Manual symbols - conventions

- Paragraphs beginning with the icons , and in relate to the following items respectively: Comment, Idea-Trick, Caution and Reminder
- Whenever the use of a specific key is required, its symbol will appear in a framed grey background, e.g. use of the 'Caps' lock key appears as: Caps Lock
- Activation of certain buttons by clicking on them is apparent in the button's image, e.g. symbolizes the 'New project' button and **Cancel** symbolizes the cancel button.
- Anything that needs to be typed appears in bold, e.g. Type
- The functions described in the present manual concern the Professional version. Some of the following features do not exist or are disabled in the Standard version. For more information, you can refer to the comparative table of the program versions on our website www.alconsoft.com.

Product Activation

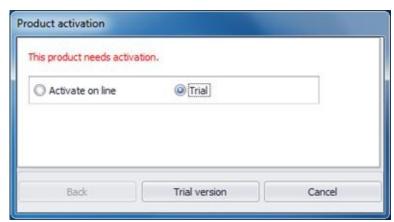
At the first run of ExtrAXION the program asks you for activation.

More:

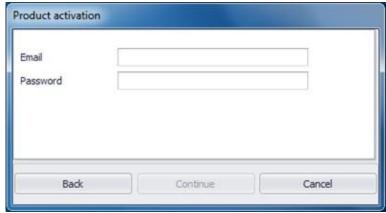
- Activation of trial version
- Activation of full license version
- Off-line activation steps

Activation of trial version

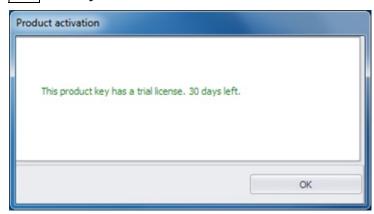
If you have not already purchased ExtrAXION you can choose the trial version.



Insert the email and the password that you have used for the registration to ALCONSOFT's site (www.alconsoft.com) and then click Continue.

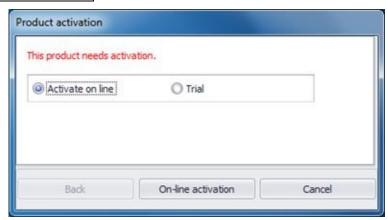


The trial activation is completed and now you are able to use the program for 30 days. Click **OK** and try ExtrAXION.



Activation of full license version

If you have purchased ExtrAXION select the option Activate on line and press **On-line activation**.



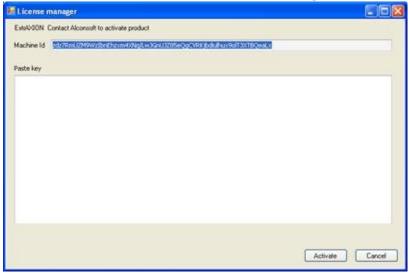
The following window shows up and you have to enter the Serial number (S/N) of the product that ALCONSOFT has provided you with. Afterwards, click **Continue**.



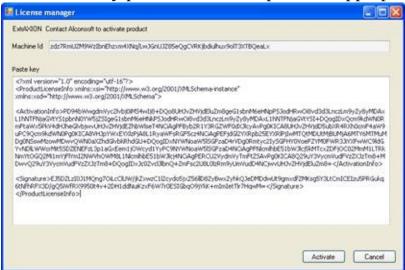
If you do not have a S/N for your product please contact ALCONSOFT or its authorized distributors via email to ask for it.

Off-line activation steps

1. Run LM shortcut which is located in ExtrAXION folder. You will see a window like the following:

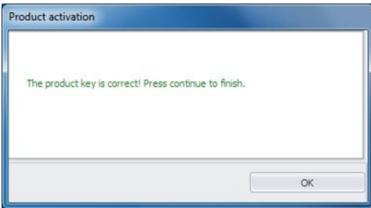


- 2. Copy and paste the machine Id shown and send it via email to ALCONSOFT <u>info@alconsoft.com</u>. ALCONSOFT will reply to you with a unique key.
- 3. Paste the key provided for each pc in the appropriate area



4. Press Activate button

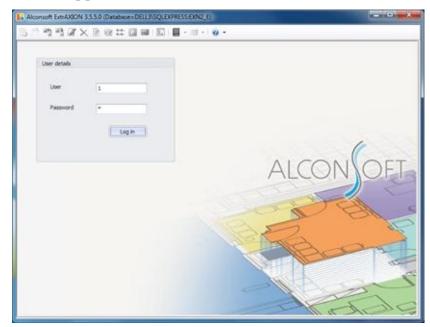
When the activation progress is completed you can see on your screen the following message:



Click **OK** and ExtrAXION opens.

General - Main Toolbar

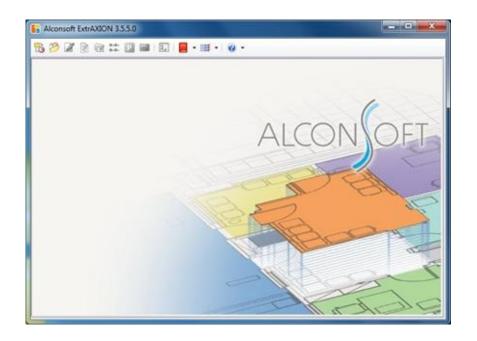
By double-clicking the ExtrAXION icon, the application starts and the following window appears:



Enter the user name and password and click **Login** (see Settings/<u>Users</u>).

1 The number 1 is the default value for both the user name and the password.

In case you are not using SQL Server, the following window appears on your screen:



Click the 'New Project' or 'Open Project' button of the main toolbar to start.

More:

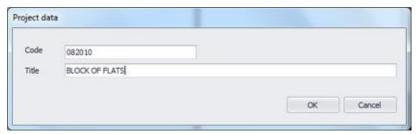
- New project
- □ Open project (Ctrl+O)
- Import/Export project
- Edit project data
- Delete project
- Refresh project
- Drawings management
- Measurement categories
- Project measurements parameters
- Recalculate
- WBS (Ctrl+B)
- Library
- Settings
- Help

[4]	<u></u> •]

New project %

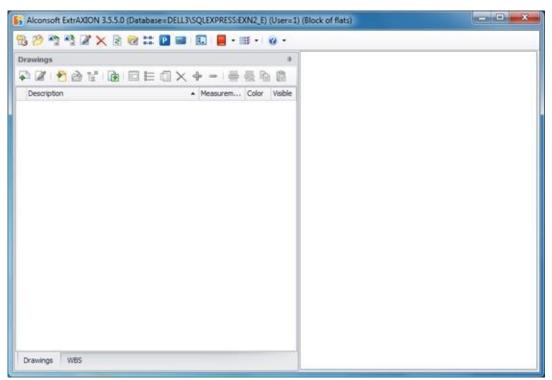
Using this button, you can create a new project.

If you are using SQL Server, the program prompts you to enter a code and title of the project:



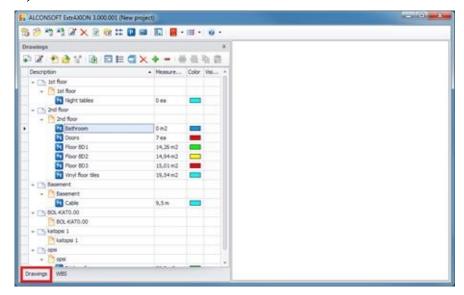
In the case you are not using SQL Server the application prompts you to specify the name of the project file and the location where the file will be stored. Then, in both cases, the display will be divided into two panes.

The project files which are created by ExtrAXION when you are not using SQL Server have the extension SDF.



In the left pane there are two tabs (see bottom of the pane). In the 'Drawings' tab a tree view of all drawings, measurement sheets and measurements of the current project is shown (See <u>Drawings</u>), while in the 'WBS' tab the tree

view consists of the WBS items and their corresponding measurements (<u>See Work items</u>).

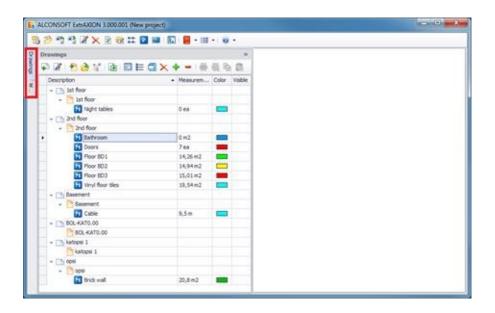


Width

You can set the width of the left pane by placing the cursor on its right margin and dragging it left or right, in order to reduce or increase its width, respectively.

Hide-Show

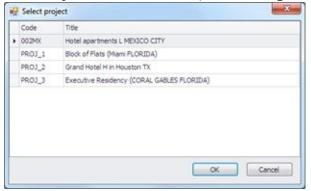
The left pane can be permanently pinned to the foreground or it can be minimized and hidden depending on the orientation of the pin ‡ on its upper right-hand corner. Click on the pin to change its orientation. When the pin is vertical ‡, the pane is permanently 'pinned' in place. On the contrary, when the pin is horizontal ‡, if you click on any part to the right of the navigation pane, the pane will hide in order to free more working space. In this case, the titles of all tabs are located in the left part of the pane, instead of the bottom. To bring a tab into the foreground, you need only hover your cursor over it.



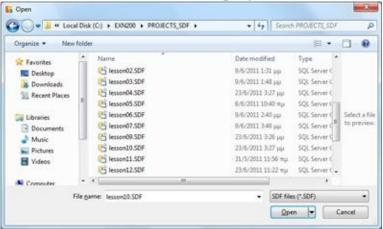
Open project (Ctrl+O) 🍪

Using this button, you may open a project, which has already been saved. Alternatively, you can use the following shortcut: Ctrl+O. The application prompts you to specify the name of the project file you wish to open. The project includes the drawings and the WBS (Work Breakdown Structure) you have entered, the measurement sheets you have created, as well as the measurements. The measurements are listed below each work item in the 'WBS' tab and below each measurement sheet in the 'Drawings' tab. By opening an existing project, you can see the 'WBS' tab open. In case there are no work items, then the 'Drawings' tab is open instead.

If you are using SQL Server, a list appears, which contains the projects contained in the database you have chosen (see Settings/Select database)



Otherwise, select the location of the saved projects (.sdf files).



Only one project may be open at any given time.

Import/Export project

With the 'Import project' button you can import an .sdf file into the Database that you are using and with the 'Export project' button you can export a project to an .sdf file in order for example to save it on your hard disc drive and send it to another ExtrAXION user.



These buttons appear only when you are using SQL Server.

More:

- Import project
- Export project

Import project 🍱

Click on the button, and select the project that you want to import. After the import is completed, the following message appears:



Then you can open the imported project by clicking on the (Open project) button.

The project retains its code and gets as a Title the name of the .sdf file.

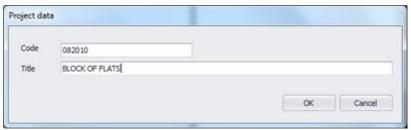
Export project 🥞

Having the project that you want to export opened click on the button. Enter the desired name for the .sdf file and press 'Save'. When the export is completed the following message appears:



Edit project data 🗷

This button enables you to set or edit the project's code and title. The default code and title are 'New project.' On your screen, the following window appears:

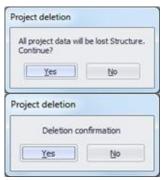


Enter the desired code and title.

In the 'Code' box you may enter up to 20 characters, and in the 'Title' box up to 100.

Delete project ×

Using this button you can delete a project from your database. It is valid only when you are using SQL server. Select the project that you want to delete from the project list and then press **OK**. The application asks your confirmation twice:



To be able to delete a project, the project must not be opened. Otherwise the following message appears:



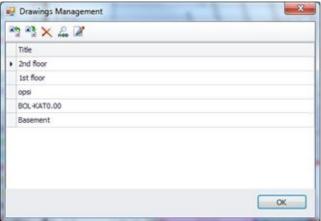
After deletion you lose all the data of your project, as well as all of your drawings with their measurements and they CANNOT be retrieved! Be very careful!

Refresh project 🗟

Using this button the project is reloaded from the current Database to be updated with additions or changes that have been made by other users who have been working simultaneously at the same project.

Drawings management @

This button allows you to manage the drawings of the project on the 'Drawings Management' window.



Use the buttons on the toolbar to:

- Import a new drawing.
- Select a format to export the current drawing.
- Delete the current drawing of the list, provided that it has no measurement sheets.
- Replace the underlying drawing with another one. This feature is very useful when the initial drawing has been modified. .
- Open the 'Drawing Properties' windows where you can see and edit the properties of the current drawing (See Drawings/<u>Drawing</u> <u>properties</u> **②**).

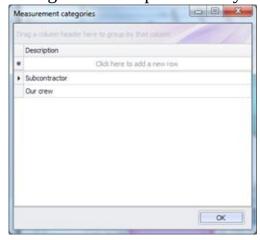
The path of the new drawing will be shown at its properties (See Drawings/Drawing Properties/General).

This change does not affect the way the drawing is stored (into the project database or as an external reference).

Measurement categories

This button allows you to set the categories which constitute a concurrent, independent organization of measurements. Using categories you may classify your measurements in various ways, such as work carried out by subcontractors or your own crew, building level, etc.

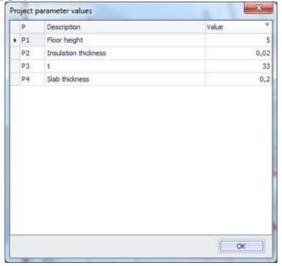
Click on the button to view a list with the various measurement categories. There is a default category 'Category 1' in every new project. To add a new category, click on the field above the list, type its description and press **Enter**. You can change the descriptions at any time.



- The measurement categories are project specific.
- Ocategories are used to group measurements. (See Appendix/Filters/Sorting)

Project measurements parameters 🖸

This button enables you to modify the default values of library parameters, which you wish to apply to all measurements of the current project.



Parameters are used in the formulas that appear in measurement calculations. To enter new parameters, click the button to view the library parameters (See General/Library/Parameters).

Recalculate **=**

By clicking this button, all of the project's measurements are recalculated, in case there has been a subsequent change to the initial calculation input data, e.g. the values of project parameters.



WBS (Ctrl+B) ₺

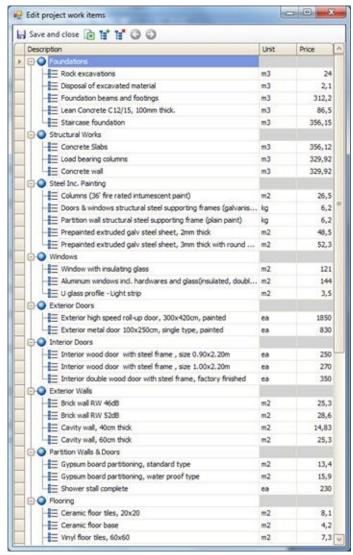
This button allows you to enter the **W**ork **B**reakdown **S**tructure (**WBS**) for your project, so that you can directly link the measurements carried out on the drawings to their corresponding work items. Alternatively, you may use the (Ctrl+B) shortcut.

Click on the 🗓 button to display the 'Edit project work items' window.

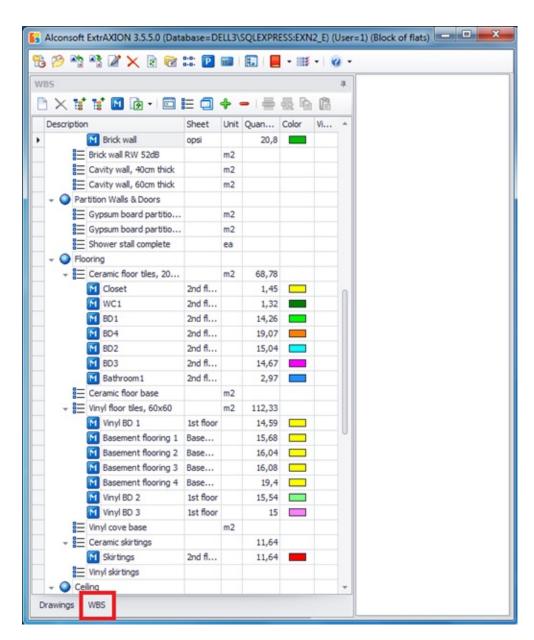


In the WBS, enter the description, the units of measurement, and the unit price for each work item.

You may add a new work item during a measurement (See Measuring in image files/Type and method of measurement/New work item).



Work items, along with quantities that result from the measurements, the corresponding measurement sheets, as well as any other details you select to view (See Appendix/Filters/Sorting), appear in the 'WBS' tab (See Work items).



More:

- Save and close
- Import WBS from Excel
- New group/work item
- Delete group/work item
- Move left , right

Save and close 🖥

This button lets you close the 'WBS' window and all changes are saved.

Import WBS from Excel

This button allows you to import a WBS from Excel. This way, you can save time and avoid re-creating the WBS in the application. The file should have the following 3-column format:

Description	Measurement	Price
	Unit	

You may enter the columns' headers in the first row of the spreadsheet.

- This row will not be taken into account on import. Therefore, the first row of the Excel spreadsheet should either contain the columns' headers or be blank. If the first row contains e.g. the first group and the following rows contain the items, it will not be imported.
- A work item row should be preceded by a group row. If not, the following message is displayed:



- Importing stops when it encounters the first blank row in the excel sheet.
 Make sure there are no blank rows between groups, work items etc.
- If there are more than one sheets (tabs) into the excel file, then only the current one is imported (current is the visible sheet when you open the excel file).
- There is a 500 characters limit of the work items descriptions. If there are longer descriptions into the Excel spreadsheet, they will be truncated. Below, you will find an example of an Excel spreadsheet for a WBS that can be imported directly:

Description	Unit	Unit Price
Main building		
Earthmoving		
General earthy excavations	m3	3,10
Concrete		
C12/15	m3	30,00
C16/20	m3	36,00
Mechanical		

Steelworks		
Black Steel Plate	kg	1,10
Plumbing		
Galvanized Steel Pipe OD	m3	17,50
1/2'		

The rows containing groups are distinguished from work items by the fact that the 'Unit' and 'Unit Price' cells of a group row should be blank.

The groups' hierarchy is set at a later stage, using the button and the button.

When the import process is completed, the following message appears.



Importing WBS from Excel may also be carried out gradually. The data of each Excel spreadsheet are added in the end, following any existing work items.

New group/work item **ば**

Using this button, you can enter either a new group or a new work item **in** the current group. The groups and the work items are indicated by • and = respectively, so that they can be distinguished. You should enter the description of each group, and in the case of a work item you can also enter the unit of measurement and unit price.

At least one group should exist before entering any work items. Otherwise, the following message will appear:



You can use the shortcut of **Ctrl** + **G** keys to create a new group and **Ctrl** + **H** keys to create a new work item.

You can move groups or work items to a different position later on. Add the desired group/work items (if it doesn't already exist) and then move it by placing your cursor on the symbol that characterizes it (or = respectively) and dragging it to the desired position. During this action, the following symbols , , appear. The light blue arrows , indicate the upward or downward direction of movement respectively, and the green indicates the new position. Moreover the symbol is used by the application to indicate the positions where moving is not allowed. Finally, the buttons allow you to change the hierarchy of the groups at a later time.

Delete group/work item **¥**

Using this button, you can delete the selected group or work item. The application will ask your confirmation each time you choose to delete a group/work item.

Move left 🔾, right 🔾

Using these buttons you can promote or demote the groups, respectively, by one level, in order to create the WBS 'tree'.

These buttons are disabled when a work item is selected.

Library 📕

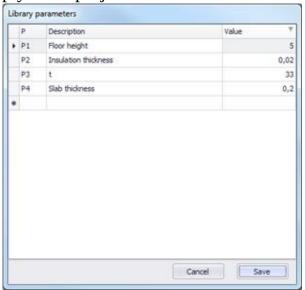
The library contains data that can be used in any project. It constitutes a database that includes parameters and model custom measurements that are provided by ALCONSOFT as examples, and can also contain your own data.

More:

- Parameters
- Custom Measurements

Parameters

Using this item of the 'Library' button, you can alter or insert new parameters, which can be used in the formulas that appear in measurement calculations and apply to all projects.



Enter a custom description. Also, you may enter a default value to be applied in all projects.

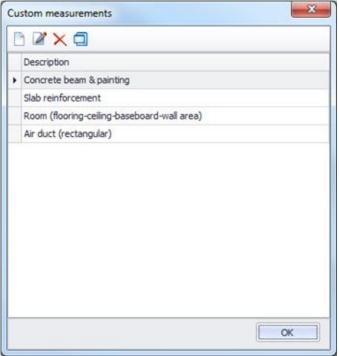
Parameters are automatically indicated with P*i*, where *i* is the increasing number.

Use parameters when there are some constant values which you wish to be modified quickly (e.g. the height of a floor). It applies to values which you know from the start that will appear many times throughout the measurements and might need to be modified.

Parameter details are saved centrally, along with their default values. In each project, their values can be modified using the 'Project Measurement Parameters' button (See General/<u>Project measurements parameters</u>).

Custom Measurements E

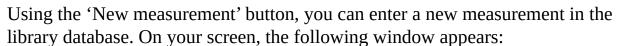
Using this item of the 'Library' button you can define your own measurement types (See Measurements in image files/Types and method of measurements/Custom measurements (E). By setting the appropriate parameters and calculation formulas, you have the ability to make use of the primary measurements and link them to one or more WBS work items. A window with ALCONSOFT's example model measurements appear on your screen. You can create as many of your own as you like.

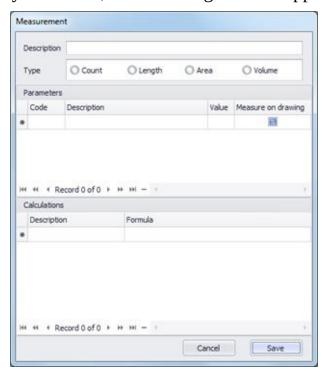


These measurements are saved in the Library and are available for use in every project.

- New measurement
- Editing a measurement
- Deleting a measurement
- Duplicate measurement

New measurement





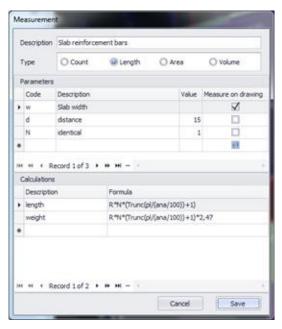
- Description-Type
- Parameters
- Calculations

Description-Type

Enter the description you wish for the new measurement, e.g. 'Slab reinforcement bars, and set the measurement type on which it will be based: objects count, length, area, or volume.

Parameters

You may set parameters for this particular measurement. Measurement parameters can be used during a measurement, for the input of extra values (that is, additionally to the primary measurement result) that influence the final result. Enter the parameter code exactly like it will be used in the calculation formulas of the final result. Also, enter a short description and a default value. Check the 'Measurement on drawing' option in case you wish the value of this particular parameter to be defined by marking a length on the drawing during the measurement.



- You can redefine the marking length of a parameter, at any time, by moving its end points. All relevant measurement values will be adjusted accordingly.
- The parameter values can be different per sub-measurement (See Drawings/Measurement analysis (E)). In the Measurement analysis window, the parameter values used in each sub-measurement appear in a separate column.
- The parameter codes can include numbers, but they must not start with a number. Also, the characters R, L, A, and P1, P2 ...Pn are not valid (they are used by the program to symbolize results and general parameters).
- Use the navigator at the bottom of the window to move from one entry to another or to delete an entry. Specifically, use the •, buttons to move to the previous or next entry, the •, to move to the previous or next page, the ••, buttons to move to the first or last entry, and, finally, the button to delete an

entry.

Calculations

You can optionally enter one or more formulas for each measurement, so they can be ready to use during measurements.

Set the description and formula for the calculation of the result. Enter the left part of the formula you desire without the = symbol, inserting numbers, parameters, and functions.

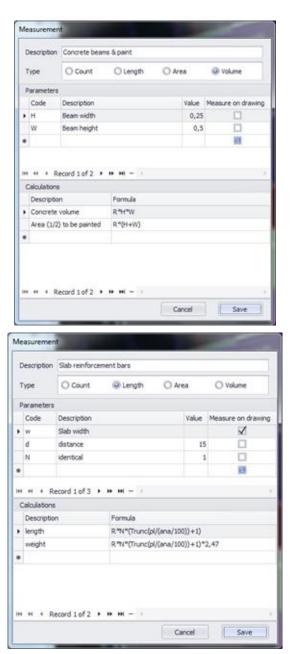
Use:

- Numbers (without the thousands separator), using the (.) as decimal point.
- Library parameters Pi which you have already defined in the library. The values that will be used in the formulas will be the ones you set for the current project in the 'Project measurement parameters' window (See General/Project measurements parameters P).
- The letters R, L, and A to symbolize the result of a measurement (**R**esult), the measured length (**L**ength), or the measured area (**A**rea) respectively. In the case of measuring area, the program automatically computes the perimeter length while in the case of measuring length (using a polyline) it attempts to calculate the area as well.
- The symbols of the mathematical operations: plus (+), minus (-), multiply (*), divide (/) and raise to power (^).
- Parentheses for grouping parts of the expression.
- Functions, which are input in the exact same format used in Excel.

There are many of the most widely used Excel functions. See the Appendix for their correct syntax. You can also refer to Excel Help.

Some of the available functions are:

ABS, ACOS, ASIN, ASINH, ATAN, ATAN2, CEILING, COS, COSH, EXP, FACT, FLOOR, LOB, ROUND, SIGN, SIN, SINH, SQRT, TRUNC



Use the navigator at the bottom of the window to move from one entry to another or to delete an entry. Specifically, use the •, • buttons to move to the previous or next entry, the •, • to move to the previous or next page, the ••, • buttons to move to the first or last entry, and finally the - button to delete an entry.

Editing a measurement 🗷

Using this button, you can open an existing custom measurement and modify it.

Deleting a measurement ×

Using this button, you can delete the selected custom measurement from your measurement list.

By deleting a measurement, you also delete all items associated with it, and they **CANNOT be retrieved!** You should be cautious in proceeding with deletion!

Duplicate measurement 🗐

Using this button, you can duplicate the current custom measurement. The duplicate is added to the list as a new custom measurement and you can open and edit it.

Settings ■

- $lue{}$ Measurement analysis parameters
- Select database
- Users
- Edit user data
- Select language

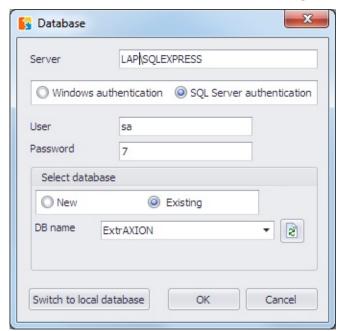
Measurement analysis parameters

Using this item of the 'Settings' button you can set various parameters which are used in the measurement documentation as, for example, colors, column widths and other. (See <u>Measurement analysis</u>).

Select database

With this option, you are able to select the way your projects are saved and change the current database. You can either store your projects on SQL Server or save each project on a local database as an .sdf file.

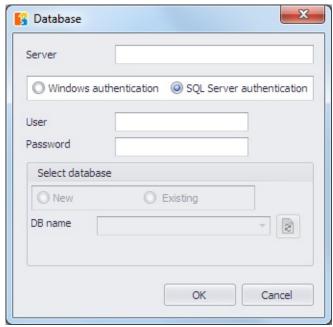
If ExtrAXION is set to use an SQL Server the following window shows up:



You may create a new database or select an existing one. You have also the option to change the way your data is saved by pressing the **Switch to local database** button. The following message appears:



If ExtrAXION is set to use local database (save projects into .sdf file type) you may change that and store your projects into an SQL Server database. In this case a window like the following one appears:



In order to select the desired Database enter the server name of the SQL Server in the field 'Server'.

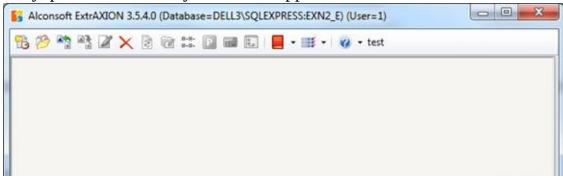
If the installation of the SQL Server was done according to ALCONSOFT's instructions (See SQL Server Installation) enter *COMPUTER_NAME\SQLEXPRESS*. You can find your computer's name from the Start menu, by right-clicking on 'Computer' and by selecting 'Properties' and the 'Computer name' tab. Copy the 'Full computer name' to the Clipboard. **ATTENTION!** If at the end of the name there is a point, copy the name till the point. If your computer is connected to a domain copy just your computer's name and not the domain name e.g. if the 'Full computer name' is delltg.ALCONSOFT.local, copy only '**delltg**'. Paste it then in the field 'Server' and then type **SQLEXPRESS** to get delltg\SQLEXPRESS.

If you have installed ExtrAXION on a server using the concurrent users licensing option the field 'Server' is dimmed and cannot be changed. Afterwards, type the user ID and the password that you use when connecting to the above mentioned instance of SQL Server.

If the installation of the SQL Server was done according to ALCONSOFT's instructions (See <u>SQL Server Installation</u>) enter **sa** in the field 'User' and **7** in the field 'Password'.

Then, select if you prefer to create a New or use an Existing database. If you

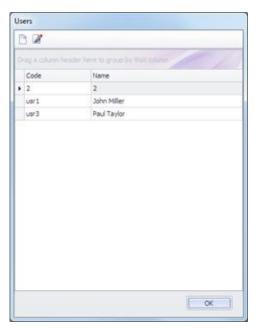
choose 'New' then enter in the field 'DB name' the name you want for the new database else if you choose 'Existing' select one of the existing databases (if any). You may also press the Refresh button to update the list. Finally, press OK and on your screen appears:



At the window's title you can see the name of the current Database.

Users

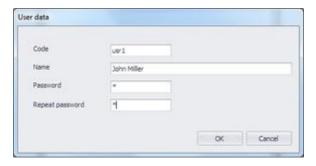
With this option, you can create new users and edit their accounts with the corresponding buttons, if you have logged on as administrator (initially, user 1).



- New user
- Edit user data

New user

On your screen appears a window with the necessary information for creating a new user.



User ID

Insert the identification code of the new user.

User Name

Insert the full name of the new user

User password

Insert the new user's password

Re-enter user password

Insert the user password again for confirmation

Hit the **OK** button and the user you just created appears in the Users list.

Edit user data 📝

On your screen appears a window with the current information of the user you have selected for editing.



User ID

Insert the new identification code of the selected user.

User Name

information.

Insert the new full name of the selected new user

User password

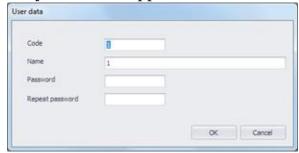
Insert the selected user's new password

Re-enter user password

Insert the selected user's new password again for confirmation Hit the \overline{OK} button and the selected user appears in the Users list with his new

Edit user data

On your screen appears a window with the information of the **current** user.



User ID

Insert the new identification code of the current user.

User Name

Insert the new full name of the current user

User password

Insert the current user's new password

Re-enter user password

Insert the current user's new password again for confirmation Hit the **OK** button and the current user appears in the Users list with his new information.

Select language

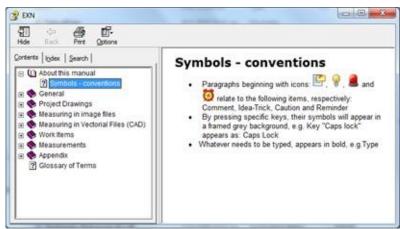
Using this item of the 'Settings' button you can set the preferred language of the program environment. For the change of language to take into effect, you must restart the application.

Help 🥝

- Help
- Export events dataAbout ExtrAXION

Help

If you select 'Help,' the help window of the application will open:



You can find information about the application, using either the table of contents or the search function.

Export events data

With this option you can export all the data of the log file into a new file (.dat format). This enables you to send information to ALCONSOFT in order to solve any issues that have occurred during the use of the program.

About ExtrAXION

If you select 'About ExtrAXION', a window with information about the currently installed version of the application and its serial number will open.



Finally, you can view information concerning the End-User License Agreement (EULA) by clicking on the respective link.

Drawings

In each project, you can add as many drawings as you wish of various file types. Both vector files and scanned (image) files are supported. Vector drawings are stored either into the project database or separately as external references, but image files can only be stored into the project.

For every drawing that you add to a project, you can create one or more measurement sheets. On each measurement sheet you can make as many measurements as you wish.

This way, a tree view is created, in each project, which consists of any number of drawings, measurement sheets and measurements. The tree view provides a clear and concise way of organizing your work and furthermore, since measurements are carried out on the measurement sheets, the original drawings are not affected.

For each measurement, the tree view of the 'Drawings' tab contains columns for the description, the color, the result (including the unit of measurement) and whether it is visible or not. You can sort the tree view list by any of these columns by clicking on its header. (see Appendix/Filters/Sorting/Data Sorting)

Sorting by the 'Description' field is applied first on the drawings, then on the measurement sheets and finally on the measurements themselves. Every drawing, measurement sheet or measurement that is added, or has its name changed afterwards, follows this setting and its position into the tree view list is set automatically.

You can expand or collapse the 'Drawings' tab tree view, by right clicking in the tab's area.

Expand *****

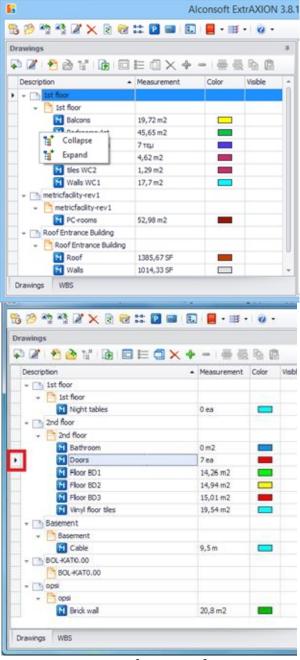
Using this button you can fully expand the tree so that all groups, work items and measurements are shown.

You can expand only a certain part of the entire tree by clicking on the 4 symbol, on the left of groups (or work items) description when collapsed.

Collapse 🔚

Using this button, you, can fully collapse the tree, so that only the groups of the 1st level are shown.

You can collapse only a certain part of the entire tree by clicking on the 6 symbol, on the left of groups (or work items) description when expanded.



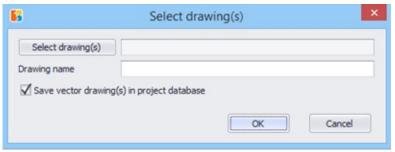
To manage drawings, measurement sheets and measurements, use the command buttons of the toolbar of the 'Drawings' tab.

- Add drawing(-s)
- Drawing properties

New measurement sheet
Open measurement sheet
■ Delete sheet
■ Export Measurements
■ Edit measurement
Measurement analysis
Duplicate measurement
Delete measurement
■ Continue measurement
■ Continue measurement (subtract)
Show all measurements
■ Hide all measurements
■ Copy visible measurements
■ Paste measurements

Add drawing(-s)

Using this button, you can add new drawings to the project. A window appears on your screen, on which you can select the drawing you wish to insert.



You may select vector files, such as .dwg, .dxf, .dgn, .emf, .wmf, or image files, such as .bmp, .gif, .jpg, .tif, .ico.png and .pdf. Select the desired drawing by double-clicking it or by clicking **OK**. The drawing is added in the 'Project Drawings' list. If you want to add more than one drawing in the project select them while pressing **CTRL** or **SHIFT** and press **OK**. The name of the file you selected is the default value for the name of the drawing in the tree view of the 'Drawings' tab, but you can change it, if you wish.

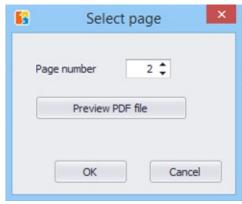
That is not possible in case of importing more than one drawing simultaneously However you can edit the drawings' names later on. (See Drawing properties)

Let the 'Save vector drawing(s) in project database' field checked, unless you want to use the original drawings as the background using an XREF like method.

In case there are image files among the drawings you have selected to import, they are always stored into the project database even if you have not checked the 'Save vector drawing(s) in project database' checkbox.

If one of the selected files is a pdf one and has more than one pages, then each page is inserted as a separate drawing with the same name followed by an underscore and the page number, for example _1, _2 etc.

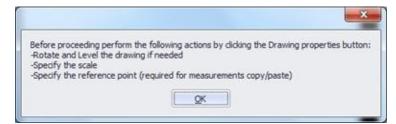
If you select to import only one pdf file that has more than one pages then the following window appears:



Select the page of the pdf file you want to import. You have also the preview option in order to select the one you want.

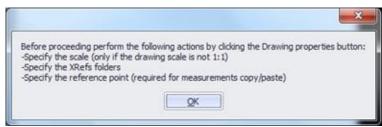
Changes in external references are reflected on the corresponding project drawing, but they have no effect on its measurement sheets. It is possible that corrections have to be made on the measurement sheets to coincide with the new version of the drawing.

After importing new drawings to the project, they are added to the 'Drawings' tab tree view and, at the same time, a new measurement sheet is created automatically as the first node below each drawing. The corresponding drawing window opens and the drawing is displayed. Finally a reminder of certain basic adjustments that may be necessary is displayed. For image files, you should rotate and level the drawing, if needed, and then set its scale and origin, for easy and correct copying of measurements from drawing to drawing.



You should follow these instructions in the order described above. Once you set the scale, you can no longer rotate the drawing, for example. If you have added a vector file, you should set the scale (only if the drawing has not been created using the usual 1:1 scale), and also specify the location of the folders of the corresponding drawings (XREF), if there are any. You should also set the scale in case the drawing unit specified in ExtrAXION differs from the unit of the drawing. Additionally, you can define the origin for easy and correct copying of measurements from drawing to drawing and

rotate the drawing, if needed.



You can adjust all of the above settings at the Properties window (See Drawings/<u>Drawing properties</u> \nearrow) where you can, also, change the description and the unit of measurement of the drawing, set digit number for the measurements calculation precision, background color etc.

When adding more than one drawings simultaneously, they do not open automatically. In this case the above windows appear when you open the drawing for the first time.

Large drawings (several MBs) may slow down the taking measurements process considerably. Therefore, it is recommended that very large drawings be converted to smaller ones, e.g. in case of .dwg drawings remove layers that are not necessary.

Drawing properties

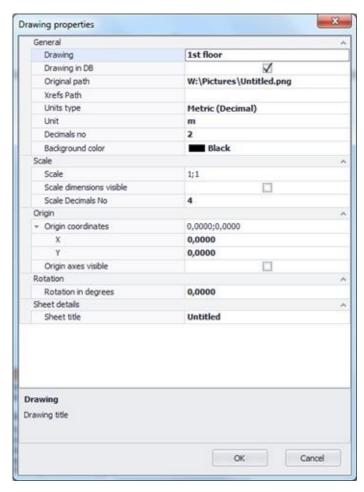
Using this button, you can set or change the properties of the current drawing. A window appears where the properties are organized in groups:

- General
- Scale
- Origin
- Rotation
- Sheet details

General

At this group you can set or change the following properties:

- The description/name of the drawing (the default name is the file name of the drawing without its extension).
- The full path and name of the original file from which the drawing was imported to the project, and whether the drawing is stored into the project or is an external reference. These two properties are read-only.
- The full paths of any external references, separated by semicolon (;).
- The unit system to be used. You can select between Metric (decimal), US Engineering and US Architectural.
- The unit of length on which measurements will be based (the default is meter for the Metric unit system and feet for the US systems).
- The accuracy of measurement calculations, by setting the number of the significant digits (the default is 2).
- The background color.



in some vector drawings the unit of length is other than the meter, for example electrical drawings with mm as unit of length. In this case you should select the same unit of length with the original drawing or define a scale different than 1:1.

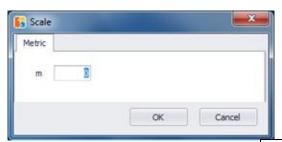
Scale

By setting the scale, you also eliminate any distortions caused by reduction or magnification during scanning or photo-copying, and thus measurements will correspond to the real dimensions:

- In image files:
- In vector drawings

In image files:

Click on the 'Scale' field and choose 'Set scale on drawing' from drop down menu. Pick two points on the drawing that is opened and then a new window appears.

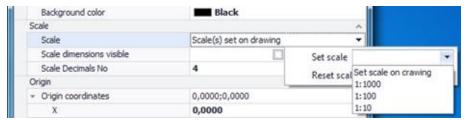


Enter the length you have marked on the drawing, click **OK**, and the scale appears on the drawing. Click the **Update and close** button to save the new scale. If you select 'Reset scale' from the drop-down menu, then the scale is set to its default value (1:1).

Scanned image files can be deformed in a way that the original x/y axis scale ratio is altered. Thus, you need to set the vertical axis scale as well. Generally, you can only move in 'ortho' mode when setting the scale.

In vector drawings

Click on the 'Scale' field and select 'Set scale' from the drop down menu.



In vector drawings you have more options:

- Type the scale
- Choose a standard one from the drop down list (1:1000, 1:100, 1:10)
- Define the scale on the drawing, as shown in image files.
- Define the accuracy of scale calculations by setting the number of the significant digits (the default is 4).
- If you don't want the scale dimensions to be visible on the drawing uncheck the 'Scale dimensions visible' box.
- In order to achieve the maximum possible accuracy in the calculations, the selection of the longest possible dimension on the drawing as well is recommended (See <u>Auxiliary measuring tools</u>).
- Scale setting makes sense in case of image files as well as in vector drawings that have been created on a scale other than 1:1.
- In vector files you cannot set both the horizontal and the vertical axis scale. Only the last calibration is saved.
- If you change the unit system or the unit of length of a drawing, then the scale is automatically reset to its default value (1:1). In this case all measurements become invalid and need to be carried out again.

Origin

By setting the origin, you can set the (0,0) coordinate point on the drawing. Click the ... button on the 'Origin coordinates' field. On the drawing that appears mark the (0,0) origin using the cross hair cursor and click **Update and close**. Alternative you can enter the X and Y coordinates at the corresponding fields. Check the 'Origin axes visible' box if you want the origin to be visible on the drawing.

Set the corresponding origin on the rest of the drawings, where you wish to copy the measurements, in order for them to be copied in the exact same location as in their original drawing. In case, for example, that the creator of the drawing changes the origin, then, if it is not reset, it is possible for copied measurements to be pasted to an entirely wrong place!

Rotation

By rotating a drawing you can change its orientation so that it is leveled during measurements. Click the ... button on the 'Rotation in degrees' field. On the drawing that appears, select two points along a horizontal line, e.g. two points on any line which should be horizontal in your drawing, but, probably due to misaligned placement in the scanner, appears tilted. Click **Update and close** to save the new rotation.

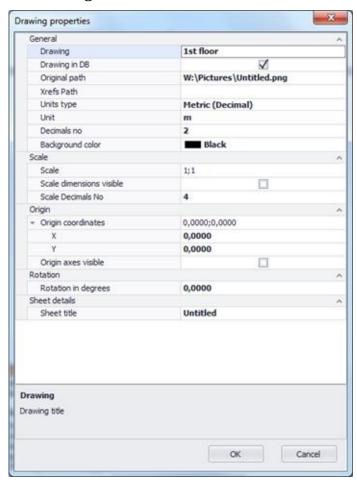


The rotation of a drawing must be done before the scale setting and before any measurement.

To rotate and level a drawing by 90 degrees you can select a vertical line on the drawing. Note that the order in which you select the start and end point will determine if the rotation is clockwise or anticlockwise.

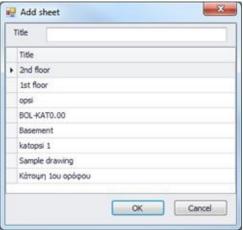
Sheet details

You can see and change the title of the current measurements sheet. However, this field is visible only if you have clicked on 'Drawing properties 'Z' while having a sheet selected.



New measurement sheet **

Using this button you can add new measurement sheets to the drawings. A window appears with the list of all drawings that you have imported into the project. Select the drawing on which you wish to create the new measurement sheet and type the title of the new measurement sheet at the field above the list.

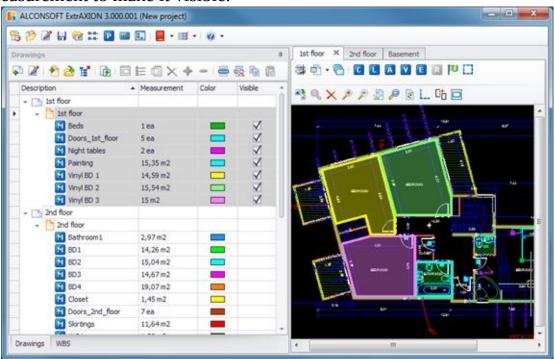


Click **OK** and the new measurement sheet is created and added as a child node of the selected drawing at the tree view of the 'Drawings' tab. Finally, on the right side of the application window, the corresponding drawing opens.

