

TUTORIAL

House Installation

How to make a simple installation project by using the most common functions in PC|SCHEMATIC Automation.

Developed by PC|SCHEMATIC A/S.

PREFACE

This booklet shows how to make a simple project using PC|SCHEMATIC Automation.

PC|SCHEMATIC has a series of booklets covering different subjects:

- Quick Start
 - Shows the different parts of the user screen, the tool bars, where to find the drawing objects
 - Use it as a reference guide when you start drawing on your own.

- Tutorial – House Installation
 - Shows you how to make a house installation project
 - The project looks like PCSINSTDEMO.
 - Make your own pickmenu, edit your lists and learn how to change database

- Tutorial – Motor Control
 - Shows you how to make a small control circuit, where all components are found in the component database. The finished project contains electrical diagrams, panel mechanical layout and various lists.
 - The project looks like PCSMOTORDEMO1. In this way you can always check that you have been through all steps.

- Tutorial – PanelBuilder
 - Document a household panel by using the PanelBuilder module
 - Create front page drawing, power dissipation calculation and single line diagram
 - Declaration of Conformity, CE-label and other markings can be printed directly from the program

- Quick Start – Plc project
 - Shows you how to document a small plc.
 - The project looks like PCSPLCDEMO1.

- Quick Start – Reference Designations
 - Learn to create and apply reference designations in a project.
 - Learn to work with wire numbering
 - See how to make graphical plans
 - You work with projects like PCSDEMO1, 2 and 3.

When you read the booklet you can follow the example. When you have worked your way through this you have tried the most common functions in the program, and you will be able to make your own project.

All examples are based on demo components from the PCSDEMO database.

The examples are made in Automation 14. With a few exceptions all examples can be made in earlier versions.

There are text highlights in the book to indicate further explanations about some of the program functions. You don't need to read these explanations to make the project.

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HOUSE INSTALLATION

Here you can see how to create your first House Installation project by using the templates that come with the program.

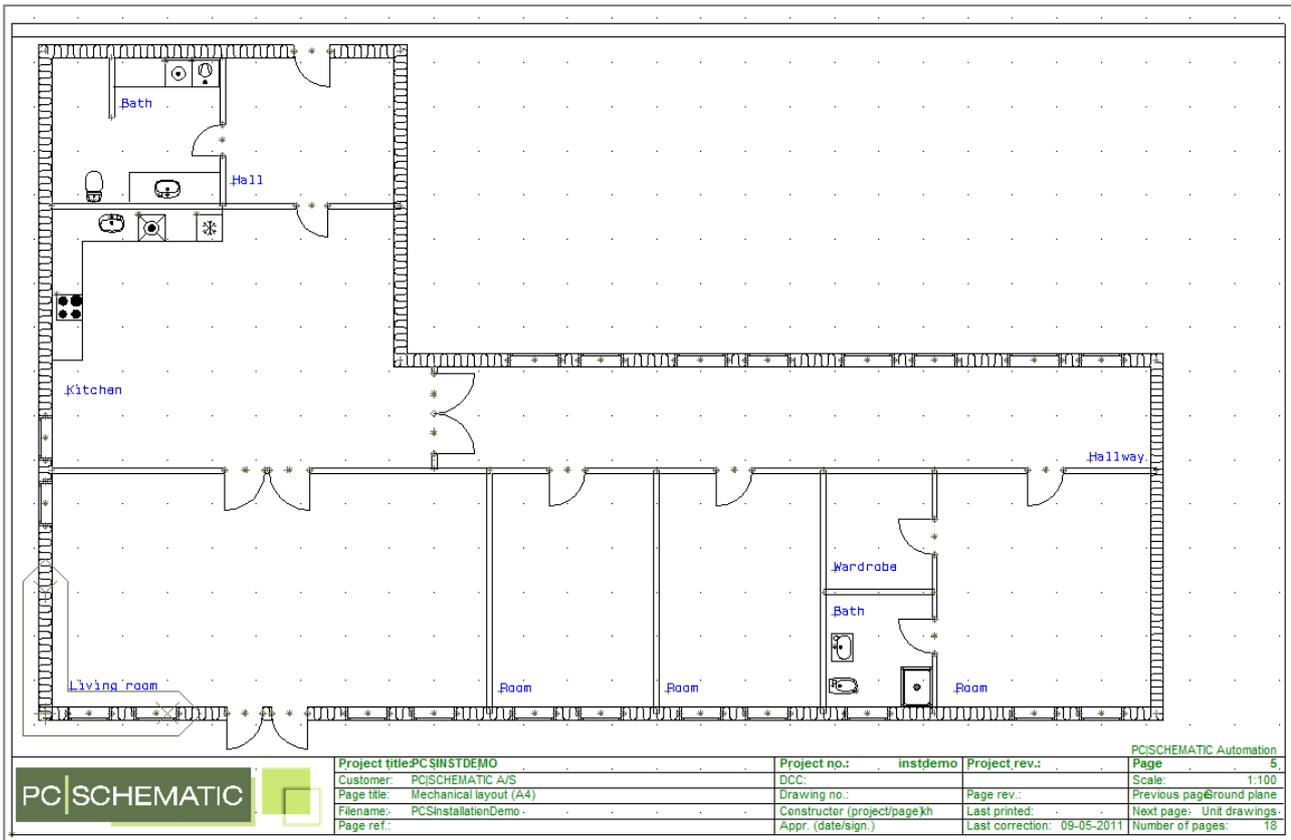
The booklet guides you through the work processes of creating the documentation of a the electrical installations in a small building.

The following subjects are covered:

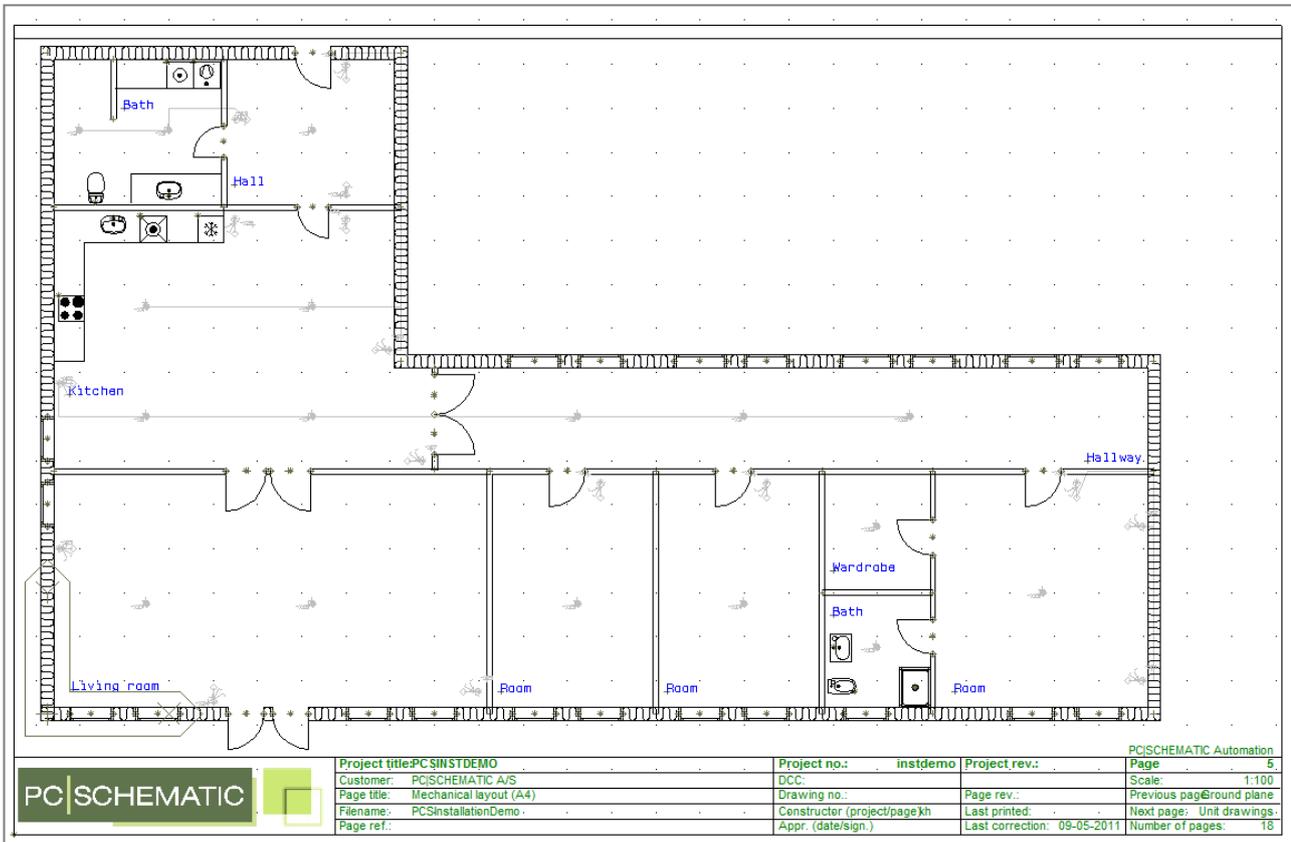
- Make a simple floorplan with walls, doors and windows
- Place electrical and alarm installations on this house plan
- Use unit drawings
- Use the coordinate system, elevation and the layer function
- Make your own pickmenu
- Learn about list settings
- How to change database

The finished project looks like PCSINSTDEMO.

