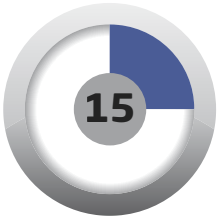
FlexPro 9

Data Analysis & Presentation



Get to know FlexPro in just 15 minutes

WEISANG

Improve quality

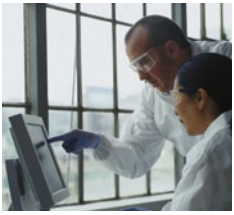
Choose FlexPro

And turn data into knowledge

Determine product lifespan

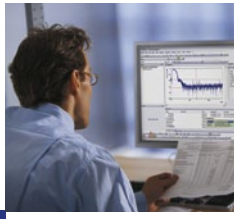
Optimize processes

Put ideas into practice



Gain additional knowledge

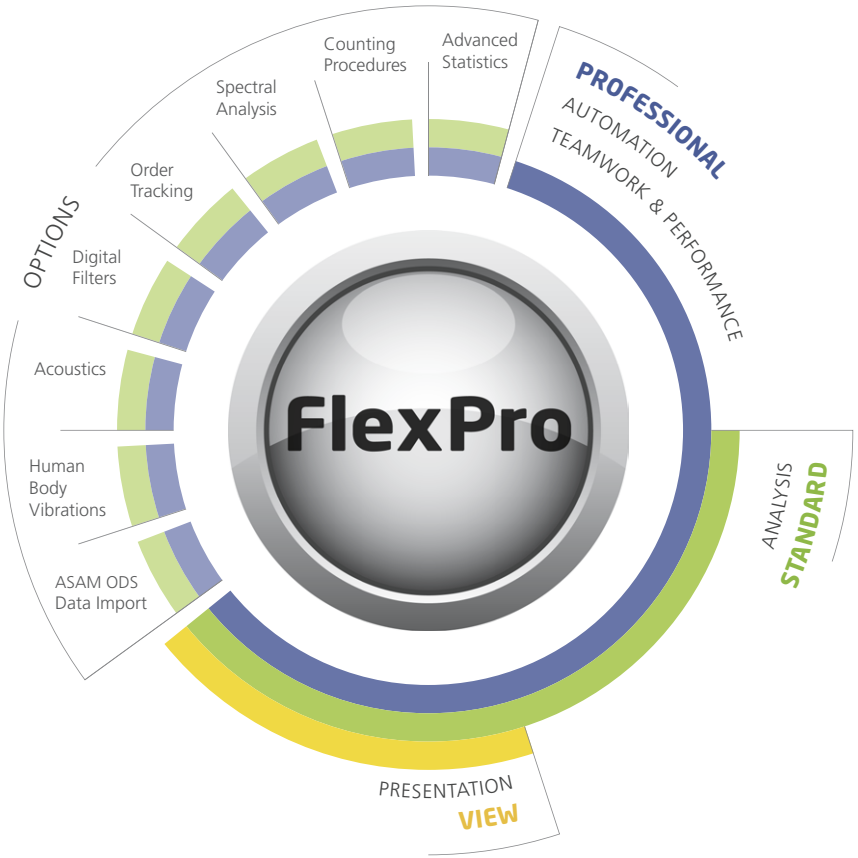
Simulate loads



Promote technologies

Use resources efficiently

Develop products


FlexPro
OPTIONS
Counting Procedures
Advanced Statistics
Spectral Analysis
Order Tracking
Digital Filters
Acoustics
Human Body Vibrations
ASAM ODS Data Import
PROFESSIONAL
AUTOMATION
TEAMWORK & PERFORMANCE
ANALYSIS
STANDARD
PRESENTATION
VIEW

FlexPro 9
Data Analysis & Presentation

Get to know FlexPro in just 15 minutes

This tutorial provides you with a brief overview of the structure of FlexPro and the basic command methods.

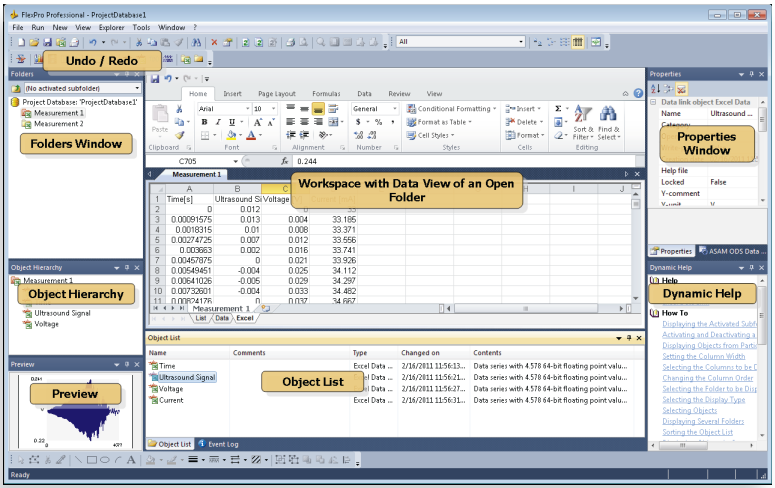
Before you start, it is vital that you read this first topic, since it will provide you with important information on getting started:

Alternative Import Options

Analyzing and Presenting Data

Managing Data with FlexPro

Structure of FlexPro's Main Window



FlexPro *stores all objects generated by you such as data sets, diagrams, folders, etc. in a project database that appears in FlexPro's main window. The object list shown above in the FlexPro window already contains some objects as examples. When you start* **FlexPro**, *these sample objects will not appear.*

- **Folders Window**
  Here, folders created by you are displayed. You can select one particular folder here and its content then appears in the Object List.
- **Object List**
  For instance, if you create a new data set or a diagram, it will appear as an object in the Object List. This allows you a general view of all objects that you are working on, such as data, diagrams and formulas.
- **Object Hierarchy**
  This window presents the objects displayed in the Object List in a hierarchical structure. You can therefore simply reconstruct which objects are linked directly or indirectly with a particular object.
- **Preview**
  In the Preview window, the content of one object in the Object List or selected in another window, such as a data set, is displayed. This provides you with an overview of the object's content without having to open it by double-clicking on it.

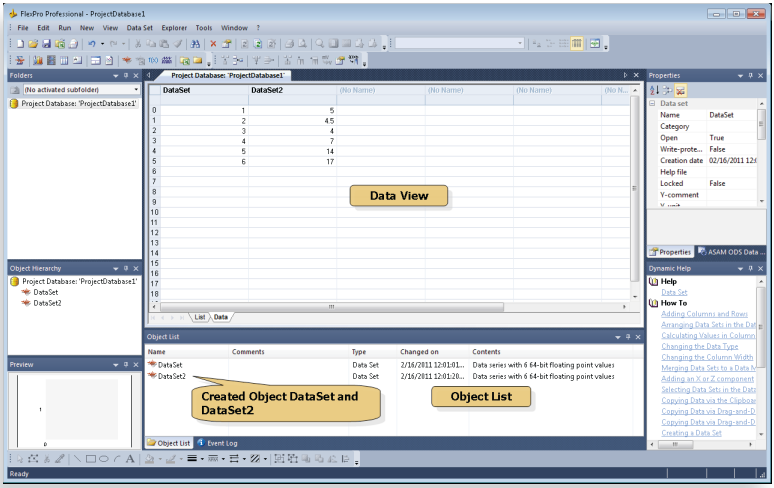
- **Properties Window**
  This powerful window allows you to quickly edit the properties of selected objects.
- **Dynamic Help**
  This window offers selected topics and procedures related to the object that you are currently processing or to the window in which you are currently working. Simply click on a help topic to display it.
- **Workspace**
  Here, the windows of open objects appear on tabs. In addition to the Object List, folders can also be opened in a window here. The above illustration shows the Data view of an open folder, which shows all data sets contained in the folder in a data grid.

Note:
If necessary, you can undo any steps you make in FlexPro. Just click on the **Undo/Redo** icons in the top toolbar.

The next step depends on which format your data is in. Select one of the four options:

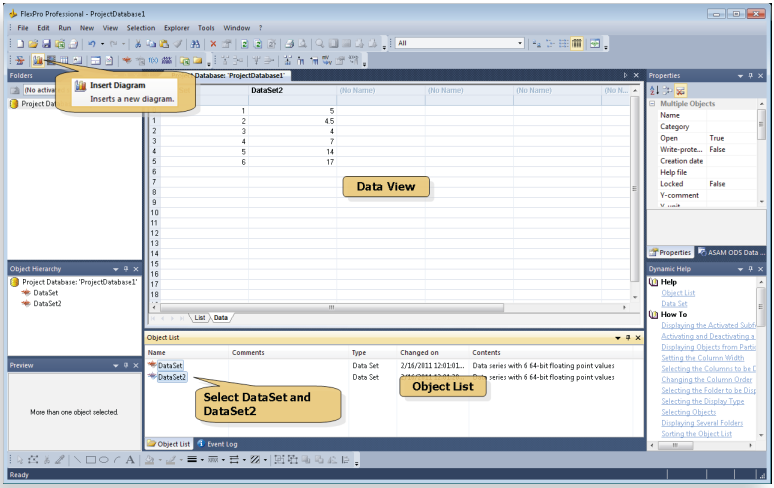
Entering Data Manually into FlexPro

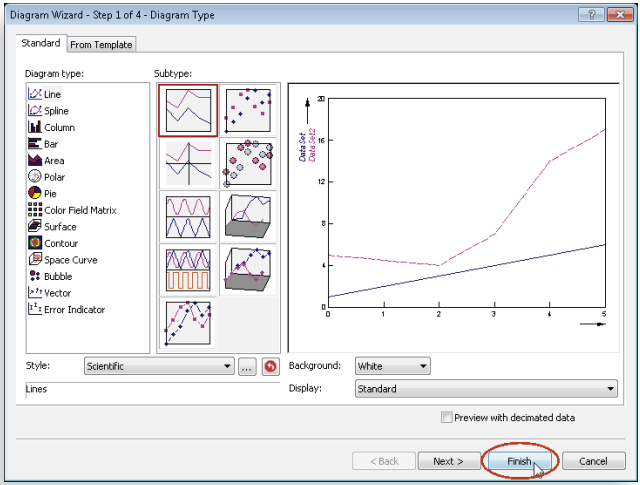
Double-click on the root folder shown in the first row in the Folders window to open it.
In the folder's window that now appears in the workspace of FlexPro's main window, click on the **Data** tab.



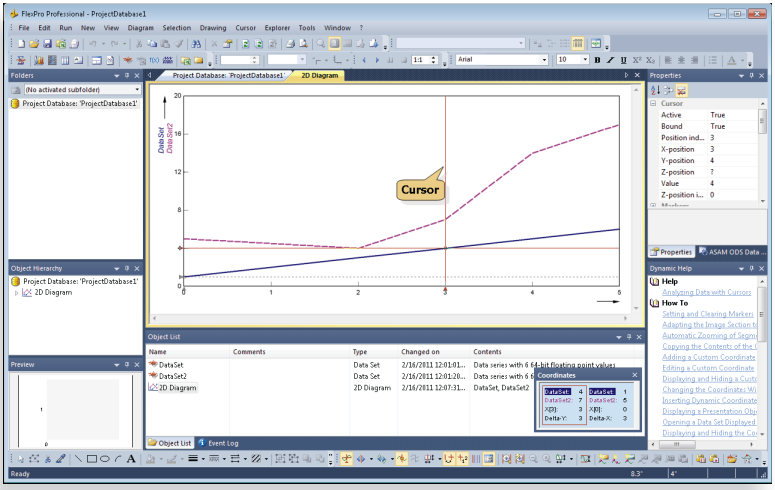
Enter the first two columns of the numerical values shown above in Data View. FlexPro automatically creates the two objects **DataSet** and **DataSet2**, which appear in the Object List.