Open measurement sheet 📂

Using this button, you can open the selected measurement sheet from the 'Drawings' tree view on a new window on the right side of the application window. You may open any number of measurements sheets of as many drawings you wish. Each open measurement sheet appears in the drawing pane with its title at the top.

- You can also open a measurement sheet window by double-clicking its title or any of its measurements. If the window is already open then it becomes current. To close a measurement sheet window click the x symbol on the right part of the window's tab.
- En The measurement sheet and its measurements of the current window are marked with gray color on the 'Drawings' and 'WBS' tree views.
- The measurements of the current window are only visible when the check box at the 'Visible' column of the 'Drawings' tree view is checked. Click on the check box to change its status or double click on a measurement to make it visible.



Delete sheet 🖹

Using this button, you can delete the selected measurement sheet from the drawings tree view. If the underlying drawing has no more measurement sheets then the drawing itself is also removed from the drawings tree view.

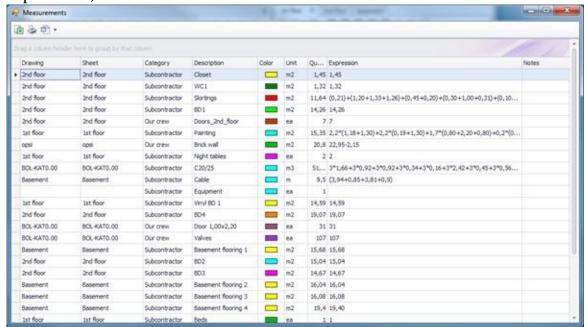
A drawing that has been removed from the tree view is not actually deleted from the project. When you create a new measurement sheet (See Drawings/New measurement sheet) and also, at the measurements management window (General/Drawings management), you can see and use all the drawings that have been imported to the project, even if they are not shown at the drawings tree view.

You should close a drawing in order to be able to delete it.

By deleting a measurement sheet, you also delete all items associated with it **along WITH its measurements** which **CANNOT be retrieved!**

Export Measurements

This button allows you to export the primary measurements to a table. Then, you can change the table's appearance before its final export to Excel. This table shows all measurement details in the following columns: 'Drawing', 'Sheet', 'Category', 'Description', 'Color', 'Unit', 'Quantity', 'Expression', 'Notes'.



Using the advanced filtering, grouping, column selection, and sorting tools, you have many options of setting the number, the form, and the type of the data you wish to view (See Appendix/Filters/Sorting).

Using the 'Measurements analysis' button vou can preview and print the analysis of the measurements in the above list. The analysis includes dimensions marking and details of surface area calculations (See Measurement analysis).

The 'Measurements analysis' button is also present at the drawings window toolbar and gives similar results (See Drawing windows/Measurement analysis •). The difference is that, the analysis obtained from this window takes into account the sub-measurements and individual shapes, if any, of each measurement. If for example the continuation of a measurement is interrupted twice (by addition or subtraction), then three sub-measurements appear in different rows and for each one of them a separate page is created.

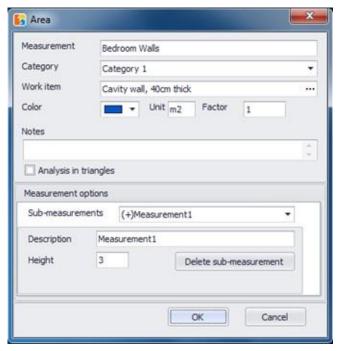
Vising the filters you can set criteria to limit the number measurements that appear in the list and subsequently the measurements that will be included in the analysis.

Exporting measurements and work items can be done from the 'WBS' tab where these features are described in detail (See Work items/Exporting WBS/Export WBS measurements).

Edit measurement 🖾

Using this button, you can view or modify the details of the selected measurement at a later stage. Correct the description or the category of the measurement, the work items of the WBS to which it is linked, change its color, insert a factor, and modify the measurement unit accordingly, or add explanatory notes. When finished, click **OK**.

Editing the names and parameters is performed per sub-measurement (See Drawings/Continue measurement). You can view and select them from the drop down list. Each one will be preceded by a (+) or (-) sign, depending on if it was created with 'Continue measurement +' or 'Continue measurement (subtract) -' respectively.

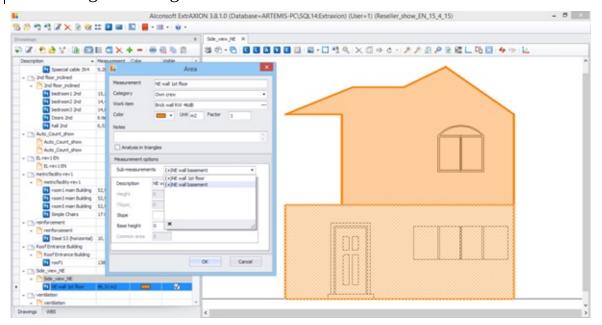


Parameters may vary depending on the sub-measurement's type, which you can change when continuing a measurement. For example, if an area measurement is performed on the drawing's level and then continued to a sub-measurement perpendicular to the drawing, only the latter will be associated with the 'Common height' parameter.

🖺 When you select a sub-measurement from the dropdown list all figures

that belong to that sub-measurement are marked on the drawing.

If you have selected on the drawing figures that belong to different measurements, when you right click and select the 'edit measurement' option, the measurement that will be edited is the one where the last selected figure belongs.

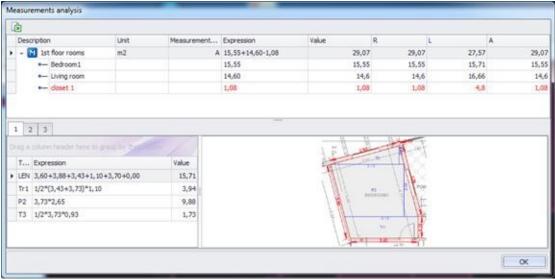


In case the values of a parameter are defined per node, e.g. when you enter them every time you create a new point by clicking on the drawing, this parameter doesn't have a common value and cannot be edited in this window. Editing such values is performed directly on the drawing by right clicking on the nodes instead (See Measurement/Measuring procedure/Figure data).

 $\stackrel{ extbf{ iny{be}}}{=}$ The notes you add will be printed in the measurement table.

Measurement analysis **≡**

Using this button, the selected measurement's analysis is viewed. Each submeasurement appears in a different row, while the main measurement's values are shown in the first row. The columns display the description (name) of the sub measurement, its unit, measurement type, calculation expression and value. Furthermore the columns L, A and R contain the length, area and primary result of the measurement respectively. On the lower part of the window there is the detailed calculation of these results, as well as a thumbnail of the region where the sub measurement was performed, divided in basic geometric shapes (See Measurement analysis). Each sub-measurement is displayed in a different tab.



Each time the continuation of a measurement (by addition or subtraction) is made, a new sub-measurement is created (See Drawings/Continue measurement). If a sub measurement was created via the Continue measurement (subtract) —, then it will be colored red.

By temporarily stopping a measurement by pressing the **Esc** key once, distinct parts are created in the measurement analysis, which are distinguished with the use of parentheses in the expression column, e.g. the measurement of the baseboard with gaps in the place of doors.

More:

Export to Excel

Export to Excel

Click the button of the above table to save it as an .xls file. Input the location and the filename you wish to use.

Duplicate measurement 🗐

Using this button, you create one or more copies of the selected measurement, which you can then move around on the drawing by defining the start and end point of a point of reference. After placing a copy at its final position, it is then linked to the same work item as the original measurement, while its name is also derived from the original via appending an index number (e.g. _1, _2, etc.). This feature is useful in cases where the same measurement can be used in different cases, e.g. a ceiling measurement can also be used to measure the floor.

In the above example, it is recommended to link the measurement with many different work items instead of duplicating it (ExtrAXION Proversion).

It is also possible to duplicate only parts of a measurement by selecting them on the drawing and using the 'Duplicate selection 'button in the drawing windows area. In this case, any copied items are added to the measurement they belong to (See <u>Auxiliary measuring tools/ Duplicate selection</u>).

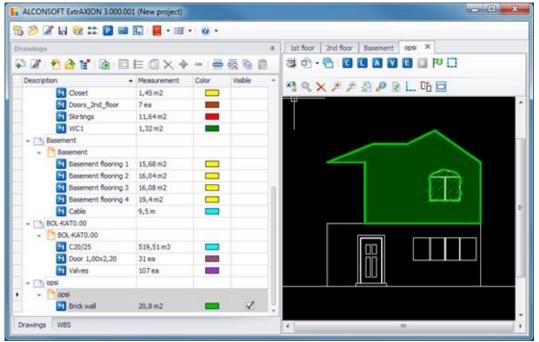
Delete measurement ×

Using the 'Delete measurement' button, you can delete the selected measurement. The measurement is removed from the 'Drawings' and 'WBS' tree views as well as from the drawing window.

By deleting a measurement you lose all of its data and you cannot retrieve them!

Continue measurement +

Using this button, you can continue the selected measurement, creating sub measurements.



A measurement consists of one or more sub measurements of the same type (e.g. count measurement). The value of the main measurement is equal to the sum of all its sub measurements' values.

Each sub measurement has its own name. When neither 'Continue measurement + 'nor 'Continue measurement (subtract) - 'is used, there is only one sub measurement with the same name as the main measurement. Each time one of those buttons is pressed, a new one is created with a new name. New names are created by appending index numbers to the original name.

Sub measurements of the same measurement have in common:

- Category
- Work item
- Color, unit and factor
- Notes
- Marking figure (See <u>Measuring in image files/Types and method of measurement/Object count</u>)

These items are properties of the main measurement. If you change one

of them when you create a new sub measurement, it will be changed for all. However the following properties are not necessarily the same in all sub measurements:

- Name (See <u>Drawings/Edit measurement</u>)
- Measurement method (e.g. <u>perpendicular to the drawing</u>, <u>marking figures</u>, etc)
- Parameters
- It is possible for all sub measurements to have the same name, but it is not recommended.
- When you create a new sub measurement with parameters, their values are equal to the previous ones by default. You can then change them.
- All these properties can also be seen during the process '<u>Edit</u> measurement', where it is apparent which properties are common or not.
- Apart from sub measurements there are also figures, which are parts of a measurement created when you pause by using ESC. (See Measuring in image files/Types and method of measurement/Length measurement/ Measuring discontinuous segments)

Continue measurement (subtract) -

Using this button, you can continue the selected measurement in cases where you wish to subtract the area of already drawn surfaces (e.g. in the facade, by removing the surface area of the wall openings). By doing so a new sub measurement is created (See Drawings/Continue measurement). The surfaces that you remove from the measurement are marked on the drawing with cross-hatching, while the outline of the areas removed is marked with a dashed line. In length measurements you can also remove parts of lines which are then marked with a dashed line.

Continue measurement (subtract) cannot be performed on count measurements . The button is deactivated too.

Show all measurements =

By selecting 'Show all measurements', all the measurements appear on the measurement sheet and the check box of the column 'Visible' appears checked.

Hide all measurements 🗟

By selecting 'Hide all measurements', all the measurements disappear from the measurement sheet and the check box of the column 'Visible' appears unchecked.

Copy visible measurements 🗎

Using this button, all measurements which are currently visible are copied to the clipboard. They can then be pasted in another measurement sheet of the same or different drawing of the current project.

You can use this button when, for example, all measurements are similar on different floors, or if a drawing is changed. Copy all the measurements and modify the ones that need to be adapted to the new drawing.

Paste measurements

This button pastes the copied measurements to the current measurement sheet. If you have set the same origin in both measurement sheets (See Drawings/Drawing Properties/Origin), the measurements are automatically pasted in the exact same position as in the initial measurement sheet.

Note that you should be very careful in setting the origin (reference point) in the case where the measurement sheets belong to different drawings. If the origin has changed in the new version of the drawing, its position should be reset before pasting the measurements.

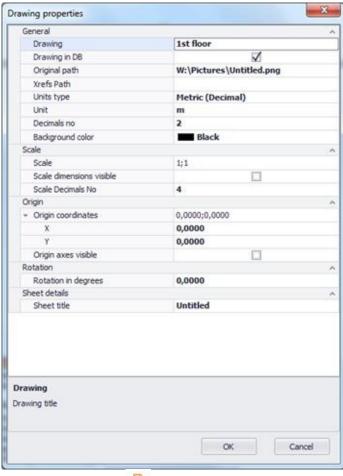
If there are already other measurements on the measurement sheet where you paste, then only those with different names from the existing ones will be pasted.

Drawing windows

Drawing windows is the area where you make your measurements. They are located at the right side of the application window and each one corresponds to a measurement sheet of the drawings tree view. A new drawing window opens when you:

 Add a new drawing to the drawings tree view in which case its first measurement sheet is also created automatically (See Drawings/<u>Add</u> <u>drawing(-s) XE "Adding: Drawing"</u> .

Create a new measurement sheet of an existing drawing (See Drawings/



New measurement sheet ²

).

 Open the current measurement sheet by using the button, by double clicking on it or on one of its measurements (See Drawings/<u>Open measurement sheet XE "Opening:measurement sheet</u>"

You can open as many drawing windows as you wish. Each one has a tab with the title of the corresponding measurement sheet and the x mark which is used to close it.

At any time, one of the open drawing windows is current, which means that appears in front of all others. The corresponding measurement sheet of the current drawing window, along with its measurements, are marked with gray color on the tree views of both 'Drawings' and 'WBS' tabs.

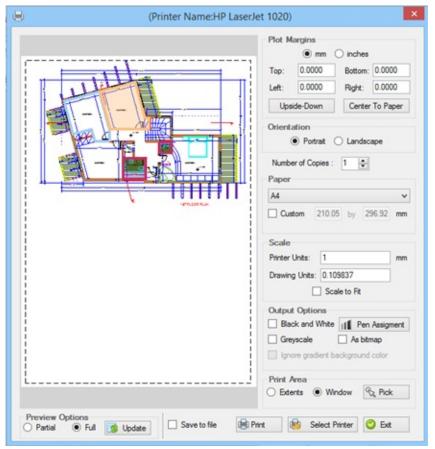
At the top of the drawing window there are buttons for managing drawings and measurement sheets and buttons to be used as tools for the measurements. The following chapters contain detailed description of the measurement procedures in case of image files (See Measuring in image files) and of vector files (See Measuring in vector files (CAD)) as well as description of many auxiliary functions and tools (See Auxiliary measuring tools).

More:

- Plot (Ctrl+P)
- Measurement analysis
- Drawing Layers
- Export Drawing

Plot (Ctrl+P) *

Using the 'Plot' button, you can print the current measurement sheet you see on the screen, including measurements that you have created. Click the 'Plot' button, or, alternatively, you can use the **Ctrl**+**P** shortcut. The print-parameters configuration window will open:



In the 'Plot margins' field, you may set the margins of the page and the alignment of the drawing on the paper by selecting 'Upside – Down' and 'Center to paper'.

In the 'Orientation' field, set the orientation of the drawing. Click on the 'Portrait' option to vertically orientate the drawing and on the 'Landscape' option to horizontally orientate the drawing.

In the 'Paper' field, you may set the dimensions of the printing paper either by selecting any of the predefined formats (letter, legal, A3, A4, A5 etc.), or by setting the paper dimensions in the 'Custom' field.

In the 'Scale' field, you can set the printing scale of the drawing by filling in the respective 'Printer Units' and 'Drawing Units' fields. Alternatively, you can customize the drawing to the paper dimensions regardless of the scale by selecting 'Scale to Fit'.

In the 'Display options' field, you can select the B&W printing option by clicking on the 'Black and white' option or the 'Grayscale' one. You can print the drawing as an image file, by selecting the 'As bitmap' option. You can also change the line width per color by pressing the 'Pen assignment' button. In the 'Print area' field, you have the possibility of selecting the area you want to print. If you want to print a part of the drawing, select the 'Window' option and then click on the 'Pick' option to mark this part on the drawing. If you wish to print the entire drawing, just click on the 'Extends' option. In the 'Preview options' field, you can select either the partial or the full preview of your drawing.

Click on the 'Update preview' option each time you change any of the printing settings in order to refresh the preview, unless of course the preview is automatically refreshed. Choose the 'Select Printer field. In the respective fields of the window that appears on the screen you may select the printer as well as the printing properties 'Properties'.

Check the 'Save to file' option, click the 'Save to file' button that appears and save the file in order to print it later on.

Click 'Print' to print the drawing or click 'Exit' to close the printing window.

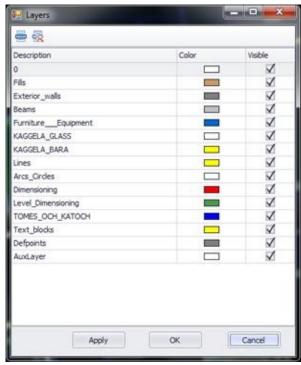
Color printing of a drawing (or part of a drawing) with active measurements (or some of the measurements) can be of great aid when checking measurements.

Measurement analysis 🗈

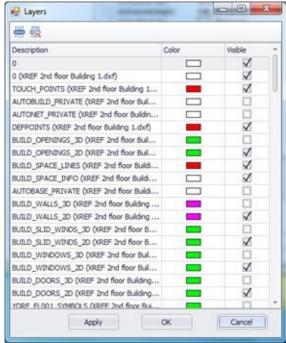
Using this button you can preview and print the analysis of the measurements. The analysis is based on the template which you select from the drop-down menu and includes dimensions marking and details of surfaces calculations. Measurement analysis is explained in detail in a separate chapter (See Measurement analysis).

Drawing Layers

By clicking on the 'Layers' button, you can see all the drawing's layers. The layers window includes their description, their color, and allows for their selective (by clicking on the respective 'visible' check box) or collective activation and deactivation. Moreover, users can sort or apply filters to the content of the columns (See Appendix/Filters/Sorting).



In the case of XREF files, in the end of the description of each layer, the word XREF and the name of the drawing from which it originates appear in parenthesis.



Select the layers you wish to activate or deactivate and click **Apply** to immediately view the changes on the drawing, without closing the window. This way, you have the ability to immediately view which layers hide or appear.

In the case of an image file there is only the auxiliary layer (Auxiliary).



More:

- Show all layers
- Hide all layers

Show all layers **≡**

By selecting 'Show all layers', all layers of the drawing are shown.

Hide all layers ፟፟፟፟፟

By selecting 'Hide all layers', all layers of the drawing are hidden.

Export Drawing

Using the 'Export drawing' button, you can export the current measurement sheet to a separate file, including the measurements you have created. The drawing can be exported only if it is saved in the database and not as an external reference.

You can export the drawing to various file types, such as: dxf, dwg, dgn, wmf, bmp, gif, jpg, tif, png, ico, svg, dwf, pdf.

Using the export option in the above file types, you can edit the drawings along with the measurements in specialized design applications or even transfer them along with their measurements to another computer in the form of a .pdf file for checking purposes.

When exporting the drawing only the visible measurements are exported, as separate layers. That enables you to export the drawing with only the measurements you want each time and then edit it easily using a CAD software.

The export file does not contain any data from external references of the drawing, if there are any. In addition, if the drawing is not stored into the project but is an external reference itself, then only the layers of the measurement sheets are exported and not the original drawing.

Initial settings

Every time you import a new image file into the project (Drawings/Add drawing), a message box appears which guides you through the initial settings you have to establish:

- Rotate and level the drawing, if needed
- Set the drawing scale
- Set the origin, if you wish to copy measurements

You can find all these initial settings at the drawing's properties window (See Drawings/ <u>Drawing properties</u> **/**)

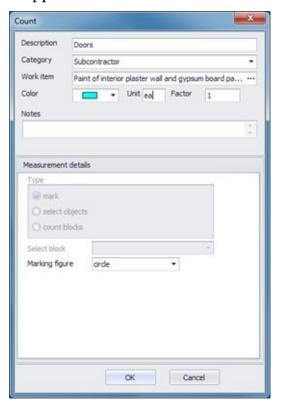
Types and method of measurement

More:

- Object count
- Length measurement
- Measuring area
- Measuring volume
- Custom measurements

Object count

Using this button, you can count objects on the drawing, e.g. how many sinks, doors, windows there are in a drawing. Click the button and the following window will appear:



More:

- Description
- Category
- Work item
- New work item
- Color
- Factor
- Unit
- Notes
- Measurement type
- Marking figure
- Object search

Description

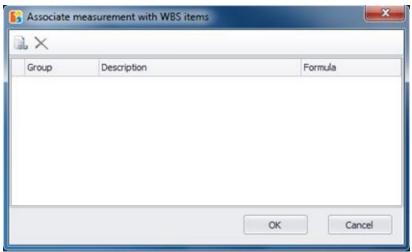
Enter the description of your new measurement in the Description field, e.g. internal doors.

Category

Select the category to which you wish to add your new measurement, thus grouping the measurements (See General/Measurement categories XE "Measurement:Categories"). For example, you may enter all door measurements in a specific category in order to filter the measurement table's data and export to Excel only this particular category (See Appendix/Filters/Sorting).

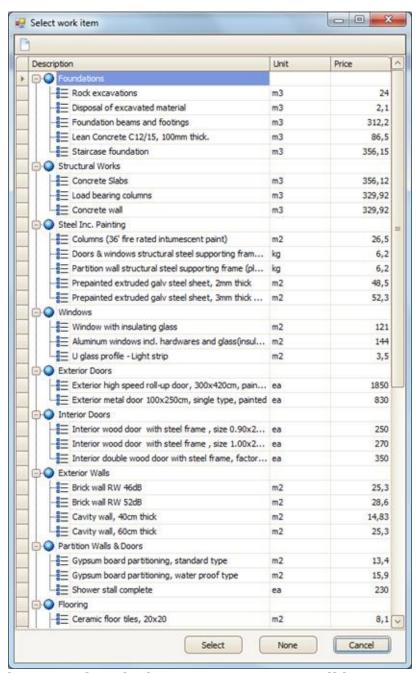
Work item

Click the button and the 'Associate measurement with WBS items' option window will appear.

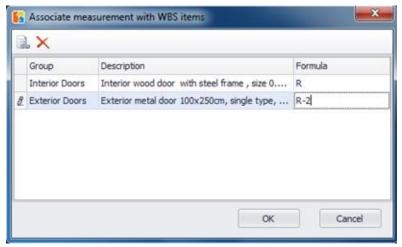


Click the 'Associate with WBS item' button to link the measurement with the work items you have entered into the WBS (See General/WBS (Ctrl+B)). In case you do not desire to enter the measurement under any of the work items, you can leave the corresponding field blank.

In the Standard version, where it is not possible to link a measurement with more than one work items, the WBS window appears on your screen immediately.

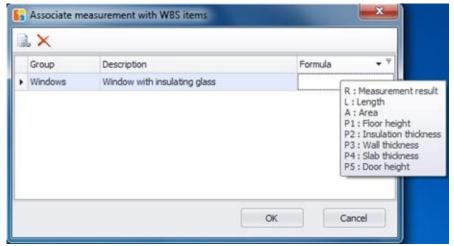


Select the work item under which your measurement will be entered by double-clicking it or by clicking on it and then clicking the $\boxed{\textbf{Select}}$ option. Repeat the procedure to link the measurement with more than one work items. If you leave the 'Formula' field blank or type the letter \mathbf{R} (\mathbf{R} esult), then the primary measurement result is entered into the WBS.



If you wish for a modified result to be entered under the work item, you should fill in the corresponding field using the available parameters and functions (See General/Library/New measurement/<u>Parameters</u>).

If you hover the mouse pointer over the 'Formula' column header, a tooltip pops up. There you can see all available parameters, as well as their descriptions.



In the WBS window you can select more than one work item by using CTRL or SHIFT and simultaneously link them to the measurement.

If you select more than one work items to link to the measurement, then they all appear at the 'Description' field, separated by commas.

■ If there is a mistake in the expression, then the result appearing in the work item is -1.

Attention! When a measurement contains a factor that is different from 1, be careful when linking it to a WBS item. If you type anything in the 'Formula'

field even only the letter **R** (**R**esult), the factor <u>is not taken into account</u>. You can use the extra results of the different types of measurements, based on the following table (See General/Library/New measurement/<u>Calculations</u>)

TABLE FOR EXTRA MEASUREMENT					
RESULTS					
Item count	n/a				
Length measurement	A C				
Area measurement					
-on drawing's level	L C				
-perpendicular to drawing	L A C				
-by item count	n/a				
Volume measurement					
-area on drawing's level	L A C				
-linear object	L A C				
-by item count	n/a				

When you select a work item, the measurement unit of the primary measurement is not automatically updated according to the unit of the work item with which it is linked. If, for example, you want to count the number of the windows, and the respective work item unit in the WBS is m2, as soon as you select the work item, the measurement unit remains items. By using an appropriate formula or factor, you can convert the result of the basic measurement to comply with the work item's units.

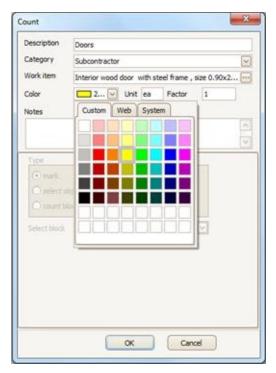
New work item

Using this button, you can enter -during a measurement- a new group of work items or a new work item that does not exist in the WBS, and link it to the result of the measurement. If you click the 'Add work item' button, the 'WBS' window will appear on your screen. Add the desired group/work item (See General/WBS (Ctrl+B) XE "WBS") and click 'Close'. The changes will appear in the 'Select Work Item' window as well as in the 'WBS' tab (See Work items).

Apart from adding a group/work item, you can also edit the description or any other detail of the existing groups/work items in the WBS or even delete some of them.

Color

You can change the default color which will be used to mark the items you want to measure.



The last selected color and measurement unit are retained in future measurements, when you assign the same work item. Of course, you have the option of changing them again.

Factor

The 'Factor' field allows you to increase or reduce a result (the primary result, as shown in the 'Drawings' tab; in the 'WBS' tab there can be modified results too) as well as to convert it to a different measurement unit. For example, suppose you want to calculate the total weight of 5 similar drainage grids in kg and each grid weighs 100kg. Enter 100 and kg in the factor and Unit fields respectively and the total weight of the grids will be immediately calculated.

In the Pro version, you are advised to use appropriate calculation formulas instead of a factor when linking a measurement to a work item.

In the case where, for example, besides the area measurement of a floor, you wish to calculate the number of tiles needed, you can add an extra work item to the WBS, named 'Tile number,' with items as its unit of measurement. You can then link the measurement with this new work item using an appropriate factor to convert area to items. Be careful to set the unit price of this work item to zero, so that it does not alter the total cost.

In case of linking a measurement that includes a factor that is different from 1 to a work item be very careful. If you type anything in the 'Formula' field even the letter **R** (**R**esult), the factor is not taken into account.

Attention! The expression in the 'Formula' refers to each submeasurement separately as well as to the letters **R** (**R**esult), **L** (**L**ength), **A** (**A**rea). e.g if you type the expression R+1 in the 'Formula' field and then continue the measurement twice thus creating three submeasurements (See Drawings/Continue measurement), the final result will be (R1+1)+(R2+1)+(R3+1) = R+3 instead of R+1 where R1,R2,R3 symbolize the results of the submeasurements and the letter R their sum. This is needed since the values of custom measurements parameters that are used in formulas may be different per sub-measurement (eg. height).

Unit

The default primary measurement unit is items. You can change the measurement unit (See Measuring in image files/Types & method of measurement/Object count/Factor).

The unit defined at this field is the one of the primary measurement and it is only used when the measurement is not linked with any WBS work items. If such is the case, then the default unit is depending on the type of measurement and changing it is only meaningful when using a factor to, for example, convert the number of objects to weight (Kg) or area (m2). If the measurement is linked to a WBS work item then the measurement unit is the unit of the linked work item.

Notes

In the 'Notes' field you can enter comments that relate to this specific measurement.

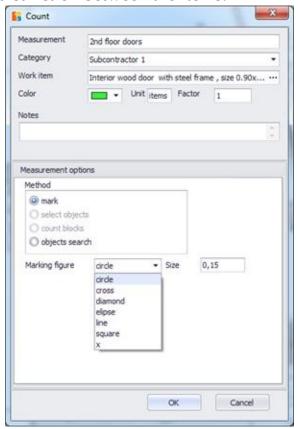
These notes will be exported along with the other details to both the measurements table and the WBS table.

Measurement type

There are two different ways to count items in image file: by marking items manually on the drawing or by automatic object detection.

Marking figure

Select the shape with which the marking on the drawing will be done. The choices are circle, diamond, ellipse, etc. By using different marking figures, you can achieve an extra distinction between the items.



More:

- Marker size
- Measuring procedure

Marker size

If the marking figures are out of proportion compared to the rest of the drawing, adjust their size by typing in this field and repeat the measurement. Keep in mind that the size also depends on the unit in use.

Measuring procedure

Once you fill in all the desired fields, click **OK**. Note that on the left side of the screen, under the work item, a new entry is created for the new measurement.

During the measuring procedure, the **Q** 'Recording' button is constantly active.

Click consecutively on the drawing, where the items you wish to count are placed, in order to mark them. Note that with each click, a mark with the selected figure and color appears in the position of the cursor.

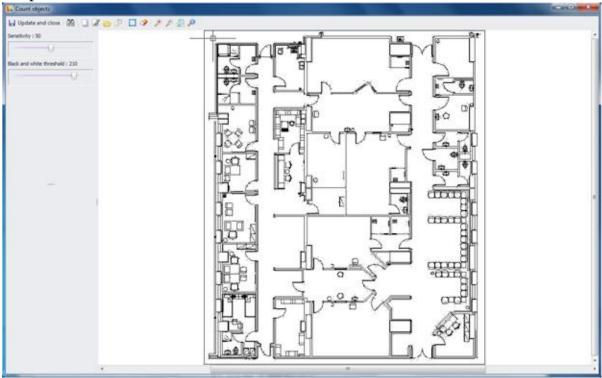
Terminating a measurement

To complete the measuring process, right-click and a shortcut menu appears. Select 'Terminate Measurement'. Alternatively, you can stop the measuring process by pressing the **Esc** key twice.



Object search

If you select 'Object search' as a measurement type, then the following window is opened

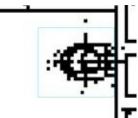


More:

- Specify template on image
- Edit template
- Load template
- Save template
- Sensitivity
- Black and white threshold
- Search objects
- Define search region
- Clear search region
- Update and close

Specify template on image

Press this button to define the object you want to count on the drawing. To mark the object, zoom on it and then enclose it in a rectangle by drag and drop.

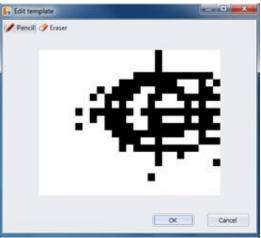


The selected template will then be displayed on the left side of the screen alongside variations produced by rotating it in steps of 90 degrees and mirroring it about the horizontal and vertical axes.

Choose the variations you want to search by filling their check boxes. However the more you choose, the longer the detection process will take. Thus you should omit mirrors when searching for symmetrical objects.

Edit template 📝

This option lets you edit the template you have defined. Use the pencil tool to darken pixels or the eraser tool to clear them.



Save template Export the template you have defined for later use.

Sensitivity

Drag this slider to the left in order to increase the tolerance in differences with the selected template and thus make it more probable to find all its occurrences. By doing so though, more unrelated objects will also be found.

Instead of decreasing the sensitivity too much, you can adjust it to find most of the template's occurrences and then add the remaining ones manually. This can be done after completing the measurement. Just click on the 'Continue measurement' ♣ button, which is located in the taskbar of the 'Drawings' or 'WBS' tab and by changing the counting method to "Mark".

Black and white threshold

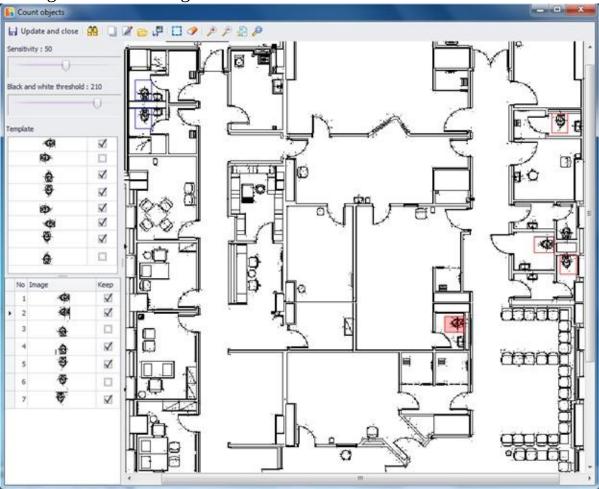
Set the threshold before a pixel is regarded black or white by the program in order to get belter results.



All images are converted to black and white when opened.

Search objects 🙈

Press this button to trigger the search for the selected template. The results will be displayed in the lower left corner of the screen and marked with a red rectangle on the drawing.



There may be unwanted items in the results list. To remove them uncheck the 'Keep' checkbox. Notice that when you click on a result item, the drawing will zoom in on it, allowing you to decide if you want to include it in the measurement or not. Excluded objects will be marked with a blue rectangle on the drawing, in contrast to the red rectangle of the included ones.

Try out different levels of sensitivity and black & white threshold, in order to achieve the best possible result.

Define search region 🛄

This button lets you define a rectangular search region, where object search will be limited to. By doing so, when you use 'Search object' (4), the object detection will only be performed in the specified area.

By limiting the detection process to the necessary area you can save up a lot of time depending on the file size. In large images the desired object will probably be located in a smaller area only, thus it pays off to use this option.

Clear search region 🧈

By pressing this button you delete the search region you defined with \square and any object searches will be performed on the entire drawing.

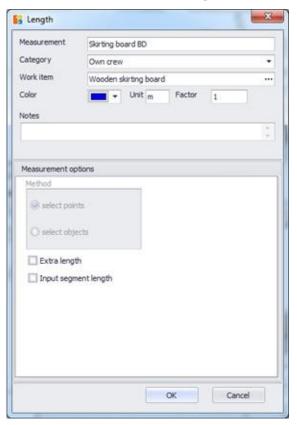
If you want to define a new search region, there is no need to clear the previous one. It will be done automatically.

Update and close

This option adds the search results to the count measurement and then closes the current window. All counted objects will be marked on the drawing with the marker color and shape you chose.

Length measurement •

Using this button, you can measure the length of a single straight line, a curve, a polyline, multiple single straight lines, curves or polylines on the drawing. Click the button and the following window will appear:



More:

- Description/Category/Work Item/Color/Notes
- Factor
- Unit
- Measurement options
- Measuring procedure
- Extra length
- Input Segment length

Description/Category/Work Item/Color/Notes

(See Measuring in image files/Types & method of measurement/<u>Object count</u> .

Factor

The 'Factor' field allows you to directly increase or reduce a result (the primary result of a measurement which is shown in the 'Drawings' tab) as well as to convert it to a different measurement unit. For example, if you wish to increase the measured distance by 10%, enter the **1.1** value in the 'Factor' field.

Unit

The default primary measurement unit is meters for the metric system and feet for the US systems. You can change the measurement unit (See Measuring in image files/Types & method of measurement/Object count .)

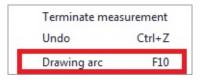
Measurement options

This region is disabled as the selection of length measurement type applies only in vector drawings.

Measuring procedure

To measure the length of a segment, click the first point that defines the distance you want to measure, move your mouse to the endpoint and click on it. If you wish to measure curved lines, click first then right-click on the point where the curve starts; from the shortcut menu that appears, select the 'Drawing arc' option, which can be enabled or disabled during a measurement.

Alternatively, you can use the **F10** key.



More:

- Measuring Discontinuous Segments
- □ Undoing a measurement (Ctrl+Z)
- Terminating a measurement
- Editing a measurement

Measuring Discontinuous Segments

If you wish to measure discontinuous segments, press the \mathbf{Esc} key once and then click on the starting point of the next segment and so on. As a result the measurement is temporarily paused and separate figures are created. These figures belong to the same sub-measurement (See $\mathbf{Drawings/Continue}$ $\mathbf{measurement}$). Thus the hierarchy is: measuremet \rightarrow sub-measurements \rightarrow figures.

In the Measurement analysis window (See Drawing windows/<u>Measurement analysis XE "Measurement analysis"</u>), each distinct segment is separated from the rest with the use of parentheses in the calculation expressions.

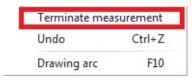
Undoing a measurement (Ctrl + Z)

In the duration of a measurement procedure, in order to quickly correct a wrong action, e.g. in the creation of a polyline, there is the ability of multiple undoing of the last actions by right clicking and selecting 'Undo,' or, alternatively, by using the **Ctrl**+**Z** key combination.

Terminate me	Terminate measurement				
Undo	Ctrl+Z				
Drawing arc	F10				

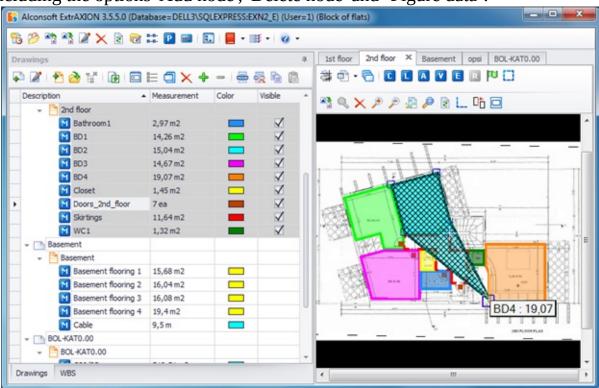
Terminating a measurement

To complete the measuring procedure, right-click. A shortcut menu appears. Select 'Terminate Measurement'. Alternatively, you can stop the measuring process by pressing the **Esc** key twice. You can also click the **R** 'Recording' button in order to disable it.



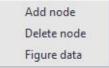
Editing a measurement

You can also modify a measurement at a later stage. You can edit the measurement by changing the polyline shape or its dimensions. Select the polyline and move its nodes or right-click on it to show the shortcut menu, including the options 'Add node', 'Delete node' and 'Figure data'.



Adding a node

By selecting this option, you will 'Add a node' in the selected closed polygon or polygonal line (polyline).



By clicking on any point in the perimeter of a polygon or a polyline, you can insert a node there. You can then move that node and view the change in the polygon or the polyline.

Deleting a node

By selecting this option, you will 'Delete a node' from the selected closed polygon or polygonal line (polyline). By clicking on any node of the polygon or polyline, you can remove it and view the resulting change in the polygon or

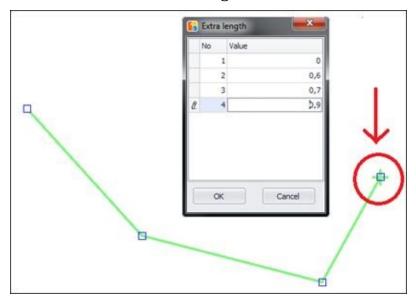
polyline.

The measurement result is automatically updated with the above changes.

Measuring length on an image file can only be done using point selection. All other options are disabled.

Figure data

In many measurement types, there are parameters the values of which are different in each node of the measurement. For example, if you perform an area measurement perpendicular to the drawing without specifying a common height, then whenever you create a new node in the measurement polyline, you will be prompted for the value of height at that node. Other examples of this behavior include length measurements with an extra length or manual length input and volume measurements using linear items. You can modify the values of such parameters by selecting 'Figure data'. Then you can edit the table that is opened, where the nodes are listed in one column and the parameter values in the other. In the previous example, even if you have chosen a common height, you could still edit each node's height via the same method.



 $\stackrel{\text{left}}{=}$ When editing a node, it will be marked on the drawing with a cross (+).

'Figure data' is deactivated in length measurements, unless you tick the 'Extra length' or 'Input Segment length' checkbox, when creating the measurement.

Parameters that are common for a measurement, or a sub-measurement to be

exact, can be edited using 'Edit measurement'. However, once you modify a node's value by using 'Figure data', the parameter stops being common and is no longer visible in the 'Edit measurement' window.

Extra length

Select the 'Extra Length' option to add length to the distance you measure (e.g. to the floor plan views of Electromechanical works for vertically-oriented piping, cabling). During a measurement in which you have enabled the extra length option, every time you click on the nodes of the distance you measure, the following window appears on the screen:



Enter the value you wish to add at this particular point and press OK.

This value will be the default value for each subsequent node in the measurement in such a way as not to require from the user to re-enter it —in case the additional length is equal to that of the previous node- while users have the possibility of changing it.

You may want to add an extra length to a point between the nodes of a line and at a later time. To do so, you can <u>add an intermediate node to the polyline</u>, then right click on it and select 'Figure data' to edit the value of the extra length. By default, the value will be copied from the previous node. Apparently, this is possible only if you have ticked the 'Extra length' checkbox, when creating the measurement.

Input Segment length

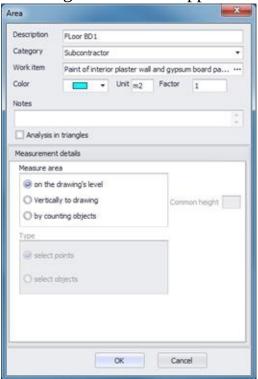
Select the 'Input Segment length' option when you prefer to manually define the length of each segment instead of letting ExtrAXION to calculate it. During a measurement in which you have enabled the input segment length option, every time you click on a node to end a segment, the following window appears on the screen:



Enter the value you wish for the current segment and press OK. You can use this feature in several cases e.g. when a drawing has different scale in some regions, in isometric type drawings or if you just want to override ExtrAXION's calculations and set the length you prefer.

Measuring area 🔼

Using this button, you can measure the area of a surface that is either perpendicular to or co-planar with the drawing, or by counting objects. Click the button and the following window will appear:



More:

- Description/Category/Work Item/Color/Notes/Factor
- Unit
- Analysis in triangles
- Measurement type
- Measuring surface area

Description/Category/Work Item/Color/Notes/Factor

(See Measuring in Image Files/Types & Method of Measurement/<u>Object count</u> •).

Unit

The default area unit is m2 for metric system and sq ft for US systems. You may change units. (See Measuring in Image Files/Types & Method of Measurement/Object count (a).

Analysis in triangles

Check the 'Analysis in triangles' box if you wish the calculation and analysis of the surface area to be carried out using triangles only. If you leave it unchecked, then rectangular, trapezoid, triangular and curved shapes will be used for the analysis (See Measurement analysis).

If the area to be calculated includes curved parts then the analysis is always carried out by the second method, even if you check the 'Analysis in triangles' box.

Analysis using only triangles is useful for on site measurements. Calculations are performed using the Heron's formula:

$$T = \sqrt{\frac{(a+b+c)(-a+b+c)(a-b+c)(a+b-c)}{16}}$$

Measurement type

This region is disabled as the selection of area measurement type applies only in vector drawings

Measuring surface area

More:

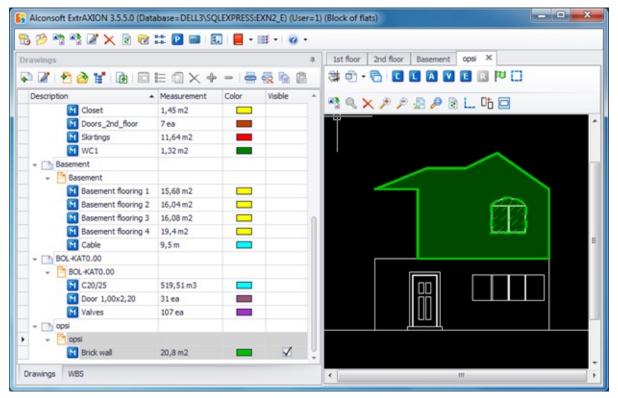
- On the drawing's level
- Sub-measurement
- Perpendicular to the drawing
- By counting objects

On the drawing's level

Select the option 'On the drawing's level' when you want to measure a surface area which is located on the same level with the one depicted in the drawing. In order to measure the desired surface, you have to draw it again by consecutively clicking on its perimeter's nodes.

During the measurement procedure, you can measure surface areas that are enclosed by curved lines by right-clicking and selecting 'Drawing arc' (See Measuring in image Files/Types & Methods of Measurement/Length Measurement/Measuring procedure).

Alternatively, you can use F10 to toggle a 'draw a curve' mode. If you want to calculate the total area of more than one surfaces in one measurement, press **Esc** once and then measure the next area, and so on (e.g. counting tiles in a WC and two bathrooms simultaneously). The measuring procedure can be completed by right-clicking and selecting 'Terminate Measurement,' or by pressing the **Esc** key twice. To continue the measurement, click the ***** 'Continue Measurement' button to add surface areas to the measurement, or ***** 'Continue Measurement (subtract)' if you wish subtract the area of already drawn surfaces (e.g. in the façade, by removing the surface area of the wall openings). The surfaces that you remove from the measurement are marked on the drawing with crosshatching, while the outline of the areas removed is marked with a dashed line.



