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How do you handle references and connections in the SIMATIC PCS 7 Plant Automation Accelerator?

PAA / V2.1

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1 Basics

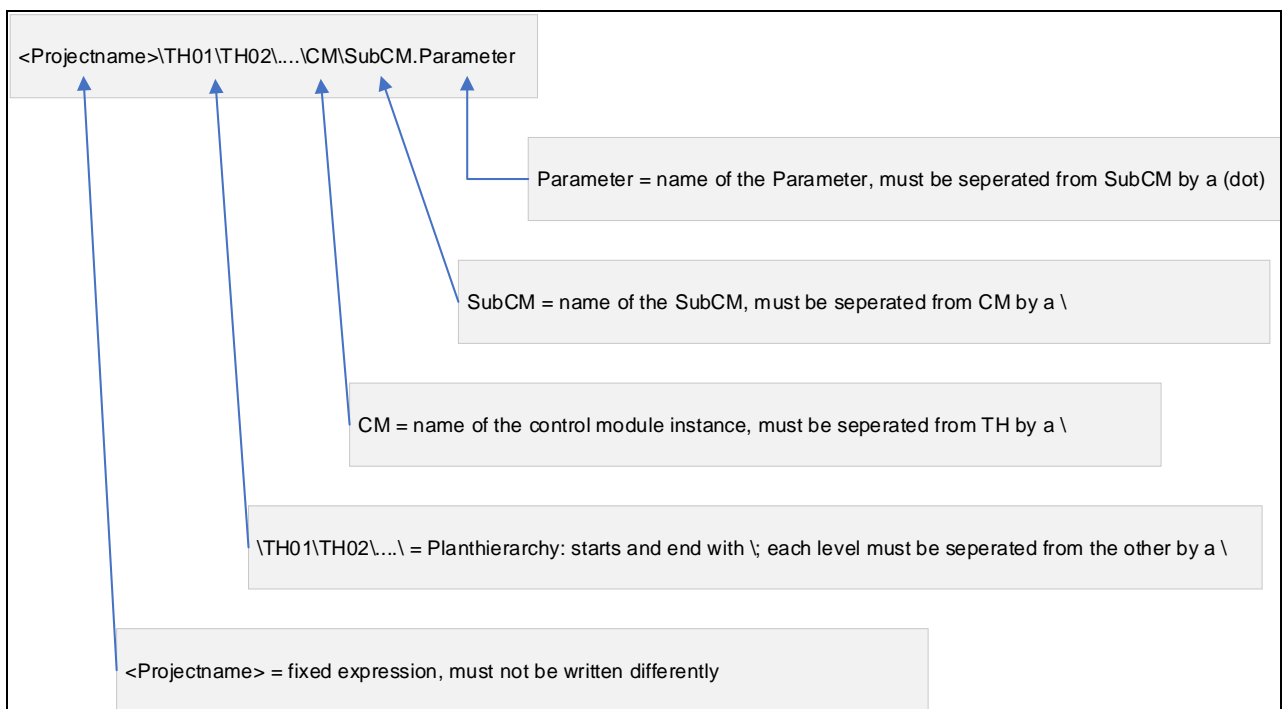
In the SIMATIC PCS 7 Plant Automation Accelerator (PAA) we distinguish between 3 different types of references (textual, global data and block variable references), and connections.

Type	Short description
Textual references <u>Chap. 1.1</u>	<ul style="list-style-type: none"> • One of the parameters to be connected is not yet available or ready for use but will be released or created later • Textual references can be entered in Connection manager by keyboard or by Drag&Drop • Textual references can be specified as absolute or relative. • Textual references can be exported from and to Excel • Textual references can be closed in Connection Manager and will then become connections • Textual references can be created graphically
Global data reference <u>Chap.1.2</u>	<ul style="list-style-type: none"> • The parameter to be connected is in a Data Block • Global data references can be entered in Connection manager by keyboard • Global data references can be exported from and to Excel • Global data references must be closed in SIMATIC PCS 7 • Global data references can be created graphically
Block variable references <u>Chap. 1.3</u>	<ul style="list-style-type: none"> • The parameter to be connected is not available in PAA • Block variable references can be entered in Connection manager by keyboard • Block variable references can be exported from and to Excel • Block variable references must be closed in SIMATIC PCS 7 • Block variable references can be created graphically
Connections <u>Chap. 1.4</u>	<ul style="list-style-type: none"> • Both parameters to be connected are present in PA Accelerator ("GREEN" parameters in Technological IOs). • Connections can be entered in Connection manager by keyboard or by Drag&Drop • Connections can be exported from and to Excel • Connections can be created graphically

1.1 Textual references

Features

- Textual references can only be drawn between parameters that are both available in PAA.
- A Textual reference can be made
 - by Drag&Drop in the connection manager (chap. 0),
 - by entering the address in the connection manager (chap. 0); a specific syntax must be used,
 - using Excel export and import (chap. 2.3),
 - graphically in the function diagram.
- In contrast to connections, however, the other parameter does not yet exist, or the connection is not yet to be used.
- Textual references can be edited on Inputs and Outputs.
- Textual references can be converted to connections.
- Textual references can be used for relative addressing.



