

## TechTip: PLC data exchange

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## 1. Use

The multiple entry of data is avoided through the PLC data exchange. This reduces the work load across departments and avoids typing errors. The configuration is accelerated overall and the planning quality is improved.

For the fundamental description of a property please refer to the current Eplan help:

- [Edit PLC Information > PLC > Basics](#)
- [Eplan Properties: Overview](#)

Further notes and specifications for individual properties can also be found in the TechTip **"TechTip-Overview-of-the-PLC-properties"**.

With Version 2.7 of Eplan Electric P8 numerous new check runs which help you in configuring the data exchange were implemented in the PLC field.

You can find details on the PLC data exchange with specific PLC configuration programs in separate TechTips.

## 2. Exchanged data

1. Hardware data  
Rack structure with part information.
2. Symbol table (assignment list, table of variables or similar)  
Contains the assignment of the symbolic address to a hardware address.
3. Network structure logical view (association of the devices to networks), not the exact cabling.

The PLC data exchange is based on a file that can be exchanged simply between the Eplan designer and the PLC programmer. Data that an editing program does not find in the exchange file because the other editing program does not know them, are supplemented during importing. Eplan supplements the further required data from the parts management.

PLC configuration programs and Eplan are based on different points of view.

Eplan configures electrical engineering hardware details such as voltage supply, etc.

PLC configuration programs have a logical view for the software programming.

Through the different views of the programs and the current developments on the hardware and software sector, the PLC data exchange cannot always cover all the requirements. This applies for example to passive items in the bus bundle and used field bus systems.

## 3. Recommended workflow in Eplan

### 3.1. Physical rack layout

Begin with the rack layout on a single-line schematic page.  
Use single-line PLC boxes as main functions.

#### Advantages:

1. The hardware data of the used devices is planned through the rack layout. All the main functions exist in the single-line representation. When this representation is copied, the parts entered there are copied as well.
2. Individual functions (I/O connection points, power supply, bus ports, etc.) can be placed via drag & drop from the PLC navigator.
3. The rack layout can be exchanged with PLC configuration programs.

The following properties must be filled at PLC cards that represent modules and / or racks:

| ID           | Property  |
|--------------|---|
| <b>20427</b> | <b>Rack</b> at a rack   |
| <b>20410</b> | <b>PLC card is placed on rack ID</b> at modules on a rack   |
| <b>20411</b> | <b>Position (slot / module)</b> at modules on a rack. As a rule this field remains empty at racks or head stations. |

Eplan assumes that devices on the same rack are connected by means of a "backplane".  
This is not configured separately.

#### Tip:

Use the "edit in table" function to achieve effective editing of the specifications. Special schemes are available here.

#### 3.1.1. Head station

A **head station** is identified by being a rack and either has the **Bus coupler / head station** check box, is not placed on a rack, or the **CPU** check box is activated.

PLC cards which are directly placed on the head station or are integrated into it, are identified by the check box **PLC card is placed on head station**. For the corresponding position on the head station, the **Position (slot / module)** property is used.

For PLC cards that are adjoined next to the head station the **PLC card is placed on head station** check box remains deactivated. For the corresponding position next to the head station, the **Position (slot / module)** property is used.

The property **PLC card is placed on head station** is used during the PLC data exchange in AutomationML AR APC format.

### 3.1.2. Extension racks

Extension racks have to be connected with the main rack via bus ports. Enter the configuration project that belongs to the PLC box, use the "Local-Bus: Extension" bus system at the bus port (see also chapter "[Connections between racks](#)"). Further properties are not required in the AutomationML AR APC format. To suppress the check run [004037](#) activate the check box **Ignore missing bus ID** at the bus port.

### 3.1.3. Passive devices

Passive devices as well as devices that should not or cannot be exchanged with the PLC configuration program can be used for the configuration of the network structure.

1. Terminals, pins: To do so activate the **Net-connecting** check box on the **Symbol / function data** tab.
2. Passive switches, bus repeaters, and similar units:
  - a) When using a PLC box: The **PLC structure data** tab remains completely empty, no PLC-specific properties are required.
  - b) When using a black box: The settings for bus capable devices are not required and remain empty. Details on the individual properties can also be found in the TechTip "**TechTip-Overview-of-the-PLC-properties**", Chapter "Settings at bus-capable devices".
  - c) Bus ports are configured as "Network / Bus cable connection points, switch connection point". Since these bus ports are treated as busbar connection points, no specifications are required on the **Bus data** tab.

