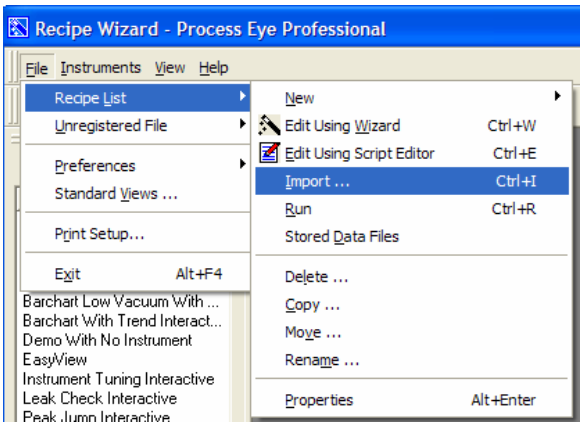
Note: If this is done with a script recipe the recipe will be edited in the script editor.

Chapter 15 – Managing Recipes

Recipe Wizard has a full set of functions to import, copy, move, rename or delete your installed recipes.

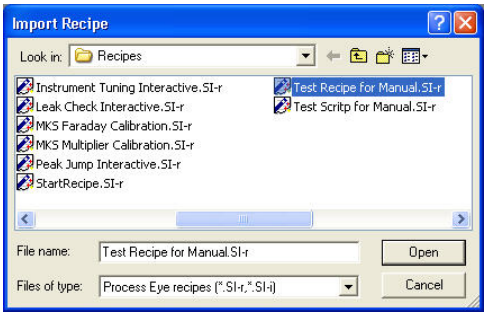
15.1 Importing a Recipe

When copying a recipe from one system to another it is not simply a case of copying the file. The details of recipes that Process Eye uses are kept in a configuration file. In order to register these entries you have to import the recipe.



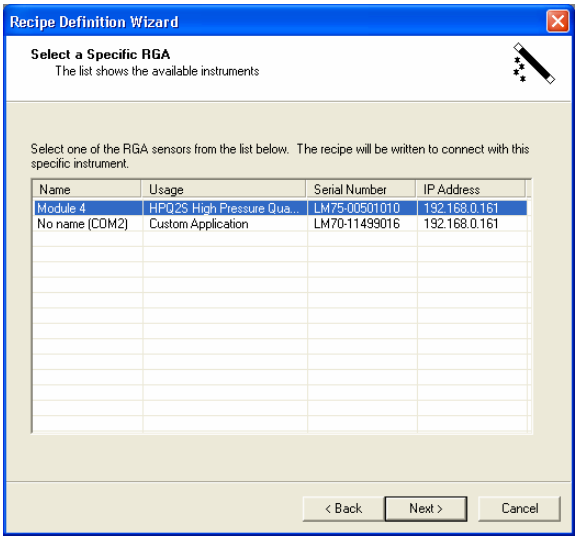
From the recipe pull down menu select **Recipe List | Import**; this will bring up the import dialog.

Alternatively use the keyboard shortcut **Ctrl + I**



Browse to the recipe file you wish to import and select Open. The settings in the recipe will then be loaded into the recipe wizard and you will step through each page of the recipe wizard as if you were editing the recipe.

If the imported recipe contains a reference to an instrument that you do not have you will see the following warning.



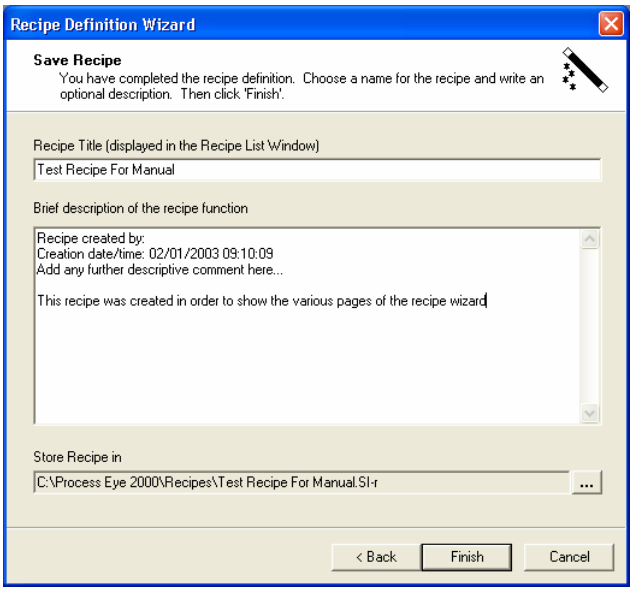
You will then be directed to the **Select a Specific RGA** dialog.

Before you can continue you must select a valid instrument from the list. If you select a different type of instrument than the one the recipe was written for, you may not be able to import all the features that were in the original recipe. For example if the original recipe contained a 1 to 200 Barchart measurement and the new instrument only has a max mass of 100 then the Barchart will need to be edited. If mass 150 is then used in an end of scan action this action will then be invalid etc.

Another place where you might get an error is on the views page. If the imported recipe contains references to views that do not exist on the current system you will see the following dialog.

In this case there are three choices that can be made. You can cancel the current import and import the required views first. Or you can click on Yes in which case the reference to the views will be left in the recipe. You can then either import the views at a later time or let Process Eye create default views when the recipe is run. Or you can click no, in which case all references to the unknown views will be removed, you can then add your own views to the recipe if required.

The last step of the wizard is the save dialog

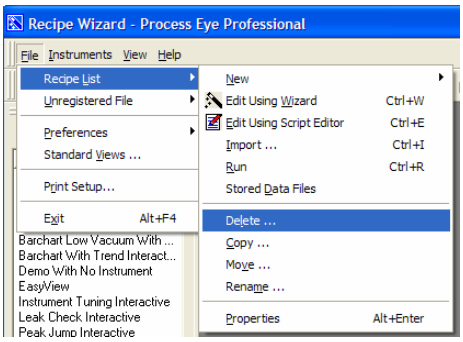


When you import the recipe, by default the recipe title will be the same as the original, the comment will be the same as the original and the recipe file name will be the original file name but with the path changed to the default recipe path. When you click on **Finish** a copy of the file will be created in the Recipes folder with any changes you made during the import process.

To export a recipe so that it can be used on another computer, simply copy the SI-r file from your computer and import it to the other computer.

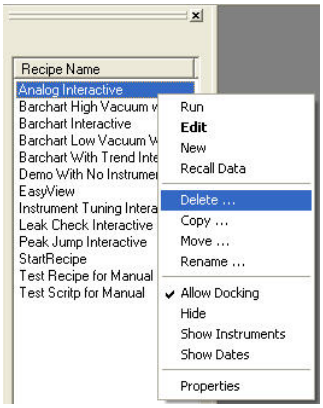
15.2 Deleting a Recipe

Recipes are registered files and deleting them is not as simple as just deleting the file from the disk

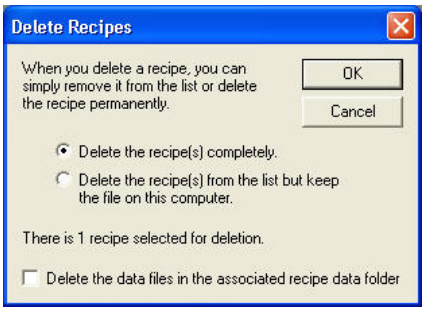


To delete a recipe first highlight it in the recipe list then select **Recipe List | Delete** from the recipe pull down menu.

You can select multiple entries in the list to delete several entries at the same time.

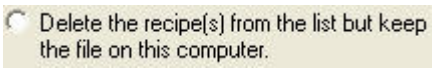


Alternatively right click on the selected recipe(s) and select **Delete**



There are two options on the Delete recipe dialog.

Select **Delete the recipe(s) completely** to delete the recipe name from the recipe list and the recipe file from the hard drive.

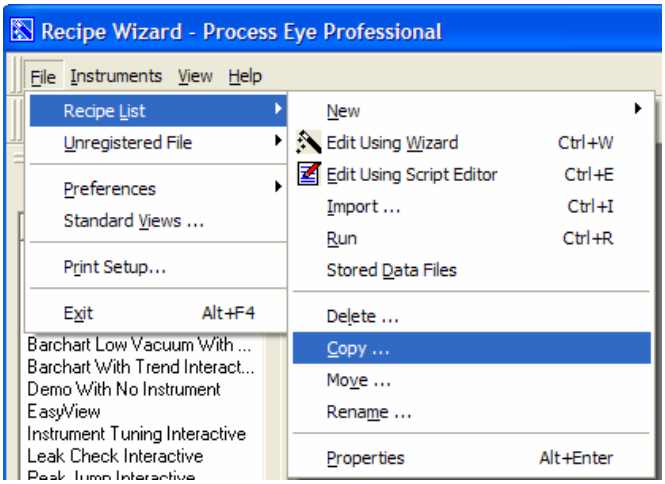


Select **Delete the recipe(s) from the list but keep the file on this computer** to delete the recipe name from the recipe list but leave the recipe file untouched so it can be imported again later.

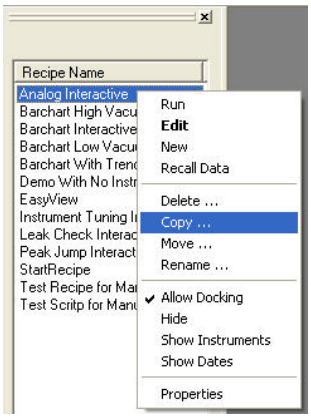
Click **OK** to make the changes or click **Cancel** to exit without making any changes

15.3 Copying a Recipe

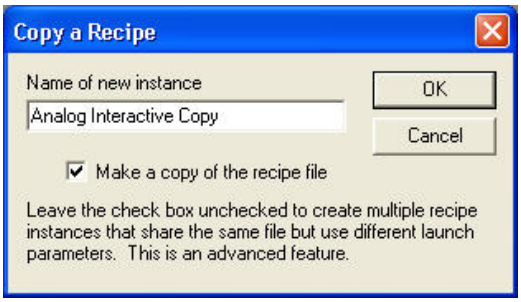
To copy a recipe either



Highlight the recipe to be copied in the recipe list and select **Recipe List | Copy** from the Recipe pull down menu



Click on the recipe to be copied with the right mouse button, then select **Copy** from the list.

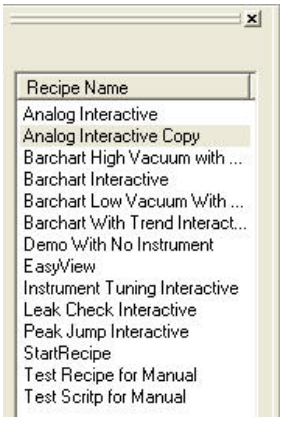


Enter the name of the new recipe; this is the name that will appear in the recipe list. By default there will also be a copy of the recipe file made with the same name as that entered into the text box but with a .SI-r extension.

To make a new reference to an existing recipe file un-check the "Make a copy of the recipe file" check box. This will make a copy reference to the same recipe file that allows the user to start the recipe with different launch parameters.

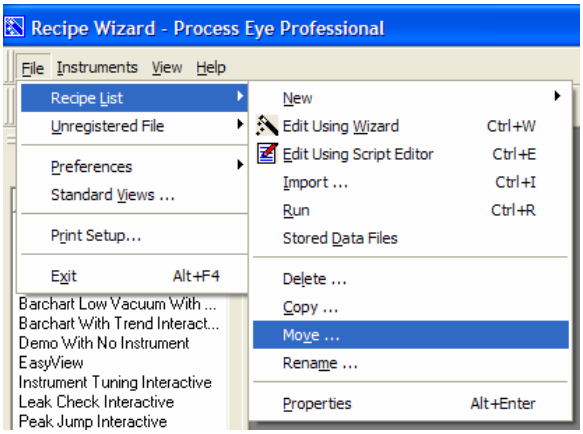
If a different name is not entered into the recipe name text box a warning dialog will be displayed.

After a copy is made there will be a new entry in the recipe list with the new recipe name. This file will have the same properties as the original recipe and can be edited in the same way.

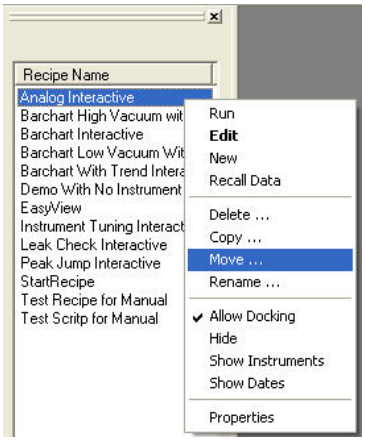


15.4 Moving a Recipe

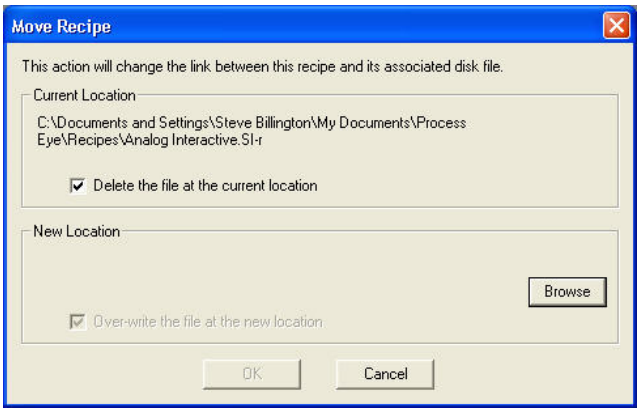
Since recipe files are registered files you cannot simply move a file to a new location.



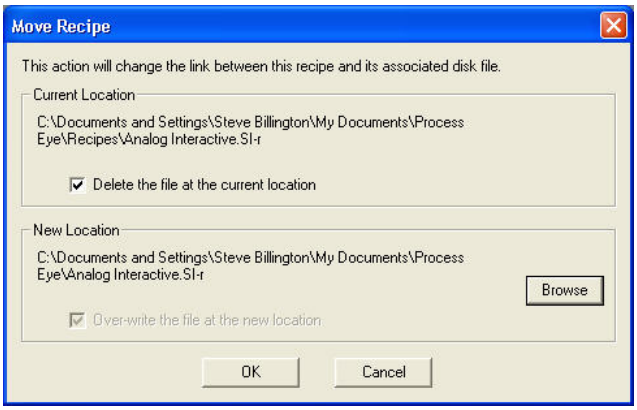
Highlight the recipe to be moved in the recipe list, then select **Recipe List | Move** from the recipe pull down menu.



Alternatively click on the recipe to be moved with the right mouse button and select **Move** from the list.



The "Move Recipe" dialog will appear; the current location of the recipe file selected will be displayed, click on **Browse** to select the new location for the file



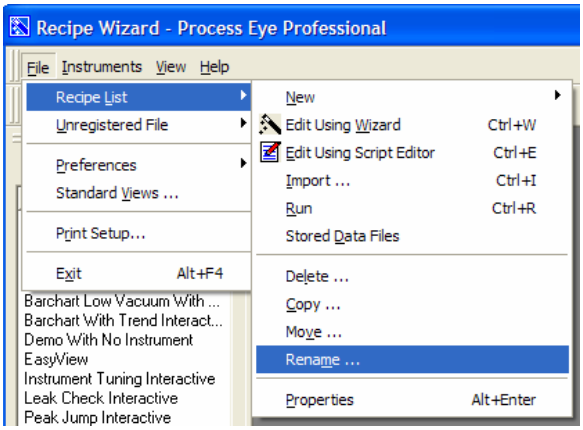
The new location will then be displayed. Click **OK** to move the file.