Example of a Textual reference:

`<Projectname>\Plant\Area_1\Level_0\V101\Intlock.In01`

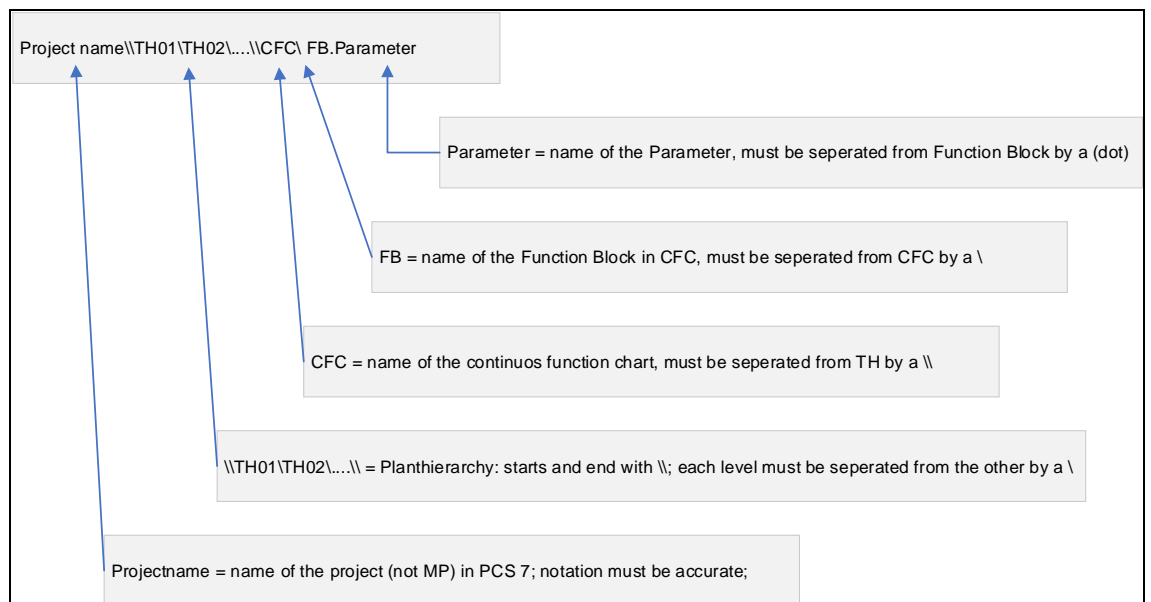
NOTE

In case some or all the parameters used as targets are already available the references may be closed immediately. They will be converted into connections.

1.3 Block variable references

Features

- A block variable reference is used to connect a parameter of an instance to a parameter which is not available in PAA. This is a parameter which is in a CFC, i.e. not in a CM.
- A block variable reference can be made
 - by entering the address in the connection manager (chap. 2.22.2); a specific syntax must be used,
 - by using Excel export and import (chap. 2.3),
 - graphically in the function diagram.
- Textual references can be edited on Inputs and Outputs.



Example of a Block variable reference:

PAA_PRJ_001\\Plant\\Utilities\\general\\collect.OUT

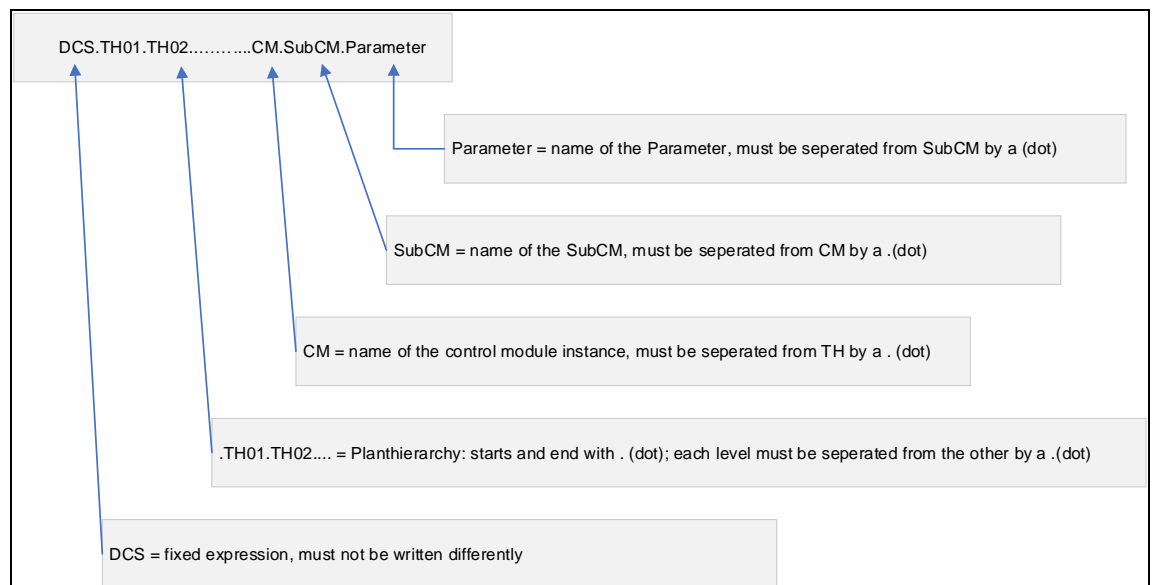
NOTE

Double backslashes enclose the technological hierarchy part.

1.4 Connections

Features

- Connections are possible between parameters which are both present in PAA (“GREEN” parameters in Technological IOs).
- A Connection can be made
 - graphically in a function chart (chap. 2.1),
 - by Drag&Drop in the connection manager (chap. 2.2.3),
 - by entering the address in the connection manager (chap. 2.2.3); a specific syntax must be used,
 - using Excel export and import (chap. 2.3).
- Connections can be edited on Inputs only.



Example of a connection: **DCS.Plant.Area_1.Level_0.V101.Intlock.In01**

2 How to work with references and connections?

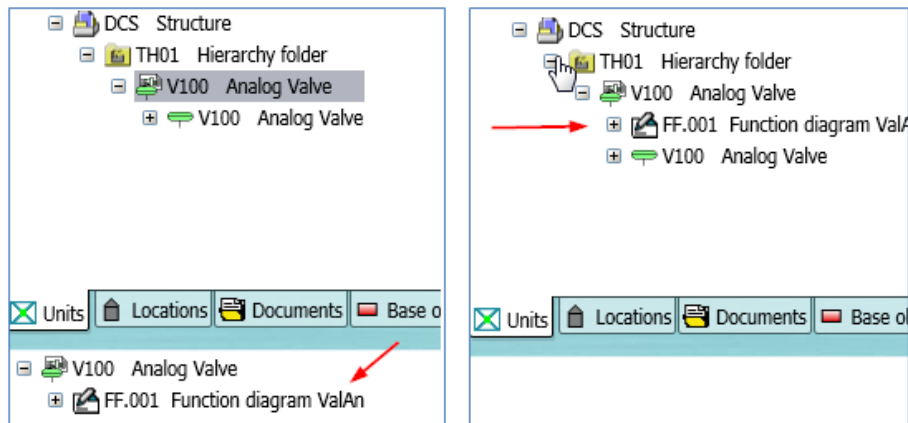
2.1 Graphically in function diagram

Cross-process tag connections can be graphically created in the CM function diagrams. This method is too laborious for a larger number of connections.

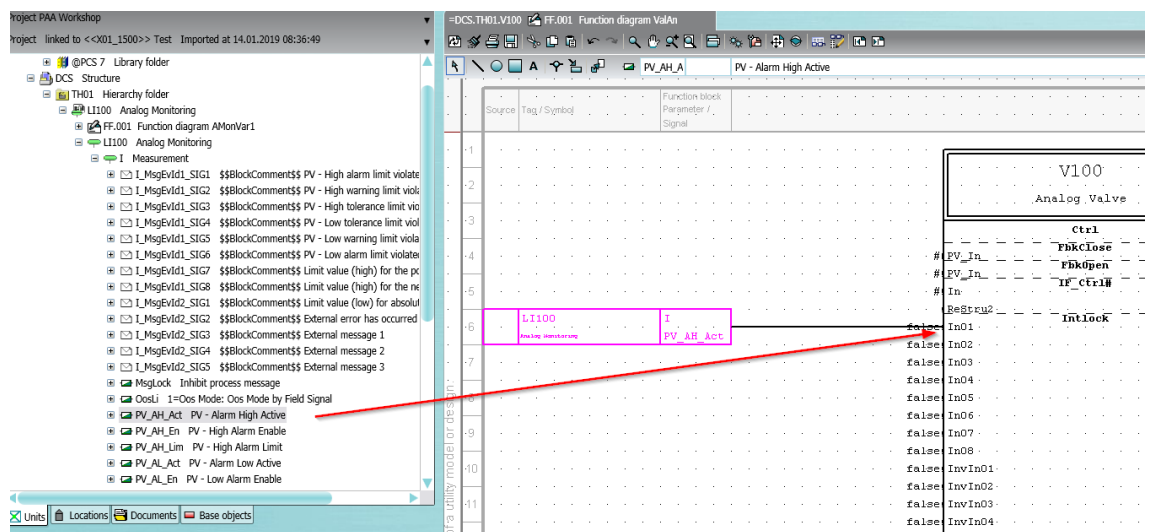
The precondition is that both connection partners are available in the PAA.