Now select the two data sets from the Object List (hold down the CTRL key and select the data sets with the left mouse button). To display the selected data sets, click on the **Insert Diagram** icon at the top of the screen. The Diagram Wizard opens.





The data sets appear in the preview of the Diagram Wizard. Click **Finish**.

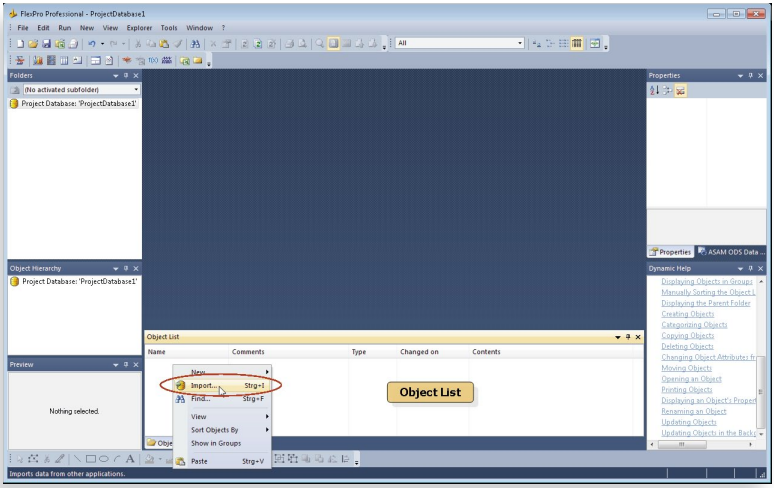


The finished diagram appears. The cursors for measuring (cross-hair in the diagram) were automatically activated.

Caution:
Since additional examples in this description are based on imported data, please select one of the alternative import methods that you want to use:

Importing Excel Data

Move your mouse pointer to the Object List. Right-click with your mouse to display the context menu. Click on the menu item **Import**.

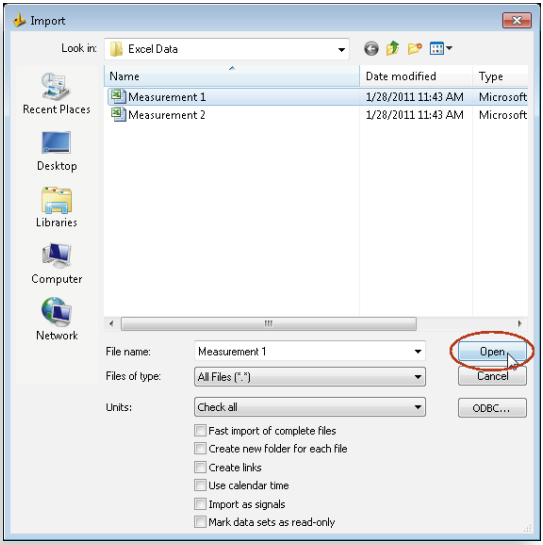


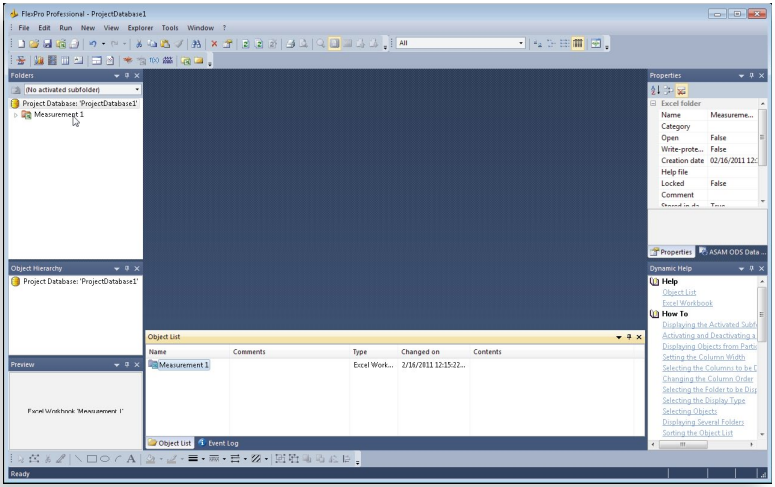
The **Import** dialog box opens.

- Under **Windows Vista or Windows 7** switch to the folder `C:\Users\Public\Documents\Weisang\FlexPro\9.0` or `C:>Users>Public>Public Documents>Weisang>FlexPro>9.0`.

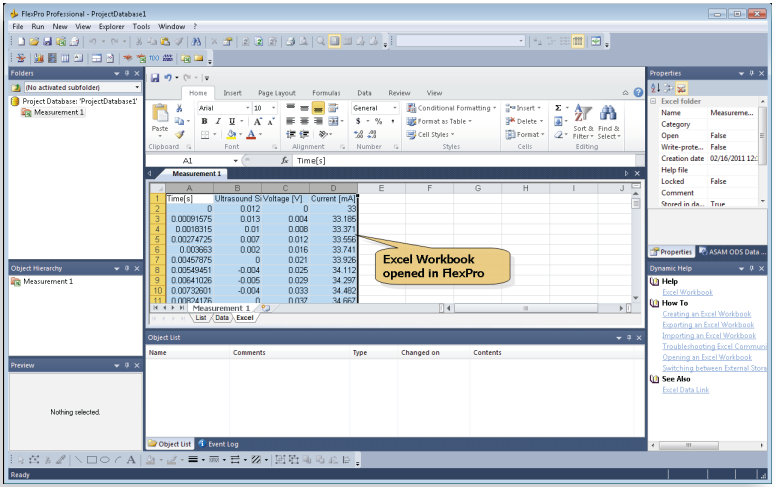
- On **Windows 2000 or XP**, the folder is under `C:\Documents and Settings\All Users\Shared Documents\Weisang\FlexPro\9.0`. From there, switch to the subfolder `Examples\Getting Started\Excel Data` and select `Measurement1.xls`.

Click **Open**.



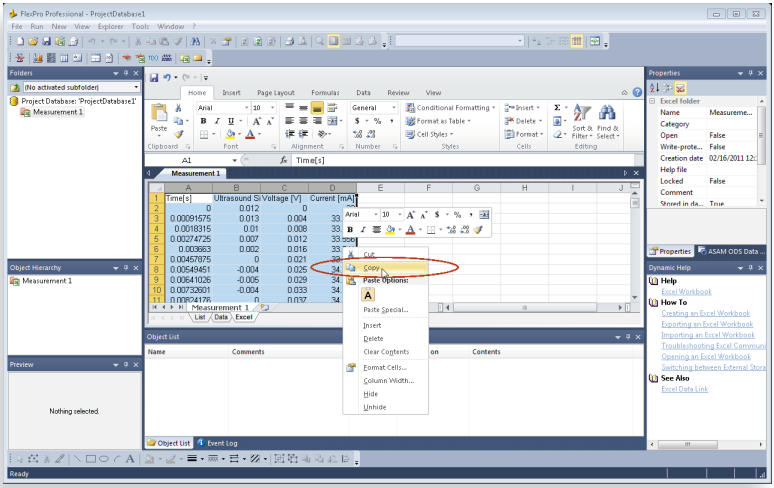


A new folder appears named **Measurement 1**. Double-clicking on this folder in the **Folder** window opens the Excel workbook in FlexPro.

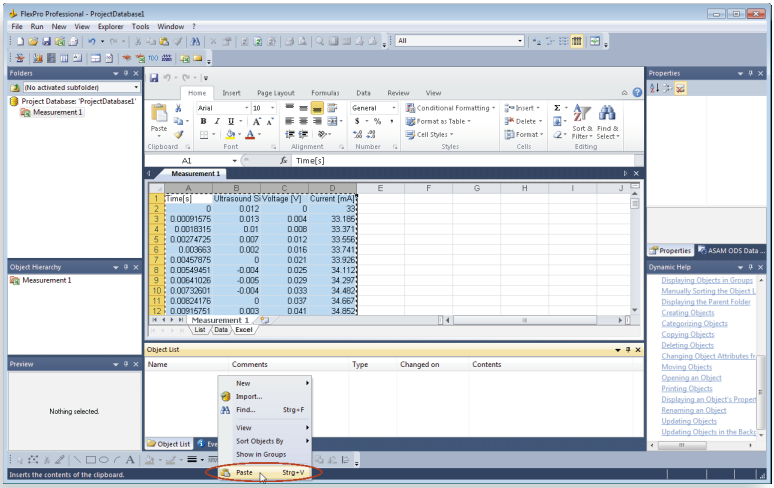


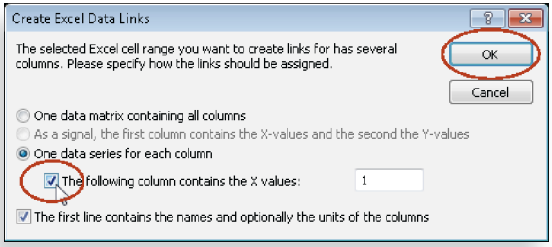
Select all columns in the Excel workbook.

Right-click with your mouse on the highlighted area in the Excel workbook and select **Copy**.

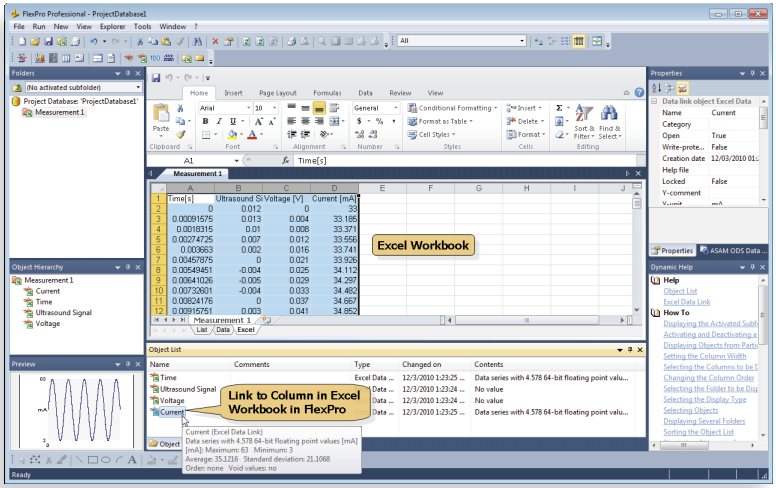


Now right-click with your mouse in FlexPro's Object List window and select **Paste**. Links to the Excel columns are then created in FlexPro.