In the case of counting items, after measurement completion, the **Continue Measurement (subtract)** option is disabled.

If you wish to subtract items, you can select them either one by one by clicking on them or all together, and then use the 'Delete selected' option.
 X.

The different types of measurements (on the drawing, perpendicular to the drawing, item counting) can be interchanged and combined (e.g. on the drawing and perpendicular to the drawing as in counting bathroom tiles), by using submeasurements (See <u>Drawings/Continue measurement</u>).

The CAD vector files (.dwg, .dxf, .dgn) provide additional abilities for measuring, in comparison to the image files (See Measuring in vector files (CAD)).

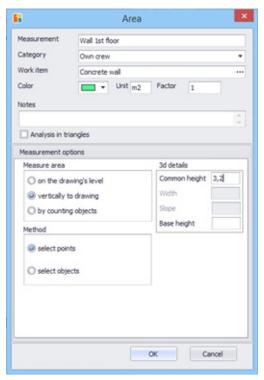
Sub-measurement

Whenever you chose to continue a measurement, either by addition or subtraction, a new sub-measurement is created. Each sub-measurement appears in the Measurement analysis window as an additional line (See Drawings/Measurement analysis).

Perpendicular to the drawing

Select the option 'Vertically to drawing' when you want to measure a surface which is perpendicular to the level depicted in the drawing.

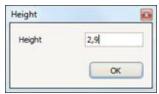
To measure surfaces that are perpendicular to the drawing, you are prompt to specify their height and their base height. If the surface height is uniform, enter its value in the 'common height' field, as illustrated, in the following window:



The base height does not affect the measurement result and it's not necessary to be defined. However it can help you to have a complete supervision of the drawing's measurements in 3D view. (See <u>3D View</u>)

Click **OK** and mark the surface you wish to measure by drawing the outline of its base.

If the height is variable, leave the common height field blank and click **OK**. Every time you click on the nodes of the surface you measure, the following window appears:



Specify the height of this particular point in the surface you measure.

This value will be the default value for each subsequent node in the measurement, so as not to require from the user to re-enter it —in case the additional height is equal to that of the previous node- while users have the ability to change it.

You can later change the height of a node, even if you have opted for a common height; you will alter only the value of a specific node. To do so, right click on any node of the measurement, choose 'Figure data' and edit the desired values in the table that is opened (See Measuring procedure/Figure data).

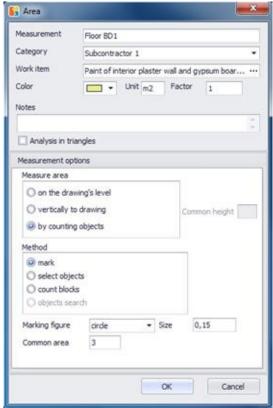
It is also possible to input a height at an intermediate node of the line. To do so, right click on the polyline and choose 'Add node', so that a new node is added (See Measuring in image files/Length measurement/Measuring procedure/Add node). After moving the node to the desired location, right click again and choose figure data, as described above.

By counting objects

Select 'By counting objects' if you wish to measure a surface based on counting items.

Mark

With this option you manually mark the desired objects on the drawing. If all items to be counted have the same area, fill in the value in the 'common area' field, as shown in the following window:



Click **OK** and select the objects by consecutively clicking on the drawing, where the objects you wish to measure are placed.

If the surface area of the objects is variable, leave the respective field blank and click **OK**.

Every time you click on an object whose surface area you wish to measure, the following window appears:



Specify the surface area of this particular object.

This value will be the default value for each subsequent object so the user does not have to re-enter it -in case the surface area is equal to that of the previous object- while users have the ability to change it.

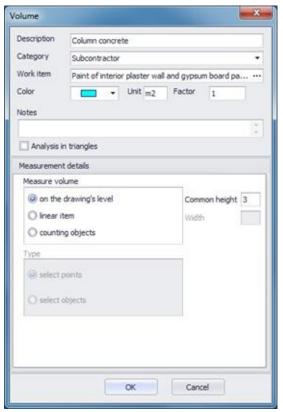
Objects search

(See <u>Measuring in image files/Types and method of measurement/Object count/Object search</u>)

Measuring volume ■

Using this button, you can measure the volume from a surface, a linear item, or objects on the drawing's level. Click the

■ button and the following window will appear:



More:

- Description/Category/Work item/Color/Notes/Factor
- Unit
- Analysis in triangles
- Measurement type
- $\ \square$ Measuring volume from

Description/Category/Work item/Color/Notes/Factor

(See Measuring in image Files/Types & Method of Measurement/<u>Object count XE "Item Counting"</u> C).

Unit

The default volume unit is m3 for metric system and cu ft for US systems. You can change the measurement unit (See Measuring in image Files/Types & Methods of Measurement/Object count (a).

Analysis in triangles

(Measuring in image files/Types and method of measurement/Measuring area/<u>Analysis in triangles</u>)

Measurement type

This region is disabled as the selection of volume measurement type applies only in vector drawings.

Measuring volume from

More:

- $\ lue{}$ A surface on the drawing's level
- Linear item
- By counting objects

A surface on the drawing's level

Select the option 'on the drawing's level' when you want to measure the volume from a surface which is located on the same level as the one depicted in the drawing.

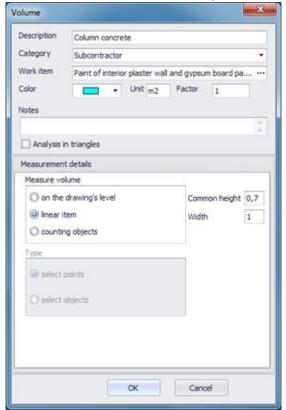
To measure the volume from a surface on the drawing's level, you have to fill in the 'common height' field. Once you specify the height, click **OK** and then draw the area you wish to measure by clicking consecutively on its nodes.(See Measuring in image Files/Types & Method of Measurement/Measuring area/Measuring surface area/On the drawing's level).

Puring a measurement, the different measuring methods (measuring volume from a surface on drawing's level, from a linear item, from counting objects) can interchange and combine.

Linear item

By selecting the option 'linear item', you can measure the volume from a linear item, as, for example, in the case you want to measure the volume of a trench in the perimeter of a plot, from a floor-plan view, in order to place rainwater drainage pipes.

To measure volume from a linear item, you will be prompted to fill in its width as well as its height in the corresponding fields; that is, if those characteristics are uniform throughout, as shown in the following window:

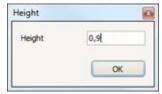


The 'width' may only be uniform and does not function the same way as the 'common height' field, which will be considered variable if you do not fill in a value. If you do not specify a width value, a warning message will appear.

Click **OK** and then click on the points of the linear item whose volume you wish to measure.

If the height of the linear items is variable, leave the corresponding field blank and click $\overline{\mathbf{OK}}$.

Every time you click on the points of the linear items whose volume you wish to measure, the following window appears:



Specify the height of this particular point of the linear item you are measuring.

This value will be the default value for each subsequent object so the user does not have to re-enter it -in case the surface area is equal to that of the previous object- while users have the ability to change it.

You can later change the height of a point, even if you have opted for a common height; you will alter only the value of a specific node. To do so, right click on any node of the measurement, choose 'Figure data' and edit the desired values in the table that is opened (See Measuring procedure/Figure data).

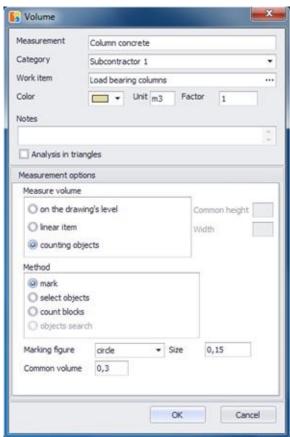
It is also possible to input a height at an intermediate node of the line. To do so, right click on the polyline and choose 'Add node', so that a new node is added (See Measuring in image files/Length measurement/Measuring procedure/Add node). After moving the node to the desired location, right click again and choose figure data, as described above.

By counting objects

Choose 'counting objects' if you wish to measure the volume based on objects. For example, you can measure the total volume of 5 decorative concrete globes if you know the volume of one of them.

Mark

With this option you manually mark the desired objects on the drawing. You can measure volume from items; if the volume of the items is common, you will be prompted to fill in the value in the corresponding field, as shown in the following window:



Click **OK** and select the objects by consecutively clicking on the drawing, where the items you wish to measure are placed.

If the volume of the items is not common, leave the corresponding field blank and click $\overline{\mathbf{OK}}$.

Every time you click on an item whose volume you wish to measure, the following window appears:



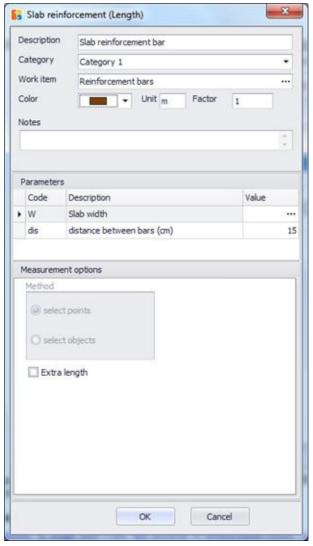
Specify the volume of the particular object you are measuring.

This value will be the default value for each subsequent object so the user does not have to re-enter it -in case the surface area is equal to that of the previous object- while users have the ability to change it.

Objects search

(See <u>Measuring in image files/Types and method of measurement/Object count/Object search</u>)

Using this button, you can make custom measurements you have set in the library (See General/Library/<u>Custom Measurements</u>). Click the button and a list of the available custom measurements of the library appears. By selecting one of them, the following window appears:



The 'Measurement details' region's exact form depends on whether the custom measurement is of object, length, area or volume type.

More:

- Description/Category /Color/Notes/Factor
- Work item
- Unit

Parameters

Description/Category /Color/Notes/Factor

(See Measurements in image files/Types and methods of measurement/<u>Object</u> <u>count</u> <u>C</u>)

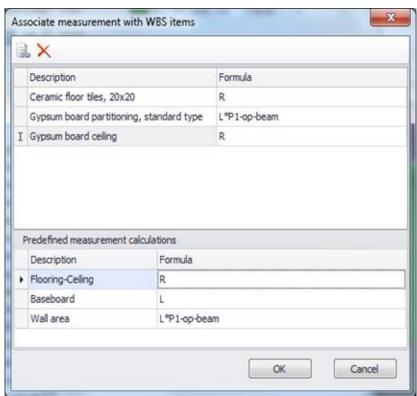
Work item

(See Measurements in image files/Types and methods of measurement/<u>Object</u> <u>count</u> <u>C</u>)

When linking the measurement with WBS work items, the formulas which were set in the region 'Predefined measurement calculations' of the 'Custom Measurement window' in the Library are also shown.

Enter for each of the WBS work items -to which the measurement will be linked- the formula you want.

Alternatively, when the cursor is at the formula field of the WBS item, you can automatically copy one of the predefined formulas by double-clicking on it.



Unit

The default unit of the primary measurement is automatically set, depending on the type of measurement you have set in the Library. It is possible to change the unit of measurement. (See Measurements in image files/Types and methods of measurement/Object count XE "Item Counting" (C)

Parameters

Here appear the parameters of the current custom measurement as they have been set them in the Library.

Enter for each parameter the values you want or leave the predefined ones.

The ... mark at the end of the value field signifies that the values of the parameters can be entered either by marking them on the drawing or by typing them in (See General/Library/Custom Measurements). During defining it on the drawing, you can form one or more line segments. When finished press ESC to add all these lengths and store the result in the parameter. The values of the rest of the parameters can be left with their default, or can be assigned a new value.

If you have created more than one sub-measurements, the value of its parameters can be different for each one (See <u>Drawings/Continue</u> <u>measurement</u>). You can edit these values separately for each sub-measurement (See <u>Drawings/Edit measurement</u>). In case the parameter can be defined on the drawing, instead of typing its new value, you can edit it by clicking on the ... sign and repeating the aforementioned procedure. Note that when doing so, you have to define all line segments from the beginning, as the previous value is not retained.

Parameters that are defined on the drawing are marked in a similar way to the dimension objects in a CAD program. You can modify them by dragging and dropping the nodes of the corresponding line segments. The value of the parameter and ultimately the measurement will be automatically renewed.

Initial settings

Every time you import a new vector file (CAD) into the project (Drawings/Add drawing), a message box appears which guides you through the initial settings you have to establish:

- Rotate the drawing, if needed
- Set the drawing scale, if other than 1:1
- Define the folders where the external references, if any, are located
- Set the origin, if you wish to copy measurements

You can find all these initial settings at the drawing's properties window (See Drawings/<u>Drawing properties XE "Drawing:Details"</u>

)

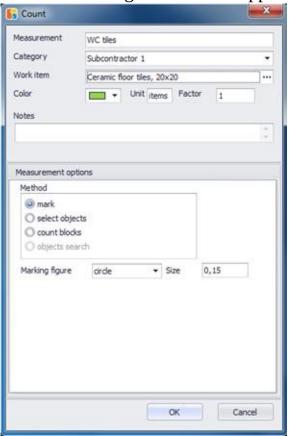
Types and method of measurement

- Object count
- Length measurement
- Measuring surface area
- Measuring volume
- Custom measurements

Object count

Using this button, you can count the objects included in the drawing. Counting objects in vector files (CAD) as opposed to image files may be done also by selecting objects or similar blocks.

Click the button and the following window will appear:



- Description/Category/Work Item/Color/Unit/Notes/Factor
- Measuring procedure

Description/Category/Work Item/Color/Unit/Notes/Factor

(See Measurements in image files/Types and methods of measurement/<u>Object</u> <u>count</u> <u>C</u>).

Measuring procedure

- Measurement by markingObject selection
- Counting blocks

Measurement by marking

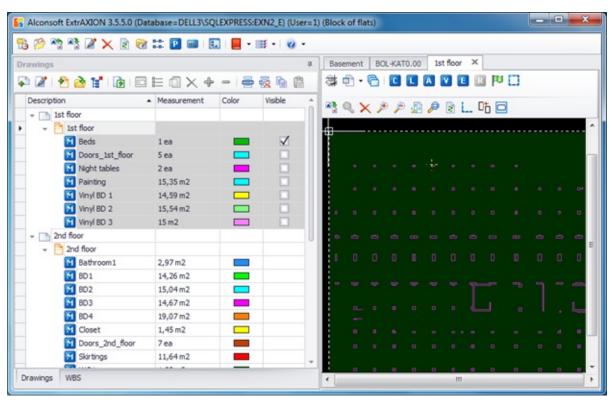
(See Measurements in image files/Types and methods of measurement/<u>Object</u> <u>count</u> <u>C</u>).

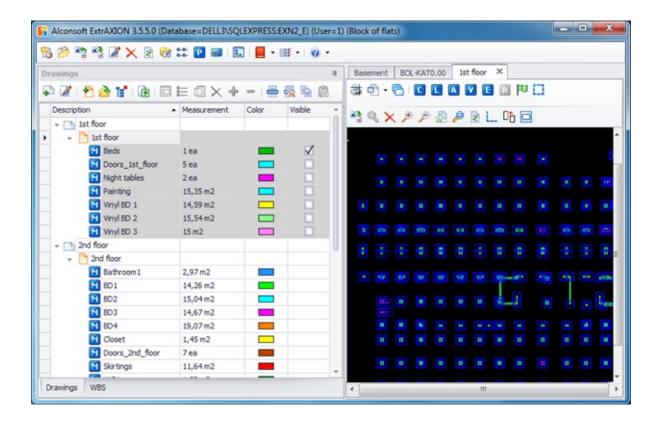
Object selection

By selecting objects on a drawing, you can measure objects which are CAD 'entities'.

On the drawing, mark the CAD objects you want to measure by clicking on any part of them. You can also select many objects simultaneously by following the same process that applies to CAD applications, e.g. by clicking on any part of the screen and dragging your cursor in such a way as to include in the marked surface the objects you wish to include in your measurement.

If you drag the cursor to the right, then the selection rectangular is blue and only objects that are fully included into it are selected. If dragging is to the left then the rectangular is green and even objects that partially intercept are selected.



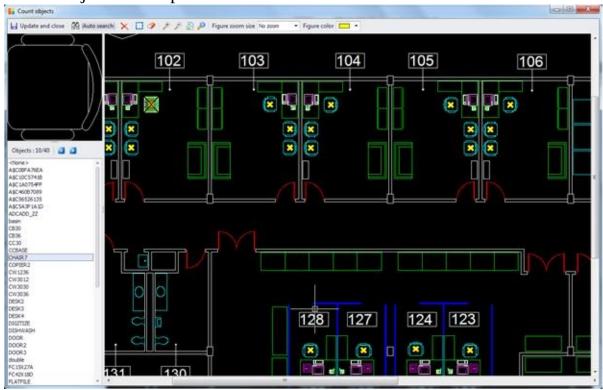


An object cannot be selected more than once on the same measurement. This way you can avoid selecting the same object twice, and consequently including it twice in your measurement.

By using the 'selecting objects' option, you can only measure standalone CAD entities, while you cannot select/mark objects that are within a block.

Counting blocks

With this option, you can count the number of similar blocks in the drawing. Select 'count blocks' as a measurement method, press **OK** and a new window 'Count objects' will open.



Block preview window

Selected blocks will be previewed in the upper left panel. Initially this window is empty.

Drawing window

On the right part of the screen you can move around the drawing and select blocks by clicking on them. When you select the instance of a block:

- The block will be displayed in the preview window.
- All instances of this block will be marked on the drawing, while the currently selected one will also be enclosed in a rectangle, marked with an X and zoomed in on.
- The name of the block will be highlighted in the list and the 'Objects' counter will show the number of all its instances.

Blocks belonging to invisible layers can't be measured, even if they are

included in the list. If you wish to count all the blocks you must, before measurement, make sure that all the layers of the drawing are checked as visible (See Drawing windows/<u>Drawing Layers XE "Layers"</u> (a).

You can change the markers' color in the window's taskbar if the one you selected when you started the measurement isn't discernible enough.

List of blocks

On the left side there is a list with the names of all the blocks in the drawing. Here you can choose a block if you know its name. You can also use the two arrows on the top to select the next or previous instance of the current block.

Processing Check the preview of a block with an obscure name to see what it corresponds to.

Taskbar

Update and close

With this button you store the counted blocks as the result of the measurement and then the window is closed.

Auto search

Enabled by default, this option triggers an automatic search for all the instances of a block, every time you choose one. You can turn it off by clicking on the button **Auto search.**

Search objects 🕮

This button is enabled when you turn off 'Auto search'. In this mode you have to manually press the button after you select an object in order to count its instances.

Delete selected X

If you select one or more markers that correspond to instances of the block you want to measure and press \times , they will be removed from the measurement. The change will also be reflected in the 'Objects' counter, which will be reduced accordingly.

We use this option to remove any unwanted instances, e.g. to delete the block instance located in the drawing's legend.

Define search region

This button lets you define a region where the search of blocks will be limited to. This region is marked with a red dashed line on the drawing. When you count blocks, any instances outside the search region will be excluded from the measurement.

• The search region will be automatically deleted if you click on a block outside its boundaries.

Blocks on the search region's edges are included in the measurement.

Clear search region 🧈

Press this button to delete the defined search region and count all the instances of a block in the drawing.

Zoom in 🥕

(See Auxiliary measuring tools/Zoom in)

Zoom Out 🥕

(See Auxiliary measuring tools/Zoom out)

Zoom Extents 🔊

(See <u>Auxiliary measuring tools/Zoom Extents</u>)

Zoom Window

(See <u>Auxiliary measuring tools/Zoom Window</u>)

Figure zoom size

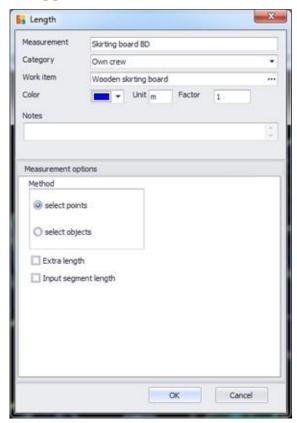
In large and complex drawings it is often difficult to discern the marked blocks. For this reason ExtrAXION automatically zooms in when you select a block instance. The 'Figure zoom size' option allows you to specify the appropriate zoom level. If you leave it at 'No zoom' the drawing will just be centered on the selected block.

Figure color

Choose the color of the markers used. (See <u>Measuring in image files/ Types and method of measurement/Object count/Color</u>).

Length measurement

Using this button, you can measure the length of a single straight line, a curve, a polyline, multiple single straight lines, curves or polylines on the drawing. Length measurement in vector files (CAD) as opposed to image files may also be done by selecting objects. Click the button and the following window will appear:



- Description/Category/Work Item/Color/Notes/Factor
- Unit
- Measuring procedure
- Extra length
- Input Segment length

Description/Category/Work Item/Color/Notes/Factor

(See Measurements in image files/Types and methods of measurement/<u>Object</u> <u>count</u> <u>C</u>).

Unit

(See Measurements in image files/Types and methods of measurement/Length Measurement).

Measuring procedure

- Selecting pointsObject selection

Selecting points

(See Measurements in image files/Types and methods of measurement/<u>Length</u> <u>Measurement</u>)

Object selection

By selecting objects on a drawing, you can measure the length of objects which are CAD 'entities'. To do that, use 'select objects' as type of measurement and click $\overline{\mathbf{OK}}$.

On the drawing, mark the CAD objects whose length you want to measure by clicking on any part of them.

Puring a measurement, every object can be selected only once. This way you can avoid selecting the same object twice, and consequently including it twice in your measurement.

By using the 'selecting objects' option, you can only measure standalone CAD entities, while you cannot select/mark objects that are within a block.

During length measurement through object selection, you cannot select and measure the length of entities that belong to a block.

Extra length

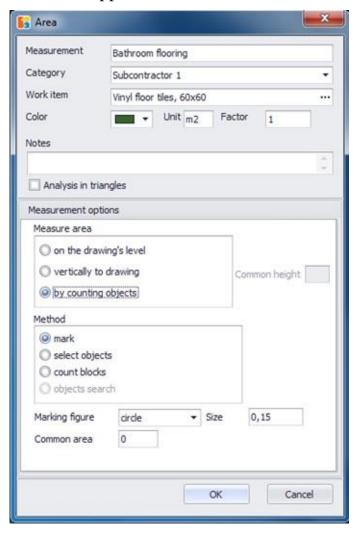
(See Measurements in image files/Types and methods of measurement/Length Measurement).

Input Segment length

(See Measurements in image files/Types and methods of measurement/Length Measurement).

Measuring surface area 🔼

Using this button, you can measure the area of a surface that is either perpendicular to or coplanar with the drawing, or by counting objects. Measuring a surface in vector files (CAD), as opposed to image files, can also be done by selecting objects or similar blocks. Click the button and the following window will appear:



- Description/Category/Work Item/Color/Notes/Factor
- Unit
- Analysis in triangles
- Measuring surface area

Description/Category/Work Item/Color/Notes/Factor

(See Measurements in image files/Types and methods of measurement/<u>Object</u> <u>count</u> <u>C</u>).

Unit

(See Measuring in Image Files/Types & Method of Measurement/Measuring area).

Analysis in triangles

(See Measuring in image files/Types and Measuring procedure/Measuring area/<u>Analysis in triangles</u>).

Measuring surface area

- On the drawing's levelPerpendicular to the drawing
- By counting objects

On the drawing's level

Selecting points

(See Measuring in Image Files/Types & Method of Measurement/Measuring a Surface Area/On the drawing's level).

Object selection

By selecting objects, you can measure the surface area of standalone CAD entities. To measure the surface area of CAD entities, select the 'By counting objects' method and click $\overline{\mathbf{OK}}$.

Then, select the CAD entities whose surface area you wish to measure, by clicking on them or by selecting all of them at once in such a way as to include the desired entities. This way, you can measure with just one click, for example, the volume of concrete in a plan view, allowing only the corresponding layer to be visible, by specifying the height and selecting all concrete walls and props at once.

By selecting objects, you can measure of CAD entities, while you cannot mark areas that are not objects.

Perpendicular to the drawing

Selecting points

(See Measuring in Image Files/Types & Method of Measurement/Measuring a Surface Area/Perpendicular to the drawing).

Object selection

(See Measuring in vector files/Types & Method of Measurement/Measuring a Surface Area/On the drawing's level/<u>Object selection</u>)

By counting objects

Measurement by marking

(See Measuring in Image Files/Types & Method of Measurement/Object count ...).

Object selection

(See Measuring in Vector Files/Measuring a Surface Area/On the drawing's level/<u>Object selection</u>)

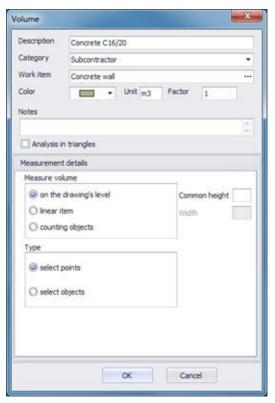
Count blocks

With this option, you can measure the surface area of similar blocks on the drawing.

Fill in the common area of each of the blocks you will count and then press **OK**. A new window, where you can count the blocks will be opened (See <u>Measuring in vector files/Object count/Counting blocks</u>).

Measuring volume ■

Using this button, you can measure volume from a surface on the drawing's level, from a linear item, or from a selection of items. Measuring in vector files (CAD), as opposed to measuring in image files, may be done by selecting objects or similar blocks. Click the button and the following window will appear:



- Description/Category/Work Item/Color/Notes/Factor
- Unit
- Analysis in triangles
- Measuring volume from

Description/Category/Work Item/Color/Notes/Factor

(See Measuring in Image Files/Types & Method of Measurement/<u>Object count</u> •).

Unit

(See Measuring in Image Files/Types & Method of Measurement/<u>Measuring</u> volume ✓).

Analysis in triangles

(See Measuring in image files/Types and Measuring procedure/Measuring area/<u>Analysis in triangles</u>).

Measuring volume from

More:

- $\hfill \square$ Surface area on the drawing's level
- Linear item
- Object selection

Surface area on the drawing's level

Selecting points

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/ A surface on the drawing's level).

Object selection

(See Measuring in Vector Files/Types & measuring procedure/Measuring a Surface Area/ On the drawing's level /<u>Object selection</u>)
(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/ <u>A surface on the drawing's level</u>).

Linear item

Selecting points

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/<u>Linear item</u>)

Object selection

(See Measuring in Vector Files/ Types & measuring procedure /Measuring a Surface Area/ On the drawing's level /<u>Object selection</u>)

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/<u>Linear item</u>)

Object selection

Measurement by marking

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume/By counting objects).

Object selection

By selecting objects, you can measure the volume of standalone CAD entities. You will be prompted to fill in the common volume of the objects you want to measure. If the objects' volume is not common, leave the field blank so that every time you select a CAD entity by clicking on it, you will be asked to enter its volume.

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume/By counting objects).

Identical blocks

(See Measuring in Vector Files/ Types & measuring procedure /Measuring Surface Area/By counting objects /<u>Count blocks</u>).

Using this button, you can make custom measurements you have set in the library (See General/Library/<u>Custom Measurements</u>). Click the button and a list of the available custom measurements of the library appears. By selecting one of them, the following window appears on your screen:



More:

 $\begin{tabular}{l} \blacksquare \ Description/Category/Color/Notes/Factor/Work \ item/Unit/Parameters \end{tabular}$

Description/Category/Color/Notes/Factor/Work item/Unit/Parameters

(See Measuring in Image Files/Types & Method of Measurement/<u>Custom</u> measurements.

Recording <a>B

The **Recording** button is activated during a measurement, and it is deactivated once the measurement is completed. By clicking the button while it is activated, you stop the measurement.

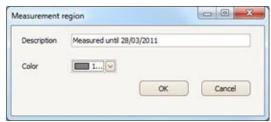
Annotations -

More:

- Draw measurement region
- Add note

Draw measurement region |**

Using this button, you can mark the areas of the drawing where the measurements have been completed. This option offers you the ability to better monitor the areas that have already been quantity surveyed. If you click the button, the following window will appear:



In the 'Description' field, enter the description of the measured area, e.g. 'OK up to 6/3/2011'. In the 'Color' field, you can change the default which is used to mark each measured area. Then, click **OK** and draw the area where all measurements are complete by consecutively clicking on its perimeter's nodes. To complete the marking procedure for the measured area, right-click or press the **Esc** key.

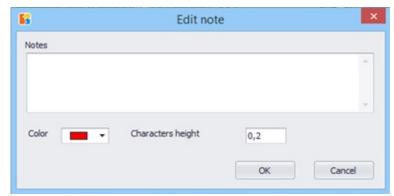
Once you have finished marking the measured area, you can modify it. By double clicking any part of the area, the 'Measurement Area' window appears and you can change both the description of the measured area and the color of the marking.

Furthermore, you may edit the marked area by changing the polyline shape (See Measurements in image files/Types and methods of measurement/Length Measurement).

By disabling and enabling the auxiliary layer, the marking of the measured area and the setting of the scale in image files hide and show, respectively.

Add note **S**

Using this button you can add notes on your drawing. If you click this button the following window will appear:



In the 'Notes' field, enter the note you want to add on the drawing, e.g. 'To be checked again'. In the 'Color' field, you can change the default which is used to write the note and in the 'Characters height' field you can change the default number in order to make the note apparent. Then, click **OK** and place the note on the drawing by clicking at the point you want it inserted. You can edit notes whenever you want. By right clicking on a note and selecting 'Edit note', the window 'Edit note' appears and you can change the description and characters' color and size.

Vsing the button 'Move selection' you can move the note or the notes you have added on the drawing after selecting them.

You can also delete one or more notes by selecting them while pressing **SHIFT** and clicking the 'Delete selected' button.

Define analysis region

Using this button you can draw a rectangular area on the drawing in order to define the measurements that will be included in the analysis of the current measurement sheet. Click and drag the cursor to define the region and click again to complete it. Analysis regions on the drawing are distinguished by a red dashed line.

You can define as many analysis regions as you wish. Each region will appear in a separate tab of the analysis window. If there is no analysis regions defined then the whole drawing is considered as one region.

Note that, for a measurement to be included in the analysis of a region, it must fully surrounded by the region's rectangle.

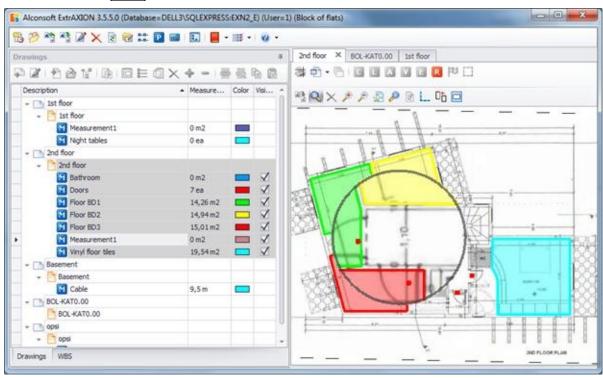
If a measurement is included in more than one analysis regions, it will be analyzed and appear in all of them.

You can resize an analysis region after its creation. Click on it to select and then drag the upper-left or the lower-right handle to change its size. Click again to complete the resizing.

You can delete a region at any time. Click on it to select and then click the 'Delete selected' × button.

Magnifier (Ctrl+M) /

Using this button, you can magnify a particular area of the drawing. Click the button with the magnifier icon or use the **Ctrl**+**M** shortcut each time you want to focus on a specific part of the drawing. The magnifier is disabled when you click on the next point of your measurement, or when you press the **Esc** button.



The magnifier button is enabled only during a measurement.

Delete selected ×

This button allows you to delete the selected lines, curves, or points that were created on the drawing during the measurements, without deleting the entire measurement (See Drawings/<u>Delete measurement</u> ×). Click on the drawing at any point of the measurement layer you wish to delete, and then click the 'Delete selected' button.

Deleting selected areas is accompanied by the update of the relevant measurements results in both 'Drawings' and 'WBS' tab tree views.

Besides measurements, you can also select and delete measurement regions and analysis regions.

Duplicate selection

You can copy one or more parts of the same or multiple measurements by selecting them on the drawing, pressing this button and moving them around. Moving is performed by defining the start and end point of a point of reference. These copies will then be automatically added to their respective measurements, the values of which will be increased.

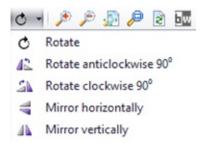
To select multiple items, press and hold **Shift** or use the selection rectangles, as in CAD software.

Move selection ⇒

Same as before (See <u>Auxiliary measuring tools/Duplicate selection</u>), but without creating copies or modifying measurements.

Rotation *

Having selected one or more parts of one or more measurements, you can rotate them using the options shown to the following drop down list.



More:

- Rotate
- Rotate anticlockwise 90°
- Rotate clockwise 90°
- Mirror horizontally
- Mirror vertically

Rotate o

You can rotate the selected measurement around a center of rotation you are asked to define on the drawing.

Rotate anticlockwise 90° 🕰

You can rotate the selected measurement 90° anticlockwise.

Rotate clockwise 90° 4

You can rotate the selected measurement 90° clockwise.

Mirror horizontally <

You can rotate the selected measurement around the horizontal axis.

Mirror vertically 4

You can rotate the selected measurement around the vertical axis.

In order to select more than one objects, you can select them one by one while pressing **SHIFT** or using rectangular selection frames like you do in a CAD program.

Zoom-in 🎤

Click this button to enlarge the drawing.

 \P You can also zoom-in by clicking on the part you want to enlarge and then rolling the mouse wheel forwards.

Zoom-out 🎤

Click this button to zoom out of the drawing.

 \P You can also zoom out by clicking on the part you want to reduce and then rolling the mouse wheel backwards.

Zoom extents 🔊

Click this button to fit the drawing to the dimensions of your screen. The drawing is moved and resized (using the appropriate zoom) so that the entire drawing appears on your screen as large as possible.

Zoom window 🔑

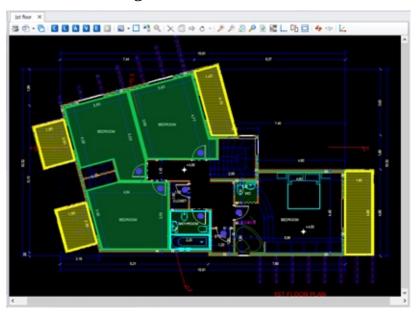
Press this button to zoom in a specific part of the drawing. Click on the drawing and define, by dragging, the desired part where you want to enlarge.

Refresh 🗟

Using this button, you can refresh the current drawing (redraw).

Black & White **!!!**

CAD Drawings usually have plenty of colors and the measurements may not be easily identified. Using this button you can convert the drawing into black & white with only the measurements' layers remaining colored. You can see the difference at the following windows:





The black & white view is possible only for vector drawings and not in image files.

Ortho (F8) ___

Using this button, you can move exclusively horizontally or vertically in the drawing. Alternatively, you can use the **F8** key.

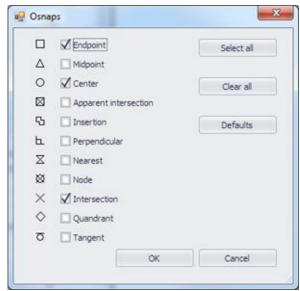


Object snap prevails over ortho.

Object snaps (Osnaps) ¹⁵

Using this button, you, can choose to activate object snapping. Set the points where you wish snapping to be possible.

The options are shown in the following window:



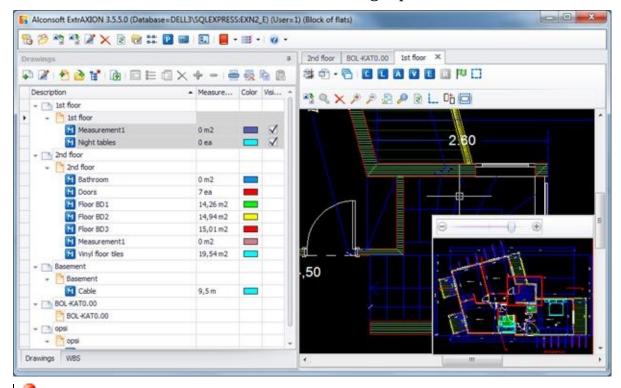
Click **Select all** in order to activate all snaps with one click, **Clear all** in order to disable all of them and **Defaults** in order to reinstate the factory presets.

You can enable, disable or change the osnap options as many times as you wish during a measurement.

If you modify any of the default osnap options, they are temporarily saved till you close the project you are working on. Note that these options apply only to the sheets of the current drawing.

Show zoom-and-pan window 🗖

Using this button you can activate or deactivate the zoom-and-pan window, so that is does or does not show in the lower right part of the screen.



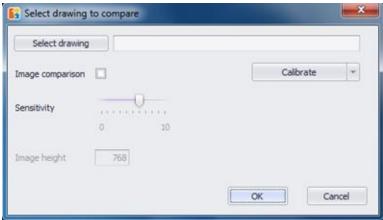
In the case of very large files, it is recommended to use alternative ways of zooming and panning, and not the zoom-and-pan window.

Having the zoom-and-pan window activated, you can pan the drawing by moving the red frame, which marks the part of the drawing that is visible in the right part of the screen. To zoom in or out, move the zoom indicator towards the + and - respectively.

Compare 4

You can compare different versions of a drawing and easily find what has been added, removed or modified.

By clicking on this button the drawing comparison starts and a new window is opened. After you have finished, press it again to exit the comparison mode.



More:

- Select drawing
- Image comparison
- Sensitivity
- Image height
- Calibrate
- Overlay

Select drawing

Choose a drawing from your computer to compare with the current one. You can perform comparisons between image files (.jpg, .png, .pdf) or between vector drawings (.dwg, .dxf) but you cannot mix them up.

Image comparison

This checkbox is activated only in vector drawings. When checked, the drawings will be converted to images and then the comparison will take place.

Sensitivity

This slider is activated when comparing image files or when you have checked 'Image comparison'. Adjust it to define how great a difference must be in order for it to be marked and displayed.

Try to decrease the sensitivity in order to ignore false positive differences, due to the slightly different scale or the image quality of the two drawings.

Image height

This field is activated when comparing image files or when you have checked 'Image comparison'. It is the height in pixels of the images when they get compared.

Calibrate

Click on the downwards arrow to view a drop down menu with the following actions:

More:

- Set rotation
- Set scale
- Set origin

Set rotation

Rotate the new drawing. (See <u>Drawings/Drawing properties/Rotation</u>)

Set scale

Type the scale, choose from a list of standard ones, or define it on the new drawing.

(See <u>Drawings/Drawing properties/Scale</u>)

■ In image files, defining the scale on the drawing isn't perfect in terms of accuracy. Thus the two drawings will most likely have a slightly different scale. If the comparison marks everything as being different, try to decrease the sensitivity or increase your accuracy with a higher zoom level when defining the scale.

Set origin

Define the (0,0) point of the new drawing. (See <u>Drawings/Drawing properties/Origin</u>)



In vector drawings you can use the Objects snaps to have perfect accuracy.

While setting the origin isn't generally required in vector drawings, unless it was changed by their author, in image files it will be most likely necessary.

Overlay

After you have selected and calibrated the second drawing, press **OK** and wait while ExtrAXION performs the comparison. Once the execution is completed, the two drawings are displayed overlaid.

- Grey items are identical in both drawings.
- Blue items are found only in the second drawing.
- Red items are found only in the first drawing.
- When an item is changed, then it is colored green.
- Changed items can be detected only in vector drawings.



To end the comparison and return to the original drawing press again. To view a more detailed comparison follow the next instructions.

Show drawing's versions comparison 🤏

This button is activated only when you compare two drawings. Press the button to open a new window, where you can move between the first drawing, the second and their overlay by clicking on the respective tabs.

(See Auxiliary measuring tools/Compare/Overlay)

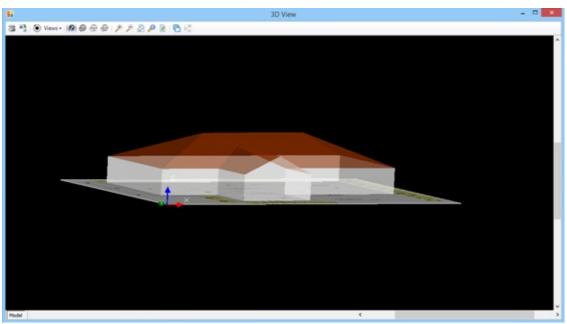
Show drawing's versions comparison

Overlay Original Modified

128 127 122 123 118 115 112 118 113 113 113 112 112 128 125 122 123 120 117 114

3D View 🔼

Using this button you can see the measurements of the drawing on 3D view. You can see perpendicular to the drawing area measurements and inclined area measurements and point out mistakes that are not visible on 2D view (e.g. wall height less than the roof's base height).



More:

- Plot (Ctrl+P)
- Export drawing
- Rotate 3D
- Views
- Render
- Shade on
- Hide
- Wire
- Zoom out
- Zoom in
- Zoom extents
- Zoom window
- Refresh
- Drawing Layers
- Black & White

Plot (Ctrl+P)

Using this button you can plot the drawing's 3D view (See Plot (Ctrl+P)

Export drawing 🥞

Using this button you can export the drawing's 3D view to several file types (See Export Drawing

Rotate 3D •

Using this button you can rotate the model/object. When you activate this button a circle appears on your screen and you can rotate the model/object pressing the left button of the mouse and moving it towards the direction you want.

Depending on where you place the cursor according to the circle, the rotation type changes as well as the cursor's shape. There are the two following cases:

- Placement of the cursor in the circle.
 - If you press the left button of the mouse while the cursor is in the area inside the circle and move the mouse keeping its left button pressed, you can rotate the model in three dimensions.
- Placement of the cursor out of the circle.

 If you press the left button of the mouse while the cursor is out of the circle and move the mouse keeping its left button pressed, you can rotate the model around the level that is defined by x, y axes.

Views

Clicking this button appear many preset viewpoint options, which you can see at the following window:



Top [□]: You can see the 3D model from the top.

Bottom²: You can see the 3D model from the bottom.

Left!: You can see the 3D model from the left.

Right¹: You can see the 3D model from the right.

Front ■: You can see the 3D model from the front.

Back !: You can see the 3D model from the back.

NE [™]: You can see the model from the Northeast direction.

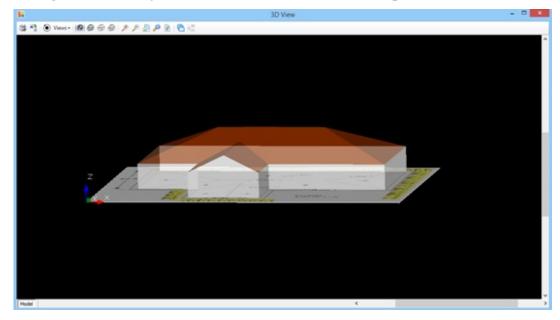
NW ♥ : You can see the model from the Northwest direction.

SE **V**: You can see the model from the Southeast direction.

SW ♥: You can see the model from the Southwest direction.

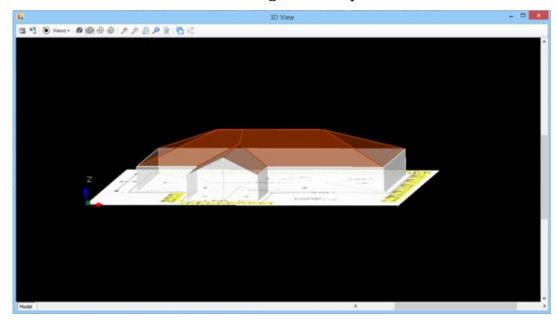
Render 🚳

Using this button you can see the model as a compact, colored solid.



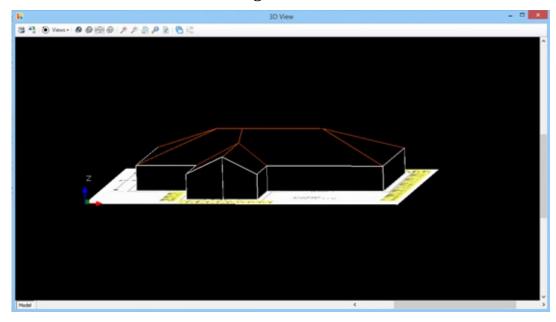
Shade on 🕮

This button has the same features with the previous one 'Render', with the difference that the model's edges are emphasized.