Click **Cancel** to exit without making any changes

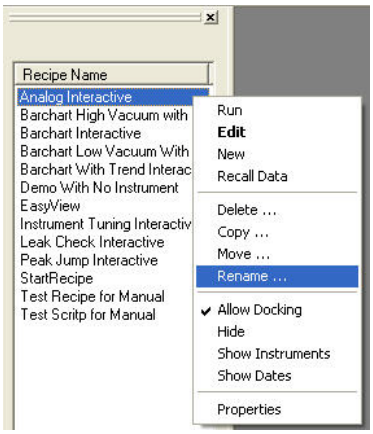
By default the **Delete the file at the current location** check box is checked. To leave a copy of the file at the current location un-check this box. It should be noted however that the file left at the original location will not be used by Process Eye. Any changes made to this file will not affect the recipe when run.

15.5 Renaming a Recipe

To give a recipe in the recipe list a new name



Highlight the recipe to be renamed in the recipe list, then select **Recipe List | Rename** from the recipe pull down menu

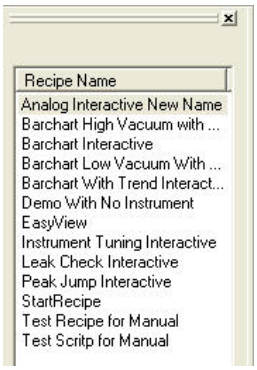


Alternatively click on the file to be renamed with the right mouse button and select **Rename** from the list

Enter a new name for the recipe in the text box. By default the **Apply the same name to the recipe file** check box is checked. This means that the recipe file will be given the same name as the name entered into the check box but with a .SI-r extension. To leave the recipe name unchanged but to simply change the name that appears in the recipe list, uncheck this box.

To change the name click OK or to exit without making any changes click **Cancel.**

If the name entered is the same as the original then a warning dialog will appear.



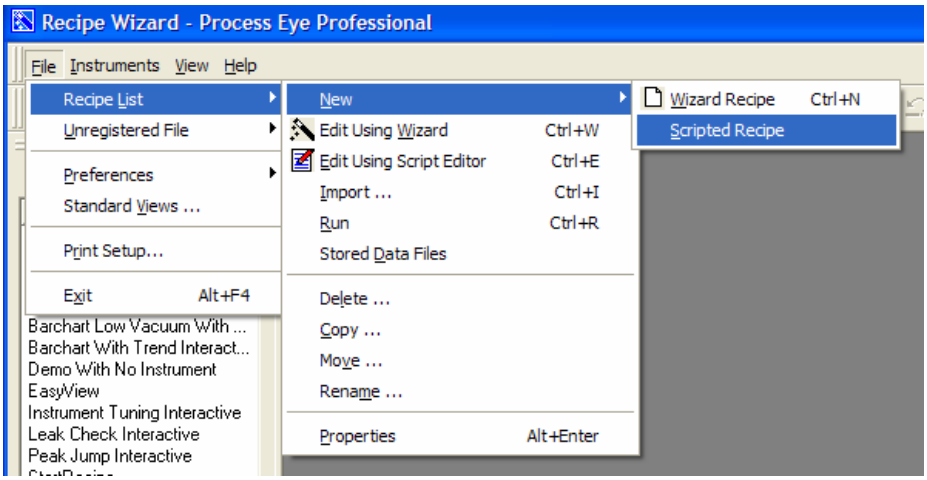
After changing the name of the file the new name will appear in the recipe list.

Chapter 16 – Additional Recipe Wizard Features

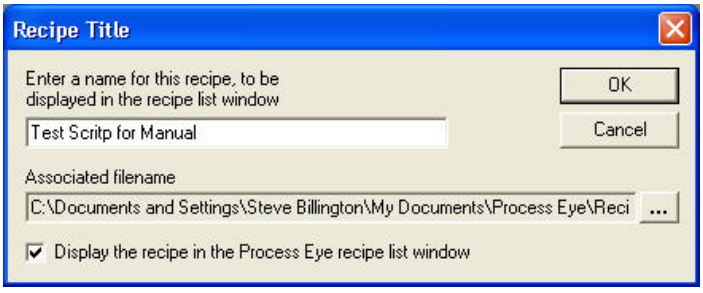
Recipe Wizard is a powerful editor in its own right. You can use it to author your own recipe scripts or to edit a range of file types such as html, xml, JavaScript and so on. These files or scripts can optionally be registered in the Recipe Wizard's recipe list.

16.1 Creating a New Script Recipe

Although it is easier to create a wizard recipe and then add your own script, it is possible to create a script recipe from scratch.

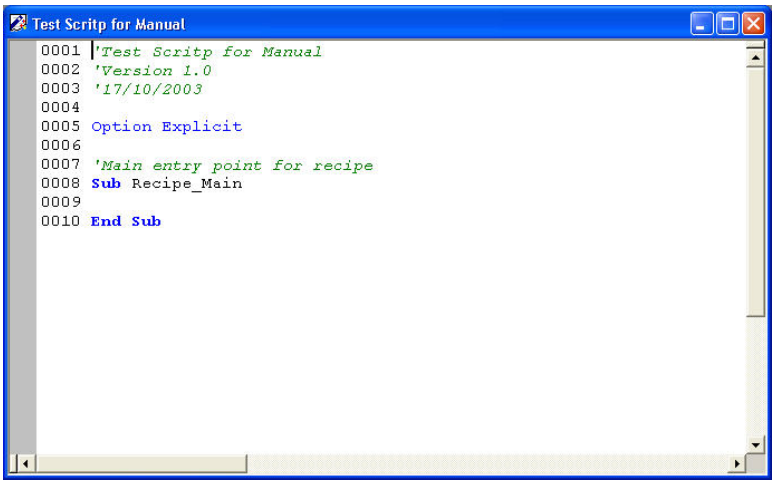


From the recipe pull down menu select **Recipe List | New | Scripted Recipe**



This will bring up the script recipe dialog. As in the recipe wizard the name that appears in the recipe list and the file name that the recipe is stored as do not have to be the same. You can click on the browse button and edit the recipe file name manually.

If you want the recipe to appear in the Process Eye recipe list then but a check in the box

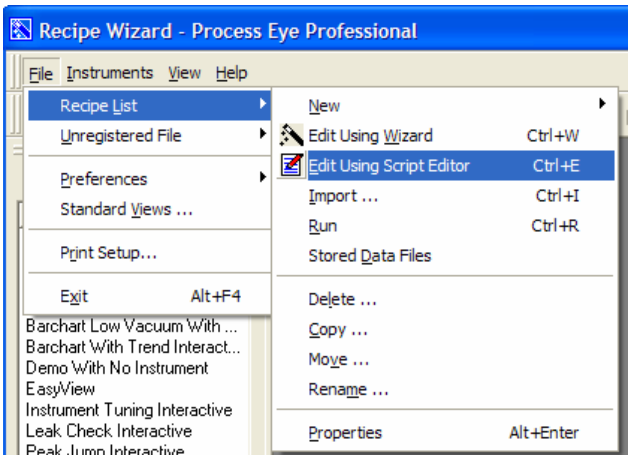


A recipe file template window will then appear in the script editor.

You can then add the required script code and click on the save icon when the code is complete. For more information on writing script see section 3.

16.2 Editing Recipe Script

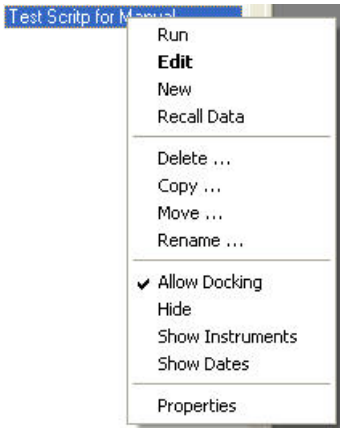
To edit script either in a script recipe or a wizard recipe, highlight the recipe in the recipe list; then click on the script edit icon.



Alternatively, highlight the recipe to be edited

From the Recipe pull down menu select
Recipe List | Edit Using Script Editor

For a script recipe you can also go to script edit from the recipe list



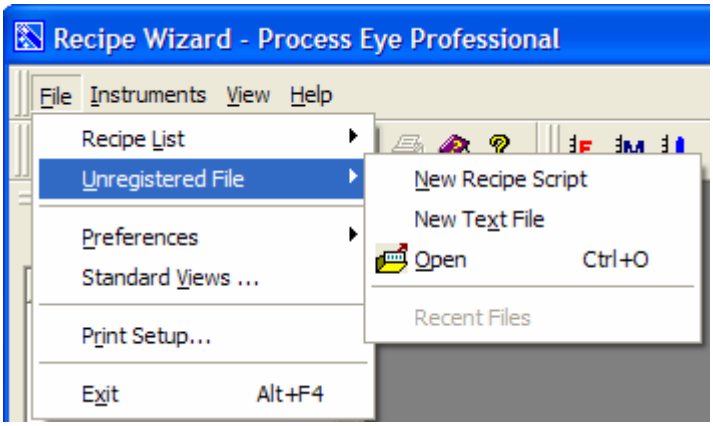
Simply click on the recipe name with the right mouse button and select **Edit.**

Finally you could highlight the recipe in the recipe list and use the keyboard shortcut **Ctrl + E**

Note: If this is done with a wizard recipe the recipe will be edited in the wizard.

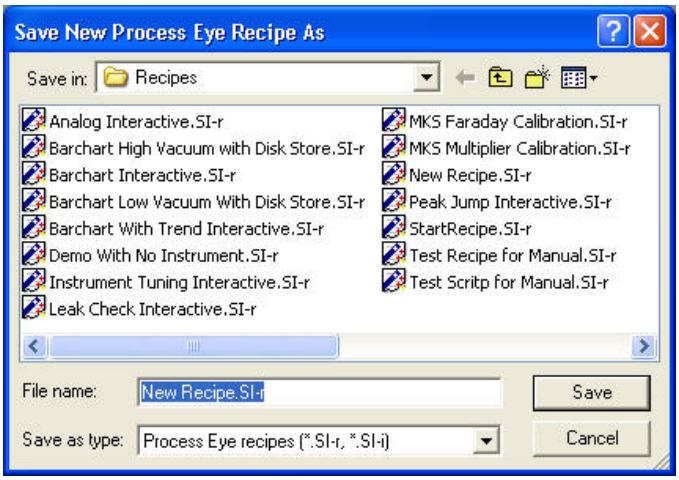
16.3 Working with Un-Registered Files

It is possible to edit un-registered files that don't appear in either the Process Eye or Recipe Wizard recipe list.



From the recipe pull down menu select **Unregistered File** and then one of the three options

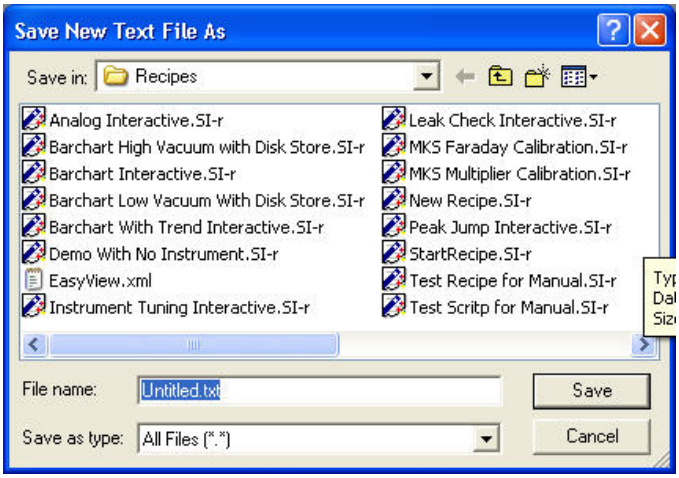
Select **New Recipe Script** to bring up the **Save New Process Eye Recipe As** dialog



Enter a name and click **Save** to create a blank recipe script. The prototype script file will be stored to disk and will open in the script editor. It will not appear in the recipe list.

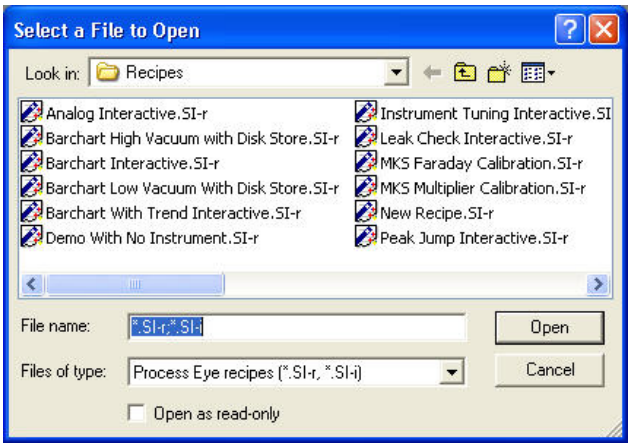
Note: You could add it to the list later by using the Recipe List | Import function.

Select **New text file** to bring up the **Save New Text File As** dialog



Enter a name and click **Save** to create a blank text file. The text file will simply be stored to disk and will open in the script editor. It will not appear in the recipe list.

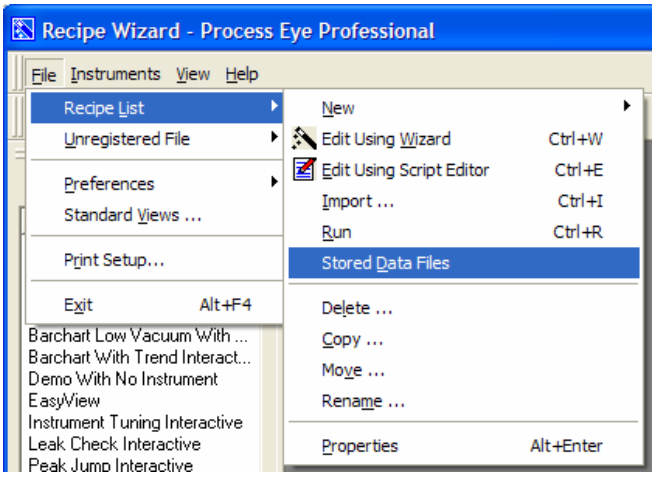
Select **Open** to bring up the **Select a file to Open** dialog.



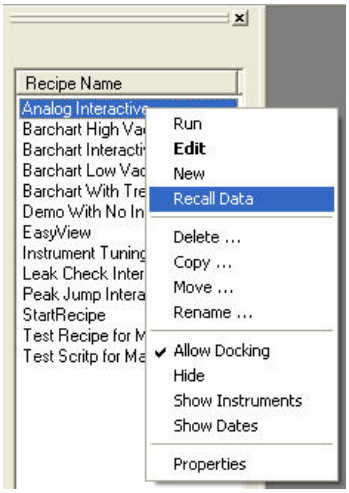
Select a single file or multiple files and click **Open** to open files in the script editor.

16.4 Opening Data Files Stored By a Recipe

It is possible to open the Recall program with the active folder set to the default folder for the recipe listed.