Floorplan of the building



Floorplan with electrical and alarm installations

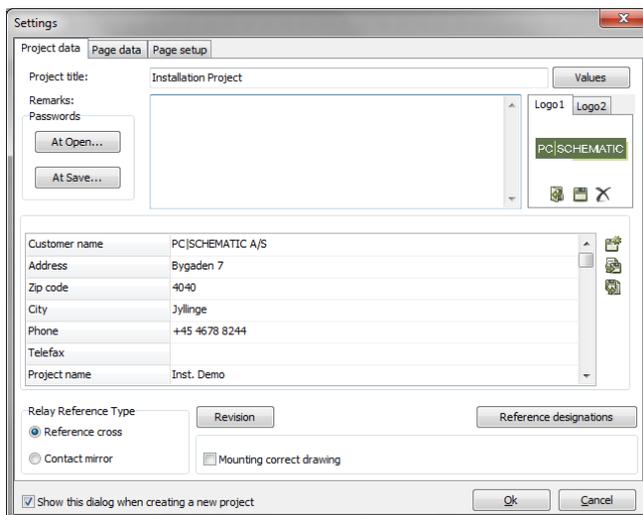
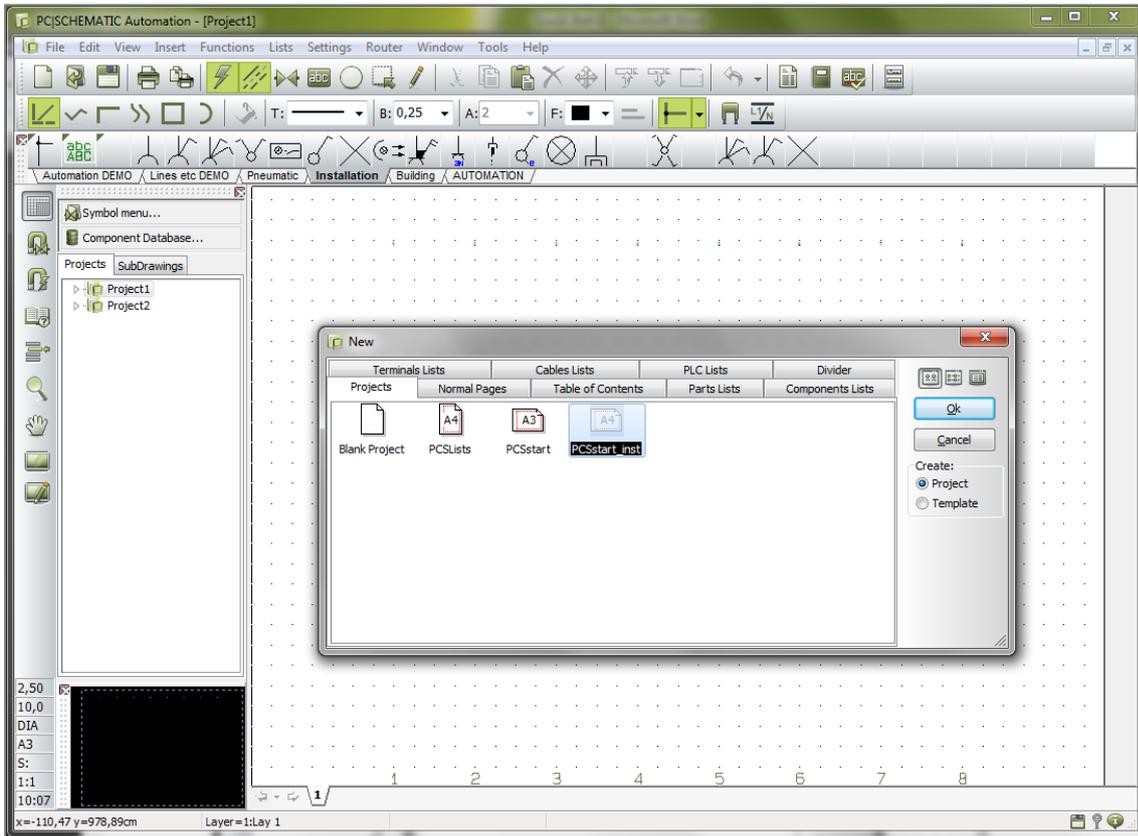


START A NEW PROJECT

You are now about to start a new project which has a page for a floorplan on page 5 of the template.

1. Go to Files|New.
2. Select PCSstart_inst

PCSstart_inst is a project template that contains the pages that are used in this installation project.



When you press <OK> this dialog will show. Type "My first project" in the project title field.

You can also type in the other data now. If you want to do this later, you can enter the dialog by pressing the Project Data button in the toolbar.

When you press <OK> you can see the title on the front page of the project.

WORK FLOW – INSTALLATION PROJECT

You can start installation projects in different ways. The most common ways are

1. That you make a quick floor plan drawing in Automation
2. That you import a floorplan from another program, typically a dwg/dxf/pdf-file.

If you select method 1 you can use the combination of working in different elevations and the program's built-in scale factor which makes the program capable of correct measurements and thus correct cable quantities. This is the method that is covered in the booklet.

If you select method 2, you will often import the drawing without the true scale factor, just a clean paper format. Therefore you draw the rest of the project without using the measurement options. The rest for the workflow is identical, however.

The floorplan is drawn on a GRP-page which is a groundplane page where everything has a physical dimension.

When the floorplan is in place the rest of the work flow is as below:

- Place installation symbols
 - Different layer for different types of installations
 - Possibly place in right elevation
 - Preserve the right scale factor
 - Fetch components from unit drawings and database
- Connect the installation symbols
 - The connections must be made in the right elevations
 - Connect with cables, that is name the individual connections
 - Remember to add cable data if they should appear on parts and component lists
- Update parts and component lists

Starting the following page, you can see how to sketch a floorplan in Automation.

You can read more about how you work with the drawing objects

- line
- symbol
- text

in the first QUICK START and, naturally, in the manual.

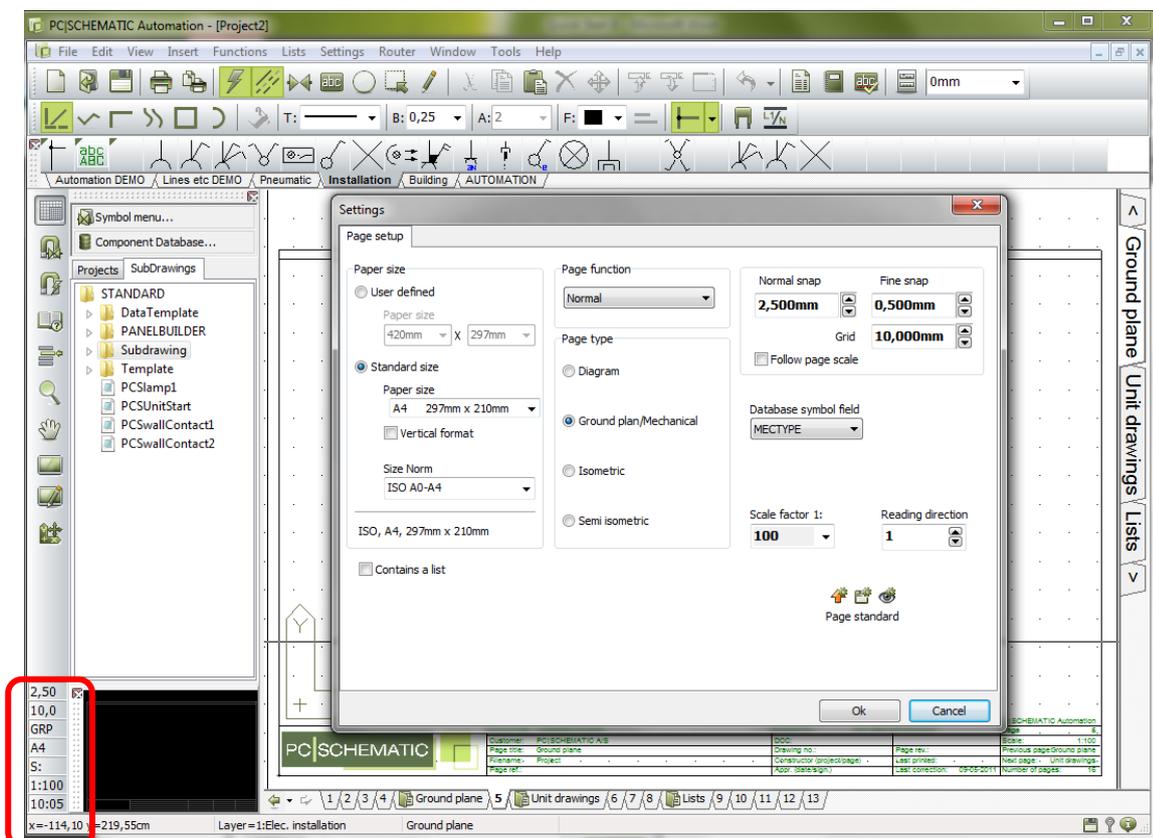
CREATE A FLOORPLAN

Go to page 5 in the project.