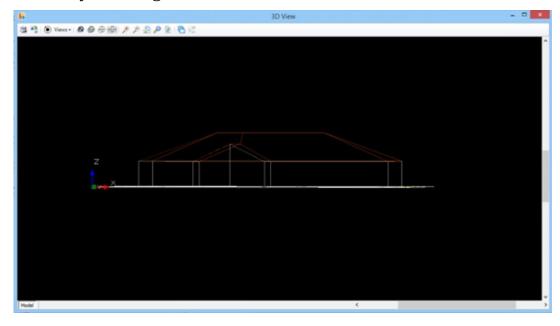
Hide @

Using this button you can view only the objects and the edges that are in the front and hide the ones being on the back of the model.



Wire @

Using this button you can depict 3D objects into transparent form and view only their edges.



Zoom out 🥕

See **Zoom-out**.

Zoom in 🥕

See **Zoom-in**.

Zoom extents 🔊

See **Zoom** extents.

Zoom window 🔑

See **Zoom window**.

Refresh 🗟

See Refresh.

Drawing Layers

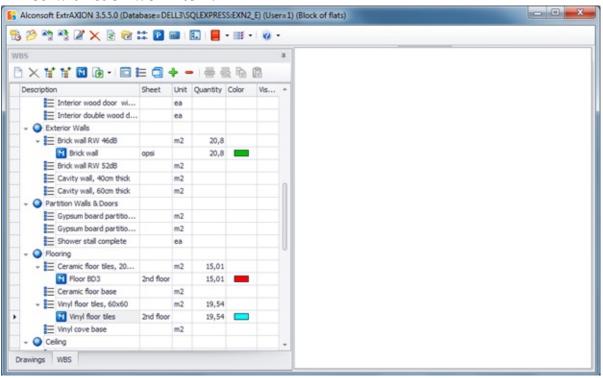
The layers which are visible by default in 3D view are defined by the 2D view. You can edit them on 3D view as well without however the changes being saved when you return to the 2D view. See Drawing Layers.

Black & White 🌆

See Black & White.

General

After opening an existing project, the 'Work Items' table appears, where you can view all of your project's work items as you entered them in the WBS (See General/WBS (Ctrl+B)), as well as the measurements you have linked with each work item.

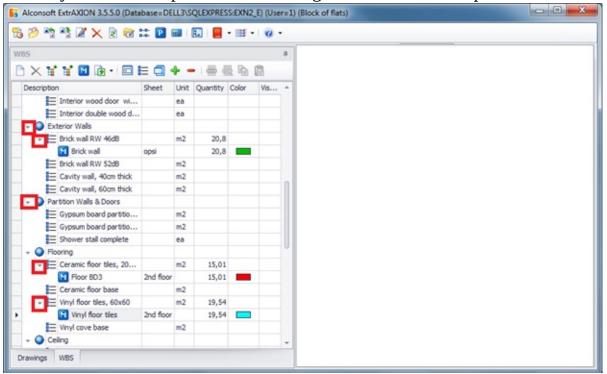


The 'Work Items' tree view table, by default, shows in columns the description of WBS work-items and measurements, the measurement sheets from which the measurements were derived, the measurement unit, the quantity, the color and the 'Visible' check box. Using the filtering, grouping, column selection, and sorting tools, you have many options of setting the number, the form, and the type of the data you wish to view (See Appendix/Filters/Sorting).

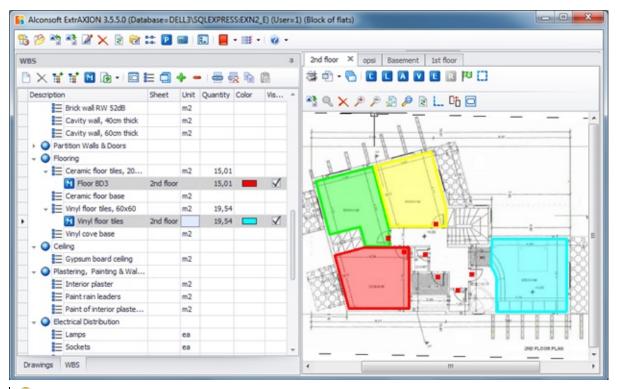
The quantity (result value) of a measurement in the 'WBS' tree view might be different of the quantity of the same measurement in the 'Drawings' tree view. This is due to the reason that in the 'Drawings' tab appear the quantities of the primary measurements, while in the 'WBS' tab appear the quantities that have been associated (linked) to each work item and might have been modified by an expression formula (See Measurement in image files/Types and method of measurement/<u>Work item</u>).

Only measurements that are checked as 'Visible' appear in the current drawing window. Click the 'Visible' check box of a measurement to change its status or double click on the measurement row to make it visible. Click on the header of the 'Drawing', 'Unit' and 'Quantity' fields etc. in order to sort the table's contents based on the above fields (See Appendix/Filters/Sorting).

By double-clicking on a work item that contains measurements, you can collapse or expand them. Alternatively, you can click on the 6 downward arrow symbol to collapse and on the 4 right-ward arrow to expand.

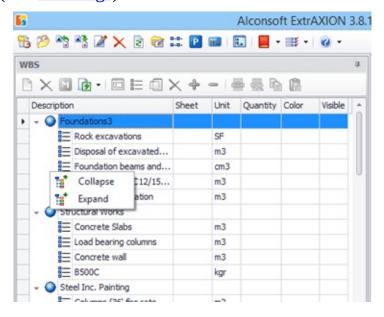


If a work item includes more than one measurement on the same drawing, e.g. ceramic floors, by double-clicking on one of its measurements, the corresponding drawing is opened, and all measurement layers that relate to this work item in this drawing are enabled.



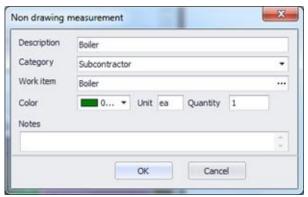
When you double click for the first time on a measurement of a measurement sheet that is either closed or open but not current, then only the measurements that are associated with the same work item appear in the drawing window. All other measurements remain invisible. This way, tracking of the areas that have not been measured yet, is greatly facilitated.

You can expand or collapse the 'WBS' tab tree view, by right clicking in the tab area. (See <u>Drawings</u>)



New non-drawing measurement

This button allows you to enter a measurement which either you do not want to measure on the drawing or cannot be measured on the drawing, but you wish to include it in the WBS quantities anyway. The following window will appear on your screen:



Set the 'Quantity', the 'Description', the 'Category', the 'Work Item', the 'Color', the 'Unit' and any notes you wish (See Measuring in Image Files/Types & Method of Measurement/Object count) and click **OK**.

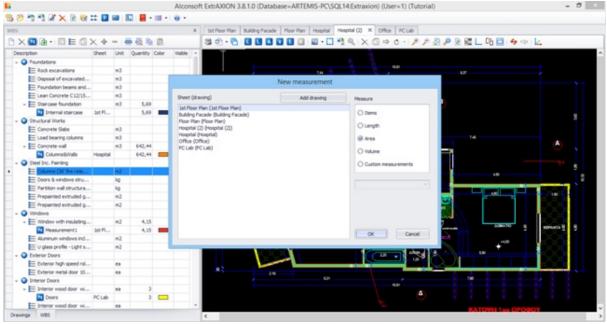
Since this measurement is not related to any drawing, it will not appear in the drawings tree view. Nevertheless it will be included in the list of measurement to export (See Work items/Exporting WBS/Export WBS measurements).

Delete non-drawing measurement ×

This button is enabled only when you have selected an existing non-drawing measurement, so that you can delete it. Select the measurement and click \times . The application will prompt you to confirm your selection.

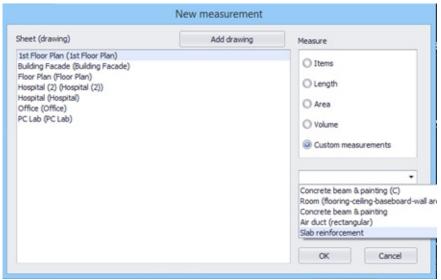
New measurement M

You can start a new measurement while viewing the WBS tab without even opening a drawing, using the ☑, ☑, ♠ and ☑ buttons. With the WBS workitem you wish to measure selected, click the 'New measurement' button ☑.



As you can see on the right, the measurement type is selected according to the measurement unit of the WBS work-item. On the left, select the measurement sheet you want from the list of sheets and click \overline{OK} .

You can add new drawings to the project directly from this window by clicking the 'Add drawing button'.



On the left side of the window that appears, select the measurement sheet you wish from the list of measurement sheets you have created and, on the right, the desired type of measurement, and click **OK**. For custom measurements, select a specific one from the drop down menu. The measurement sheet you have selected opens (if not already open) and the corresponding measurement window appears. When you start a measurement from a WBS work-item, the 'Work item' field in the measurement parameters window is pre-selected (See Measuring in Image Files/Types & Methods of Measurement/<u>Object count</u> **C**).

Each measurement sheet name in the list is followed by the name of the underlying drawing to facilitate its identification.

The
 button is disabled when you are at group level.

Exporting WBS

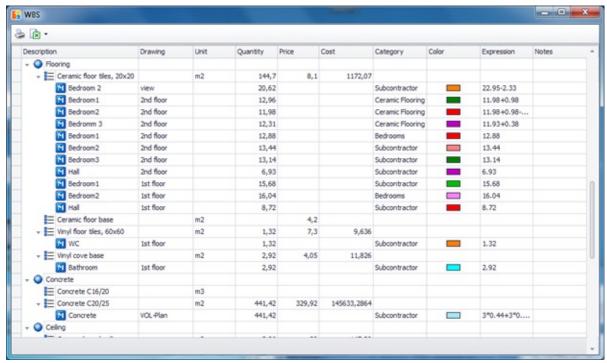
This button allows you to export work items and measurements to a table where you can make adjustments on their appearance e.g. hiding or moving columns etc. before you make the final export to an Excel table.

More:

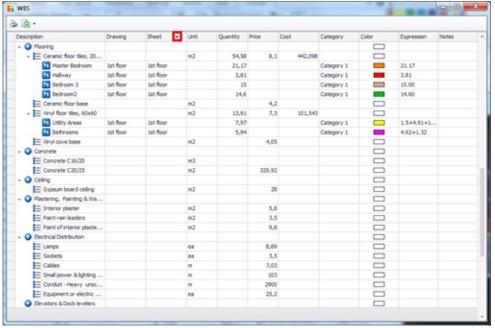
- Export WBS
- Export WBS measurements

Export WBS

The table shows all WBS and measurement details in the following columns: 'Description', 'Drawing', 'Sheet', 'Unit', 'Quantity', 'Unit Price', 'Cost', 'Category', 'Description', 'Color', 'Expression', 'Notes'. Using the advanced column selection and sorting tools, you have numerous options of setting the number, the form and the type of data you wish to view or to export (See Appendix/Filters/Sorting).



Click on the header of any column to sort the table contents based on the above-mentioned fields (See Appendix/Filters/Sorting).



You can also apply ascending or descending sorting by right-clicking on any of the columns and using the corresponding option from the popup menus. Finally, use the 'Column chooser' to add or remove columns from the default table (See Appendix/Filters/Sorting).

More:

Exporting to Excel

Exporting to Excel

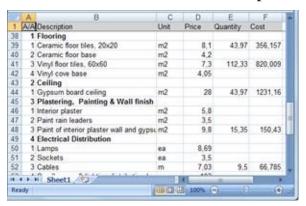
Click the button of the above table to save it as an .xls file. Specify the location and filename you wish to use. The application offers you many exporting options.

More:

- Exporting a WBS
- Export details
- Export summary
- Export work items

Exporting a WBS

By selecting 'Export WBS', a table which includes the groups and work items as you entered them in their respective locations (See General/WBS (Ctrl+B), the total quantity of each work item, and the cost is exported to Excel.

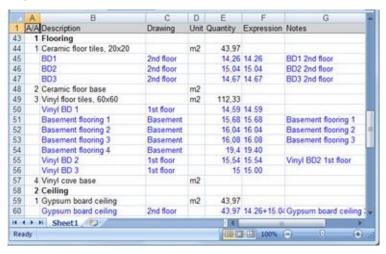


The data you export to Excel are predefined, regardless of which columns have been added or removed using the 'Column Chooser'.

If you wish to sort data according to a column's content, the exporting procedure will be performed based on the applied sorting.

Export details

By selecting 'Export details', you can export a table to Excel, with the measurements that are linked to each work item appearing below it, and the following measurement details: description, measurement sheet of origin, measurement unit, quantity (partial or total), numeric analysis of the result, and notes. The measurements and their details appear in the Excel table in blue font, in order to be easily visible.



The data you export to Excel are predefined, regardless of which columns have been added or removed using the 'Column Chooser.

If you wish to sort data according to a column's content, the exporting procedure will be performed based on the applied sorting.

Export summary

Exporting the quantity survey summary includes the description of groups and work items, the measurement unit and the total quantity that derives from the measurements.



The data you export to Excel are predefined, regardless of which columns have been added or removed using the 'Column Selector'.

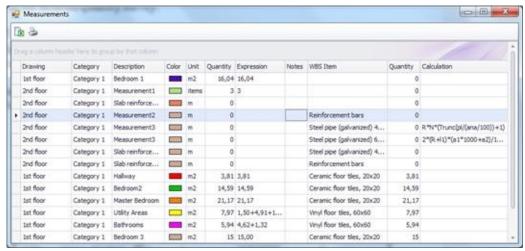
If you wish to sort data according to a column's content, the exporting procedure will be performed based on the applied sorting.

Export work items

By selecting the 'Export work items' option, you can export the work items table by applying any column choice or data sorting you wish. Basically, you export the table to Excel as viewed in the application (WYSIWYG). The measurements, along with their details, appear in blue font, as in the case of the detailed quantity survey.

Export WBS measurements

This table includes all the WBS work item details, along with their linked measurements and their details. This data appears in the following columns: 'Drawing', 'Sheet', 'Category', 'Description', 'Color', 'Unit, 'Quantity', 'Expression', 'Notes', 'Work item', 'Calculation'. Each measurement can be viewed more than once, depending on the number of the work items with which it is linked. For this reason, along with each work item appears the function that produces its quantity value.



Using the advanced column selection and sorting tools, you have numerous options of setting the number, the form and the type of data you wish to view or to export. (See Appendix/Filters/Sorting). Click on the header of any column to sort the table contents based on the above-mentioned fields (See Appendix/Filters/Sorting).

You can also apply ascending or descending sorting by right-clicking on any of the columns and using the respective option from the popup menus. Finally, use the 'Column Chooser' to add or remove columns from the default table (See Appendix/Filters/Sorting).

More:

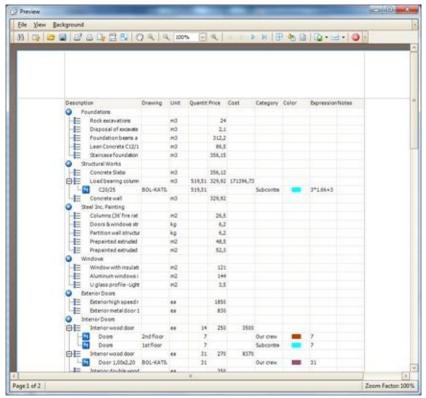
- Export to Excel
- Print

Export to Excel 🗟

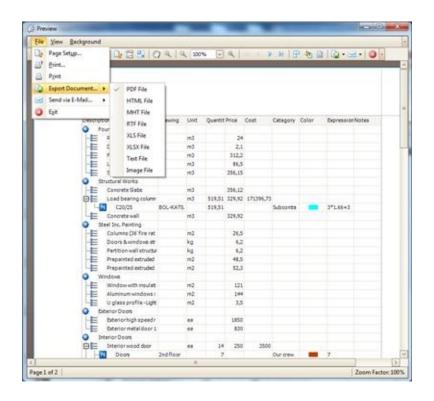
Click the button of the above table to save it as an .xls file. Input the location and the filename you wish to use.

Print 🌦

Click this button to print the work item table. Printing includes the table's details, as you have selected them to appear on the screen, e.g. any sorting or addition/removal of columns is preserved. Print preview appears on your screen.



You may print the table as it is or configure the page, the background, the margins and other printing preferences. You may also export the file in various formats (.pdf, .xls, .html, .rtf etc.) or even send a copy of the table directly by email.



Edit measurement

(See Drawings/<u>Edit measurement</u>).

Measurement analysis ≡

From the 'WBS' tab select a **work item** (not a measurement), press 'Measurement analysis 'and wait as a new window is opened. This window is similar to the one opened if you use 'Measurement analysis 'rom the 'Drawings' tab (See Drawings/Measurement analysis).

×													
Des	scription	Unit	Measuremen	Expression	Value	Formula	Parameters	R	L	A	Formula (no symbols)	* V	Vork item value
	Ceramic fl	m2			0			0	0	0			44,4
	+ 🚺 1st flo	m2	A	14,65+16,	32,2			32,2	38,19	32,2			32,
	Clo			1,50	1,5			1,5		1,5			1,
	*- Be			14,65	14,65			14,65		14,65			14,6
	Livi			16,05	16,05				16,62				16,0
	Stairs	m2	A	4,90	4,9	R*2,5		4,9	9,4	4,9	4,9*2,5		12,2
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T LEN	Expression 3,42+1,80+1,2	23+1,46 5)=1,10	5+1,10+3,96+3,6	Value 0 16,57 1,82						West			
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T LEN Tr1 Tr2 T3 P4	Expression 1 3,42+1,80+1,2 1 1/2*(1,46+1,8) 2 1/2*(1,85+1,8)	23+1,46 5)*1,10 6)*0,06	5+1,10+3,96+3,6	Value 0 16,57 1,82 0,11						7			

- However, there are a few new columns displayed, such as: The calculation **formula** column, which is empty unless one was created when you linked a measurement to the work item. There actually two columns; one where the variables are written as names and one where they are substituted by their values.
- The **parameter** column, where the parameters of a **custom measurement** are shown, if you created a formula containing them during linking the measurement to the work item.
- The **work item value** column, which displays the number shown in the 'WBS' tab under this work item. This is the result of the aforementioned formula, while the primary result of the measurement is the count, length, area or volume measured directly on the drawing. The latter, which is shown in the 'Drawings' tab, might be used in a formula in order to produce the value corresponding to a work item (See <u>Drawings</u>).

If you press 'Measurement analysis **=** while having selected a

measurement, you won't see this kind of window but a window like the one that appears if you press \sum from the 'Drawings' tab.

Duplicate measurement

(See Drawings/<u>Duplicate measurement</u> <u>1</u>).

Continue measurement +

(See Drawings/<u>Continue measurement</u> ♣).

Continue measurement (subtract) -

(See Drawings/<u>Continue measurement (subtract)</u> —).

Show all measurements =

(See Drawings/Show all measurements =).

Hide all measurements 🗟

Copy visible measurements 🗐

(See Drawings/Copy visible measurements •).

Paste measurements

(See Drawings/Paste measurements).

Measurement analysis

General

Measurements analysis is the procedure through which you can preview and print the analysis of selected measurements including dimensions marking and details of surfaces.

The selected measurements are printed on template sheets of various sizes (A3, A4 etc), in separate pages or all in one. Calculation expressions and results of the analysis are printed at designated parts of the template sheets. Analysis of surface area can be carried out using triangles only or using rectangular, trapezoid, triangular and curved shapes (See Measurement in image files/Measuring area/<u>Analysis in triangles</u>). Triangle calculations are performed using the Heron's formula:

$$T = \sqrt{\frac{(a+b+c)(-a+b+c)(a-b+c)(a+b-c)}{16}}$$
$$T = SQRT((a+b+c)*(-a+b+c)*(a+b-c)/16)$$

where a b c are the lengths of the triangle sides.

You can select and set various parameters which affect the template sheet appearance as, for example, colors, column widths and formulas (See General/Settings/Measurement analysis parameters).

Note, also, that measurement analysis can be done either overall in which case it includes all measurements, or selectively by defining analysis regions (See Auxiliary tools/Analysis regions).

More:

that is:

- Overall measurement analysis
- Measurement analysis by region

Overall measurement analysis

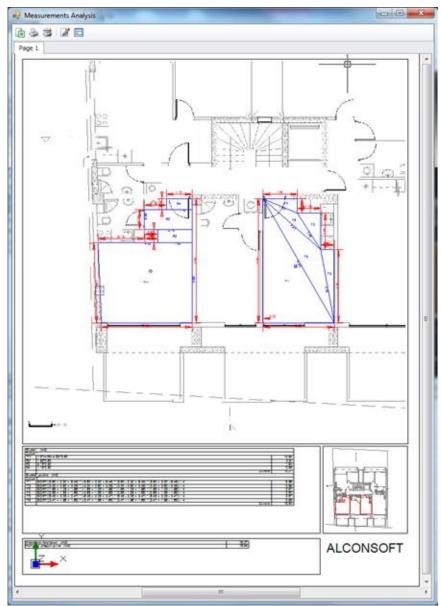
Click the 'Export measurements' button of the 'Drawings' tab. At the 'Measurements' window that appears click the 'Measurement analysis' button and, from the list of the templates provided by ALCONSOFT, select the one you wish to use for the analysis.

Using the filters you can limit the number of measurements to be included in the analysis (See Appendix/<u>Filters/Sorting</u>). Another way to "isolate" the measurements you want to be included in the analysis is to define one or more analysis regions (See Auxiliary measuring tools/

<u>Define analysis region</u>, in which case each region will be analyzed and printed in a separate page of the template sheet.

If there are no filters, all measurements will be analyzed.

When the analysis includes a high number of measurements with too many shapes, then it might be time consuming. Click the **Cancel** button if you wish to stop the procedure after the analysis of the current measurement is completed. You can preview and print the analysis of the pages that have been created before interrupting the analysis.



Zoom in using the mouse wheel for a clear view of each page.

Using Print and Plot buttons you can print the current page of the analysis. Plot prints the whole drawing while Print prints each page separately.

The appearance of the page depends on the selected template.

Work items associated with the measurements and their quantities are printed in the work breakdown structure (WBS) region. In the CALCULATIONS region the detailed numbers and expressions of every measurement part are presented.

The part of the drawing related to the measurement is printed in the IMAGE region while in the PLAN region there is a thumbnail of the whole drawing

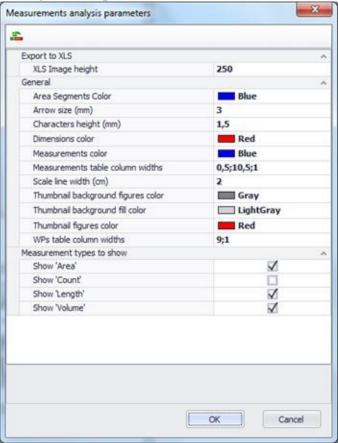
where the measurement position is marked with a sharp color. ALCONSOFT provides ready to use templates with various ways of organizing and positioning of the above regions. These templates have various sizes (A3, A4 etc) and orientations and new ones are frequently added. Templates are files located into the template subfolder of the application folder.

More:

- Template parameters
- Export to Excel
- Edit drawing

Template parameters

Using this button a window appears where you can set various parameters of the measurement analysis templates.



Select:

- the image height for the export to .xls file Select also the color you wish to be used for:
 - drawing area segments
 - drawing dimension lines and numbers
 - drawing measurements
 - thumbnail figures background
 - thumbnail background filling
 - drawing thumbnail figures

Select also or type:

- the arrow size in mm
- the characters height in mm
- the measurements table column widths in cm, separated by

semicolons (;)

- the scale line width in cm
- the WBS table columns widths

Finally you can select which measurement types you want to show on the analysis sheets. The default setting is to show all except object counting.

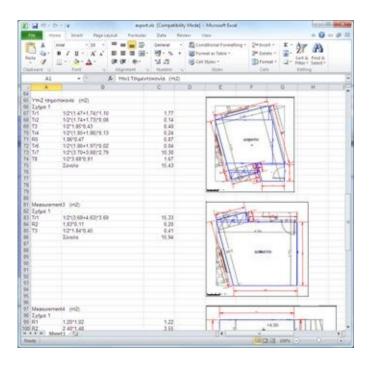
If you wish to exclude certain measurements irrespective of their type, you can simply make them invisible before you start the analysis procedure.

Setting the right values of the parameters results in better appearance of the analysis sheets. For example you can avoid character overlapping you can decrease their height.

If you click the 'Defaults' button all parameter values are set to their defaults irrespective of any changes you have made.

Export to Excel 🗟

Using this button you can export the data to .xls format file. Type the name of the new file and click 'Yes' to immediately open the file containing your data.



Edit drawing

Using this button a window appears where you can edit the drawing. In this window you can move the various parts of the drawing in order to achieve the best result

When the editing is complete click the Save and Close 🖥 button to see your changes on the main drawing and print it.

Note that the changes you make are not preserved if you repeat the analysis procedure.

Measurement analysis by region

If you do not wish the overall analysis of all measurements of the current measurement sheet, then you can define one or more analysis regions on the drawing (See Auxiliary measuring tools/

<u>Define analysis region</u>).

If you define more than one analysis region then each region is analyzed and printed in a separate page of the analysis sheet. You can preview these pages at the 'Measurement analysis' window which appears when you click the Measurement analysis button and select a template. You can navigate through the pages by clicking on their tabs. All other features of the overall measurement analysis such as exporting, printing, editing and parameter setting, apply to the measurement analysis by region as well.

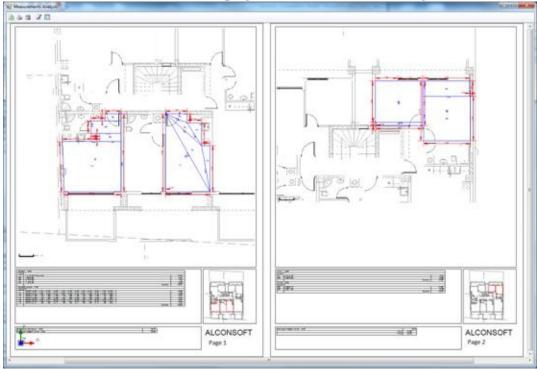
Note that, for a measurement to be included in the analysis of a region, it must fully surrounded by the region's rectangle. Furthermore, if a measurement is included in more than one analysis regions, it will be analyzed and appear in all of them.

More:

All pages

All pages

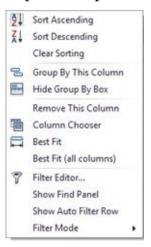
Click this button to show all pages on a common backgound.



Click again to show each page separately.

Filters/Sorting

All list display customization options are available by right-clicking on the header row and selecting the respective option from the pop-up menu.



More:

- Data Sorting
- Grouping
- Show/Hide/Best fit
- Show find panel
- Show Auto Filter Row
- Record filters

Data Sorting

Using the 'Ascending/Descending sorting' options you can sort the list whenever you wish, based on any column. Sorting is also done by clicking on the respective header. By selecting 'Clear sorting', the entries are sorted by their creation date.

Grouping

By selecting 'Group by this column', or by dragging the header to the Grouping Area (the row above headers), you group the list based on the corresponding column. By repeating this procedure with other columns, you can achieve multiple grouping with any desired combination sequence.

Show/Hide/Best fit

You can show or hide each one of the list's columns at your discretion. By selecting 'Remove This column' or by dragging the header downwards (a large X symbol appears) you can hide the selected column.

By selecting 'Column Chooser', a box that includes all hidden columns is shown in the lower right part of the list.

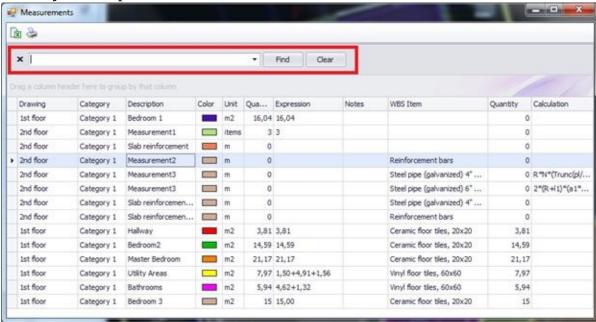


By dragging them from the list to the headers row, you can display them again.

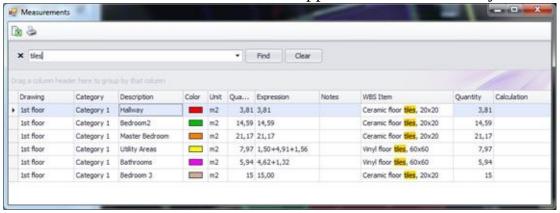
By selecting 'Best fit (all columns)' or 'Best fit', the width of all the columns or each column respectively, will be automatically and optimally set, based on the properties of the corresponding field.

Show find panel

Using the 'Show find panel', a frame appears on the top part of the table, where you can perform a search of the table's content.

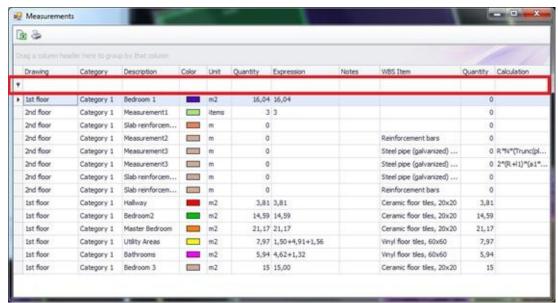


Enter the desired search description, and the table content is automatically narrowed to the search criteria, which appear marked in a bold yellow color.

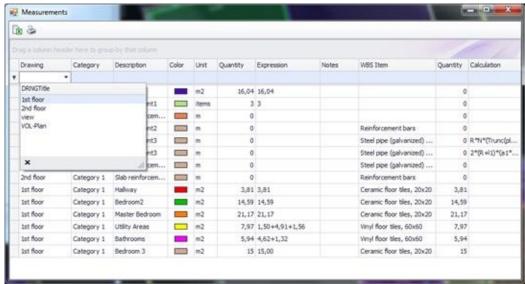


Show Auto Filter Row

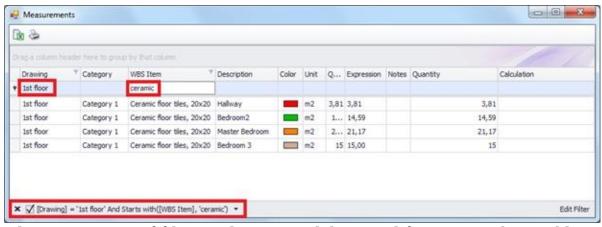
Using the 'Show Auto Filter Row' option, a special line with the ♥ (filter) symbol appears over the table's top row, on the left.



In each of the columns, select or type in the desired filter criteria, in order to filter the table content.



The criteria you set appear in the automatic filter line, as well as at the bottom of the table.



Alternative ways of filter application and their modification are thoroughly described in the following pages.

Record filters

More:

- Quick data filter
- \square Filter editor
- Changing column width and position

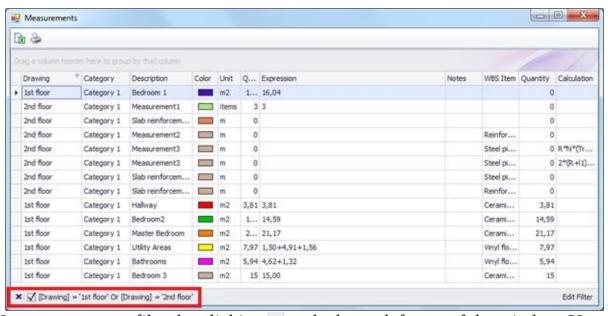
Quick data filter

You can display a subset of the entries in a list by clicking on the (filter) symbol that appears when you hover your cursor over a column header. This action displays a list, in which you can either quickly select an item depending on the field type, or select 'Custom' to set a more complex filter.

Click on the 'Custom' option in each column to apply a more complex filter to the table contents. Filters work either integrally or disjunctively. The criteria may be either both true ('and') or one of them true ('or').

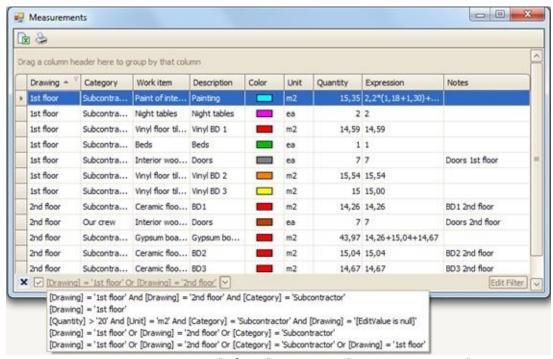


The criteria used appear in the lower left part of the screen.

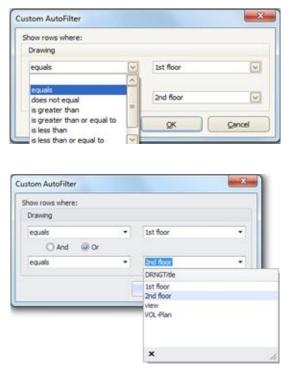


You can remove a filter by clicking \square at the lower left part of the window. You can also temporarily disable the filter by clicking \square on the right. By clicking \square again, you can re-enable it.

The filters you apply are stored until you exit the application. You may recall any of them by clicking the right arrow key and selecting from the list (drop down menu).

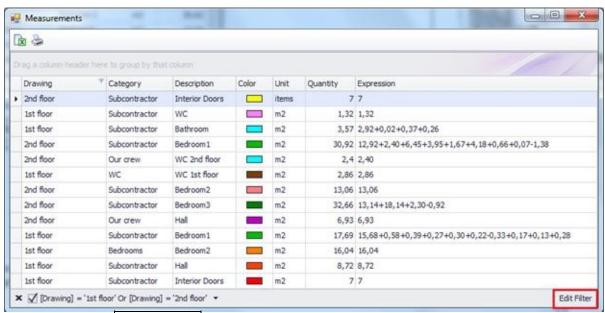


You can create criteria using predefined types such as 'is greater than', 'is greater than or equal to', 'is less than', 'blanks' etc.



Filter editor

Using the Filter editor at the lower right part of the window or in the shortcut menu, you can create a filter that only displays the entries that comply with predefined criteria.



By clicking the **Edit Filter** button, a new window, called 'Filter editor,' appears on the screen.

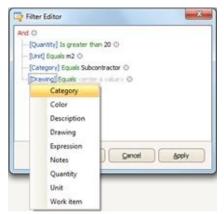


By selecting + you can 'add a new condition to this group' and you have the ability to create multiple combinations between the data in the table's columns. Each criterion consists of **one field**, **one factor** (e.g. contains, is equal to, etc.) and **one value**, which should be entered or selected from a list. You can add as many criteria as you wish, which are combined together with (and) or (or / either). Once you create the filter, click **OK** or **Apply** and the list will display only the entries that comply with the filter's criteria.

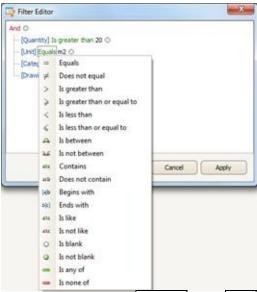
The initial filter you apply may include or exclude the subsequent options.



Then, select the field on which the filter you wish to create will be based.



The factors of comparison change depending on the field you select (details, quantity survey, category, Unit, description, items, etc.).



Apply the filters you wish and then click **Apply** and **OK**.



Changing column width and position

You can change the width of each column by clicking and dragging with your cursor the separation lines between two field headers, to the left or to the right. You may also change the fields' order by selecting the header of any column you wish to move and dragging it to a new place.

Special Software Requirements

In order to run ExtrAXION, Microsoft.net Framework 3.5 needs to be installed.

Functions

More:

- ABS
- ACOS
- ASIN
- ATAN
- ATAN2
- **CEILING**
- **COSH**
- \square EXP
- FACT
- FLOOR
- PI
- ROUND
- SIGN
- SIN
- SINH
- SQRT
- **TRUNC**

ABS

Returns the absolute value of a number, a number without its sign.

Syntax

ABS(number)

Number is the true number whose absolute value you need.

ACOS

Returns the arccosine of a number, the angle whose cosine is this number. The angle is in radians, in the range from 0 to pi.

Syntax

ACOS(number)

Number is the cosine of the desired angle, and must be a number between -1 and 1.

ASIN

Returns the arcsine of a number, the angle whose sine is this number. The angle is in radians, in the range -pi/2 to pi/2.

Syntax

ASIN(number)

Number is the sine of the desired angle, and must be a number between -1 and 1.

Comments

In order to express the arcsine in degrees, you have to multiply the result by 180/pi(), or use the DEGREES function.

ATAN

Returns the arctangent of a number, the angle whose sine is this number. The angle is in radians, in the range –pi/2 to pi/2.

Syntax

ATAN(number)

Number is the tangent of the desired angle

Comment

In order to express the arctangent in degrees, you have to multiply the result by 180/pi(), or use the DEGREES function.

ATAN2

Returns the arctangent of the specified x and y coordinates (the angle of a line that crosses the origin (0,0) and a point with x_num , y_num coordinates). The angle is in radians, in the range -pi to pi, excluding the value -pi.

Syntax

ATAN2(x_num;y_num)

X_num is the point's x coordinate.

Y_num is the point's y coordinate.

Comment

A positive result signifies a counterclockwise angle with the x axis, while a negative result signifies a clockwise angle.

ATAN2(a;b) equals ATAN(b/a), but in the ATAN2 function, a can be equal to 0.

If the x_num and y_num values are 0, the ATAN2 function returns the error value #DIV /0!.

In order to express the arctangent in degrees, you have to multiply the result by 180/pi(), or use the DEGREES function.

CEILING

Rounds the number up, to the nearest integer or to the nearest multiple of significance. For example, if you wish to use cents in your transactions, and the price of an item is 9\$ 36 cents, use the =CEILING(936; 10) to round the prices to the next dime.

Syntax

CEILING(number, significance)

Number is the value you wish to round.

Significance is the multiple based on which you wish the rounding to be performed. **Comment**

If one of the entries is not numeral, the CEILING function returns the error value #VALUE!.

Regardless of the number's sign, a value is rounded up when it is adjusted away from zero. If the number is an exact multiple of the Significance entry, then the value is not rounded.

If the entries Number and Significance have different signs, the CEILING function returns the error value #NUM!.

COS

Returns the cosine of the given angle.

Syntax

COS(number)

Number is the angle (in radians) whose cosine you desire.

Comment

If the angle is in degrees, you have to multiply the result by pi()/180, or use the RADIANS function, in order to convert it to radians.

Example

The example will be easier, if you copy it to an empty worksheet.

COSH

Returns the hyperbolic cosine of the given angle.

Syntax

COSH(number)

Number is any real number, whose hyperbolic cosine you need.

Comment

The hyperbolic cosine definition is:

$$COSH(z) = \frac{e^z + e^{-z}}{2}$$

EXP

Returns e raised to the power of a given number. The constant 'e' is equal to 2,71828182845904 and constitutes the basis of the natural logarithm.

Syntax

EXP(number)

Number is the exponent that is applied to the base e.

Comment

In order to calculate the powers of other bases, use the factor of raising to a power ($^{\land}$).

The EXP function is the reverse of the LN function, a number's natural logarithm.

FACT

Returns the factorial of a number, equal to 1*2*3*...*number.

Syntax

FACT(number)

Number is the non-negative number whose factorial you wish to calculate. If the entry Number is not an integer, the decimal digits are cut off

FLOOR

Rounds a number down, to the nearest specified multiple of significance.

Syntax

FLOOR(number;significance)

Number is the numeral value you wish to round.

Significance the multiple based on which you wish the rounding to be performed.

Comment

If either of the entries is non-numeral, the FLOOR function returns the error value #VALUE!.

If the entries Number and Significance have different signs, the FLOOR function returns the error value #NUM!.

Regardless of the number's sign, a value is rounded down when it is adjusted away from zero. If the entry Number is an exact multiple of the entry Significance, then the value is not rounded.

LOG

Returns the logarithm of a number to the base you specify.

Syntax

LOG(number;base)

Number is the positive real number whose logarithm you desire. Base is the logarithm's base. If the entry Base is skipped, it is considered to be equal to 10.

PΙ

Returns the number 3,14159265358979, the mathematical constant pi, with 15 decimal digits precision.

Syntax PI()

ROUND

Rounds a number to the specified number of digits.

Syntax

$ROUND (number; num_digits)$

Number is the number you wish to round.

Num_digits specifies the number of digits to which you want to round the number. **Comment**

If the entry num_digits is greater than zero, then the number is rounded to the specified number of decimal digits.

If the entry num_digits is 0, then the number is rounded to the nearest integer.

If the entry num_digits is lower than zero, the the number is rounded to the specified number of decimal digits, to the left of the decimal point.

SIGN

Returns the sign of a number. It returns the value 1 if the number is positive, 0 if it is 0, and -1 if it is negative.

Syntax

SIGN(number)

Number is any real number.

SIN

Returns the sine of a desired angle.

Syntax

SIN(number)

Number is the angle whose sine you desire, expressed in radians.

Comment

If the angle is in degrees, you have to multiply the result by pi()/180, or use the RADIANS function, in order to convert it to radians.

SINH

Returns the hyperbolic sine of the given angle.

Syntax

SINH(number)

Number is any real number.

Comment

The hyperbolic sine definition is: $SINH(z) = \frac{e^{z^{2}} - e^{-z^{2}}}{2}$

$$SINH(z) = \frac{e^{z} - e^{-z}}{2}$$

SQRT

Returns the square root of a number.

Syntax

SQRT(number)

Number is the number whose square root you desire

Comment

If the entry Number is a negative number, the SQRT function returns the error value #NUM!.

TRUNC

Truncates a number to an integer by removing the decimal (or fractional) part of the number.

Syntax

TRUNC(number;num_digits)

Number is the number whose decimal digits you wish to truncate. Num_digits is the number of decimal digits that remain after the truncation. The default value of the entry num_digits is 0 (zero).

Comment

The TRUNC and INT functions are similar, as both return an integer. The TRUNC function removes the decimal part of a number, while the INT function rounds the number down, to the closest integer, based on the number's decimal part. The INT function is different from the TRUNC function only in the handling of negative numbers: The formula TRUNC(-4,3) returns the value -4, while the formula INT(-4,3) returns the value -5, because -5 is the nearest downward integer.

SQL Server Installation

If you want to store your projects on an SQL Server database you should have access to an SQL Server instance with mixed mode authentication. If not, you must install it first. For example the **SLQ Server 2008 R2 Express** version can be downloaded for free from Microsoft's website: www.microsoft.com/en-us/download/details.aspx?id=30438

• For 64 bit systems select the 1st file:

SQLEXPR_x64_ENU.exe

122.4 MB

• For 32 bit systems select the 3rd file:

SQLEXPR32_x86_ENU.exe

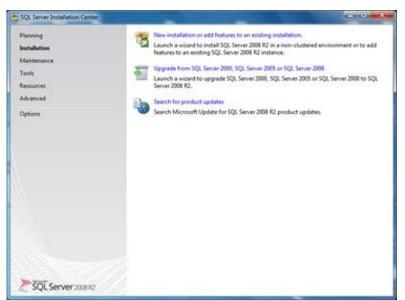
97.4 MB

- 1. If you do have a server within your organization it is recommended that you do the SQL Server installation on the server, so that the database of the measurements is centralized.
- 2. If you do not have a server or if you want to work at your laptop without connecting to the server then install the SQL server at your PC.

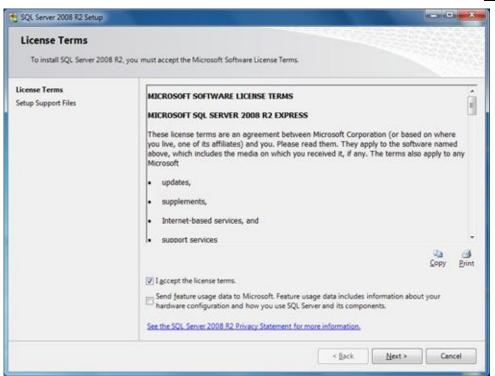
Save on your hard disc the SQL Server's setup file and run it to start the installation.



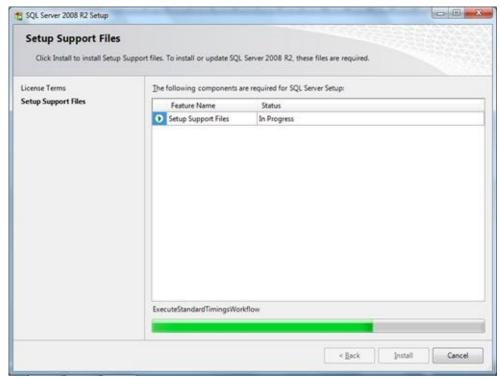
After the folder extraction is completed, the window of 'SQL Server Installation Center' shows up. Select 'New installation or add features to an existing installation' in order to launch the installation wizard.