Instruction step by step

1. Open the Function diagram of the CM you want to edit. Depending on the display setting, you will find the function diagram directly in the CM folder in the navigation area or in the details (bottom left) of the selected CM.

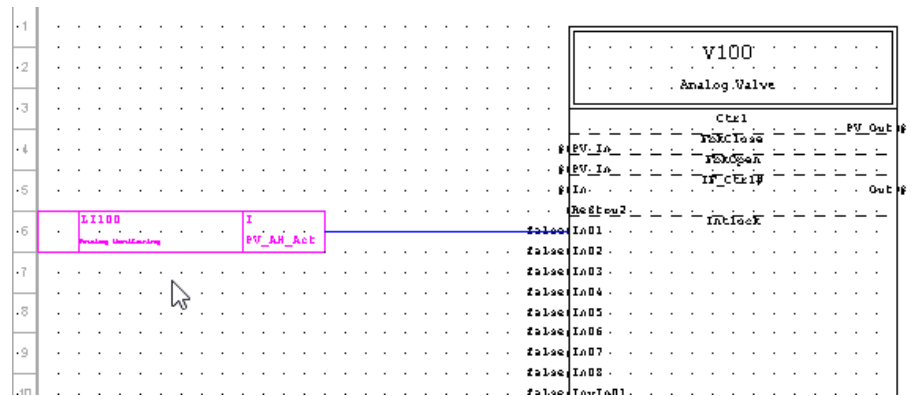
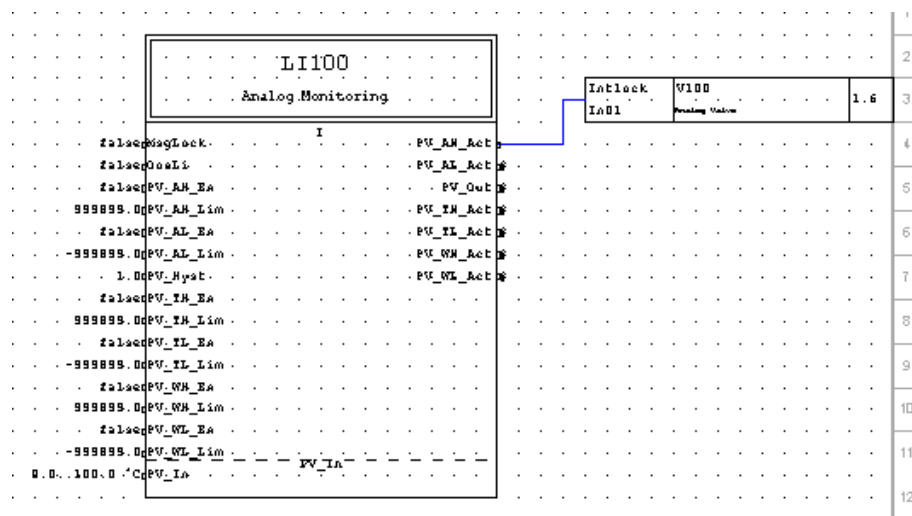


2. In case of Connection, select the parameter you want to connect in the navigation area and Drag&Drop it to the parameter in the function diagram.