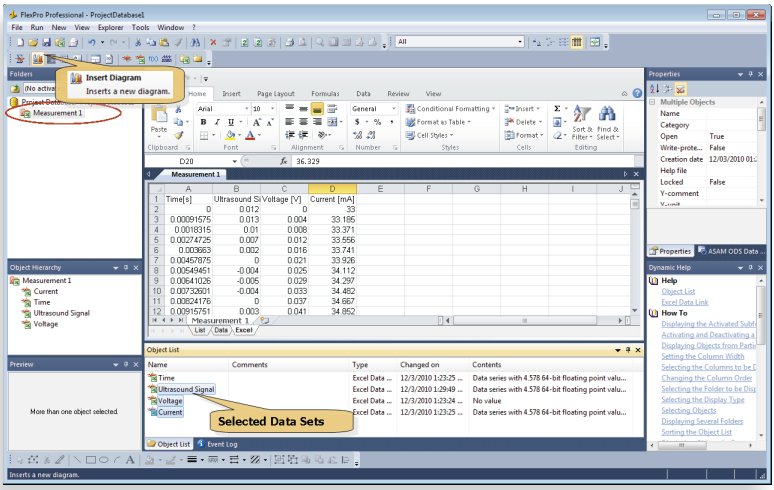


Since in this example the first column (time [s]) of the Excel workbook contains time values, select the option **The following column contains the X values**. Click **OK**.

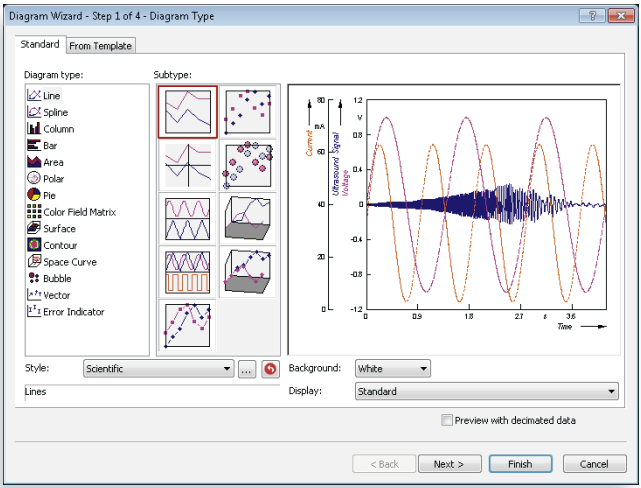


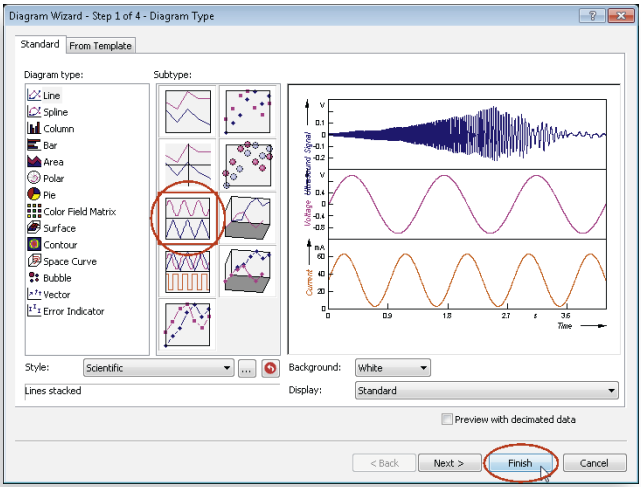
For each Excel column, FlexPro has a link to it in the Object List.

To create a diagram from the data sets that is placed in the root folder of the project database, select the root folder in the first row of the **Folders** window and then select the three data sets **Ultrasound Signal, Voltage** and **Current** in FlexPro's Object List (hold down the CTRL key and select the data sets with the left mouse button). Next, click on the **Insert Diagram** icon in the top toolbar. The Diagram Wizard opens.

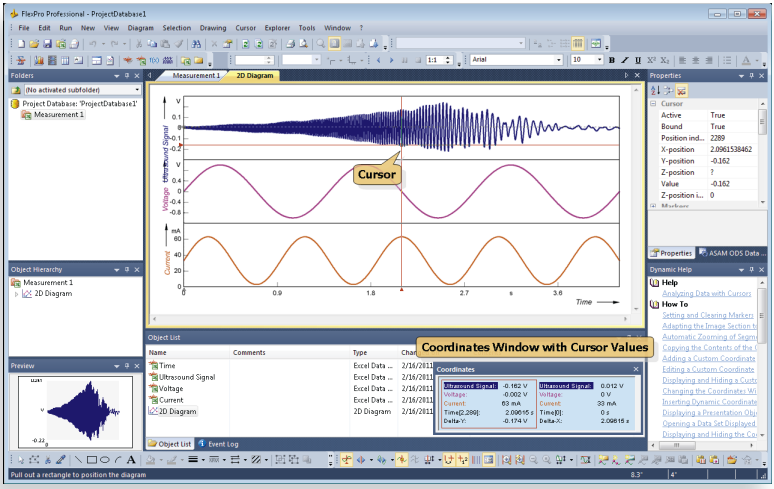


The Diagram Wizard shows **Line** as the standard default diagram type.





Click on the subtype **Lines stacked** and then click **Finish**.



The finished diagram now appears in FlexPro. The cursors are activated in the diagram. The cursor values for different curves appear in the coordinates window.

Now close the diagram by clicking on **Close** in the upper-right corner of the diagram window. The diagram will not be deleted, but instead remains in the Object List.

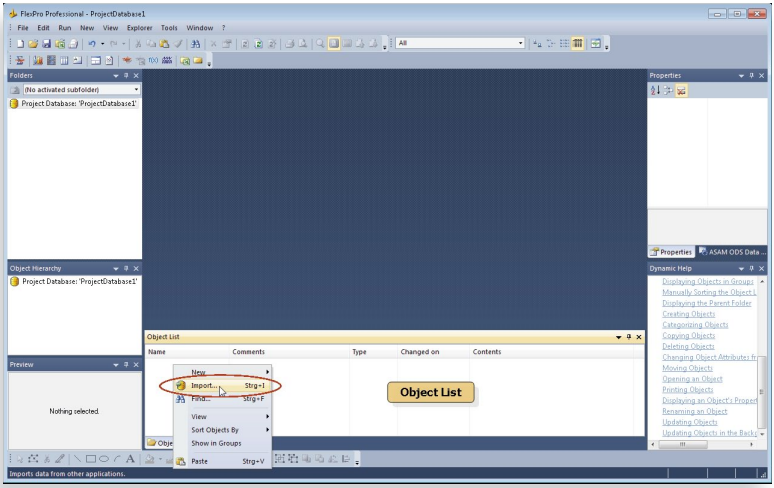
Now select the diagram in the Object List and press on the DEL key to delete it.

Next:

- Creating and Editing Diagrams P.26

Importing Data from Measuring Devices

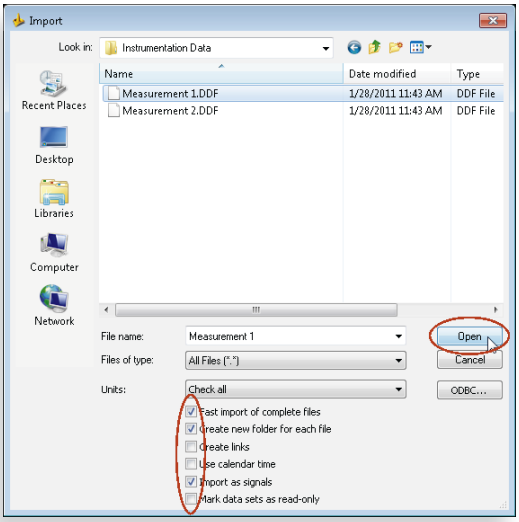
Move your mouse pointer to List View. Hold down the right mouse button. Click with your mouse on the menu item called **Import**.



The **Import** dialog box opens.

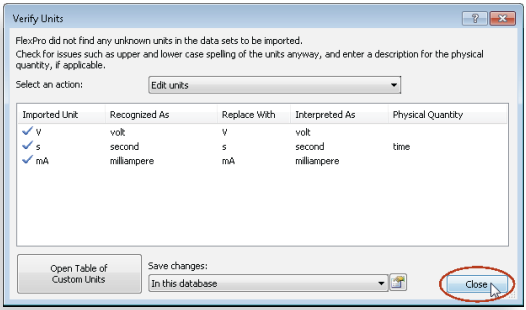
- Under **Windows Vista or Windows 7**, switch to the folder `C:\Users\Public\Documents\Weisang\FlexPro\9.0` or `C:>Users>Public>Public Documents>Weisang>FlexPro>9.0`.

- On **Windows 2000 or XP** in den Ordner `C:\Documents and Settings\All Users\Shared Documents\Weisang\FlexPro\9.0`. From there, switch to the subfolder `Examples\Getting Started\Measuring Devices` and select `Measurement1.DDF`. Enable Fast Import and the other options shown above.



Click **Open**.

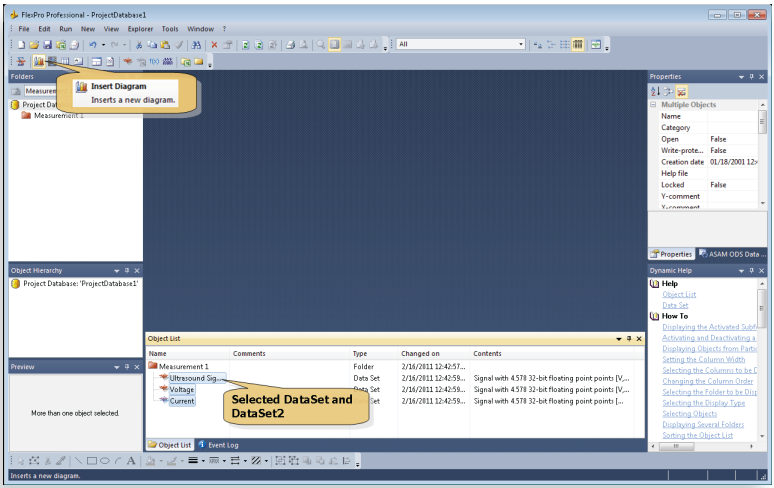
Note:
If you expand the **File Type** list, all available import options will appear.



In the **Verify Units** dialog box, FlexPro displays all imported unit symbols.

The column **Interpreted as** shows that all units were imported correctly.

Close the dialog box.

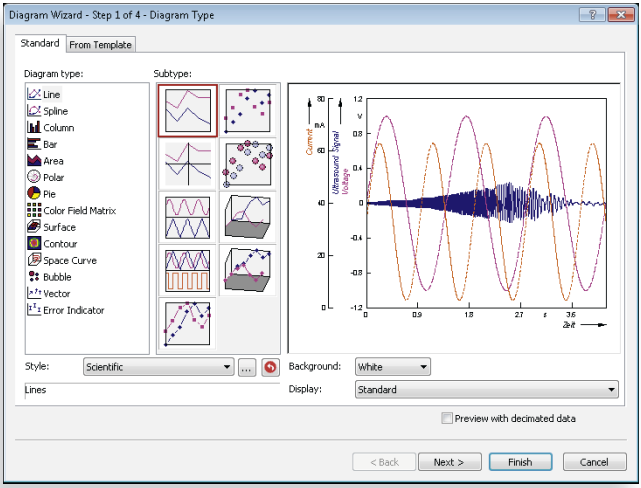


The imported data sets are automatically highlighted in the Object List.

