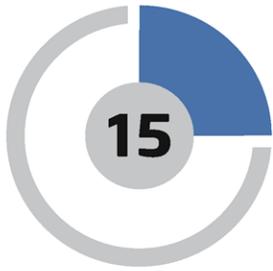


FlexPro 2017

Data Analysis & Presentation



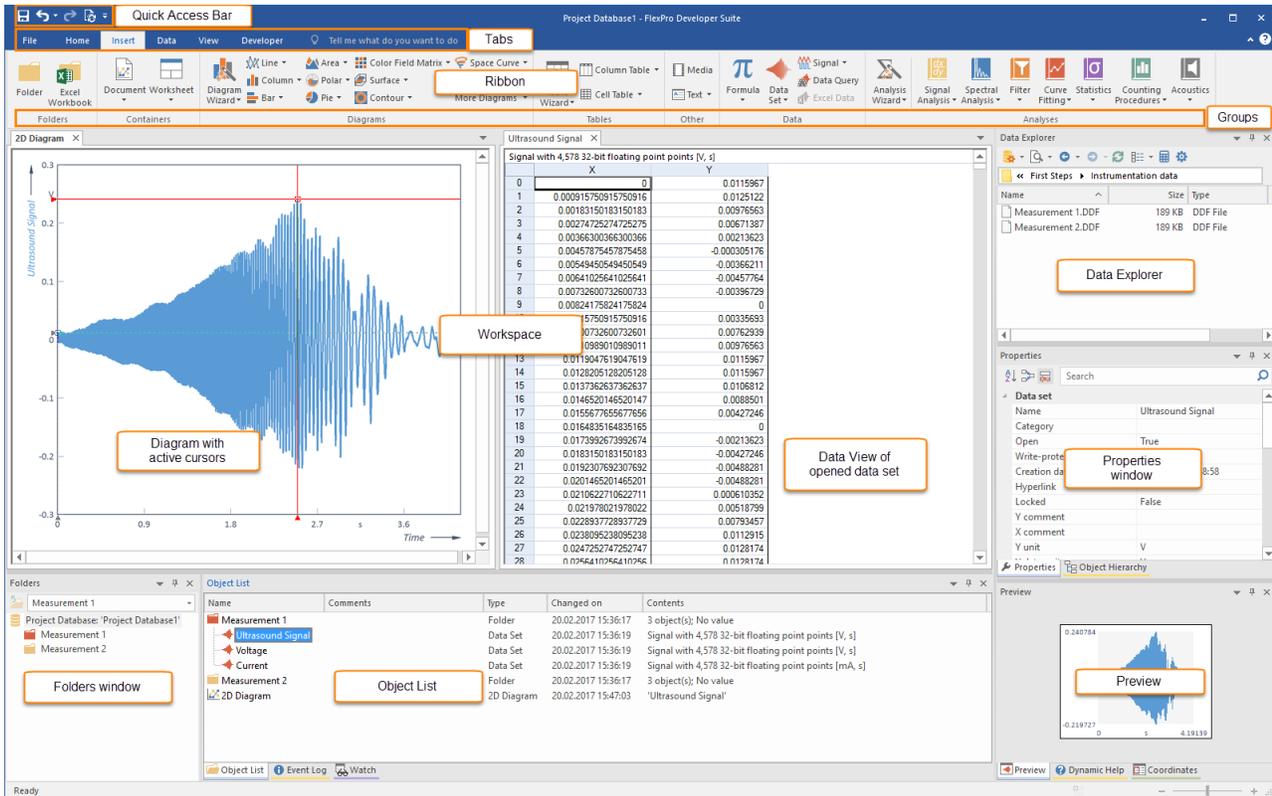
Get to know FlexPro
in just 15 minutes



Getting 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.

Managing Data with FlexPro



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.

Structure of FlexPro's Main Window

- **Ribbon**

This is where you select commands. The ribbon is divided into several tabs. Only one tab is active at a time. The example above shows the **Home** tab. You can switch tabs by clicking on the tab title. The commands are arranged in groups. Their names are below the icons. The FlexPro documentation uses the following syntax to refer to a command: **Tab[Group] > Command**, e.g. **Home[Clipboard] > Copy**. Some icons open menus from which you can choose an entry. This can be identified by a small arrow next to or under the icon; for instance: **Home[Clipboard] > Paste > Paste Special**.

- **Quick Access Toolbar**

This displays frequently used commands that you can always access without having to change tabs.

- **Folders Window**

This is where 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.

- **Data Explorer**

Depending on the view selected, Data Explorer displays files on your hard disk or indexed data.

- **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 **Quick Access Toolbar** bar.

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

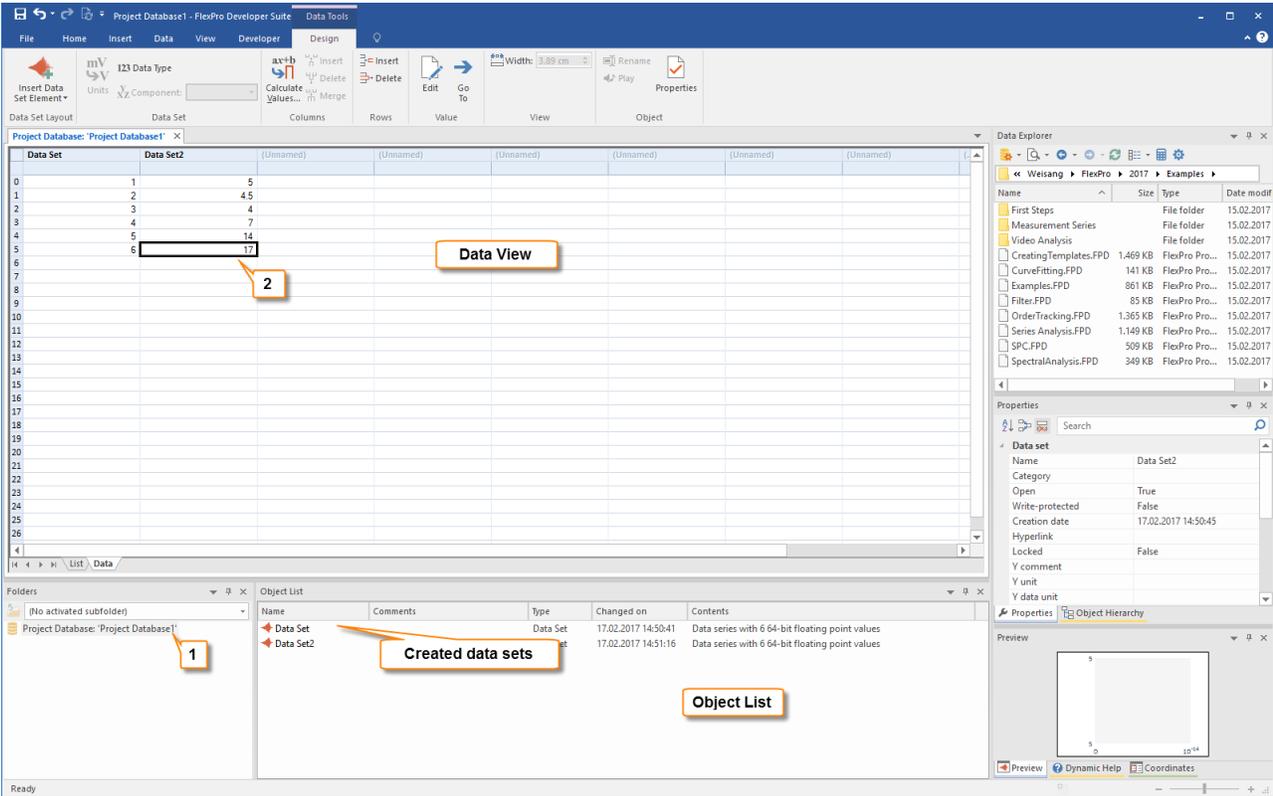
[Entering Data Manually into FlexPro](#) ⁶

[Importing Excel Data](#) ⁸

[Importing Data from Measuring Devices](#) ¹³

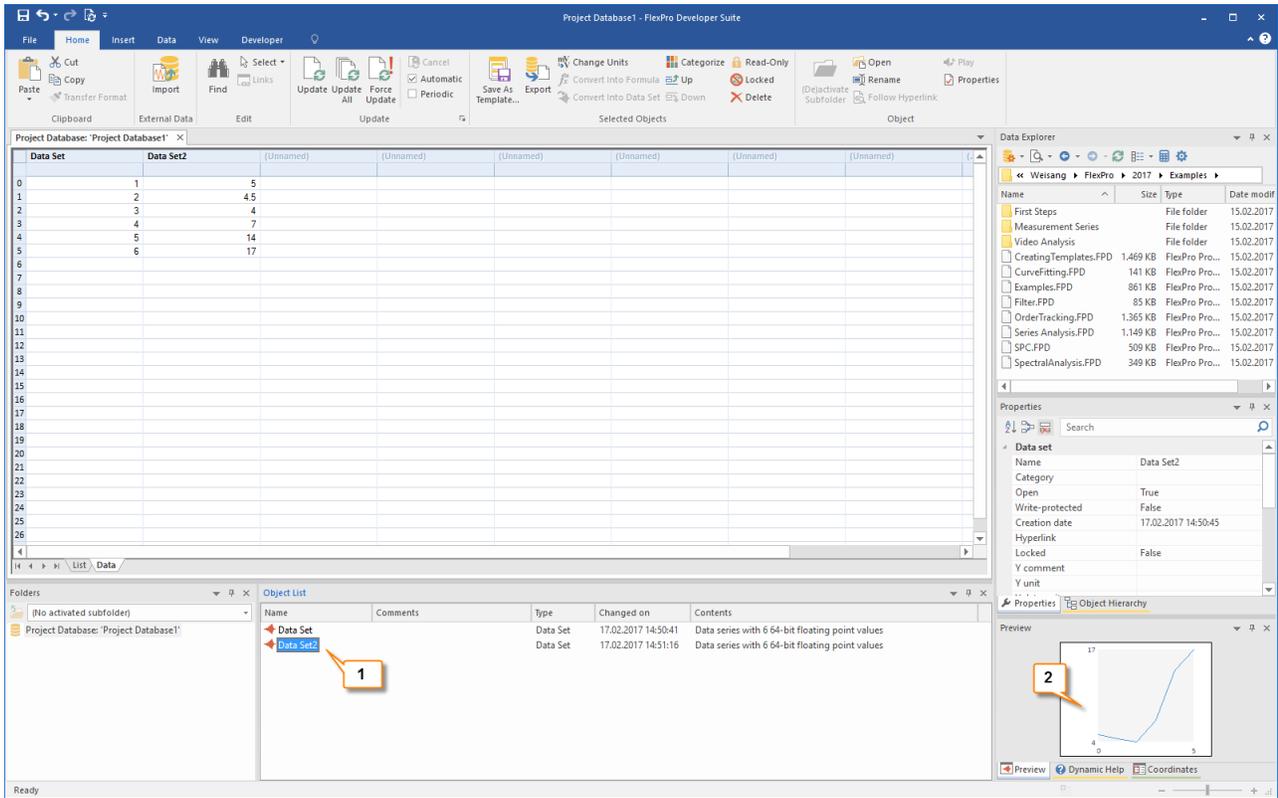
[Importing Text Data \(ASCII Files\)](#) ¹⁵

Entering Data Manually into FlexPro



Double-click on the root folder shown in the first row in the Folders window to open it [1].

Enter the first two columns of the numerical values shown above in Data View [2]. FlexPro automatically creates the two objects **DataSet** and **DataSet2**, which appear in the Object List.



To check the data, you can select a data set in the Object List [1] and view its content as a curve in the Preview [2].

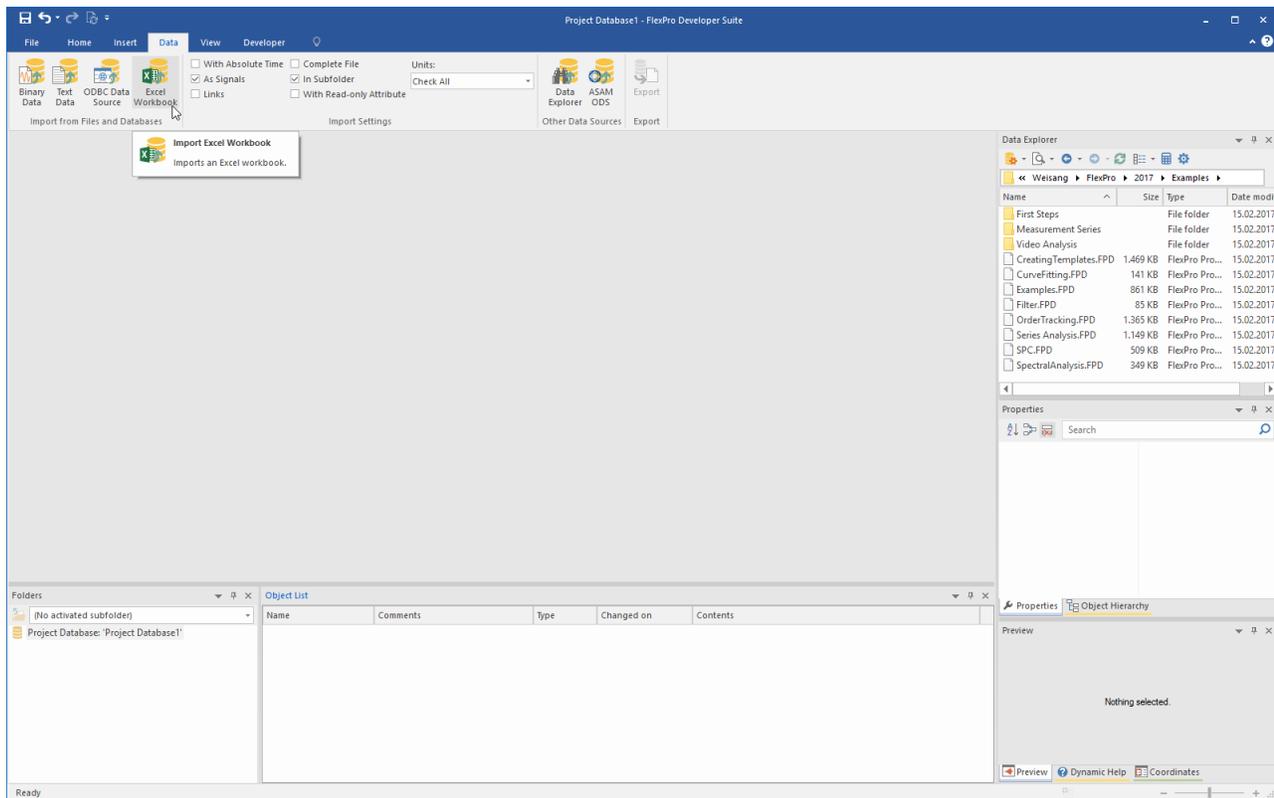
Caution: The following examples in this tutorial are based on imported data. Please select one of the alternative import methods that you want to use:

[Importing Excel Data](#) [8]

