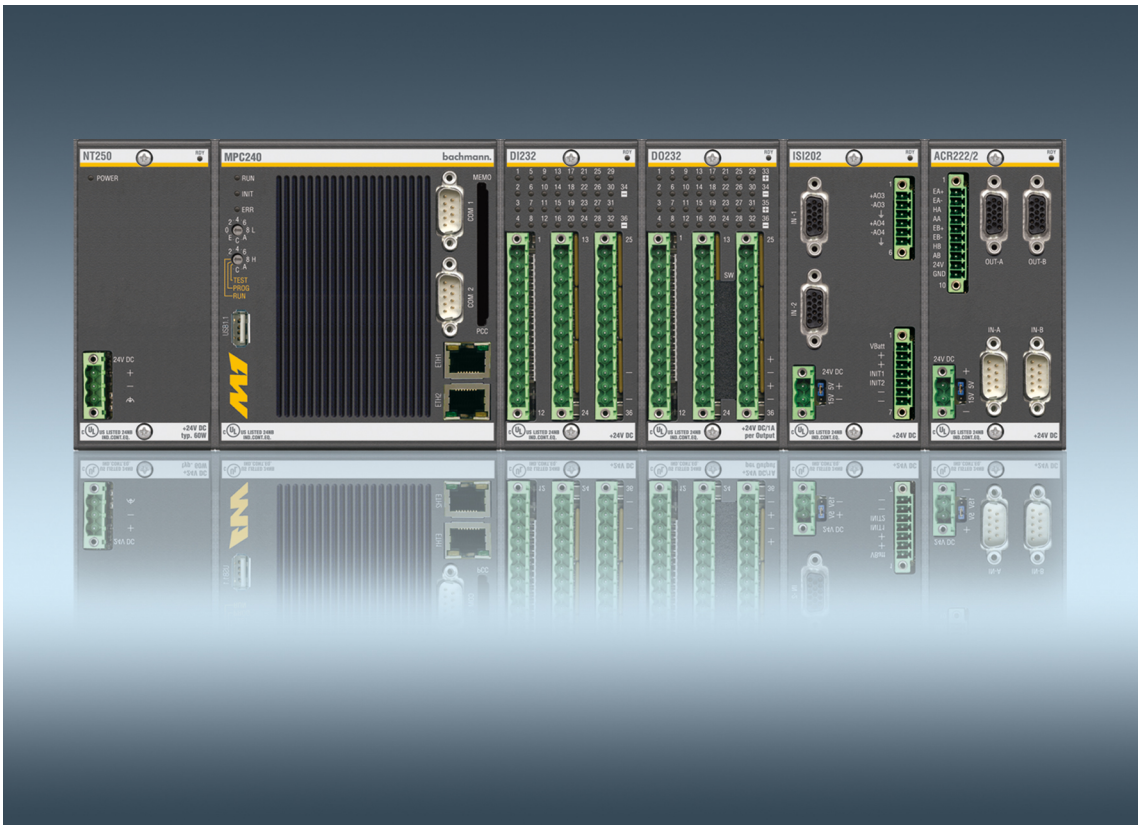
bachmann.

Application Note Bachmann Macros in EPLAN Electric P8



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1 General

This document describes the use of Bachmann macros with EPLAN Electric P8 for the M1 controller hardware, visualization hardware and PLC data export.

A good knowledge of EPLAN Electric P8 and PLC navigation is required to use the macros. The file structures mentioned below are for information only and can deviate from the actual structures of the application.

Independent changes to the macros provided by Bachmann electronic GmbH are not recommended.

Requirements

- EPLAN Electric P8 version 2.1 or higher
- Microsoft Excel® 2003 or higher

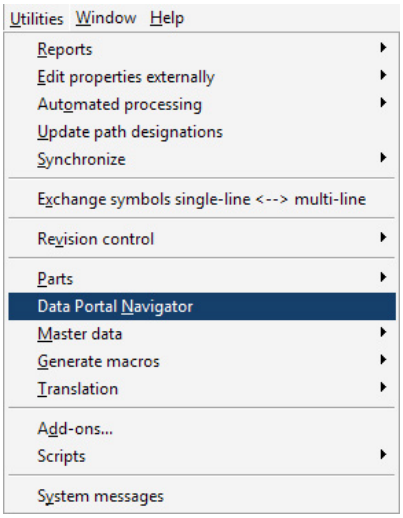
1.1 Importing Bachmann macros from the EPLAN Data Portal

Macros of the PLC modules are useful for creating a schematic project with Bachmann electronic GmbH products. The macros are created by Bachmann electronic GmbH and are published by EPLAN on the EPLAN Data Portal. From there they can be imported directly into the schematic project.

Requirements

- Valid EPLAN license
- User account present
- Internet access

Procedure:

1. 

Select **Utilities > Data Portal Navigator** via the menu bar.

➔ The "Navigator" will open.