This is a GRP-page, meaning that it is a page intended for containing floorplans.

It is as A4-page with a scale factor of 1:100.

If you wish to change those settings you can double-click in the vertical toolbar section framed below. That will take you to Settings|Page setup where you can change the settings..



On the floorplan page you can draw

- mechanical (non-conducting) lines – e.g. inner and outer walls
- mechanical (non-conducting) symbols – e.g. doors and windows
- installation symbols – e.g. switches and outlets
- cables, that si conducting lines with article data

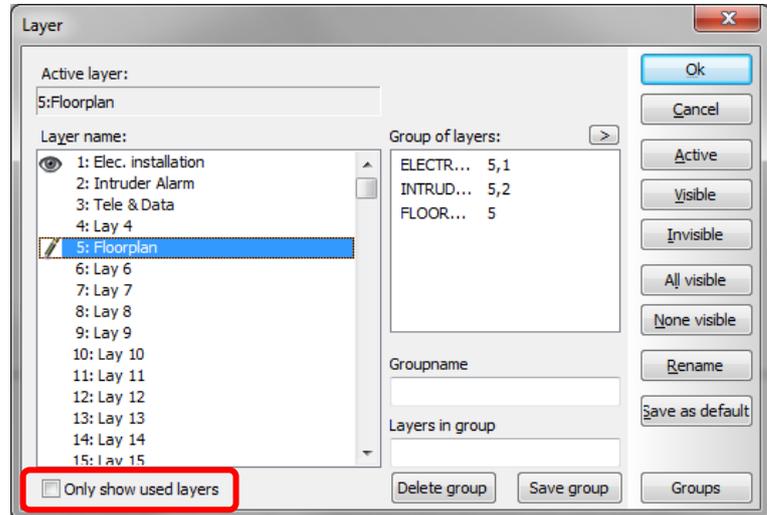
When you draw on the mechanical page, all measurements are "real" which means that the program will calculate the true length of the drawn cables based on the scale factor you have chosen.

DRAW OUTER AND INNER WALLS

Use the layer structure

When you make installation drawings you will often draw on different layers: one layer for the floorplan, one layer for the house installation, one layer for intruder alarm installation and so on.

1. Press the layer button  in the vertical toolbar. If you cannot see all layers you will have to delete the check in "Only show used layers".
2. The layer structure is already defined to contain certain data. So you go to layer 5 – Floorplan.
 -
3. Select layer 5, click the button <Active> followed by <OK> or doubleclick layer 5.

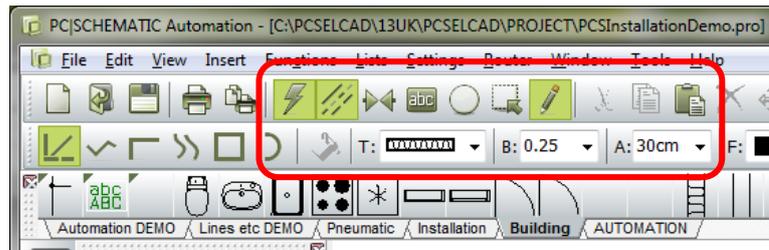


Lines for outer and inner walls

You are going to use non-conducting lines for outer and inner walls for the house. You must select a line that shows a structure.

Go to the pickmenu Building. In this pickmenu you will find a line with a width (A) of 30 cm, and a pen (P) of 0,25 mm.

You also have the option to define your own line with another width and pen by adjusting the settings in the toolbar.



When you select the line from the pickmenu the program will automatically change to line drawing mode with active pen, which means Instant Drawing.

You can see it because the pen is marked. 

Use the coordinate system

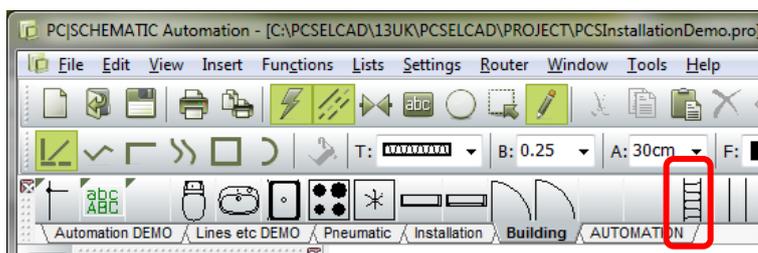
When you draw a house or another structure with fixed measure, the easiest way of doing it, is by exploiting the page's built-in coordinate system.

On mechanical pages you see a "Point Zero" – Origo – which indicates (0,0) for the page. You can move this point, thus making it a useful point of reference.

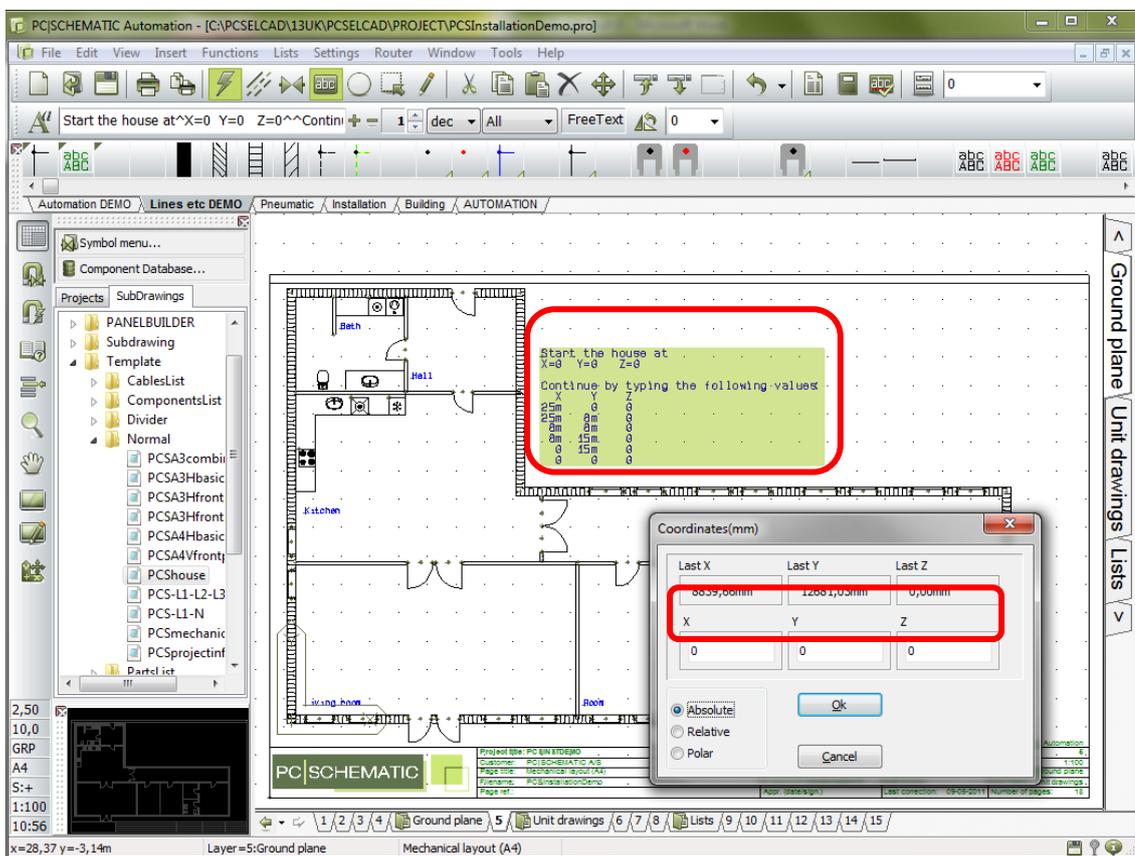


When clicking the icon  you can move the zero to a natural starting point for your floorplan, e.g. one of the corners.