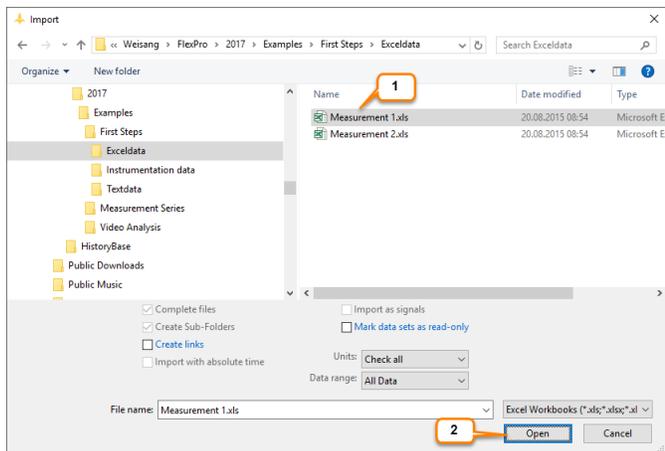
[Importing Data from Measuring Devices](#) [13]

[Importing Text Data \(ASCII Files\)](#) [15]

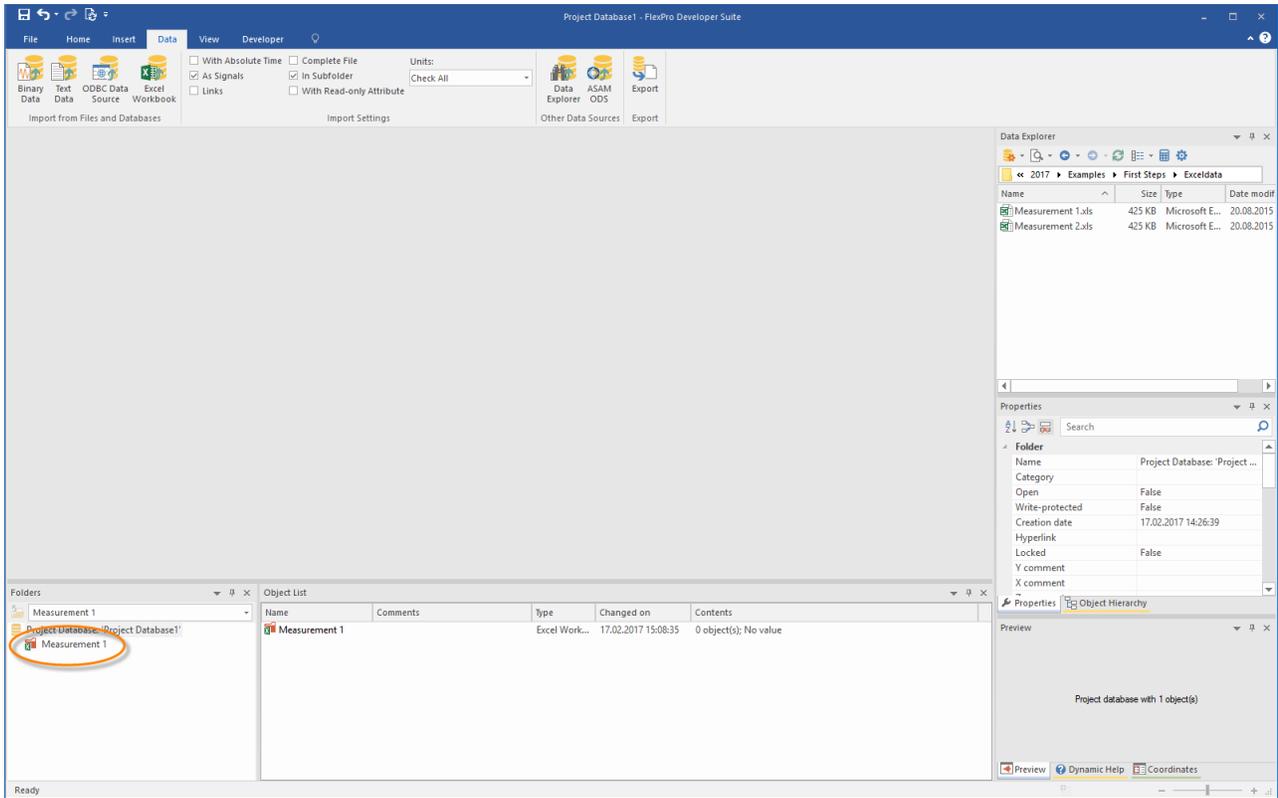
Importing Excel Data



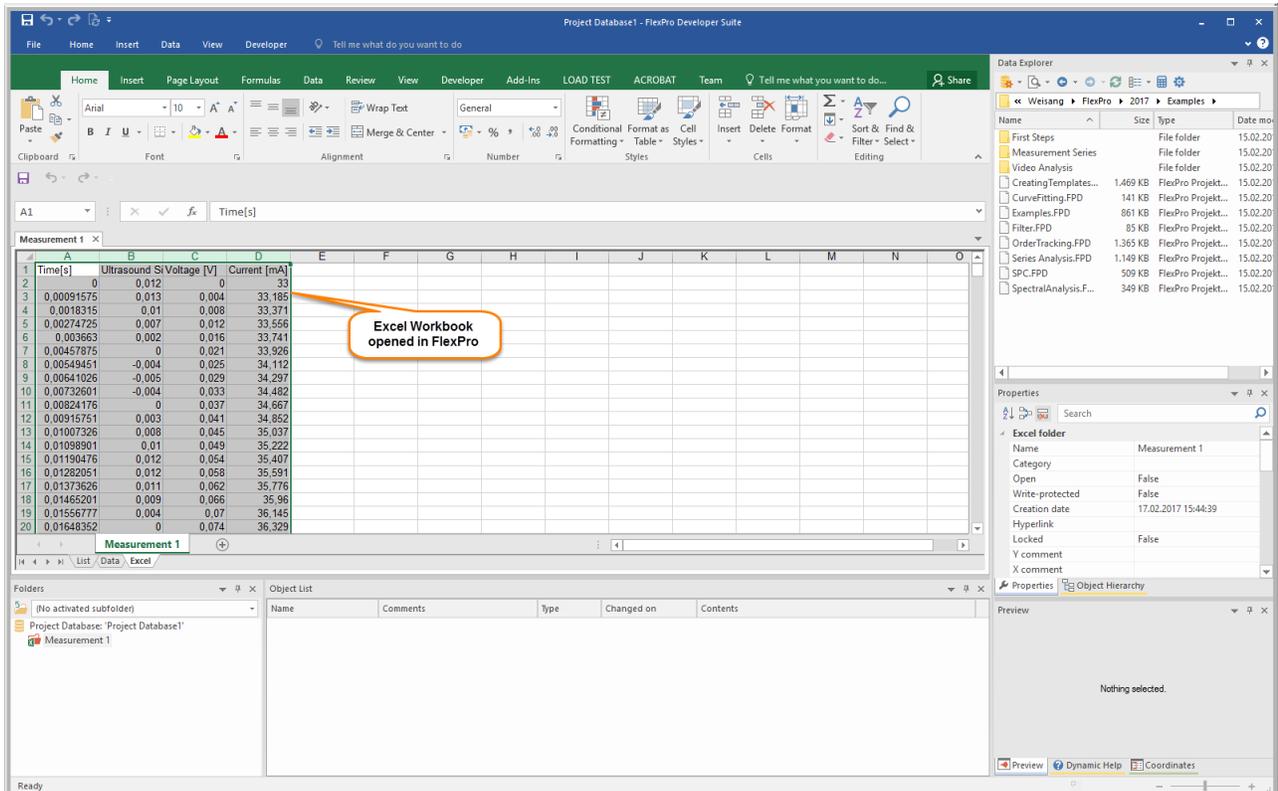
Click on Data[Excel Workbook].



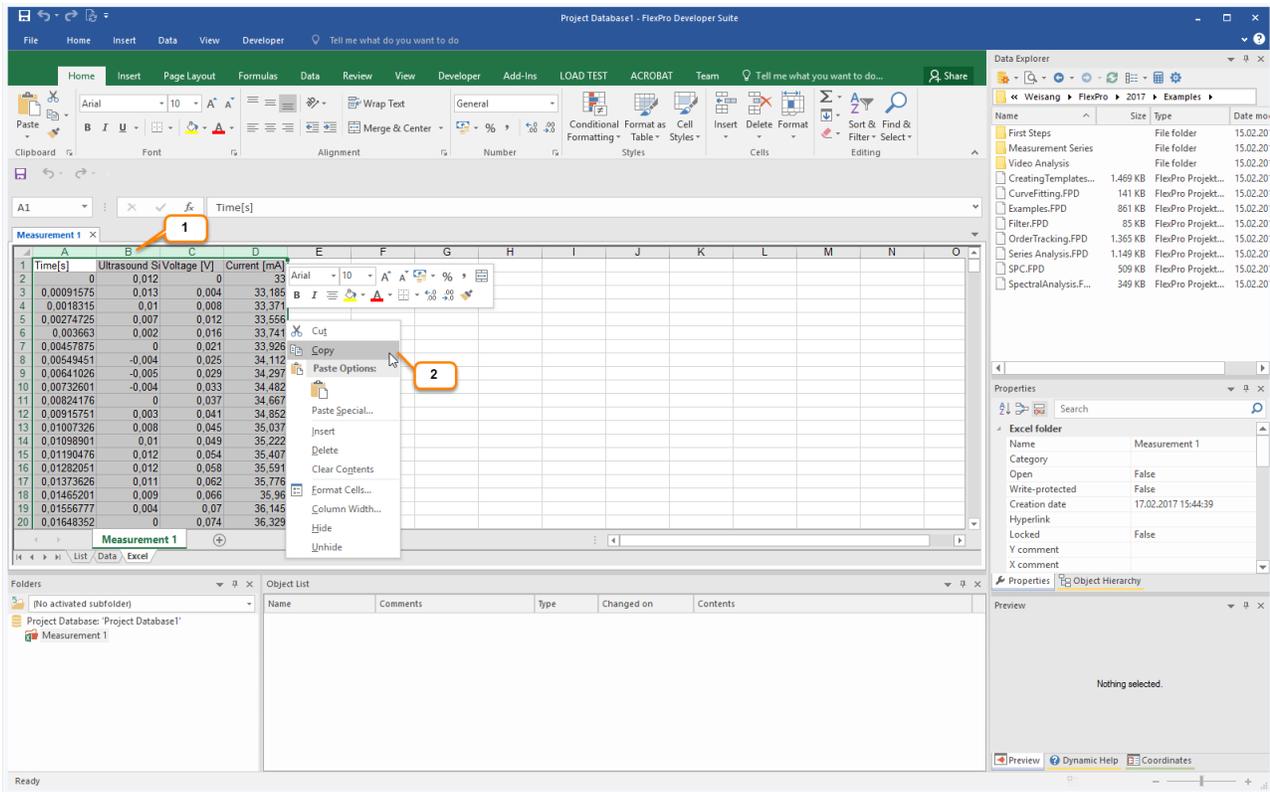
The **Import** dialog box opens. Switch to the folder C:\Users\Public\Documents>Weisang\FlexPro\2017 or C:>Users>Public>Public Documents>Weisang>FlexPro>2017. From there, switch to the subfolder Examples\First Steps\Excel Data and select Measurement 1.xls [1]. Click Open [2].



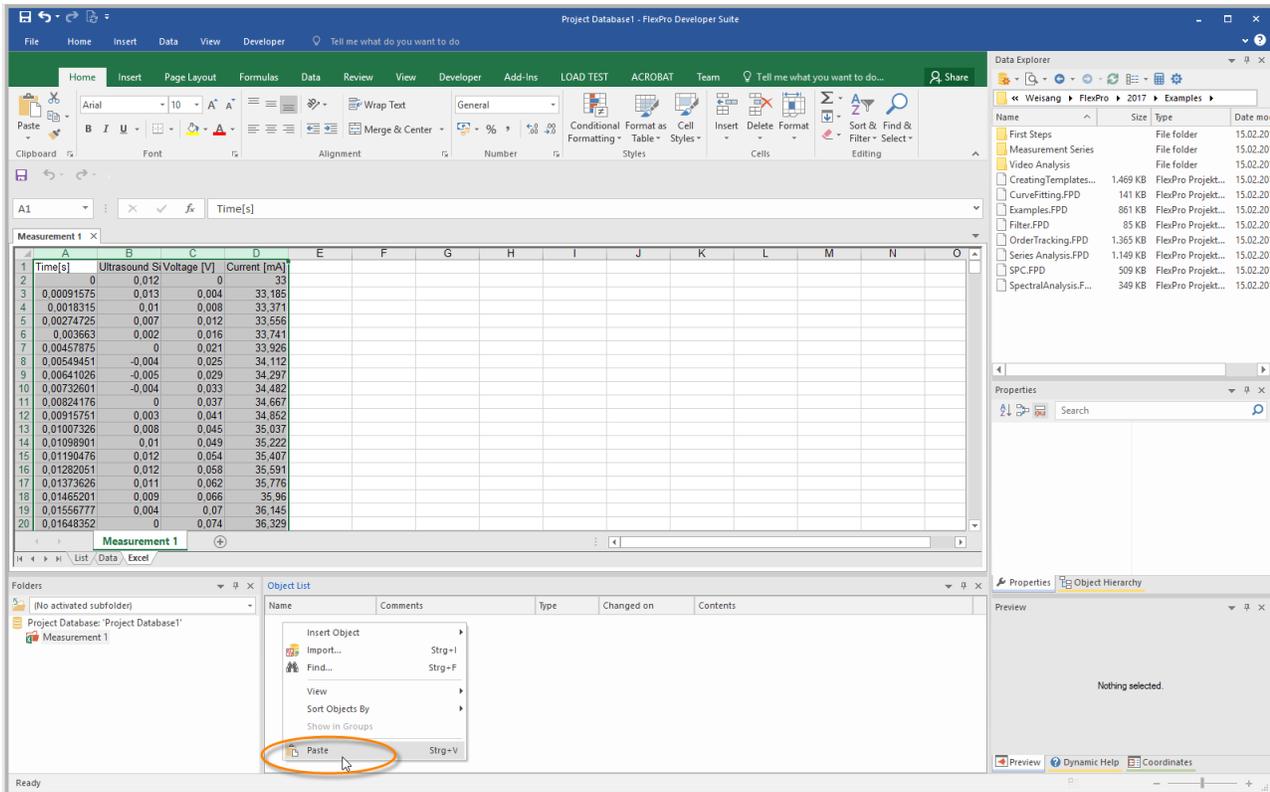
A new folder appears called Measurement 1. Double-clicking on this folder in the Folders window opens the Excel workbook in FlexPro.



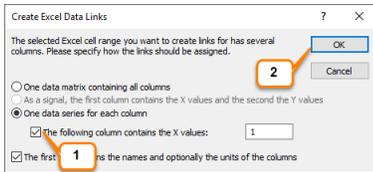
Select all columns in the Excel workbook [1].