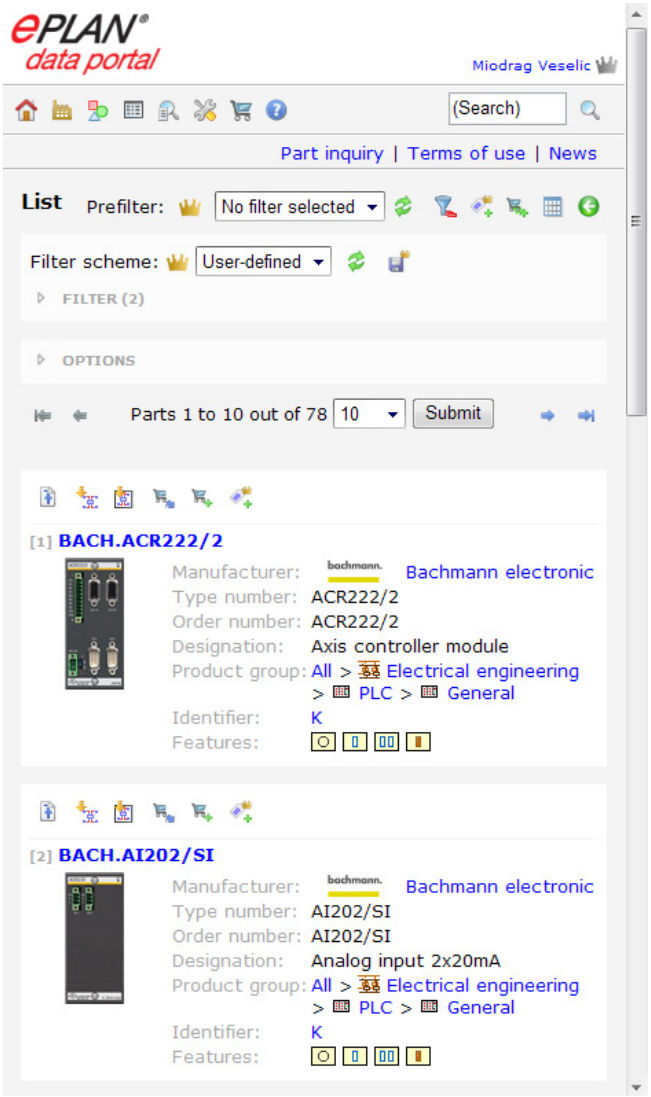


Fig. 1: Navigator

2. From the Navigator, Bachmann articles can be imported directly into the EPLAN Electric P8 project or can be downloaded as an article to the user's article database.

1.2 Importing the filter scheme

To perform a PLC data export to a Bachmann M1 controller, an appropriate filter scheme must first be imported or created in EPLAN Electric P8.

Requirements

The **PLC Navigator** (**Project data > PLC > Navigator**) is opened.

Procedure:

1. Click on ... in the **PLC Navigator**.
   ➔ The "Filter" dialog opens.

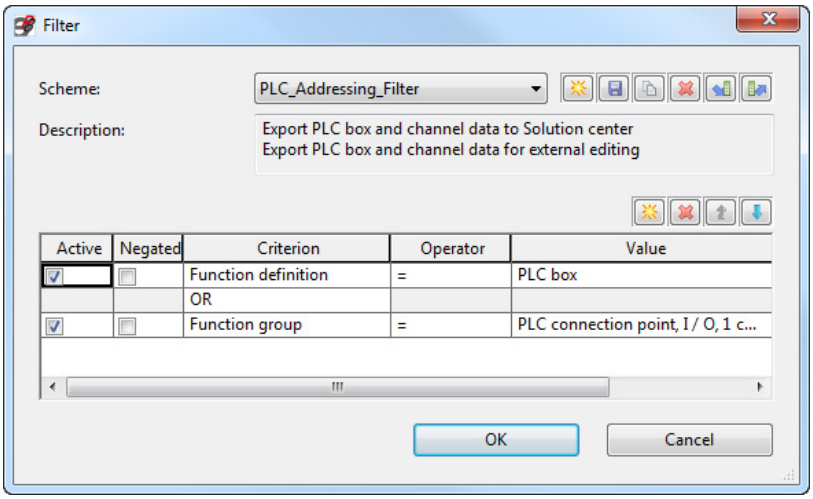


Fig. 2: "Filter" dialog

2. Click on .
   ➔ The "Select import file" dialog opens.
3. Select the directory, from which a scheme should be imported.
4. Highlight the `PCfiP.PLC_Addressing_Filter` file and click on <Open>.
5. Confirm with <OK>.