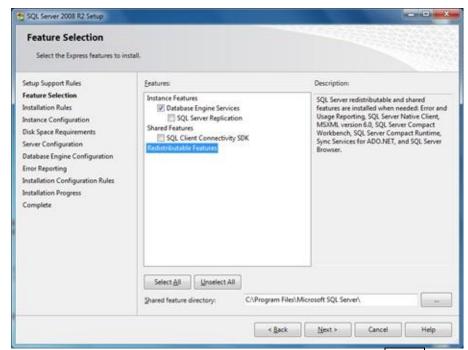
Read the License Terms for MICROSOFT SQL SERVER 2008 R2 EXPRESS and check the box 'I accept the license terms'. Then click **Next**.



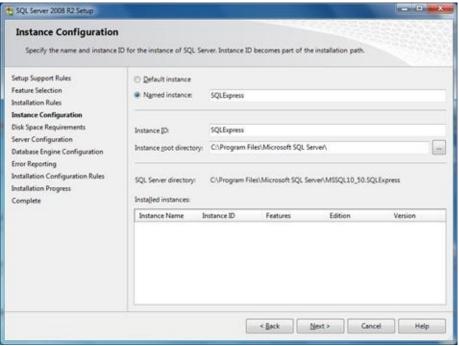
The Setup begins automatically and the SQL Server's Setup Support Files are being installed.



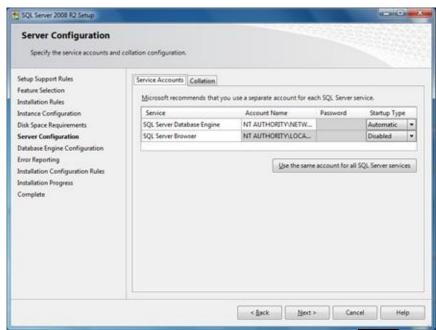
After the installation of these files is completed the following window shows up:



Check only the 'Database Engine Services' box and click **Next**.

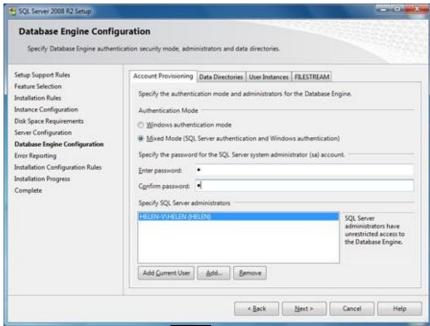


In the above window you can choose the name and the ID for the instance of SQL Server. Select 'Named instance' and notice that the default name is SQLExpress. In case you choose a different name it is essential to remember it because it becomes a part of the Server name that will be used in ExtrAXION. Click **Next**.

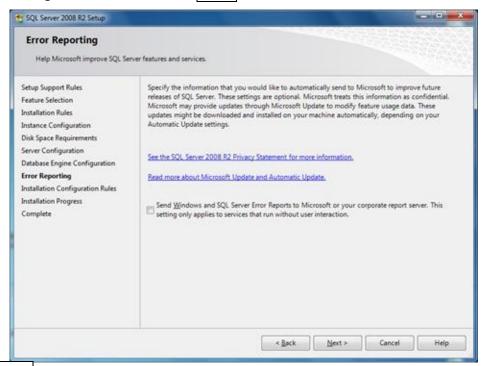


In the 'Server Configuration' window that appears click **Next**. Then in the 'Database Engine Configuration' window, select 'Mixed mode (SQL Server authentication and Windows authentication)' and as a password

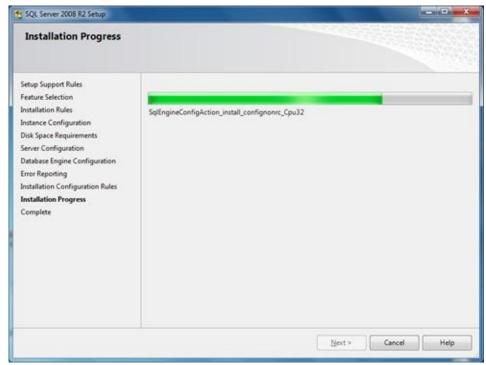
for user **sa** enter the number **7**.



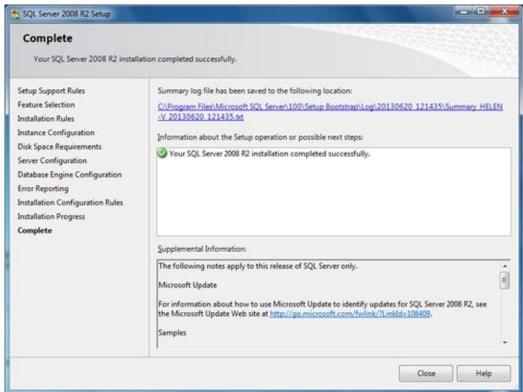
Confirm the password and click **Next**.



Click **Next** to continue to the 'Installation Progress'.



After the installation is completed successfully, the following window appears:



Click **Close** to exit the wizard and now you are ready to run ExtrAXION with access to SQL Server.

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Γιώργος Κιόρτσης, ALCONSOFT (George Kiortsis)
ExtrAXION_manual_EN_V38-11-template.dot Dell3XPSec 2 4
2015-06-09T07:31:00Z 2015-06-09T07:33:00Z 2015-0609T07:33:00Z 2 29725 160519 1337 379 189865 11.9999 1024x768
false false

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ExtrAXION

User manual

Description: sima

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User manual

1 About this manual

1.1 Manual symbols XE "Symbols" - conventions

•	Paragraphs beginning with the icons	 ,
	,	and
	relate to the followi	ng items respectively:
	Comment, Idea-Trick, Caution and Reminder	
•	• Whenever the use of a specific key is required, in	ts symbol will appear in
	a framed grey background, e.g. use of the 'Caps' le	ock key appears as:
	Caps Lock	
•	 Activation of certain buttons by clicking on then 	n is apparent in the
	button's image, e.g.	symbolizes the 'New
	project' button and Cancel symbolizes the cancel	button.
•	• Anything that needs to be typed appears in hold	o a Type

- Anything that needs to be typed appears in bold, e.g. **Type**
- The functions described in the present manual concern the Professional version. Some of the following features do not exist or are disabled in the Standard version. For more information, you can refer to the comparative table of the program versions on our website www.alconsoft.com.

2 Product Activation XE "Activation"

At the first run of ExtrAXION the program asks you for activation.

2.1 Activation of trial version XE "Activation:Trial"

If you have not already	purchased ExtrAXION y	ou can choose the	e trial version.
	e password that you have		
ALCONSOFT's site (w	<u>vww.alconsoft.com</u>) and t	hen click Contin	<u>ue</u> .
The trial activation is a	ampleted and navy view arm	o abla ta waa tha r	wagum fan 70
days. Click OK and try	ompleted and now you ary ExtrAXION.	e able to use the p	orogram for 30

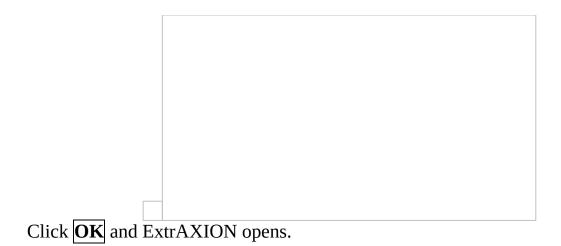
2.2 Activation of full license version XE "Activation: full license"

If you have purchased ExtrAXION select the option Activate on line and press **On-line activation**.

On-line activation	<u> </u>	
The following wi	ndow shows up and you have to enter the Serial	_ number (S/N)
	at ALCONSOFT has provided you with. Afterwa	
]
	-	
	If you do not have a S/N for your r	roduct places
contact ALCON	If you do not have a S/N for your p SOFT or its authorized distributors via email to	-

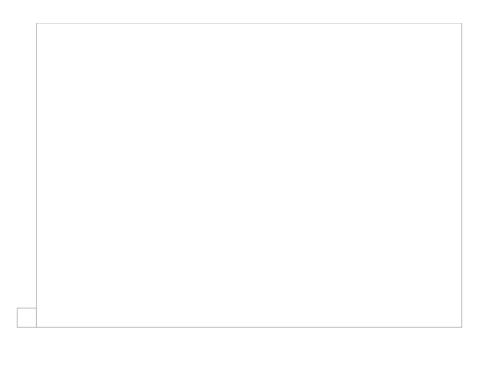
2.3 Off-line activation steps XE "Activation: Off-line"

1. Run LM shortcut which is located in ExtrAXION folder.
You will see a window like the following:
2. Copy and paste the machine Id shown and send it via email to ALCONSOF
info@alconsoft.com. ALCONSOFT will reply to you with a unique key.
3. Paste the key provided for each pc in the appropriate area
4. Press Activate button
When the activation progress is completed you can see on your screen the
following message:



3 General - Main Toolbar

By double-clicking the ExtrAXION following window appears:	icon, the application starts and the
Enter the user name and password and c 08D0C9EA79F9BACE118C8200AA00	elick Login (see Settings/ <u>Users</u> 4BA90B02000000080000000E0000005F
).	
The number 1 is the default value password.	for both the user name and the
In case you are not using SQL Server, the screen:	ne following window appears on your

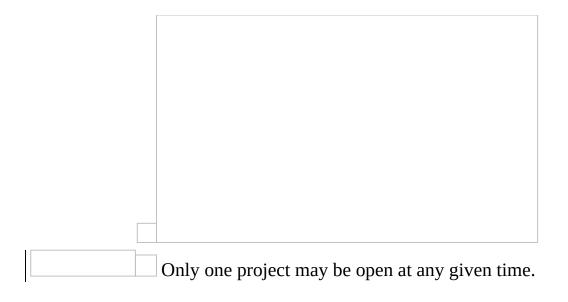


Click the 'New Project' or 'Open Project' button of the main toolbar to start.

3.1 New projects	•		ct" XE commands ¡	project:
New proj		•		
Using this button, If you are using So of the project:	•		you to enter a coo	le and title
In the case you are the name of the print in both cases, the case are not using SQI	oject file and the display will be di The project files	location where vided into two pwhich are create	the file will be stopanes. ed by ExtrAXION	ored. Then,

In the left pane there are two tabs (see bottom of the pane). In the 'Drawings' tab
a tree view of all drawings, measurement sheets and measurements of the curren
project is shown (See <u>Drawings</u>
<u>08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000</u>
), while in the 'WBS' tab the tree view consists of the WBS items and their
corresponding measurements (<u>See Work items</u>
<u>08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000</u>
).
Width XE "Navigation Pane:Width"
You can set the width of the left pane by placing the cursor on its right margin
and dragging it left or right, in order to reduce or increase its width, respectively.
Hide-Show XE "Hide-Show Navigation Pane" XE "Navigation Pane:Hide-
Show"
The left pane can be permanently pinned to the foreground or it can be
minimized and hidden depending on the orientation of the pin on its upper
right-hand corner. Click on the pin to change its orientation. When the pin is
vertical , the pane is permanently 'pinned' in place. On the contrary, when the
pin is horizontal , if you click on any part to the right of the navigation pane,
the pane will hide in order to free more working space. In this case, the titles of
all tabs are located in the left part of the pane, instead of the bottom. To bring a
tab into the foreground, you need only hover your cursor over it.

3.2 Open project XE "Opening: Project" XE
"Options - commands project: Opening a project "
(Ctrl+O)
Using this button, you may open a project, which has already been saved. Alternatively, you can use the following shortcut: Ctrl+O. The application prompts you to specify the name of the project file you wish to open. The project includes the drawings and the WBS (Work Breakdown Structure) you have entered, the measurement sheets you have created, as well as the measurements. The measurements are listed below each work item in the 'WBS' tab and below each measurement sheet in the 'Drawings' tab. By opening an existing project, you can see the 'WBS' tab open. In case there are no work items, then the 'Drawings' tab is open instead.
If you are using SQL Server, a list appears, which contains the projects contained in the database you have chosen (see Settings/ REF
Ref361042807 \h * MERGEFORMAT Select database
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
Otherwise, select the location of the saved projects (.sdf files).



3.3 Import/Export project

With the 'Import project' button you can import an .sdf file into the Database that you are using and with the 'Export project' button you can export a project
to an .sdf file in order for example to save it on your hard disc drive and send it
to another ExtrAXION user.
These buttons appear only when you are using SQL Server.
3.3.1 Import project XE "Importing:a Project" XE
"Options - commands project: Importing a
project " 📖
Click on the button, and select the project that you want to import. After the import is completed, the following message appears:
the import is completed, the following message appears.
Then you can open the imported project by clicking on the
(Open project) button.
The project retains its code and gets as a Title the name of the sdf file.
3.3.2 Export project XE "Exporting:a Project" XE
"Options - commands project: Exporting a
project "
Having the project that you want to export opened click on the button.
Enter the desired name for the .sdf file and press 'Save'. When the export is
completed the following message appears:

3.4	Edit project data XE "Project:data" XE	
	"Options - commands project: edit project	data "
	button enables you to set or edit the project's code and title. The	
code	e and title are 'New project.' On your screen, the following windo	w appears:
Ente	er the desired code and title.	
	In the 'Code' box you may enter up to	20
char	racters, and in the 'Title' box up to 100.	

3.5 Delete project XE " Deleting: Project" XE "Options - commands project: Delete a project "

"Options - commands project: Delete a project " $oxdot$
Using this button you can delete a project from your database. It is valid only when you are using SQL server. Select the project that you want to delete from the project list and then press $\overline{\mathbf{OK}}$. The application asks your confirmation twice:
To be able to delete a project, the project must not
be opened. Otherwise the following message appears:
After deletion you lose all the data of your project, as well as all of your drawings with their measurements and they
CANNOT be retrieved! Be very careful!
well as all of your drawings with their measurements and they CANNOT be retrieved ! Be very careful!

3.6 Refresh project XE "Options - commands project: Refresh a project "

Using this button the project is reloaded from the current Database to be updated with additions or changes that have been made by other users who have been working simultaneously at the same project.

3.7 Drawings management XE " Drawings management " XE "Options - commands project: Drawings management "

This button allows Management' wind	•	drawings of the project of	on the 'Drawings

Use the buttons on the toolbar to:

- Import a new drawing. XE "Importing:a drawing" XE "Options commands Drawings management:Import a drawing "
- Select a format to export the current drawing. XE "Exporting:a drawing" XE "Options - commands Drawings management:Export a drawing"
- Delete the current drawing of the list, provided that it has no measurement sheets. XE "Deleting: drawing " XE "Options - commands Drawings management:Delete a drawing "
- Replace the underlying drawing with another one. This feature is very useful when the initial drawing has been modified. . XE "Replace a drawing "XE "Options - commands Drawings management: Replace a drawing "
- Open the 'Drawing Properties' windows where you can see and edit the properties of the current drawing (See Drawings/<u>Drawing properties</u> XE "Drawing:Details" XE "Drawing: Properties " 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E000).

(See Drawings/Drawing Properties/General
<u>08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005</u>
).
This change does not affect the way the drawing
is stored (into the project database or as an external reference).

3.8 Measurement categories XE "Measurement:Categories" XE "Categories" This button allows you to set the categories which constitute a concurrent, independent organization of measurements. Using categories you may classify your measurements in various ways, such as work carried out by subcontractors or your own crew, building level, etc. button to view a list with the various measurement Click on the categories. There is a default category 'Category 1' in every new project. To add a new category, click on the field above the list, type its description and press **Enter**. You can change the descriptions at any time. The measurement categories are project specific. Categories are used to group measurements. (See Appendix/Filters/Sorting

"Project:Par	asurements parameters ameter values" XE "Opti parameter values "	
	to modify the default values of librate to all measurements of the current	<i>J</i> 1
Param	neters are used in the formulas that a	appear in

measurement calculations. To enter new parameters, click the _____ button to

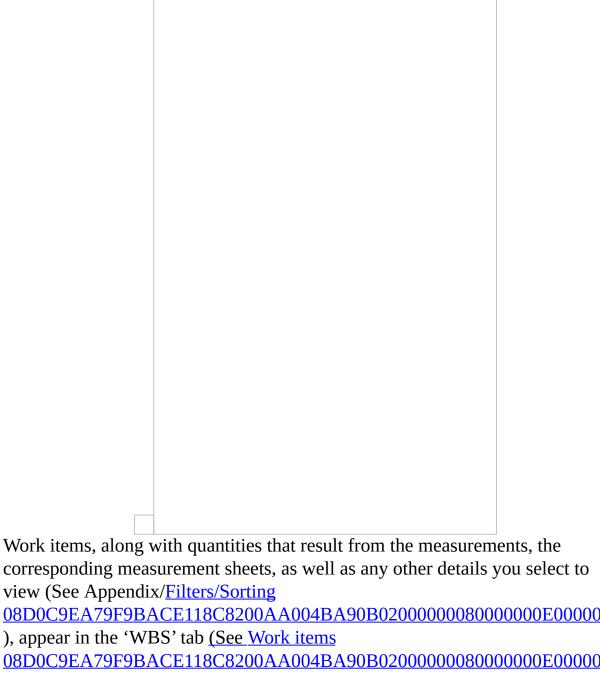
view the library parameters (See General/Library/Parameters

).

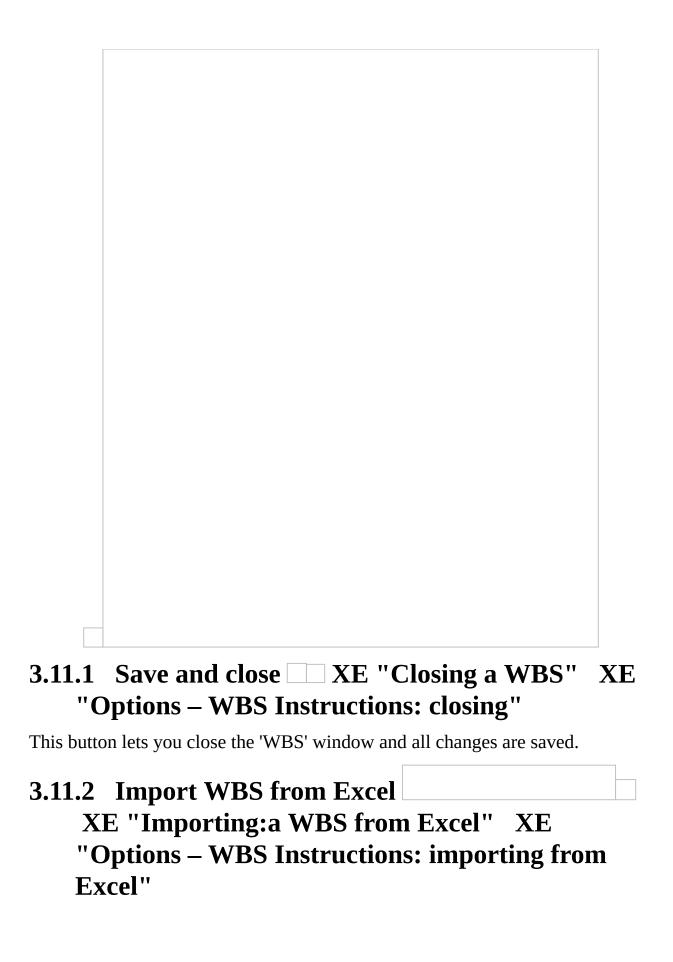
3.10 Recalculate 2 commands pro		lation" XE "Option lation "	is -
	equent change to the	asurements are recalculated, i e initial calculation input data	

3.11 WBS (Ctrl+B) XE "WBS" XE "Budget" XE "BOQ" XE "Options - commands project: Work Breakdown Structure "

Breakdown Structure "	
This button allows you to enter the W ork B reakdown S tructure (WBS) your project, so that you can directly link the measurements carried out drawings to their corresponding work items. Alternatively, you may use (Ctrl + B) shortcut. Click on the button to display the 'Edit project work items' window	on the the
In the WBS, enter the description, the units of measurement, and the unifor each work item. You may add a new work item during a measurement (See Measuring in image files/Type and method of measurement/New work item XE "New:Work Item" 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E).	



corresponding measurement sheets, as well as any other details you select to view (See Appendix/Filters/Sorting 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005E), appear in the 'WBS' tab (See Work items 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005E).



This button allows you to import a WBS from Excel. This way, you can save time and avoid re-creating the WBS in the application. The file should have the following 3-column format:

n	Measurement	Price	
	Unit		
You I	may enter the colum	ıns' head	ers in the first row of the spreadsheet.
first			e taken into account on import. Therefore, the
	-		et should either contain the columns' headers or
			s e.g. the first group and the following rows
cont	ain the items, it will	not be 11	mported.
	A work iter	n row sh	ould be preceded by a group row. If not, the
follo	wing message is dis	splayed:	
	Importing s	tops whe	en it encounters the first blank row in the excel
shee	t. Make sure there a	re no bla	ank rows between groups, work items etc.
	If there are	more tha	on one sheets (tabs) into the excel file, then only
the c	current one is impor	ted (curr	ent is the visible sheet when you open the excel
file).			
	There is a 5	500 chara	acters limit of the work items descriptions. If
there			the Excel spreadsheet, they will be truncated.
	•		of an Excel spreadsheet for a WBS that can be
	rted directly:	.Aumpie	of all Exect spicadsficet for a WES that can be
шро	ica difectly.		1 1

Description	Unit	Unit Price
Main building		
Earthmoving		
General earthy excavations	m3	3,10
Concrete		
C12/15	m3	30,00
C16/20	m3	36,00
Mechanical		
Steelworks		_

Black Steel Plate	kg	1,10
Plumbing		
Galvanized Steel Pipe OD	m3	17,50
1/2'		

The rows containing groups are distinguished from work items by the fact that the 'Unit' and 'Unit Price' cells of a group row should be blank.
The groups' hierarchy is set at a later stage, using the
button and the button. When the import process is completed, the following message appears.
Importing WBS from Excel may also be carried out gradually. The data of each Excel spreadsheet are added in the end, following any existing work items.
3.11.3 New group/work item XE "Options – WBS Instructions: new group/item" XE
"New:Group/Work Item"
9 1
"New:Group/Work Item" Using this button, you can enter either a new group or a new work item in the current group. The groups and the work items are indicated by and respectively, so that they can be distinguished. You should enter the description of each group, and in the case of a work item you can also enter the unit of

			trl + G keys to create a new	V
group and Ctı	rl + H keys to crea	ate a new wor	k item.	
it by placing y respectively) of following symmetric indicate the upgreen indication to	esired group/work is our cursor on the stand dragging it to to bols , , , , , , , , , , , , , , , , , , ,	tems (if it door ymbol that characters) the desired polyage. The direction of ition. Moreovers where moreovers	k items to a different position esn't already exist) and then aracterizes it (or or or osition. During this action, the light blue arrows of, or or or osition. The light blue arrows of movement respectively, and were the osymbol is used by the light buttons allowed. Finally, the light buttons allow you to change	move the by the
hierarchy of th	e groups at a later	time.		
Deleti Using this butto	ng: Group/It on, you can delete to l ask your confirma	em" the selected g	roup or work item. The se you choose to delete a	∃ ''
	ove XE "Op ig a Group/It		BS Instructions:	
			<u> </u>	
"Mov	ing:Group/It	em"left		 ,
right				
_	ttons you can prom to create the WBS '		e the groups, respectively, by	one
	These buttons ar	re disabled wl	nen a work item is selected.	

3.12 Library XE "Library"

The library contains data that can be used in any project. It constitutes a database that includes parameters and model custom measurements that are provided by ALCONSOFT as examples, and can also contain your own data.

3.12.1 Parameters XE " Parameters"

Using this item of the 'Library' button, you can alter or insert new parameters, which can be used in the formulas that appear in measurement calculations and apply to all projects.

Enter a custom description. Also, you may enter a default value to be applied in all projects.

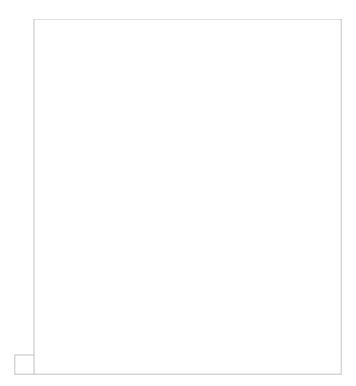
Parameters are automatically indicated with P*i*, where *i* is the increasing number. Use parameters when there are some constant values which you wish to be modified quickly (e.g. the height of a floor). It applies to values which you know from the start that will appear many times throughout the measurements and might need to be modified.

Parameter details are saved centrally, along with their default values. In each project, their values can be modified using the 'Project Measurement Parameters' button (See General/Project measurements parameters). XE "Project:Parameter values" XE "Options - commands project: Project:Parameter values"

3.12.2 Custom Measurements XE "Custom

measurements"

O	ne 'Library' button you can define your own mea	
• •	ments in image files/Types and method of measur	
	'4 \h * MERGEFORMAT Custom measurement ACE118C8200AA004BA90B0200000008000000	
	propriate parameters and calculation formulas, yo	
, , ,	of the primary measurements and link them to on	
WBS work items.	or the primary measurements and mix them to on	c or more
	CONSOFT's example model measurements appe	ar on vour
	ate as many of your own as you like.	ur ou your
	s are saved in the Library and are available for us	se in every
project.		
New measureme	ent XE "New: measurement" XE "Custo	m
measurements: 1	new measurement"	
Using the 'New mea	asurement' button, you can enter a new measurer	nent in the
library database. On	your screen, the following window appears:	

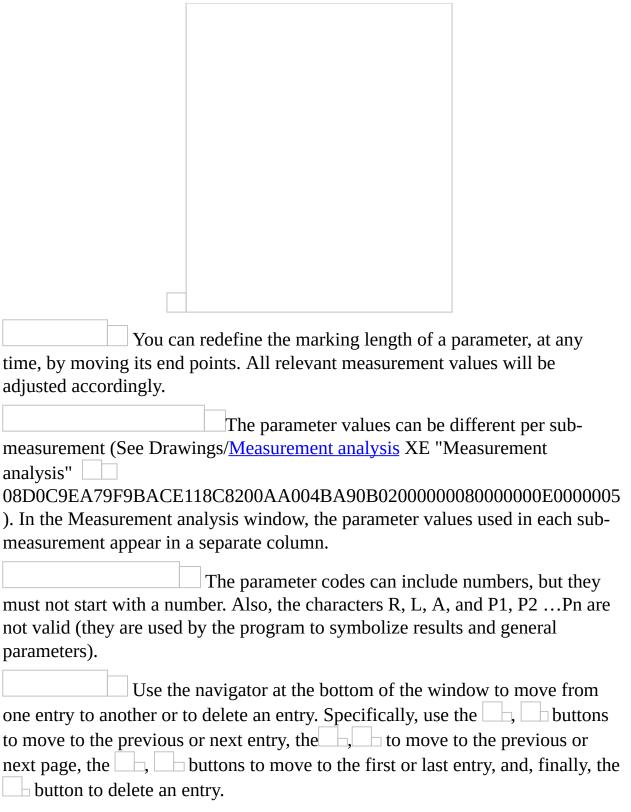


Description-Type

Enter the description you wish for the new measurement, e.g. 'Slab reinforcement bars, and set the measurement type on which it will be based: objects count, length, area, or volume.

Parameters

You may set parameters for this particular measurement. Measurement parameters can be used during a measurement, for the input of extra values (that is, additionally to the primary measurement result) that influence the final result. Enter the parameter code exactly like it will be used in the calculation formulas of the final result. Also, enter a short description and a default value. Check the 'Measurement on drawing' option in case you wish the value of this particular parameter to be defined by marking a length on the drawing during the measurement.



Calculations

You can optionally enter one or more formulas for each measurement, so they

can be ready to use during measurements.

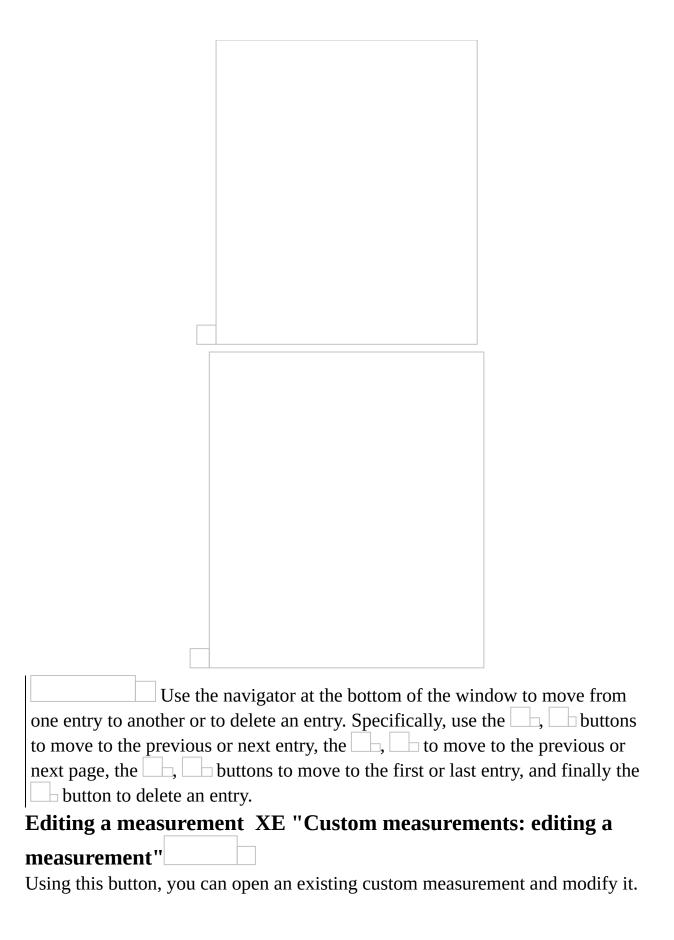
Set the description and formula for the calculation of the result. Enter the left part of the formula you desire without the = symbol, inserting numbers, parameters, and functions.

Use:

- Numbers (without the thousands separator), using the (.) as decimal point.
- The letters R, L, and A to symbolize the result of a measurement (**R**esult), the measured length (**L**ength), or the measured area (**A**rea) respectively. In the case of measuring area, the program automatically computes the perimeter length while in the case of measuring length (using a polyline) it attempts to calculate the area as well.
- The symbols of the mathematical operations: plus (+), minus (-), multiply (*), divide (/) and raise to power (^).
- Parentheses for grouping parts of the expression.
- Functions, which are input in the exact same format used in Excel.

	There are many of the most widely used Excel functions. See
the Appendix	for their correct syntax. You can also refer to Excel Help.
Some of the av	vailable functions are:

ABS, ACOS, ASIN, ASINH, ATAN, ATAN2, CEILING, COS, COSH, EXP, FACT, FLOOR, LOB, ROUND, SIGN, SIN, SINH, SQRT, TRUNC



Deleting a measurement XE "Custom measurements: deleting a	L
measurement"	
Using this button, you can delete the selected custom measurement from your measurement list.	
By deleting a measurement, you also delete all item associated with it, and they CANNOT be retrieved! You should be cautio in proceeding with deletion!	
Duplicate measurement XE "Duplicate:Custom measurement "	
Using this button, you can duplicate the current custom measurement. The duplicate is added to the list as a new custom measurement and you can open and edit it.	

3.13 Settings XE "Tools" XE " Settings "

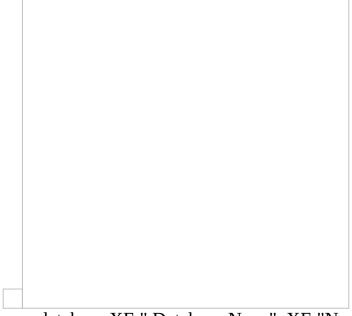
3.13.1 Measurement analysis parameters XE "Measurement analysis:parameters"

Using this item of the 'Settings' button you can set various parameters which are used in the measurement documentation as, for example, colors, column widths and other. (See Measurement analysis <a href="Measurement an

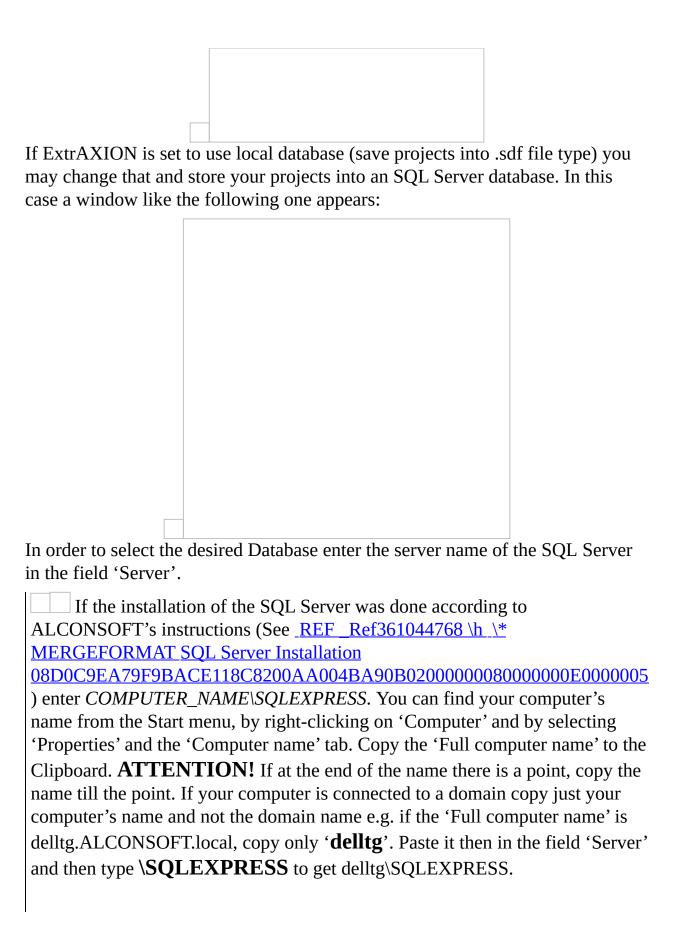
3.13.2 Select database XE " Database: Select "

With this option, you are able to select the way your projects are saved and change the current database. You can either store your projects on SQL Server or save each project on a local database as an .sdf file.

If ExtrAXION is set to use an SQL Server the following window shows up:



You may create a new database XE " Database:New " XE "New:Database" or select an existing one. You have also the option to change the way your data is saved by pressing the **Switch to local database** XE " Database: Switch to local " button. The following message appears:

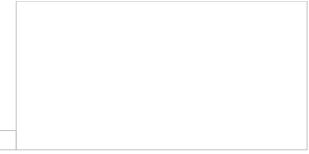


If you have installed ExtrAXION on a server using the concurrent users licensing option the field 'Server' is dimmed and cannot be changed. Afterwards, type the user ID and the password that you use when connecting to the above mentioned instance of SQL Server.
If the installation of the SQL Server was done according to ALCONSOFT's instructions (See SQL Server Installation 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000
) enter sa in the field 'User' and 7 in the field 'Password'. Then, select if you prefer to create a New or use an Existing database. If you choose 'New' then enter in the field 'DB name' the name you want for the new database else if you choose 'Existing' select one of the existing databases (if any). You may also press the Refresh button to update the list.
Finally, press OK and on your screen appears:
At the window's title you can see the name of the current Database.

3.13.3 Users

With this option, you can create new users and edit their accounts with the corresponding buttons, if you have logged on as administrator (initially, user 1).

Nanana VE U IIa	and No.	C UNIO II	.11
New user XE " Us			
On your screen appear new user.	s a window with the r	iecessary inforn	nation for creating a
new user.			
_			
User ID	1 (.1		
Insert the identification	n code of the new user	r.	
User Name	.1		
Insert the full name of	the new user		
User password			
Insert the new user's p	_		
Re-enter user pass		ian	
Insert the user password Hit the OK button and	_		the Heare list
Edit user data XE			
On your screen appear		current informat	tion of the user you
have selected for editing	ıg.		



User ID

Insert the new identification code of the selected user.

User Name

Insert the new full name of the selected new user

User password

Insert the selected user's new password

Re-enter user password

Insert the selected user's new password again for confirmation Hit the \boxed{OK} button and the selected user appears in the Users list with his new information.

3.13.4 Edit user data

On your screen appears a window with the information of the **current** user.

User ID

Insert the new identification code of the current user.

User Name

Insert the new full name of the current user

User password

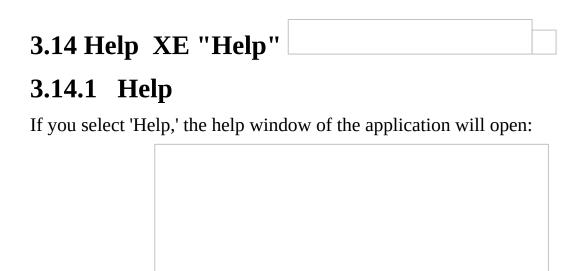
Insert the current user's new password

Re-enter user password

Insert the current user's new password again for confirmation Hit the $\boxed{\mathbf{OK}}$ button and the current user appears in the Users list with his new information.

3.13.5 Select language XE " Select language " XE " Language"

Using this item of the 'Settings' button you can set the preferred language of the program environment. For the change of language to take into effect, you must restart the application.



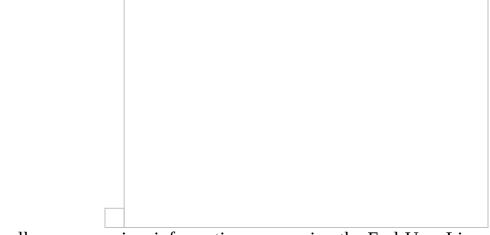
You can find information about the application, using either the table of contents or the search function.

3.14.2 Export events data XE "Exporting:events data" XE "Log file" XE "Errors log file"

With this option you can export all the data of the log file into a new file (.dat format). This enables you to send information to ALCONSOFT in order to solve any issues that have occurred during the use of the program.

3.14.3 About ExtrAXION XE "Help:About ExtrAXION" XE "ExtrAXION Version" XE "Version of ExtrAXION"

If you select 'About ExtrAXION', a window with information about the currently installed version of the application and its serial number will open.



Finally, you can view information concerning the End-User License Agreement (EULA) by clicking on the respective link.

4 Drawings XE "Project:Drawings"

In each project, you can add as many drawings as you wish of various file types. Both vector files and scanned (image) files XE "Scanned drawings" are supported. Vector drawings are stored either into the project database or separately as external references, but image files can only be stored into the project.

For every drawing that you add to a project, you can create one or more measurement sheets. On each measurement sheet you can make as many measurements as you wish.

Sorting by the 'Description' field is applied first on the
drawings, then on the measurement sheets and finally on the measurements
themselves. Every drawing, measurement sheet or measurement that is added,
or has its name changed afterwards, follows this setting and its position into the
tree view list is set automatically.
You can expand or collapse the 'Drawings' tab
tree view, by right clicking in the tab's area.
Expand
Using this button you can fully expand the tree so that all groups, work items
and measurements are shown.
You can expand only a certain part of the entire tree by clicking
on the 4 symbol, on the left of groups (or work items) description when
collapsed.
Collapse

Using this button, years level are shown.	ou, can fully collapse the tree, so that only	y the groups of the
clicking on the 6 sy	u can collapse only a certain part of the e mbol, on the left of groups (or work item	
expanded.		

To manage drawings, measurement sheets and measurements, use the command buttons of the toolbar of the 'Drawings' tab.

4.1 Add drawing(-s) XE "Adding: Drawing" XE "New:Drawing" XE "Drawing: Adding"

Using this button, you can add new drawings to the project. A window appears on your screen, on which you can select the drawing you wish to insert.
You may select vector files, such as .dwg, .dxf, .dgn, .emf, .wmf, XE "Vector Files .dwg, .dxf, .dgn, .emf, .wmf" or image files, such as .bmp, .gif, .jpg, .tif, .ico.png and .pdf XE "Image Files .bmp, .gif, .jpg, .tif, .ico, .png" . Select the desired drawing by double-clicking it or by clicking OK . The drawing is added in the 'Project Drawings' list. If you want to add more than one drawing in the project select them while pressing CTRL or SHIFT and press OK . The name of the file you selected is the default value for the name of the drawing in the tree view of the 'Drawings' tab, but you can change it, if you wish.
That is not possible in case of importing more than one drawing simultaneously However you can edit the drawings' names later on. (See Drawing properties XE "Drawing:Details" XE "Drawing:
Properties " 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000
Let the 'Save vector drawing(s) in project database' field checked, unless you want to use the original drawings as the background using an XREF like method
In case there are image files among the drawings you have selected to import, they are always stored into the project database even if you have not checked the 'Save vector drawing(s) in project database' checkbox.
If one of the selected files is a pdf one and has

1 0		-	arate drawing with the nber, for example _1, _2
	•	-	y one pdf file that has
more than one pages t	hen the followir	ng window appears	5 :
Select the page of the poption in order to select		_	ave also the preview
_	Changes in	external reference	es are reflected on the
corresponding project sheets. It is possible the	•		
sheets to coincide with	h the new versio	n of the drawing.	
After importing new ditab tree view and, at th	-	•	_
automatically as the fir window opens and the		•	corresponding drawing
Finally a reminder of c	ertain basic adjı	istments that may	•
displayed. For image fi and then set its scale an	-		•
from drawing to drawi	_	J I	
	You should	follow these instr	uctions in the order
described above. Once	e you set the sca	le, you can no lon	ger rotate the drawing,

If you have added a vector file, you should set the scale (only if the drawing has			
not been created using the usual 1:1 scale), and also specify the location of the			
folders of the corresponding drawings (XREF), if there are any. You should also			
set the scale in case the drawing unit specified in ExtrAXION differs from the			
unit of the drawing. Additionally, you can define the origin for easy and correct			
copying of measurements from drawing to drawing and rotate the drawing, if			
needed.			
You can adjust all of the above settings at the Properties window (See			
Drawings/ <u>Drawing properties</u> XE "Drawing:Details" XE "Drawing: Properties "			
Diawings/ <u>Diawing properties</u> AL Diawing. Properties			
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F			
) where you can, also, change the description and the unit of measurement of the			
drawing, set digit number for the measurements calculation precision,			
background color etc.			
When adding more than one drawings			
simultaneously, they do not open automatically. In this case the above windows			
appear when you open the drawing for the first time.			
Large drawings (several MBs) may slow down			
the taking measurements process considerably. Therefore, it is recommended			

that very large drawings be converted to smaller ones, e.g. in case of .dwg

drawings remove layers that are not necessary.

for example.

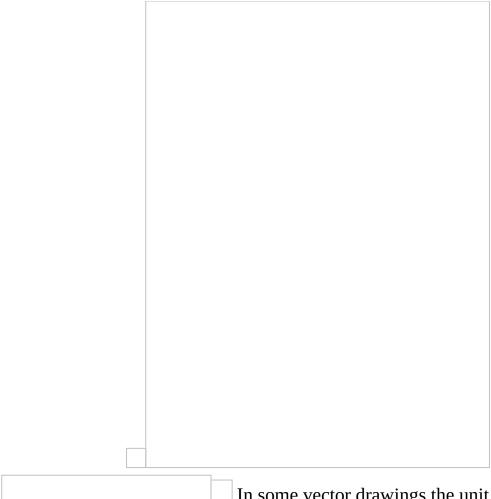
4.2 Drawing properties XE "Drawing: Details" XE "Drawing: Properties "

Using this button, you can set or change the properties of the current drawing. A window appears where the properties are organized in groups:

4.2.1 General

At this group you can set or change the following properties:

- The description/name of the drawing (the default name is the file name of the drawing without its extension).
- The full path and name of the original file from which the drawing was imported to the project, and whether the drawing is stored into the project or is an external reference. These two properties are read-only.
- The full paths of any external references, separated by semicolon (;).
- The unit system to be used. You can select between Metric (decimal), US Engineering and US Architectural.
- The unit of length on which measurements will be based (the default is meter for the Metric unit system and feet for the US systems).
- The accuracy of measurement calculations, by setting the number of the significant digits (the default is 2).
- The background color.



In some vector drawings the unit of length is other than the meter, for example electrical drawings with mm as unit of length. In this case you should select the same unit of length with the original drawing or define a scale different than 1:1.

4.2.2 Scale XE "Specifying the Scale" XE "Drawing: Scale Specifying"

By setting the scale, XE "Setting the Scale in a Drawing" you also eliminate any distortions caused by reduction or magnification during scanning XE "Scanned drawings" or photo-copying, and thus measurements will correspond to the real dimensions:

In image files:

Click on the 'Scale' field and choose 'Set scale on drawing' from drop down menu. Pick two points on the drawing that is opened and then a new window appears.