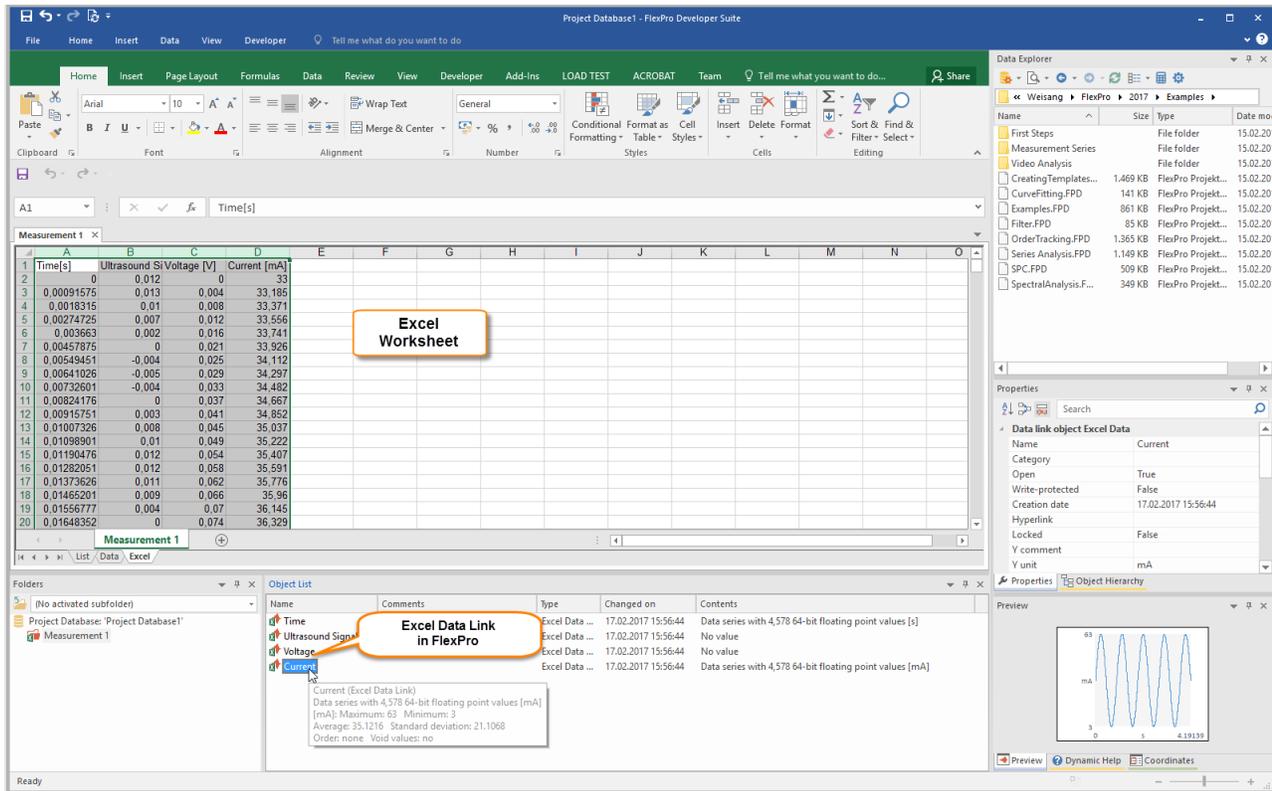
Right-click with your mouse on the highlighted area in the Excel workbook and select Copy [2].



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 [1]. Click OK [2].



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

The screenshot displays the FlexPro Developer Suite interface. The main window shows a spreadsheet with the following data:

Time[s]	Ultrasound Si Voltage [V]	Current [mA]
0	0.012	0
0.00091575	0.013	0.004
0.0018315	0.01	0.008
0.00274725	0.007	0.012
0.003663	0.002	0.016
0.00457875	0	0.021
0.00549451	-0.004	0.025
0.00641026	-0.005	0.029
0.00732601	-0.004	0.033
0.00824176	0	0.037
0.00915751	0.003	0.041
0.01007326	0.008	0.045
0.01098901	0.01	0.049
0.01190476	0.012	0.054
0.01282051	0.012	0.058
0.01373626	0.011	0.062
0.01465201	0.009	0.066
0.01556777	0.004	0.07
0.01648352	0	0.074

The Object List on the bottom left shows the following items:

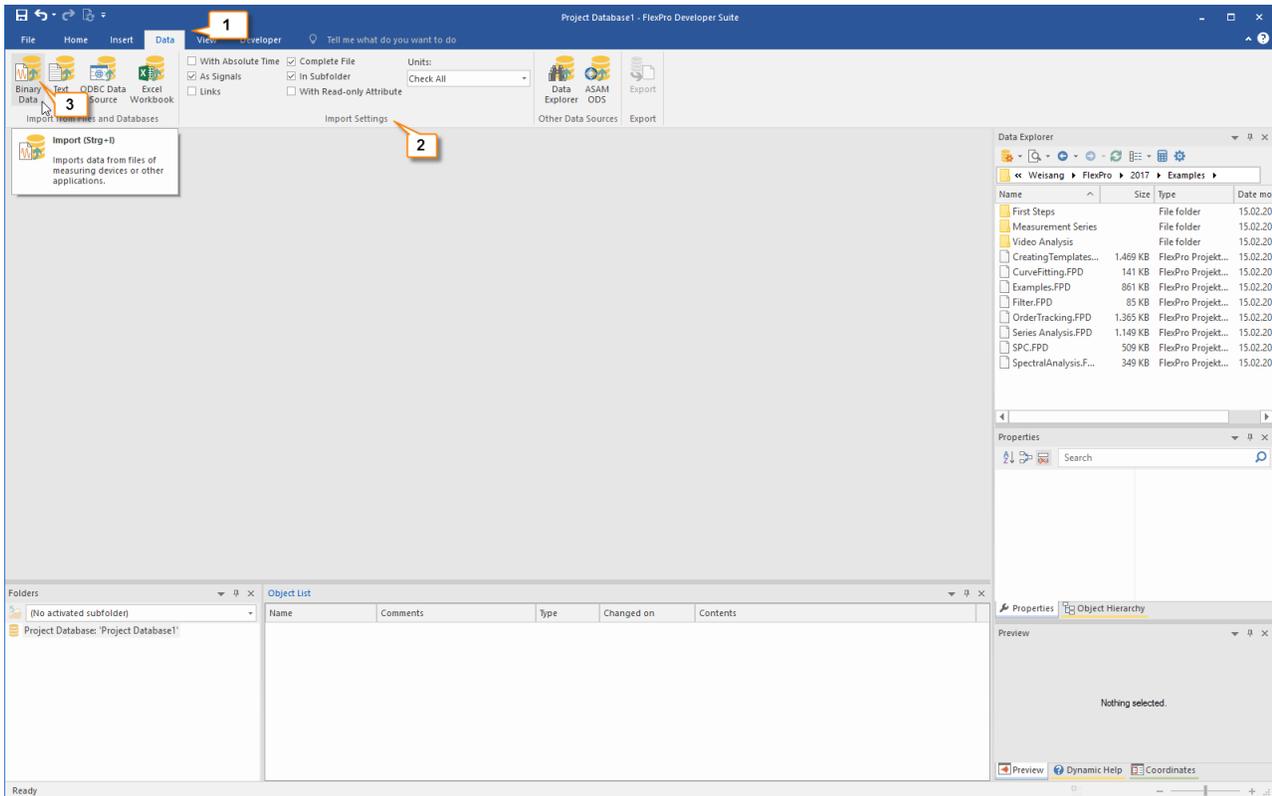
- Time
- Ultrasound Signal
- Voltage
- Current

The Preview window on the bottom right shows a graph of the Current data, with a peak value of 63 mA and a minimum value of 3 mA. The graph is labeled with '2'.

To check the data, you can select a data set in the Object List [1] and view its content as a curve in the Preview [2].

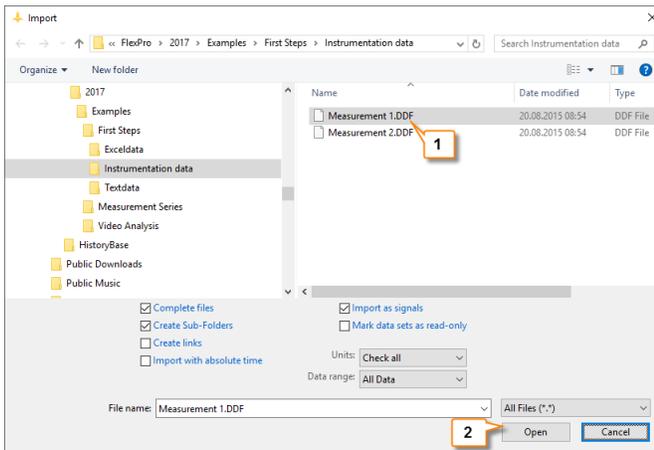
Next: [Creating and Editing Diagrams](#) [18].

Importing Data from Measuring Devices



Click on the **Data** tab on the ribbon [1] and in the **Import Settings** group select the options **As Signals**, **Complete File** and **In Subfolder** [2].

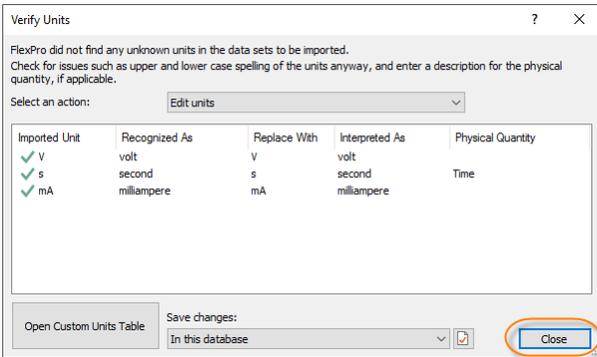
Click on [**Import from Files and Databases**] > **Binary Data** [3].



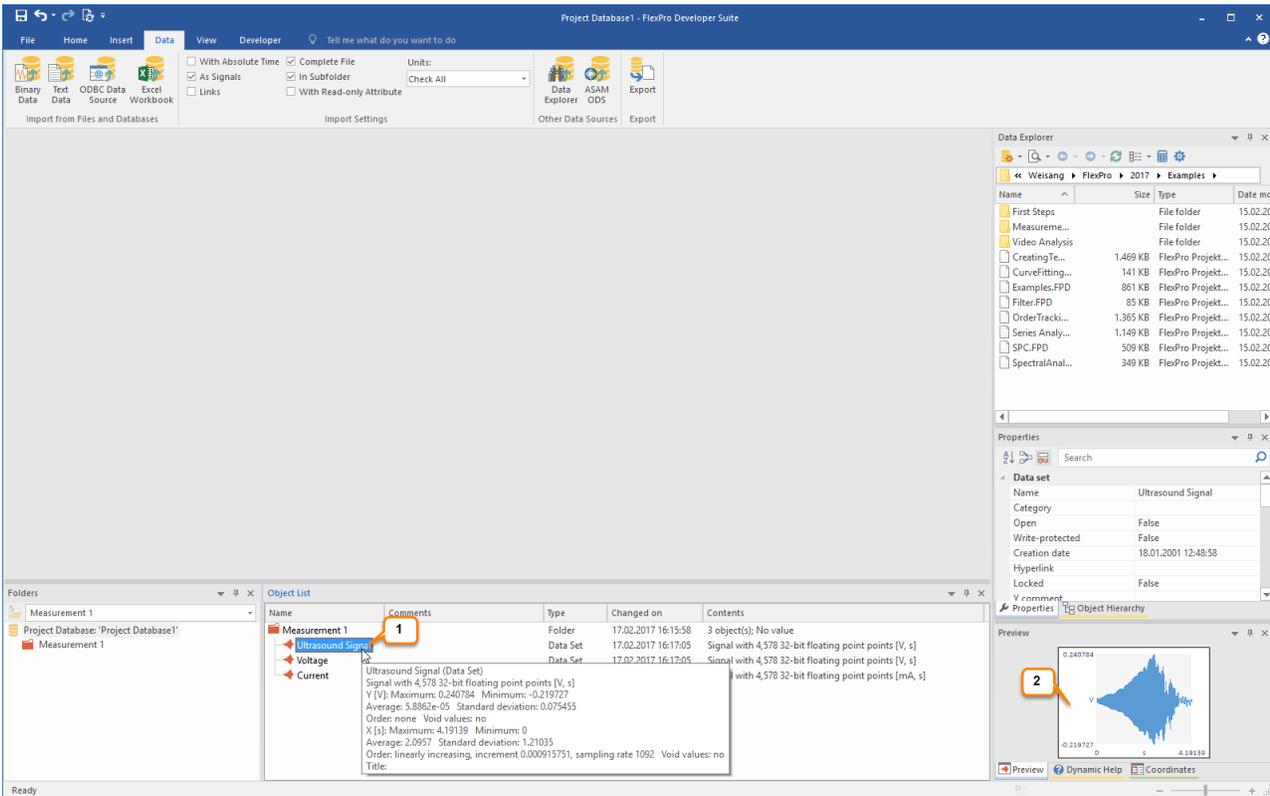
The **Import** dialog box opens.

Switch to the folder `C:\Users\Public\Documents\Weisang\FlexPro\2017` or `C:\Users\Public\Public Documents\Weisang\FlexPro\2017`. From there, switch to the subfolder `Examples\First Steps\Instrumentation Data` and select **Measurement 1.DDF** [1]. Click **Open** [2].

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

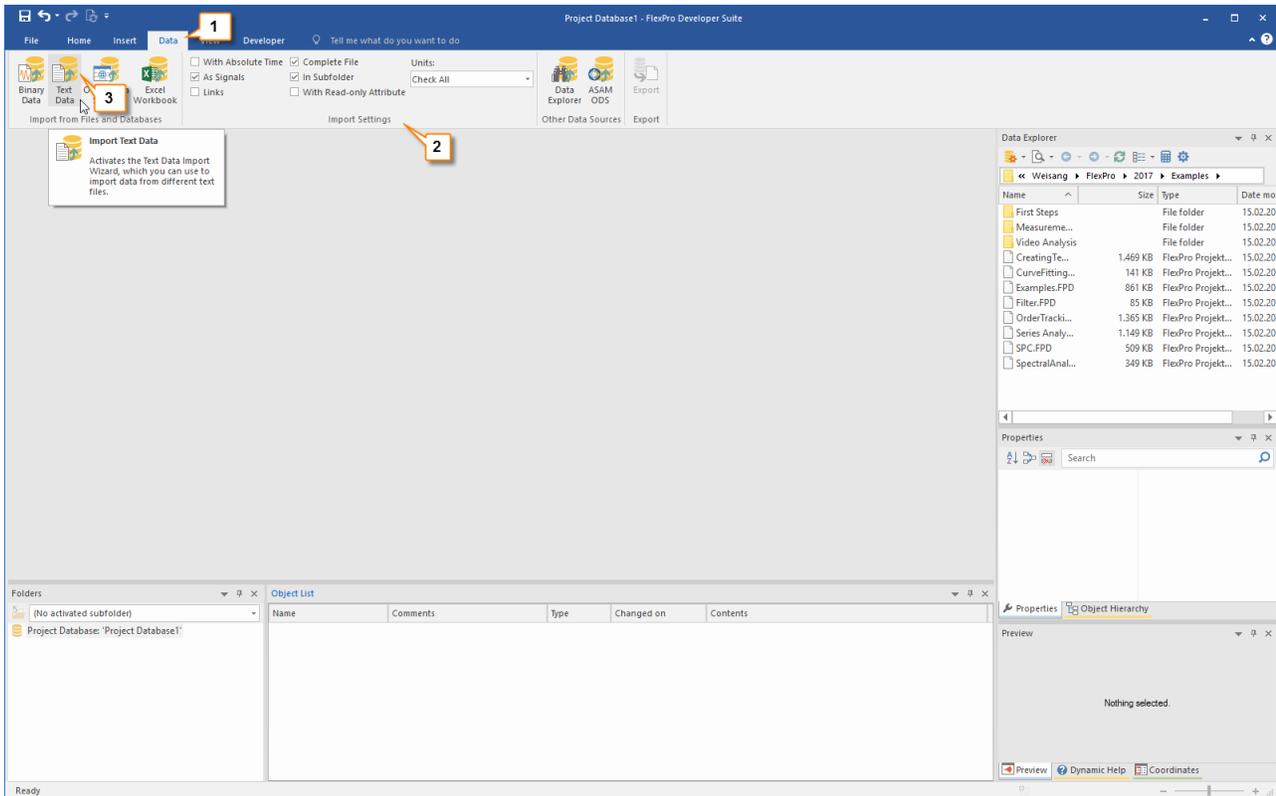


In the **Verify Units** dialog box, FlexPro displays all imported unit symbols. The column **Interpreted as** shows that all units were imported correctly. Close the dialog box.