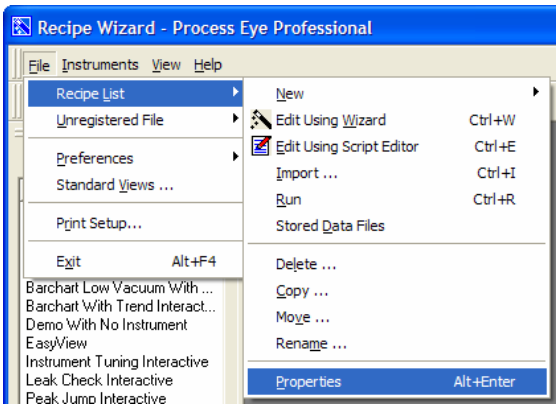
Highlight a recipe in the recipe list then from the recipe pull down list select **Recipe List | Stored Data Files**



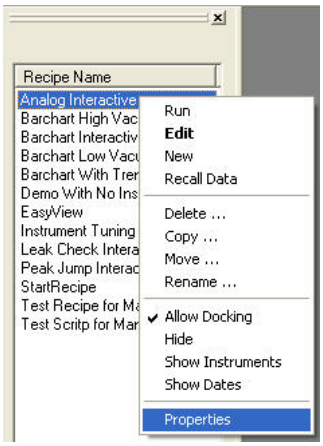
Alternatively right click on the recipe and select **Recall Data** from the list

16.5 Recipe Properties

The recipe properties dialog gives details of the recipe, allows the comment portion of the recipe script to the viewed and allows run parameters to be set for the recipe.

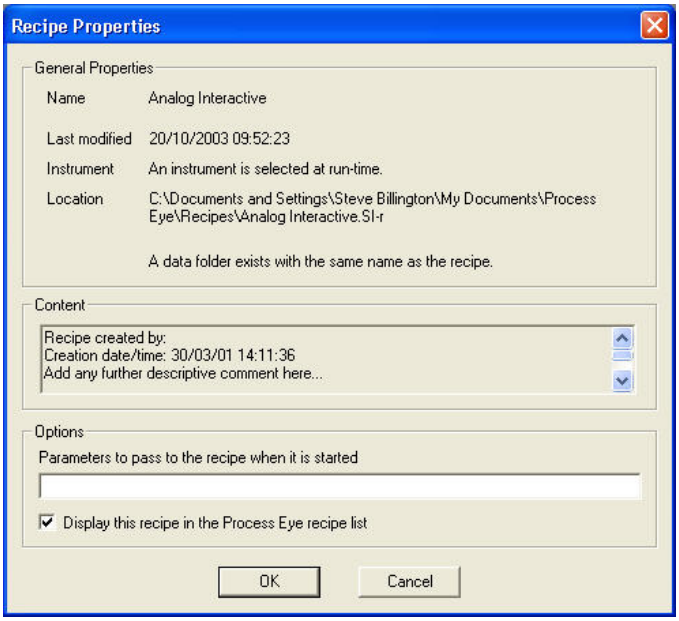


To view the properties dialog highlight the recipe in the recipe list then select **Recipe List | Properties** from the Recipe pull down list.



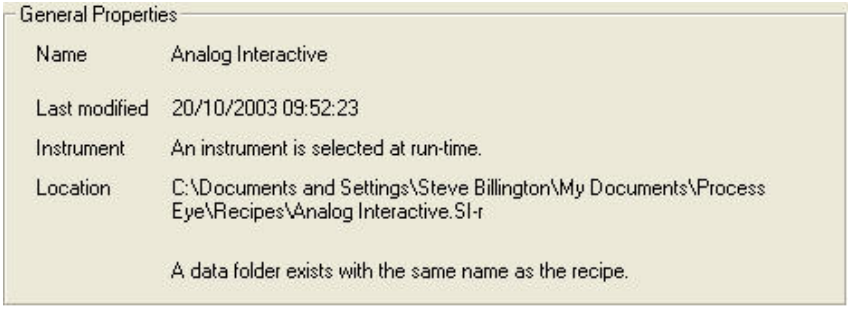
Alternatively click on the recipe with the right mouse button and select **Properties** from the list

Finally you could highlight the recipe in the recipe list and use the keyboard shortcut **Alt+Enter**



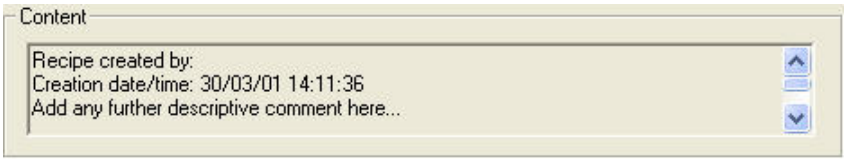
The "Recipe Properties" dialog contains three parts

I General Properties



Included in general properties is the name of the recipe as it appears in the recipe list, the date the recipe was last modified, the name of the instrument associated with this recipe (in this case the recipe is generic and has no specific instrument associated with it) and the file name and location of the recipe file. If there is a folder in the data directory with the same name as the recipe this information will also be displayed.

II Content



The recipe content text box displays all the comments in the recipe script above the start of the recipe wizard generated code that starts with the line

'{{RWIZ01

Recipes written by the wizard will normally only have the creation date, however additional descriptive comment can be added using the script editor (see section 3.2) Comment lines always start with an apostrophe and in the script editor will appear as green text

'Recipe comments appear as green text

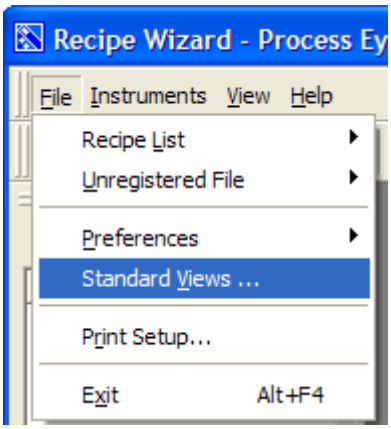
III Options

Recipe start parameters are parameters that you wish to pass the recipe at startup. The parameters must be passed as a single text string, however multiple parameters can be passed by using a delimiting character between them and then using the recipe script to split the string and interpret the parameters. Examples of parameters that might be sent at startup are the Head Name or Serial Number of the instrument the recipe should connect to or the name of the file that should be used to store the data.

Depending on the options chosen when the recipe was created the **Display this recipe in the Process Eye recipe list** may be checked or not. If checked the recipe appears in both the Recipe Wizard and Process Eye recipe lists. If it is un-checked then the recipe will only appear in the Recipe Wizard list.

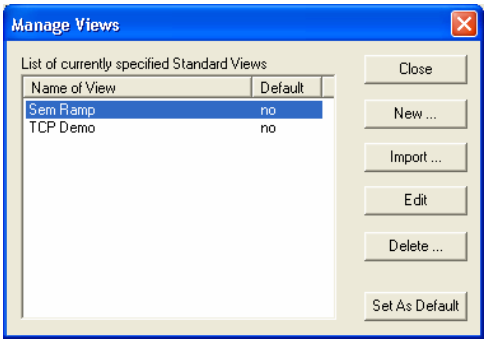
Chapter 17 – Managing Views

All data is displayed using pre-defined views, these views can be created, edited or imported using the view manager.

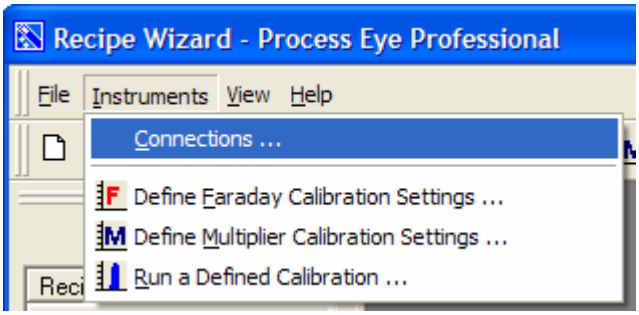


To start the view manger select **Standard Views** from the recipe pull down menu.

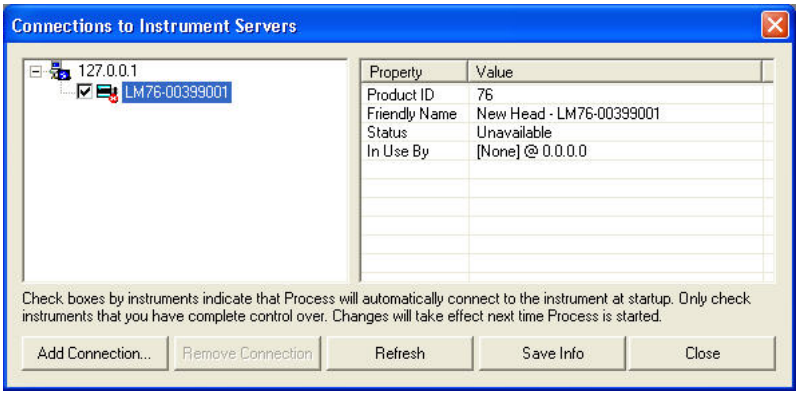
This will bring up the view manger dialog.



For more information about View Manger see section 8 of the Process Eye Professional manual.



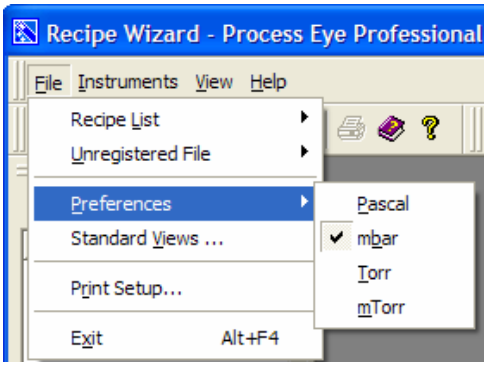
To go to the connections dialog select **Instruments | Connections** from the recipe pull down menu.



This dialog can be used to configure the instrument connections. It is the same dialog that is used in Process Eye and is described in the Process Eye manual.

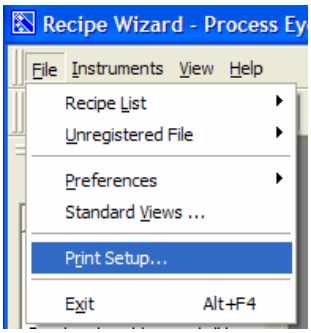
Chapter 19 – Preferences

The only preference that can be changed in Recipe Wizard is the pressure unit used.

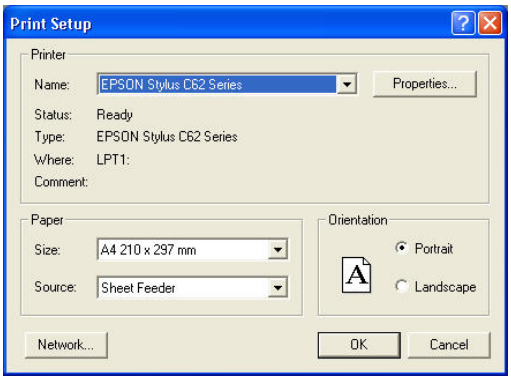


From the Recipe pull down menu select **Preferences** and then the units you wish to use. The currently available units are Pascal, mBar, Torr or mTorr. The units in Recipe Wizard do not have to be the same as those in Process Eye. However the setup applications can be used to set a common set of units throughout the whole application suite.

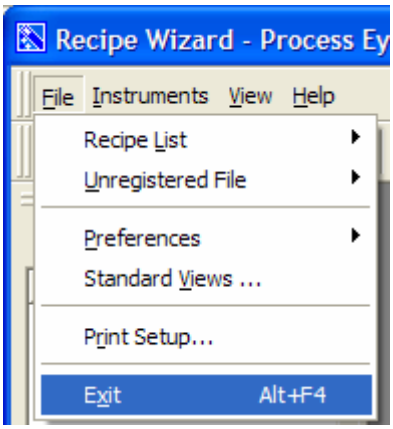
20.1 Print Setup



To set up the printer select **Print Setup** from the recipe pull down menu. This will bring up a standard windows printer setup dialog.



20.2 Closing Recipe Wizard



To close recipe wizard either

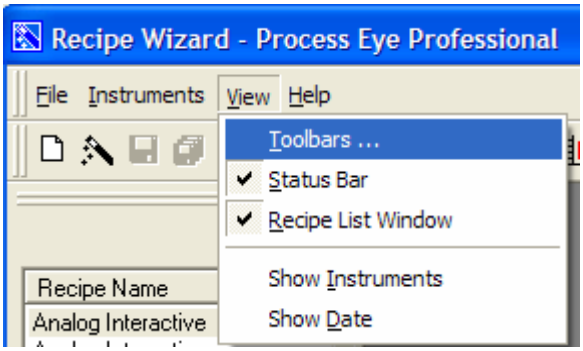
Select **Exit** from the Recipe pull down menu

Use the close button in the top right corner of the application window.

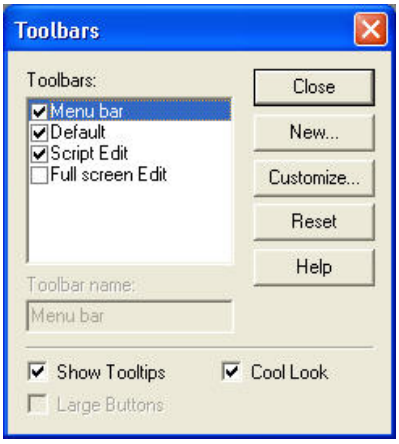
Use the keyboard shortcut **Alt-F4**

20.3 View Menu

I Toolbars



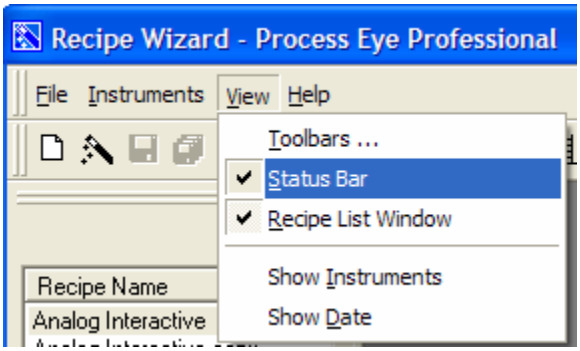
To edit the toolbars select **Toolbars** from the view pull down menu



This will bring up the toolbars dialog; from here it is possible to choose which toolbars are displayed and to customise the toolbars.

This dialog is described in the Process Eye manual.

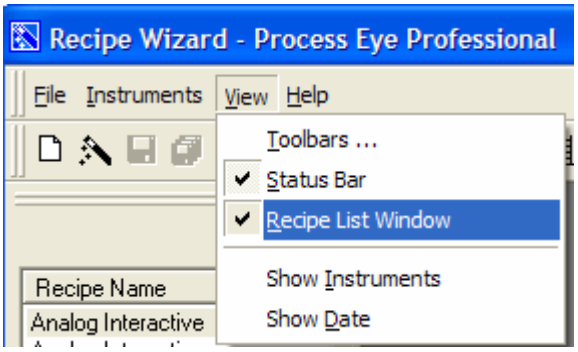
II Status Bar



The status bar can be switched on and off

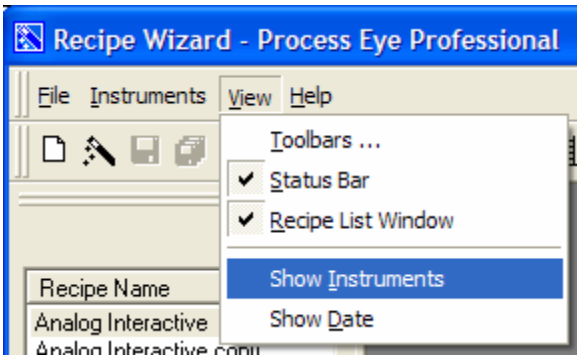
Select **Status Bar** from the view pull down menu. Selecting will toggle the Status Bar on and off. When on there will be a tick next to Status Bar in the list.