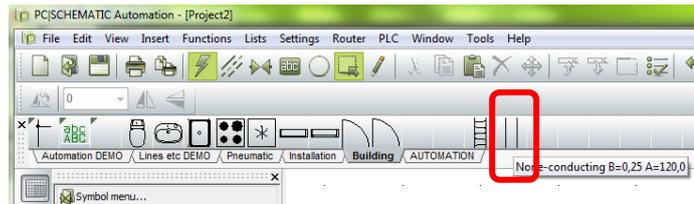
- Now you are ready to draw!!
Select the "outer wall line" in the pickmenu Building. The pen is active, and you are ready to draw immediately.



- Go to Functions|Coordinates – or use the shortcut <Ctrl+I> – to retrieve the dialog. Start by writing the coordinates x= 0 and y=0 – (0,0) – this is the starting point of your house and click OK. Press <Ctrl+I> again and write (25m,0) to get a 25 m horizontal line starting from the corner. Press OK.
- Continue drawing the outer walls by writing the coordinates shown below.



- When you have "been around the house" press <Esc> to end the line and another <Esc> to deactivate the pen. Continue finishing the house by placing inner walls – you will also find a line for this in the pickmenu (width 12 cm).



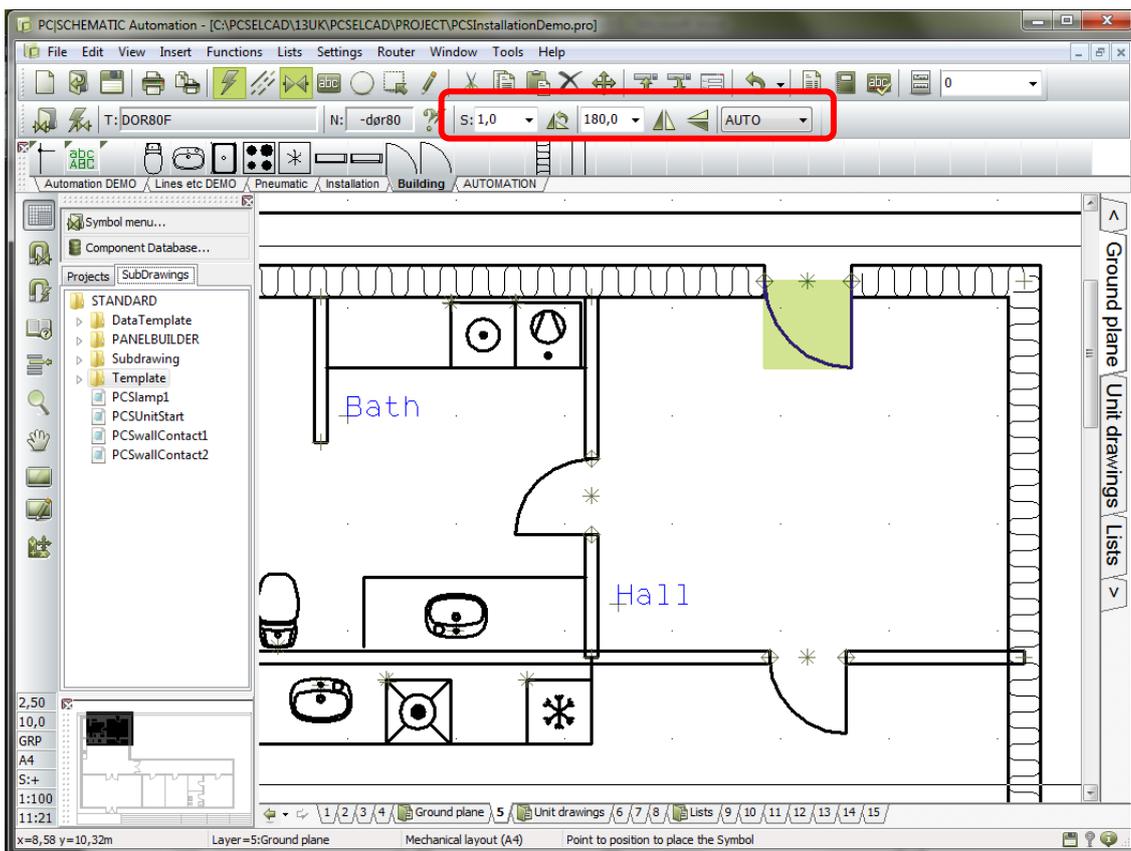
Place windows, doors etc.

When the contour of the house is made, you can place doors, windows and various equipment like stove, dishwasher etc.. In the Building pickmenu you can find symbols for these, and you can find more symbols in the BUILDING folder, which you can see when you press the button <Symbolmenu>.

When you place these symbols you might use coordinates again, or you can place them directly on the drawing with the mouse.

When you place symbols – like doors and windows – on a line – like the outer wall – the line will open automatically and make room for the symbol. If you delete the symbol again the line will close.

All (mechanical = non-conducting) symbols are scaled down according to the page scale factor.

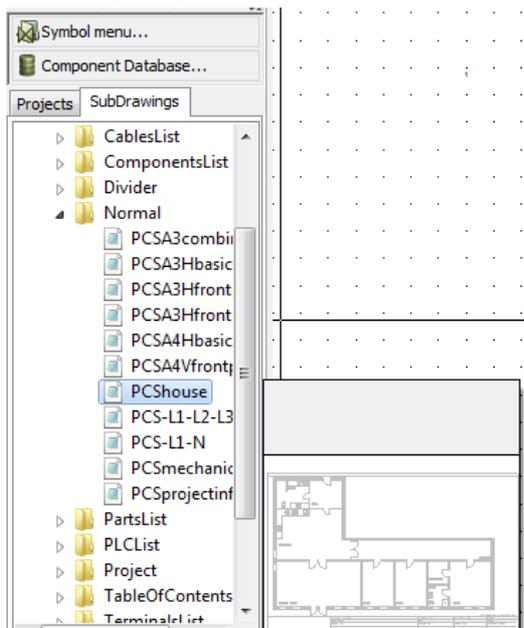


You might need to rotate a symbol: You rotate a symbol 90° by marking the symbol, or before it is placed, and press the <space bar> or by typing the desired rotation in the toolbar.

You can also mirror symbols – vertically or horizontally: mark the symbol and press one of the mirror icons in the toolbar.

Remember...

Even though the sketch has true dimensions it is not a real floorplan, just a sketch. The dimensions that you have made are referring to the middle of the line and not to the inside or outside of the wall.

Cheat code ☺

Did you draw the house? Or do you need a "cheat code"?

The house can also be found as a template in the explorer window that you find in the Sub-drawings tab. Find it in Templates|Normal as PCShouse.

You can drag the page into your project: Place the mouse on the template, hold down the mouse button, and drag it into the project.

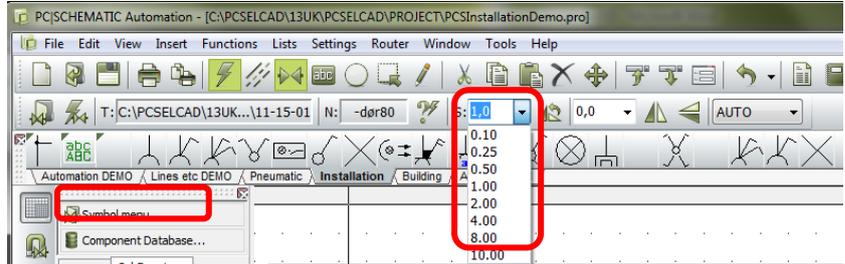
PLACE ELECTRICAL INSTALLATIONS

In this project electrical installations have been placed on layer 1. Press the layer button and double-click to select layer 1.

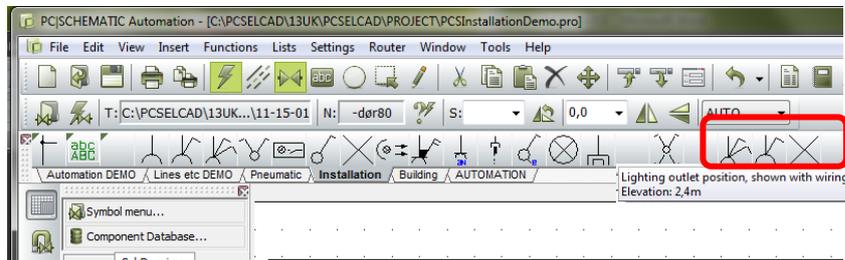


In the pickmenu Installation you find symbols for electrical installations. You can find more symbols in the folder INST, when you press the <Symbolmenu>.