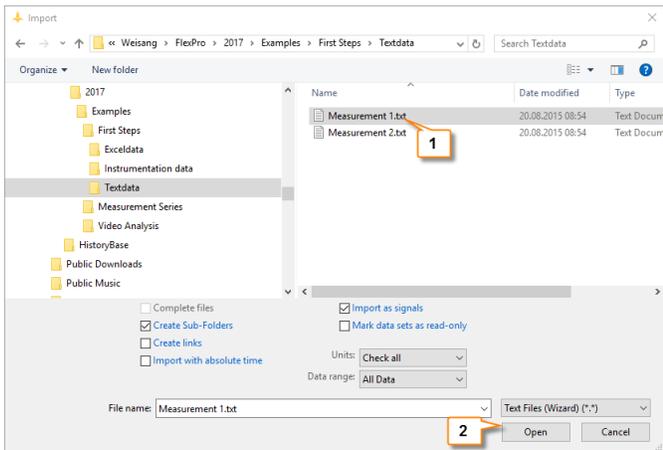
To check the data, you can select a data set in the Object List [1] and view its content as a curve in the Preview [2].
Next: [Creating and Editing Diagrams](#) [18].

Importing Text Data (ASCII Files)

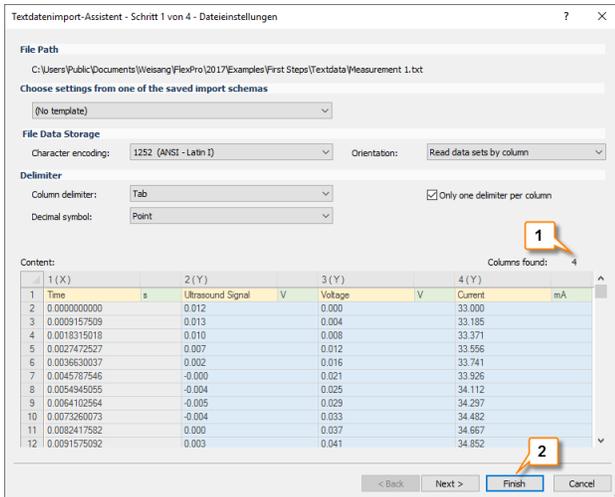


Click on the **Data** tab of the ribbon [1] and in the **Import Settings** group select the options **As Signals**, **Complete File** and **In Subfolder** [2].

Click [**Import from Files and Databases**] > **Text Data** [3].

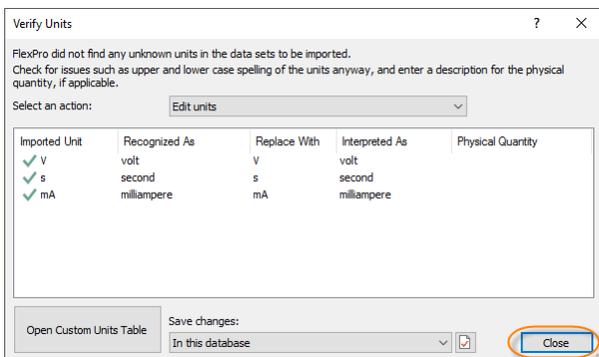


The **Import** dialog box opens. Switch to the folder **C:\Users\Public\Documents\Weisang\FlexPro\2017** or **C:\Users\Public\Public Documents\Weisang\FlexPro\2017**. From there, switch to the subfolder **Examples\First Steps\Text Data** and select **Measurement 1.txt** [1]. Click **Open** [2].

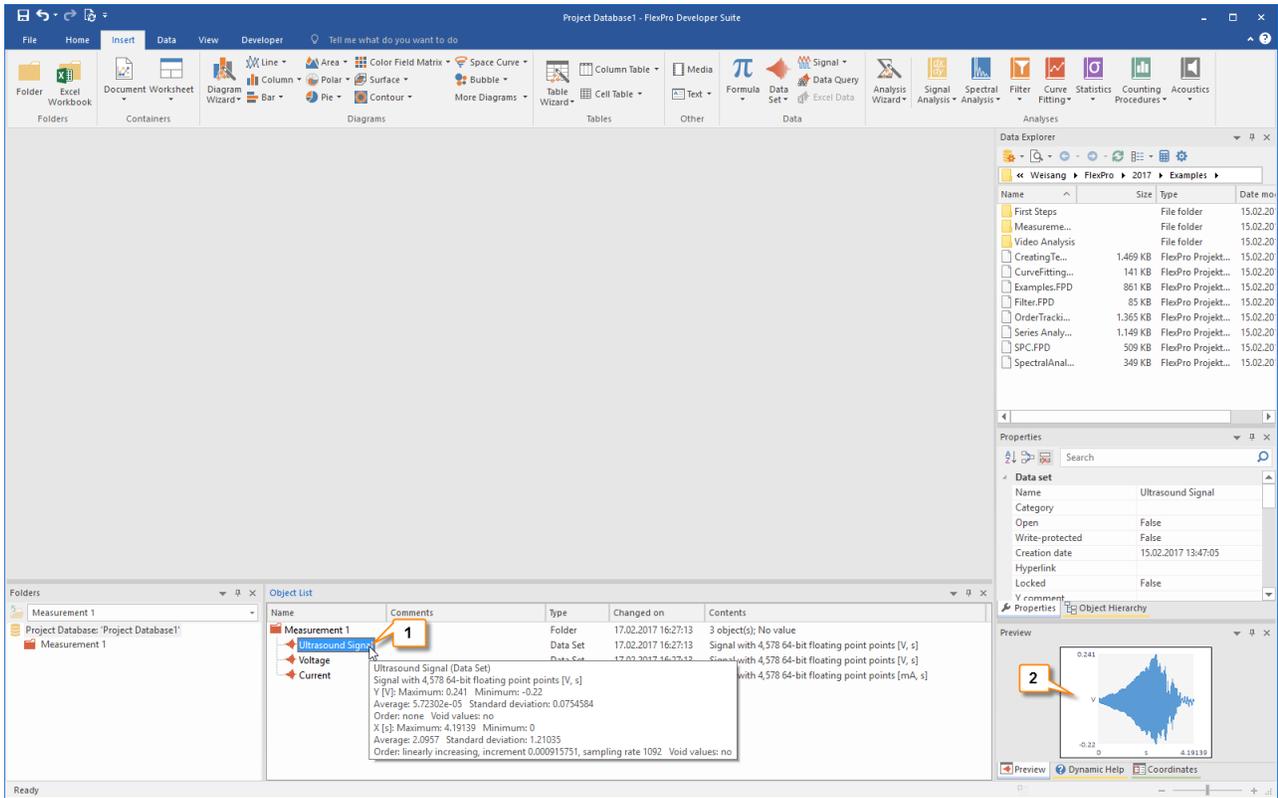


FlexPro automatically recognizes the current data set structure. You can verify this by looking at the value displayed for Columns found [1]. Click Finish [2].

Note: When you import your own data, you may have to configure the settings on the next page of the wizard so that the data is interpreted correctly. You can save all settings made in the wizard to quickly import data with the same data structure in the future. On the last page of the wizard, select the **Import Schema** option.

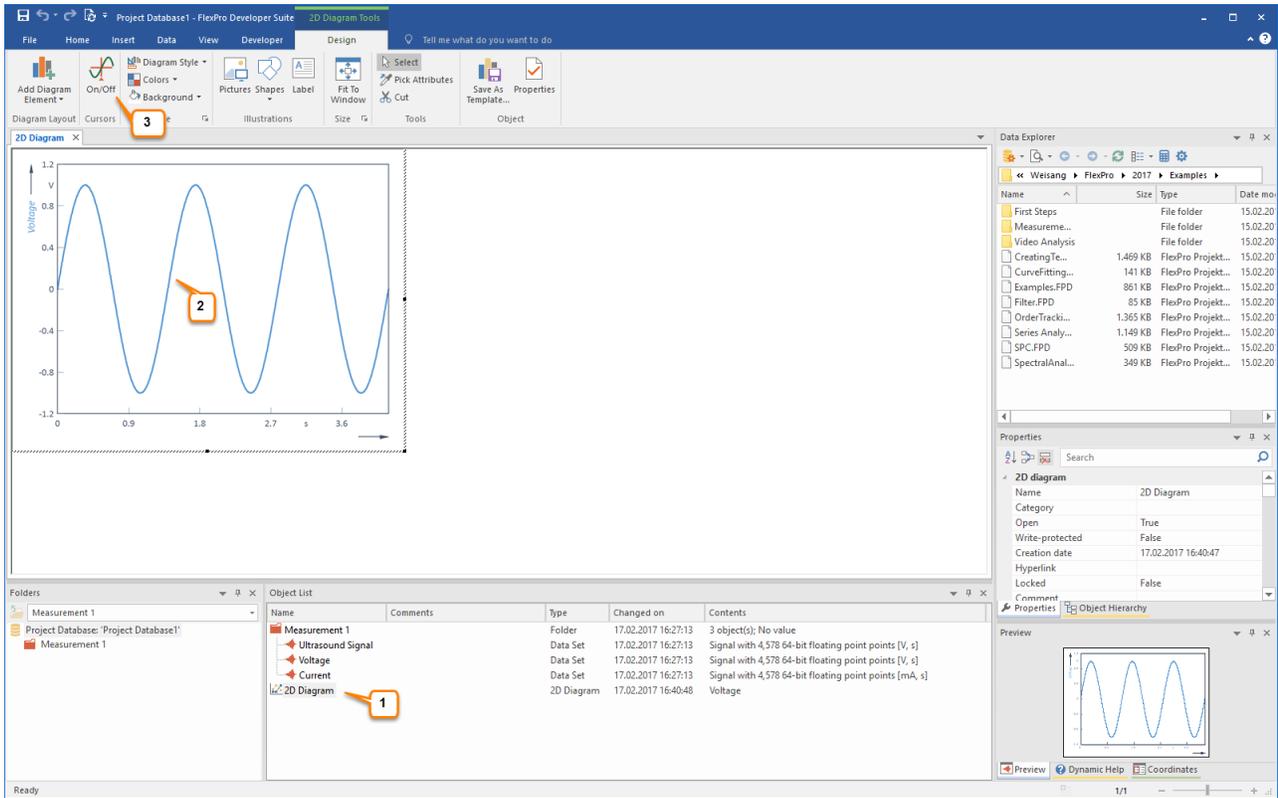


In the **Verify Units** dialog box, FlexPro displays all imported unit symbols. The column **Interpreted as** shows that all units were imported correctly. Close the dialog box.



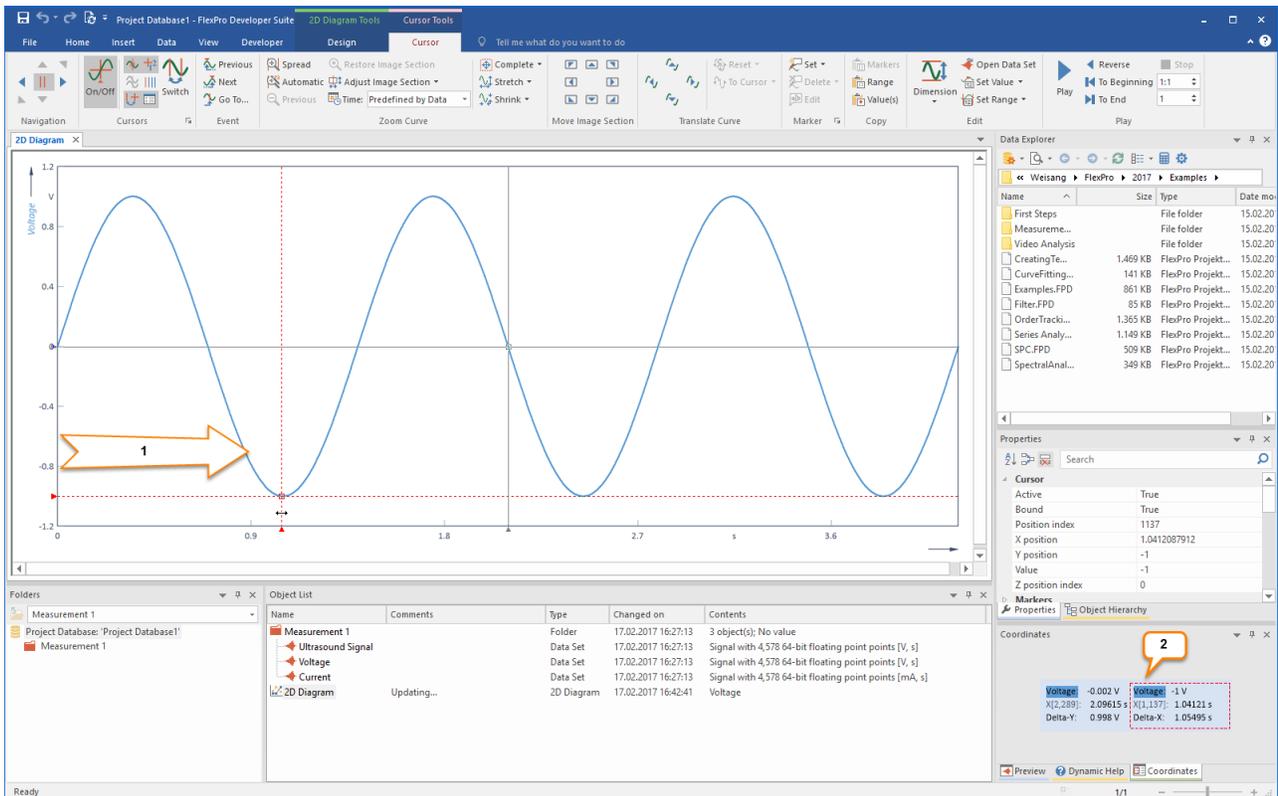
To check the data, you can select a data set in the Object List [1] and view its content as a curve in the Preview [2].

Next: [Creating and Editing Diagrams](#) [18].