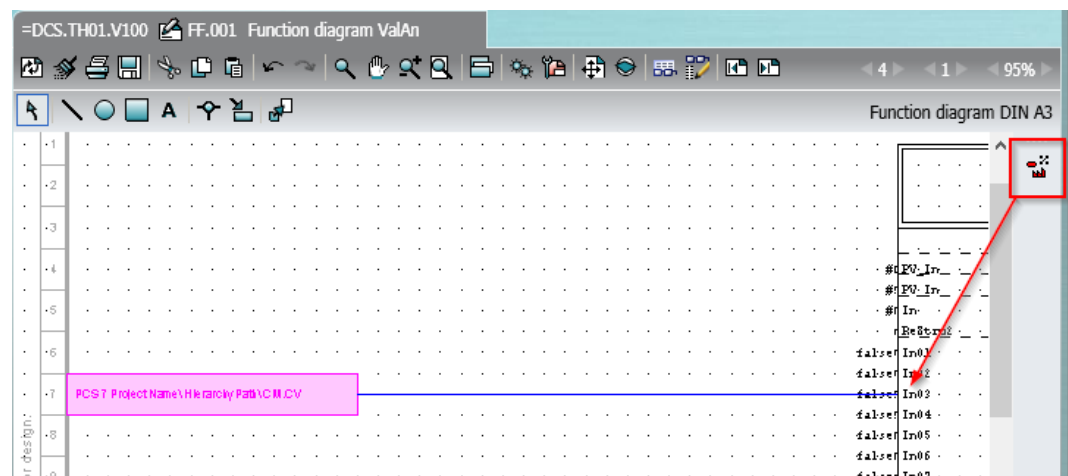


2 How to work with references and connections?

- The connection will be drawn automatically and will be visible in both function diagrams.

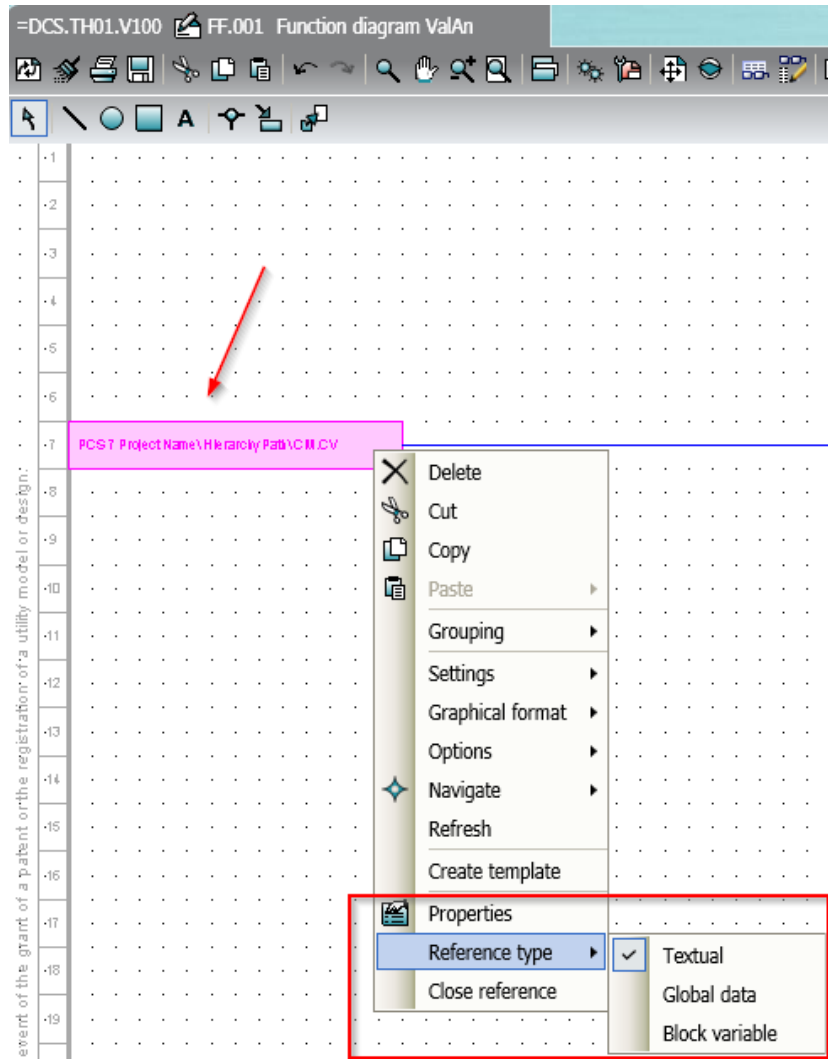


- In case of references, select the icon on the very right. Move the mouse pointer to the parameter. Click and draw the connection. Finish with a right click.



2 How to work with references and connections?

5. Right click the reference box to open the menu.
6. Select the reference type.

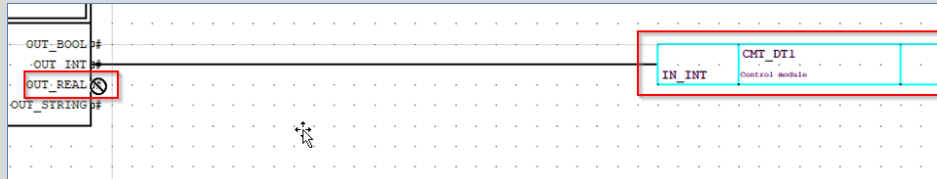


7. Double click the reference box and write the address.
For the correct syntax, see chap. 1.

NOTE

When u Drag&Drop a parameter directly to the connection of a parameter on the CM block on the function diagram, there are 2 known limitations:

- If a parameter has already been placed and there is no more room, the second parameter can not be dragged directly to the port



Remedy:

Drag&Drop the parameter under the first parameter and connect with the connection tool.