Before you place these symbols you should change the symbol scale to 0,35 which will give a reasonable symbol size on the drawing.

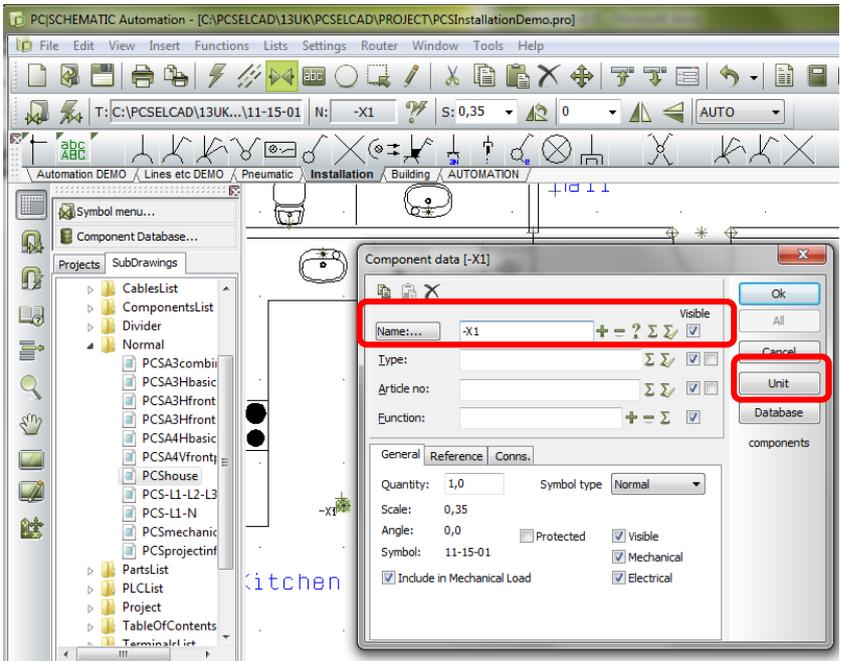


In the pickmenu select the lamp plug – the right most symbol. The three symbols have all been designated with an elevation in the pickmenu.



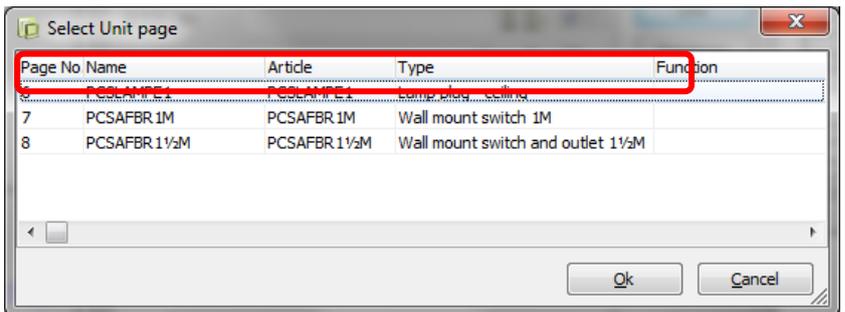
Place the symbol on the floorplan. The Component data dialog automatically pops up. Give the component the next available name by clicking the ? .

You can select component data by clicking the Unit button in the dialog.



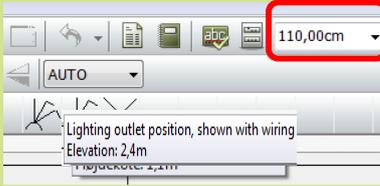
Select type “lamp plug – ceiling” .

Continue by placing more symbols for the electrical installation this way.



SYMBOLS ARE PLACED IN DIFFERENT HEIGHTS / ELEVATIONS

We have chosen to place the symbols at the correct elevations on the floorplan, which makes it possible to obtain a (close to) correct cable length..



On the right side of the toolbar you can see the elevation of the symbols. This function is only

If you are going to place a lot of symbols at the same elevation, it might be a good idea to have the elevation included with the symbol in the pickmenu. Right-click in the pickmenu to change it.

You can also choose the elevation symbol by symbol: at the upper right corner of the toolbar you simply type the elevation of symbol.

Texts relating to the symbols are, however, always at height 0.

SYMBOLS WITH ARTICLE DATA

You can place symbols on the drawing without giving them any data or name, and still the program can count how many of each symbol you have used in the project.

Still, the great advantage of working in Automation will be obtained when you seize the opportunity to have component data on your symbols as you make the documentation.

Below you can see two different ways of having article data included with the symbols.

Article data from unit drawings and lists

The relation between symbols and components for house installations is not 1 to 1: E.g. a switch on a wall it is not a fixed component that you can buy, but a component that consists of several articles, that can be combined in a number of ways: the switch itself can be combined with different frames (size, color etc.) different mounting boxes depending of the type of wall (wood, plaster, brick), is the switch mounted on the wall or flush-mounted. Altogether, there are many different combinations.

Unit drawings show the individual articles that are included in e.g. a switch for mounting on a brick wall. Besides the graphics, the drawing contains a complete parts list of the used articles.

Unit drawings are informative – for the installer and for the end-user, as it gives a view of the includes parts.

Unit *drawings* are created as drawings with own article number. Unit *lists* can be created directly in the database, if you don't need to see the components. See how to create unit drawings and lists in the manual.

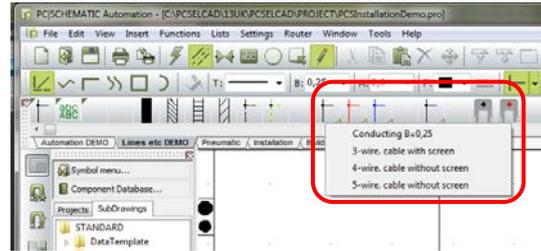
Article data from the database

You can also use the database when you make installation drawings. See how to search for components etc. in the other QUICK START booklets and in the manual.

CONNECT THE SYMBOLS WITH CABLES

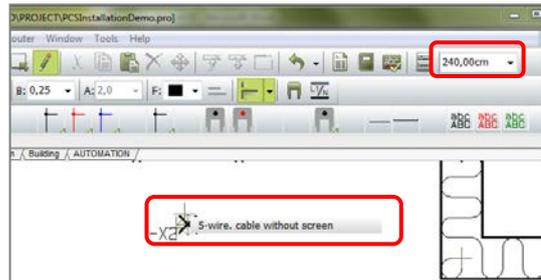
You can connect the symbols with the right cable, making sure that your parts list will be correct..

Select one of the cables from the pickmenu "Lines etc." and select the linetype "Conducting line without dot".



When you select the cable directly from the pickmenu the pen is activated and you are ready to draw instantly.

The cable can find the right elevation of the symbols and you can see the actual elevation at the right side of the toolbar. When you select a connection point on a symbol, you see a small info-box on the screen box showing the cable type.

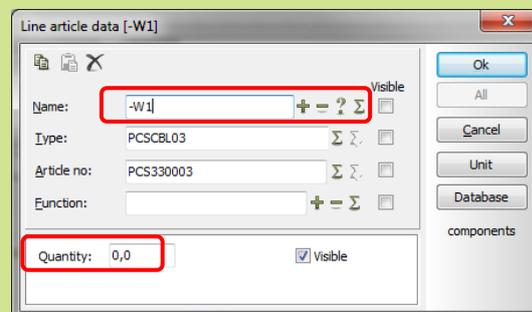


When you draw on GRP-pages the program will find the cable length itself, as long as you leave quantity at 0.0. If you write anything else, this will be the length of the cable.

You cannot see the length of the individual cables directly on the drawing, but you can see it if you right-click and select Information.

You can also see the cable length in the components list, if the cables have individual names: Open the dialog by double-clicking the desired cable (without active pen!!). Now you can name the cable.

If your cable is in another elevation than your current elevation, hold down the Shift key when you click to select the cable. This changes your elevation to that of the cable.



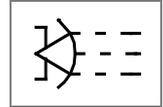
You can create different cables in the pickmenu, both regarding color, line type and article numbers. See how to do it from page 18.

PLACE INTRUDER ALARM INSTALLATION

Go to layer 2 which is the layer for intruder alarm in this project. Press the layer button  to select layer 2.

Go to the Symbolmenu by clicking the  in the toolbar or use the shortcut F8. Go to the ALARM folder.

Select the symbol AIA008, which is a movement detector. Set your symbol scale to 0.35 again, as that is a reasonable size of the symbol on this drawing. Place three detectors at an elevation of 200 cm.