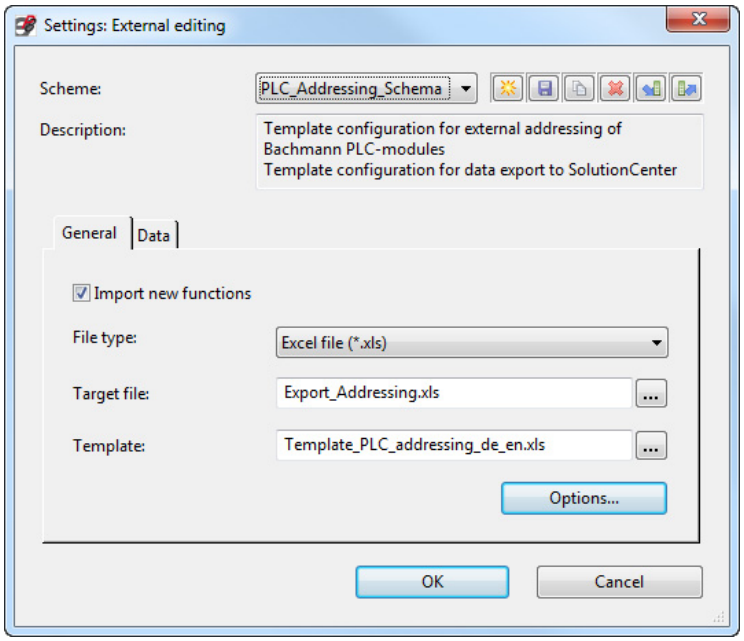
1.3 Importing the export scheme

To perform a PLC data export to a Bachmann M1 controller or to perform the addressing externally, an appropriate export scheme must be imported in EPLAN Electric P8.

Requirements

The "Edit functions externally" dialog (**Utilities > Edit properties externally > Export functions**) is opened.

Procedure:

1. Click on ... beside the drop-down list **Scheme** in the "Edit functions externally" dialog.
   ➔ The "Settings: External editing" dialog opens.
2. Click on .
   ➔ The "Select import file" dialog opens.
3. Select the directory, from which a scheme should be imported.
4. Import the SolutionCenter export scheme or the PLC adressing scheme.
   4.1
   

   Highlight the `PCfiP.PLC_Addressing_Schema` file and click on <Open>.
   4.2 For **File type** select type **Excel file (*.xls)**.
   4.3 Select the path to the target file via ... beside **Target file**.
   4.4 Select the `Template_PLC_Addressing_de_en.xls` file at **Template** via ... .
5. Confirm with <OK>.

1.4 Importing the PLC addressing scheme

The absolute addressing of the hardware modules of Bachmann electronic GmbH is considerably different to the widely used byte-oriented addressing. We therefore recommend that you create or import a specially adapted addressing scheme.

Procedure:

1. Select **Options > Settings > 'Project' > Devices > PLC**.
   ➔ The "Settings: PLC" dialog opens.
2. Click on ... beside the drop-down list **Scheme** in the "PLC" dialog.
   ➔ The "Settings: PLC specific" dialog opens.

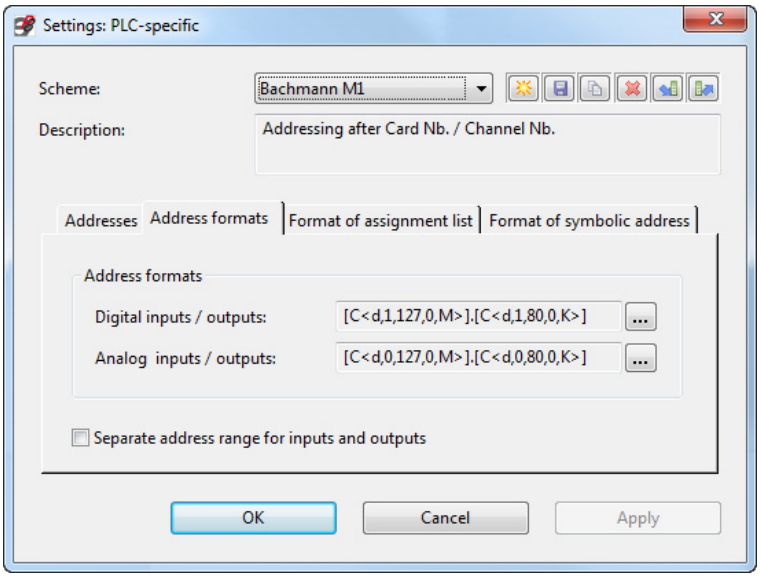


Fig. 3: "Settings: PLC specific" dialog

3. Click on .
   ➔ The "Select import file" dialog opens.
4. Select the directory, from which a scheme should be imported.
5. Highlight the `PP.Bachmann_M1.xml` file and click on <Open>.

2 Drawing with Bachmann macros

The following should be noted when drawing with Bachmann macros:

- **Overview macros** ("overview" version) contain all the connections of a device.
- **Overview macros with variant E** are graphic representations of devices framed with a PLC box. The PLC box is used for the automatic generation of PLC configurations in EPLAN Electric P8.
- **Rack macros** ("multi-line" version) are graphic representations of devices framed in a PLC box which include the universal supply unit connections of modules as well. The supply unit connections can also be designed with standard PLC symbols. Apart from a few exceptions, other variants of the "multi-line" version contain multi-line connection macros with which a channel can be placed with all connections using the function **Place macro > Multi-line**. Only when there are several active connections per channel must the connections be assigned individually via **Assign**.
- **Mounting macros** (part placement, "control cabinet layout" version) are full-size 2D graphic representations, which can be used for the placement of parts when creating the control cabinet layout. If a device has multiple mounting variants, it is possible to find these among different part placement variants.
- If a macro contains several **display modes** or several **variants**, those can be selected via shortcuts. If the macro is attached to the cursor, the [Shift] + [Tab] keys can be used for switching between the display modes. If a display mode has several variants, the [Tab] key can be used for switching between them.
- **Connections** like module supply connections, bus connections, I/O supply connections and PLC inputs and outputs are configured, if possible, according to their function:
  - With differential inputs (analog modules), the positive input is defined as **PLC connection point, AI**.
  - For modules with selectable PLC connections, the connections are preallocated according to the function definition, e.g. for the DIO2xx. The preallocation can be modified as needed.
  - For modules with 2 connections per channel, one of both preallocated connections is deactivated, e.g. for the AIO288. The preallocation can be modified as needed.