III Changing Recipe List View

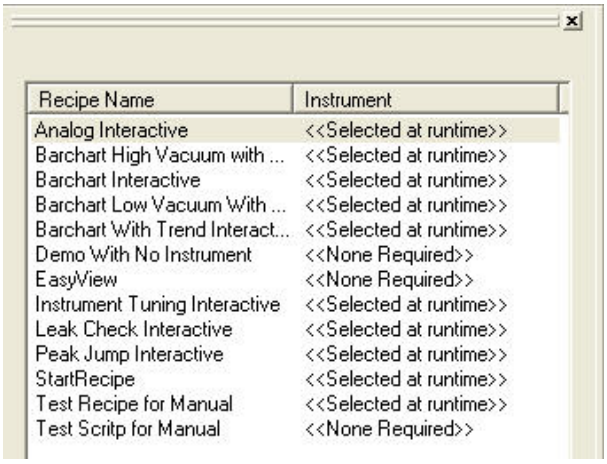


The recipe list window can be switched on and off

Select **Recipe List Window** from the view pull down menu. Selecting will toggle the Recipe List Window on and off. When on there will be a tick next to Recipe List Window in the list. Although the recipe list can be closed from elsewhere, this is the only place that where the view can be switched back on.

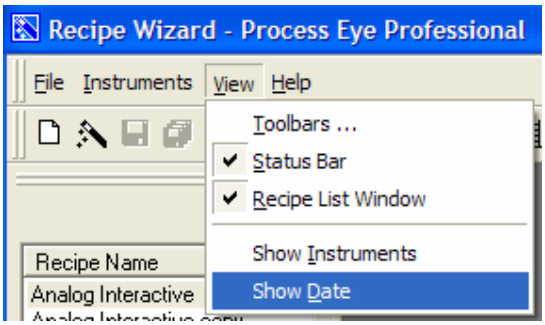


To show the instruments that each recipe is associated with select **Show Instruments** from the View pull down menu

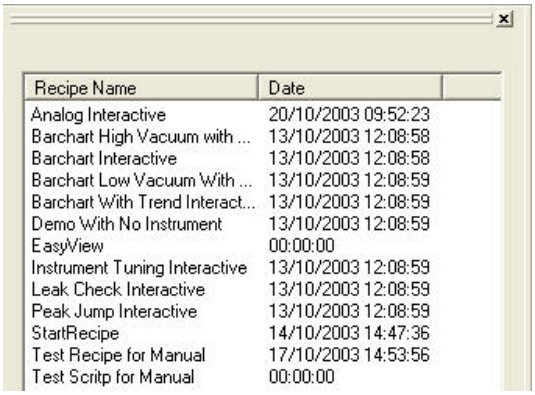


Recipe Name	Instrument
Analog Interactive	<<Selected at runtime>>
Barchart High Vacuum with ...	<<Selected at runtime>>
Barchart Interactive	<<Selected at runtime>>
Barchart Low Vacuum With ...	<<Selected at runtime>>
Barchart With Trend Interact...	<<Selected at runtime>>
Demo With No Instrument	<<None Required>>
EasyView	<<None Required>>
Instrument Tuning Interactive	<<Selected at runtime>>
Leak Check Interactive	<<Selected at runtime>>
Peak Jump Interactive	<<Selected at runtime>>
StartRecipe	<<Selected at runtime>>
Test Recipe for Manual	<<Selected at runtime>>
Test Scritp for Manual	<<None Required>>

Next to the recipe name will be the instrument name. Generic recipes will have **<<Selected at runtime>>** as the instrument.



To show the date that the recipe was last modified select **Show Date** from the View pull down menu

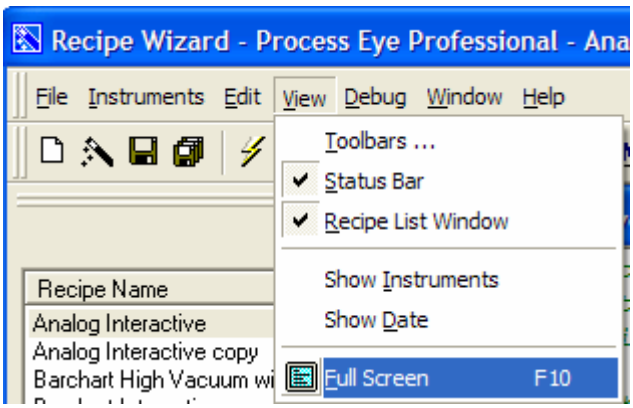


Recipe Name	Date
Analog Interactive	20/10/2003 09:52:23
Barchart High Vacuum with ...	13/10/2003 12:08:58
Barchart Interactive	13/10/2003 12:08:58
Barchart Low Vacuum With ...	13/10/2003 12:08:59
Barchart With Trend Interact...	13/10/2003 12:08:59
Demo With No Instrument	13/10/2003 12:08:59
EasyView	00:00:00
Instrument Tuning Interactive	13/10/2003 12:08:59
Leak Check Interactive	13/10/2003 12:08:59
Peak Jump Interactive	13/10/2003 12:08:59
StartRecipe	14/10/2003 14:47:36
Test Recipe for Manual	17/10/2003 14:53:56
Test Scritp for Manual	00:00:00

The date the recipe was modified will be shown next to the recipe name.

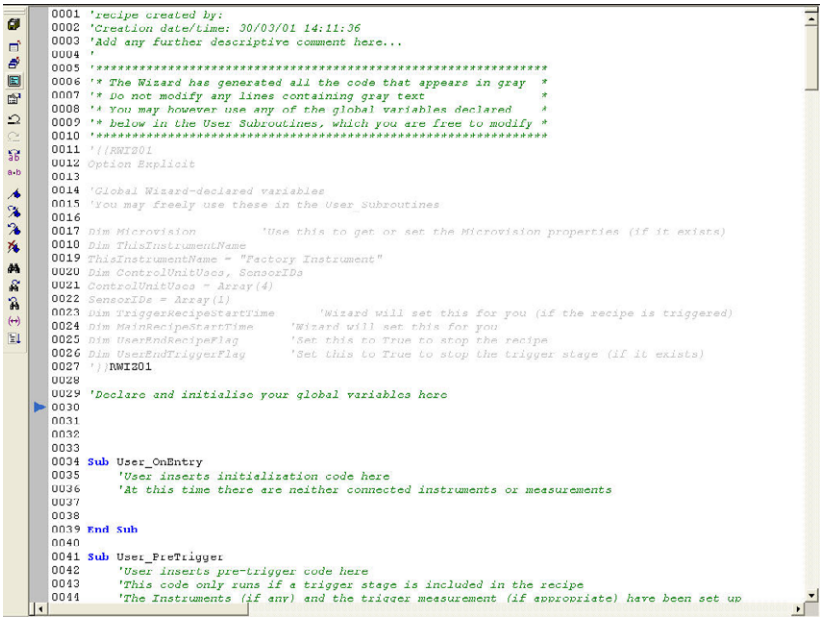
Both the instrument and date can be displayed at the same time.

IV Full Screen Edit



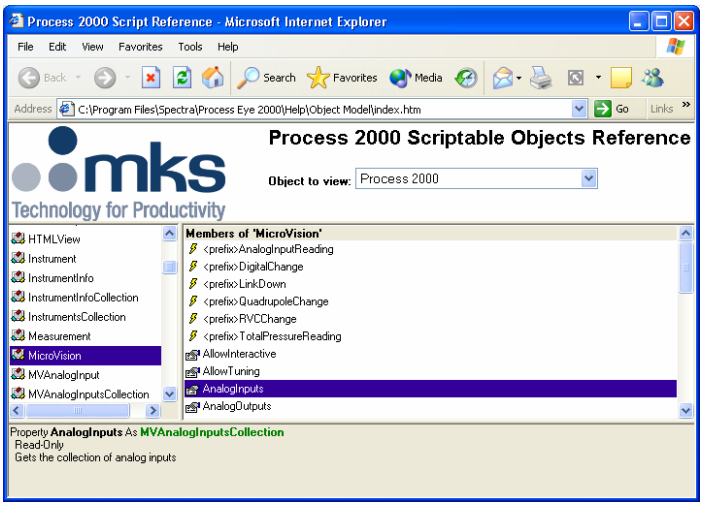
If a recipe script is open there will be an additional item on the View pull down menu

To select full screen edit either click on , select **Full Screen** from the View pull down menu or use the keyboard shortcut **F10**



To return to the standard edit view click on again or use the keyboard shortcut **F10**

20.4 Help Menu

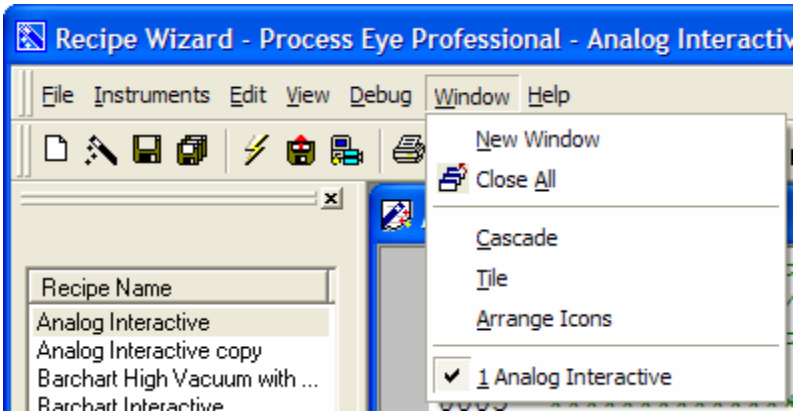


From here you can browse the Process Eye Object Model. This contains the object model for all the VB script code specific to Process Eye. The object model is a HTML document and will be opened in your default internet browser.

This document provides a comprehensive list of all the commands required to write recipes in Script. The next chapter has more details.

The last option is **About Recipe Wizard**; this gives details of the software version of your currently installed version of Recipe Wizard. This information will be required if contacting MKS for technical assistance. The information is displayed in the standard windows dialog.

20.5 Window Pull Down Menu



There are five functions on the window pull down menu; in addition all open scripts will be listed at the bottom of the menu. The current active script will be the one with the check next to it. To select another script to edit simply click on the required recipe script in the list. In the above example the Analog Interactive script is open in the editor.

To open a new script window for an already open script select **New Window**

The originally open window will be renamed as window 1 the new window will be window 2 etc. The new window contains script loaded from the file on the disk, it will not contain any changes made to window 1 that have not been saved to disk.

To close all the open script windows select **Close All** from the window pull down menu.

To cascade the open windows select **Cascade**; to tile the windows horizontally select **Tile.**

Chapter 21 – Process Eye Recipe Script

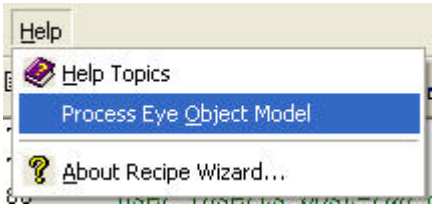
Overview

All Process Eye recipes are Visual Basic script files; this is true whether the script is written manually or via the recipe wizard. The recipe wizard application contains a script editor that helps the user to create and edit script code. In addition recipes written by the wizard contain pre-defined subroutines to allow for easy addition of code.

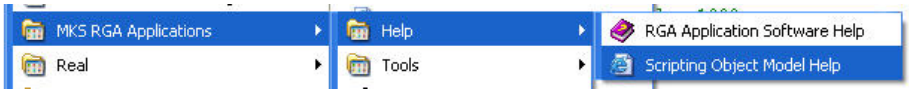
This section of the manual is intended for those customers who have a working knowledge of VB script. Customers who have very little or no knowledge of VB script are advised to familiarize themselves with the language before attempting to write or edit recipes.

21.1 Process Eye Object Model

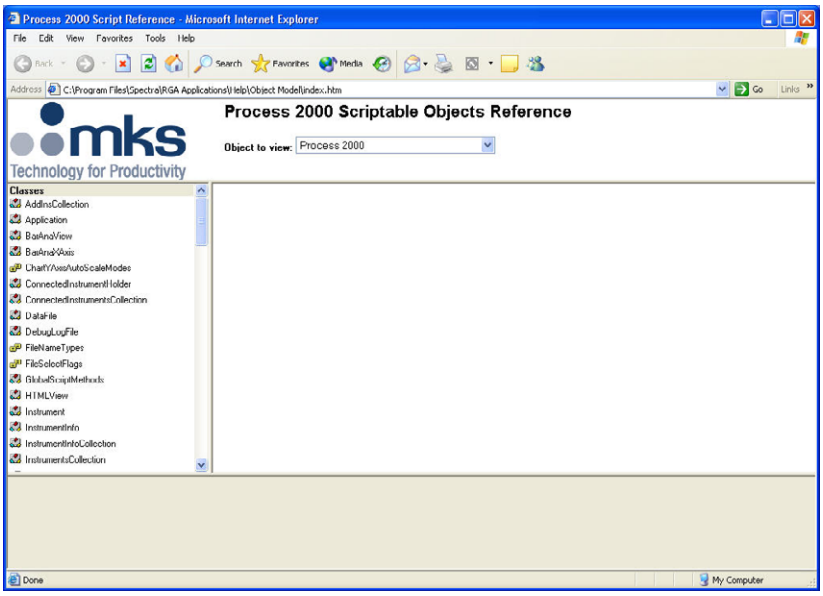
The Process Eye object model contains all the script classes and objects particular to Process Eye.