Increase the connection distance via properties (CM > "COMOS System" tap > "Connector distance" to "double" attributes)

PAA only evaluates the data type after it has been dropped. Therefore, e.g. BOOL can be connected to INT. (This will be displayed after the drop as a red inconsistent connection)

NOTE

Save the changes before closing the function diagram



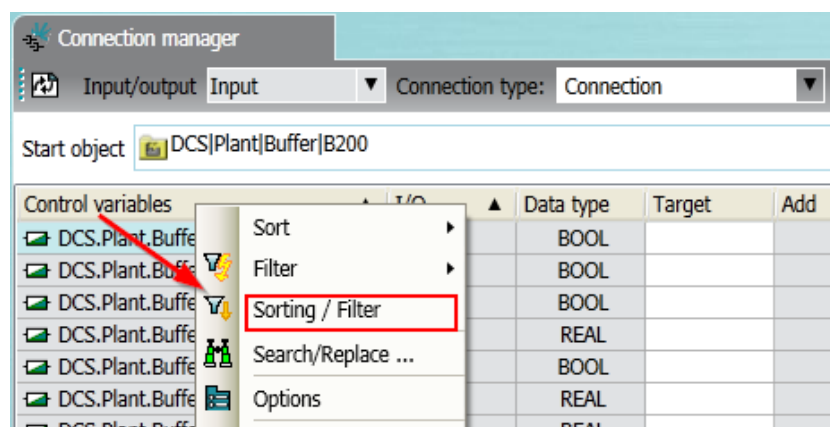
2.2 In the Connection Manager

The Connection Manager is meant to create and edit cross process tag connections on a larger scale.

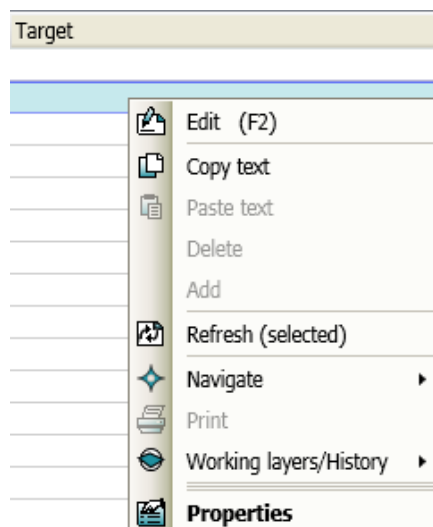
The different types of references and connections must be processed separately in the Connection Manager. Each type has its own selection.

2.2.1 General handling


1. Regardless of the connection/reference type the use of filter settings makes sense. Right click on the header cell of the column to open the menu.



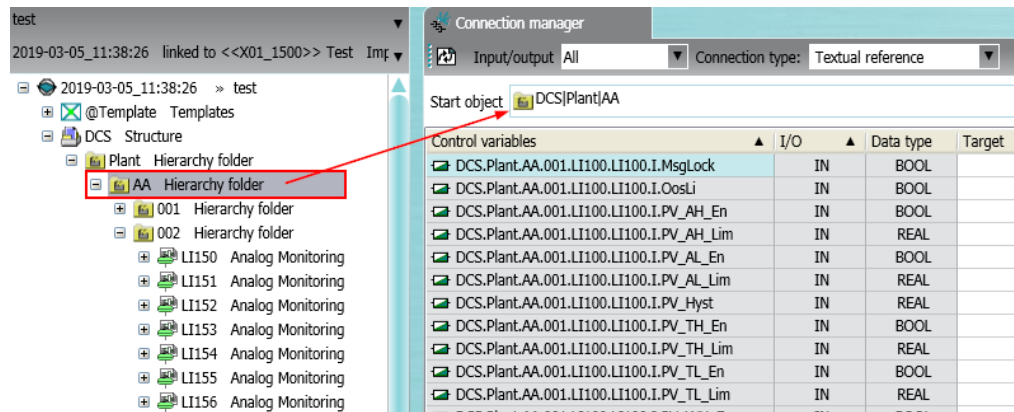
2. Addresses can be entered using the keyboard. Right click the parameter in the target column and select "Edit" from the menu.
3. Connections can be copied and pasted via the context menu. Right click the parameter in the target column and select "Copy text" or "Paste text" from the menu