Modifying the preallocation:

→ *Figure 5 "Properties: PLC connection points and bus ports", Page AP-11*

There are universally valid input/output macro variants that can be used for the multi-line version.

→ *Chapter 2.3 "Additional support ", Page AP-14*

2.1 Modules

Inserting a module

Procedure:

1. Select **New...** in the context menu of the **page navigator**.
   ➔ The "New page" dialog opens.

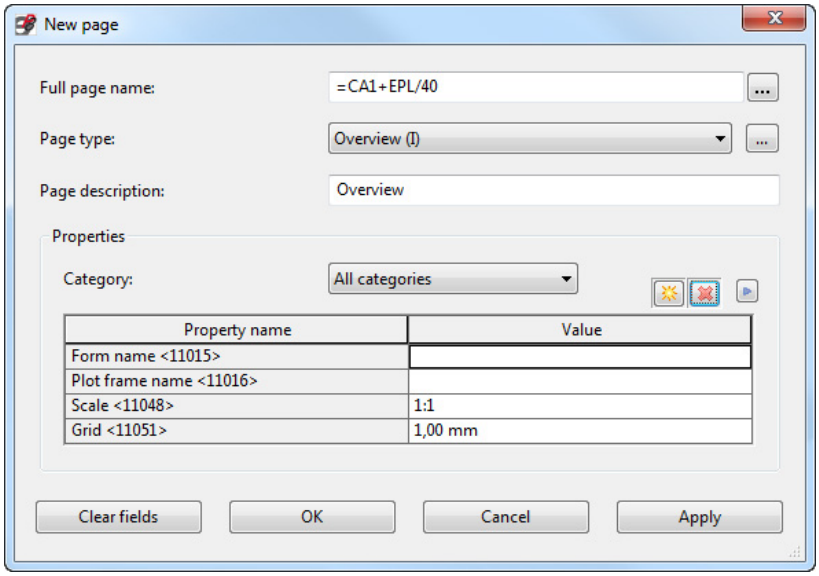


Fig. 4: New page

2. Add page with page type **Overview (I)**.
3. Confirm with <OK>.
4. Select **Insert > Device... – or – Insert > Window macro...** via the menu bar and select the macro.

   In the case of large macros, the total configuration is divided into 2 variants and can only be pasted onto 2 separate pages.
5. Confirm with <Open>.
6. Check the module in the **PLC Navigator** for completeness.
7. At **Module is placed on rack ID** enter the station number (StationNb).
8. At **Position (slot / module)** enter the module number (CardNumber).

Further information

For station number and the module number, see chapter "Configure hardware module" under Developing (with SolutionCenter) in User Manual M-BASE.

Setting selectable connections

The selectable PLC connections and/or the analog inputs/analog outputs with several connection possibilities are preallocated according to the default function definition. With these connections, the logic (analog or digital, input or output) must be set on the function template as appropriate. For modules with 2 connections per channel, one of both preallocated connections is deactivated, e.g. for the AIO288. The preallocation can be modified as needed.

Procedure:

1. Select **Properties...** in the context menu of the PLC connection in the **PLC Navigator**.

   ➔ The "Properties" dialog opens.