The network structure in the AutomationML AR APC format is exported.  
However, the port-specific interconnection is missing.

## 3.2. I/O interconnection

Place the I/O connection points with the associated sensors / actuators on multi-line schematic pages.

Use bitwise representation (meaning one macro per channel) with functional grouping of the devices.

### Advantages:

1. Once macros have been created they can be used repeatedly for similar machine functions.
2. I/O connection points or channels can be placed via drag & drop from the PLC navigator or assigned.
3. You can check the assignment in the PLC navigator or on a PLC overview page.

## 3.3. Network structure

Connect the single-line bus ports of the modules via autoconnecting. Bus ports are by default net-connecting and signal-transmitting.

### Advantages:

1. The network structure can be documented clearly by connecting the single-line bus ports.
2. The network structure can be exchanged with PLC configuration programs. The logical view (association of the devices to networks), is always exchanged. The export / import of the exact cabling depends on the bus system and the exchange format used.

The following properties have to be filled at the bus ports:

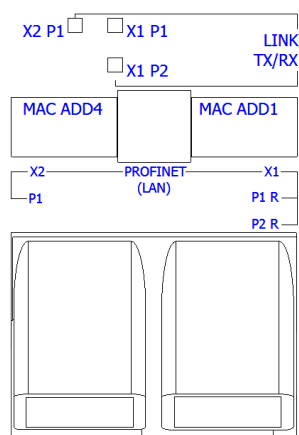
| ID    | Property  |
|-------|---|
| 20406 | Plug designation                                  |
| 20308 | Bus system  |
| 20311 | Physical network: Bus ID / item number            |
| 20413 | Physical network: Name                            |
| 20414 | Logical network: Name                             |
| 20447 | Bus interface: Name at Ethernet-based bus systems |

For the bus ports the **Plug designation** is identifying together with the **Bus interface: Name** property.

In Ethernet-based bus systems, associated bus ports are combined to a bus interface via the bus interface name. You can recognize this by the respective specifications in the manual or through labels on the PLC card.

An exact overview of the properties to be filled for the PLC data exchange in AutomationML AR APC format can be found in chapter "Settings for different bus systems".

Example "6ES7516-3AN01-0AB0" of SIEMENS



This PLC card has three bus ports for Ethernet-based bus systems:

| Connection point | Plug designation | Bus interface: Name |
|------------------|------------------|---------------------|
| 1                | P1 R             | X1                  |
| 2                | P2 R             | X1                  |
| 3                | P1               | X2                  |

In the process the connection points 1 and 2 form a bus interface, connection point 3 forms a second bus interface.

Identify connection point 1 and 3 as main bus ports (activate **Bus interface: Main bus port** property) and enter the relevant bus data here.

Eplan treats the following bus systems equivalently during exporting / importing, because they have the same hardware topology (Ethernet-based bus systems):

- BACnet
- CC-Link IE
- CC-Link IE Control
- CC-Link IE Field
- CC-Link IE Field Basic
- EtherCAT
- EtherCAT G
- EtherCAT P
- Ethernet
- EtherNet/IP
- Modbus TCP
- Powerlink
- PROFINET
- SERCOS III
- SSCNET III
- VARAN



### Special features of the "EtherCAT" bus system

- The **Physical network: Bus ID / item number** property is not used for the "EtherCAT" bus system. The associated check run [004037](#) can be suppressed by activating the property **Ignore missing bus ID** (ID 20412) for this bus port.
- The sequence of the bus ports is determined on the basis of the connections of the bus nodes. Therefore it is essential to configure the connections between the bus ports and activate the option **Export port-specific interconnection** in the dialog **Export PLC data**.

### Special features of the bus systems "Local-Bus: Extension", "DRIVE-CLiQ", "IO link", "PortToPort" and "ET connection"

- These bus systems do not form a network.
- For these bus systems only the connection between the bus ports is exported (port-specific interconnection).
- The property **Bus interface: Name** (ID 20447) must be identical at all associated bus ports of a device, an empty entry is permissible as well here.
- No bus address is required. The associated check run [004037](#) can be suppressed by activating the property **Ignore missing bus ID** (ID 20412) for this bus port.

#### Note:

A port-specific interconnection is only exported in the AutomationML AR APC format. If necessary, you can deactivate this setting in the dialog [Settings: AutomationML AR APC export](#).