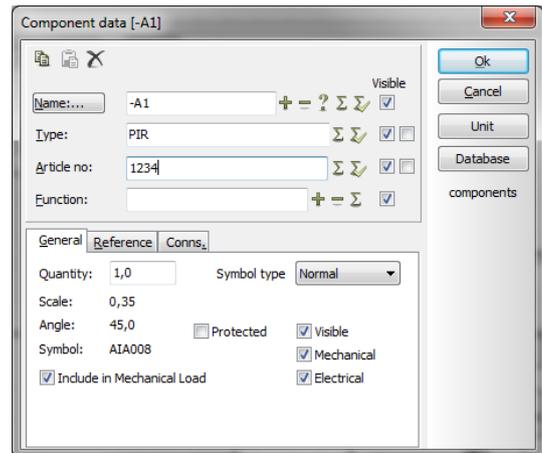


Assign a unique name to every symbol by using the



Type in component data as shown (PIR: Passive Infra Red).

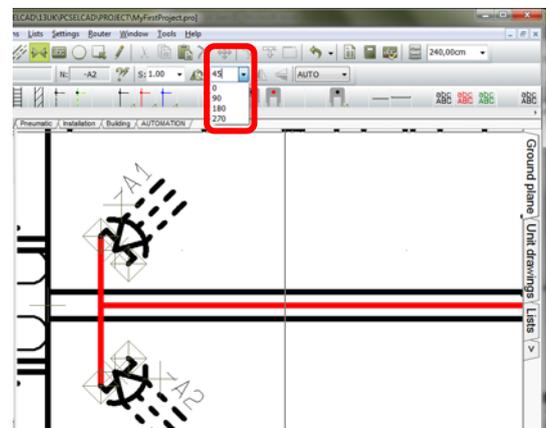
Connect the detectors with cable.



Rotate a symbol

A PIR-detector is usually placed in a corner and therefore you need to rotate the symbol by 45°. This is done by typing 45 in the window after you have selected the symbol with the mouse.

If you need to rotate the symbol 90° to fit the other corner, you can use the <space bar.

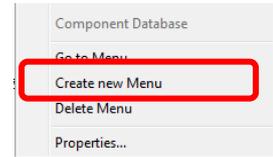


If you are going to use a lot of alarm symbols in the future, why not make your own alarm pickmenu? See how to do this on page 18.

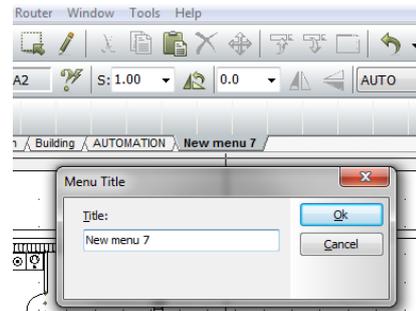
MAKE YOUR OWN PICKMENU

If you are going to make a lot of alarm installations it will be very helpful to have a pickmenu with the desired alarm symbols and components.

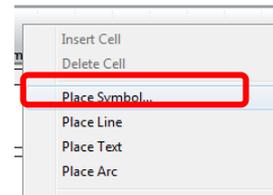
1. Right-click somewhere in an existing pickmenu
2. Select "Create new menu"



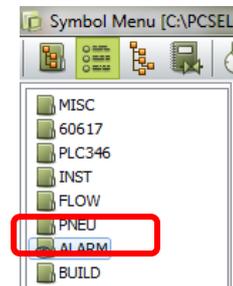
3. A new menu is created – "New menu 7".
4. You can edit the name by double-clicking on it.



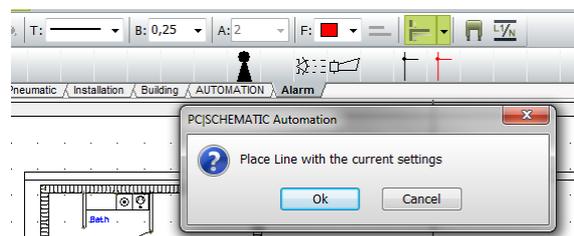
5. Right-click in one of the empty fields and select "Place symbol..." to place a symbol in the pickmenu.



6. The symbol menu opens automatically.
7. Alarm symbols are found in the ALARM folder.



8. You can also have lines in the pickmenu.
9. Rightclick in an empty field and select "Place line..."
10. The program asks if you want a line with the current properties, i.e. 0.25 mm pen, straight, black, conducting line? You can see the properties in the toolbar.
11. You can have several lines with different properties.

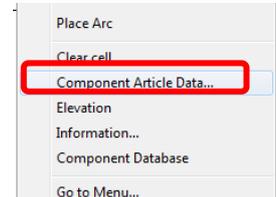
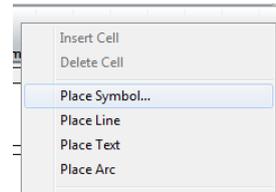


12. You can also have texts or circles/arcs in the pickmenu:

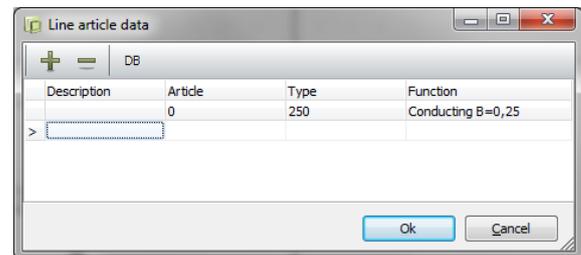
- Texts in the pickmenu are text properties – font, size, color
- Circles/arcs in the pickmenu are all the properties from the toolbar.
-
-
-

13. You can add component data on symbols and lines that you have placed:

14. Right-click on a placed symbol (or line) and select Component article data.



15. When you select Component article data, you will see this dialog. Here you can type your own data for the item, or you can fetch data from the database by pressing the [DB] button. You can add more sets of component article data on a symbol or line, thus saving space in the pickmenu.



In the pickmenus that come with the program, you will find examples of pure symbols, lines and text format and of the same with one or more sets of article data.,

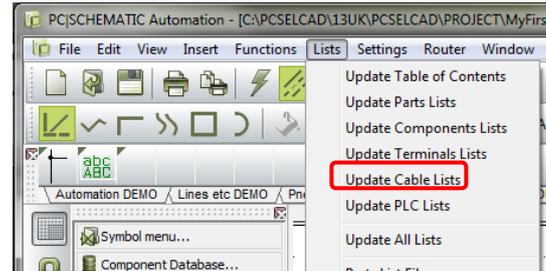
The components only work as long as you are connected with a database with the used (demo) component. You will find the demo components in the PCSDEMO and PCSEDU databases.

See how to change database on 26.

LISTS IN THE PROJECT

The start template for this project contains a set of lists that are suited for an installation project. The lists are table of contents, various parts lists and a component list.

Start by updating all lists: Go to the Lists menu and select Update all lists...



WHAT IS A PARTS LIST

The first list is a parts list. A parts list works by counting all **article numbers**, making a list that you can use for ordering components.

WHAT IS A COMPONENT LIST

You will also find a component list in the project. A component list contains one line for **each component** in the project, and it shows all relevant data for all project components.

Other lists

In Automation you can also have cable lists, terminal lists and plc lists. Those lists are not relevant in this project template, but most of the following settings are also valid for those lists.

You also have the option to export the lists to other file formats e.g. Excel from the List menu which gives you the opportunity to interface to other programs. Read more about this in the manual.

LIST SETUP

The General tab

Rightclick the list and select List settings. You have following options:

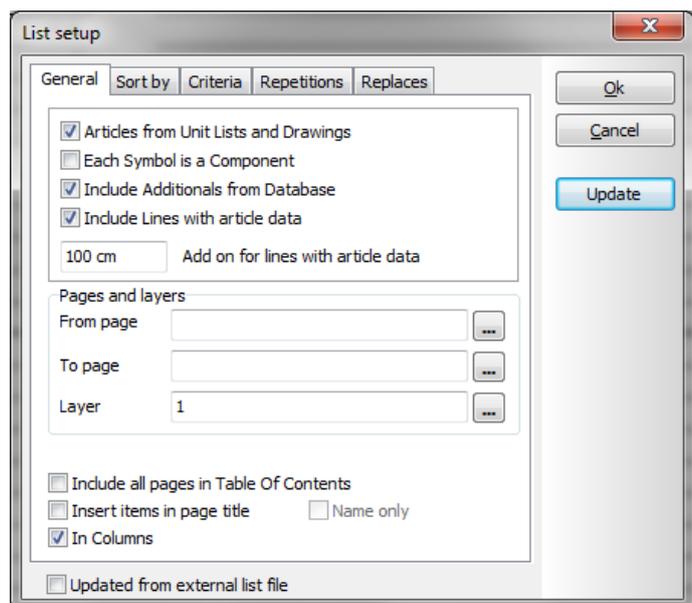
Articles from Unit lists and drawings

If you select this option, the individual articles from the unit drawings will appear in the list, that is the parts list will contain the articles that make up e.g. a "wall-mount plug with two switches".