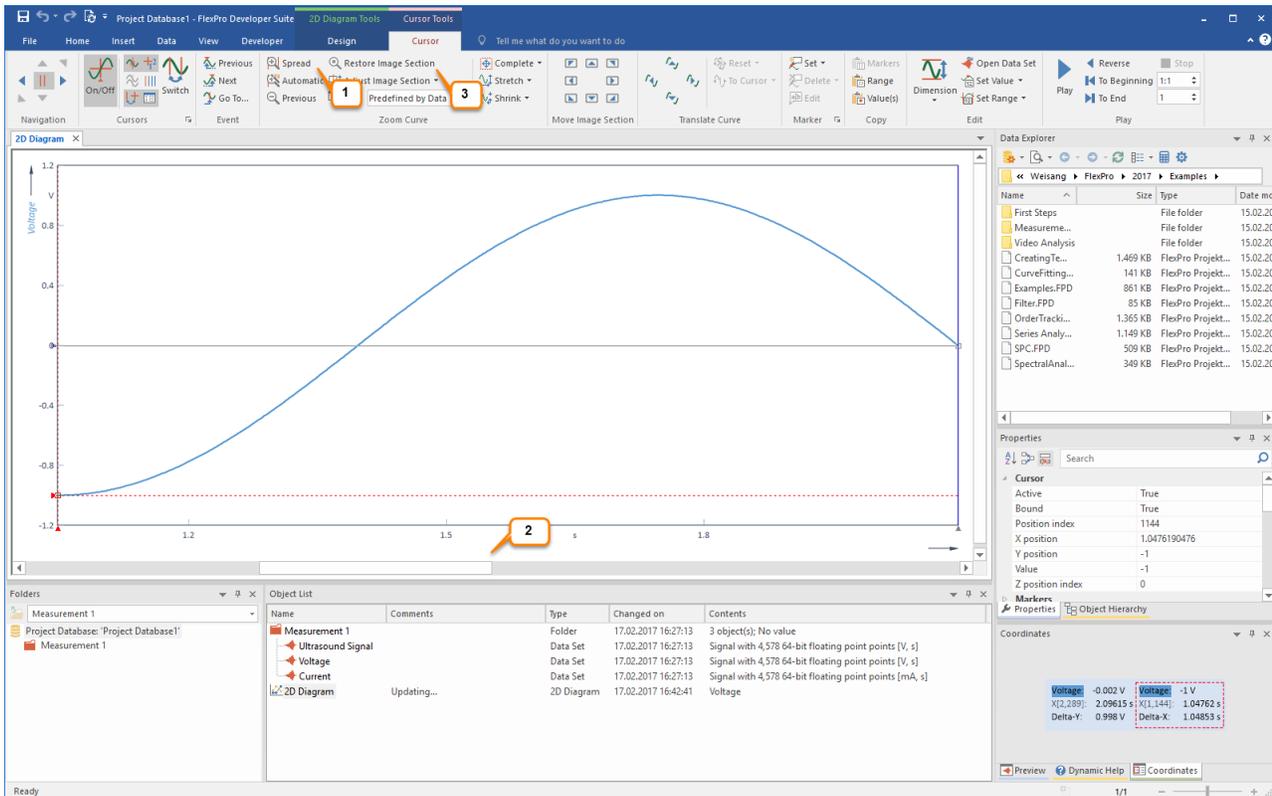
The new diagram is inserted into the Object List [1] and is opened in the workspace [2]. Click **Cursors On/Off** to activate the data cursors [3].

Using Cursors to Measure Data Sets



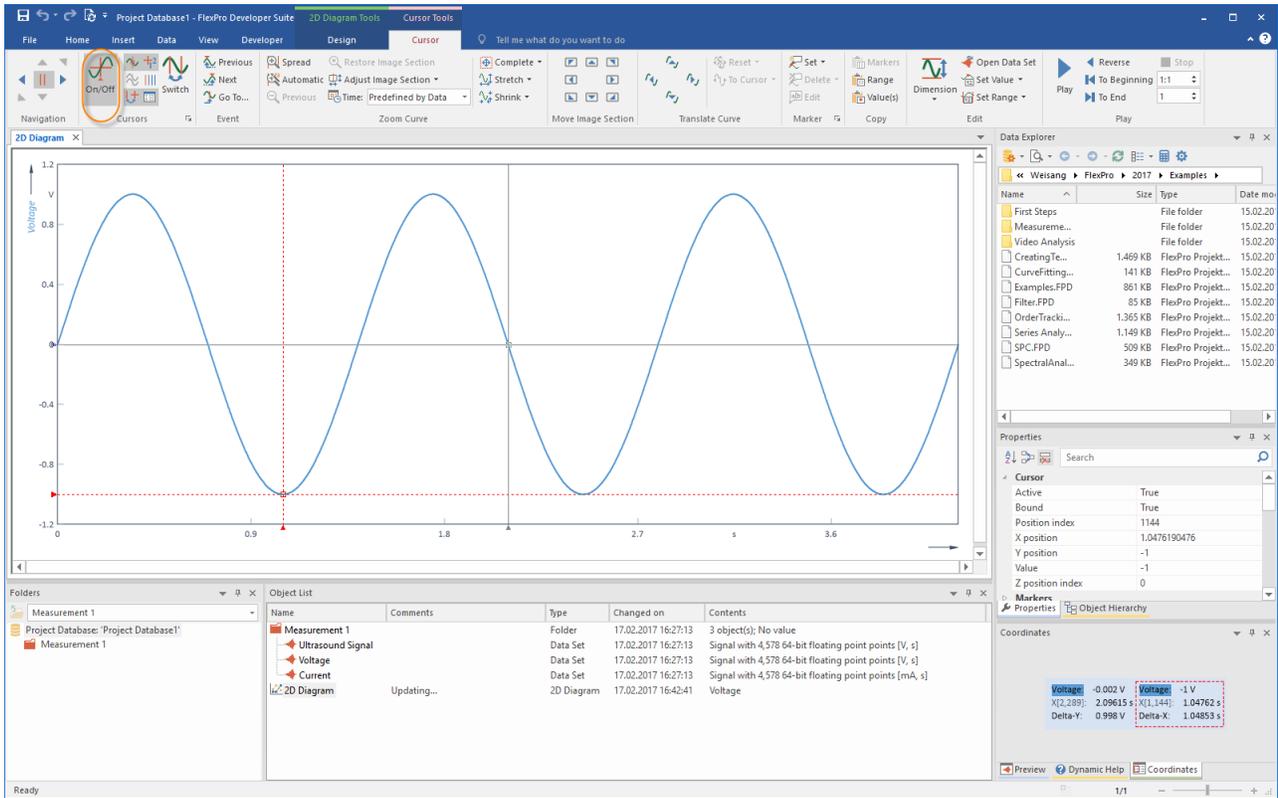
Move your mouse pointer to the left Y axis where one of two cursors is located. A horizontal double arrow appears. Hold the left mouse button down and move the cursor to the right [1]. The current values for the positions of the cursors are displayed in the Coordinates window [2].

Spreading the Curve in a Diagram

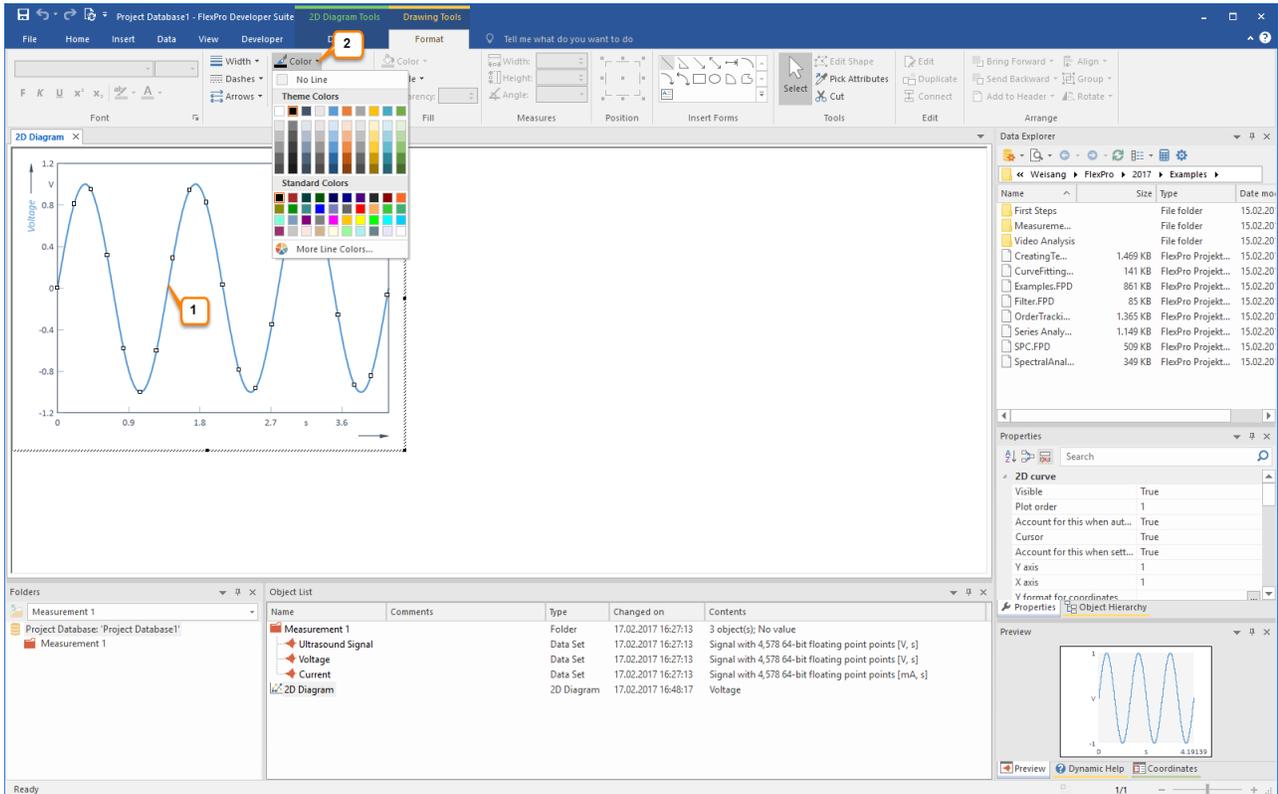


Clicking on the **Spread** [1] icon enlarges the signal section between the cursors. Use the scrollbar [2] to move the stretched data set within the diagram.

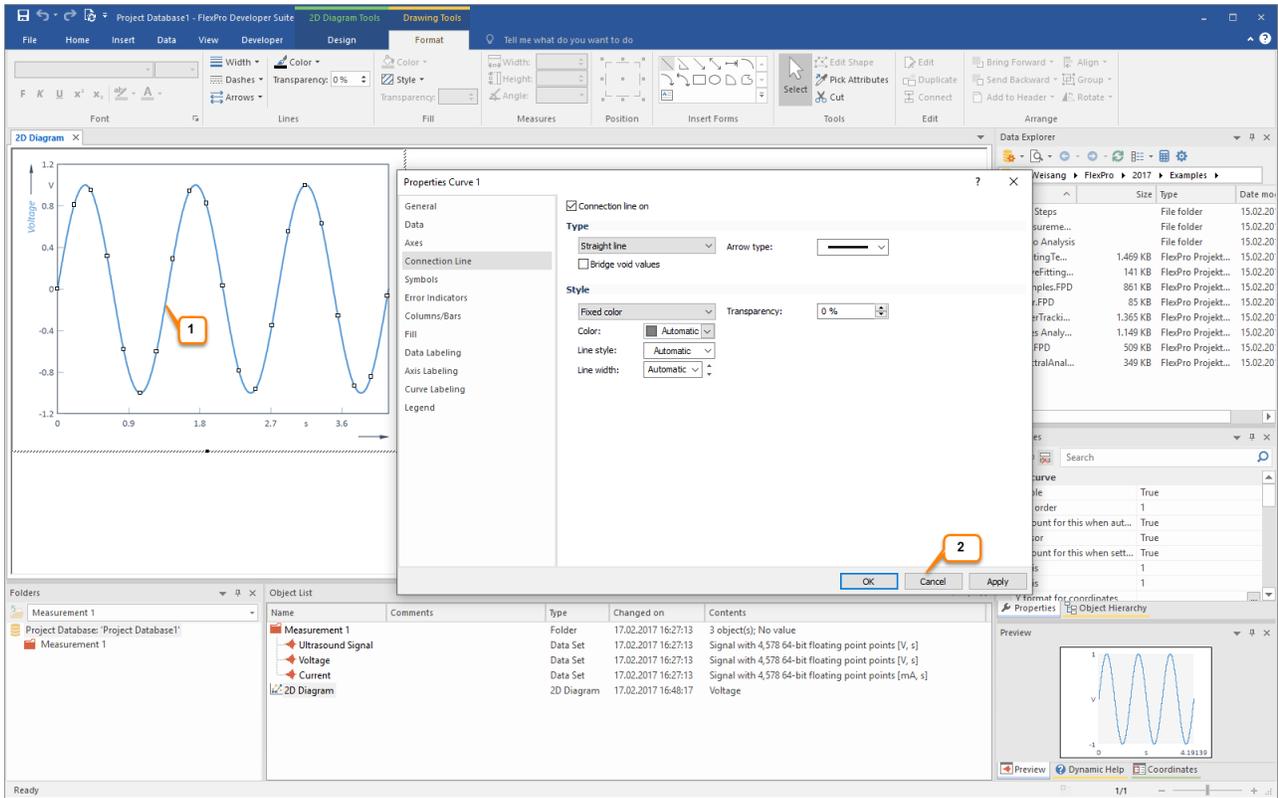
The **Restore Image Section** [3] icon allows you to undo all zoom operations in one step.



Switch off the cursors using [Cursors] > On/Off in order to edit the diagram.



With one click of the left mouse button on the curve of the diagram, this curve can be selected for editing [1]. Using the Line Color [2] menu, you can now change the color of the curve, for instance.



Double-clicking with the left mouse button on the selected curve [1] opens the Properties dialog box for the curve. This is where all options for changing this curve are displayed. Now close the Properties dialog box by clicking on **Cancel** [2].

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

Creating a New Y Axis

The screenshot shows the FlexPro Developer Suite software interface. The main window displays a 2D diagram of a sine wave. The Y-axis is labeled 'Voltage' and has numerical values from 0.0 to 1.2. A mouse cursor is positioned over the value 0.4, which is highlighted. A large orange arrow points from the 0.4 value to the right edge of the plot area, indicating the direction of the new axis. A small box with the number 3 is at the right edge of the plot area. The software interface includes a menu bar, a toolbar, a Data Explorer on the right, and an Object List at the bottom.

Name	Type	Changed on	Contents
Measurement 1	Folder	17.02.2017 16:27:13	3 object(s); No value
Project Database: 'Project Database1'	Data Set	17.02.2017 16:27:13	Signal with 4,578 64-bit floating point points [V, s]
Measurement 1	Data Set	17.02.2017 16:27:13	Signal with 4,578 64-bit floating point points [V, s]
Ultrasound Signal	Data Set	17.02.2017 16:27:13	Signal with 4,578 64-bit floating point points [mA, s]
Voltage	Data Set	17.02.2017 16:27:13	Signal with 4,578 64-bit floating point points [mV, s]
Current	Data Set	17.02.2017 16:27:13	Signal with 4,578 64-bit floating point points [mA, s]
2D Diagram	2D Diagram	17.02.2017 16:48:17	Voltage

Click on the scaling of the Y axis using the left mouse button. The numerical values appear highlighted [1].