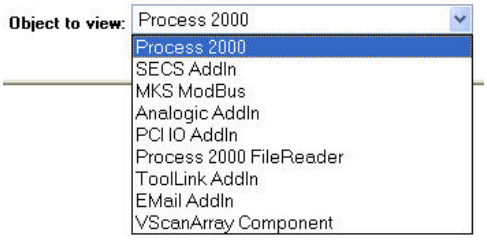
To view the object model select **Process Eye Object Model** from the Help pull down menu



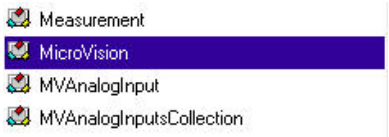
Alternatively select **Scripting Object Model Help** from **Start | All Programs | MKS RGA Applications | Help**



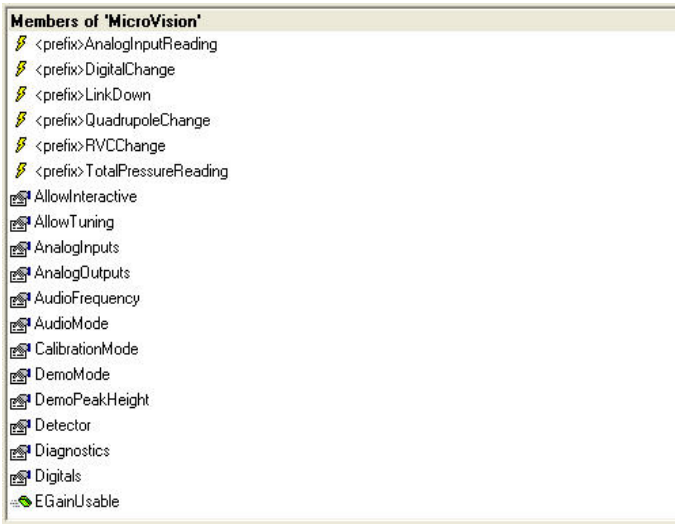
The object model will run in your active browser. The object model includes the classes for all the current addins for Process Eye



To see the classes for one of the addins simply select the addin from the object to view pull down list. The classes for that object will then be displayed in the classes list window. To see the members of a class click on the class



For example, to see the methods used in the include file example to read the analog input click on **Microvision**



In the list of "Members of Microvision" select **AnalogInputs**

In the property window a brief description of the property is given, along with any further links. Click on the link **MVAnalogInputsCollection**

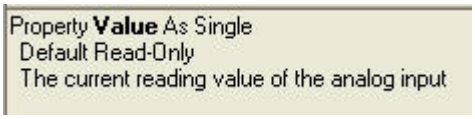
The class list will now jump to the **MVAnalogInputsCollection**

And the members of **MVAnalogInputsCollection** will be displayed

Click on Item to see the properties of microvision.analoginputs

This shows that the item is the index of the analog input, click on MVAnalogInputs to see the members of microvision.analoginputs(0)

As can be seen many of the properties used in the example are shown in the list. To see a description of the value property click on Value

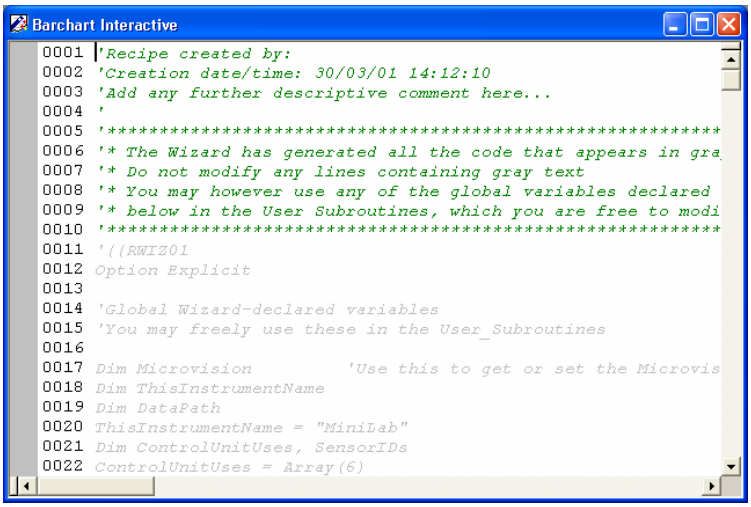


This shows that microvision.analoginputs(0).value returns a read only single precision number representing the value (voltage) of analog input 1

Note: The object model lists all classes and their properties; however its usefulness as a manual for writing script code is somewhat limited. For example, from the above example it would not be obvious that an analog input has to be enabled before it can be read.

21.2 - Script Editor

To edit the script in a recipe, highlight the required recipe in the recipe view list then either click on the Script Edit icon , select **Recipe List | Edit Using Script Editor** from the File pull down menu or use the keyboard shortcut **ctrl E**. This will bring up the script window



When in editor mode a number of new pull down menus will be displayed as well as new options on the normal pull down menus

I Undo and Redo Functions

Any changes to the script code can be undone and redone using the undo and redo functions.

To undo a change either click on the undo icon , select **Undo** from the edit pull down menu, right click on the recipe script and select **Undo** from the list or use the keyboard shortcut **ctrl Z**.

One a change has been undone it can be redone by either using the redo icon , selecting <Redo> from the edit pull down list, right click on the recipe script and select **Redo** from the list or by using the keyboard short cut **ctrl+Y**

II Cut, Copy and Paste Functions

You can edit blocks of text in the normal way using the cut, copy and paste functions.

To move a block of text from one place to another, first highlight the text to be moved.

Then select cut either by clicking on the cut icon , selecting **Cut** from the pull down menu, right clicking on the recipe script and selecting **Cut** from the list or using the keyboard shortcut **Ctrl+X**.

To copy the cut text to a new location, click on the place you want the cut text to start

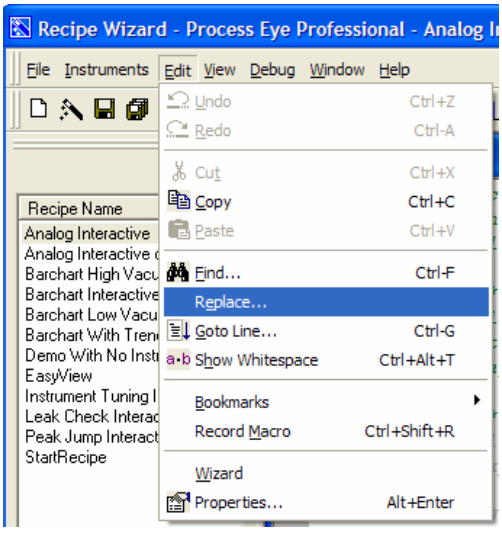
Then paste the cut text either by clicking on the paste icon , selecting **Paste** from the edit pull down menu, right clicking on the recipe script and selecting **Paste** from the list or using the keyboard shortcut **Ctrl+V**.

To copy a block of text from one place to another, first highlight the text to be copied. Then select copy either by clicking on the copy icon , selecting **Copy** from the pull down menu, right clicking on the recipe script and selecting **Copy** from the list or using the keyboard shortcut **Ctrl+C**.

To copy the text to a new location, click on the place you want the copied text to start.

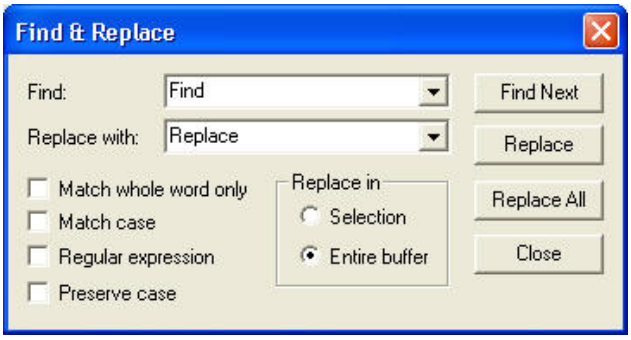
Then paste the text either by clicking on the paste icon , selecting **Paste** from the edit pull down menu, right clicking on the recipe script and selecting **Paste** from the list or using the keyboard shortcut **Ctrl+V**.

III Find and Replace Functions



The replace function is selected from the edit pull down menu

Select **Replace** from the Edit pull down menu or right click on the recipe script and select **Replace** from the list



This will bring up a standard Find & Replace dialog. Type the text to find in the find text box and the text to replace it with in the replace text box. To limit the text to be searched select the **Selection** option in the **Replace in** section. The only text to be searched will be the part of the script highlighted before the Replace function was selected. Select the **Entire buffer** option to search an entire script.

To replace all instances of the text to be found, click on **Replace All**

To check the text first click on **Find Next**; the found text will be shown; to replace that text click on **Replace**. The editor will replace the text and automatically find the next instance. To leave that particular text unchanged click on **Find Next** instead of **Replace**. Click on **Close** to exit.

The check boxes allow extra checks on the find and replace actions; to activate the option check the box next to it.

To find text click on the button, alternatively select **Find** from the edit pull down menu, or right click on the recipe script and select **Find** from the list or use the keyboard shortcut **Ctrl+F.**

In the Find dialog, enter the text to find then click **Find** to search for the text.

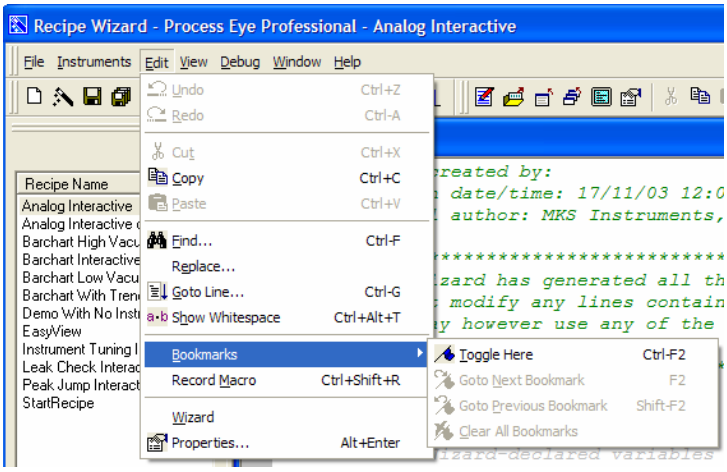
Click **Mark All** to mark the margin next to all lines containing the text

Click on **Close** to exit

Once text has been found, the next instance can be found by clicking on or by using the keyboard shortcut **F3**

To find the previous instance of the text click on or use the keyboard shortcut **shift F3**

IV Bookmarks



Bookmarks are marks in the margin of the recipe text file

They can be controlled from the Edit pull down menu

Select **Bookmarks** and the function required; alternatively use the toolbar buttons or keyboard shortcut.

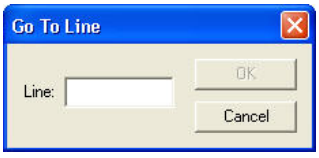
To place a bookmark move the cursor to the required line and click on or use the keyboard shortcut **Ctrl+F2**; to switch off the bookmark go to the line again and click on the bookmark button again or press **Ctrl+F2** again.

If there are more than one bookmark, jump to the next bookmark by clicking on or using the keyboard shortcut **F2**

Jump to the previous bookmark by clicking on or using the keyboard shortcut **Shift+F2**

To clear all bookmarks click on

V Miscellaneous Edit Functions



To jump to a particular line click on or select **Goto Line** from the Edit pull down menu or use the keyboard shortcut **Ctrl+G**

Enter the line to goto on the text box the click **OK**.

To show all spaces in the recipe file click on or select **Show Whitespace** from the Edit pull down menu, or right click on the recipe script and select **Show Whitespace** from the list or use the keyboard shortcut **Ctrl+Alt+T**

The space will be marked with a dot, so the text

```
'Recipe created by:
'Creation date/time: 30/03/01 14:11:36
'Add any further descriptive comment here...
```

Would become

```
'Recipe·created·by:·····
'Creation·date/time:·30/03/01·14:11:36
'Add·any·further·descriptive·comment·here...
```

To remove the whitespace markers click on again

To transpose characters on either side of the cursor click .

'Re will become 'eR, clicking on the button again will swap the characters back again

```
Pressure=Mbartopa(10^((7*Voltage/8)-10.75))
```

To find the matching bracket in an equation highlight one bracket and then click

```
Pressure=Mbartopa(10^((7*Voltage/8)-10.75))
```

Click again to go back to the first bracket. If the bracket is missing the cursor will not move

To set the case of all letters in a portion of recipe script text, first highlight the text to be changed

```
'Recipe created by:
```

Then click on the text with the right mouse button and select **Make Uppercase** this will convert all characters in the highlighted text to uppercase

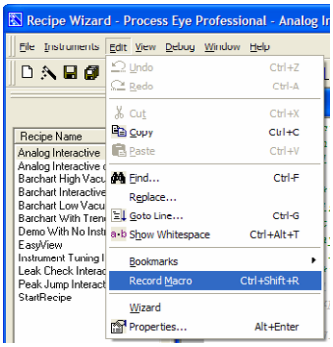
```
'RECIPE CREATED BY:
```

To convert all letters to lowercase right click on the text and select **Make Lowercase** from the list

```
'recipe created by:
```

VI The Edit Macro Command

To record a series of key presses use the record macro function



Select **Record Macro** from the Edit pull down menu or use the keyboard shortcut **ctrl shift R**

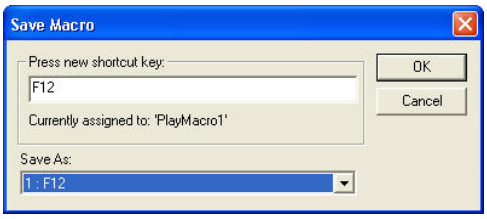
The mouse pointer will change to

Then perform the key presses to be recorded.

For example typing `my macro text`

When finished click on the stop button

This will bring up the save macro dialog



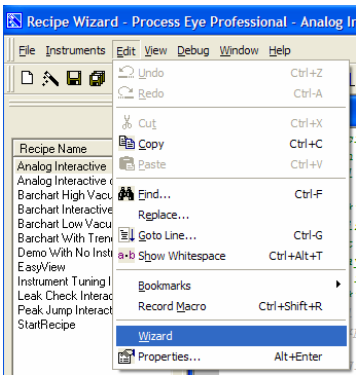
Press the key to be used as the shortcut to this macro, in this case **F12**

Each time **F12** is pressed the macro will be activated and the text appears

```
my macro text
my macro text
my macro text
```

VII Recipe Edit

To edit the open file using the recipe wizard

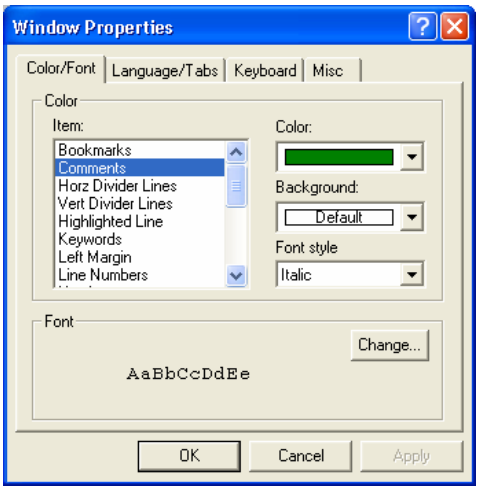


Select **Wizard** from the edit pull down menu. If the recipe is not a wizard recipe this will have no effect.

VIII Properties

Properties can also be accessed using the properties icon , or by selecting **Properties** from the Edit pull down menu, or by clicking on an open recipe script and selecting **Properties** from the list or by using the keyboard shortcut **Alt-Enter**

This will bring up the properties dialog



IX Colour/Font Properties

In order to make it easier to check the written script the text is colour coded. These colours can be changed by right-clicking on the window and selecting properties. The default settings for the text colours are as follows.

Any code written by the recipe wizard will appear in Grey

Any comment (text which follows ' on a line) will appear in Green

Any text strings (text inside "") will appear in Plum

Any VB Keywords will appear in blue

Any VB scope keywords will appear in blue bold

Objects and collections of objects will appear in pink

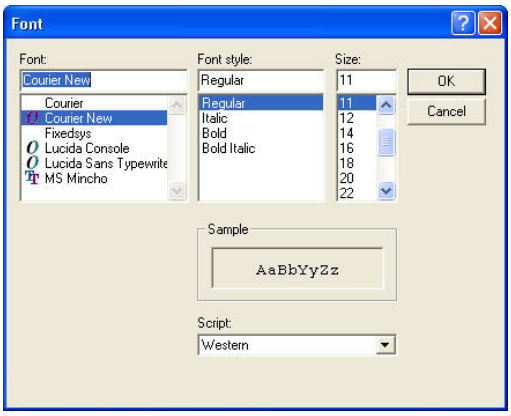
Properties of objects and logical operators will appear in red.

Methods of objects will appear in dark red bold

All other text will appear in black.