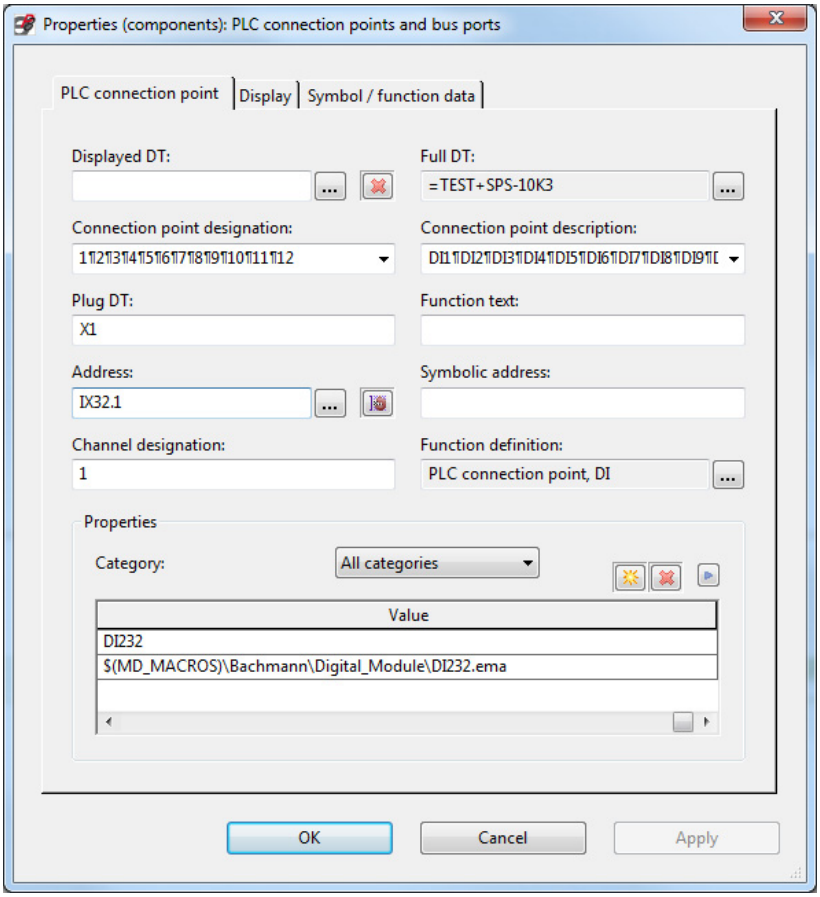


Fig. 5: Properties: PLC connection points and bus ports

2. Click on ... next to the **Function definition** field.
   ➔ The "Function definitions" dialog opens.

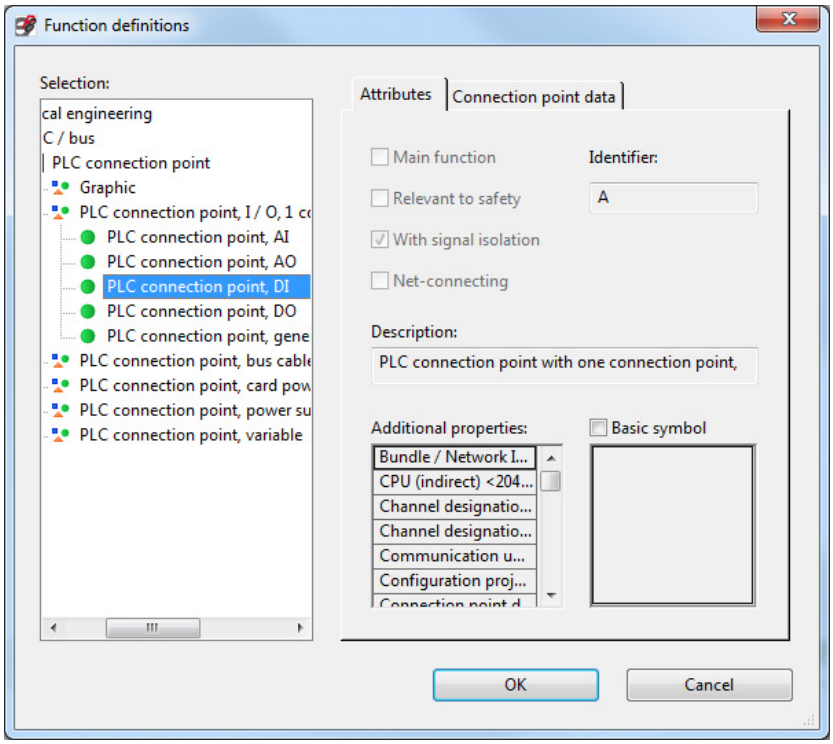


Fig. 6: Function definitions

3. Select connection.
4. Confirm with <OK>.

2.2 Visualization devices

These components are mostly customer-specific. The macros therefore contain only the standard interfaces.

- There are always 2 variants: variant A is the connection variant, and variant B is the display variant.
- IPM is a special type of cabinet PC: It has several variants of the mounting macro, as this can be installed vertically or horizontally.
- Accessories must be dealt with separately, e.g. plug-in module cards.

2.3 Additional support

Macro variants

The following connection macros ("multi-line") for various modules are also available:

- Current input
- Voltage input
- Resistance input
- Pt100 input
- Digital input, 3-wire connection
- Digital input, 3-wire connection with external power supply connections, e.g. VP200 terminal block module
- Digital output, 2-wire connection
- Incremental encoder

Special feature with the incremental encoder macro

Macros of incremental encoder modules, e.g. CNT204/H, include only one connection per incremental encoder input because they are treated as a single analog input. For the representation of an incremental encoder connection, either a standard PLC symbol for a one pin version or the **Incremental Encoder** macro variant can be used. With the macro, the connections are defined as device connections, apart from the A+ input, which with can be combined via **Assign** with an PLC analog input.

Part variants

Macros with altered I/O assignment can be saved as part variants.

> With configurable parts (IPC, etc.), we recommend the generation of a separate part variant for each application. In this case, it must be ensured that the function template with PLC parts is correct.

Generating part variants

Procedure:

1. Select **Properties...** in the context menu of the PLC box in the **PLC Navigator**.
   ➔ The "Properties" dialog opens.