If not selected, the parts list will show how many "wall-mounted plugs" you have in the project.

Each symbol is a component

If you haven't named each symbol uniquely, you can select this option, and have the program count each symbol as one component.



Include additional from the database

If a component has a fixed additional article number, a socket light bulb for the lamp or a special mounting bracket, you can have the program include these additional automatically when they have been listed in the database.

Include lines with article data

Cables on an installation drawing are (conducting) lines with article data. If you want to include these cables in the parts list, you must select this option. The cable length is deducted from the drawing based on the positions of symbols and the page scale. If you name each cable you can also choose to have an add-on for each cable and see each cable on the component list.

Pages and layers

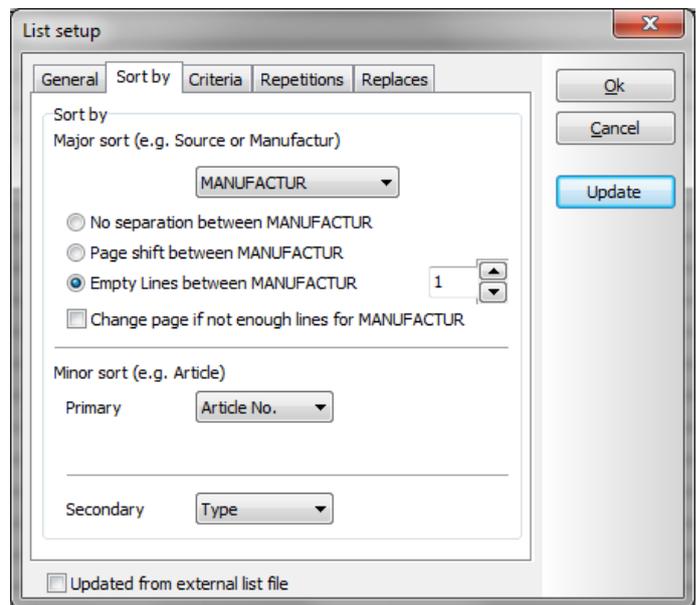
You can make lists for one or more pages. No selection means "all pages".

You can make lists for one or all layers, "0" means "all layers".

The tab Sort by

In this tab you select the way you want to sort the list. Here the list is sorted by MANUFACTURER (from the database) and 1 empty line is inserted between each manufacturer.

You can choose to sort by all database fields. If you choose [None] the list will only be sorted by the fields seen in the "Minor sort" section.



The tab Criteria

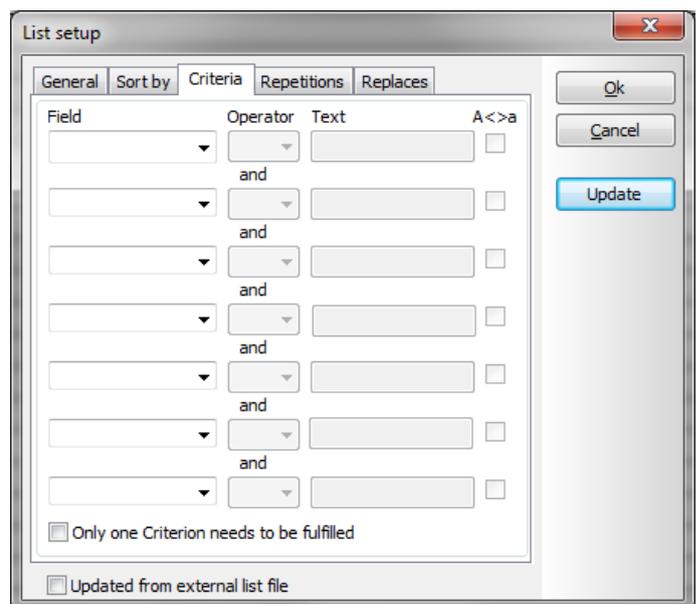
In the tab Criteria you can set up rules about the selection of components in the list.

Field: You can select between database fields and some fields from the project.

Operator: Field is <. >, =, <> Text

Text: A value to be fulfilled by Field.

In this way you can choose to have a list of component from e.g. one supplier.



The tab Repetitions

Here you type what you want to see in case of repetitions in the list.

Here the list will show [---] every time a Manufacturer or a Supplier is repeated.

The screenshot shows the 'List setup' dialog box with the 'Repetitions' tab selected. The 'Field' column contains 'MANUFACTUR' and 'SOURCE'. The 'Text' column contains '---' for both. There are three empty rows below. The 'Updated from external list file' checkbox is unchecked. Buttons for 'Ok', 'Cancel', and 'Update' are on the right.

The tab Replaces

Here you choose to fill data into the list even though your selected datafield for the list is empty. That means that you can select an alternative text if your datafield is empty.

You can select data fields from the database or from the projects.

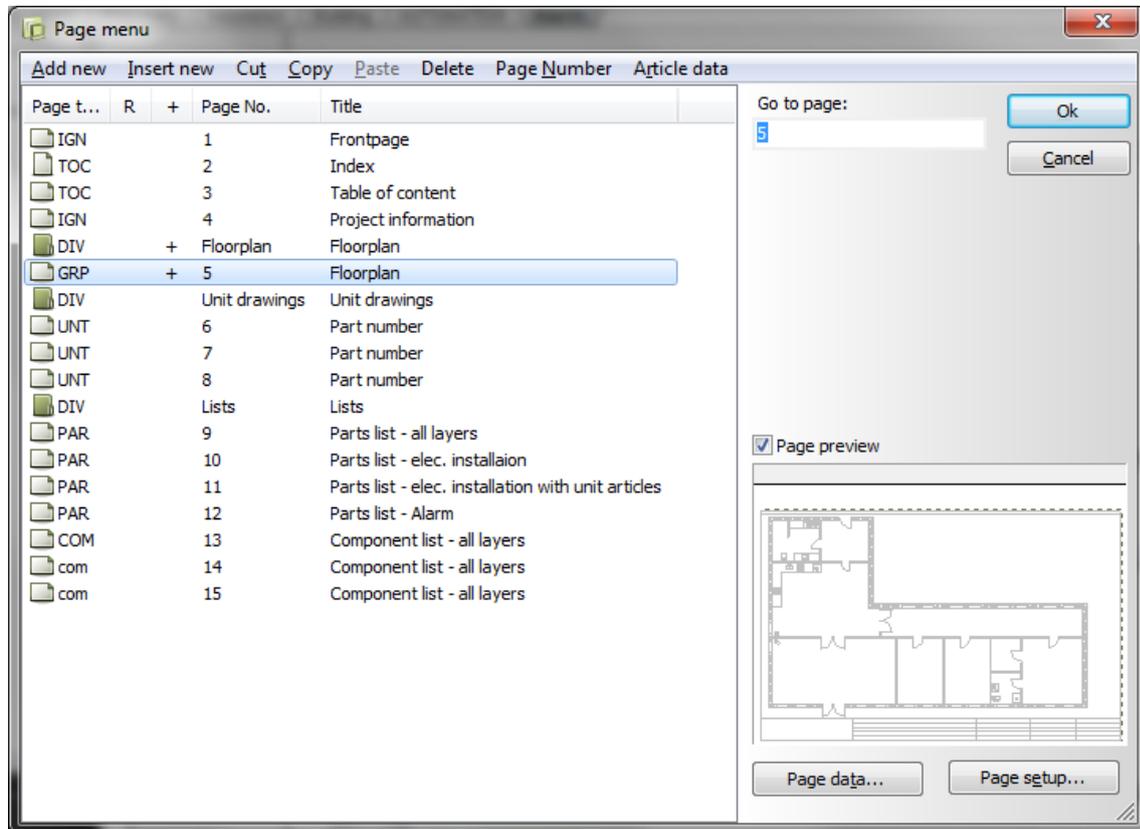
The screenshot shows the 'List setup' dialog box with the 'Replaces' tab selected. The 'Field' column contains 'Function'. The 'Replace with Field' column contains 'DESCRIPT'. There are three empty rows below. The 'Updated from external list file' checkbox is unchecked. Buttons for 'Ok', 'Cancel', and 'Update' are on the right.

Are you wondering why some datafields have CAPITAL LETTER NAMES and some others haven't? That is because we have chosen to name all our database fields with CAPITAL LETTERS, and the other datafields are Project Datafields.