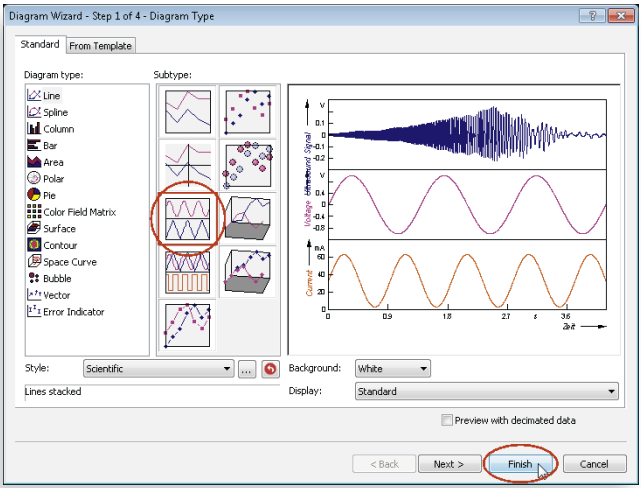
Note:
For the most frequently imported measuring device data, the data sets are imported as signals, i.e., the Y values (amplitude) of a channel are stored together with the X values (time) in a data set object. Data sets that contain a signal do not additionally appear in Data View.

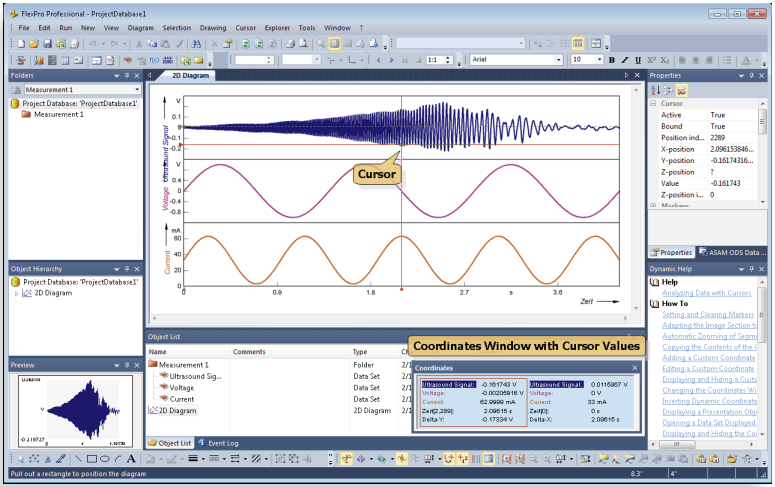
Now click on the **Insert Diagram** icon at the top of the screen. The Diagram Wizard opens.

The Diagram Wizard shows **Line** as the standard default diagram type.



Click on the subtype **Lines stacked** and then click **Finish**.





The finished diagram now appears in FlexPro. The cursors are activated in the diagram. The cursor values for different curves appear in the coordinates window.

Now close the diagram by clicking on **Close** in the upper-right corner of the diagram window. The diagram will not be deleted, but instead remains in the Object List.

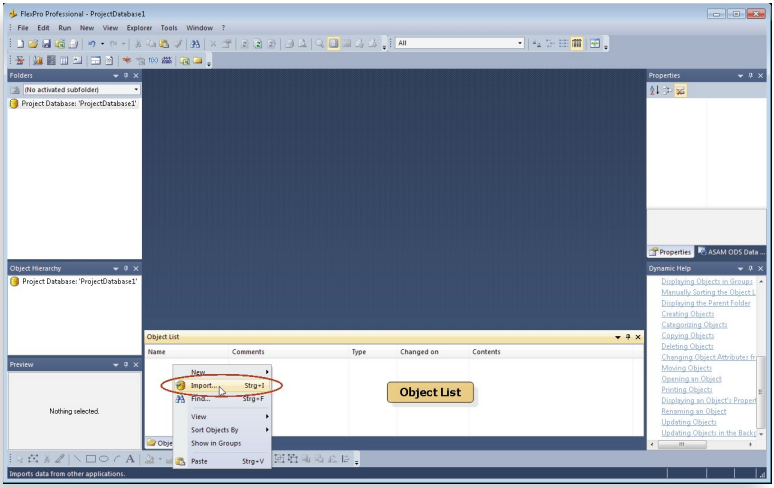
Now select the diagram in the Object List and press on the DEL key to delete it.

Next:

- Creating and Editing Diagrams P.26

Importing Text Data (ASCII Files)

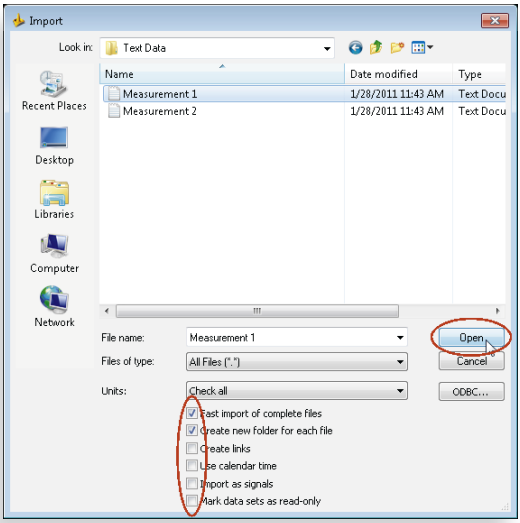
Move your mouse pointer to the Object List. Hold down the right mouse button to open the context menu. Click with your mouse on the menu item called **Import**.

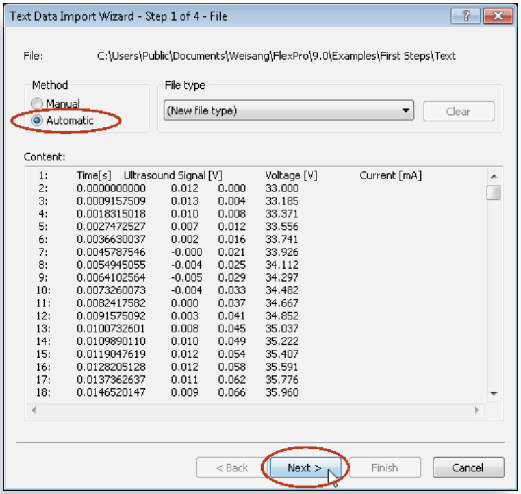


The **Import** dialog box opens.

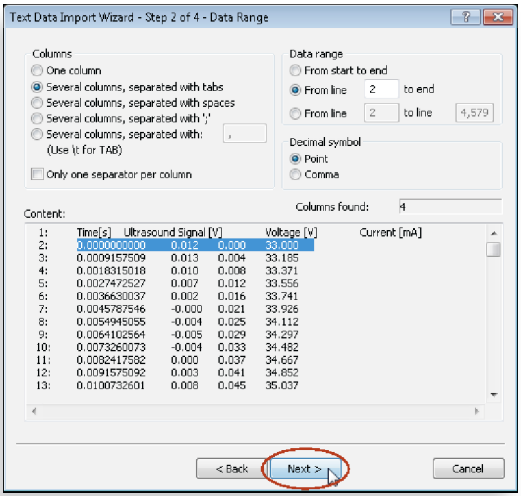
- Under **Windows Vista or Windows 7** switch to the folder `C:\Users\Public\Documents\Weisang\FlexPro\9.0` or `C:>Users>Public>Public Documents>Weisang>FlexPro>9.0.`
- On **Windows 2000 or XP** the folder is under `C:\Documents and Settings\All Users\Shared Documents\Weisang\FlexPro\9.0.` From there, switch to the subfolder `Examples\Getting Started\Text Data` and select `Measurement 1.txt.`

Click on **Open**.



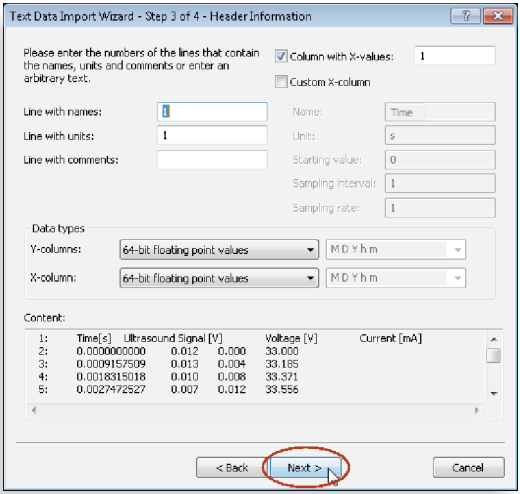


Select **Automatic** as the import method. Click on **Next**.

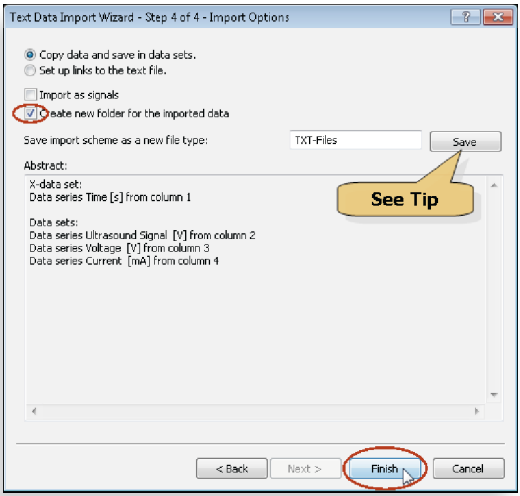


FlexPro automatically recognizes the current data set structure. You can verify this by looking at the value displayed for **Columns found**. Click on **Next**.

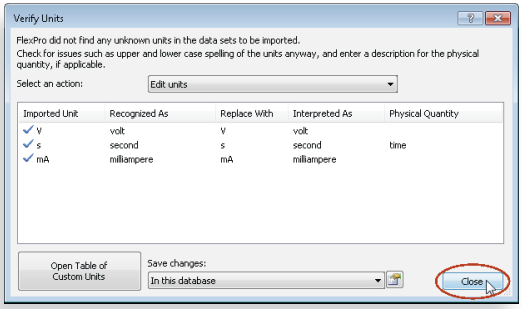
FlexPro then asks for the row with the names of the data sets. In our example, the row is recognized correctly. Click on **Next**.



Select the option **Create new folder for the imported data**. The imported text data is then placed in a new folder in the Object List. Click on **Finish**.



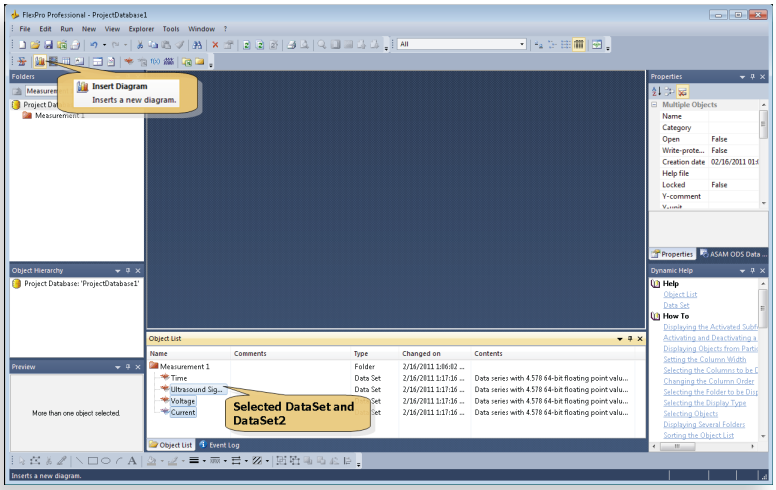
Note:
If you are importing your own data, you can save all settings made in the Wizard for quick importation of data with the same data structure in the future. To do this, click on **Save**.