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. Now also press the CTRL key. The mouse pointer now displays an additional + sign. Move the mouse pointer to the white space to the right of the diagram [2]. Now release the mouse button [3]. A new axis is added 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

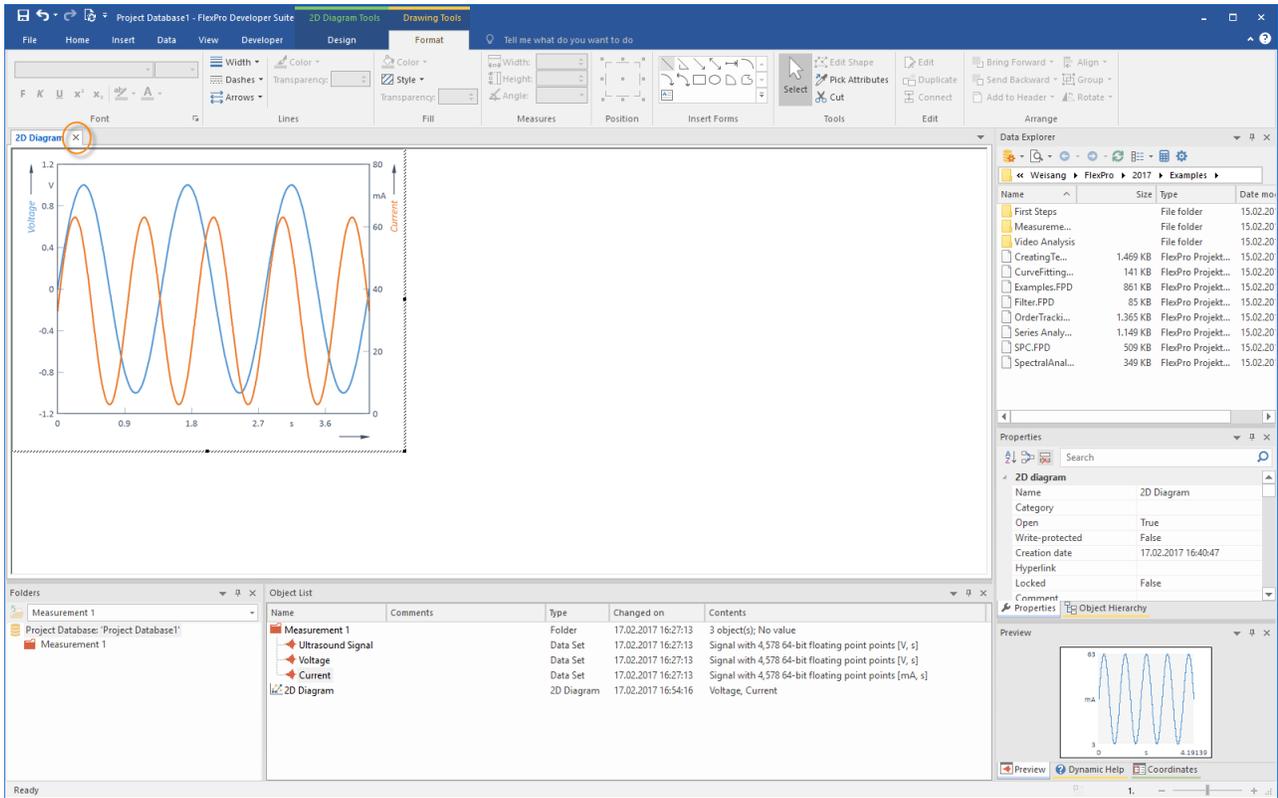
The screenshot shows the FlexPro Developer Suite interface. The main window displays a 2D Diagram with a sine wave plot. The x-axis is labeled 's' and ranges from 0 to 3.6. The y-axis is labeled 'Voltage' and ranges from 0.0 to 1.2. A new axis is being added to the right of the existing plot, indicated by a red arrow and a '3' in a box. The Object List at the bottom shows the 'Current' data set selected, indicated by a red arrow and a '1' in a box. The Properties window on the right shows the '2D axis' settings, including Plot order, Position, Spacing, Beginning, End, and Draw grid.

Name	Type	Changed on	Contents
Measurement 1	Folder	17.02.2017 16:27:13	3 object(s); No value
Project Database: 'Project Database1'	Data Set	17.02.2017 16:27:13	Signal with 4,578 64-bit floating point points [V, s]
Measurement 1	Data Set	17.02.2017 16:27:13	Signal with 4,578 64-bit floating point points [V, s]
Voltage	Data Set	17.02.2017 16:27:13	Signal with 4,578 64-bit floating point points [mA, s]
Current	Data Set	17.02.2017 16:27:13	Signal with 4,578 64-bit floating point points [mA, s]
2D Diagram	2D Diagram	17.02.2017 16:48:17	Voltage

In the Object List, click on the data set called **Current**. Press and hold down the left mouse button [1].

Move your mouse pointer to the new axis [2]. Release the mouse button [3]. 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 bring the window to the foreground.



This is how your diagram now looks with two data sets and two Y axes. Now close the diagram by clicking on the Close icon in the window tab.

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.

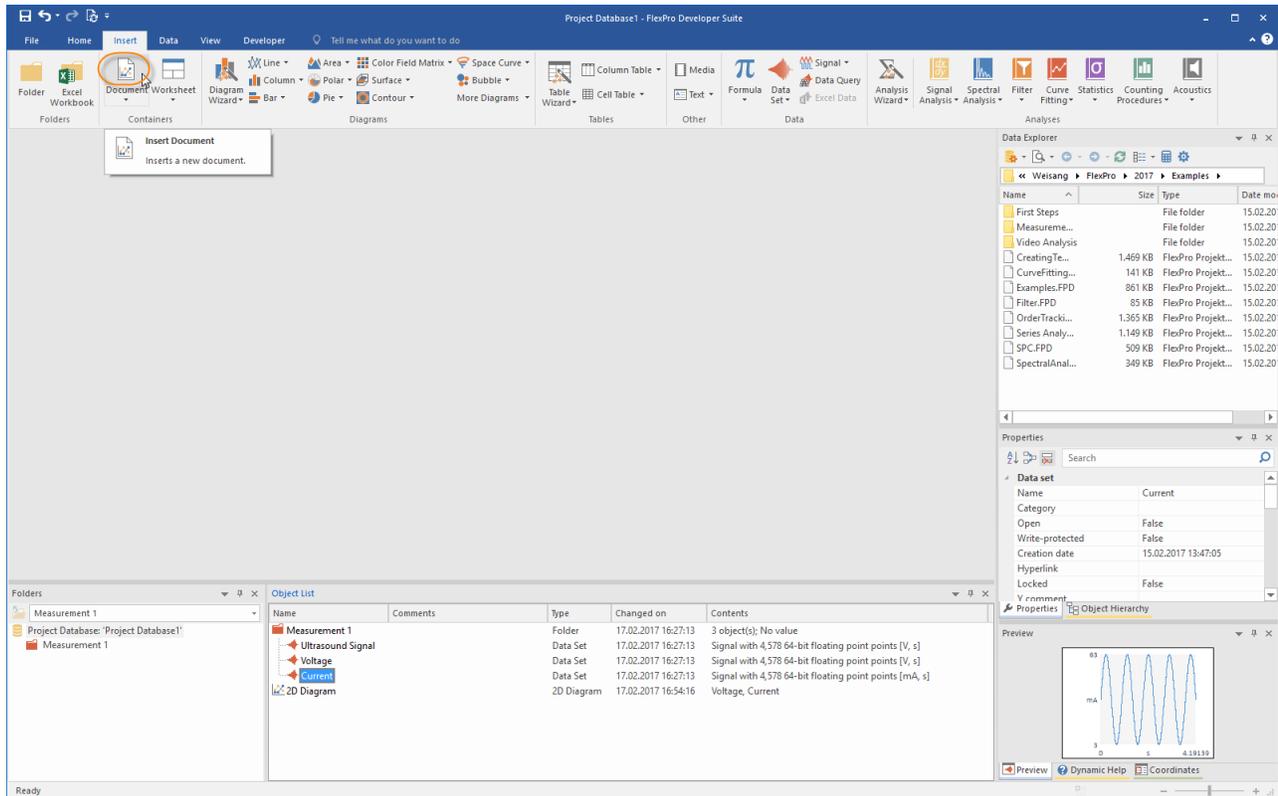
Next: [Creating a Document](#) 26

Creating a Document

The Document

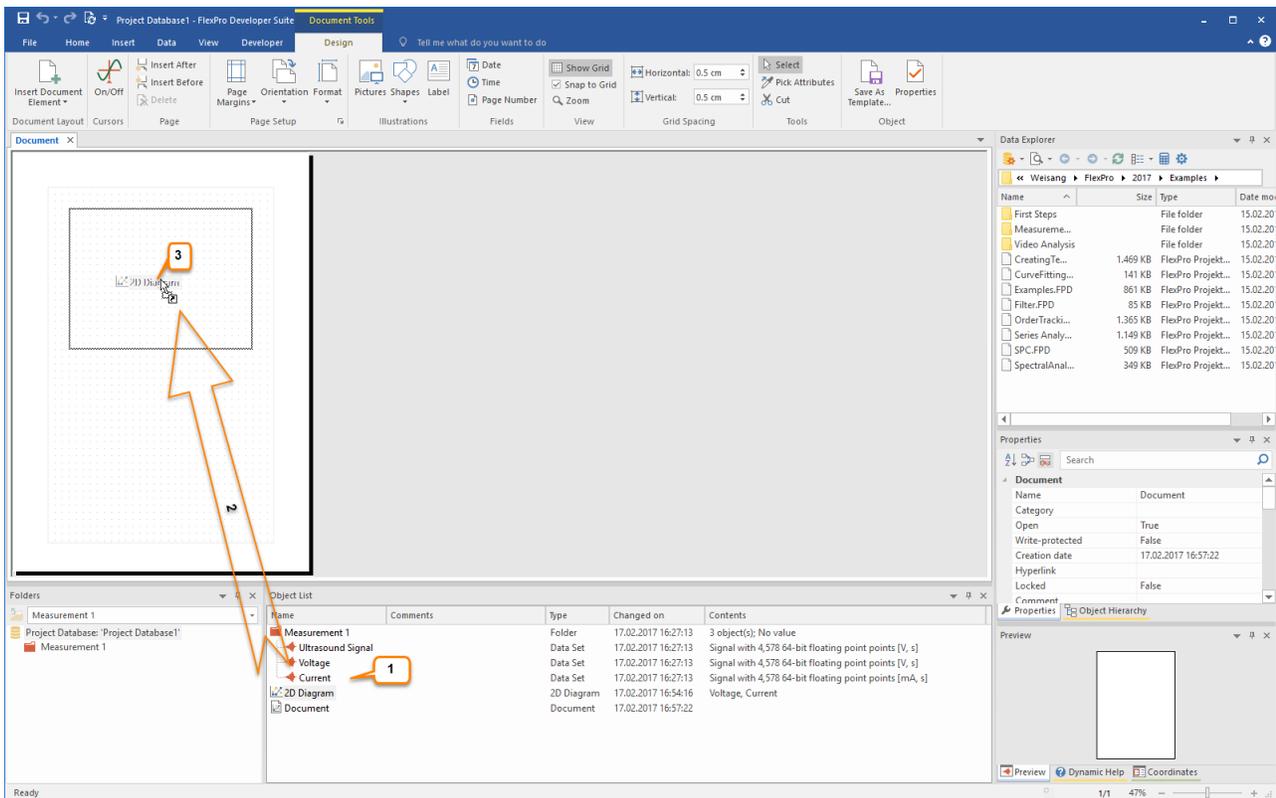
A document is the equivalent of a piece of paper on which you can place diagrams, text and tables and then print it out.

Creating a Document



Click on the Insert[Containers] > Document to create a blank document.

Displaying a Diagram in a Document

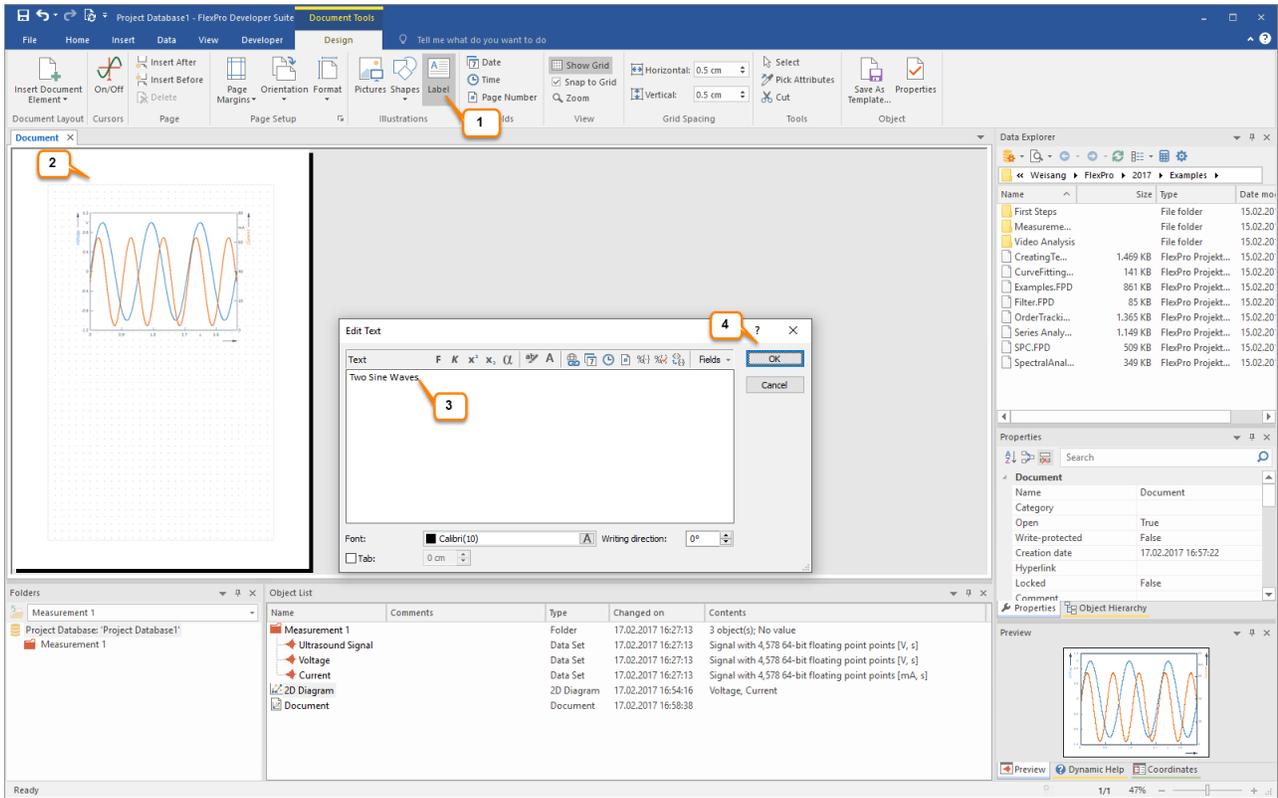


Select the appropriate diagram, in this case **2D Diagram**, from the Object List [1]. Next, drag this diagram to the document by holding down the left mouse button and placing it where you want it to be located [2]. After releasing the button on your mouse, the diagram is displayed in the document [3].