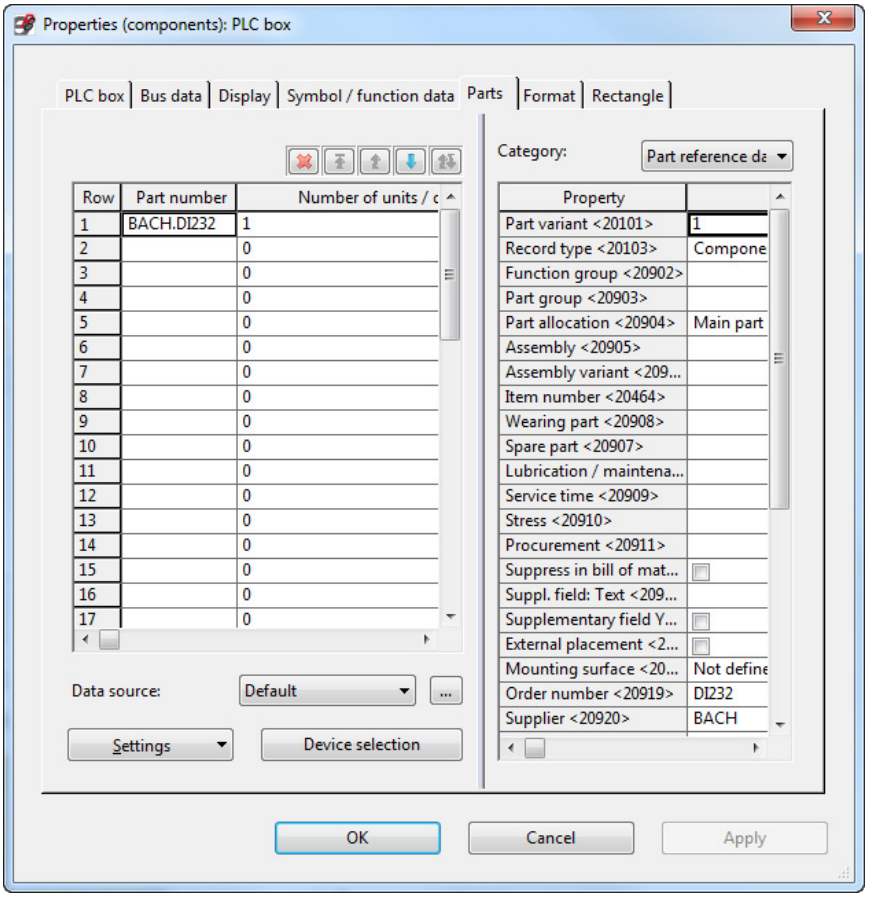


Fig. 7: Properties: PLC box

2. Open "Parts" tab.
3. In the right Property field, change the **Part variant** to a new value.
4. Confirm with <OK>.
5. Select **Generate part** in the overview page context menu.
6. Confirm with <OK>.

3 PLC addressing

The absolute addressing of devices in M-PLC includes the module and channel numbers and is only required for a compliant representation of the device (station number, module number and channel number) in EPLAN Electric P8.

A separate addressing scheme must be created or imported for a compliant addressing type between M-PLC and EPLAN.

→ *Chapter 1.4 "Importing the PLC addressing scheme ", Page AP-7*

The automatic addressing of EPLAN does **not** function correctly when a new module or macro is inserted, since the module number (**Position (slot / module)**) can only be changed after the insertion.

Both with the EPLAN addressing tool and also for the data export, the addressing in the **Properties** dialog window works with the following properties of the **PLC box** and **PLC connection point**:

- **Module is placed on rack ID**
- **Position (slot / module)**
- **Channel designation**

A unique device ID is also required for the data export to the SolutionCenter.

The function text is required for further processing as a variable name in the SolutionCenter. In order for it to be passed on to the SolutionCenter, the function text must not contain any special characters or spaces.

If the absolute addressing is to be consistent with the addressing in M-PLC, the following should be noted:

- The module number (**Position (slot / module)**) can be freely assigned, however no number can be repeated. It must, however, be consistent with the PLC configuration (CardNumber) in the SolutionCenter.
- Not all devices have their channels numbered in ascending order according to the terminals. The EPLAN addressing that is called via **Project data > PLC > Address...** can therefore only be executed with the imported addressing scheme.

  → *Chapter 1.4 "Importing the PLC addressing scheme ", Page AP-7*
- The addresses generated when a macro is inserted in EPLAN Electric P8 must be corrected (see note above).

3.1 Addressing with an addressing scheme

Procedure:

1. In the **PLC Navigator** (**Project data > PLC > Navigator**) select the PLC cards to be addressed.
2. Select **Project data > PLC > Address...**.
   ➔ The "Readdress PLC connection points" dialog opens.