Enter the l	length vou	ı have m	arked on tl	ne drawing, cl	ick OK , an	d the scale
	0 0			late and close	<u> </u>	
,			ale' from t	he drop-down	menu, then	the scale is s
to its defa	ult value ((1:1).				
		S	canned im	age files XE "	Scanned dr	awings" can
	-		•	y axis scale ra		-
				ell. Generally,	you can on	lly move in
	ode when	O	ne scale.			
In vector		•			, , ,	
Click on t	he 'Scale'	field and	d select 'S	et scale' from	the drop do	wn menu.
,	1 •		, •			
		-	more opti	ons:		
	pe the sca					
-	accon a ct	andard or	na fram th	o drop down li	ct (1.1000	1.100 1.10)
• Cl				e drop down li	•	•
• Cl				e drop down li g, as shown in	•	•
• Cl	efine the s	scale on t	he drawin	_	image files	5.
• Cl	efine the s	scale on t efine the	he drawin	g, as shown in of scale calcul	image files	5.
• Cl	efine the s	scale on t efine the	he drawing accuracy default is	g, as shown in of scale calcul 4).	image files	s. etting the num
• Cl • De	efine the s Do nificant d	scale on t efine the igits (the	he drawing accuracy default is	g, as shown in of scale calcul 4).	image files ations by se cale dimens	etting the num
• Cl • De	efine the s Do nificant d	scale on t efine the igits (the	he drawing accuracy default is	g, as shown in of scale calcul 4).	image files ations by se cale dimens	etting the num
• Cl • De of the sig	efine the s Do nificant d	efine the igits (the	he drawing accuracy default is If you do eck the 'S In order	g, as shown in of scale calcul 4). on't want the so cale dimension to achieve the	image files ations by secale dimens as visible' be maximum	etting the num sions to be oox. possible
• Cl • Do of the sig	on the draw	efine the igits (the ring unch	he drawing accuracy default is If you do eck the 'S In order, the select	g, as shown in of scale calcul 4). on't want the secale dimension to achieve the tion of the long	image files ations by se cale dimens as visible' b maximum gest possibl	etting the numbersions to be possible to dimension o
Cl De of the sig visible or accuracy the drawi	nificant din the draw	efine the igits (the ring unch culations lis recon	he drawing accuracy default is If you do eck the 'S In order, the selection	g, as shown in of scale calcul 4). on't want the secale dimension to achieve the tion of the longer	image files ations by se cale dimens ns visible' b maximum gest possibl measuring	etting the num sions to be oox. possible e dimension o
Cl De Of the sig visible or accuracy the drawi	nificant din the draw	efine the igits (the ring unch culations lis recon	he drawing accuracy default is If you do eck the 'S In order, the selection	g, as shown in of scale calcul 4). on't want the secale dimension to achieve the tion of the long	image files ations by se cale dimens ns visible' b maximum gest possibl measuring	etting the num sions to be oox. possible e dimension o

Scale setting makes sense in case of image files as well as in vector drawings that have been created on a scale other than 1:1.
In vector files you cannot set both the horizontal and the vertical axis scale. Only the last calibration is saved.
If you change the unit system or the unit of length of a drawing, then the scale is automatically reset to its default value (1:1). In this case all measurements become invalid and need to be carried out again.
4.2.3 Origin
By setting the origin, you can set the (0,0) coordinate point on the drawing. Click the button on the 'Origin coordinates' field. On the drawing that appears mark the (0,0) origin using the cross hair cursor and click Update and close . Alternative you can enter the X and Y coordinates at the corresponding fields. Check the 'Origin axes visible' box if you want the origin to be visible on the drawing.
Set the corresponding origin on the rest of the drawings, where you wish to copy the measurements, in order for them to be copied in the exact same location as in their original drawing. In case, for example, that the creator of the drawing changes the origin, then, if it is not reset, it is possible for copied measurements to be pasted to an entirely wrong place!
4.2.4 Rotation
By rotating a drawing you can change its orientation so that it is leveled during measurements. Click the button on the 'Rotation in degrees' field. On the drawing that appears, select two points along a horizontal line, e.g. two points on any line which should be horizontal in your drawing, but, probably due to misaligned placement in the scanner, appears tilted. Click Update and close to save the new rotation.
The rotation of a drawing must be done before the scale setting and before any measurement.

	To rotate and level a drawing by 9 al line on the drawing. Note that the order in world will determine if the rotation is clockwise	which you select
anticlockwise.		
4.2.5 Sheet d	letails	
You can see and cha	ange the title of the current measurements she	eet. However,
this field is visible on while having a sheet	only if you have clicked on 'Drawing properti et selected.	ies ,

4.3 New measurement sheet XE "New:measurement sheet"

Using this button you can add new measurement sheets to the drawings. A window appears with the list of all drawings that you have imported into the project. Select the drawing on which you wish to create the new measurement sheet and type the title of the new measurement sheet at the field above the list.

Click **OK** and the new measurement sheet is created and added as a child node of the selected drawing at the tree view of the 'Drawings' tab. Finally, on the right side of the application window, the corresponding drawing opens.

4.4 Open measurement sheet XE "Opening:measurement sheet "

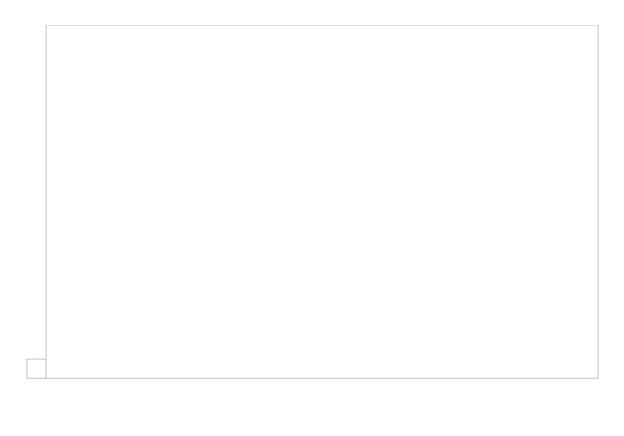
measurement to make it visible.

Using this button, you can open the selected measurement sheet from the 'Drawings' tree view on a new window on the right side of the application window. You may open any number of measurements sheets of as many drawings you wish. Each open measurement sheet appears in the drawing pane with its title at the top.

You can also open a measurement sheet window by double-clicking its title or any of its measurements. If the window is already open then it becomes current. To close a measurement sheet window click the symbol on the right part of the window's tab.

The measurement sheet and its measurements of the current window are marked with gray color on the 'Drawings' and 'WBS' tree views.

The measurements of the current window are only visible when the check box at the 'Visible' column of the 'Drawings' tree view is checked. Click on the check box to change its status or double click on a



4.5 Delete sheet XE " Deleting: measurement sheet " Using this button, you can delete the selected measurement sheet from the drawings tree view. If the underlying drawing has no more measurement sheets then the drawing itself is also removed from the drawings tree view. A drawing that has been removed from the tree view is not actually deleted from the project. When you create a new measurement sheet (See Drawings/New measurement sheet) and also, at the measurements management window (General/<u>Drawings management</u> XE " Drawings management "XE "Options - commands project: Drawings management " 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005), you can see and use all the drawings that have been imported to the project, even if they are not shown at the drawings tree view. You should close a drawing in order to be able to delete it. By deleting a measurement sheet, you also delete all items associated with it **along WITH its measurements** which

CANNOT be retrieved!

4.6	Export Measurements XE	
	"Exporting:measurements"	
can c	button allows you to export the primary methange the table's appearance before its finateable shows all measurement details in the et', 'Category', 'Description', 'Color', 'Unit', '	al export to Excel. following columns: 'Drawing',
Sirec	t, Category, Description, Color, Onit,	Qualitity, Expression, Tvotes.
have	g the advanced filtering, grouping, column many options of setting the number, the fo	9
<u>08D0</u>	to view (See Appendix/ <u>Filters/Sorting</u>)C9EA79F9BACE118C8200AA004BA90	B02000000080000000E0000005E
	g the 'Measurements analysis' button	
mark	rsis of the measurements in the above list. It is and details of surface area calculations	-
08D0	surement analysis OC9EA79F9BACE118C8200AA004BA90	B02000000080000000E0000005I
). 	The 'Measuremen	its analysis' button is also present
	e drawings window toolbar and gives simi dows/ <u>Measurement analysis</u> XE "Measurer	lar results (See Drawing
1	•	-

08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
). The difference is that, the analysis obtained from this window takes into
account the sub-measurements and individual shapes, if any, of each
measurement. If for example the continuation of a measurement is interrupted
twice (by addition or subtraction), then three sub-measurements appear in
different rows and for each one of them a separate page is created.
Using the filters you can set criteria to limit the number measurements that appear in the list and subsequently the measurements that will be included in the analysis. Exporting measurements and work items can be done from the 'WBS' tab where these features are described in detail (See Work items/Exporting WBS/Export WBS measurements 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000

4.7	Edit measu	rement XE	"Editing: mea	asurement"
meas meas inse	surement at a later s surement, the work	tage. Correct the items of the WBS the measurem	Ty the details of the se description or the cat S to which it is linked ent unit accordingly,	egory of the , change its color,
<u>Drav</u>	wings/Continue mea	<u>surement</u>). You o	ormed per sub-measu can view and select th a (+) or (-) sign, depe	em from the drop nding on if it was
creat	ted with 'Continue r	neasurement	or 'Continu	ie measurement
(020	tract)	' respectively.		
		Parameter	s may vary depending	g on the sub-
mea	asurement's type, wl		nge when continuing	
	example, if an area the drawing's level a		ed to a sub-measurem	is performed ent perpendicular

1 1 11 11 (When you select a sub-measurement from the
dropdown list all f drawing.	figures that belong to that sub-measurement are marked on th
diawing.	
bolong to different	If you have selected on the drawing figures that the measurements, when you right click and select the 'edit
0	ion, the measurement that will be edited is the one where the
last selected figure	
iust serected figure	
	In case the values of a parameter are defined per
node of when w	In case the values of a parameter are defined per
•	ou enter them every time you create a new point by clicking
•	ou enter them every time you create a new point by clicking
on the drawing, th	ou enter them every time you create a new point by clicking is parameter doesn't have a common value and cannot be
on the drawing, th	ou enter them every time you create a new point by clicking is parameter doesn't have a common value and cannot be
on the drawing, the edited in this wind	ou enter them every time you create a new point by clicking is parameter doesn't have a common value and cannot be low. Editing such values is performed directly on the drawing
on the drawing, the edited in this wind by right clicking o	ou enter them every time you create a new point by clicking is parameter doesn't have a common value and cannot be low. Editing such values is performed directly on the drawing on the nodes instead (See Measuring in image files/Length
on the drawing, the edited in this wind by right clicking o	ou enter them every time you create a new point by clicking is parameter doesn't have a common value and cannot be low. Editing such values is performed directly on the drawing
on the drawing, the edited in this wind by right clicking o	ou enter them every time you create a new point by clicking is parameter doesn't have a common value and cannot be low. Editing such values is performed directly on the drawing on the nodes instead (See Measuring in image files/Length

4.8 Measurement analysis XE "Measurements:analysis"

Using this button, the selected measurement's analysis is viewed. Each submeasurement appears in a different row, while the main measurement's values are shown in the first row. The columns display the description (name) of the sub measurement, its unit, measurement type, calculation expression and value. Furthermore the columns L, A and R contain the length, area and primary result of the measurement respectively. On the lower part of the window there is the detailed calculation of these results, as well as a thumbnail of the region where the sub measurement was performed, divided in basic geometric shapes (See Measurement analysis). Each submeasurement is displayed in a different tab. Each time the continuation of a measurement (by addition or subtraction) is made, a new sub-measurement is created (See **Drawings/Continue measurement**). If a sub measurement was created via the Continue measurement (subtract) _____, then it will be colored red. By temporarily stopping a measurement by pressing the **Esc** key once, distinct parts are created in the measurement

4.8.1 Export to Excel XE "Exporting:to Excel"

analysis, which are distinguished with the use of parentheses in the expression column, e.g. the measurement of the baseboard with gaps in the place of doors.

Click the	button of the above table to save it as an .xls f	file.
Input the l	ocation and the filename you wish to use.	

4.9 Duplicate measurement XE "Duplicate: measurement"

Using this button, you create one or more copies of the selected measurement, which you can then move around on the drawing by defining the start and end point of a point of reference. After placing a copy at its final position, it is then linked to the same work item as the original measurement, while its name is also derived from the original via appending an index number (e.g. _1, _2, etc.). This feature is useful in cases where the same measurement can be used in different cases, e.g. a ceiling measurement can also be used to measure the floor.

In the above example, it is recommended to link the
measurement with many different work items instead of duplicating it
(ExtrAXION Pro version).
It is also possible to duplicate only parts of a measurement by selecting them on the drawing and using the 'Duplicate
selection button in the drawing windows area. In this case, any
copied items are added to the measurement they belong to (See Auxiliary
measuring tools/ Duplicate selection).

4.10 Delete measurement XE " Deleting: measurement"
Using the 'Delete measurement' button, you can delete the selected neasurement. The measurement is removed from the 'Drawings' and 'WBS' tre riews as well as from the drawing window.
By deleting a measurement you lose all of its data and you cannot retrieve them!

4.11 Continue measurement XE "Continue measurement" XE "Measurement:Continue" Using this button, you can continue the selected measurement, creating sub measurements. A measurement consists of one or more sub measurements of the same type (e.g. count measurement \(\bigcup_{\quad} \). The value of the main measurement is equal to the sum of all its sub measurements' values. Each sub measurement has its own name. When neither 'Continue measurement 'nor 'Continue measurement (subtract) ' is used, there is only one sub measurement with the same name as the main measurement. Each time one of those buttons is pressed, a new one is created with a new name.

- Category
- Work item
- Color, unit and factor
- Notes
- Marking figure (See <u>Measuring in image files/Types and method of measurement/Object count</u>)

New names are created by appending index numbers to the original name.

Sub measurements of the same measurement have in common:

These items are properties of the main measurement.
If you change one of them when you create a new sub measurement, it will be
changed for all.
However the following properties are not necessarily the same in all sub
measurements:
 Name (See <u>Drawings/Edit measurement</u>)
 Measurement method (e.g. <u>perpendicular to the drawing</u>, <u>marking</u>
<u>figures</u> , etc)
• Parameters
It is possible for all sub measurements to have the
same name, but it is not recommended.
When you create a new sub measurement with parameters, their values are equal to the previous ones by default. You can then
change them.
All these properties can also be seen during the
process 'Edit measurement', where it is apparent which properties are common
or not.
Apart from sub measurements there are
also figures, which are parts of a measurement created when you
pause by using ESC. (See Measuring in image files/Types and
method of measurement/Length measurement/ Measuring
discontinuous segments)

4.12 Continue measurement (subtract) XE "Continue
measurement (subtract)"
Using this button, you can continue the selected measurement in cases where you wish to subtract the area of already drawn surfaces (e.g. in the facade, by removing the surface area of the wall openings). By doing so a new sub measurement is created (See Drawings/Continue measurement). The surfaces that you remove from the measurement are marked on the drawing with crosshatching, while the outline of the areas removed is marked with a dashed line. In length measurements you can also remove parts of lines which are then marked with a dashed line.
Continue measurement (subtract) cannot be performed on count measurements . The button is deactivated too.

4.13 Show all measurements XE	
"Measurements:Show all"	

By selecting 'Show all measurements', all the measurements appear on the measurement sheet and the check box of the column 'Visible' appears checked.

4.14 Hide all	measurements XE	"Measurements:Hide
all"		

By selecting 'Hide all measurements', all the measurements disappear from the measurement sheet and the check box of the column 'Visible' appears unchecked.

4.15 Copy visible measurements XE

"Measurements:Copying"

Using this button, all measurements which are currently visible are copied to the clipboard. They can then be pasted in another measurement sheet of the same or different drawing of the current project.

You can use this button when, for example, all measurements are similar on different floors, or if a drawing is changed. Copy all the measurements and modify the ones that need to be adapted to the new drawing.

4.16 Paste measurements XE"Measurements: Pasting"

8
This button pastes the copied measurements to the current measurement sheet. If you have set the same origin in both measurement sheets (See
Drawings/Drawing Properties/ <u>Origin</u>
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
), the measurements are automatically pasted in the exact same position as in the initial measurement sheet.
initial measurement sheet.
Note that you should be very careful in setting the
origin (reference point) in the case where the measurement sheets belong to
different drawings. If the origin has changed in the new version of the drawing,
its position should be reset before pasting the measurements.
If there are already other measurements on the
measurement sheet where you paste, then only those with different names from
the existing ones will be pasted.

5 Drawing windows

Drawing windows is the area where you make your measurements. They are located at the right side of the application window and each one corresponds to a measurement sheet of the drawings tree view. A new drawing window opens when you:

measurement sheet is a <u>Ref361045442 \h</u> Add "New:Drawing" XE "E		E
).	E118C8200AA004BA90B0200000008000000	<u>JUEUUU</u>
,		DEE
Create a new measurement	sheet of an existing drawing (See Drawings/	<u>REF</u>
D (D04045464)]		
<u>Ref361045464 \h</u>		
 New measurement sh 		
08D0C9EA79F9BACE	E118C8200AA004BA90B0200000008000000	00E000

).
Open the current measurement sheet by using the
button, by double clicking on it or on one of its measurements (See
Drawings/ <u>REF_Ref361045495 \h</u> Open measurement sheet XE
"Opening:measurement sheet "
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E000
)
You can open as many drawing windows as you wish. Each one has a tab with
the title of the corresponding measurement sheet and the \mathbf{x} mark which is used to
close it.
At any time, one of the open drawing windows is current, which means that
appears in front of all others. The corresponding measurement sheet of the
current drawing window, along with its measurements, are marked with gray color on the tree views of both 'Drawings' and 'WBS' tabs.
color on the tree views of both Drawings and WD3 tabs.
At the top of the drawing window there are buttons for
managing drawings and measurement sheets and buttons to be used as tools for
the measurements. The following chapters contain detailed description of the
measurement procedures in case of image files (See Measuring in image files
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
) and of vector files (See <u>Measuring in vector files (CAD)</u> 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
) as well as description of many auxiliary functions and tools (See <u>Auxiliary</u>
measuring tools
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
).
1.

5.1 Plot (Ctrl+P) XE "Printing: Drawings" XE "Drawing: Printing"

Using the 'Plot' button, you can print the current measurement sheet you see on the screen, including measurements that you have created. Click the 'Plot' button, or, alternatively, you can use the **Ctrl**+**P** shortcut. The print-parameters configuration window will open:

In the 'Plot margins' field, you may set the margins of the page and the alignment of the drawing on the paper by selecting 'Upside – Down' and 'Center to paper'. In the 'Orientation' field, set the orientation of the XE "Drawing: Orientation" XE "Orientation" drawing. Click on the 'Portrait' option to vertically orientate the drawing and on the 'Landscape' option to horizontally orientate the drawing. In the 'Paper' field, you may set the dimensions of the printing paper either by selecting any of the predefined formats (letter, legal, A3, A4, A5 etc.), or by setting the paper dimensions in the 'Custom' field.

In the 'Scale' field, you can set the printing scale of the drawing by filling in the

respective 'Printer Units' and 'Drawing Units' fields. Alternatively, you can

customize the drawing to the paper dimensions regardless of the scale by selecting 'Scale to Fit'.

In the 'Display options' field, you can select the B&W printing option by clicking on the 'Black and white' option or the 'Grayscale' one. You can print the drawing as an image file, by selecting the 'As bitmap' option. You can also change the line width per color by pressing the 'Pen assignment' button.

In the 'Print area' field, you have the possibility of selecting the area you want to print. If you want to print a part of the drawing, select the 'Window' option and then click on the 'Pick' option to mark this part on the drawing. If you wish to print the entire drawing, just click on the 'Extends' option.

In the 'Preview options' field, you can select either the partial or the full preview of your drawing.

Click on the 'Update preview' option each time you change any of the printing settings in order to refresh the preview, unless of course the preview is automatically refreshed. Choose the 'Select Printer field. In the respective fields of the window that appears on the screen you may select the printer as well as the printing properties 'Properties'.

Check the 'Save to file' option, click the 'Save to file' button that appears and save the file in order to print it later on.

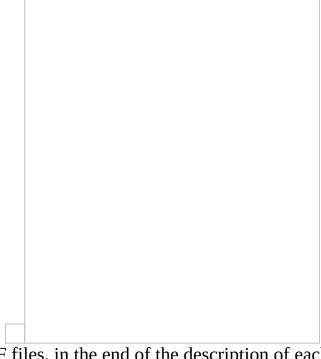
Click 'Print' to print the drawing or click 'Exit' to close the printing window.

Color printing of a drawing (or part of a drawing
with active measurements (or some of the measurements) can be of great aid
when checking measurements.

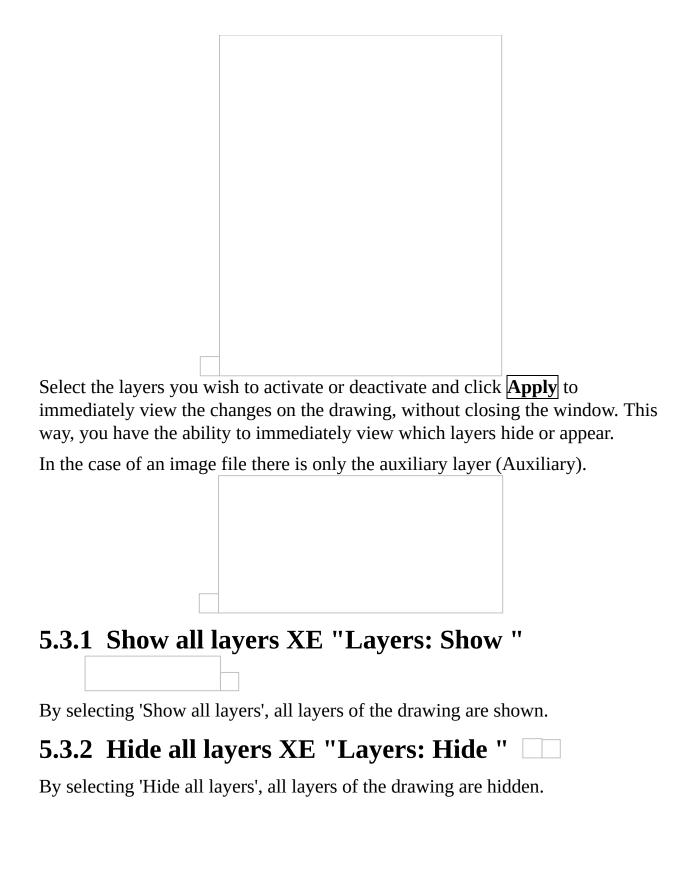
5.2 Measurement analysis XE "Measurement analysis"

Using this button you can preview and print the analysis of the measurements. The analysis is based on the template which you select from the drop-down menu and includes dimensions marking and details of surfaces calculations. Measurement analysis is explained in detail in a separate chapter (See Measurement analysis 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000000005F).

5.3 Drawin	g Layers XE	"Layers"	XE	"Drawing:
Layers"				



In the case of XREF files, in the end of the description of each layer, the word XREF and the name of the drawing from which it originates appear in parenthesis.



5.4 Export Drawing XE "Exporting:a drawing" XE "Drawing: Exporting "

Using the 'Export drawing' button, you can export the current measurement sheet to a separate file, including the measurements you have created. The drawing can be exported only if it is saved in the database and not as an external reference.

You can export the drawing to various file types, such as: dxf, dwg, dgn, wmf, bmp, gif, jpg, tif, png, ico, svg, dwf, pdf.

Using the export option in the above file types, you can edit
he drawings along with the measurements in specialized design applications or even transfer them along with their measurements to another computer in the
form of a .pdf file for checking purposes.
When exporting the drawing only the visible measurements are exported, as separate layers. That enables you to export the drawing with only he measurements you want each time and then edit it easily using a CAD software.
The export file does not contain any data from
external references of the drawing, if there are any. In addition, if the drawing is
not stored into the project but is an external reference itself, then only the layers
of the measurement sheets are exported and not the original drawing.

6 Measuring in image files XE "Measurements:in Image Files"

6.1 Initial settings

Every time you import a new image file into the project (Drawings/Add drawing), a message box appears which guides you through the initial settings you have to establish:

- Rotate and level the drawing, if needed
- Set the drawing scale
- Set the origin, if you wish to copy measurements

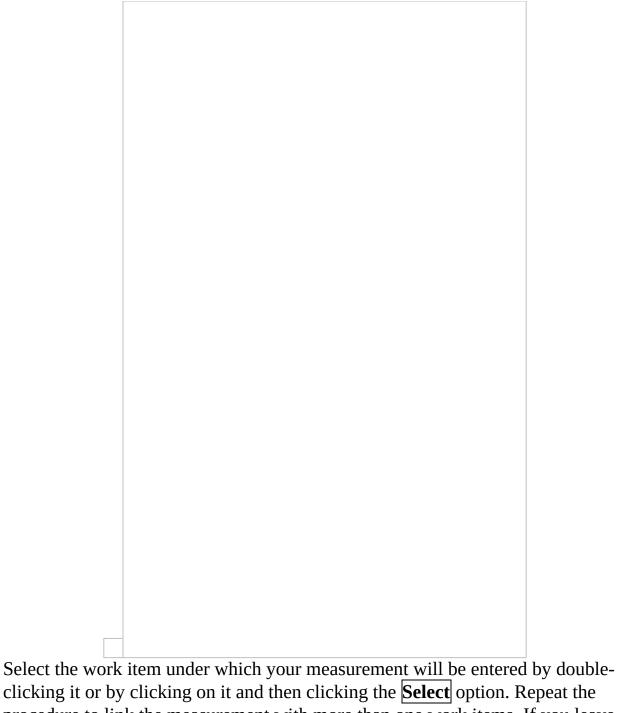
You can find all these initial settings at the drawing's properties window (See
Drawings/ <u>Drawing properties</u> XE "Drawing: Details" XE "Drawing: Properties
п
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005

6.2 Types and method of measurement XE "Measurement:Types" XE "Types of measurement"

measurement "
6.2.1 Object count XE "Item Counting"
XE"Counting items"
Using this button, you can count objects on the drawing, e.g. how many sinks,
doors, windows there are in a drawing. Click the button and the following window will appear:
Description XE "Measurement:Description"
Enter the description of your new measurement in the Description field, e.g. internal doors.
Category XE "Measurement:Categories"
Select the category to which you wish to add your new measurement, thus grouping the measurements (See General/ <u>REF_Ref361045877 \h</u> Measurement
categories XE "Measurement:Categories" XE "Categories"

08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F). For example, you may enter all door measurements in a specific category in order to filter the measurement table's data and export to Excel only this particular category (See Appendix/Filters/Sorting 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F Work item XE "Measurement:Work Item" button and the 'Associate measurement with WBS items' option window will appear. Click the ' Associate with WBS item' button to link the measurement with the work items you have entered into the WBS (See General/WBS (Ctrl+B) XE "WBS" XE "Budget" XE "BOQ" XE "Options commands project: Work Breakdown Structure " 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F). In case you do not desire to enter the measurement under any of the work items, you can leave the corresponding field blank. If you click one of the measurement buttons () while the WBS tab is open in the left part of the screen and some work item is selected then this work item is automatically selected as the linked to the current measurement work item. In the Standard version, where it is not possible to link a measurement with more

than one work items, the WBS window appears on your screen immediately.



Select the work item under which your measurement will be entered by double-clicking it or by clicking on it and then clicking the **Select** option. Repeat the procedure to link the measurement with more than one work items. If you leave the 'Formula' field blank or type the letter **R** (**R**esult), then the primary measurement result is entered into the WBS.

If you wish for a	modified result to be entered under the work item,	vou should
•	conding field using the available parameters and fur	-
General/Library/	/New measurement/ <u>Parameters</u>).	•
	If you hover the mouse pointer over the 'Formula'	column
header, a tooltip	pops up. There you can see all available parameter	
their description	1S.	
	In the WBS window you can select more than one	work item
by using CTRL	or SHIFT and simultaneously link them to the me	easurement.
	If you select more than one work items to link to t	he
measurement, tl	hen they all appear at the 'Description' field, separat	ted by
commas.		
If	there is a mistake in the expression, then the result a	appearing in
the work item is	s -1 .	-

Attention ! When a measurement contains a factor that is
different from 1, be careful when linking it to a WBS item. If you type anything
in the 'Formula' field even only the letter ${f R}$ (${f R}$ esult), the factor ${f is}$ not taken into
account.

You can use the extra results of the different types of measurements, based on the following table (See General/Library/New measurement/<u>REF</u>

<u>Ref361045970 \h</u> Calculations

<u>08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F</u>

TABLE FOR EXTRA MEASUREMENT RESULTS	
Item count	n/a
Length measurement	A C
Area measurement	
-on drawing's level	L C
-perpendicular to drawing	L A C
-by item count	n/a
Volume measurement	
-area on drawing's level	L A C
-linear object	L A C
-by item count	n/a

When you select a work item, the measurement unit of the primary measurement is not automatically updated according to the unit of the work item with which it is linked. If, for example, you want to count the number of the windows, and the respective work item unit in the WBS is m2, as soon as you select the work item, the measurement unit remains items. By using an appropriate formula or factor, you can convert the result of the basic measurement to comply with the work item's units.

New work item XE "New:Work Item"

Using this button, you can enter -during a measurement- a new group of work items or a new work item that does not exist in the WBS, and link it to the result of the measurement. If you click the 'Add work item' button, the 'WBS' window will appear on your screen. Add the desired group/work item (See General/REF_Ref361045984 \h_* MERGEFORMAT WBS (Ctrl+B) XE "WBS" XE "Budget" XE "BOQ" XE "Options - commands project: Work Breakdown

<u>08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000E0000005</u>] and click 'Close'. The changes will appear in the 'Select Work Item' window as
) and click '(lose'. The changes will appear in the 'Select Work Item' window as
,
well as in the 'WBS' tab (See <u>Work items</u> 08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005
).
Apart from adding a group/work item, you can
also edit the description or any other detail of the existing groups/work items in
the WBS or even delete some of them.
Color XE "Colour"
You can change the default color which will be used to mark the items you want
to measure.
The last selected color and measurement unit are retained in
future measurements, when you assign the same work item. Of course, you have the option of changing them again.

Factor

The 'Factor' field allows you to increase or reduce a result (the primary result, as shown in the 'Drawings' tab; in the 'WBS' tab there can be modified results too) as well as to convert it to a different measurement unit. For example, suppose

grid weighs 100kg. Enter 100 and kg in the factor and Unit fields respectively and the total weight of the grids will be immediately calculated.
In the Pro version, you are advised to use appropriate
calculation formulas instead of a factor when linking a measurement to a work
item.
In the case where, for example, besides the area
measurement of a floor, you wish to calculate the number of tiles needed, you can add an extra work item to the WBS, named 'Tile number,' with items as its unit of measurement. You can then link the measurement with this new work item using an appropriate factor to convert area to items. Be careful to set the unit price of this work item to zero, so that it does not alter the total cost.
In case of linking a measurement that includes a factor that is
different from 1 to a work item be very careful. If you type anything in the
'Formula' field even the letter ${f R}$ (${f R}$ esult), the factor is not taken into account.
Attention The companion in the (Formula) refere to each
Attention! The expression in the 'Formula' refers to each submeasurement separately as well as to the letters R (R esult), L (L ength), A (A rea). e.g if you type the expression R+1 in the 'Formula' field and then continue the measurement twice thus creating three submeasurements (See Drawings/Continue measurement), the final result will be (R1+1)+(R2+1)+(R3+1) = R+3 instead of R+1 where R1,R2,R3 symbolize the results of the submeasurements and the letter R their sum. This is needed since the values of custom measurements parameters that are used in formulas may be different per sub-measurement (eg. height).
Unit XE "MU" XE "Unit"
The default primary measurement unit is items. You can change the measurement unit (See Measuring in image files/Types & method of measurement/Object count/ <u>Factor</u> 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F
).
The unit defined at this field is the one of the primary measurement and it is only used when the measurement is not linked with any WBS work items. If such is the case, then the default unit is depending

on the type of measurement and changing it is only meaningful when using a factor to, for example, convert the number of objects to weight (Kg) or area (m2). If the measurement is linked to a WBS work item then the measurement unit is the unit of the linked work item.

Notes XE "Notes"

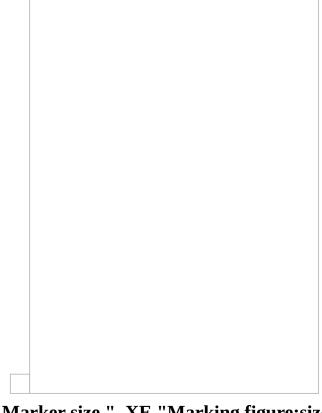
In the 'Notes' field you can enter comments that relate to this specific	
measurement.	
These notes will be exported along with the oth details to both the measurements table and the WBS table.	hei

Measurement type

There are two different ways to count items in image file: by marking items manually on the drawing or by automatic object detection.

Marking figure XE "Marking figure"

Select the shape with which the marking on the drawing will be done. The choices are circle, diamond, ellipse, etc. By using different marking figures, you can achieve an extra distinction between the items.



Marker size XE " Marker size " XE "Marking figure:size" XE " Size of

marking figure "

If the marking figures are out of proportion compared to the rest of the drawing, adjust their size by typing in this field and repeat the measurement. Keep in mind that the size also depends on the unit in use.

Measuring procedure XE "Measuring procedure "

selected figure and color appears in the position of the cursor.

Once you fill in all the desired fields, click **OK**. Note that on the left side of the screen, under the work item, a new entry is created for the new measurement.

During the measuring procedure, the 'Recording' button is constantly active.

Click consecutively on the drawing, where the items you wish to count are placed, in order to mark them. Note that with each click, a mark with the

Terminating a measurement XE "Terminating a Measurement" XE "Measurement:termination"

To complete the measuring process, right-click and a shortcut menu appears. Select 'Terminate Measurement'. Alternatively, you can stop the measuring process by pressing the **Esc** key twice.

Object search XE "Object search " XE "Automatic counting on image files"

If you select 'Object search' as a measurement type, then the following window is opened

Specify template	on image XE "S	Specify templat	te" XE "Template:S	pecify"
				_
	•	•	count on the drawing. angle by drag and drop	
the object, zoom e			angre by arag and are	
The selected temp	late will then be	displayed on th	e left side of the scree	ın
_			os of 90 degrees and n	
it about the horizo	ontal and vertical	axes.		
	Choo	se the variation	ıs you want to search l	by filling
		•	, the longer the detect	ion
symmetrical obje		ı ollili illilildis v	vhen searching for	
Edit template XI		lit "		
This option lets yo	ou edit the templa	ate you have de	fined. Use the pencil t	ool to
darken pixels or th	ne eraser tool to c	clear them.		

Load template XE "Template:Load"
Import a template you have saved on your computer beforehand.
Save template XE "Template:Save"
Export the template you have defined for later use.
Sensitivity XE "Sensitivity"
Drag this slider to the left in order to increase the tolerance in differences with
the selected template and thus make it more probable to find all its occurrences. By doing so though, more unrelated objects will also be found.
by doing so though, more unrelated objects will also be found.
Instead of decreasing the sensitivity too much, you
can adjust it to find most of the template's occurrences and then add the remaining ones manually. This can be done after completing the measurement.
Just click on the 'Continue measurement' button, which is located in the
taskbar of the 'Drawings' or 'WBS' tab and by changing the counting method to
"Mark".
Black and white threshold XE "Threshold " XE "Black and white
Threshold "
Set the threshold before a pixel is regarded black or white by the program in order to get belter results.
order to get berter results.
All images are converted to black and white when
opened.
Search objects
Press this button to trigger the search for the selected template. The results will
be displayed in the lower left corner of the screen and marked with a red

rectangle on the drawing.	
There may be unwanted items in the results list. To remove them uncheck to 'Keep' checkbox. Notice that when you click on a result item, the drawing zoom in on it, allowing you to decide if you want to include it in the	
measurement or not. Excluded objects will be marked with a blue rectangle	on
the drawing, in contrast to the red rectangle of the included ones.	
Try out different levels of sensitivity and blace	·k &
white threshold, in order to achieve the best possible result.	.ii Q
Define search region XE "Search region:Define"	
This button lets you define a rectangular search region, where object search	ı will
be limited to. By doing so, when you use 'Search object', the object	
detection will only be performed in the specified area.	
By limiting the detection process to the neces	sary
area you can save up a lot of time depending on the file size. In large imag	es the

desired object will probably be located in a smaller area only, thus it pays off to use this option.
Clear search region XE "Search region:Clear" By pressing this button you delete the search region you defined with and any object searches will be performed on the entire drawing.
If you want to define a new search region, there is no need to clear the previous one. It will be done automatically.
Update and close
This option adds the search results to the count measurement and then closes the current window. All counted objects will be marked on the drawing with the marker color and shape you chose.
6.2.2 Length measurement XE "Length
Measurement"
Using this button, you can measure the length of a single straight line, a curve, a polyline, multiple single straight lines, curves or polylines on the drawing. Click
the button and the following window will appear:

Description/Catego	ry/Work Item/Color/N	otes
(See Measuring in imag	ge files/Types & method of 1	neasurement/ <u>Object count</u>
XE "Item Counting" XI	9	
08D0C9EA79F9BACE).	118C8200AA004BA90B02	2000000080000000E0000005F
Factor		
	s you to directly increase or	reduce a result (the primary
	which is shown in the 'Dra	,
		nple, if you wish to increase
Unit	y 10%, enter the 1.1 value	in the factor neig.
	asurement unit is meters for	r the metric system and feet
	can change the measureme	_
image files/Types & me	thod of measurement/Object	ct count XE "Item Counting"
XE"Counting items"	11000000110017100700	
08D0C9EA79F9BACE).	118C8200AA004BA90B02	2000000080000000E0000005F
<i>)</i> •		

Measurement options

This region is disabled as the selection of length measurement type applies only in vector drawings.

Measuring procedure

To measure the length of a segment, click the first point that defines the distance you want to measure, move your mouse to the endpoint and click on it. If you wish to measure curved lines, click first then right-click on the point where the curve starts; from the shortcut menu that appears, select the 'Drawing arc' option, which can be enabled or disabled during a measurement. Alternatively, you can use the **F10** key.

Measuring Discontinuous Segments XE "Pausing a Measurement" XE "Measuring Discontinuous Segments"

If you wish to measure discontinuous segments, press the $\boxed{\textbf{Esc}}$ key once and then click on the starting point of the next segment and so on. As a result the measurement is temporarily paused and separate figures are created. These figures belong to the same sub-measurement (See $\boxed{\textbf{Drawings/Continue}}$ $\boxed{\textbf{measurement}}$). Thus the hierarchy is: measuremet \rightarrow sub-measurements \rightarrow figures.

In the Measurement analysis XE "Measurement
analysis" window (See Drawing windows/ <u>REF_Ref361046436 \h</u>
Measurement analysis XE "Measurement analysis"
08D0C9EA79F9BACE118C8200AA004BA90B020000000800000000000005
), each distinct segment is separated from the rest with the use of parentheses in
the calculation expressions.

Undoing a measurement (Ctrl + Z) XE "Undoing a Measurement" XE "Undo"

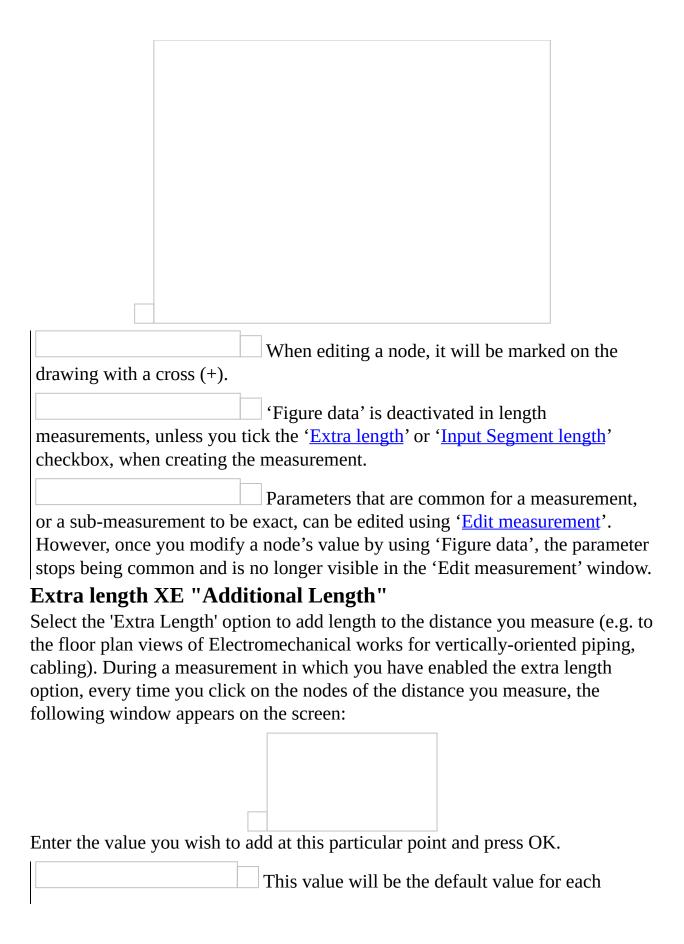
In the duration of a measurement procedure, in order to quickly correct a wrong action, e.g. in the creation of a polyline, there is the ability of multiple undoing of the last actions by right clicking and selecting 'Undo,' or, alternatively, by using the **Ctrl**+**Z** key combination.

Towningting a magazine	mant VE "Taxminati	ng a Mangawamant''
Terminating a measure		ck. A shortcut menu appears.
-	0.	you can stop the measuring
process by pressing the		
process by pressing the p		
	'Recording' button	in order to disable it.
Editing a measurement		
You can also modify a m	easurement at a later st	tage. You can edit the
•		its dimensions. Select the
	•	to show the shortcut menu,
including the options 'Ad	d node', 'Delete node'	and 'Figure data'.