### 3.3.1. Connections between racks

Use the bus ports of the type "Network / bus cable connection point, general" for the connection of racks with each other. The "Local-Bus: Extension" bus system must be set at these bus ports.

In addition take into account the special features described in the previous section for the bus system "Local Bus: Extension".

### 3.3.2. Automatic connections between associated bus ports

Network / bus cable connection points of the type "Network / bus cable connection point, general" are considered as belonging together and are automatically connected to each other through an internal connection if they have the same DT, belong to the same bus system and have the same *bus interface name*. Enter further data, such as **Physical network: Bus ID / item number** only at the main bus port of the bus interface.

#### Note:

A "Network / bus cable connection point, general" with empty bus interface name cannot establish an internal connection to another "Network / bus cable connection point, general".

The check run [004040](#) can be used to find contradictory data.

#### Note:

During the PLC data exchange in the *AutomationML AR APC format* bus ports within the same bus system and the same physical network (**Physical network: Name** property) are considered as connected with each other even if they have different DTs. This is, however, not evident during net tracking. The [004104](#) check run reports such bus ports as not being connected to each other. This message can be ignored if the network structure was consciously configured like this due to the physical conditions.

It is mandatory that the following properties be filled at the PLC bus port:

| ID           | Property                     |
|--------------|------------------------------|
| <b>20006</b> | <b>DT</b>                    |
| <b>20406</b> | <b>Plug designation</b>      |
| <b>20308</b> | <b>Bus system</b>            |
| <b>20447</b> | <b>Bus interface: Name *</b> |

\*: Must always be filled for Ethernet-based bus systems, for other bus systems only if automatic connections are to be generated between general network / bus cable connection points.

The check run [004040](#) outputs a message when one of the following properties is different:

| ID                    | Property                                 |
|-----------------------|--|
| <a href="#">20413</a> | Physical network: Name                   |
| <a href="#">20414</a> | Logical network: Name                    |
| <a href="#">20310</a> | Logical network: Bus port is master      |
| <a href="#">20311</a> | Physical network: Bus ID / item number   |
| <a href="#">20386</a> | Physical network: Bus ID / item number 2 |
| <a href="#">20309</a> | DNS/PROFINET device name                 |
| <a href="#">20313</a> | Data transfer rate                       |
| <a href="#">20289</a> | Integrated module                        |
| <a href="#">20334</a> | MasterSystemID                           |
| <a href="#">20312</a> | Subslot                                  |
| <a href="#">20186</a> | Marked for deletion                      |
| <a href="#">20446</a> | Subnet mask                              |

A check is carried out if the property to be checked is not empty at the second bus port.

If the property to be checked is empty at the first bus port and is filled at the second bus port, a message is also output.

## 4. Export from Eplan

Before the export from Eplan:

1. Check the project by means of the check runs from the 004 range. Eplan makes schemes available to you here that you use or adjust according to your requirements.
2. Delete the data not required at the auxiliary functions (**File > Extras > Command group Organize > Project > Command group Optimize > Compress project > Field Settings, Button [...] > Remove project data > Remove PLC structure data at PLC auxiliary functions**).
3. For an optimum PLC data exchange always configure *all I/O connection points and bus ports* of a device, even when they are not connected.

### 4.1. Hardware data

1. The Eplan export references a **configuration project** that is specified at all the associated PLC boxes.
2. The bus ports are represented in single-line and are connected with each other. During the PLC data exchange in the AutomationML AR APC format, multi-line representations and bus ports connected to each other are also taken into consideration.
3. A device is identified with the **CPU** property (check box is activated). The complete **CPU name** in the form [Configuration project].[Station ID].[CPU identifier] must be unique project-wide.
4. The **device identification** takes place by means of
  - a) the **PLC type designation** property or
  - b) a device description file (e.g. GSD / GSDML / EDS file, property **Device description: File name** property) and the **Object description** or
  - c) a device description file (e.g. GSD / GSDML / EDS file, property **Device description: File name**) and the **Device description: Index in file** during the data exchange in AutomationML AR APC format.

The **PLC type designation** as a rule corresponds to the order number in the hardware catalog of the respective PLC configuration program. The exact spelling is important.

Each PLC card can only have **one** device identification. A combination of several parts by entering several PLC type designations, device description files or indexes is not supported.

PLC connection points of the following categories are not exchanged:

- General
- 2 connection points
- Power supply
- Card power supply.