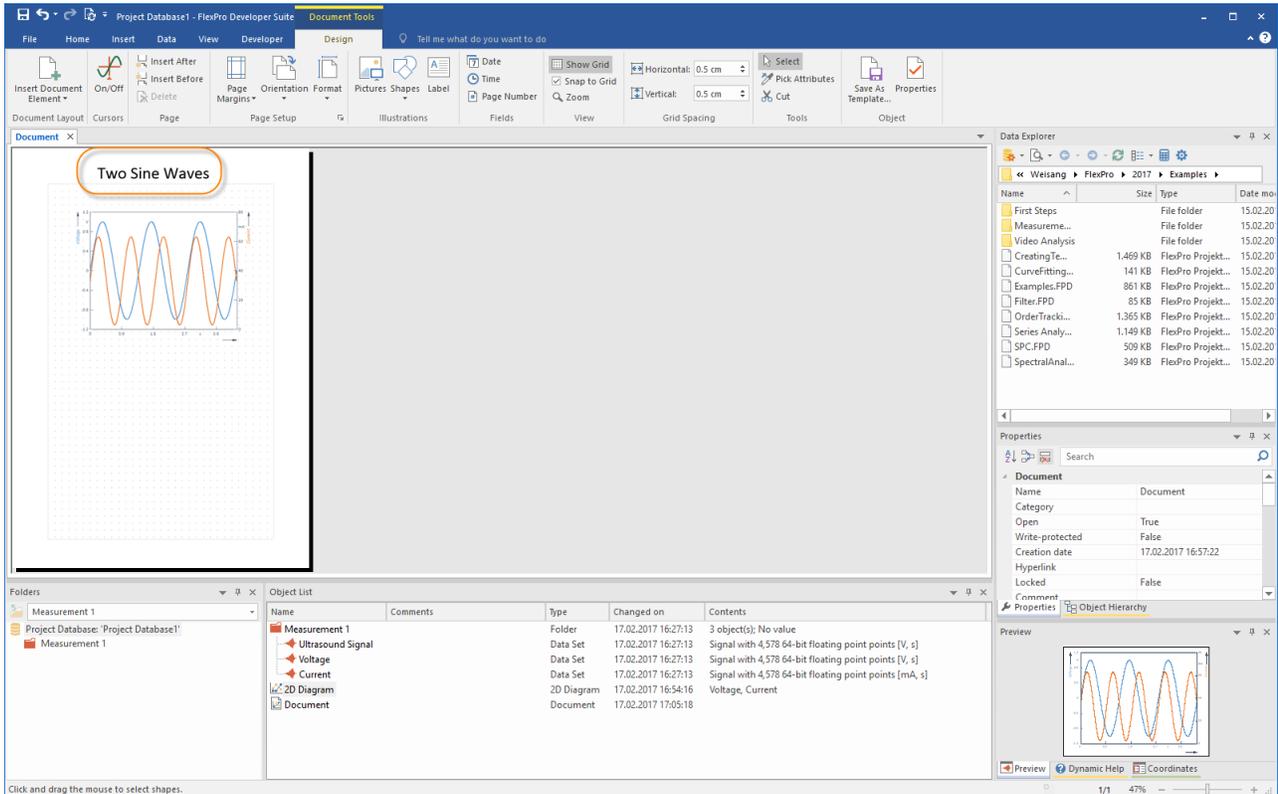
Note: In this case, a link to the diagram located in the Object List is inserted into the document. You can see this as a link icon, which appears on the mouse pointer. To insert a standalone copy of the diagram into the document, you have to hold down the CTRL key and mouse button at the same time.

Inserting a Row of Text into a Document

Click **Design[Illustrations] > Label** [1] and then move the mouse pointer to the location where you want the label in the document [2]. Click to open the **Edit Text** dialog box.



Now enter the appropriate text [3] and click OK [4]. The text will then appear in the document.



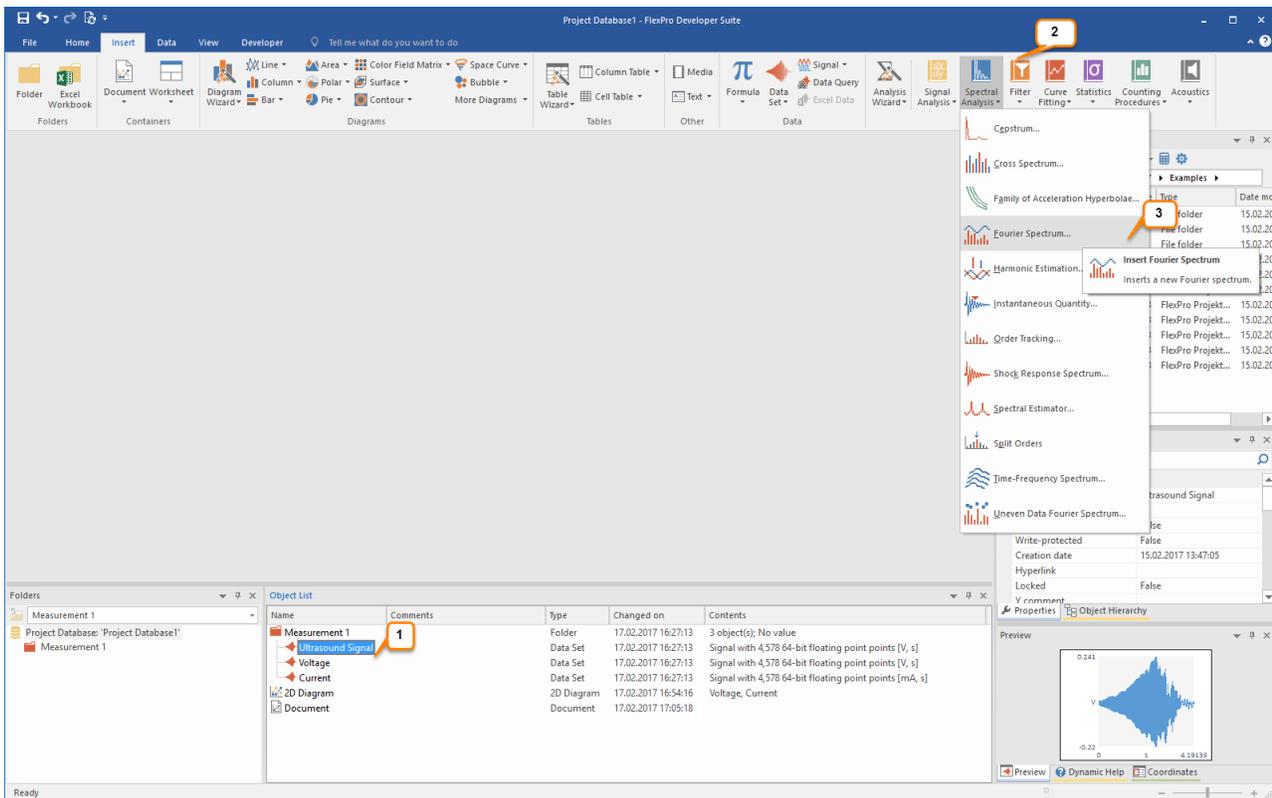
The inserted text can now be moved and resized with the mouse.

Now close the document.

Note: If you activate the cursor using the **Document Tools[Cursors] > On/Off** icon and click on the diagram in the document, all of the cursor options become available to you in the document. You can also create multi-page documents.

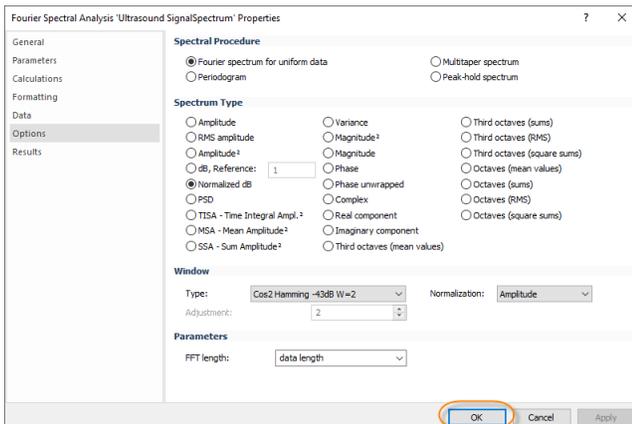
Next: [Calculations in FlexPro](#)  30.

Calculations in FlexPro

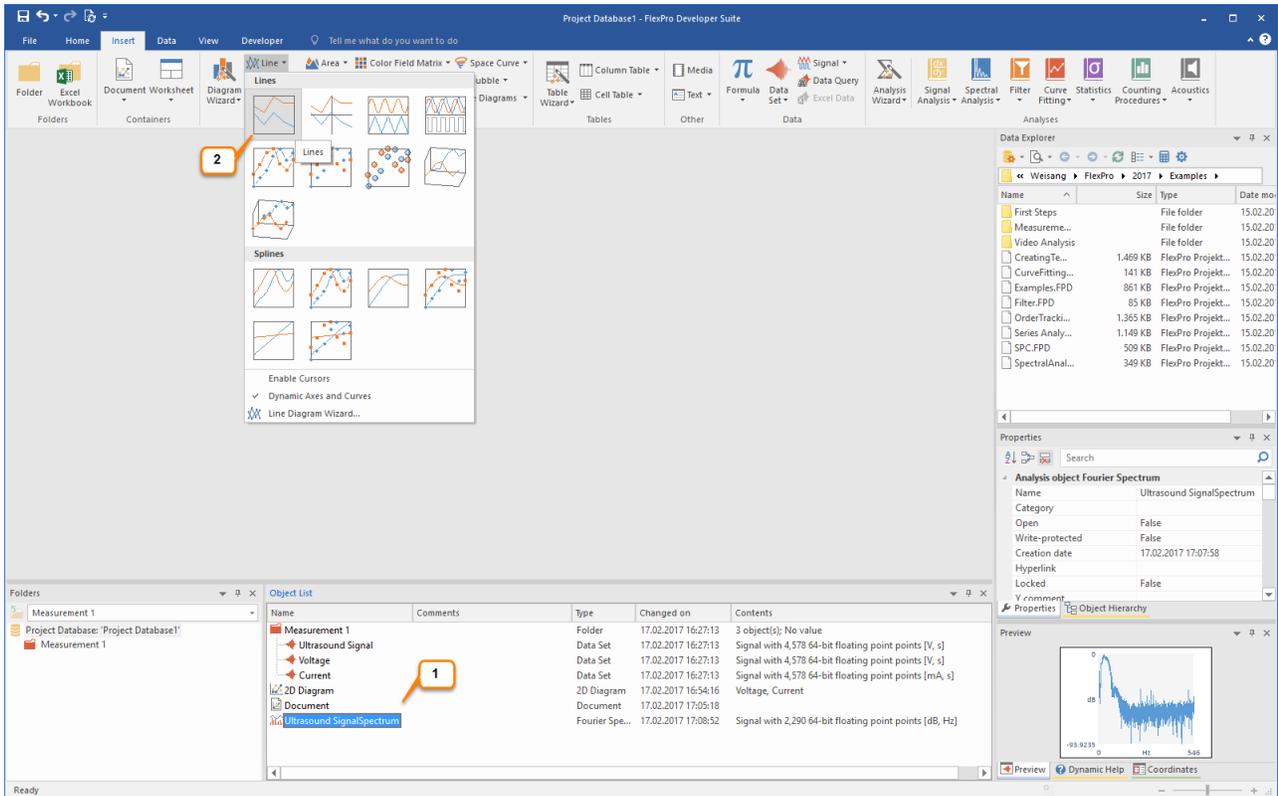


Select the data set in the Object List called **Ultrasound Signal** [1]. In the Preview you can see the shape of the signal.

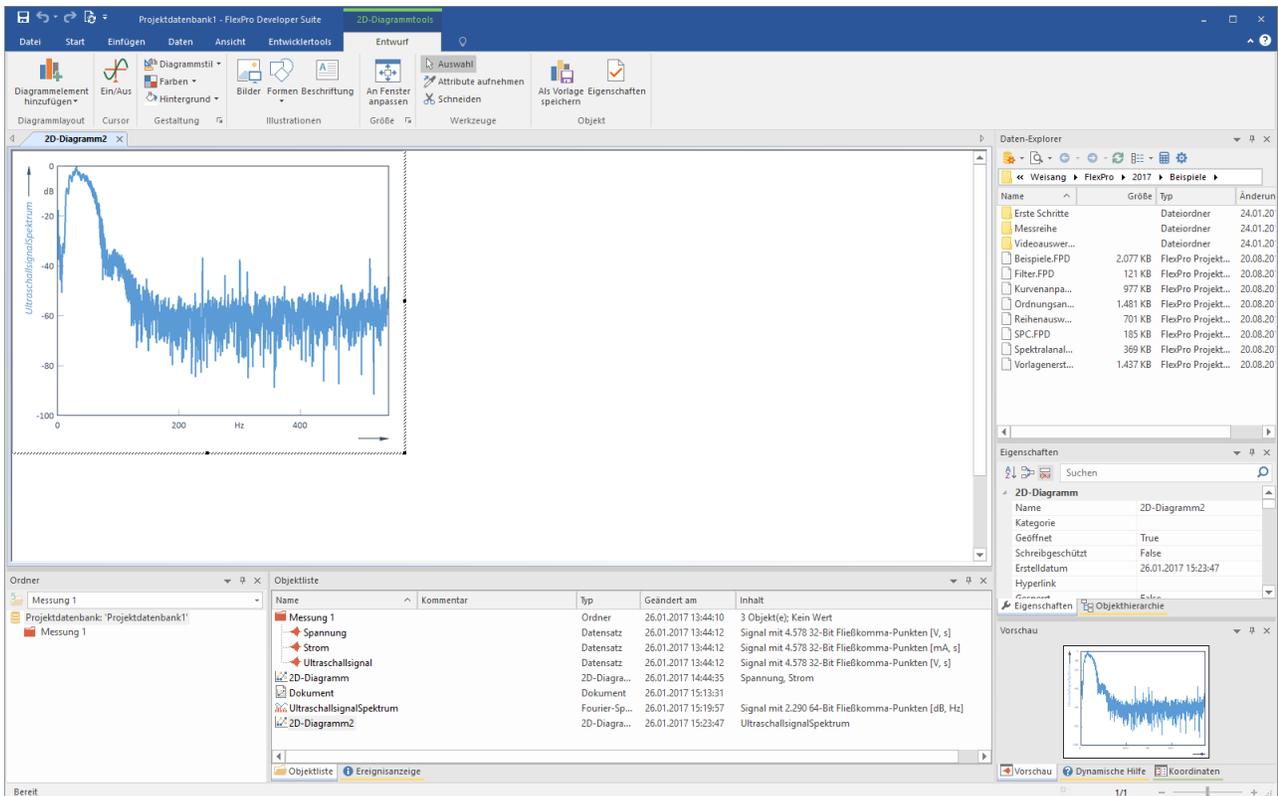
Next, from the **Insert[Analyses] > Spectral Analysis** [2] menu select **Fourier Spectrum** [3]. FlexPro now creates an analysis object for calculating the Fourier spectrum.



In the **Properties** dialog box, which is now opened, 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 **Ultrasound SignalSpectrum** [1]. 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, select **Insert[Diagram] > Line > Lines** [2].

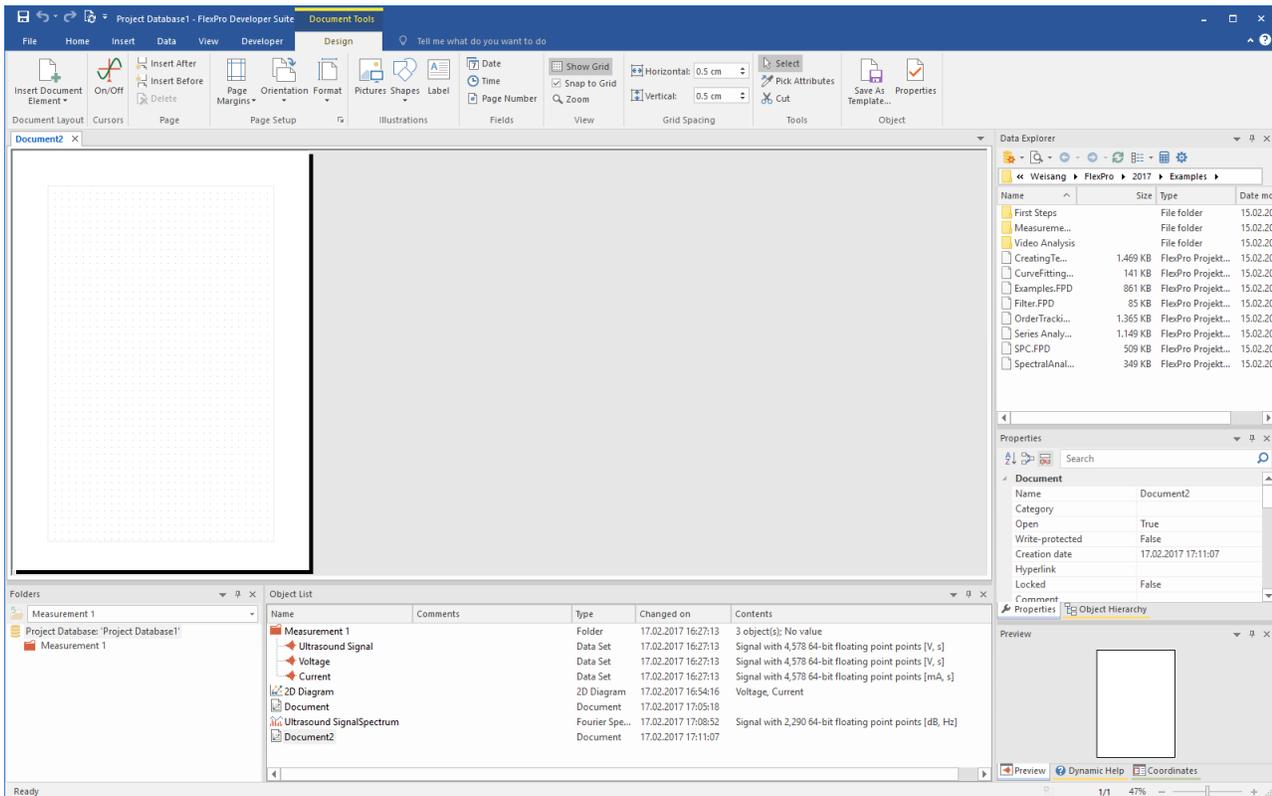


The new diagram with the spectral analysis is then displayed in a new window. Now close the diagram.