Adding a node XE "Adding: Node"

By selecting this option, you will 'Add a node' in the selected closed polygon or

polygonal line (polyline).
By clicking on any point in the perimeter of a polygon or a polyline, you can insert a node there. You can then move that node and view the change in the polygon or the polyline.
Deleting a node
By selecting this option, you will 'Delete a node' from the selected closed polygon or polygonal line (polyline). By clicking on any node of the polygon or polyline, you can remove it and view the resulting change in the polygon or polyline.
The measurement result is automatically updated
with the above changes.
Measuring length on an image file can only be done using point selection. All other options are disabled.
Figure data
In many measurement types, there are parameters the values of which are different in each node of the measurement. For example, if you perform an area measurement perpendicular to the drawing without specifying a common height, then whenever you create a new node in the measurement polyline, you will be prompted for the value of height at that node. Other examples of this behavior include length measurements with an extra length or manual length input and volume measurements using linear items. You can modify the values of such parameters by selecting 'Figure data'. Then you can edit the table that is opened, where the nodes are listed in one column and the parameter values in the other. In the previous example, even if you have chosen a common height, you could still edit each node's height via the same method.



subsequent node in the measurement in such a way as not to require from the user to re-enter it —in case the additional length is equal to that of the previous node- while users have the possibility of changing it.
You may want to add an extra length to a point between the nodes of a line and at a later time. To do so, you can add an intermediate node to the polyline, then right click on it and select 'Figure data' to edit the value of the extra length. By default, the value will be copied from the previous node. Apparently, this is possible only if you have ticked the 'Extra length' checkbox, when creating the measurement.
Input Segment length XE "Input Segment length" XE "Manual
length input " Select the 'Input Segment length' option when you prefer to manually define the length of each segment instead of letting ExtrAXION to calculate it. During a measurement in which you have enabled the input segment length option, every time you click on a node to end a segment, the following window appears on the screen:
Enter the value you wish for the current segment and press OK. You can use this feature in several cases e.g. when a drawing has different scale in some regions, in isometric type drawings or if you just want to override ExtrAXION's calculations and set the length you prefer.
6.2.3 Measuring area
Using this button, you can measure the area of a surface that is either perpendicular to or co-planar with the drawing, or by counting objects. Click the button and the following window will appear:

Description/Categor	y/Work Item/Color/Notes/F	actor
(See Measuring in Image	Files/Types & Method of Measur	rement/ <u>Object count</u>
XE "Item Counting" XE' 08D0C9EA79F9BACE1	Counting items" 18C8200AA004BA90B02000000	080000000E0000005F
).		
Unit		110
	n2 for metric system and sq ft for in ing in Image Files/Types & Metl	
•	nt XE "Item Counting" XE"Coun	
	18C8200AA004BA90B02000000	00800000000E0000005F
). Analysis in triangles	XE "Analysis: only in trian	ıgles"
,	iangles' box if you wish the calcu	•
the surface area to be car	ried out using triangles only. If yo	u leave it unchecked,
	d, triangular and curved shapes w	
•	<u>861046515 \h</u>	
).	10 CO2007 II 100 TD 130 D02000000	

If the area to be calculated includes curved parts then the analysis is always carried out by the second method, even if you check the 'Analysis in triangles' box.
Analysis using only triangles is useful for on site measurements. Calculations are performed using the Heron's formula:
Measurement type
This region is disabled as the selection of area measurement type applies only in vector drawings
Measuring surface area XE " Measuring area"
On the drawing's level XE " Measuring area: On the drawing's level" Select the option 'On the drawing's level' when you want to measure a surface area which is located on the same level with the one depicted in the drawing. In order to measure the desired surface, you have to draw it again by consecutively clicking on its perimeter's nodes. During the measurement procedure, you can measure surface areas that are enclosed by curved lines XE "Curved Line" XE "Arc" by right-clicking and selecting 'Drawing arc' (See Measuring in image Files/Types & Methods of Measurement/Length Measurement/Measuring procedure 08D0C9EA79F9BACE118C8200AA004BA90B020000000800000000E0000005F).
Alternatively, you can use F10 to toggle a 'draw a curve' mode. If you want to calculate the total area of more than one surfaces in one measurement, press Esc once and then measure the next area, and so on (e.g. counting tiles in a WC and two bathrooms simultaneously). The measuring procedure can be completed by right-clicking and selecting 'Terminate Measurement,' or by pressing the Esc key twice. To continue the measurement, click the 'Continue Measurement'
button to add surface areas to the measurement, or 'Continue Measurement (subtract)' XE "Resuming a Measurement (subtract)" if you wish

subtract the area of already drawn surfaces (e.g. in the façade, by removing the surface area of the wall openings). The surfaces that you remove from the
measurement are marked on the drawing with cross-hatching, while the outline of the areas removed is marked with a dashed line.
In the case of counting items, after measurement completion, the Continue Measurement (subtract) XE "Resuming a Measurement (subtract)" option is disabled.
If you wish to subtract items, you can select them either one by one by clicking on them or all together, and then use the 'Delete selected' option.
The different types of measurements (on the drawing, perpendicular to the drawing, item counting) can be interchanged and combined (e.g. on the drawing and perpendicular to the drawing as in counting bathroom tiles), by using sub-measurements (See Drawings/Continue measurement).
The CAD vector files (.dwg, .dxf, .dgn) provide additional abilities for measuring, in comparison to the image files (See <u>REF Ref361046587 \h</u> Measuring in vector files (CAD)

08D0C9EA79F9BACE1	18C8200AA004BA90B02000000080000000E0000005
).	
Sub-measurement XE "	Sub-measurement"
	ontinue a measurement, either by addition or
-	easurement is created. Each sub-measurement appears
	vsis window XE "Measurement analysis" as an
	rings/ <u>Measurement analysis</u> XE
"Measurements:analysis"	
08D0C9EA79F9BACE11	18C8200AA004BA90B0200000080000000E0000005F
).	
Perpendicular to the dra	awing XE "Measuring surface area: Vertically to the
drawing"	wing 112 Wedouring surface area. Vertically to the
•	lly to drawing' when you want to measure a surface
-	the level depicted in the drawing.
1 1	are perpendicular to the drawing, you are prompt to
	neir base height. If the surface height is uniform, enter
its value in the 'common	height' field, as illustrated, in the following window:
	The base height does not affect the measurement
result and it's not necess	ary to be defined. However it can help you to have a

complete supervision of the drawing's measurements in 3D view. (See <u>3D View</u>
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
)
Click OK and mark the surface you wish to measure by drawing the outline of
its base.
If the height is variable, leave the common height field blank and click $\overline{\mathbf{OK}}$.
Every time you click on the nodes of the surface you measure, the following
window appears:
Specify the height of this particular point in the surface you measure.
This value will be the default value for each
subsequent node in the measurement, so as not to require from the user to re-
enter it —in case the additional height is equal to that of the previous node- while
users have the ability to change it.
You can later change the height of a node, even if
you have opted for a common height; you will alter only the value of a specific
node. To do so, right click on any node of the measurement, choose 'Figure
data' and edit the desired values in the table that is opened (See Measuring in
image files/Length measurement/Measuring procedure/Figure data).
It is also possible to input a height at an
intermediate node of the line. To do so, right click on the polyline and choose 'Add node', so that a new node is added (See Measuring in image files/Length
measurement/Measuring procedure/Add node). After moving the node to the
desired location, right click again and choose figure data, as described above.
By counting objects XE "Measuring surface area:by counting items" Select 'By counting objects' if you wish to measure a surface based on counting
items.

Mark

With this option you manually mark the desired objects on the drawing. If all

items to be counted have field, as shown in the fol	e the same area, fill in the value llowing window:	e in the 'common area'
	objects by consecutively click	ing on the drawing, where
the objects you wish to r. If the surface area of the	neasure are placed. objects is variable, leave the re	espective field blank and
click OK .	objects is variable, reave the r	especiare mera siann ana
	an object whose surface area y	ou wish to measure, the
following window appear	irs:	
Specify the surface area	of this particular object.	
	This value will be the de	
1	e user does not have to re-enter he previous object- while users	
change it.	F-2.1343 35Jeet Willie 48616	a and desirely to

Objects search

(See Measuring in image files/Types and method of measurement/Object count/Object search)

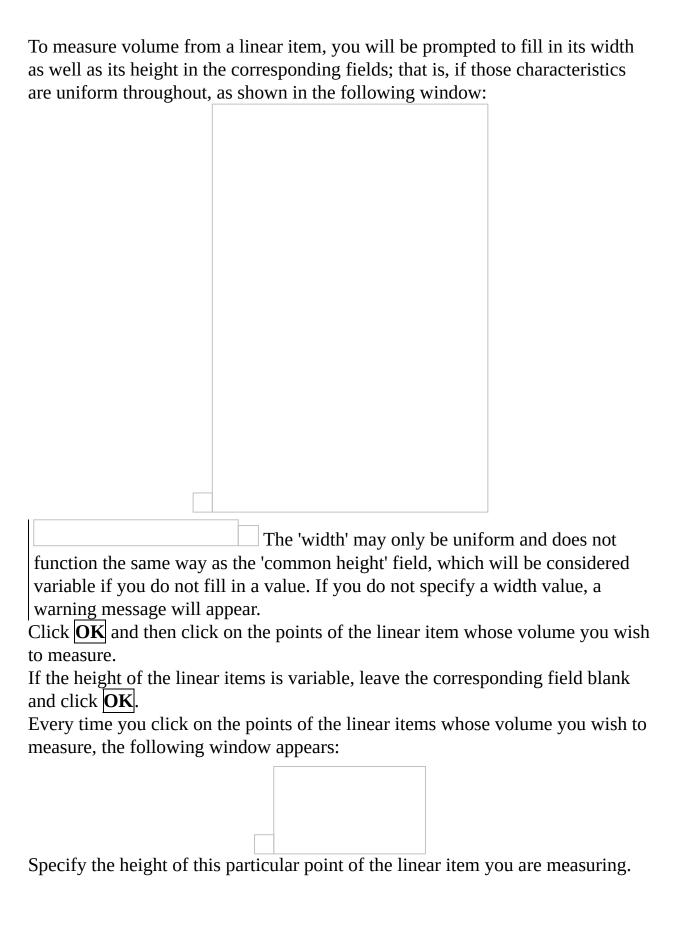
6.2.4	Measuring	g volume XE	"Measuring v	olume"
Using t	his button, you c	can measure the volu	me from a surface, a	linear item, or
-	on the drawing's owing window v	s level. Click the vill appear:		button and
	O			
		_		
Descr	iption/Catego	ry/Work item/Co	olor/Notes/Factor	r
•			thod of Measuremer <u>bject count</u> XE "Iten	
	unting items"	118C8200 A A 004B	A90B020000000800	00000F000005
).		210 CO 20 01 11 100 7D1		<u> </u>

Unit

The default volume unit is m3 for metric system and cu ft for US systems. You

can change the measurement unit (See Measuring in image Files/Types &
Methods of Measurement/Object count XE "Item Counting" XE"Counting
items"
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F
).
Analysis in triangles
(Measuring in image files/Types and method of measurement/Measuring
area/ <u>Analysis in triangles</u>
$\underline{08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005} \\$
)
Measurement type
This region is disabled as the selection of volume measurement type applies only
in vector drawings.
Measuring volume from
A surface on the drawing's level XE "Measuring volume:from Surface area
at drawing level"
Select the option 'on the drawing's level' when you want to measure the volume
from a surface which is located on the same level as the one depicted in the
drawing.
To measure the volume from a surface on the drawing's level, you have to fill in
the 'common height' field. Once you specify the height, click OK and then draw
the area you wish to measure by clicking consecutively on its nodes.(See
Measuring in image Files/Types & Method of Measurement/Measuring
area/Measuring surface area/ <u>On the drawing's level</u>
$\underline{08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E00000005}$
).
During a measurement, the different measuring methods
(measuring volume from a surface on drawing's level, from a linear item, from
counting objects) can interchange and combine.
counting objects) can interchange and combine. Linear item XE "Linear Item" XE "Measuring volume:from Linear item"

By selecting the option 'linear item' XE "Measuring volume: from Linear item' By selecting the option 'linear item', you can measure the volume from a linear item, as, for example, in the case you want to measure the volume of a trench in the perimeter of a plot, from a floor-plan view, in order to place rainwater drainage pipes.



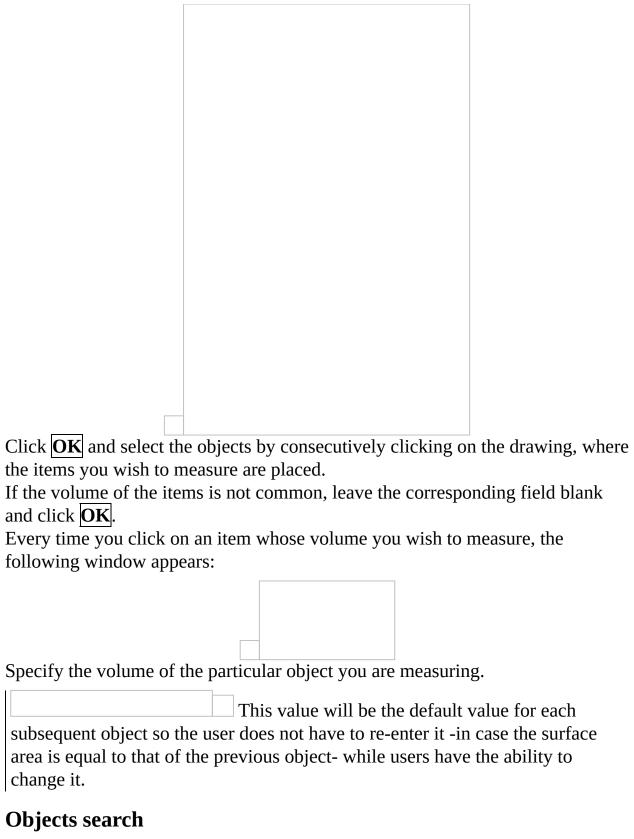
This value will be the default value for each
subsequent object so the user does not have to re-enter it -in case the surface area is equal to that of the previous object- while users have the ability to
change it.
You can later change the height of a point, even in
you have opted for a common height; you will alter only the value of a specific
node. To do so, right click on any node of the measurement, choose 'Figure
data' and edit the desired values in the table that is opened (See Measuring in
image files/Length measurement/Measuring procedure/Figure data).
It is also possible to input a height at an
intermediate node of the line. To do so, right click on the polyline and choose
'Add node', so that a new node is added (See Measuring in image files/Length
measurement/Measuring procedure/Add node). After moving the node to the
desired location, right click again and choose figure data, as described above.

By counting objects

Choose 'counting objects' if you wish to measure the volume based on objects. For example, you can measure the total volume of 5 decorative concrete globes if you know the volume of one of them.

Mark

With this option you manually mark the desired objects on the drawing. You can measure volume from items; if the volume of the items is common, you will be prompted to fill in the value in the corresponding field, as shown in the following window:



(See Measuring in image files/Types and method of measurement/Object

count/Object search)

6.2.5 Custom measurements **XE** "Custom measurements"

Using this button, you can make custom measurements you have set in the library (See General/Library/Custom Measurements 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F button and a list of the available custom measurements of the library appears. By selecting one of them, the following window appears:

The 'Measurement details' region's exact form depends on whether the custom measurement is of object, length, area or volume type.

Unit

The default unit of the primary measurement is automatically set, depending on
the type of measurement you have set in the Library. It is possible to change the
unit of measurement. (See Measurements in image files/Types and methods of
measurement/ <u>REF_Ref361046905 \h</u> Object_count XE "Item Counting"
XE"Counting items"
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005I
)
Parameters
Here appear the parameters of the current custom measurement as they have
been set them in the Library.
Enter for each parameter the values you want or leave the predefined ones.
The mark at the end of the value field
signifies that the values of the parameters can be entered either by marking
them on the drawing or by typing them in (See General/Library/ <u>Custom</u>
Measurements
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
). During defining it on the drawing, you can form one or more line segments.
When finished press ESC to add all these lengths and store the result in the
parameter. The values of the rest of the parameters can be left with their default,
or can be assigned a new value.
If you have created more than one sub-
measurements, the value of its parameters can be different for each one (See
<u>Drawings/Continue measurement</u>). You can edit these values separately for each
sub-measurement (See <u>Drawings/Edit measurement</u>). In case the parameter can
be defined on the drawing, instead of typing its new value, you can edit it by
clicking on the sign and repeating the aforementioned procedure. Note that
when doing so, you have to define all line segments from the beginning, as the
previous value is not retained.
Parameters that are defined on the drawing are
marked in a similar way to the dimension objects in a CAD program. You can
modify them by dragging and dropping the nodes of the corresponding line
segments. The value of the parameter and ultimately the measurement will be
automatically renewed.

7 Measuring in vector files (CAD) XE "Measurements:in Vector Files (CAD)"

7.1 Initial settings

Every time you import a new vector file (CAD) into the project (Drawings/Add drawing), a message box appears which guides you through the initial settings you have to establish:

- Rotate the drawing, if needed
- Set the drawing scale, if other than 1:1
- Define the folders where the external references, if any, are located
- Set the origin, if you wish to copy measurements

You can find all these initial settings at the drawing's properties window (See
Drawings/ <u>REF_Ref361046970 \h</u> Drawing properties <u>XE "Drawing:Details"</u>
XE "Drawing: Properties "
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005E

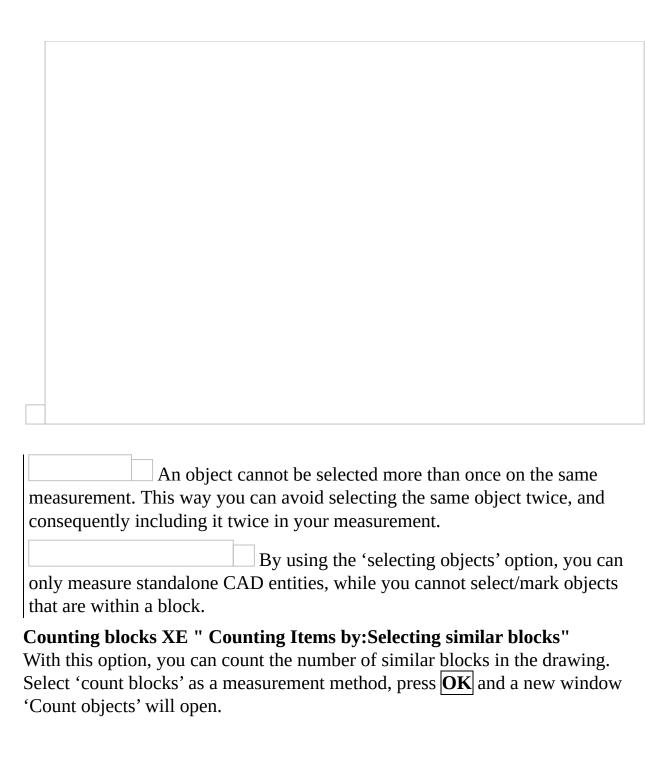
7.2 Types and method of measurement

7.2.1 Object count XE"Counting items"

J			8		
Using this button, objects in vector fi	les (CAD) as o	pposed to in		_	_
Click the appear:		button a	nd the follow	ving window wil	l
Description/Ca	tegory/Work	∢ Item/Col	or/Unit/No	 otes/Factor	
(See Measurement					ect
count XE "Item Co 08D0C9EA79F9B).	ounting" XE"C	ounting item	ns"		

Measuring procedure

Measurement by marking XE " Counting Items by: Marking " (See Measurements in image files/Types and methods of measurement/ <u>Object</u>	
count XE "Item Counting" XE"Counting items" 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000005F).	
Object selection XE " Counting Items by: Selecting CAD objects" By selecting objects on a drawing, you can measure objects which are CAD 'entities' XE "CAD Entities". On the drawing, mark the CAD objects you want to measure by clicking on any part of them. You can also select many objects simultaneously by following the same process that applies to CAD applications, e.g. by clicking on any part of the screen and dragging your cursor in such a way as to include in the marked surface the objects you wish to include in your measurement.	
If you drag the cursor to the right, then the selection rectangular is blue and only objects that are fully included into it are selected. If dragging is to the left then the rectangular is green and even objects that partially intercept are selected.	



	lock preview window
	elected blocks will be previewed in the upper left panel. Initially this window is npty.
D	rawing window
	n the right part of the screen you can move around the drawing and select ocks by clicking on them. When you select the instance of a block:
	• The block will be displayed in the preview window.
	• All instances of this block will be marked on the drawing, while the currently selected one will also be enclosed in a rectangle, marked with an
	X and zoomed in on.
	• The name of the block will be highlighted in the list and the 'Objects'
	counter will show the number of all its instances.
	Blocks belonging to invisible layers can't be
	neasured, even if they are included in the list. If you wish to count all the locks you must, before measurement, make sure that all the layers of the
	rawing are checked as visible (See Drawing windows/ <u>REF_Ref361047228 \h</u>
Γ	Orawing Layers XE "Layers" XE "Drawing: Layers"

08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000000005
). You can change the markers' color in the window's taskbar if
the one you selected when you started the measurement isn't discernible enough.
List of blocks
On the left side there is a list with the names of all the blocks in the drawing. Here you can choose a block if you know its name. You can also use the two arrows on the top to select the next or previous instance of the current block.
Check the preview of a block with an obscure name to see what it corresponds to.
Taskbar
Update and close With this button you store the counted blocks as the result of the measurement and then the window is closed.
Auto search Enabled by default, this option triggers an automatic search for all the instances of a block, every time you choose one. You can turn it off by clicking on the button Auto search.
Search objects
This button is enabled when you turn off 'Auto search'. In this mode you have to manually press the button after you select an object in order to count its instances.
Delete selected
If you select one or more markers that correspond to instances of the block you want to measure and press, they will be removed from the measurement. The change will also be reflected in the 'Objects' counter, which will be reduced accordingly.
Use this option to remove any unwanted instances, e.g. to delete the block

instance located in the drawing's legend.
Define search region XE "Search region:Define" This button lets you define a region where the search of blocks will be limited to. This region is marked with a red dashed line on the drawing. When you count blocks, any instances outside the search region will be excluded from the measurement.
The search region will be automatically deleted if you click on a block outside its boundaries. Blocks on the search region's edges are included in the measurement.
Clear search region XE "Search region:Clear" Press this button to delete the defined search region and count all the instances of a block in the drawing.
Zoom in
(See <u>Auxiliary measuring tools/Zoom in</u>)
Zoom Out
(See <u>Auxiliary measuring tools/Zoom out</u>)
Zoom Extents
(See <u>Auxiliary measuring tools/Zoom Extents</u>)
Zoom Window
(See <u>Auxiliary measuring tools/Zoom Window</u>)

Figure zoom size XE "Figure zoom size"

In large and complex drawings it is often difficult to discern the marked blocks. For this reason ExtrAXION automatically zooms in when you select a block instance. The 'Figure zoom size' option allows you to specify the appropriate zoom level. If you leave it at 'No zoom' the drawing will just be centered on the selected block.

Figure color

Choose the color of the markers used. (See Measuring in image files/ Types and method of measurement/Object count/Color).

7.2.2 Length m	easurement XE "Length	
Measureme	nt"	
polyline, multiple single	can measure the length of a single straight straight lines, curves or polylines on the vector files (CAD) as opposed to image	e drawing.
be done by selecting ob following window will	•	button and the
Description/Catego	ry/Work Item/Color/Notes/Facto	r
(See Measurements in i	mage files/Types and methods of measur	rement/ <u>Object</u>
	ng" XE"Counting items" 118C8200AA004BA90B0200000000800	00000E0000005F
). Unit		

(See Measurements in image files/Types and methods of measurement/Length Measurement).

Measuring procedure

Selecting points XE "Length Measurement:By Selecting Points"

(See Measurements in image files/Types and methods of measurement/<u>Length</u> <u>Measurement</u>)

Object selection XE " Counting Items by: Selecting CAD objects "

By selecting objects on a drawing, you can measure the length of objects which are CAD 'entities' XE "CAD Entities" . To do that, use 'select objects' as type of measurement and click **OK**.

On the drawing, mark the CAD objects whose length you want to measure by clicking on any part of them.

During a measurement, every object can be selected only onc
This way you can avoid selecting the same object twice, and consequently
ncluding it twice in your measurement.
By using the 'selecting objects' option, you can only measure standalone CAD entities, while you cannot select/mark objects hat are within a block.
During length measurement through object selection, you canno
elect and measure the length of entities that belong to a block.

Extra length

(See Measurements in image files/Types and methods of measurement/Length Measurement).

Input Segment length XE "Input Segment length" XE "Manual length input "

(See Measurements in image files/Types and methods of measurement/Length Measurement).

7.2.3 Measuring surface area

Using this button, you can measure the area of a surface that is either perpendicular to or coplanar with the drawing, or by counting objects. Measuring a surface in vector files (CAD), as opposed to image files, can also be

done by selecting objects or similar blocks. Click the button and the following window will appear:
Description/Category/Work Item/Color/Notes/Factor
(See Measurements in image files/Types and methods of measurement/ <u>Object</u>
count XE "Item Counting" XE"Counting items"
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F
). TT
Unit (See Measuring in Image Files/Types & Method of Measurement/Measuring)
(See Measuring in Image Files/Types & Method of Measurement/Measuring area).
Analysis in triangles
(See Measuring in image files/Types and Measuring procedure/Measuring area/Analysis in triangles

<u>08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F</u>

Measuring surface area

On the drawing's level XE "Measuring surface area:On the drawing's level"

Selecting points XE "Measuring surface area:On the drawing's level:by selecting points"

Object selection XE "Measuring surface area:On the drawing's level:by selecting objects"

By selecting objects, you can measure the surface area of standalone CAD entities. To measure the surface area of CAD entities, select the 'By counting objects' method and click **OK**.

Then, select the CAD entities whose surface area you wish to measure, by clicking on them or by selecting all of them at once in such a way as to include the desired entities. This way, you can measure with just one click, for example, the volume of concrete in a plan view, allowing only the corresponding layer to be visible, by specifying the height and selecting all concrete walls and props at once.

By selecting objects, you can measure of CAD
ntities, while you cannot mark areas that are not objects.

Perpendicular to the drawing XE "Measuring surface area: Vertically to the drawing"

Selecting points XE "Measuring surface area: Vertically to the drawing:by selecting Items"

(See Measuring in Image Files/Types & Method of Measurement/Measuring a Surface Area/Perpendicular to the drawing 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000005F).

Object selection XE "Measuring surface area: Vertically to the drawing:by selecting objects"

(See Measuring in vector files/Types & Method of Measurement/Measuring a Surface Area/On the drawing's level/<u>Object selection</u>

<u>08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F</u>
)

By counting objects XE "Measuring surface area:by counting items"

Measurement by marking XE "Measuring surface area:by counting items:Measurement by marking"

(See Measuring in Image Files/Types & Method of Measurement/Object count XE "Item Counting" XE"Counting items" 08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F).

Object selection XE "Measuring surface area:by Counting items:selecting objects"

(See Measuring in Vector Files/Measuring a Surface Area/On the drawing's level/<u>Object selection</u> <u>08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F</u>)

Count blocks XE "Measuring surface area:byCounting items:finding similar blocks"

With this option, you can measure the surface area of similar blocks on the drawing.

Fill in the common area of each of the blocks you will count and then press **OK**. A new window, where you can count the blocks will be opened (See <u>Measuring in vector files/Object count/Counting blocks</u>).

7.2.4 Measuring volume XE "Measuring volume"

Using this button, you can measure volume from a surface on the drawing's level, from a linear item, or from a selection of items. Measuring in vector files (CAD), as opposed to measuring in image files, may be done by selecting

objects or similar blocks. following window will a					button and the
Description/Categor (See Measuring in Image	•				
XE "Item Counting" XE'	'Counting	items"			
08D0C9EA79F9BACE1	18C8200A	AUU4B	A90B0200	UUUUUBU	JUUUUUUEUUUUUUSE
Unit					
(See Measuring in Image	Files/Typ	es & M	ethod of M	easurem	ent/ <u>Measuring</u>
volume XE "Measuring v 08D0C9EA79F9BACE1		A004B	A90B0200	0000080)000000F000005F
).	10002007	u 100∓D	115000200	0000000	7000000L00000051
Analysis in triangles					
(See Measuring in image		s and M	leasuring p	rocedure	e/Measuring
area/Analysis in triangles			- •		-
<u>08D0C9EA79F9BACE1</u>	18C8200A	<u>A004B</u>	A90B0200	0000080)000000E0000005F
).					

Measuring volume from

Surface area on the drawing's level

Selecting points

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/ <u>A surface on the drawing's level</u> <u>08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F</u>).

Object selection

(See Measuring in Vector Files/Types & measuring procedure/Measuring a Surface Area/ On the drawing's level / REF_Ref362267803 \h_* MERGEFORMAT Object selection 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F) (See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/ A surface on the drawing's level 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000005F).

Linear item

Selecting points

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/<u>Linear item</u> <u>08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F</u>)

Object selection

```
(See Measuring in Vector Files/ Types & measuring procedure /Measuring a Surface Area/ On the drawing's level /Object selection 08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005I) ) (See Measuring in Image Files/Types & Method of Measurement/Measuring Volume from/Linear item 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005I)
```

Object selection

Measurement by marking

(See Measuring in Image Files/Types & Method of Measurement/Measuring Volume/By counting objects 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F).

Object selection

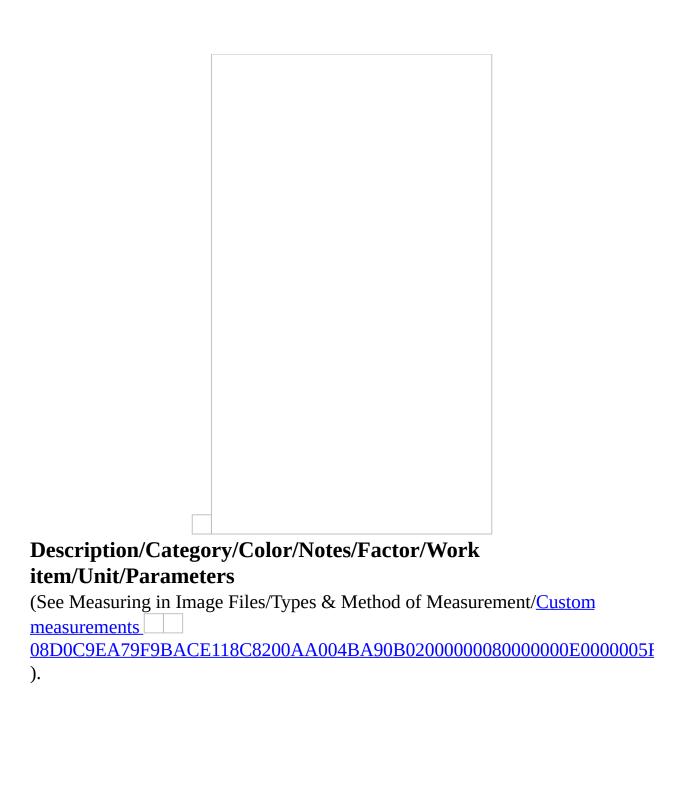
By selecting objects, you can measure the volume of standalone CAD entities. You will be prompted to fill in the common volume of the objects you want to measure. If the objects' volume is not common, leave the field blank so that every time you select a CAD entity by clicking on it, you will be asked to enter its volume.

Identical blocks

(See Measuring in Vector Files/ Types & measuring procedure /Measuring Surface Area/By counting objects /<u>Count blocks</u> 08D0C9EA79F9BACE118C8200AA004BA90B020000000800000000005F).

7.2.5 Custom measurements XE "Custom measurements"

Using this button, you can make custom measurements you have set in the
library (See General/Library/ <u>Custom Measurements</u>
<u>08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005I</u>
). Click the button and a list of the available custom measurements of the
library appears. By selecting one of them, the following window appears on your
screen:

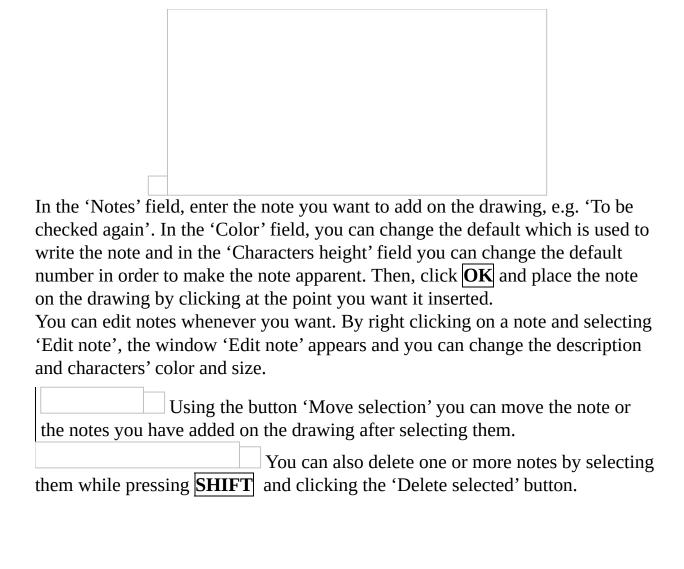


8 Auxiliary measuring tools

8.1 Rec	cording	
The		Recording button is activated during a
measuremen	nt, and it is deactiv	vated once the measurement is completed. By
clicking the	button while it is	activated, you stop the measurement.

8.2	Annotations
8.2.	1 Draw measurement region
measi monit	this button, you can mark the areas of the drawing where the arements have been completed. This option offers you the ability to better or the areas that have already been quantity surveyed. If you click the a, the following window will appear:
to 6/3 mark meason the E doubl and y the m Furth	'Description' field, enter the description of the measured area, e.g. 'OK up /2011'. In the 'Color' field, you can change the default which is used to each measured area. Then, click OK and draw the area where all trements are complete by consecutively clicking on its perimeter's nodes. Implete the marking procedure for the measured area, right-click or press key. You have finished marking the measured area, you can modify it. By the clicking any part of the area, the 'Measurement Area' window appears ou can change both the description of the measured area and the color of the arking. The procedure for the measured area area area area and the color of the arking. The procedure for the measured area area area area and the color of the arking. The procedure for the measured area area area area and the color of the area.
	By disabling and enabling the auxiliary layer, the ing of the measured area and the setting of the scale in image files hide and, respectively.
8.2.	2 Add note XE "Add note"

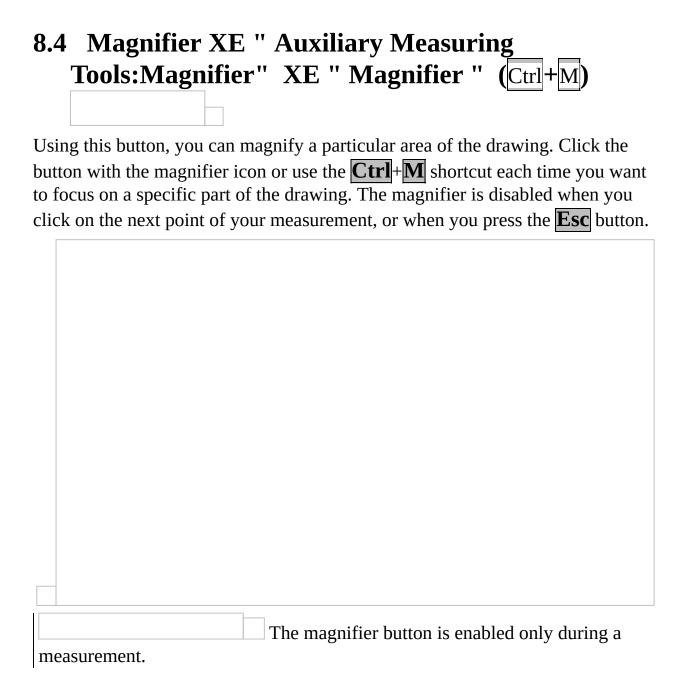
Using this button you can add notes on your drawing. If you click this button the following window will appear:



8.3 Define analysis region

Using this button you can draw a rectangular area on the drawing in order to define the measurements that will be included in the analysis of the current measurement sheet. Click and drag the cursor to define the region and click again to complete it. Analysis regions on the drawing are distinguished by a red dashed line.

You can define as many analysis regions as you
wish. Each region will appear in a separate tab of the analysis window. If there is no analysis regions defined then the whole drawing is considered as one region.
Note that, for a measurement to be included in the analysis of a region, it must fully surrounded by the region's rectangle.
If a measurement is included in more than one analysis regions, it will be analyzed and appear in all of them.
You can resize an analysis region after its creation. Click on it to select and then drag the upper-left or the lower-right handle to change its size. Click again to complete the resizing.
You can delete a region at any time. Click on it to
select and then click the 'Delete selected' button.



Tools:Deleting Selected " This button allows you to delete the selected lines, curves, or points that were created on the drawing during the measurements, without deleting the entire measurement (See Drawings/Delete measurement 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F Click on the drawing at any point of the measurement layer you wish to delete, and then click the 'Delete selected' button. Deleting selected areas is accompanied by the update of the relevant measurements results in both 'Drawings' and 'WBS' tab tree views. Besides measurements, you can also select and delete measurement regions and analysis regions.

8.6 Duplicate selection XE "D	Duplicate:selection" 📖
You can copy one or more parts of the same of selecting them on the drawing, pressing this be Moving is performed by defining the start and These copies will then be automatically added the values of which will be increased.	or multiple measurements by button and moving them around. Indeed, and point of a point of reference.
	ress and hold Shift or use the

8.7	Move selection	XE	"Moving:sel	lection"	
------------	-----------------------	----	-------------	----------	--

Same as before (See <u>Auxiliary measuring tools/Duplicate selection</u>), but without creating copies or modifying measurements.

8.8 Rotation
Having selected one or more parts of one or more measurements, you can rotate them using the options shown to the following drop down list.
8.8.1 Rotate
You can rotate the selected measurement around a center of rotation you are asked to define on the drawing.
8.8.2 Rotate anticlockwise 90°
You can rotate the selected measurement 90° anticlockwise.
8.8.3 Rotate clockwise 90°
You can rotate the selected measurement 90° clockwise.
8.8.4 Mirror horizontally
You can rotate the selected measurement around the horizontal axis.
8.8.5 Mirror vertically
You can rotate the selected measurement around the vertical axis.
In order to select more than one objects, you can select them one by one while pressing SHIFT or using rectangular selection frames like you do in a CAD program.

8.9 Zoom-in XE " Auxiliary Measuring Tools: Zoon	1-
in" XE "Zoom-in"	
Click this button to enlarge the drawing.	
You can also zoom-in by clicking on the part you want to enlarge and then rolling the mouse wheel forwards.	

8.10 Zoom-out XE " Auxiliary Measuring Tools:Zoom-out" XE "Zoom-out"

	10018:Z00m-out	AL	Zoom-out
Clicl	this button to zoom out o	of the dr	awing.
	You can also	zoom o	ut by clicking on the part you want to
redu	ice and then rolling the m	ouse wh	eel backwards.

8.11 Zoom extents	XE '	' Auxiliary	Measuring	Tools:
Zoom extents "	XE	" Zoom:ex	tents "	

Click this button to fit the drawing to the dimensions of your screen. The drawing is moved and resized (using the appropriate zoom) so that the entire drawing appears on your screen as large as possible.

8.12 Zoom window XE " Auxiliary Measuring Tools:Zoom window" XE " Zoom:window "

Press this button to zoom in a specific part of the drawing. Click on the drawing and define, by dragging, the desired part where you want to enlarge.

8.1	3 Refresh XE "	Auxiliary	Measuring
	Tools:Refresh"	XE "Refr	esh"

Using this button, you can refresh the current drawing (redraw).

8.14 Black & White

CAD Drawings usually have plenty of colors and the measurements may not be easily identified. Using this button you can convert the drawing into black &white with only the measurements' layers remaining colored. You can see the difference at the following windows:

The black & white view is possible only for vector drawings and not in image files.

8.15 Ort	ho (F8) XE " Auxiliary Measur	ing Tools:
Orth	o " XE " Ortho "	
•	utton, you can move exclusively horizontally call ternatively, you can use the $\mathbf{F8}$ key.	or vertically in the

8.16 Object snaps (Osnaps) XE " Auxiliary Measuring Tools: Osnaps " XE " Auxiliary Measuring Tools: Object snaps " XE " Osnaps " XE " Object snaps " Using this button, you, can choose to activate object snapping. Set the points where you wish snapping to be possible. The options are shown in the following window:

Click **Select all** in order to activate all snaps with one click, **Clear all** in order to disable all of them and **Defaults** in order to reinstate the factory presets.

	You can enable, disable or change the osnap
options as many times as y	ou wish during a measurement.
	If you modify any of the default osnap options, they
are temporarily saved till y	ou close the project you are working on. Note that
these options apply only to	the sheets of the current drawing.

8.17 Show zoom-and-pan window XE " Auxiliary Measuring Tools: Zoom-and-pan window "XE" **Zoom-and-pan window** " Using this button you can activate or deactivate the zoom-and-pan window, so that is does or does not show in the lower right part of the screen. In the case of very large files, it is recommended to use alternative ways of zooming and panning, and not the zoom-and-pan window.

Having the zoom-and-pan window activated, you can pan the drawing by moving the red frame, which marks the part of the drawing that is visible in the right part of the screen. To zoom in or out, move the zoom indicator towards the + and - respectively.

8.18 Compare XE "Compare drawings"
You can compare different versions of a drawing and easily find what has been added, removed or modified.
By clicking on this button the drawing
comparison starts and a new window is opened. After you have finished, press it again to exit the comparison mode.
8.18.1 Select drawing
Choose a drawing from your computer to compare with the current one. You can perform comparisons between image files (.jpg, .png, .pdf) or between vector drawings (.dwg, .dxf) but you cannot mix them up.
8.18.2 Image comparison XE "Compare image
drawings"
This checkbox is activated only in vector drawings. When checked, the drawings will be converted to images and then the comparison will take place.
8.18.3 Sensitivity XE "Sensitivity"
This slider is activated when comparing image files or when you have checked 'Image comparison'. Adjust it to define how great a difference must be in order for it to be marked and displayed.
Try to decrease the sensitivity in order to ignore false positive differences, due to the slightly different scale or the image quality of the two drawings.

8.18.4 Image height XE "Image height"

This field is activated when comparing image files or when you have checked 'Image comparison'. It is the height in pixels of the images when they get compared.

8.18.5 Calibrate XE "Calibrate"

Click on the downwards arrow to view a drop down menu with the following actions:

Type the scale, choose from a list of standard ones, or define it on the new

Set rotation

Rotate the new drawing.

(See <u>Drawings/Drawing properties/Rotation</u>)

Set scale

drawing.
(See <u>Drawings/Drawing properties/Scale</u>)
In image files, defining the scale on the drawing isn't
perfect in terms of accuracy. Thus the two drawings will most likely have a
slightly different scale. If the comparison marks everything as being different,
try to decrease the sensitivity or increase your accuracy with a higher zoom
level when defining the scale.

Set origin

Define the (0,0) point of the new drawing. (See <u>Drawings/Drawing properties/Origin</u>)

	In vector drawings you can use the Objects snaps to
have perfect accuracy.	
	While setting the origin isn't generally required in
vector drawings, unless i most likely necessary.	t was changed by their author, in image files it will be

8.18.6 Overlay XE "Overlay"

After you have selected and calibrated the second drawing, press $\overline{\mathbf{OK}}$ and wait while ExtrAXION performs the comparison. Once the execution is completed, the two drawings are displayed overlaid.

- Grey items are identical in both drawings.
- Blue items are found only in the second drawing.
- Red items are found only in the first drawing.
- When an item is changed, then it is colored green.

	Changed items can be detected only in vector
drawings.	
<u> </u>	
	To end the comparison and return to the original
	To view a more detailed comparison follow the next
instructions.	

8.19 Show drawing's versions comparison XE " Show versions comparison " This button is activated only when you compare two drawings. Press the button to open a new window, where you can move between the first drawing, the second and their overlay by clicking on the respective tabs. (See Auxiliary measuring tools/Compare/Overlay)

8.20 3D View	
Using this button you can see the measurements of the drawing on 3D view. You can see perpendicular to the drawing area measurements and inclined area measurements and point out mistakes that are not visible on 2D view (e.g. wa height less than the roof's base height).	
8.20.1 Plot (Ctrl+P) ΧΕ "Εκτύπωση σχεδίου" ΧΕ "Σχέδιο : εκτύπωση"	
Using this button you can plot the drawing's 3D view (See Plot (Ctrl+P) X "Printing: Drawings" XE "Drawing: Printing" 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E00	
8.20.2 Export drawing	
Using this button you can export the drawing's 3D view to several file typ (See Export Drawing XE "Exporting:a drawing" XE "Drawing: Exporting	
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E00	000
8.20.3 Rotate 3D	
Using this button you can rotate the model/object. When you activate this	

button a circle appears on your screen and you can rotate the model/object pressing the left button of the mouse and moving it towards the direction you want.

Depending on where you place the cursor according to the circle, the rotation type changes as well as the cursor's shape. There are the two following cases:

Placement of the cursor in the circle.

If you press the left button of the mouse while the cursor is in the area inside the circle and move the mouse keeping its left button pressed, you can rotate the model in three dimensions.

Placement of the cursor out of the circle.

If you press the left button of the mouse while the cursor is out of the circle and move the mouse keeping its left button pressed, you can rotate the model around the level that is defined by x, y axes.

8.20.4 Views

Clicking this button appear many preset viewpoint options, which you can see at the following window:

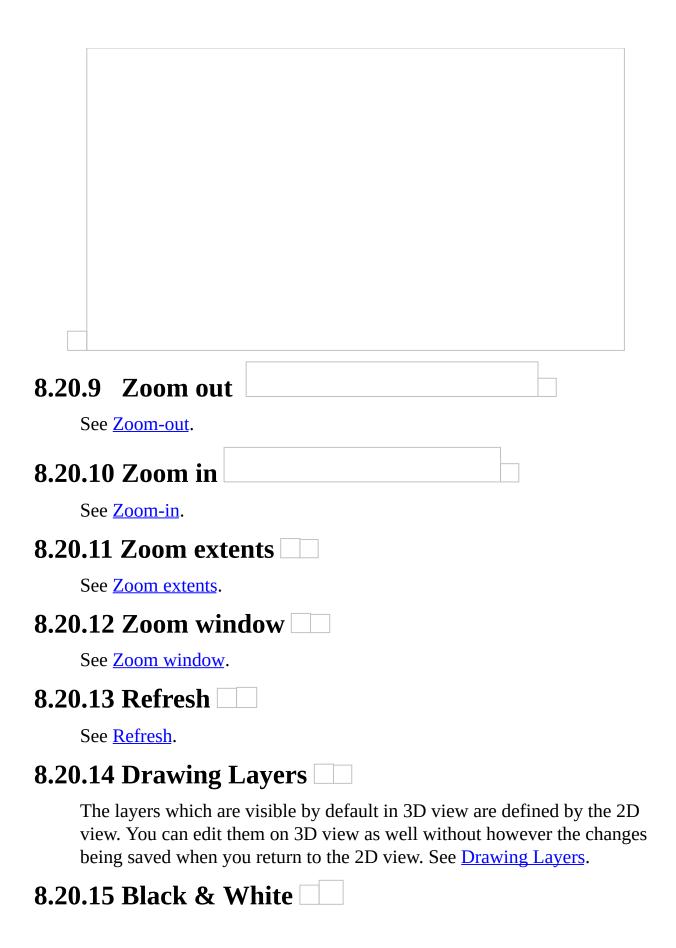


Top:: You can see the 3D model from the top.