## 4.2. Assignment list

A PLC connection point (input / output) existing in a assignment list (symbol table) is exported if the following conditions are fulfilled:

1. Only PLC connection points with the following function definitions are exchanged:

- a. PLC connection point, DI
- b. PLC connection point, DO
- c. PLC connection point, AI
- d. PLC connection point, AO
- e. PLC connection point, multi-function with the type of signal
  - Digital input
  - Digital output
  - Analog input
  - Analog output

(Exception: PLC standard exchange format, all PLC connection points are exchanged here)

2. A PLC connection point, multi-function is treated with its logic like the corresponding I/O connection. For example

*PLC connection point, multi-function, type of signal digital input corresponds to PLC connection point, DI*

3. A CPU exists in a configuration project.

4. The **symbolic address** is specified. The symbolic address must be unique within a CPU.

5. The **Data type** (BOOL, BYTE, etc.) is specified.

6. The associated PLC box is assigned to a CPU by specifying the property CPU: Name. The correct and full specification of the CPU name at the PLC box is required so that the assignment list (designation in the AutomationML AR APC format: "TagTable") can be exported fully.

## 5. Import in Eplan

### 5.1. Devices

During importing Eplan supplements item data such as inputs / outputs from the parts data.

1. The [device identification](#) takes place by means of:
  - a) the **PLC type designation** property or
  - b) a GSD / GSDML / EDS file (**Device description: File name** property) and the **Object description** or
  - c) a GSD / GSDML / EDS file (property **Device description: File name**) and the **Device description: Index in file** during the data exchange in AutomationML AR APC format.
2. If items with placeholder characters (such as "\*" and "?") are found in the PLC type designation in the parts database during an import into Eplan, the first suitable part is used (PLC configuration programs do not always differentiate between parts that are equivalent electrotechnically).
3. If multiple parts with the same **PLC type designation** are found during the import in Eplan, the first of those parts with the matching **Object description** (in as far as this import file is available) is assigned. If no part has a matching object description, the first found part is assigned.
4. If no appropriate part is found, a simple PLC box is created.

In these cases messages are output so that the imported devices can be checked subsequently.

Device and PLC connection points that are available in the project but not in the import file, have the **Marked for deletion** property assigned during import. These objects can be filtered in the PLC navigator and subsequently be edited. Deactivate this property after the check or editing.

### 5.2. Connections

Eplan detects existing connections during the import.

New or changed connections are listed via the message management and have to be created or changed by the user in Eplan. To this purpose the corresponding functions have to be placed and connected to each other.

## 6. Recommendation for preparation of the master data

Eplan recommends prepared macros for standardization. In many cases you can obtain the parts and part macros from the Eplan Data Portal. It is nevertheless possible that a used PLC card is not available there. In this case you have to create the required parts and macros yourself.

The TechTip "**TechTip-Preparation-of-master-data-for-PLC-data-exchange**" is available as an aid. It contains additional information on editing parts data and the creation of macros.

"Appendix A: Relevant properties" contains an overview of all properties important for the data exchange, with the information on where the data can be entered.

## 7. AutomationML AR APC

Details on the individual properties can be found in the TechTip "**TechTip-Overview-of-the-PLC-properties**".

Free symbolic addresses (which are not assigned to any PLC connection point) can be exported and imported in AutomationML AR APC format via the PLC data exchange. After the import of an AML file, the free symbolic addresses existing there are available in Eplan.

The export in the AutomationML AR APC format can take place in the following AR APC versions: V1.0.0 / V1.1.0 / V1.2.0 / V1.3.0 / V1.4.0

Features in the export format for AutomationML AR APC Version 1.1.0:

- Through extensions in the AutomationML AR APC format longer device tags can be replaced.
- An improved exchange of free symbolic addresses is possible through extensions in the AutomationML AR APC format regarding the assignment list.
- The assignment of the PLC cards to your CPUs is replaced. This way you can restore the association of the PLC cards to "their" CPU during the data exchange.
- The bus system "PortToPort" can be used if you do not want to export the logical network but only the connection between the bus ports (port-specific interconnection).
- The bus systems "DRIVE-CLiQ", "IO Link", "PortToPort" and "ET connection" are exchanged correctly with port-specific interconnection.
- The connections between racks are exchanged with port-specific interconnection.
- Safety addresses at the bus systems are exchanged.
- The manufacturer name at the devices can be replaced. In Eplan the manufacturer name is saved in the part reference data.