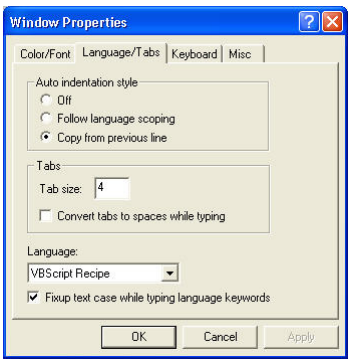
To change the colours of the text select the type of text from the item list and then select the colour, background and font type from the drop down list boxes

To change the font click on **Font.**



This will bring up a standard font dialog, select the required font and click **OK.**

X Language/Tabs

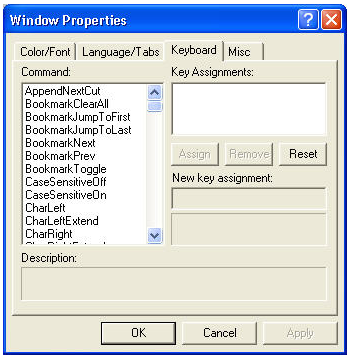


From this dialog select the auto-indentation rule to be used and the size of the tab indent.

Select the type of format rules to be applied to the script from the drop down list box. By default this will be **VB Script Recipe**.

The **Fixup test case while typing language keywords** check box will automatically assign the correct capitalisation to VB keywords such as Sub and If.

XI Keyboard



Assign keyboard shortcuts to specific functions. Select the function in the command list, the current Key assignment will be displayed, to assign a different key click on the **New key assignment** text box and press the key to be used. If the key is currently assigned to another command, this will be displayed underneath. The description box gives a brief description of the selected function. To save the changes click on **Apply**, to exit and save the changes click on **OK** to exit without making any changes click on **Cancel.**

XII Misc

There are a number of miscellaneous properties that can be switched on or off by checking the boxes next to them. In addition format the line numbering by selecting the style of number to be used and the number of the first line. Change the number of actions that are store in memory so they can be undone by selecting **Limited to** and entering a number. By default the number of actions stored to be undone is unlimited.

21.4 Adding Script to a Wizard Recipe

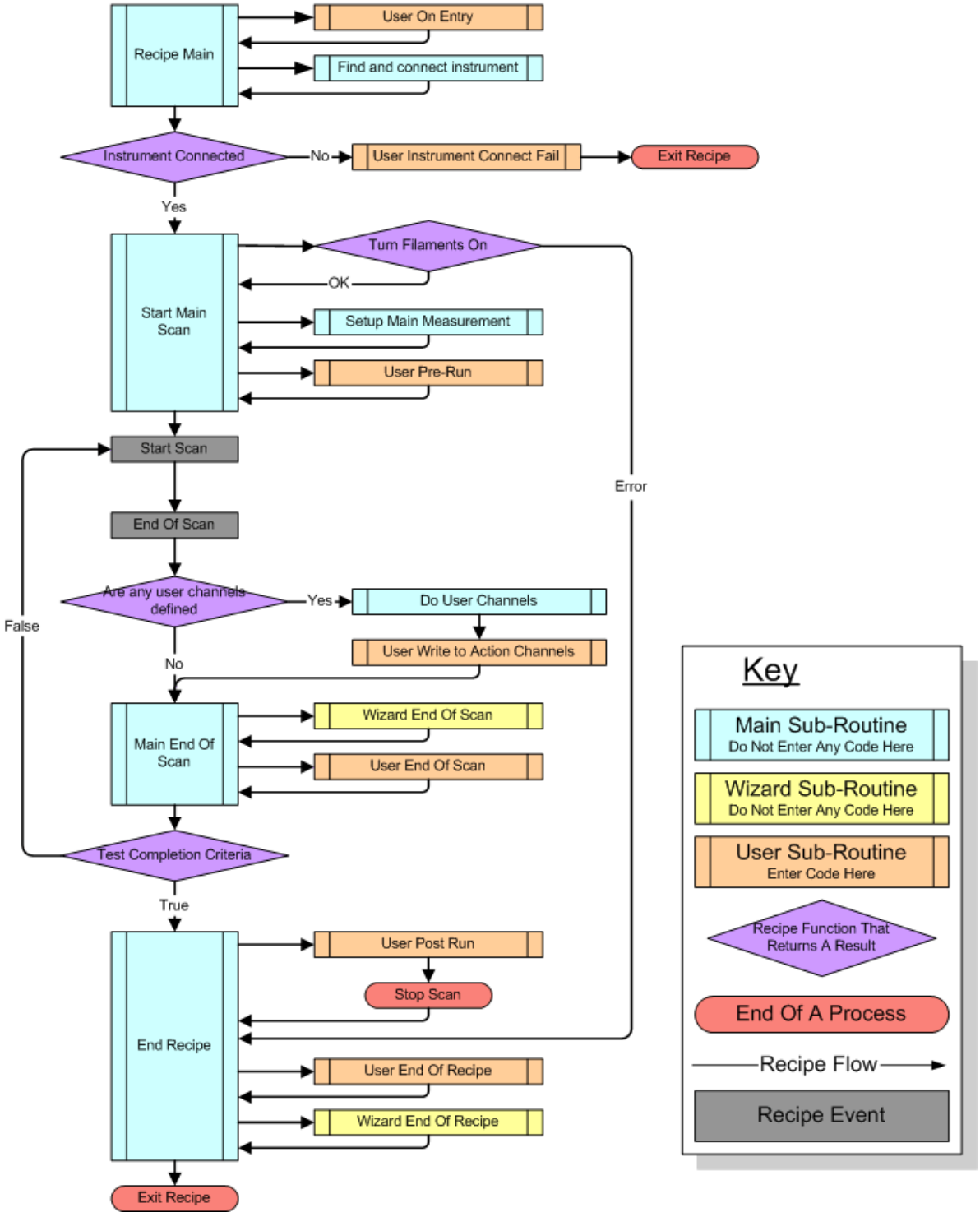
There are a number of pre-configured subroutines in order to make it easier to add script to a wizard recipe. Not all subroutines are called as some of them depend on various options being set in the recipe wizard. However before you can add code you need to know where in the program to add it. The following Flow Charts describe the operation of the software in typical recipes. All the tan subroutines shown are places where you can add code. The names of all the subroutines start with the prefix User_ and all recipes will contain all the user subroutines even if the options selected mean that some of these subroutines will never get called. If you add code into any of the other subroutines (the turquoise or yellow boxes) then running the recipe through the recipe wizard will delete this code.

In addition you can add your own subroutines; however you will need to hook these into the recipe yourself.

You can also add code using an include file, see section 3.8 for more information

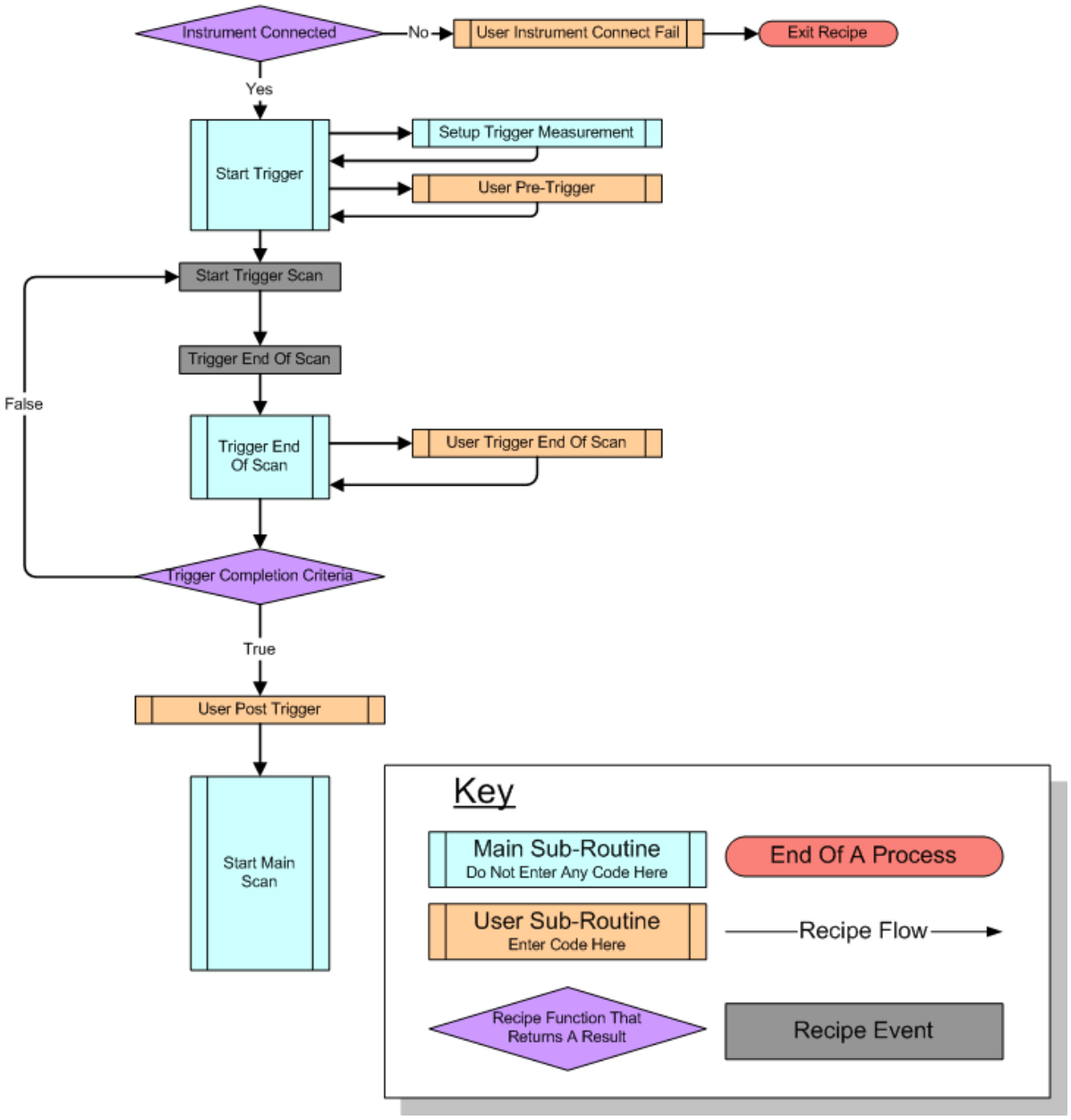
Software Flow Chart For a Wizard Recipe with No Trigger Stage

(Sub-Routines Triggered by Events are not shown)



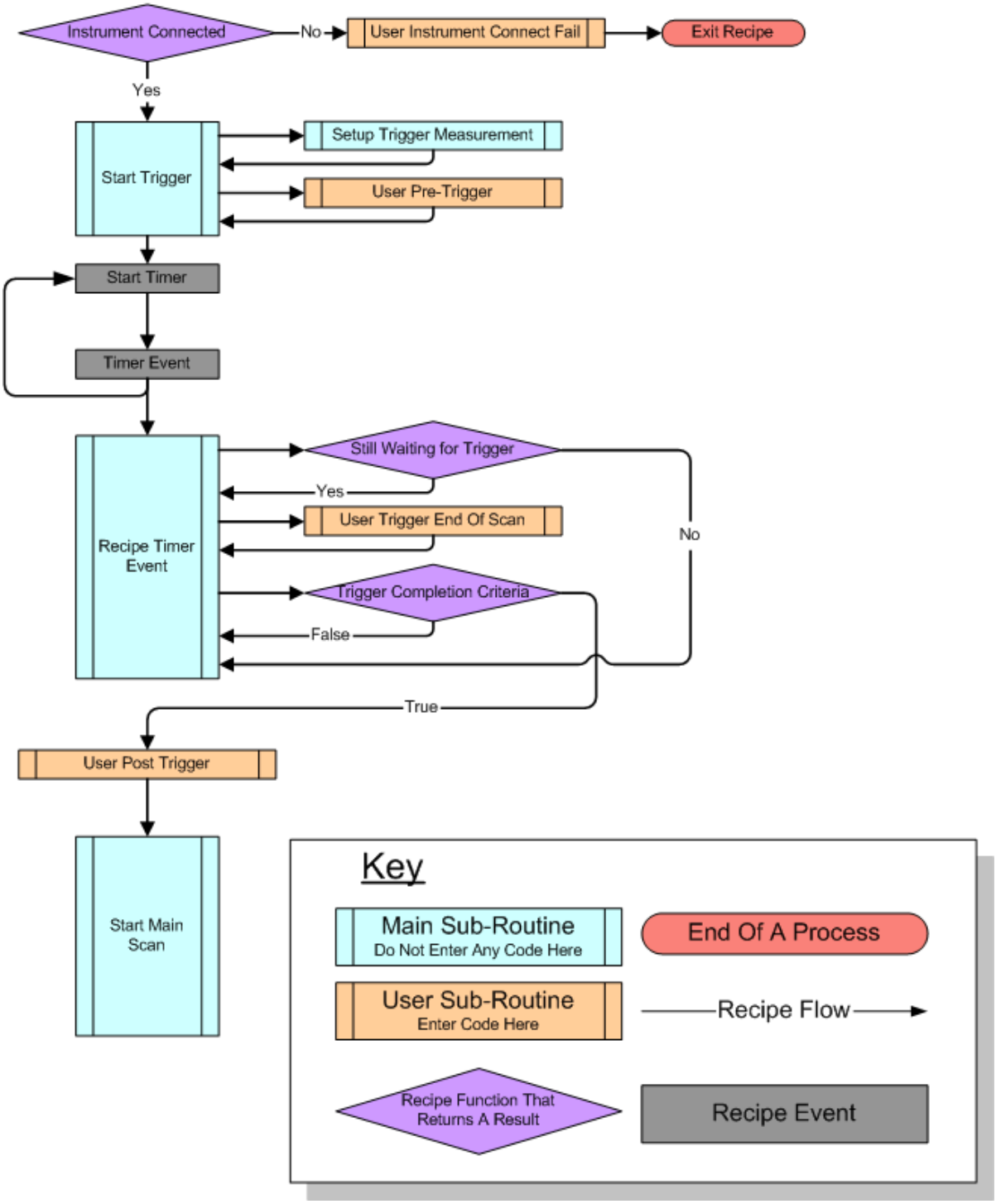
Software Flow Chart For a Wizard Recipe Trigger Stage

(Trigger based on a Partial Pressure Measurement)



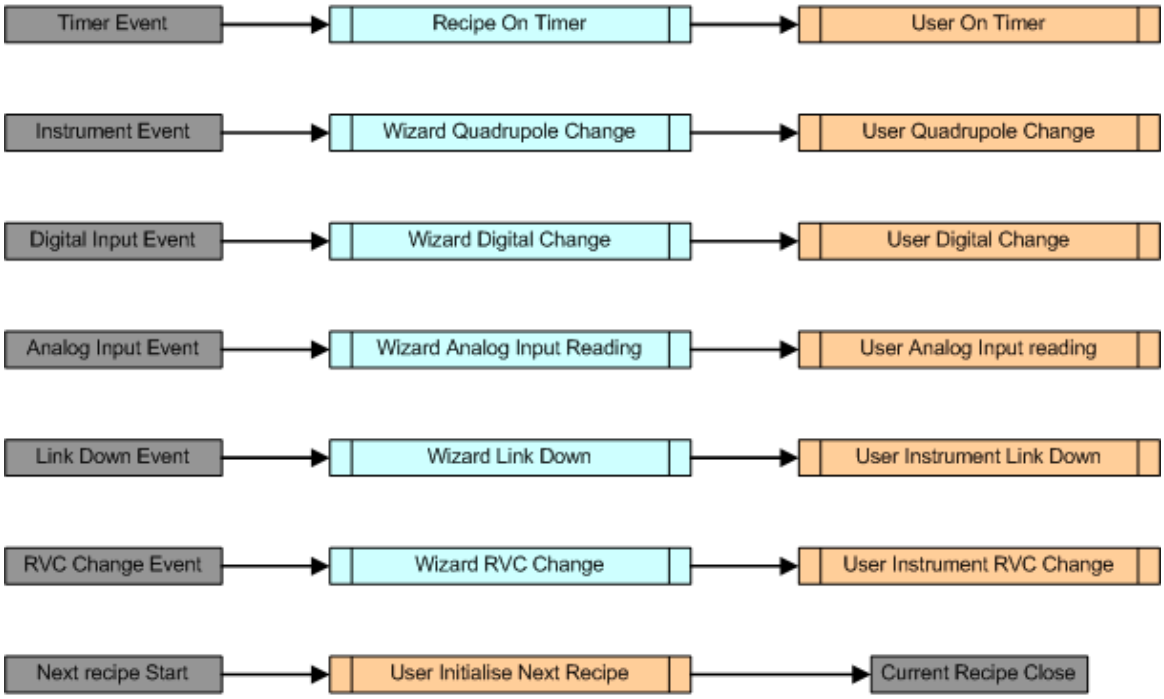
Software Flow Chart For a Wizard Recipe Trigger Stage