THE LAST FINISH... A FEW MORE HINTS

You have started by using a template. That means that you might have to add extra pages or that you might have to delete some other pages. After that you will have to renumber all pages in the project.

Those tasks are done in the Page menu. Press the icon  in the vertical toolbar.



Add/Insert new pages

You can insert more pages here. The difference is that “Add...” adds pages at the end of the project, whereas “Insert...” insert in front of the current page.

Delete excess pages

You can delete excess pages with Cut or Delete.

New page numbers

If you mark one or more pages, you can change page numbers on those.

All commands are found in the top line of the dialog.

FLOOR PLANS IN OTHER FORMATS

DWG AND DXF-FORMAT

Very often you can get a floorplan in dwg-format. It is possible to import a floorplan like this into the project.

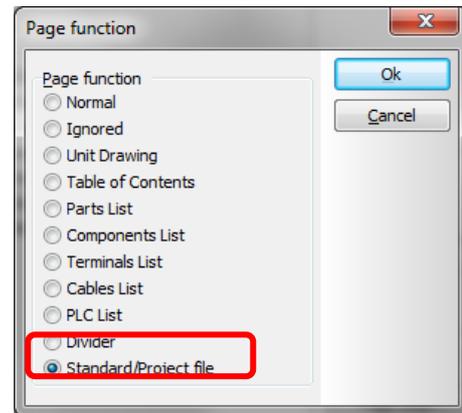
The advantage is partly to save time, partly that the floorplan is a more correct plan than what you can make in Automation. The measure function works correctly if you import the floorplan in the correct page scale.

The disadvantage is that it can be a little difficult to convert the dwg-file, depending on how the original drawing has been made.

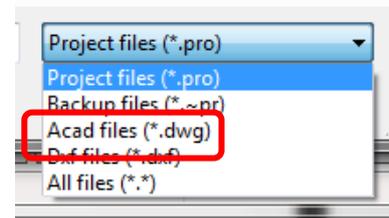
When you have imported the floorplan into your project, you start drawing your electrical installation as described earlier in this booklet.

You do it like this

1. Go to the page where you want the floorplan and go to the right layer, i.e. layer 5.
2. Go to the Page menu and select Insert new.
3. Select Standard/project file.
4. Find and select the desired file.



5. Select the correct file filter, here you see *.dwg for AutoCAD.



6. The page with your dwg-file is opened in your project.
7. Place electrical installations and cables on the plan as described earlier in this booklet.

If your MAP-file has the right settings the dwg-file has been converted correctly and can be used instantly. However, it might take some time to set up the MAP-file, which is a setup for how to “translate” a dwg-file to Automation.

MAP-FILE

When you convert a dwg-file to Automation, you use a MAP-file. It is a file with which defines how each individual part of a dwg/dxf file (or another file type) is going to be converted.

Because you can draw in many different ways there is no “the only right way” to make this MAP-file. Normally you will have to adjust the settings several times.

You can read more about the MAP-file in the Tools manual.

PDF FORMAT

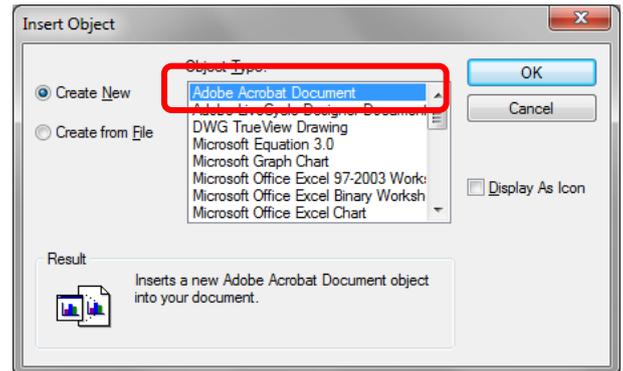
You can insert a pdf-file of a floorplan and draw on top of this.

The advantage is that you save the time it takes to draw the floorplan yourself.

The disadvantage is that the program can not find the correct cable lengths. The other functions of parts and components lists work as described.

Do it like this

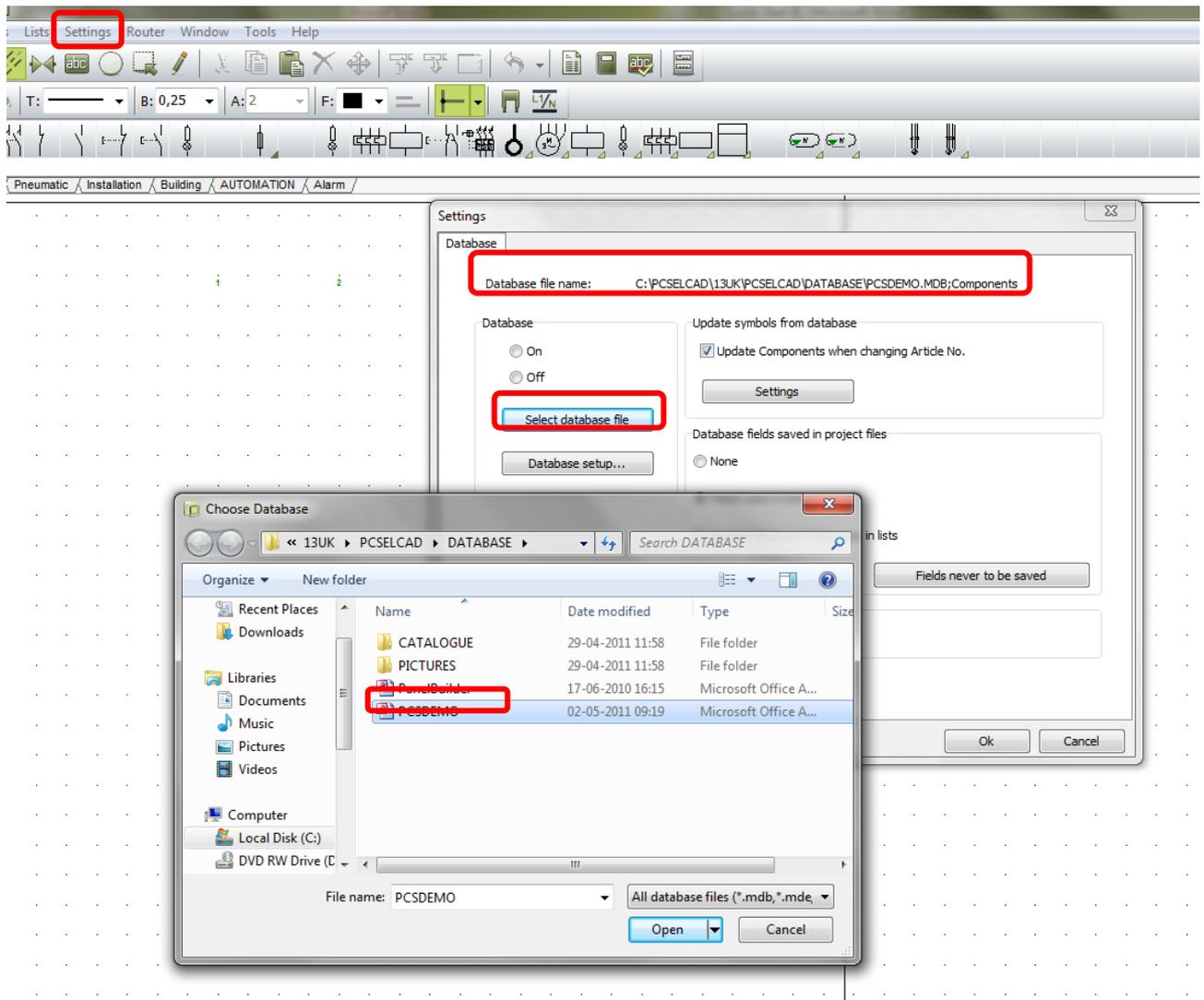
1. Go to the floorplan page, and then to the layer, ie layer 5.
2. Select Insert Object in the Insert menu.
3. Select Adobe Acrobat Document in the dialog.
4. Find the right document on your pc.
5. When the pdf-file is inserted on the page, beware that you probably have to change your page scale to 1:1 instead of 1:100. And this still is not a guarantee for a correct page scale.
6. Place your electrical installatons and cables on the drawing as described earlier in this booklet.



CHANGE DATABASE

If you want to change database, you do it like this:

1. Select the menu Settings|Database. Here you can see which database is currently connected to your program.
2. Press the button [Select database file] to change to another database
3. You will now enter the program's database folder. Double-click to select the desired database. If you wish to search another folder, just search for it in this explorer window.
4. When you have selected the database, you must select the table that contains components – here the table Components.
5. Finish by clicking <OK>.



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