In the **Verify Units** dialog box, FlexPro displays all imported unit symbols.

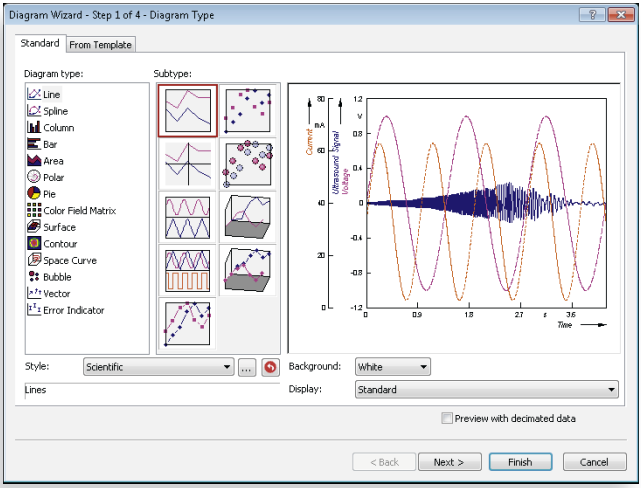
The column **Interpreted as** shows that all units were imported correctly.

Close the dialog box.

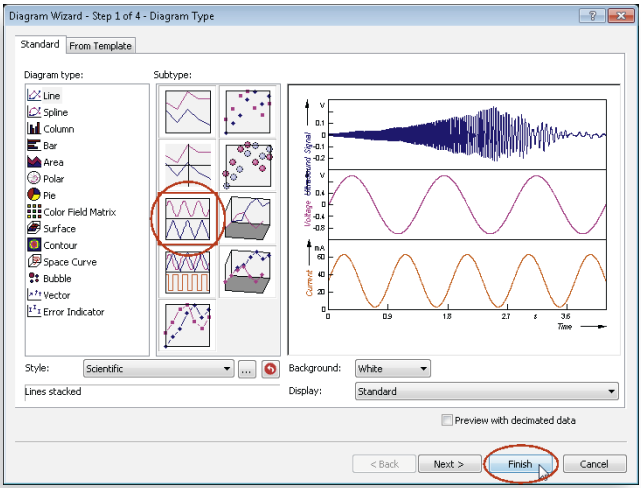


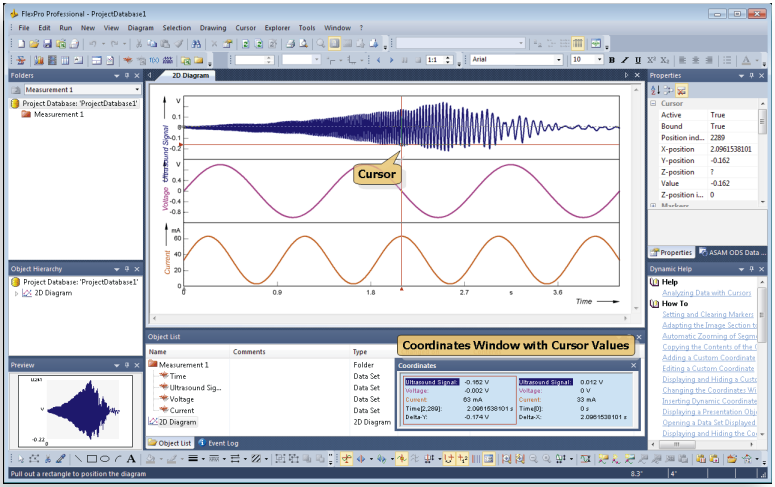
Select the three data sets called **Ultrasound Signal, Voltage** and **Current** in FlexPro's Object List (hold down the CTRL key and select the data sets with the left mouse button). To create a diagram from this data, click on the icon **Insert Diagram**.

The Diagram Wizard shows **Line** as the standard default diagram type.



Click on the subtype **Lines stacked** and then click **Finish**.





The finished diagram now appears in FlexPro. The cursors are activated in the diagram. The cursor values for different curves appear in the coordinates window.

Now close the diagram by clicking on **Close** in the upper-right corner of the diagram window. The diagram will not be deleted, but instead remains in the Object List.

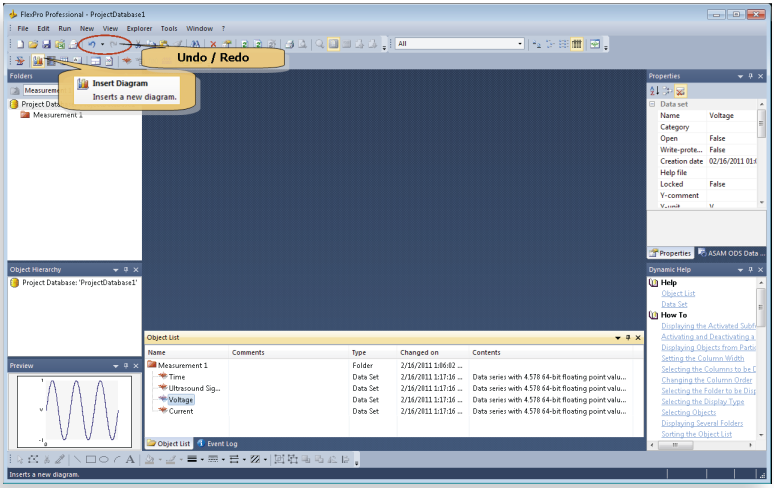
Now select the diagram in the Object List and press on the DEL key to delete it.

Next:

- Creating and Editing Diagrams P.26

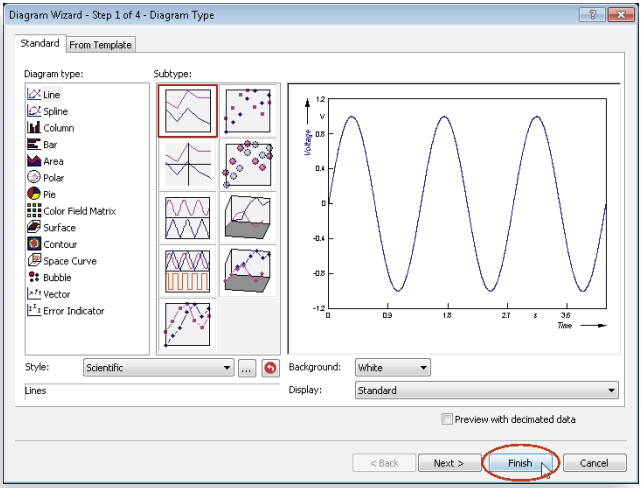
Creating and Editing Diagrams

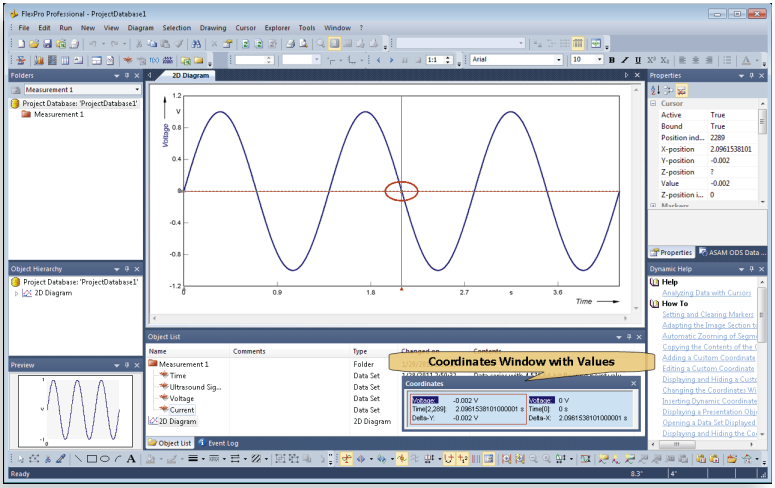
Use your left mouse button to select the data set **Voltage**. Next, click on the **Insert Diagram** icon in the top toolbar. The Diagram Wizard opens.



Note:
If necessary, you can undo any steps you make in FlexPro. Just click on the **Undo/Redo** icons in the top toolbar.

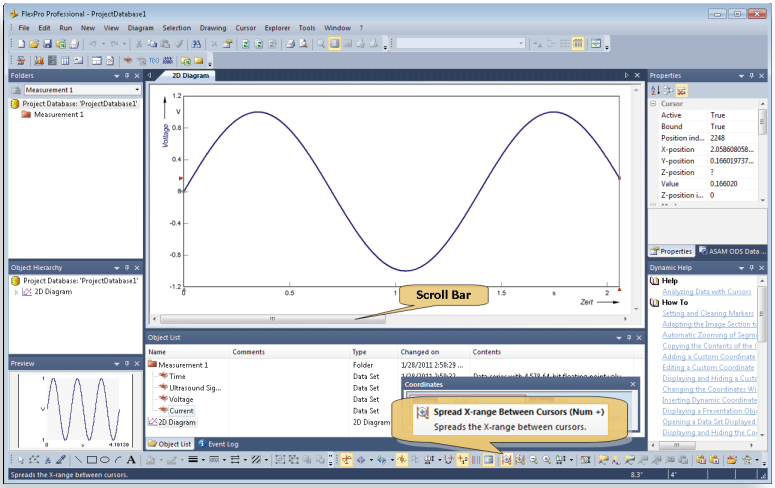
Click on **Finish**.





Using Cursors to Measure Data Sets

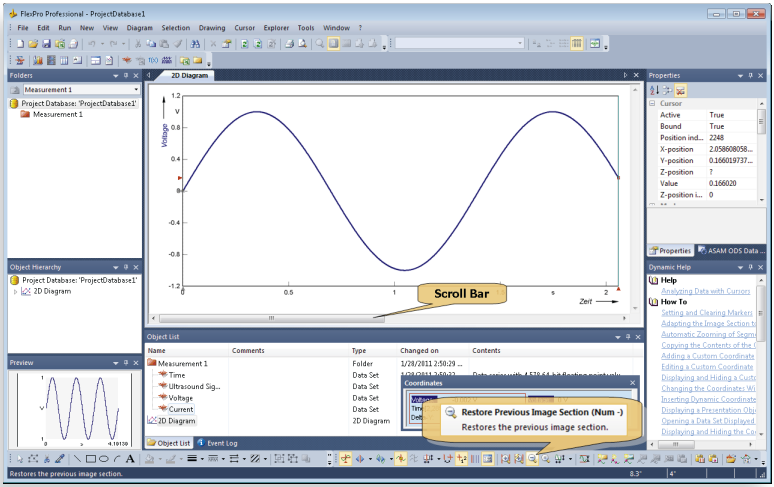
The diagram is displayed in FlexPro. Move your mouse pointer to the left Y axis where one of two cursors is located. A horizontal double arrow appears. Hold the left mouse button down and move the cursor to the right. The current values for the positions of the cursors are displayed in the Coordinates window.