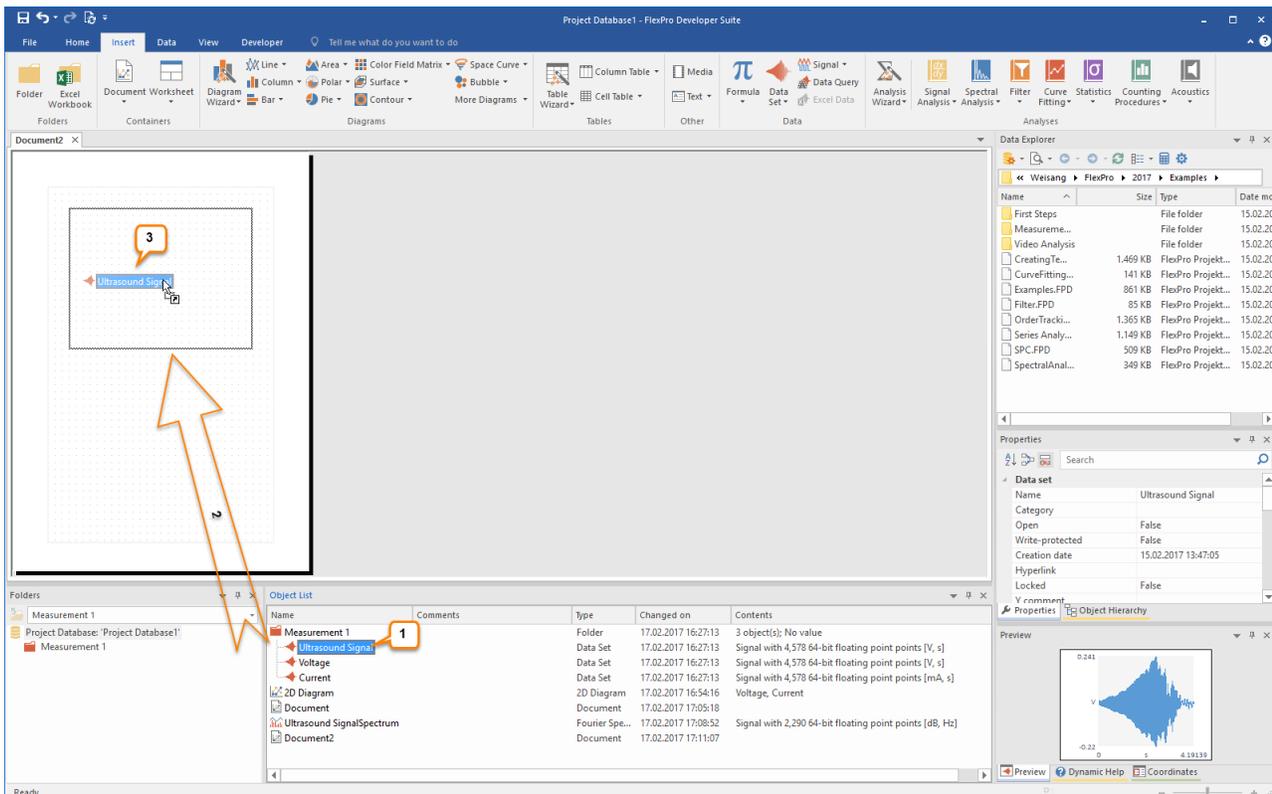
Note: You can also set up your own calculations as FlexPro formulas. Wizards are available to assist you with this process.

Next: [Automatic Presentation and Calculation of Data with the Press of a Button](#) ³³.

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

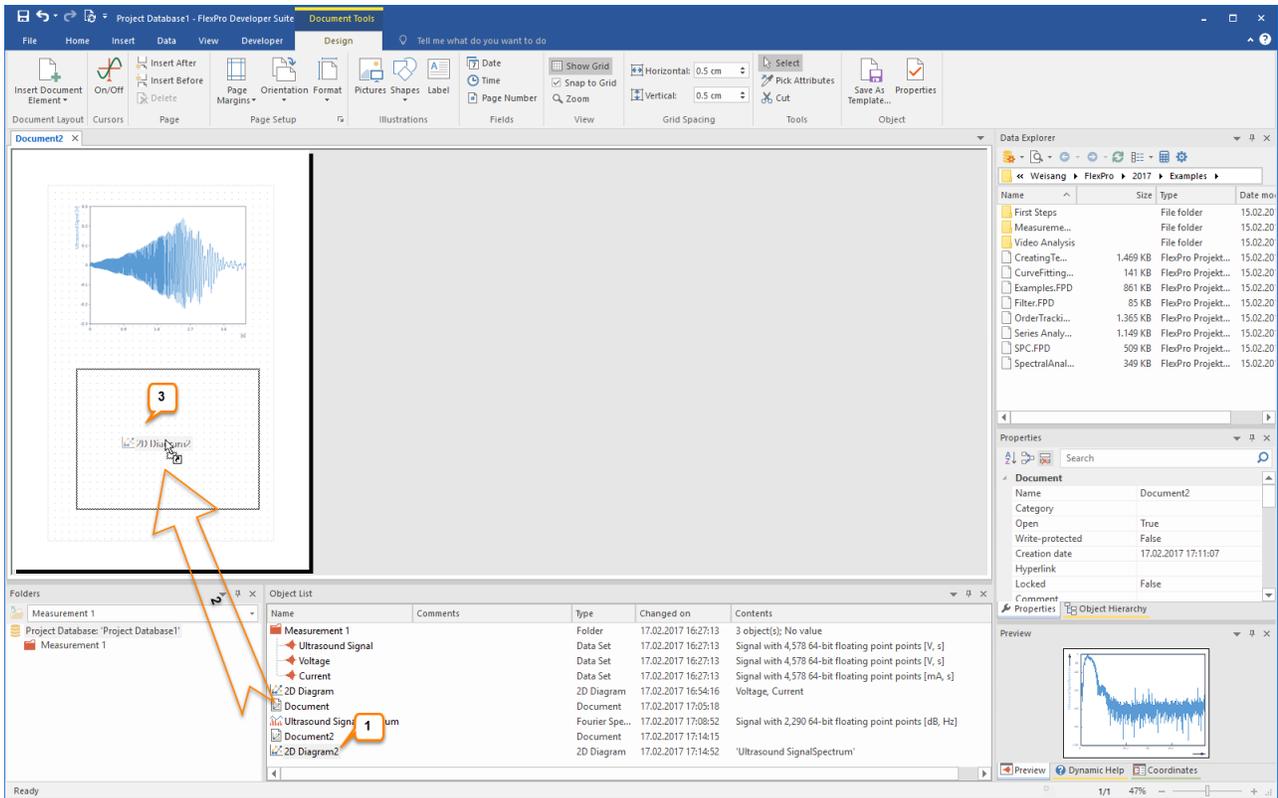


Create a new document by clicking on Insert[Container] > Document.

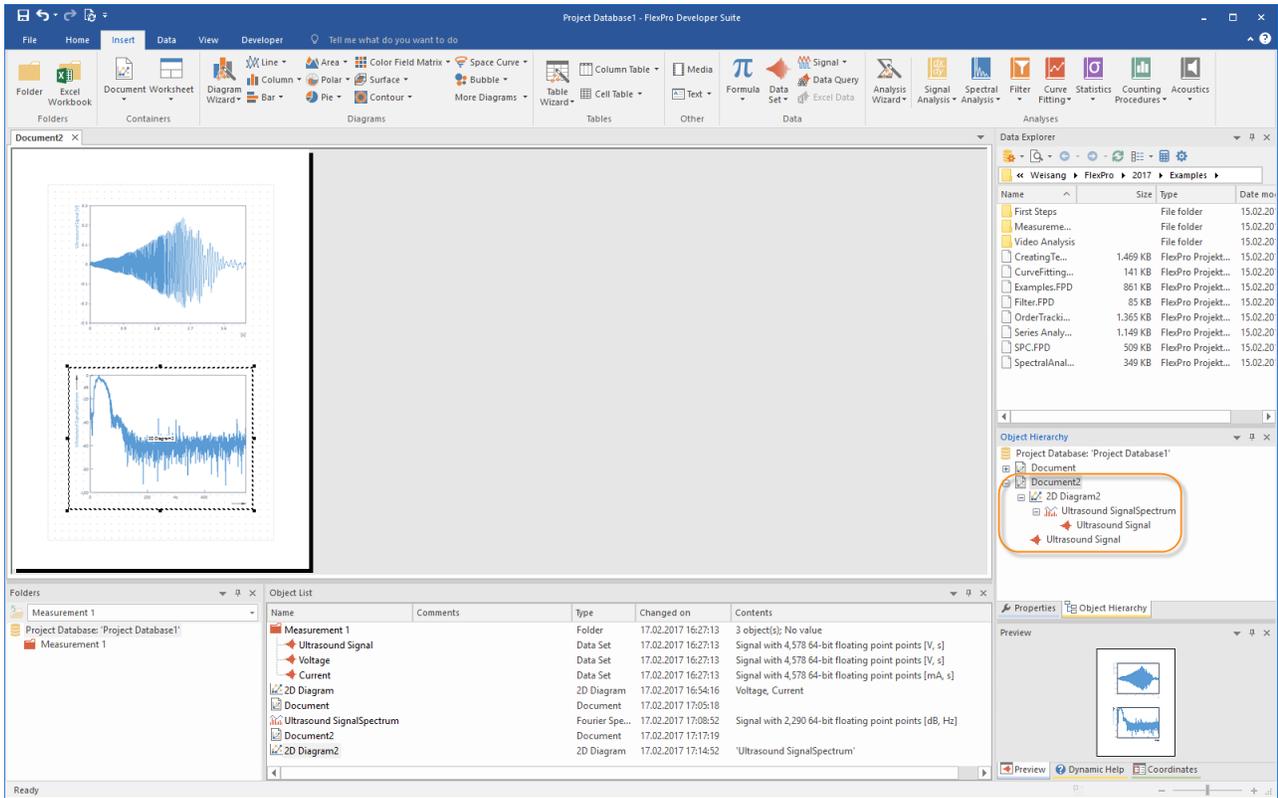


Select the data set in the Object List called **Ultrasound Signal [1]**. Drag this data set to the document by holding down the left mouse button [2] and placing it where you want it to be located. After releasing the mouse button, the data set is displayed in the document [3].

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 Diagram2 [1]** 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 [2] and drop it there [3].



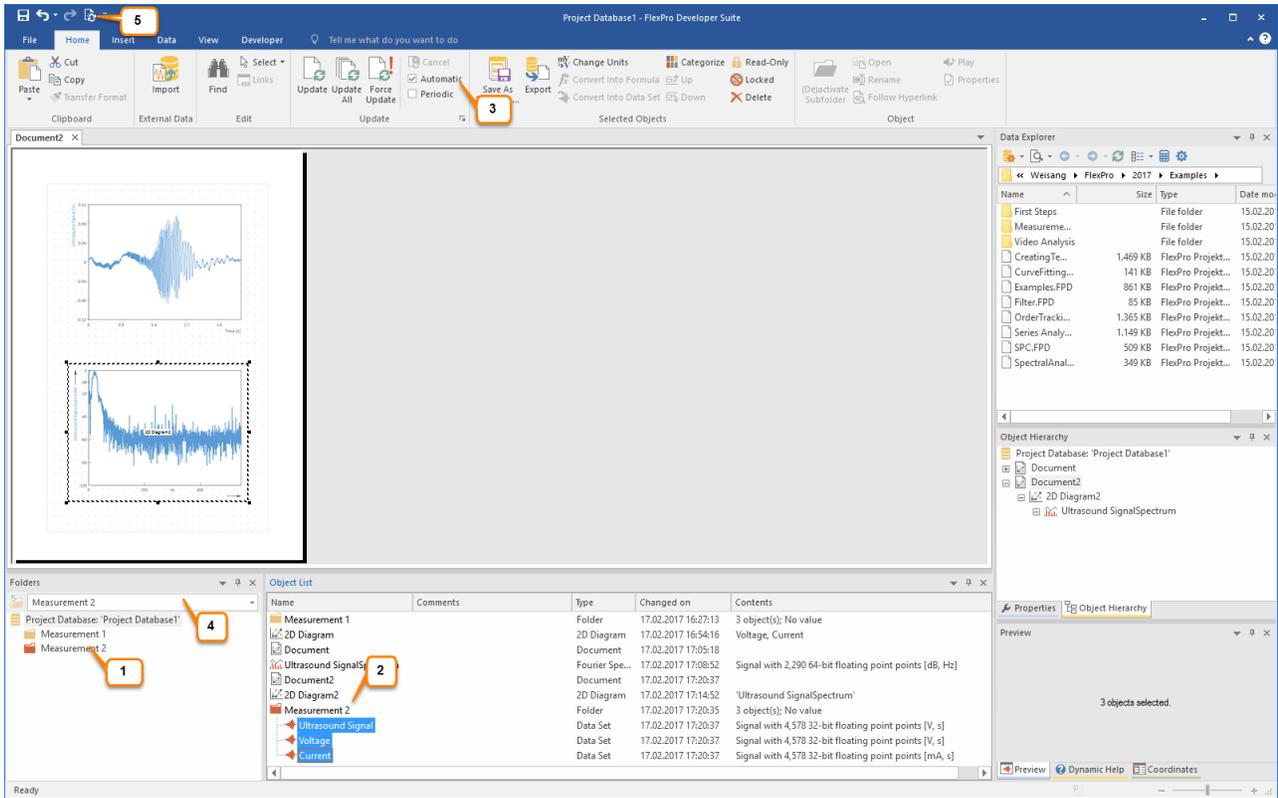
You now have a finished document with the ultrasound signal and the spectral analysis of this signal from **Measurement 1**.

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](#) [8]
- [Importing Data from Measuring Devices](#) [13]
- [Importing Text Data \(ASCII Files\)](#) [15]

In FlexPro, a second folder called **Measurement 2** is now created and activated (distinguished by the red folder icon) [1]. The content of the active folder is displayed [2] and all open windows are updated, since the option **Home[Update] > Automatic** is selected [3].



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 4**. 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 [5].

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.

Search the Online Help for the relevant Help topics.



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