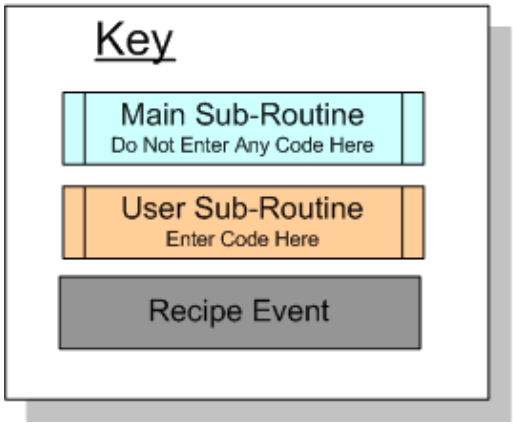
(Trigger not based on a Partial Pressure Measurement)



Software Flow Chart For Wizard Recipe Events

(All events are independent of the main software flow)





```
Sub User_OnEntry
```

This subroutine is only run once during the lifetime of the recipe. It is run when the recipe first starts, before there are any references to an instrument or a measurement. This is the place to put initialization code for the rest of the recipe that does not reference the instrument or measurement.

```
Sub UserInstrument_ConnectFail (Reason)
```

This subroutine is only run if there is an error connecting to the instrument. The error number is also passed. The error numbers have the following meanings

1:	Cannot find instrument.
2:	Cannot connect to server.
3:	The instrument is not configured for this recipe.
4:	Error occurred in connecting to instrument.
5:	Either the recipe was cancelled by the user, or no instrument was found that matches the required specification.
6:	Failed to connect to instrument.
7:	Untrapped error in FindAndConnectInstrument function after making a successful connection to instrument.
8:	The filament failed to turn on on instrument.
11:	There are no instrument servers associated with Process Eye. Close the recipe, then choose the Recipe | Connections menu and Add a server connection.
31:	This recipe requires the ProcSECS Add-in which is not installed.
32:	The ProcSECS link is down and this recipe uses Polled VIDs, so the recipe has aborted.
Else	Undefined error number.

Unless you end the recipe in this subroutine the recipe will simply stop. The recipe tab will remain but the recipe will fire no events or timers.

```
Sub User_PreTrigger
```

This subroutine only runs if a trigger event has been enabled in the recipe wizard. This code only runs once during the lifetime of the recipe. It runs before the trigger criteria have been checked but after the recipe has connected to the instrument (if it has one) and after the trigger measurement has been setup. This is a useful place to load any trigger message displays, for example a HTML page.

```
Sub User_Trigger_EndOfScan
```

This subroutine runs at the end of every trigger scan, or if the trigger is not based on an RGA measurement, every 500 milliseconds. This subroutine only runs if a trigger measurement has been set up. Put your own trigger criteria code here and to come out of trigger mode and into main measurements set the following

```
UserEndTriggerFlag = True
```

Note: You must enable a trigger measurement in the recipe wizard options, even if you do not enable one of the recipe wizard triggers, otherwise this code will not run.

```
Sub User_PostTrigger
```

This subroutine only runs if a trigger event has been enabled in the recipe wizard. This code only runs once during the lifetime of the recipe. It runs after the trigger criteria have been met but before the trigger measurements have been removed. This is where you would put code to remove any trigger message loaded during User_PreTrigger

```
Sub User_PreRun
```

This subroutine is only run once during the lifetime of the recipe. It is run after the instrument has been connected and the main measurements setup but before the main measurement starts scanning. This is the place to put code that only needs to be run once but requires a reference either to the instrument or the measurement. For example this is where you would initialize an analog input.

```
Sub User_WriteToActionChannels(UserMeasurement)
```

This subroutine only runs if an End of Scan event has been added using the recipe wizard. This is the only place where you can write to Action Channels defined in the recipe wizard. If the subroutine is enabled it runs after a scan has finished but before the User_EndOfScan subroutine. You can write to channels in one of 2 ways.

```
UserMeasurement.Data("Name of channel").Value = Value
```

Or

```
UserMeasurement.Data("Name of channel").Pressure = Pressure_Value
```

If you use the .Pressure form then the reading passed to the channel has to be in Pascal. The value displayed will then be automatically converted to the current user pressure units. If the .Value form is used then the number passed to the channel will be the number displayed.

The "Name of channel" has to be the name of a channel already defined using recipe wizard (see the section on end of scan actions 1.213(III) and in particular the section on adding unscripted user channels). If the "Name of channel" does not match the name of the channel used exactly, then an error will be generated when the recipe is run.

```
Sub User_EndOfScan
```

This subroutine runs at the end of every scan; it should be noted however that the routine is triggered at the end of scan and the scan then restarts. The scan does not wait for the User_EndOfScan code to complete before starting the next scan. This can cause a problem if the User_EndOfScan code takes a longer time than the scan itself. This is the place where you would put the code to evaluate alarms on the live data. All the measurements, including user measurements are complete and you can freely read data from any of them.

```
Sub User_PostRun
```

This subroutine is only run once during the lifetime of the recipe. It is run after the scan has finished and the recipe end criteria are fulfilled but before the scan measurements are removed. This means you still have access to the measurement data.

```
Sub User_EndOfRecipe
```

This subroutine is only run once during the lifetime of the recipe. It is run after the scan has finished and the recipe end criteria are fulfilled and after the scan measurements are removed. This is where you would put code to chain to another recipe for example.

```
Sub User_InitializeNextRecipe (TheNextScript)
```

This subroutine is only run once during the lifetime of the recipe. It is run after the scan has finished and the recipe end criteria are fulfilled and after the scan measurements are removed. It is only run if you have an action defined in the wizard that calls another recipe. For example if you start a recipe in the end of scan alarm on activate event. It is where you would put specialist user code to initialize variables or call functions in a chained-to recipe, if one exists. This code runs after the next recipe has been started but before this one closes. It is likely that, at this time, the only valid data from this recipe will be global variables. Variables or functions in the chained-to recipe must be declared as 'Public'.
For example use

```
TheNextScript.PublicVariable = ThisScriptVar + 1
```

To add a counter that counts how many chained recipes have been run.

```
Sub UserTimer_OnTimer
```

If enabled, this subroutine will run at the Timer Interval (set in milliseconds). The timer interval has to be enabled with a statement in such as

```
If TimerInterval = 0 Then TimerInterval = 1000
```

The statement should go in the User_PreRun subroutine so it does not interfere with the trigger measurement if there is one. Use the Timer carefully because some recipes require that the Wizard sets TimerInterval for its own purposes. When your UserTimer_OnTimer code completes Process Eye starts the timer again.

```
Sub UserInstrument_QuadrupoleChange(Microvision, ChangedBits)
```

This subroutine is triggered whenever one of the enabled Quadrupole State Change Flags changes value. The available flags are as follows

Quadrupole Event	Event Constant Name	Event Value
Filament Supply Change	mvQuadFilamentSupply	1
Filament Emission Trip	mvQuadEmissionTrip	2
Filament ExternalTrip	mvQuadExternalTrip	4
Filament Total Pressure Trip	mvQuadTotalPressureTrip	8
Filament RVC Trip	mvQuadRVCTrip	16
RF Trip	mvQuadRFTrip	32
Selected Filament Change	mvQuadFilamentSelect	64
Current Emission Trip State	mvQuadCurrentEmissionTripState	128
Current External Trip State	mvQuadCurrentExternalTripState	256
Current RVC Trip State	mvQuadCurrentRVCTripState	512
Summary State	mvQuadSummaryState	1024
All Events	mvQuadAllEvents	2047

You can set which events trigger the subroutine using the QuadrupoleEventMask object. This can be done once you have a reference to a control unit, in PreRun for example. To setup the event mask so only an RVC event and an external trip event triggers the subroutine add the line

```
Microvision.QuadrupoleEventMask=20
```

If the RVC event occurs the value of ChangedBits will then 16 and if the external trip event occurs the value of ChangedBits will be 4. If both events occur then the value of ChangedBits will be 20. By default the event mask is set to All Events.

The parameter TheMicrovision makes a local reference to the control unit object available to the subroutine. You can use it to access the Filament object by writing TheMicrovision.Filaments.

```
Sub UserInstrument_RVCChange(Microvision, ChangedBits)
```

This subroutine is triggered whenever one of the enabled RVC State Change Flags changes value. The available flags are as follows

RVC Event	Event Constant Name	Event Value
Pump State Change	rvcPump	1
Heater State Change	rvcHeater	2
Valve State Change	rvcValve	4
Interlock State Change	rvcInterlocks	8
Status State Change	rvcStatus	16
Digital Input State Change	rvcInputs	32
All State Changes	rvcAllEvents	63

If one of the RVC parameters changes state then this subroutine will be called. The value of ChangedBits will be the sum of all the changed states. For example if the pump switches off then not only will the pump state change but if interlocks are enabled and the valves are open they will close. The value of ChangedBits will therefore be 5 (4+1).

The parameter TheMicrovision makes a local reference to the control unit object available to the subroutine. You can use it to access the RVC object by writing TheMicrovision.RVC.

```
Sub UserInstrument_DigitalChange (MV, ThePort, ChangedBits)
```

This subroutine is triggered whenever one of the enabled digital inputs changes value. The digital lines are in 2 ports of 8 lines. The ports are named A and B and the lines are 0 to 7.

The parameter ChangedBits is the value of the bit that has changed. The value is the binary value of the bit, so bit 0 (digital line 1) has a value of 1 and bit 7 (digital line 8) has a value of 128.

The parameter ThePort is a reference to the port that has changed. To find out which port has changed use ThePort.Name (returns either A or B) or ThePort.Index (returns either 0 or 1)

The parameter TheMicrovision makes a local reference to the control unit object available to the subroutine. You can use it to access the any of the control unit's other properties.

```
Sub UserInstrument_AnalogInputReading (MV, TheInput)
```

This subroutine is triggered whenever one of the enabled analog inputs is read by the control unit.

The parameter TheInput is a reference to the input that has been read. The new value can be read using TheInput.Value which returns the voltage and the index of the input that has changed can be read using TheInput.Index. The number returned is a 0 based index between 0 and 3 with analog input 1 being index 0, analog input 2 being index 1 etc.

The parameter TheMicrovision makes a local reference to the control unit object available to the subroutine. You can use it to access the any of the control unit's other properties.

In order for the analog input event to be fired you have to enable the analog input first in Pre-Run for example. In this case use the line

```
Microvision.AnalogInput(0).Enabled = True
```

to enable the analog input, then use the line

```
Microvision.AnalogInput(0).EventEnabled = True
```

to cause the analog input to call the UserInstrument_AnalogInputReading subroutine when there is a new reading at the control unit. You can also control the interval and number of readings to average using the following 2 lines

```
Microvision.AnalogInput(0).ReadingInterval = New_Interval_In_milliseconds
Microvision.AnalogInput(0).AverageCount = Number_of_readings_To_average
```

Note: If you have a hardware profile that includes an analog input, the enabling code will be added automatically by the wizard.

```
Sub UserInstrument_LinkDown (MV, Reason)
```

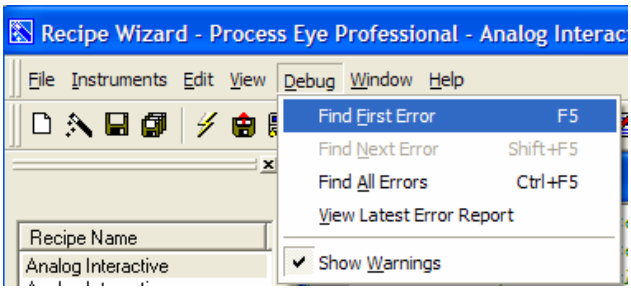
This subroutine is triggered when the communication link to the control unit fails.

The parameter Reason is the error number of the link down type.

Error Type	Error Constant Name	Error Value
Serial communication between the server and control unit was lost	mvLinkDownSerial	0
A higher priority user has requested the instrument and Process Eye has failed to connect	mvLinkDisconnectTimeout	1
The link has been closed by a server operator	mvLinkDownServerOperator	2
The link has been closed by the server closing down	mvLinkDownServerExit	3
TCP communication to the server has been lost	mvLinkDownTCP	4

The parameter TheMicrovision makes a local reference to the control unit object available to the subroutine. You can use it to access the any of the control unit's other properties.

The recipe wizard has some limited error checking built in. To check a script for the first error

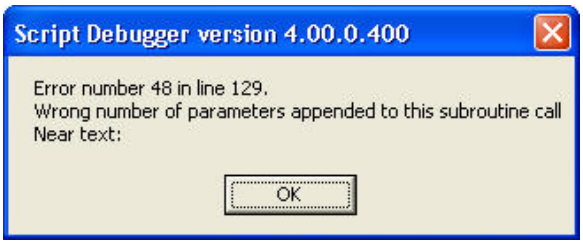


Select **Find First Error** from the debug pull down menu, or use the keyboard shortcut **F5**

In the following example

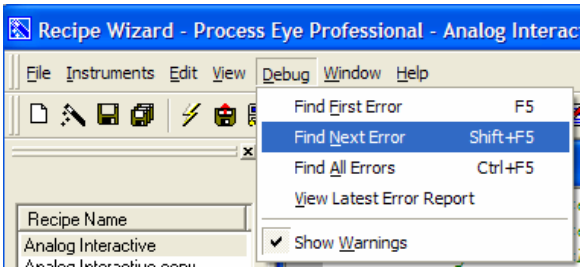
```
0127 Sub UserInstrument_ConnectFail (Reason)
0128     'Added by Recipe Wizard on upgrading
0129     MsgBox
0130     Reason
0131 End Sub
```

The Mgsbox function and the reason parameter should be on the same line. Find first error will show the following dialog



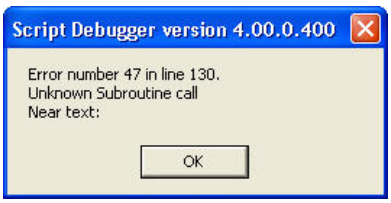
This is because the Msgbox function needs at least one parameter, the text to display

The error contains the standard VB error code, the line the error appears on and a text description of the error

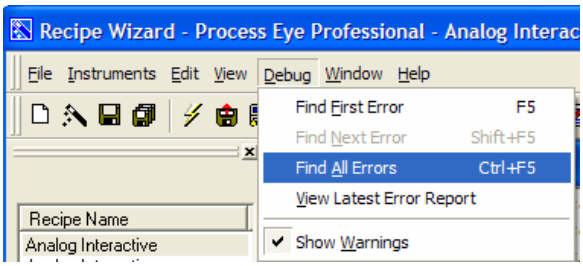


To find the next error select **Find Next Error** from the Debug pull down menu or use the keyboard shortcut **Shift F5**

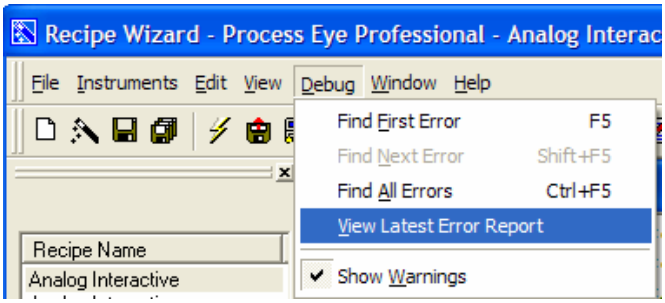
In the above example this will produce the following dialog



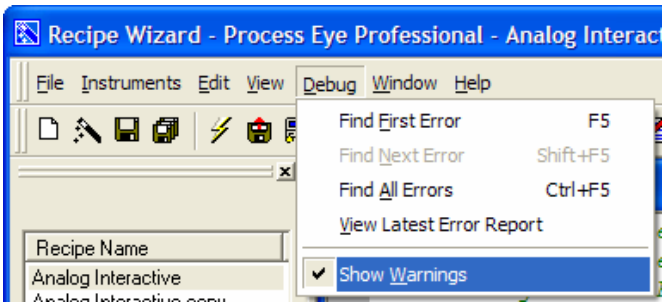
This is because the script will treat reason as a subroutine call and the editor cannot find either a subroutine or function called reason.