Features in the export format for AutomationML AR APC Version 1.2.0:

- The exchange of [drive components](#) is possible. For the export of drives and drive components, you can activate the **Export drives** check box in the [Settings: AutomationML AR APC export](#) dialog.
- The exchange of device-specific configuration values is possible. To this purpose you can specify a template in the **PLC device: TemplateIdentifier** or **PLC station: TemplateIdentifier** property or you can use user-defined part reference properties. Extensive information is provided in the TechTip "**TechTip-PLC-data-exchange-with-device-related-configuration-values**".

Features in the export format for AutomationML AR APC Version 1.3.0:

- The exchange of symbolic addresses within user-defined data types (UDT) is possible.

Features in the export format for AutomationML AR APC Version 1.4.0:

- The management of pluggable bus ports at the superior device is possible. To this purpose the property **Manage bus ports at the superior device** (ID 20620) is available in the property dialog of PLC boxes in the tab **PLC structure data**.

An import file in AutomationML AR APC format is always imported irrespective of the AR APC version with which the file was created. This means that all the data known for the respective Eplan version is imported.

If the import file was created with a higher AR APC version than supported by the used Eplan version, it is possible that not all file contents are imported. As of Eplan version 2.9 SP1 information is provided in this case.

The following sections contain information about the bus systems and special features of different devices.



## 7.1. Settings for different bus systems

The following table provides an overview of the properties relevant for the PLC data exchange in the AutomationML AR APC format. Which properties at the bus ports must be filled (x), should be filled or are optional (o) depends on the bus system being used.

| ID    | Property                                 | Bus system      |                 |                 |   |                 |
|-------|--|-----------------|-----------------|-----------------|---|-----------------|
|       |  | Ethernet-based  | PROFIBUS DP     | ASI             | DRIVE-CLiQ<br>IO link<br>PortToPort<br>ET-Connection<br>Local-Bus:<br>extension | All others      |
| 20161 | Configuration project                    | o <sup>*1</sup> | o <sup>*1</sup> | o <sup>*1</sup> | o <sup>*1</sup>   | o <sup>*1</sup> |
| 20308 | Bus system                               | x               | x               | x               | x   | x               |
| 20406 | Plug designation                         | x               | x               | x               | x   | x               |
| 20447 | Bus interface: Name                      | x               |                 |                 |   |                 |
| 20448 | Bus interface: Main bus port             | o               |                 |                 |   |                 |
| 20413 | Physical network: Name                   | o               | o               | o               |   | o               |
| 20311 | Physical network: Bus ID / item number   | o               | o               | o               |   | o               |
| 20386 | Physical network: Bus ID / item number 2 |                 |                 | o <sup>*2</sup> |   |                 |
| 20446 | Subnet mask                              | o               |                 |                 |   |                 |
| 20414 | Logical network: Name                    | o               | o               |                 |   |                 |
| 20310 | Logical network: Bus port is master      | o               | o               |                 |   |                 |
| 20412 | Ignore missing bus ID                    |                 |                 |                 | o <sup>*3</sup>   |                 |

\*1: Only required if the value deviates from that of the associated PLC box.

\*2: Can be filled if it is an ASI dual device.

\*3: Can be activated to ignore bus ports that do not require a bus address during the execution of the [004037](#) error checking.

Non-identified fields are not required for the PLC data exchange. If the optional fields (o) are left empty, the import to the PLC configuration program is possible but post-processing is required.

**Note:**

The properties [Logical network: Name](#) and **Logical network: Bus port is master** determine the association of a station to the DP master or the IO controller.

Within an IO system, there is always a master that is designated through the check box **Logical network: Bus port is master**.

## 7.2. PC station

1. The PC is a separate station and is configured as Rack "0". All other fields of the rack assignment remain empty.
2. The **Bus coupler / head station** check box is to be activated.

## 7.3. Switches

1. The switch is an own station and is configured as **Rack "0"**. All other fields of the rack assignment remain empty.
2. The **Bus coupler / head station** check box is to be activated.
3. Bus ports:  
All bus ports have the function definition "Network / bus cable connection point, general" and have the same bus interface names.
  - a) All the required interface data are entered at the bus port that represents the input (including **Physical network: Bus ID / item number**, **Bus interface: Main bus port**)
  - b) At all other bus ports the specifications **Physical network: Name**, **Logical network: Name** and **Physical network: Bus ID / item number**, amongst others, can be empty.