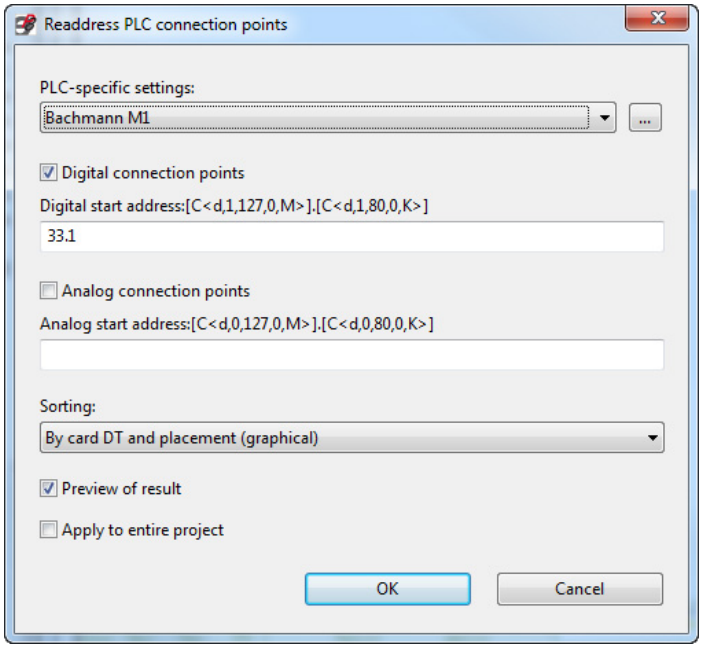


Fig. 8: "Readdress PLC connection points" dialog

3. At **PLC specific settings** select the imported "Bachmann M1" configuration or a user-specific configuration (➔ *Chapter 1.4, Page AP-7*).
4. Confirm with <OK>.

3.2 Implementing external automatic addressing

The external automatic addressing generates the address from the module number (**Position (slot / module)**) and the channel number.

The formula for calculating the address is stored in the Microsoft Excel® file `Template_PLC_Addressing_de_en.xls`.

Example: Channel 5 of an analog input module with the module number 36 is given the calculated address **IW36.5**.

Requirements

- The **Module is placed on rack ID** and **Position (slot / module)** fields must be filled in at the Properties of every device.

  Module is placed on rack ID corresponds to the MConfig.ini keyword StationNb.

  Position (slot / module) corresponds to the MConfig.ini keyword CardNumber.

- The Microsoft Excel® template `Template_PLC_Addressing_de_en.xls` for export is preferably filed in the directory `..\EPLAN\Electric P8\Templates\<CustomerID>`.

- The **PLC_Addressing_Filter** (`PCfiP.PLC_Addressing_Filter`) filter scheme must be available in the **PLC Navigator**.

  → *Chapter 1.2 "Importing the filter scheme ", Page AP-5*

- The export scheme **PLC_Addressing_Schema** (`PCfiP.PLC_Addressing_Schema`) must be available at **Utilities > Edit properties externally > Export functions**.

  → *Chapter 1.3 "Importing the export scheme ", Page AP-6*

Procedure:

1. Select the filter scheme **PLC_Addressing_Filter** in the **PLC Navigator** and activate the check box **Active**.
2. Highlight the external addressing components in the **PLC Navigator**.

3. Select **Utilities > Edit properties externally > Export functions** via the menu bar.

   ➔ The "Edit functions externally" dialog opens.

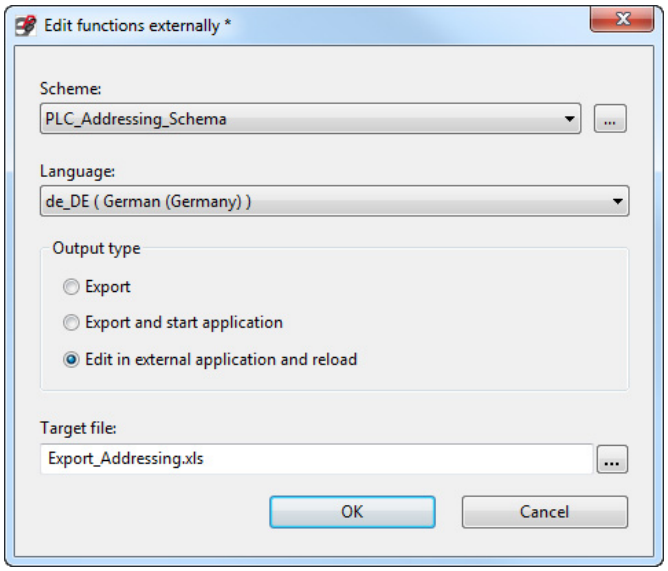


Fig. 9: Edit functions externally

4. Select the **PLC_Addressing_Schema** export scheme.
5. Select the language.
6. Select **Edit in external application and reload** as output type.
7. Confirm with <OK>.

   ➔ Microsoft Excel® is opened.

> In order for the external addressing to function correctly, the security level of the macros must be set in Microsoft Excel® to **Medium**.

8. Confirm the security warning with <Acivate macros> macros.

> The Microsoft Excel® template contains the formula for calculating the absolute addresses. The **Function text** column can be reworked and filled in.

9. In Microsoft Excel® click on **SPS-Adresse füllen und Excel beenden** / **Fill in PLC address and terminate Excel**, so that PLC addresses are generated automatically and the program is closed.