To find all error in one pass and save the details to an Xml error log select **Find All Errors** or use the keyboard shortcut **ctrl F5**



To view the error log created by finding all errors select **View Latest Error Report** from the debug pull down menu.



Sometimes the debugger cannot decide for sure if a particular section of code constitutes an error or not. Often these items have to do with arrays and the error may not be apparent until the recipe is run in a particular way.

To show warnings select **Show Warnings** from the edit pull down menu. To not show warnings, select the same item again. If **Show warnings** is enabled there will be a check next to it in the pull down menu

21.7 Include Files

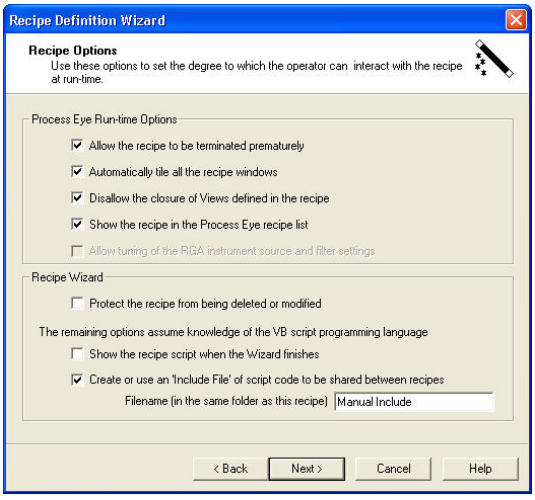
Include files allow code written for one recipe to be applied to other recipes. Include files have an extension SI-i and are text files containing VB script code very similar to recipes. There are two ways to use include files.

The first is to manually write the file and then save it with a SI-i extension. To use the include file in a recipe file add the line

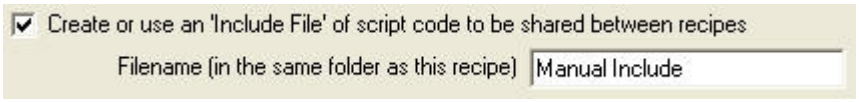
```
'Declare and initialise your global variables here
#include "Include File.SI-i"
```

The include file is then included with the recipe file at runtime, as if the code written in the include file was attached to the recipe script. This means that variables, subroutines and functions in the include file must not have the same name as any of those in the actual recipe. Also there are no links to the include file in the recipe file so in order to run code in the include file the subroutine calls must be in the recipe.

The second and probably more useful include file is created by recipe wizard.

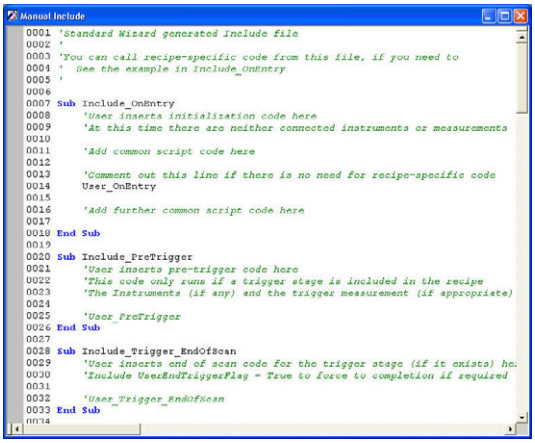


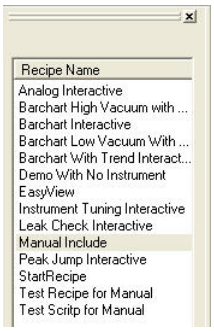
On the **Recipe Options** page of the wizard



Check the **Create or use an include file** check box and either enter a new name for a new include file or enter the name of an existing include file.

Recipe wizard will automatically create an include file that does not exist.





And the include file will appear in the recipe list

The include file can then be edited in the same way as a recipe script. This include file will have the same subroutines has those described in the recipe script explanation except instead of having the prefix User_ they now have the prefix Include_

```
Sub Include_OnEntry
    'User inserts initialization code here
    'At this time there are neither connected instruments or measurements

    'Add common script code here

    'Comment out this line if there is no need for recipe-specific code
    User_OnEntry

    'Add further common script code here

End Sub
```

For example the subroutine User_OnEntry is now Include_OnEntry and if the include file is added in the recipe wizard then it is Include_OnEntry that is called by the recipe and not User_OnEntry. If you also want to run code in the recipe subroutine User_OnEntry then include the line

```
User_OnEntry
```

If you don't want to run the code in the User_OnEntry subroutine then comment out this line

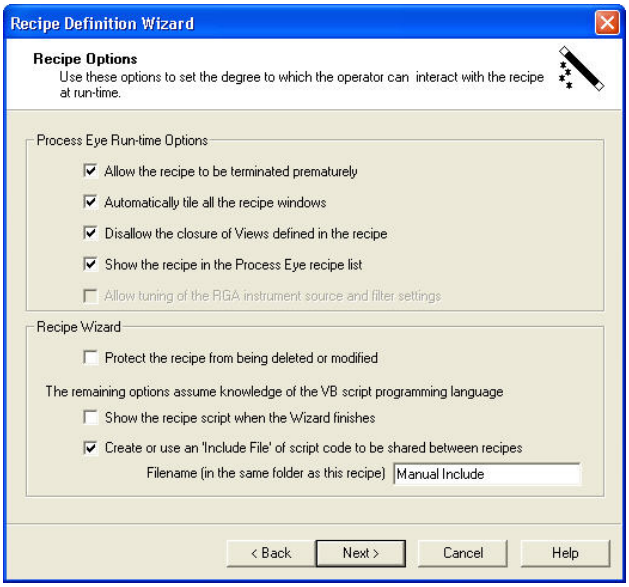
```
'User_OnEntry
```

Any code entered above this line will be performed before User_OnEntry and any code below will be performed after.

The same is true for all the other subroutines in the include file.

***Important note**: If you write your own include file, do not check the wizard include file check box unless your own include file contains all the Include_ subroutines that the wizard script will call.*

The following example is of a wizard include file to measure the pressure of a system using an MKS 903 Cold Cathode Gauge connected to analog input 1 of a Microvision control unit.



Step 1 is to create the blank include file using the recipe wizard

Create a new recipe and add an include file at the above dialog

Step 2 is to open the include file in recipe wizard for editing

Step 3 is to create a variable to hold the value of the pressure

```
Dim Gauge_Pressure
```

Do this at the top of the include file, outside any subroutines

Step 4 is to add a record to the data to store the pressure.

```
With Streams.Create()
    .Fields.Add "903 Gauge Pressure",fieldPressure
    .Initialise "MyStream",bufferContinuous,10
End With
```

This will add a data field called "903 Gauge Pressure" which will accept data that is a pressure in Pascal. This is done in the subroutine Include_PreRun. It should be done before enabling the analog input, so there is no possibility of getting a reading before there is anywhere to store it.

Step 5 is to enable the analog input

```
microvision.AnalogInputs(0).Enabled=True
microvision.AnalogInputs(0).EventEnabled=True
microvision.AnalogInputs(0).ReadingInterval=250000
microvision.AnalogInputs(0).AverageCount=True
```

This is done in the subroutine Include_PreRun. The above code enables analog input 1 (index 0) and enables the Analog Input Event so the subroutine IncludeInstrument_AnalogInputReading is run when the control unit

has a new reading ready. A reading is taken every ¼ second (250,000 microseconds) and 4 readings are averaged before a single reading is sent from the unit.

Step 6 is to calculate the pressure

```
If TheInput.Index=0 Then Gauge_Pressure=mBarToPa(10^(TheInput.Value-10.875))
```

This is done in the subroutine IncludeInstrument_AnalogInputReading. This subroutine runs everytime a new reading is ready at the control unit. The code to calculate the pressure only runs when the reading is for analog input 1. The input voltage is converted to pressure using the equation from the 903 gauge manual. This pressure is then converted from mBar to Pascal.

Step 7 is to write the new pressure value to the record previously created

```
With Streams("MyStream")
     .AddRecord
     .Fields("903 Gauge Pressure").Value = Gauge_Pressure
     .CommitRecord
End With
```

This is done in the subroutine IncludeInstrument_AnalogInputReading after the above line. This adds the pressure in variable Gauge_Pressure to the record "903 Gauge Pressure"

Step 8 is to disable the analog input when the recipe exits

```
microvision.AnalogInputs(0).Enabled=False
```

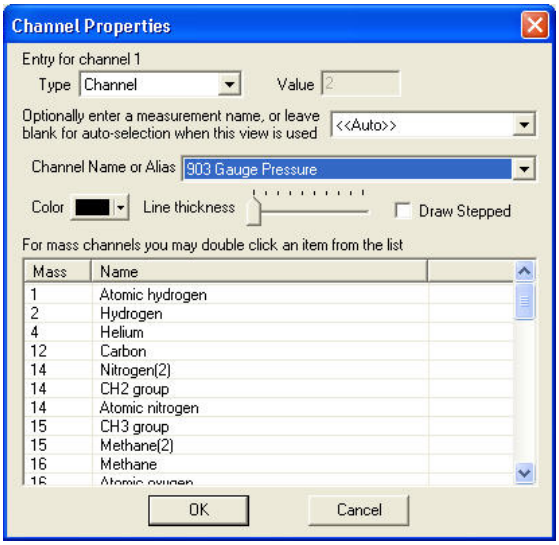
This line disables the analog input when the the recipe exits. This line should go into the Include_EndofRecipe subroutine.

Step 9 is to save the changes made to the include file

Click on the save button

Step 10 is to run the recipe

To see the pressure, add a trend and edit one of the channels

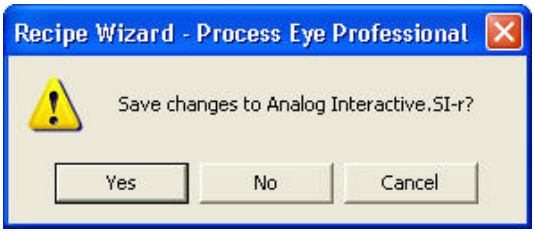


The channel "903 Gauge Pressure" can be selected from the channel name drop down list box.

21.9 Saving Changes to a Script Recipe

If any changes are made to the recipe script an asterix will appear in the title bar

if you then attempt to close the recipe you will be prompted to save the changes with the following dialog



To save the changes and exit click **Yes.**

To exit without saving the changes click **No.**

To cancel the exit command click **Cancel.**

You can save changes in the active file without closing the file by clicking on the save to disk icon , selecting **Save** from the recipe pull down menu or by using the keyboard shortcut **Ctrl+S**.

You can save the changes to a new file by selecting **Save As** from the Recipe pull down menu.

You can save all the changes on the currently open recipes by clicking on the **Save All** icon , selecting **Save All Files** from the recipe pull down menu or by using the keyboard shortcut **Shift**+**Ctrl+S**.

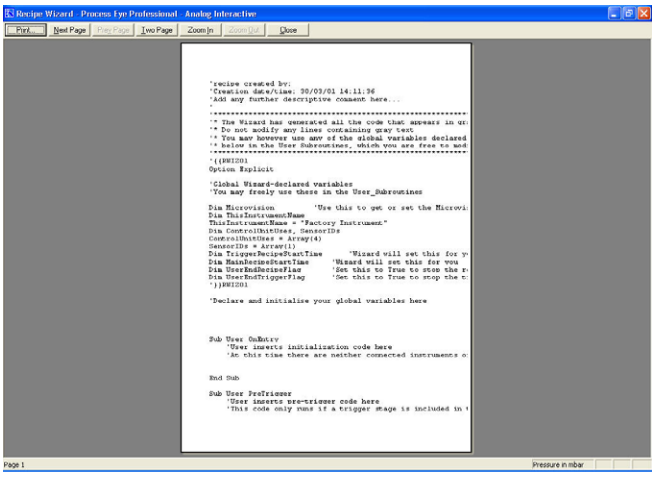
21.10 Closing a Recipe Script

To close an open script use the close script button , select **Close** from the recipe pull down menu or click on the close window button in the top left corner of the script window. To close all open scripts at once click on the close all button

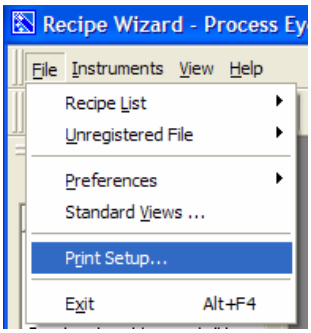
Chapter 22 – Printing Recipe Script

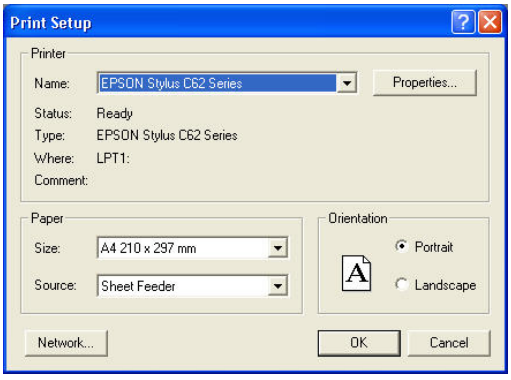
The active recipe script can be printed by clicking on the print button or selecting **Print** from the recipe pull down menu or by using the keyboard shortcut **ctrl P**

To view a preview of the print select **Print Preview** from the recipe pull down menu



This will show a standard print preview window. Click **Print** to print the script and **Close** to return to recipe wizard.



To change the printer settings select **Print Setup** from the recipe pull down menu or click on **Setup** on the print preview page.

This will bring up a standard windows printer setup dialog.