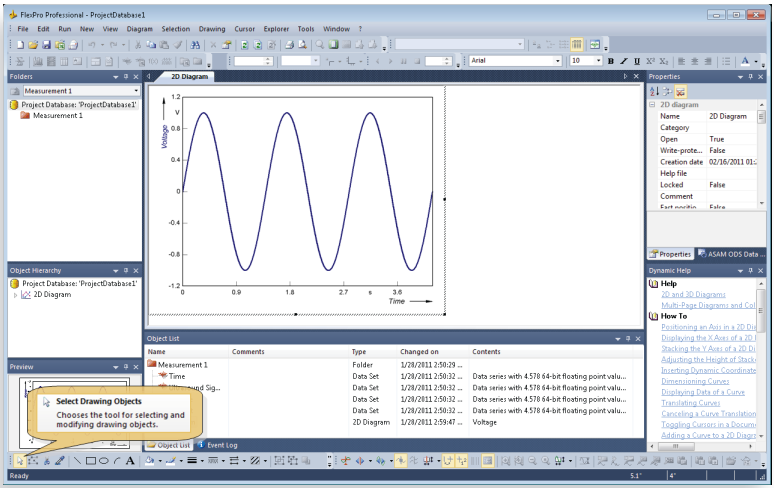
Resizing Data Sets In a Diagram

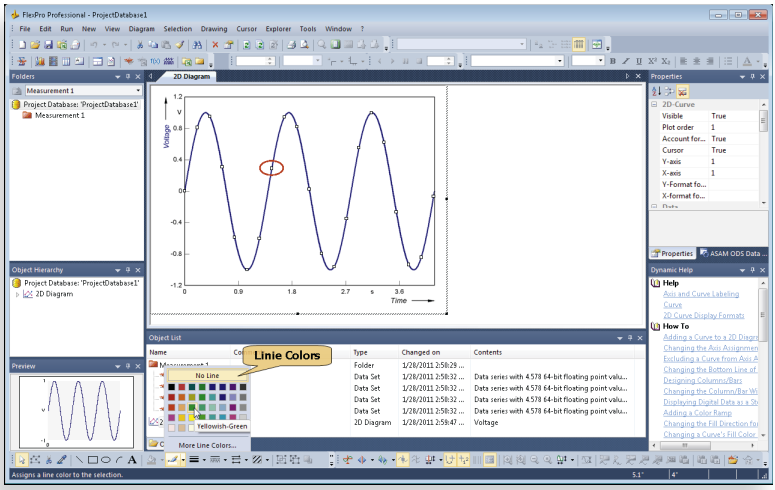
By clicking on the **Spread X Range Between Cursors** icon, the signal section between the cursors is enlarged. Using the scrollbar, you can move the stretched data set within the diagram.

The **Restore Original Image Section** icon allows you to undo all zoom operations in one step.

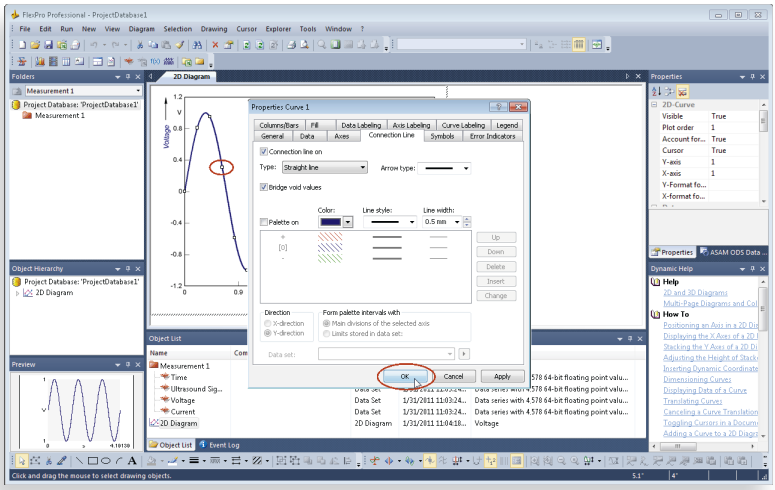


To edit the diagram, deactivate the cursor using the **Select Drawing Objects** icon. Another way to do this is to deselect the **Activate Cursors** icon.





With one click of the left mouse button on the curve of the diagram, this curve can be selected for editing. Using the **Line Color** menu, you can now change the color of the curve, for instance.

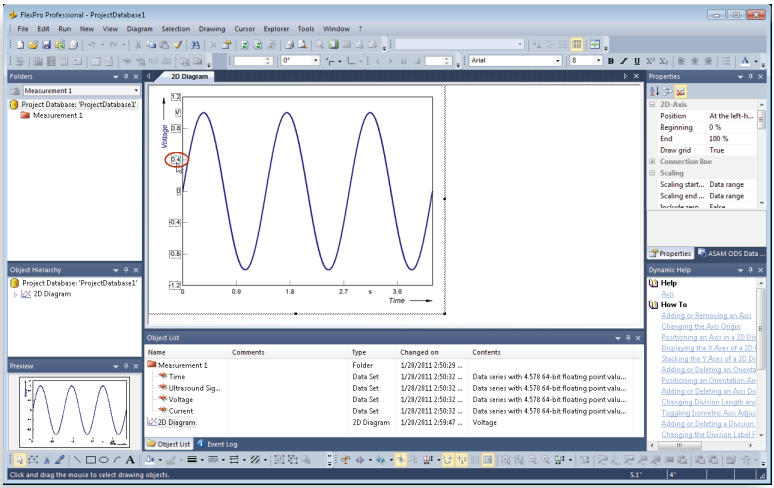


By double-clicking with the left mouse button on the selected curve, the Properties dialog box for the curve opens. Here, all options for changing this curve are displayed. Now close the Properties dialog box by clicking on **Cancel**.

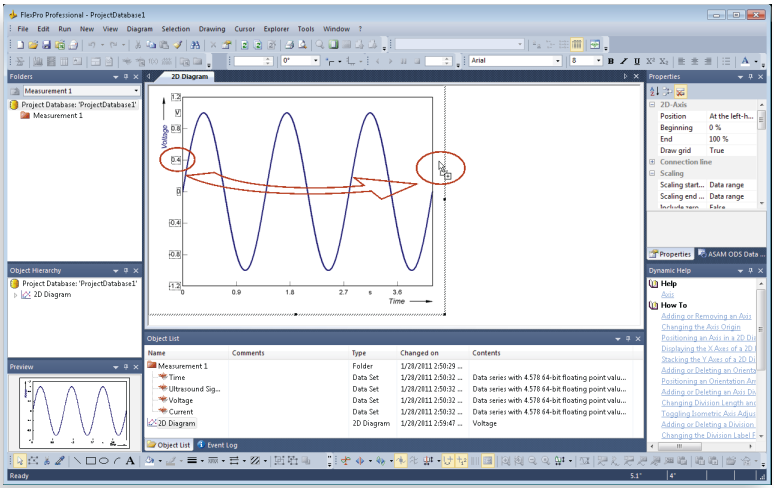
Note:
By double-clicking on any element (axes, scaling, etc.), the respective Properties dialog box opens automatically and you can work with the element.

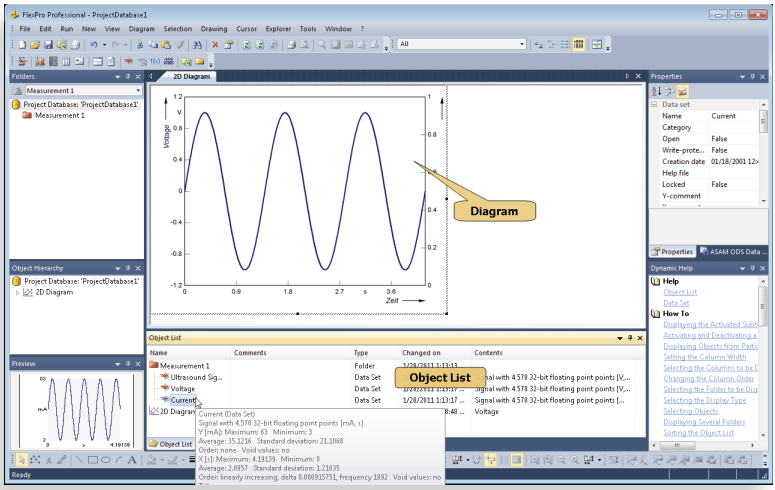
Creating a New Y Axis

Click on the scaling of the Y axis using the left mouse button. The numerical values appear highlighted.



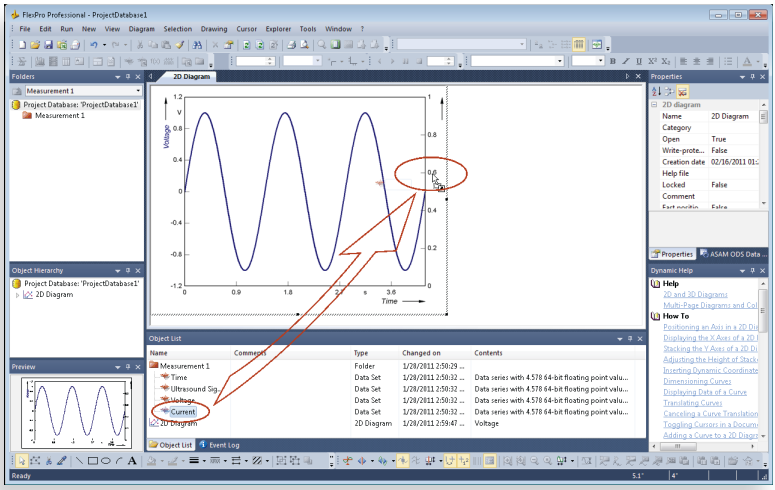
Move your mouse pointer to one number on the Y axis. For example, click on the number **0.4** and hold down the left mouse button. The mouse pointer now displays an additional + sign. Move the mouse pointer to the white space to the right of the diagram. Now release the mouse button. A new axis appears at the selected position. In the next step, a data set will be scaled over this new axis.





Adding a Second Data Set to the Diagram and Scaling Over the New Axis

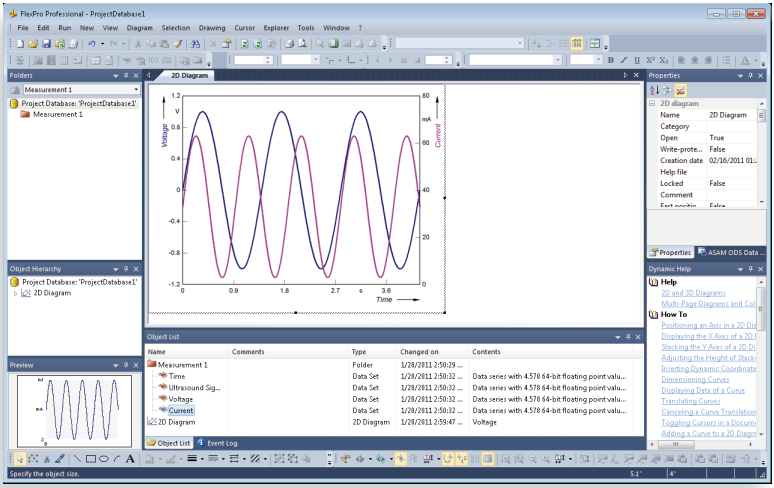
In the Object List, click on the data set called **Current**. Press and hold down the left mouse button.



Move your mouse pointer to a number on the new axis. Release the mouse button. The **Current** data set appears in the diagram and is automatically scaled over the new axis.

Note:
If the object in which you want to insert an element via drag-and-drop is located on a tab in the background and is therefore not visible, move your mouse pointer to the tab of the target object and wait a moment. FlexPro will then move the window to the foreground.

This is how your diagram now looks with two data sets and two Y axes. Now close the diagram.