Example "SCALANCE X200IRT" of SIEMENS

#### Settings at PLC box

| ID    | Property             | Value               |
|-------|----------------------|---------------------|
| 20416 | PLC type designation | 6GK5 204-0BA00-2BA3 |
| 20409 | PLC station: Type    | Scalance/X200IRT    |

#### Settings at the bus ports

|       |                     |  |
|-------|---------------------|--|
| 20447 | Bus interface: Name | X1 (for all bus ports)   |
| 20406 | Plug designation    | Px R, for all bus ports, whereby x = 1 ... Number of bus ports |

Identify the first bus port as **Bus interface: Main bus port** and enter the relevant bus data here.

## 7.4. Bus adapter

Stations of the ET 200SP type or similar devices or of a SCALANCE router require bus adapters (media modules) to which the network connections are connected.

In the case of these devices with adapter shafts for the bus ports, the function templates for the bus ports must be entered at the respective bus adapter. Two parts must be created to this purpose in the parts management:

1. The device with the adapter shafts only has one function template for the PLC box (main function) and if necessary further function templates for PLC inputs and outputs.
2. The "Bus adapter" device has one function template for the PLC box (main function) as well as function templates for the bus ports.

Ensure that if the bus adapter is used on a head station, the check box **PLC card is placed on head station** (ID 20444) is activated in the device properties (**PLC structure data** tab) at a bus adapter.

In addition the device identification for the device with the adapter ducts and the "Bus adapter" device must be carried out in the same way. Either both must be identified by means of the PLC type designation or both through the specification of a device description file.

### Settings at the PLC box for the bus adapter

| ID    | Property                           | Value                               |
|-------|------------------------------------|-------------------------------------|
| 20161 | Configuration project              | Not empty                           |
| 20416 | PLC type designation               | e.g. 6ES7 193-6AR00-0AA0            |
| 20410 | PLC card is placed on rack ID      | Like head station                   |
| 20411 | Position (slot / module)           | Not empty                           |
| 20444 | PLC card is placed on head station | <input checked="" type="checkbox"/> |

### Settings at the bus ports

|       |                     |  |
|-------|---------------------|--|
| 20447 | Bus interface: Name | X1 (for all bus ports at all adapters)   |
| 20406 | Plug designation    | Px R, for all bus ports, whereby x = 1 ... Number of bus ports, the method of counting is non-adapter-specific |

Identify the first bus port as **Bus interface: Main bus port** and enter the relevant bus data here.

## 7.5. IO-Link systems

An IO-Link system consists of an IO-Link master and one or more IO-Link devices. The IO-Link master makes the interface to the PLC available and controls the communication with the connected IO-Link devices. To this purpose the IO-Link master disposes of at least two IO-Link ports.

The connected IO-Link devices can, for example, be actuators or sensors and dispose of exactly one IO-Link port.

IO-Link ports are configured via bus ports of the "IO-Link" bus port

Additional information on the definition of PLC inputs and outputs or PLC bus ports can be found in the TechTip "**TechTip-Preparation-of-master-data-for-PLC-data-exchange**" in Section 2.4.

### 7.5.1. IO-Link master and IO-Link devices within a rack structure

IO-Link masters and IO-Link devices can be part of a rack structure.

IO-Link masters and IO-Link devices are parameterized like standard PLC devices within a rack structure.

### 7.5.2. IO-Link devices outside a rack structure

IO-Link devices can also be located as autonomous devices at any point in the network (for example a motor or sensor) without rack structure.

The property dialog of a device depends on the function category. The property dialog of a PLC box thus contains the **PLC structure data** tab. This tab is missing for non-PLC devices.

In this case the required properties can be filled into the property table of the first tab.

#### Settings at PLC box

| ID           | Property                     |           |
|--------------|------------------------------|-----------|
| <b>20161</b> | <b>Configuration project</b> | Not empty |
| <b>20408</b> | <b>PLC station: ID</b>       | Not empty |

#### Settings at the bus ports

| ID           | Property          |         |
|--------------|-------------------|---------|
| <b>20308</b> | <b>Bus system</b> | IO Link |

## 7.6. PLC subdevices

Specific PLC devices consist of multiple integrated modules, that each have their own [address ranges](#) and start addresses. Such a device can consist, for example, of an internal CPU module, an internal input / output module, internal analog module as well as an internal counter module - however with only one part number. Such integrated modules within a PLC device can be displayed in Eplan with PLC subdevices. To this purpose up to twelve PLC subdevices are available. Each PLC subdevice is defined by the corresponding properties (x in the following describes the number of PLC subdevice 1...12). You can find more information in the Online help in the section "[PLC subdevices](#)" as well as in the TechTip "**TechTip-Preparation-of-master-data-for-PLC-data-exchange**" in the chapter "PLC devices with subdevices".