   ➔ Import to EPLAN Electric P8 is started.

10. Confirm data import with <Yes>.
11. Select **Utilities > Synchronize > Functions > Overview --> All representation types** via the menu bar so that the PLC data is synchronized from **Overview** to **Multi-line**.
12. Check PLC addresses.

4 SolutionCenter data transfer

Performing a SolutionCenter export

Requirements

- The **Module is placed on rack ID** and **Position (slot / module)** fields must be filled in at the Properties of every device.

  Module is placed on rack ID corresponds to the MConfig.ini keyword StationNb.

  Position (slot / module) corresponds to the MConfig.ini keyword CardNumber.
- The **PLC_Addressing_Filter** (`PCfiP.PLC_Addressing_Filter`) filter scheme must be available in the **PLC Navigator**.

  → *Chapter 1.2 "Importing the filter scheme ", Page AP-5*
- The export scheme **PLC_Addressing_Schema** (`PCfiP.PLC_Addressing_Schema`) must be available at **Utilities > Edit properties externally > Export functions**.

  → *Chapter 1.3 "Importing the export scheme ", Page AP-6*
- The PLC configuration must be completed in the schematic project and verified. However, it is possible to make changes to the configuration.

Procedure:

1. Select the filter scheme **PLC_Addressing_Filter** in the **PLC Navigator** and activate the check box **Active**.
2. Highlight the export components in the **PLC Navigator**.
3. Select **Utilities > Edit properties externally > Export functions** via the menu bar.

   ➔ The "Edit functions externally" dialog opens.

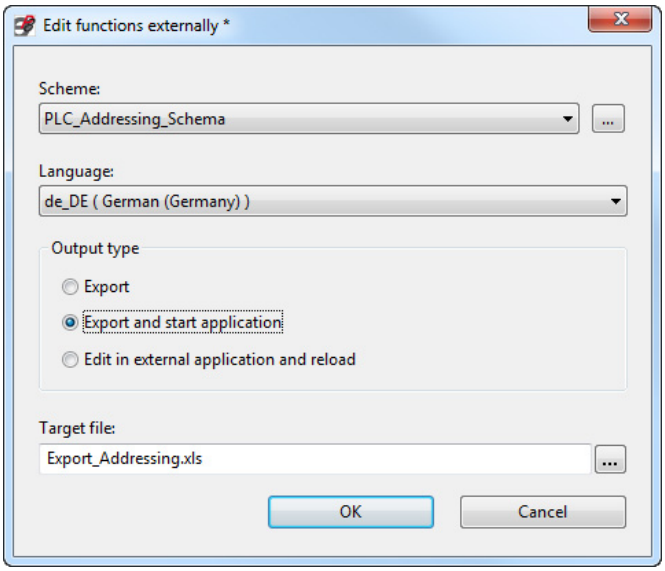


Fig. 10: Edit functions externally

4. Select the **PLC_Addressing_Schema** export scheme.
5. Select the language.

6. Select **Export and start application** as output type.
7. Confirm with <OK>.

➔ Microsoft Excel® is opened.

> In order for the creation of the EDC file to function correctly, the security level of the macros must be set to **Medium** in Microsoft Excel®.

8. Confirm the security warning with <Activate macros>.
9. In Microsoft Excel® click on **EDC-Datei erstellen und Excel beenden** / **Generate EDC file and terminate Excel**, so that an EDC file is generated automatically and the program is closed.

➔ The dialog "Export EDC file" is opened.

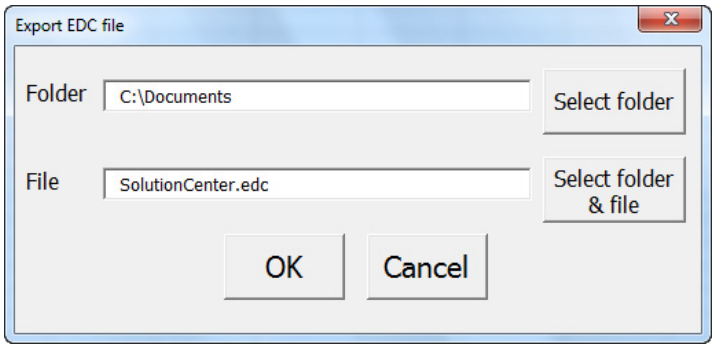


Fig. 11: "Export EDC file" dialog

> The "Export EDC file" dialog always shows the last file used.

10. Define export target and file name:

Create a new EDC file

10.1 At **Folder** use the <Select folder> button to select the folder in which the EDC file is to be stored.

The export target can also be entered manually in the **Folder** entry field.

10.2 Enter the file name in the **File** entry field.

EDC file already exists

10.3 Select the EDC file via the <Select folder & file> button.

The export target and the file name can also be entered manually in the entry field.

11. Confirm with <OK>.

➔ EDC file is exported.

Microsoft Excel® is automatically closed.

For further information on importing an EDC file in the SolutionCenter see chapter "Import ECAD data" at Developing (with SolutionCenter) in the User Manual M-BASE.

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