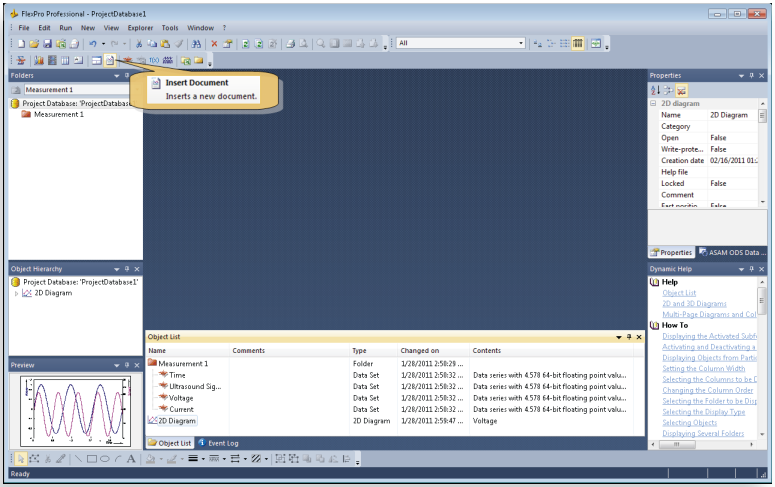


Note:
Click the **2D Diagram** object in the Object List. Now you can copy this diagram to the clipboard or use drag-and-drop to copy it into a Word document, for example.

Next:

- Creating a Document P.33

Creating a Document

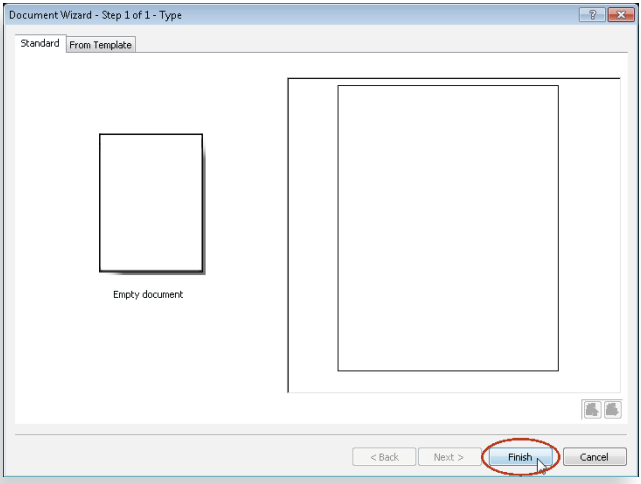


The Document

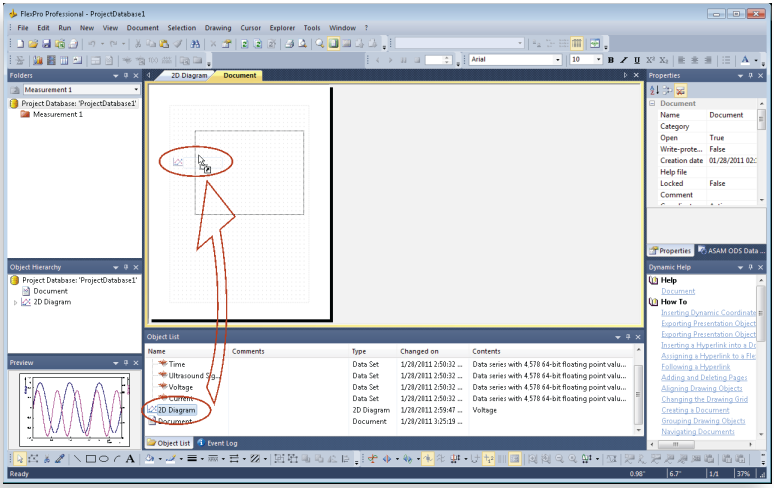
A document is the equivalent of a piece of paper on which you can place diagrams, text and tables and then print it out.

Creating a Document

Click on the **Insert Document** icon in the top toolbar. The wizard for creating a document appears.



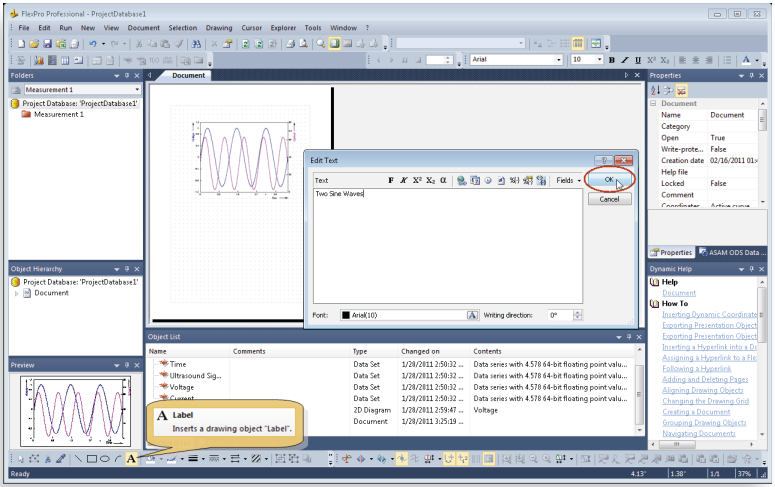
Click **Finish** to create a blank document.



Displaying a Diagram in a Document

Select the appropriate diagram, in this case **2D Diagram**, from the Object List. Next, drag this diagram to the document by holding down the left mouse button and placing it where you want it to be located. After releasing the button on your mouse, the diagram is displayed in the document.

Note:
In this case, a link to the diagram located in the Object List is inserted into the document. You can see this as a link icon, which appears on the mouse pointer. To insert a standalone copy of the diagram into the document, you have to hold down the CTRL key and mouse button at the same time.



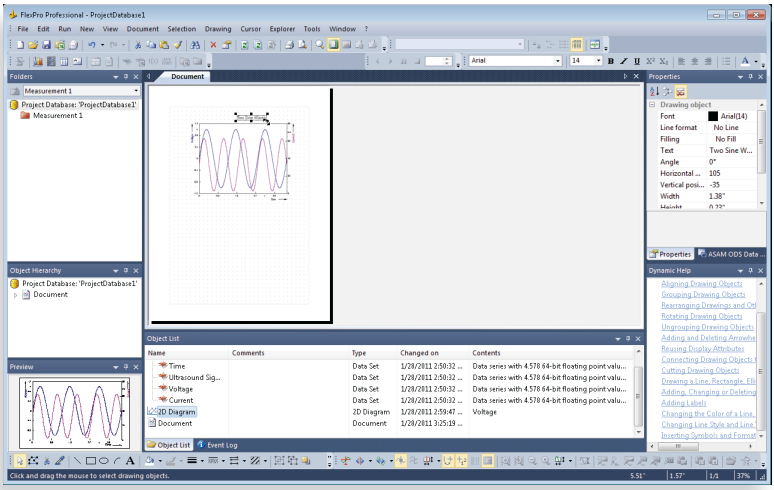
Inserting a Row of Text into a Document

Right-click with your mouse on the **Label** icon in the toolbar at the bottom of the window and then move the mouse pointer to the location where you want the label in the document. Click to open the **Edit Text** dialog box. Now enter the appropriate text and click **OK**. The text will then appear in the document.

The inserted text can now be moved and resized with the mouse.

Now close the document.

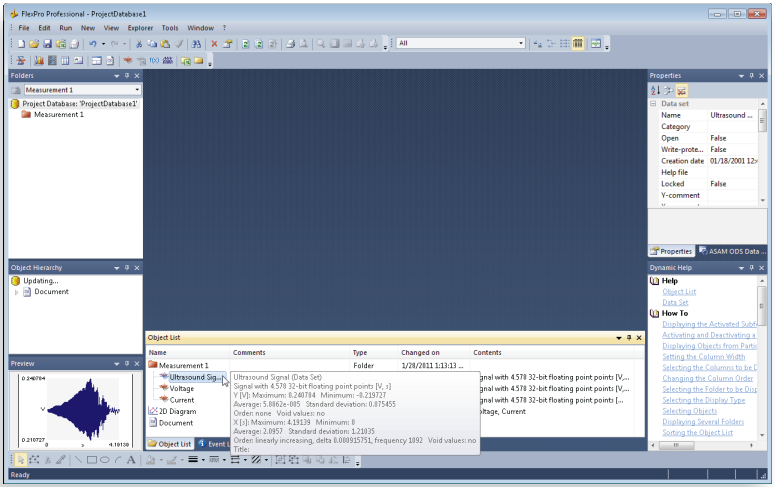
Note:
If you activate the cursor over the **Activate Cursors** icon and click on the diagram in the document, all of the cursor options in the document become available to you. You can also create multi-page documents.



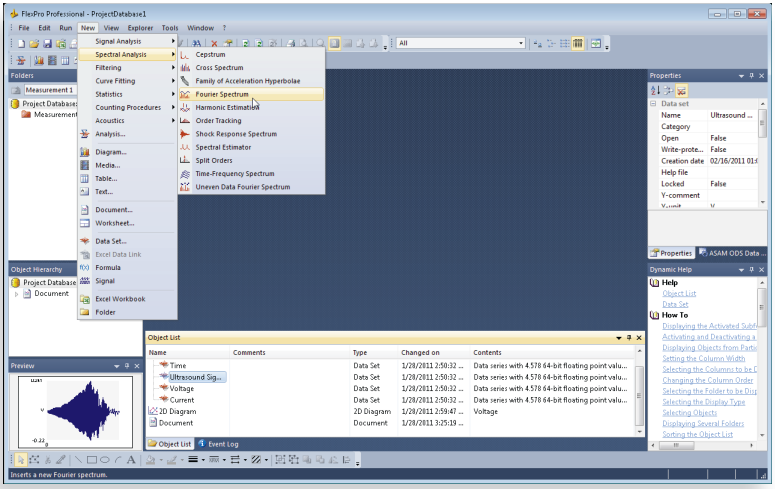
Next:

■ Calculations in FlexPro P.37

Calculations in FlexPro

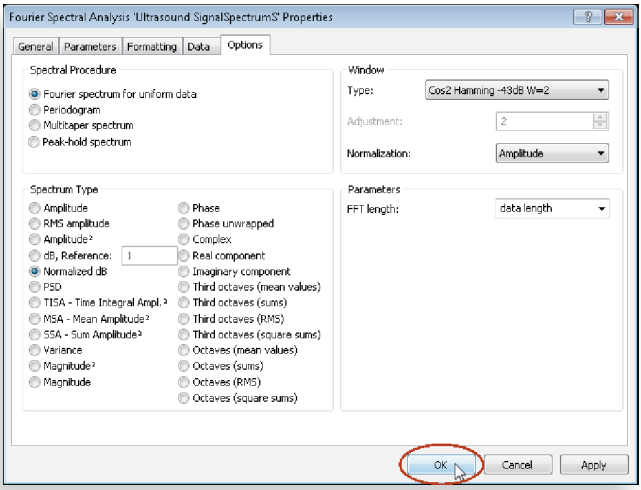


Select the data set called **Ultrasound Signal** from the Object List. In the Preview you can see the shape of the signal.