PLC subdevices are exported if they have at least one start address or one bus port or one I/O connection point or one [Device identification](#).

**Note:**

If a PLC card has no PLC subdevices (meaning that it only consists of one module), definitions for these can be omitted. The value "0" is entered at the **PLC subdevice: Index** property at the associated PLC connection points.

You obtain further information on the definition of PLC subdevices from your PLC manufacturer or in the TechTip "**TechTip-Configuring-PLC-devices-with-device-description-files**".

## 7.7. Accessories

A PLC card can have accessories.  
The requirement for a data exchange is:

- The accessory is defined in the parts management.
- The accessory has a PLC type designation.
- The number of units used is larger than 0.

**Note:**

You can deactivate the export of the accessories, in the [Settings: AutomationML AR APC export](#) dialog, if needed.

## 7.8. Device sets ("Bundles")

Device sets (so called "Bundles", meaning bundles that consist of different devices) are not supported by all PLC configuration programs (for example SIEMENS STEP 7 TIA Portal). In this case the device set for the PLC data exchange must be broken up by configuring the devices contained in the device set individually with the associated device identification.

## 7.9. Device-specific configuration values

As of AutomationML AR APC version 1.2.0, you can also specify device-specific configuration values. To do this, activate the **Export device-specific configuration values** check box in the [Settings: AutomationML AR APC export](#) dialog.

Further notes and specifications for handling of device-specific configuration values are available in the Tech Tip "**TechTip-PLC-data-exchange-with-device-related-configuration-values**".

## 7.10. Drives

As of AutomationML AR APC version 1.2.0, you can also specify drive components. To do this, activate the **Export drives** check box in the [Settings: AutomationML AR APC export](#) dialog.

If this check box is selected, drive components are exported as well. This means all other functions that have a drive assigned are exported in addition to the PLC devices and bus-capable devices.

If the check box is deactivated, only PLC devices and bus-capable devices are exported.

Note: During import the corresponding devices must be available in the parts management, otherwise an empty PLC box is created.

For the export the following properties, amongst others, have to be filled at the drive components:

| ID                              | Property                          |
|---------------------------------|-----------------------------------|
| <a href="#">20576 [1... 64]</a> | Drive                             |
| <a href="#">20415</a>           | Device description: File name     |
| <a href="#">20381</a>           | Device description: Index in file |
| <a href="#">20577</a>           | Device type                       |
| <a href="#">20161</a>           | Configuration project             |
| <a href="#">20417</a>           | Object description                |
| <a href="#">20408</a>           | PLC station: ID                   |
| <a href="#">20416</a>           | PLC type designation              |

## 8. Check of the PLC configuration project

All devices that are to be exported or imported via PLC data exchange, require the following structure:

1. **Configuration project** → This is the main node.
2. **Station ID** → A grouping element.
3. **Rack** → If the device is used as the basis for other devices, this property has to be filled numerically.  
A rack is numbered consecutively with the **Rack** property.  
A CPU or a bus coupler is numbered consecutively with a **Rack** if the device itself is not placed on a rack.  
PLC devices that can add other PLC devices are also numbered consecutively with **Rack**.
4. All PLC devices that are placed on a rack or assigned to a rack receive the number of the rack via the **PLC card is placed on rack ID** property.
5. If the **PLC card is placed on rack ID** property is filled, the position at which the device is located has to be defined. This is done via the **Position (slot / module) property**.

### 8.1. Check via message management

When checking the PLC configuration project, you are supported by check runs. In most cases the "PLC data exchange (Mitsubishi)" run scheme can be used. For adjustments of the check runs a copy of this scheme is recommended.

This check increases the quality of the project and helps with error prevention.



## Appendix A: Relevant properties

The following overview shows which properties are important during the PLC data exchange.

The data input in Eplan can be effected:

A = in the parts data

M = in the macro

P = in the project

We recommend entering the data preferably in the parts data and / or in the macros.

### Note:

If necessary, you can create part variants in the Eplan parts management.