Bottom: You can see the 3D model from the bottom. Left: You can see the 3D model from the left. Right: You can see the 3D model from the right. Front: You can see the 3D model from the front. Back: You can see the 3D model from the back.
Back: You can see the 3D model from the back. NE: You can see the model from the Northeast direction.
NW: You can see the model from the Northwest direction.
SE : You can see the model from the Southeast direction.
SW : You can see the model from the Southwest direction.
8.20.5 Render Using this button you can see the model as a compact, colored solid.
8.20.6 Shade on

This button has the same features with the previous one 'Render', with the difference that the model's edges are emphasized.

20.7	Hide			
		n you can vi ne ones bein	-	ges that are in
	T 4 7 °			
20.8	Wire			

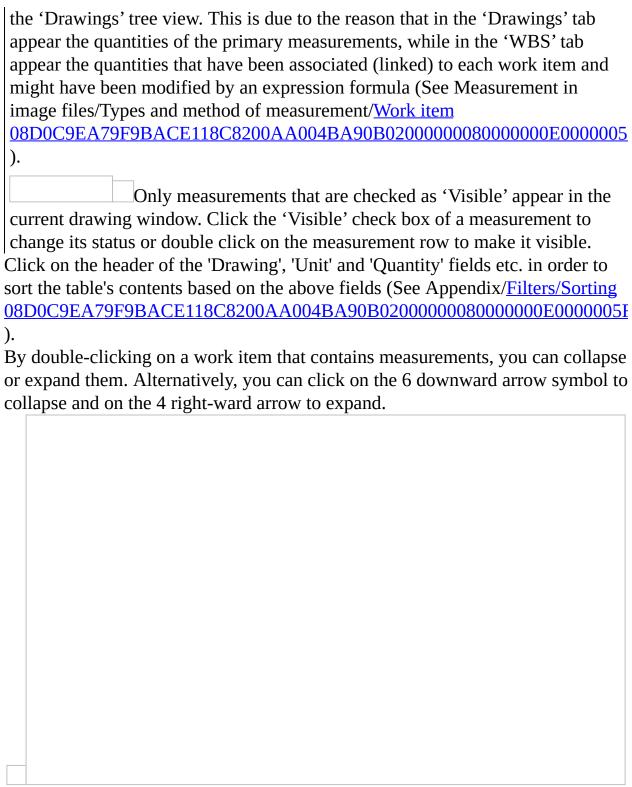


See Black & White.

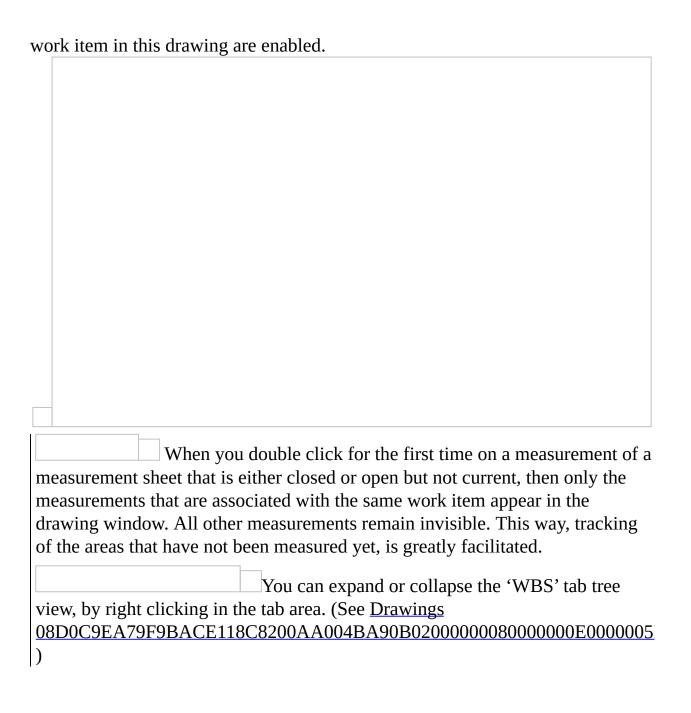
9 Work items XE "Work Items"

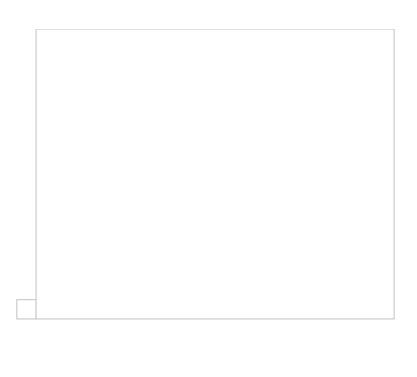
9.1 General

view all of your project's work items as you entered them in the WBS (See General/WBS (Ctrl+B) XE "WBS" XE "Budget" XE "BOQ" XE "Options - commands project: Work Breakdown Structure " 08D0C9EA79F9BACE118C8200AA004BA90B020000008000000E0000005E), as well as the measurements you have linked with each work item.
commands project: Work Breakdown Structure " \(\begin{aligned} \text{08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E00000005F} \end{aligned} \)
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F
), as wen as the incusarements you have minet with each work item.
The 'Work Items' tree view table, by default, shows in columns the description of
WBS work-items and measurements, the measurement sheets from which the
measurements were derived, the measurement unit, the quantity, the color and the 'Visible' check box. Using the filtering, grouping, column selection, and
sorting tools, you have many options of setting the number, the form, and the
type of the data you wish to view (See Appendix/Filters/Sorting
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000000005E
).
The grantite (as solt as loss) = 6 =
'WBS' tree view might be different of the quantity of the same measurement in



If a work item includes more than one measurement on the same drawing, e.g. ceramic floors, by double-clicking on one of its measurements, the corresponding drawing is opened, and all measurement layers that relate to this





9.2	New non-drawing measurement		
	XE "Measurement:Non-		
]	Drawing"		
meas inclu	button allows you to enter a measurement which either you do not want to ure on the drawing or cannot be measured on the drawing, but you wish to de it in the WBS quantities anyway. The following window will appear of screen:		
J			
Set th	ne 'Quantity', the 'Description', the 'Category', the 'Work Item', the 'Color',		
	Jnit' and any notes you wish (See Measuring in Image Files/Types &		
Meth	od of Measurement/Object count XE "Item Counting" XE"Counting item		
08D0			
	click $\overline{\mathbf{OK}}$.		
drox	Since this measurement is not related to any		
	ring, it will not appear in the drawings tree view. Nevertheless it will be uded in the list of measurement to export (See Work items/Exporting		
	S/Export WBS measurements		
<u>500</u>	<u>0C9EA79F9BACE118C8200AA004BA90B02000000080000000E00000</u>		

9.3 Delete non-drawing measurement XE "
Deleting: Non-Drawing Measurement" XE
"Measurement:Deleting a Non-Drawing
Measurement"
This button is enabled only when you have selected an existing non-drawing measurement, so that you can delete it. Select the measurement and click
. The application will prompt you to confirm your selection.

9.4 New measurement XE "New measurement" XE "New:Measurement" You can start a new measurement while viewing the WBS tab without even opening a drawing, using the and buttons. With the WBS work-item you wish to measure selected, click the 'New measurement' button As you can see on the right, the measurement type is selected according to the measurement unit of the WBS work-item. On the left, select the measurement sheet you want from the list of sheets and click **OK**. You can add new drawings to the project directly from this window by clicking the 'Add drawing button'.

On the left cid	o of the window that appears, called the measurement she	oot vou
	e of the window that appears, select the measurement she list of measurement sheets you have created and, on the	-
desired type of	f measurement, and click $\overline{\mathbf{OK}}$. For custom measurements	s, select a
_	om the drop down menu. The measurement sheet you ha	
_	s (if not already open) and the corresponding measurement you start a measurement from a WBS work-item, the 'V	
	easurement parameters window is pre-selected (See Meas	
Image Files/Ty	ypes & Methods of Measurement/Object count XE "Item	l
O	"Counting items"	
	F9BACE118C8200AA004BA90B020000000800000001	E0000005F
). I		
	Each measurement sheet name in the lis	
followed by the	he name of the underlying drawing to facilitate its identif	fication.
	The button is disabled when you a	re at
group level.		

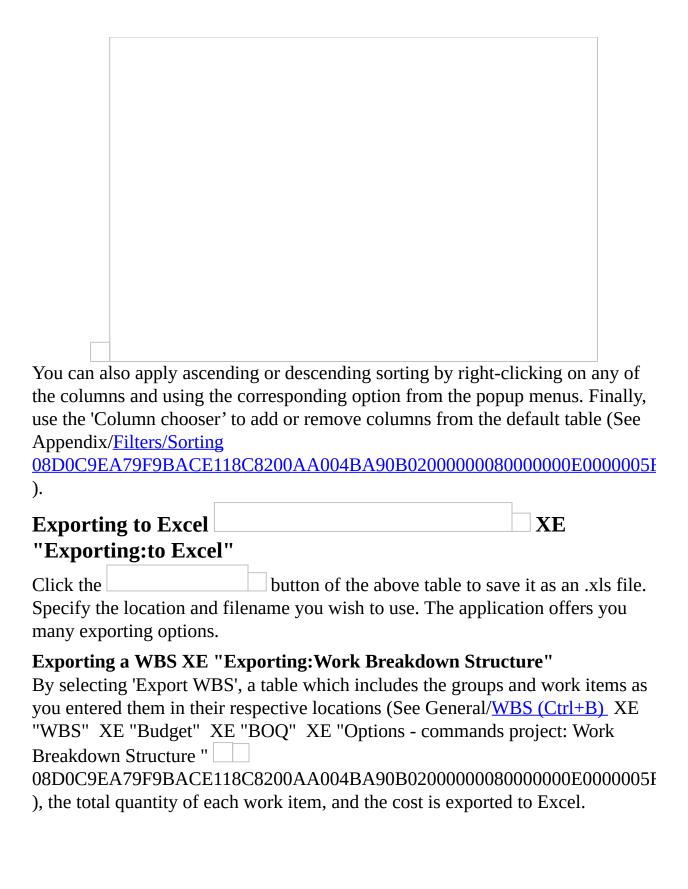
9.5 Exporting WBS XE "Exporting:WBS-measurements"

This button allows you to export work items and measurements to a table where you can make adjustments on their appearance e.g. hiding or moving columns etc. before you make the final export to an Excel table.

9.5.1 Export WBS

The table shows all WBS and measurement details in the following columns: 'Description', 'Drawing', 'Sheet', 'Unit', 'Quantity', 'Unit Price', 'Cost', 'Category', 'Description', 'Color', 'Expression', 'Notes'. Using the advanced column selection and sorting tools, you have numerous options of setting the number, the form and the type of data you wish to view or to export (See Appendix/Filters/Sorting 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000
).

Click on the header of any column to sort the table contents based on the above-mentioned fields (See Appendix/<u>Filters/Sorting</u> 08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F).



The data you export to Excel are predefined,
regardless of which columns have been added or removed using the 'Column Chooser'.
If you wish to sort data according to a column's content, the exporting procedure will be performed based on the applied sorting.
Export details XE "Exporting:analytical quantity survey"
By selecting 'Export details', you can export a table to Excel, with the neasurements that are linked to each work item appearing below it, and the ollowing measurement details: description, measurement sheet of origin,
neasurement unit, quantity (partial or total), numeric analysis of the result, and notes. The measurements and their details appear in the Excel table in blue font,
n order to be easily visible.
The data you export to Excel are predefined, regardless of which columns have been added or removed using the 'Column
Chooser.

If you wish to sort data according to a column's ontent, the exporting procedure will be performed based on the applied sorting.
Export summary XE "Exporting:quantity survey summary" Reporting the quantity survey summary includes the description of groups and ork items, the measurement unit and the total quantity that derives from the easurements.
The data you export to Excel are predefined, egardless of which columns have been added or removed using the 'Column
elector'.
If you wish to sort data according to a column's ontent, the exporting procedure will be performed based on the applied sorting.

Export work items XE "Exporting:Form Details"

By selecting the 'Export work items' option, you can export the work items table by applying any column choice or data sorting you wish. Basically, you export the table to Excel as viewed in the application (WYSIWYG). The measurements, along with their details, appear in blue font, as in the case of the detailed quantity survey.

9.5.2 Export WBS measurements

This table includes all the WBS work item details, along with their linked measurements and their details. This data appears in the following columns: 'Drawing', 'Sheet', 'Category', 'Description', 'Color', 'Unit, 'Quantity', 'Expression', 'Notes', 'Work item', 'Calculation'. Each measurement can be viewed more than once, depending on the number of the work items with which it is linked. For this reason, along with each work item appears the function that

produces its quantity value.
Using the advanced column selection and sorting tools, you have numerous
options of setting the number, the form and the type of data you wish to view or
to export. (See Appendix/Filters/Sorting
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
). Click on the header of any column to sort the table contents based on the
above-mentioned fields (See Appendix/Filters/Sorting
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
).
You can also apply ascending or descending sorting by right-clicking on any of
the columns and using the respective option from the popup menus. Finally, use
the 'Column Chooser' to add or remove columns from the default table (See
Appendix/Filters/Sorting
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
).
Export to Excel XE
"Exporting:to Excel"
Click the button of the above table to save it as an .xls file.
Input the location and the filename you wish to use.
Drint VE UDrinting to heles!
Print XE "Printing: tables"
Click this button to print the work item table. Printing includes the table's details
as you have selected them to appear on the screen, e.g. any sorting or
addition/removal of columns is preserved. Print preview appears on your screen.

Va	the table as it is an earlienne the mage the background	_ _ _ _ _
You may print	the table as it is or configure the page, the background	a, tne
_		
margins and of	her printing preferences. You may also export the file	in various
	her printing preferences. You may also export the file	
	her printing preferences. You may also export the file xls, .html, .rtf etc.) or even send a copy of the table di	
formats (.pdf, .		
formats (.pdf, .		

9.6	Edit measurement		
`	Drawings/ <u>Edit measurement</u> C9EA79F9BACE118C8200 <i>A</i>	O	00E0000005F
).			,0_000000

9.7 Measurement analysis XE "Measurement analysis" XE "Analysis: measurement"

From the 'WBS' tab select a work item (not a measurement), press 'Measurement analysis 'and wait as a new window is opened. This window is similar to the one opened if you use 'Measurement analysis' from the 'Drawings' tab (See Drawings/Measurement analysis XE "Measurements:analysis" 08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000055.

- However, there are a few new columns displayed, such as: The calculation **formula** column, which is empty unless one was created when you linked a measurement to the work item. There actually two columns; one where the variables are written as names and one where they are substituted by their values.
- The **parameter** column, where the parameters of a **custom measurement** are shown, if you created a formula containing them during linking the measurement to the work item.
- The **work item value** column, which displays the number shown in the 'WBS' tab under this work item. This is the result of the aforementioned formula, while the primary result of the measurement is the count, length, area or volume measured directly on the drawing. The

latter, which is shown in the 'Drawings' tab, might be used in a formula in order to produce the value corresponding to a work item (See <u>Drawings</u>).
If you press 'Measurement analysis while
having selected a measurement, you won't see this kind of window but a
window like the one that appears if you press from the 'Drawings' tab.

9.8	Duplicate measurement
(See I	Drawings/ <u>Duplicate measurement</u>
<u>08D0</u>	<u>C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F</u>
).	

9.9	Continue measurement	
(See I	Drawings/Continue measurement XE "Continue measurement" XE	
"Meas	surement:Continue"	
08D0	C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000000	5F
).		

9.10 Continue measurement (subtract) XE "Continue measurement (subtract)"
(See Drawings/Continue measurement (subtract) XE "Continue measurement
(subtract)"
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005
).

9.11 Show all measurements	
(See Drawings/Show all measurements XE	"Measurements:Show all"
08D0C9EA79F9BACE118C8200AA004B	A90B0200000008000000E0000005F

9.12 Hide all measurements
(See Drawings/ <u>Hide all measurements</u> XE "Measurements:Hide all" 08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005F).

9.13 Copy visible measurements	
(See Drawings/Copy visible measurements XE "Measurements:Copying"	
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E00000000000000000000)05I

9.14 Paste measurements XE "Paste measurements"	
(See Drawings/Paste measurements XE "Measurements:Pasting"	
08D0C9EA79F9BACE118C8200AA004BA90B02000000080000000E0000005	F
).	

10 Measurement analysis XE "Measurement analysis:general"

General

Measurements analysis is the procedure through which you can preview and print the analysis of selected measurements including dimensions marking and details of surfaces.

The selected measurements are printed on template sheets of various sizes (A3, A4 etc), in separate pages or all in one. Calculation expressions and results of the analysis are printed at designated parts of the template sheets. Analysis of surface area can be carried out using triangles only or using rectangular, trapezoid, triangular and curved shapes (See Measurement in image files/Measuring area/Analysis in triangles

<u>08D0C9EA79F9BACE118C8200AA004BA90B0200000080000000E0000005F</u>). Triangle calculations are performed using the Heron's formula:

that is:	T = SQRT((a+b+c)*(-a+b+c)*(a+b-c)/16)
where a b c are tl	e lengths of the triangle sides.
affect the templa	You can select and set various parameters which e sheet appearance as, for example, colors, column widths and
_	11
`	neral/Settings/ <u>Measurement analysis parameters</u>
08D0C9EA79F9	BACE118C8200AA004BA90B02000000080000000E0000005
).	

Note, also, that measurement analysis can be done either overall in which case it includes all measurements, or selectively by defining analysis regions (See Auxiliary tools/Analysis regions).

10.1 Overall measurement analysis XE "Measurement analysis:overall"

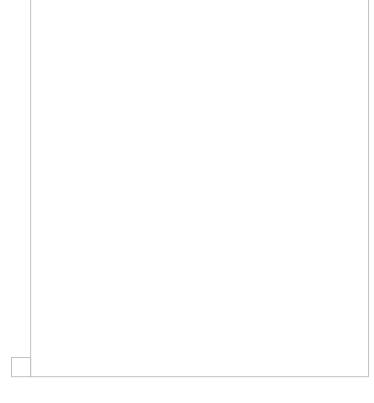
Click the 'Export measurements' button of the 'Drawings' tab. At the 'Measurements' window that appears click the 'Measurement analysis'
button and, from the list of the templates provided by ALCONSOFT, select the one you wish to use for the analysis.
Using the filters you can limit the number of
measurements to be included in the analysis (See Appendix/ <u>Filters/Sorting</u>
08D0C9EA79F9BACE118C8200AA004BA90B0200000008000000000000000000000000000
). Another way to "isolate" the measurements you want to be included in the analysis is to define one or more analysis regions (See Auxiliary measuring tools/
<u>Define analysis region</u> , in which case each region will be analyzed and printed in a separate page of the template sheet.
If there are no filters, all measurements will be
analyzed.
When the analysis includes a high number of
measurements with too many shapes, then it might be time consuming. Click
the Cancel button if you wish to stop the procedure after the analysis of the
current measurement is completed. You can preview and print the analysis of
the pages that have been created before interrupting the analysis.

Zoom in using	g the mou	se wheel fo	r a clear vi	ew of each	page.	
Using Print	_	and Plot			rint the curre	1 0
the analysis. I separately.	Plot prints	the whole o	drawing wh	nile Print pr	ints each pag	e
The appearan	ce of the r	oage depend	ls on the se	lected temp	olate.	
Work items as	ssociated	with the me	asurements	and their c	uantities are	-
the work brea		`	, 0			•
the detailed not The part of the		-	-			
region while i	_			-		
where the mea		•				Č

ALCONSOFT provides ready to use templates with various ways of organizing and positioning of the above regions. These templates have various sizes (A3, A4 etc) and orientations and new ones are frequently added. Templates are files located into the template subfolder of the application folder.

10.1.1 Template parameters

Using this button a window appears where you can set various parameters of the measurement analysis templates.



Select:

- the image height for the export to .xls file Select also the color you wish to be used for:
 - drawing area segments
 - drawing dimension lines and numbers
 - drawing measurements
 - thumbnail figures background
 - thumbnail background filling
 - drawing thumbnail figures

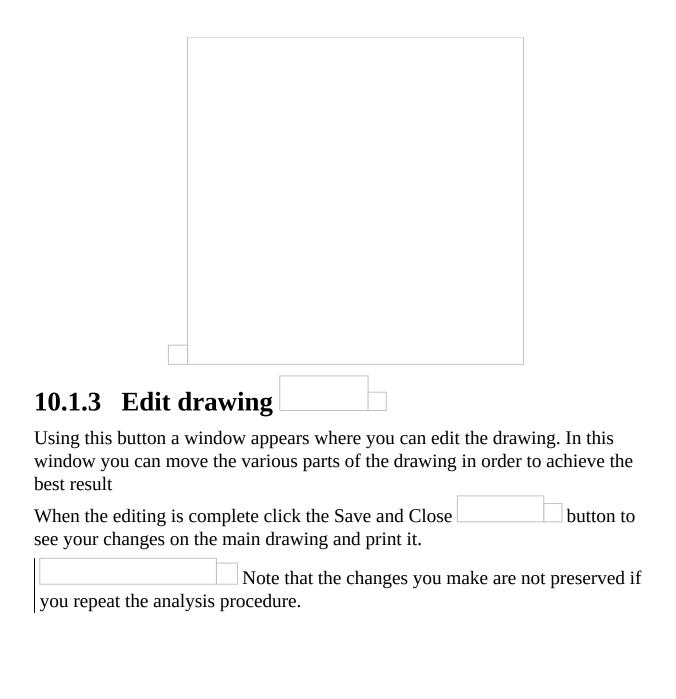
Select also or type:

- the arrow size in mm
- the characters height in mm
- the measurements table column widths in cm, separated by semicolons (;)
- the scale line width in cm
- the WBS table columns widths

Finally you can select which measurement types you want to show on the analysis sheets. The default setting is to show all except object counting.

"Exporting:to Excel"

Using this button you can export the data to .xls format file. Type the name of the new file and click 'Yes' to immediately open the file containing your data.



10.2 Measurement analysis by region XE "Measurement analysis:by region"

If you do not wish the overall analysis of all measurements of the current measurement sheet, then you can define one or more analysis regions on the drawing (See Auxiliary measuring tools/

Define analysis region).

If you define more than one analysis region then each region is analyzed and printed in a separate page of the analysis sheet. You can preview these pages at the 'Measurement analysis' window which appears when you click the Measurement analysis button and select a template. You can navigate through the pages by clicking on their tabs. All other features of the overall measurement analysis such as exporting, printing, editing and parameter setting, apply to the measurement analysis by region as well.

Note that, for a measurement to be included in the analysis of a region, it must fully surrounded by the region's rectangle. Furthermore, if a measurement is included in more than one analysis regions, it will be analyzed and appear in all of them.

10.2.1 All pages

Click this button to show all pages on a common backgound.

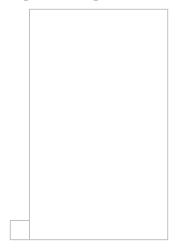


Click again to show each page separately.

11 XE "Appendix" Appendix

11.1 Filters/Sorting XE "Filters/Sorting"

All list display customization options are available by right-clicking on the header row and selecting the respective option from the pop-up menu.



11.1.1 Data Sorting XE "Filters/Sorting:Data Sorting"

Using the 'Ascending/Descending sorting' options you can sort the list whenever you wish, based on any column. Sorting is also done by clicking on the respective header. By selecting 'Clear sorting', the entries are sorted by their creation date.

11.1.2 Grouping XE "Filters/Sorting:Grouping"

By selecting 'Group by this column', or by dragging the header to the Grouping Area (the row above headers), you group the list based on the corresponding column. By repeating this procedure with other columns, you can achieve multiple grouping with any desired combination sequence.

11.1.3 Show/Hide/Best fit XE "Filters/Sorting:Show/Hide Columns"

You can show or hide each one of the list's columns at your discretion. By selecting 'Remove This column' or by dragging the header downwards (a large X

symbol appears) you can hide the selected column. By selecting 'Column Chooser', a box that includes all hidden columns is shown in the lower right part of the list.
By dragging them from the list to the headers row, you can display them again. By selecting 'Best fit (all columns)' or 'Best fit', the width of all the columns or each column respectively, will be automatically and optimally set, based on the properties of the corresponding field.
11.1.4 Show find panel
Using the 'Show find panel', a frame appears on the top part of the table, where you can perform a search of the table's content.
Enter the desired search description, and the table content is automatically narrowed to the search criteria, which appear marked in a bold yellow color.

11.1.5	Show Auto Filter Row
	e 'Show Auto Filter Row' option, a special line with the papears over the table's top row, on the left.

In each of the columns, select or type in the desired filter criteria, in order to filter the table content.

The crit	eria you set	appear in th	ne automa	tic filter l	ine, as we	ell as at th	ne bottom of
the table	2.						
	•	C11. 11		1.1.	1.6.	.1	1.1
	ive ways of ed in the foll			their mo	dification	are thor	oughly

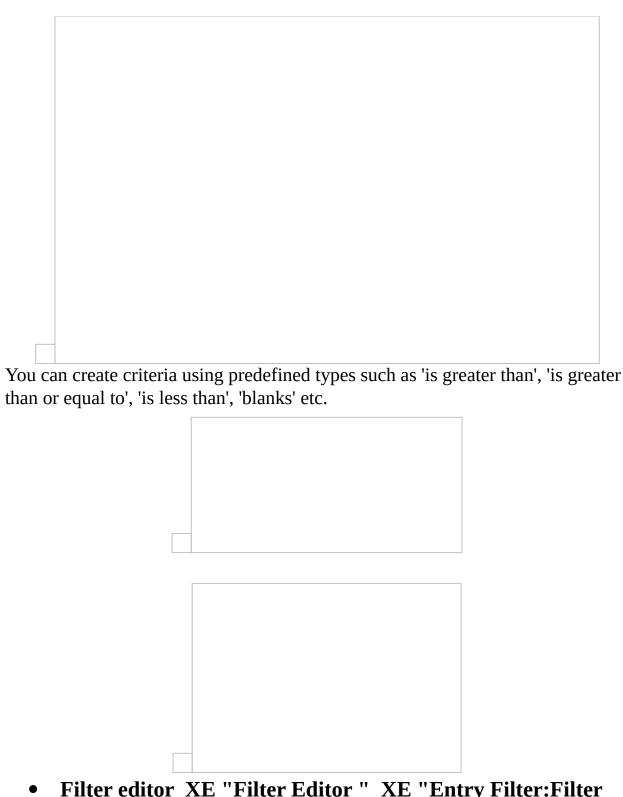
11.1.6 Record filters XE "Filters/Sorting:Entry Filter"

Quick data filter

XE "Entry Filter:Quick Data Filter" You can display a subset of the entries in a list by clicking on the (filter) symbol that appears when you hover your cursor over a column header. This action displays a list, in which you can either quickly select an item depending on the field type, or select 'Custom' to set a more complex filter.

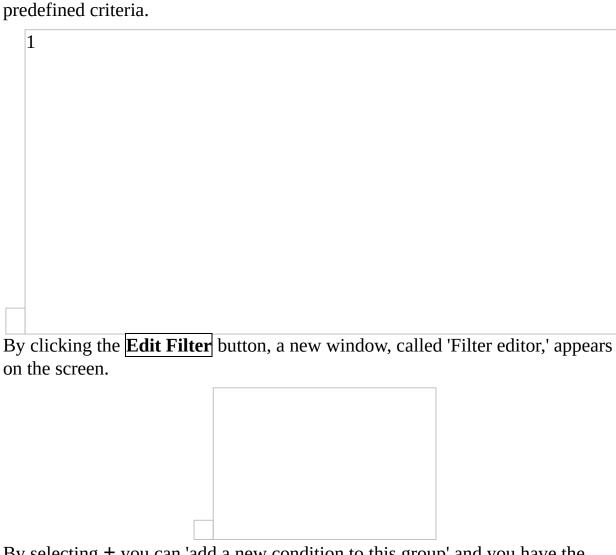
Click on the 'Custom' option in each column to apply a more complex filter to

the table contents. Filters work either integrally or disjunctively. The criteria may be either both true ('and') or one of them true ('or').
The criteria used appear in the lower left part of the screen.
You can remove a filter by clicking at the lower left part of the window.
You can also temporarily disable the filter by clicking on the right. By clicking again, you can re-enable it. The filters you apply are stored until you exit the application. You may recall any of them by clicking the right arrow key and selecting from the list (drop down menu).



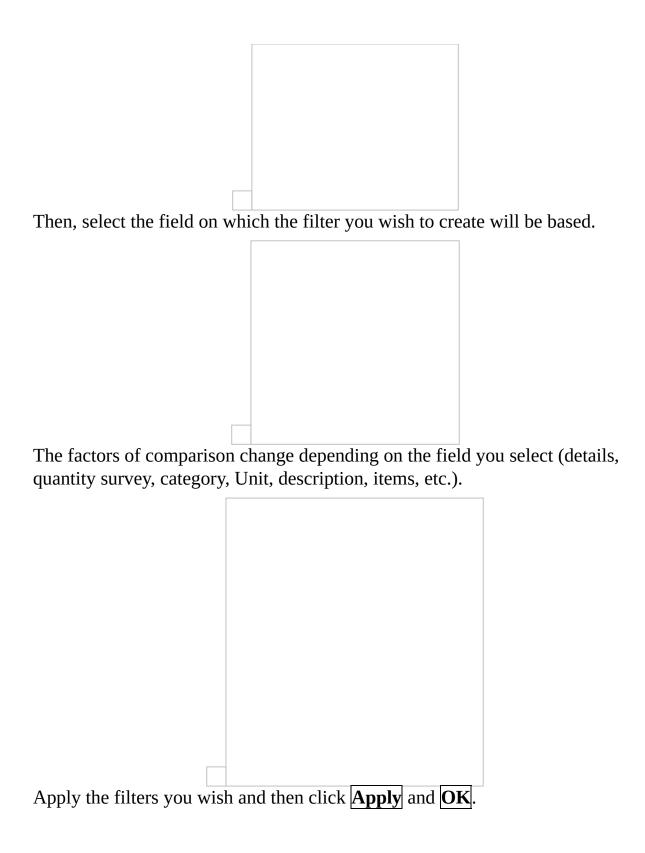
• Filter editor XE "Filter Editor " XE "Entry Filter:Filter Editor"

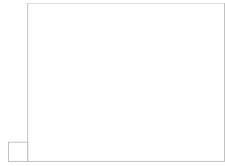
Using the Filter editor at the lower right part of the window or in the shortcut menu, you can create a filter that only displays the entries that comply with



By selecting + you can 'add a new condition to this group' and you have the ability to create multiple combinations between the data in the table's columns. Each criterion consists of **one field**, **one factor** (e.g. contains, is equal to, etc.) and **one value**, which should be entered or selected from a list. You can add as many criteria as you wish, which are combined together with (and) or (or / either). Once you create the filter, click **OK** or **Apply** and the list will display only the entries that comply with the filter's criteria.

The initial filter you apply may include or exclude the subsequent options.





Changing column width and position

XE "Filters/Sorting:Changing column width and position" You can change the width of each column by clicking and dragging with your cursor the separation lines between two field headers, to the left or to the right. You may also change the fields' order by selecting the header of any column you wish to move and dragging it to a new place.

11.2 Special Software Requirements

In order to run ExtrAXION, Microsoft.net Framework 3.5 needs to be installed.

11.3 Functions

11.3.1 ABS

Returns the absolute value of a number, a number without its sign.

Syntax

ABS(number)

Number is the true number whose absolute value you need.

11.3.2 ACOS

Returns the arccosine of a number, the angle whose cosine is this number. The angle is in radians, in the range from 0 to pi.

Syntax

ACOS(number)

Number is the cosine of the desired angle, and must be a number between -1 and 1.

11.3.3 **ASIN**

Returns the arcsine of a number, the angle whose sine is this number. The angle is in radians, in the range -pi/2 to pi/2.

Syntax

ASIN(number)

Number is the sine of the desired angle, and must be a number between -1 and 1.

Comments

In order to express the arcsine in degrees, you have to multiply the result by 180/pi(), or use the DEGREES function.

11.3.4 ATAN

Returns the arctangent of a number, the angle whose sine is this number. The angle is in radians, in the range –pi/2 to pi/2.

Syntax

ATAN(number)

Number is the tangent of the desired angle

Comment

In order to express the arctangent in degrees, you have to multiply the result by

180/pi(), or use the DEGREES function.

11.3.5 ATAN2

Returns the arctangent of the specified x and y coordinates (the angle of a line that crosses the origin (0,0) and a point with x_num, y_num coordinates). The angle is in radians, in the range -pi to pi, excluding the value -pi.

Syntax

ATAN2(x_num;y_num)

X_num is the point's x coordinate.

Y_num is the point's y coordinate.

Comment

A positive result signifies a counterclockwise angle with the x axis, while a negative result signifies a clockwise angle.

ATAN2(a;b) equals ATAN(b/a), but in the ATAN2 function, a can be equal to 0. If the x_num and y_num values are 0, the ATAN2 function returns the error value #DIV /0!.

In order to express the arctangent in degrees, you have to multiply the result by 180/pi(), or use the DEGREES function.

11.3.6 CEILING

Rounds the number up, to the nearest integer or to the nearest multiple of significance. For example, if you wish to use cents in your transactions, and the price of an item is 9\$ 36 cents, use the =CEILING(936; 10) to round the prices to the next dime.

Syntax

CEILING(number, significance)

Number is the value you wish to round.

Significance is the multiple based on which you wish the rounding to be performed. **Comment**

If one of the entries is not numeral, the CEILING function returns the error value #VALUE!.

Regardless of the number's sign, a value is rounded up when it is adjusted away from zero. If the number is an exact multiple of the Significance entry, then the value is not rounded.

If the entries Number and Significance have different signs, the CEILING function returns the error value #NUM!.

11.3.7 COS

Returns the cosine of the given angle.

Syntax

COS(number)

Number is the angle (in radians) whose cosine you desire.

Comment

If the angle is in degrees, you have to multiply the result by pi()/180, or use the RADIANS function, in order to convert it to radians.

Example

The example will be easier, if you copy it to an empty worksheet.

11.3.8 **COSH**

Returns the hyperbolic cosine of the given angle.

Syntax

COSH(number)

Number is any real number, whose hyperbolic cosine you need.

Comment

The hyperbolic cosine definition is:

11.3.9 EXP

Returns e raised to the power of a given number. The constant 'e' is equal to 2,71828182845904 and constitutes the basis of the natural logarithm.

Syntax

EXP(number)

Number is the exponent that is applied to the base e.

Comment

In order to calculate the powers of other bases, use the factor of raising to a power (^).

The EXP function is the reverse of the LN function, a number's natural logarithm.

11.3.10 FACT

Returns the factorial of a number, equal to 1*2*3*...*number.

Syntax

FACT(number)

Number is the non-negative number whose factorial you wish to calculate. If the entry Number is not an integer, the decimal digits are cut off

11.3.11 FLOOR

Rounds a number down, to the nearest specified multiple of significance.

Syntax

FLOOR(number;significance)

Number is the numeral value you wish to round.

Significance the multiple based on which you wish the rounding to be performed.

Comment

If either of the entries is non-numeral, the FLOOR function returns the error value #VALUE!.

If the entries Number and Significance have different signs, the FLOOR function returns the error value #NUM!.

Regardless of the number's sign, a value is rounded down when it is adjusted away from zero. If the entry Number is an exact multiple of the entry Significance, then the value is not rounded.

11.3.12 LOG

Returns the logarithm of a number to the base you specify.

Syntax

LOG(number;base)

Number is the positive real number whose logarithm you desire.

Base is the logarithm's base. If the entry Base is skipped, it is considered to be equal to 10.

11.3.13 PI

Returns the number 3,14159265358979, the mathematical constant pi, with 15 decimal digits precision.

Syntax

PI()

11.3.14 ROUND

Rounds a number to the specified number of digits.

Syntax

ROUND(number;num_digits)

Number is the number you wish to round.

Num_digits specifies the number of digits to which you want to round the number. **Comment**

If the entry num_digits is greater than zero, then the number is rounded to the specified number of decimal digits.

If the entry num_digits is 0, then the number is rounded to the nearest integer. If the entry num_digits is lower than zero, the the number is rounded to the specified number of decimal digits, to the left of the decimal point.

11.3.15 **SIGN**

Returns the sign of a number. It returns the value 1 if the number is positive, 0 if it is 0, and -1 if it is negative.

Syntax

SIGN(number)

Number is any real number.

11.3.16 SIN

Returns the sine of a desired angle.

Syntax

SIN(number)

Number is the angle whose sine you desire, expressed in radians.

Comment

If the angle is in degrees, you have to multiply the result by pi()/180, or use the RADIANS function, in order to convert it to radians.

11.3.17 SINH

Returns the hyperbolic sine of the given angle.

Syntax

SINH(number)

Number is any real number.

CommentThe hyperbolic sine definition is:

11.3.18 SQRT

Returns the square root of a number.

Syntax

SQRT(number)

Number is the number whose square root you desire

Comment

If the entry Number is a negative number, the SQRT function returns the error value #NUM!.

11.3.19 TRUNC

Truncates a number to an integer by removing the decimal (or fractional) part of the number.

Syntax

TRUNC(number;num_digits)

Number is the number whose decimal digits you wish to truncate. Num_digits is the number of decimal digits that remain after the truncation. The default value of the entry num_digits is 0 (zero).

Comment

The TRUNC and INT functions are similar, as both return an integer. The TRUNC function removes the decimal part of a number, while the INT function rounds the number down, to the closest integer, based on the number's decimal part. The INT function is different from the TRUNC function only in the handling of negative numbers: The formula TRUNC(-4,3) returns the value -4, while the formula INT(-4,3) returns the value -5, because -5 is the nearest downward integer.

11.4 SQL Server Installation

If you want to store your projects on an SQL Server database you should have access to an SQL Server instance with mixed mode authentication. If not, you must install it first. For example the **SLQ Server 2008 R2 Express** version can be downloaded for free from Microsoft's website: www.microsft.com and more specifically from the link: http://www.microsoft.com/en-us/download/details.aspx?id=30438

• For 64 bit systems select the 1st file:

SQLEXPR_x64_ENU.exe

122.4 MB

• For 32 bit systems select the 3rd file:

SQLEXPR32_x86_ENU.exe

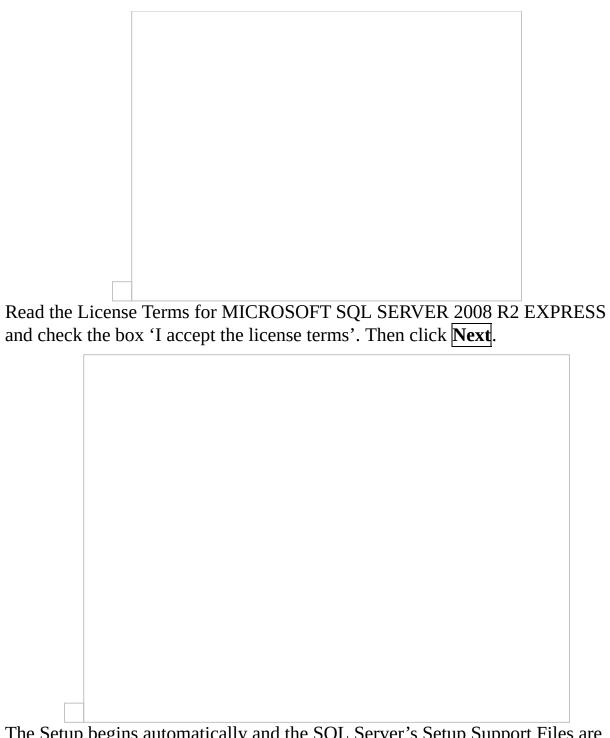
97.4 MB

- 1. If you do have a server within your organization it is recommended that you do the SQL Server installation on the server, so that the database of the measurements is centralized.
- 2. If you do not have a server or if you want to work at your laptop without connecting to the server then install the SQL server at your PC.

Save on your hard disc the SQL Server's setup file and run it to start the installation.

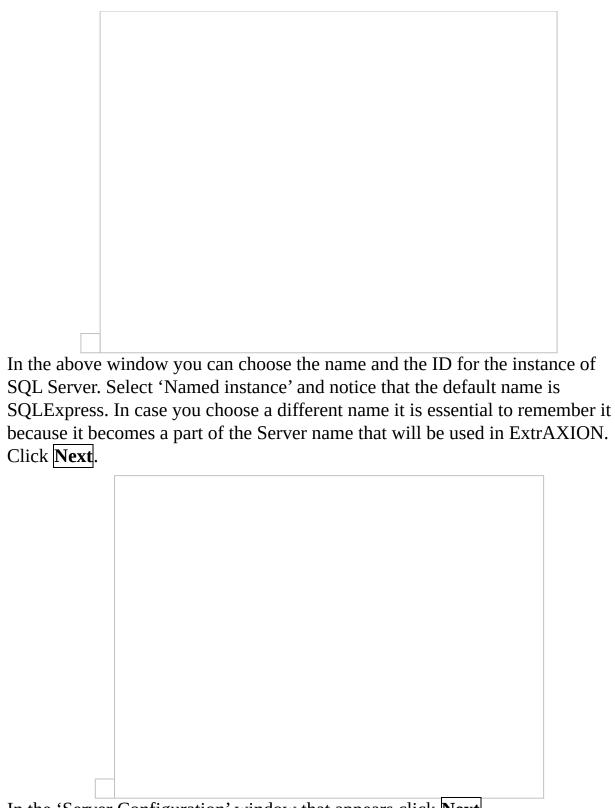


After the folder extraction is completed, the window of 'SQL Server Installation Center' shows up. Select 'New installation or add features to an existing installation' in order to launch the installation wizard.



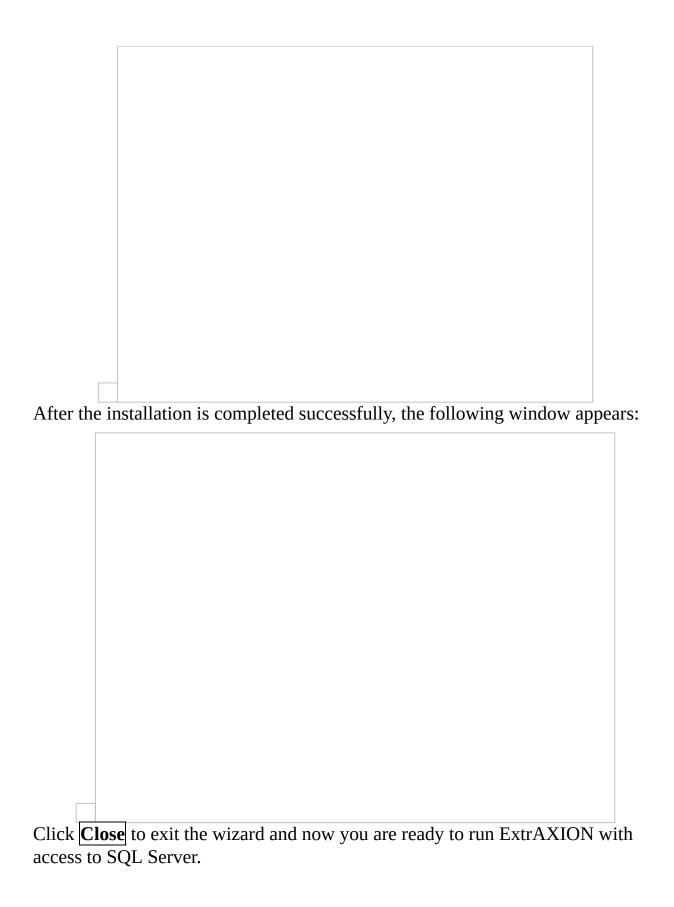
The Setup begins automatically and the SQL Server's Setup Support Files are being installed.

After the i	nstallation	of these	files is cor	npleted the	e followin	g window	shows
After the i	nstallation	of these	files is cor	npleted the	e followin	g window	shows
After the i	nstallation	of these	files is cor	npleted the	e followin	g window	shows
After the i	nstallation	of these	files is cor	npleted the	e followin	g window	shows
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After the i	nstallation	of these	files is cor	npleted the	e followin	g window	shows
After the i	nstallation	of these	files is cor	npleted the	e followin	g window	shows



In the 'Server Configuration' window that appears click **Next**. Then in the 'Database Engine Configuration' window, select 'Mixed mode (SQL Server authentication and Windows authentication)' and as a password for user

sa enter the number 7.	
Confirm the password and click Next .	
Click Next to continue to the 'Installation Progress'.	



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