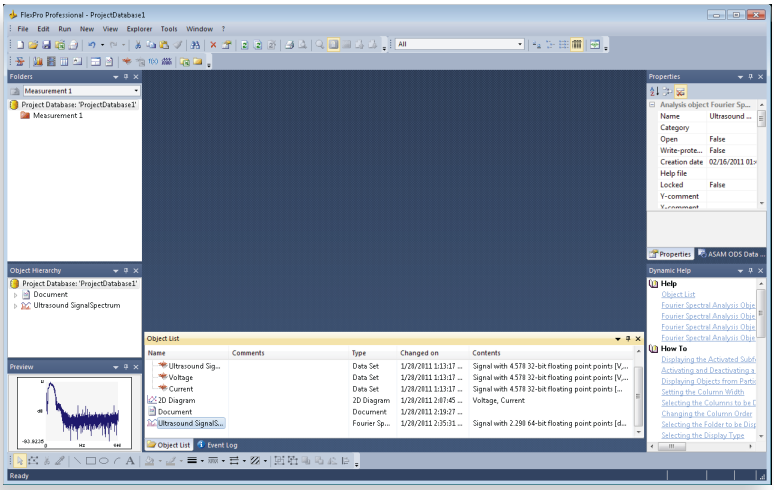


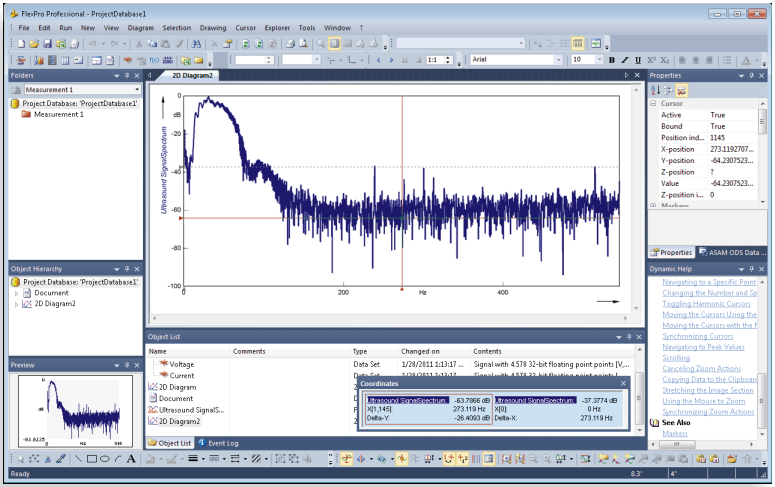
Next, from the **New** menu, select the submenu **Spectral Analysis** and then **Fourier Spectrum**. FlexPro now creates an analysis object for calculating the Fourier spectrum.

In the **Properties** dialog box, which is now open, leave all settings unchanged and exit by clicking **OK**. The spectral analysis is performed for this example using the default settings in the dialog box.



In the Object List, the analysis object is displayed with the name **Spectrum**. This represents the spectral analysis of the ultrasound signal and can be used like a data set. To display this calculated spectrum in a diagram, open the Diagram Wizard.





The new diagram with the spectral analysis is then displayed in a new window. Now close the diagram.

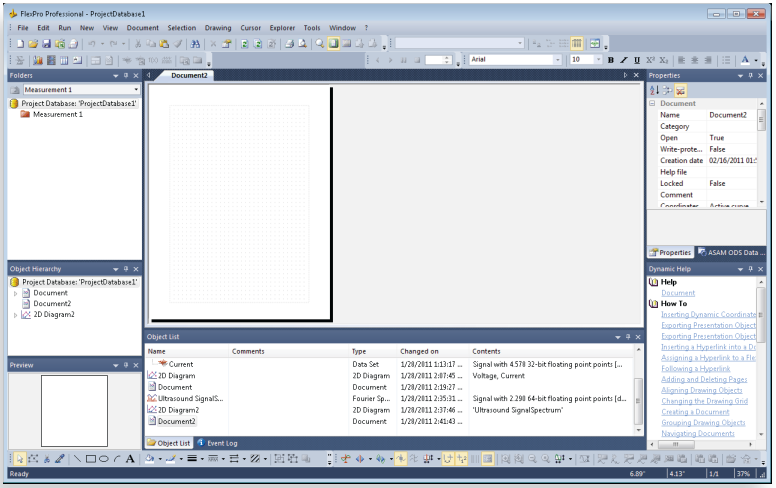
Note:
You can also set up your own calculations as FlexPro formulas. Wizards are available to assist you with this process.

Next:

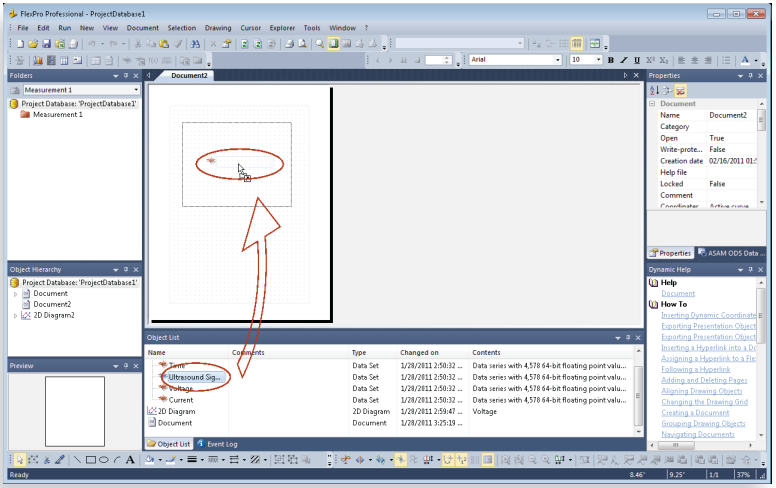
- Automatic Presentation and Calculation of Data with the Click of a Button P.40

Automatic Presentation and Calculation of Data with the Click of a Button

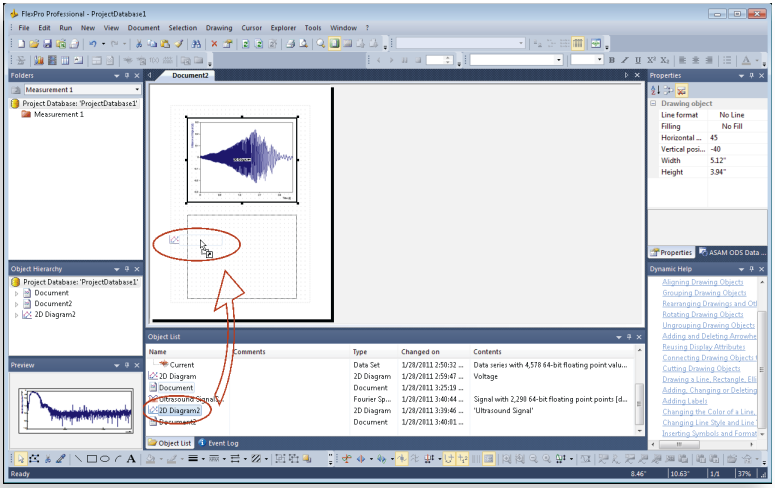
Create a new document by clicking on the **Insert Document** icon in the top toolbar.



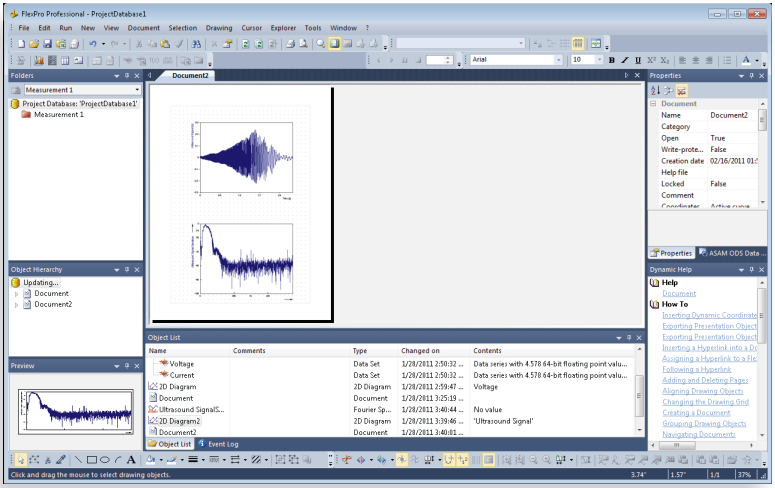
Select the data set called **Ultrasound Signal** from the Object List. Drag this data set to the document by holding down the left button on your mouse and placing it where you want it to be located. After releasing the mouse button, the data set is displayed in the document.



Note:
You can drag a data set directly into a document without creating a diagram first. If you do this, a diagram is automatically created within the document.



Now select the diagram called **2D Diagram 2** with the spectral analysis and place this diagram within the document by selecting the diagram in the Object List with your left mouse button and, while holding the mouse button down, drag the diagram to the desired location in the document.



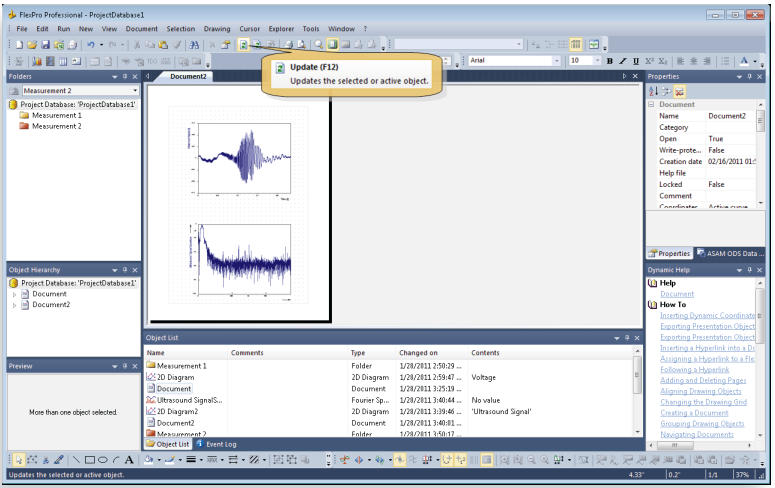
You now have a finished document with the ultrasound signal and the spectral analysis of this signal from **Measurement 1**.

All objects from which you have assembled your evaluation form a dynamic network, which is displayed in the **Object Hierarchy** window. You can thus use the evaluation directly as a template for evaluating additional measurements. Import the file MEASUREMENT 2 from the data folder.

You can find **information** on the relevant import options under:

- Importing Excel Data P.10
- Importing Data from Measuring Devices P.16
- Importing Text Data (ASCII Files) P.20

In FlexPro, a second folder called **Measurement 2** is now created and activated (distinguished by the red folder icon). The content of the active folder is displayed and all open windows are updated, since the option **Automatic Update** is selected in the **Run** menu.



Note:
You can switch between the individual measurements at any time by selecting the appropriate subfolder from the **Activate or deactivate subfolder** list box at the top of the **Folder** window. FlexPro updates all windows automatically as long as the option **Automatic Update** is selected. Otherwise, you can also carry out the update manually using the **Update All** command.

If you want to, you can now try out other options available in FlexPro.

Here are a few suggestions:

- Double-click on the object **UltrasoundSignalSpectrum** and convert the spectral format from dB to amplitude.
- Create statistics for measured data and display these as a table within the document.
- Export the complete analysis as an HTML web page.
- Record a few command steps as a macro.
- Create a formula for calculating data sets.

You can find additional information about FlexPro in the FlexPro Online Help and in the FlexPro manual.

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