### PLC connection point:

| ID           | Property   | Data input |   |   |
|--------------|--|------------|---|---|
|              |  | A          | M | P |
| <b>20384</b> | <b>PLC subdevice: Index</b>                            | X          | X | X |
| <b>20428</b> | <b>Channel designation</b>                             | X          | X | X |
| <b>20610</b> | <b>Symbolic address: Group <sup>*1</sup></b>           | -          | - | X |
| <b>20618</b> | <b>Symbolic address: UDT (name) <sup>*2</sup></b>      | -          | - | X |
| <b>20619</b> | <b>Symbolic address: UDT (data type) <sup>*2</sup></b> | -          | - | X |

<sup>\*1</sup> Exchange as of AutomationML AR APC Version 1.1.0

<sup>\*2</sup> Exchange as of AutomationML AR APC Version 1.3.0

### PLC bus port:

| ID    | Property                                 | Data input |   |   |
|-------|--|------------|---|---|
|       |  | A          | M | P |
| 20448 | Bus interface: Main bus port             | -          | X | X |
| 20447 | Bus interface: Name                      | X          | X | X |
| 20386 | Physical network: Bus ID / item number 2 | -          | - | X |
| 20313 | Data transfer rate                       | -          | X | X |
| 20289 | Integrated module                        | -          | X | X |
| 20312 | Subslot                                  | -          | X | X |
| 20308 | Bus system                               | X          | X | X |
| 20446 | Subnet mask                              | -          | X | X |
| 20613 | Standard gateway *                       | -          | X | X |
| 20309 | DNS/PROFINET device name *               | -          | X | X |

\* Exchange as of AutomationML AR APC Version 1.2.0

### PLC card:

| ID                                | Property                                  | Data input |   |   |
|-----------------------------------|---|------------|---|---|
|                                   |   | A          | M | P |
| 20437                             | PLC card name                             | -          | - | X |
| 20164                             | Bus coupler / head station                | X          | X | X |
| 20381                             | Device description: Index in file         | X          | X | X |
| 20521 ff.                         | PLC subdevice x: Name                     | X          | X | X |
| 20533 ff.                         | PLC subdevice x: Position (slot / module) | X          | X | X |
| 20454, 20382, 20392 ff. 20452 ff. | PLC subdevice x: Start address (inputs)   | -          | - | X |
| 20455 ff., 20478 ff., 20515 ff.   | PLC subdevice x: Start address (outputs)  | -          | - | X |

| ID   | Property  | Data input |   |                 |
|--|---|------------|---|-----------------|
|  |   | A          | M | P               |
| 20548, 20605,<br>20547, 20551 ff.<br>20570 | PLC subdevice x: Data length (inputs)                 | X          | X | X               |
| 20550, 20604,<br>20549, 20560 ff.          | PLC subdevice x: Data length (outputs)                | X          | X | X               |
| 20607,<br>20582 ff.                        | PLC subdevice x: PLC type designation                 | X          | X | X               |
| 20606,<br>20593 ff.                        | PLC subdevice x: Device description:<br>Index in file | X          | X | X               |
| 20417                                      | Object description                                    | X          | X | X               |
| 20550                                      | PLC device: Data length (outputs)                     | X          | X | X               |
| 20548                                      | PLC device: Data length (inputs)                      | X          | X | X               |
| 20289                                      | Integrated module                                     | -          | X | X               |
| 20444                                      | PLC card is placed on head station                    | X          | X | X               |
| 20312                                      | Subslot   | -          | X | X               |
| 20439                                      | Safety address: Target <sup>*1</sup>                  | -          | - | X               |
| 20615                                      | Safety address: Source <sup>*1</sup>                  | -          | - | X               |
| 20616                                      | Safety address: Upper value <sup>*1</sup>             | -          | - | X <sup>*3</sup> |
| 20617                                      | Safety address: Lower value <sup>*1</sup>             | -          | - | X <sup>*3</sup> |
| 20409                                      | PLC station: Type                                     | X          | X | X               |
| 20580                                      | PLC device: TemplateIdentifier <sup>*2</sup>          | X          | X | X               |
| 20614                                      | PLC station: TemplateIdentifier <sup>*2</sup>         | -          | X | X               |
| 20576                                      | Drive <sup>*2</sup>                                   | -          | X | X               |

<sup>\*1</sup> Exchange as of AutomationML AR APC Version 1.1.0

<sup>\*2</sup> Exchange as of AutomationML AR APC Version 1.2.0

<sup>\*3</sup> Values in Eplan are write-protected and are only filled via the PLC data exchange