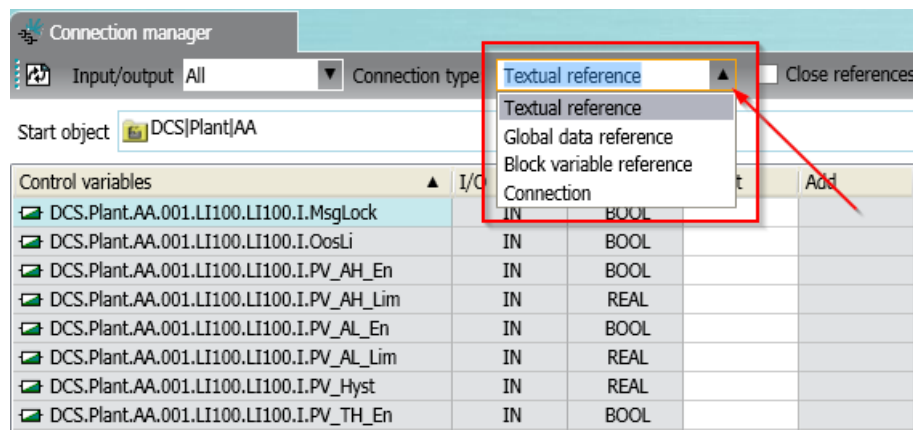
Instruction step by step

4. Open the Connection manager via the menu “Plugins → Automation → PCS 7 interface → Connection manager” or use the short cut icon  in the PAA menu bar.

5. Set start object via drag and drop.



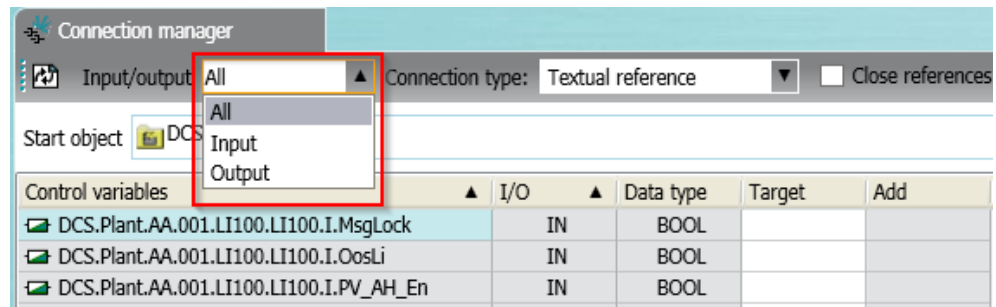
6. Select the connection type you want to work on.



2 How to work with references and connections?

7. In the case of Connections, the display scope is fixed to Input.

In the case of the three reference types, you can choose between input, output or both (ALL) for the display scope.

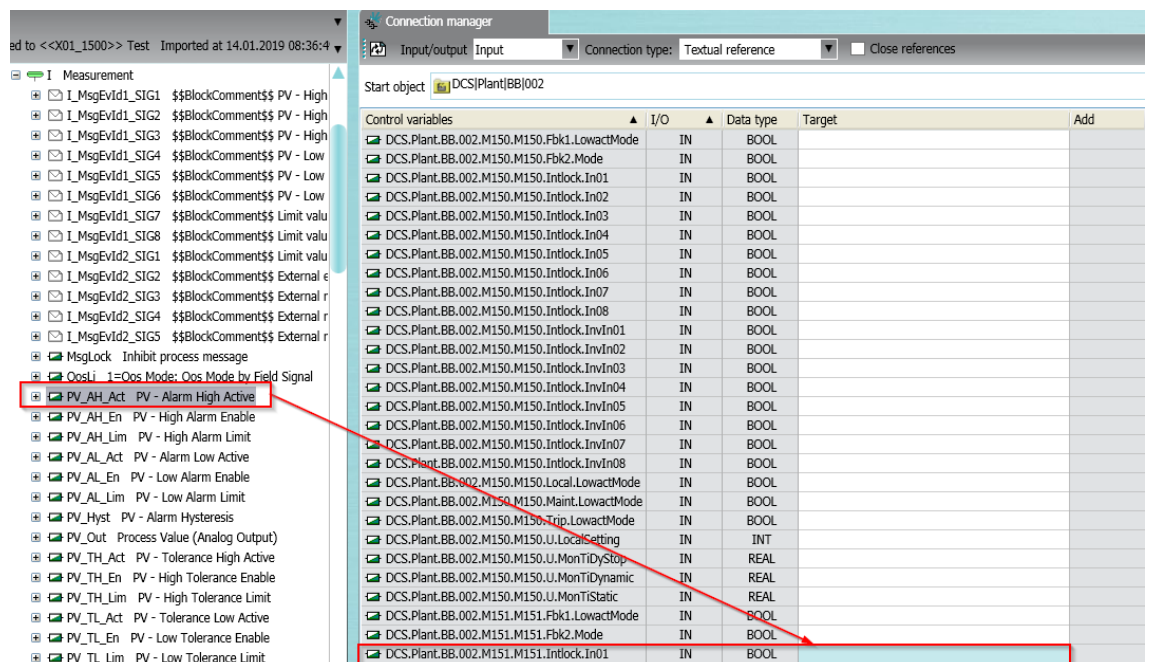


2.2.2 References

For Textual reference there are 2 ways:

Drag&Drop

1. Drag the parameter to be linked from the navigation area to the target cell of the parameter in the Connection Manager.

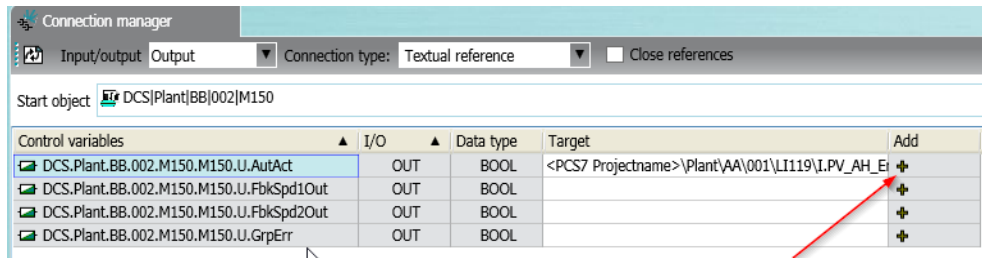


You can configure several references at outputs.

//Several references can be configured at outputs.

2 How to work with references and connections?

Create the first reference as described above. Then drag the next parameter to be connected to the "+" sign in the right column.

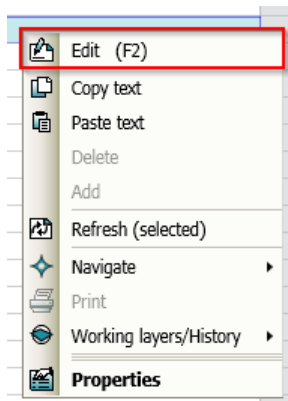


Textual

2. Write the address of the source/destination:

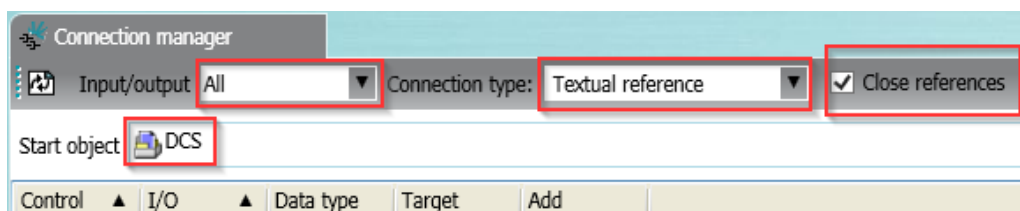
Right click the parameter in the target column and select "Edit".

Write the address: **<Projectname>\TH1\TH2....\CM\SubCM.Parameter**



NOTE Pay attention to the correct syntax

3. By setting "Close references" and saving with "Apply", the textual reference for which source- and target parameter are available are closed and converted into connections.



NOTE For textual references which are to be exported to PCS 7, the placeholder <projectname> must be replaced by the correct PCS 7 project name.

For Global data reference and Block variable reference:

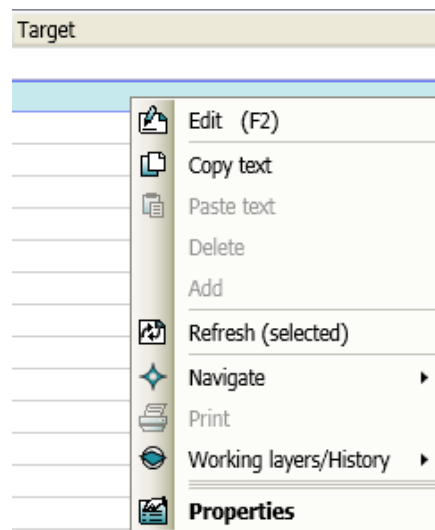
Since the source or destination does not exist in PAA, you cannot work with Drag&Drop.

1. Write the address of the source/destination:

Right click the parameter in the target column and select Edit. Write the address:

Global data reference → **“Symbolic Name of DB.Name of variable”**

Block variable reference → **Project name\\TH1\TH2
...\\CFC\FB.parameter**



NOTE

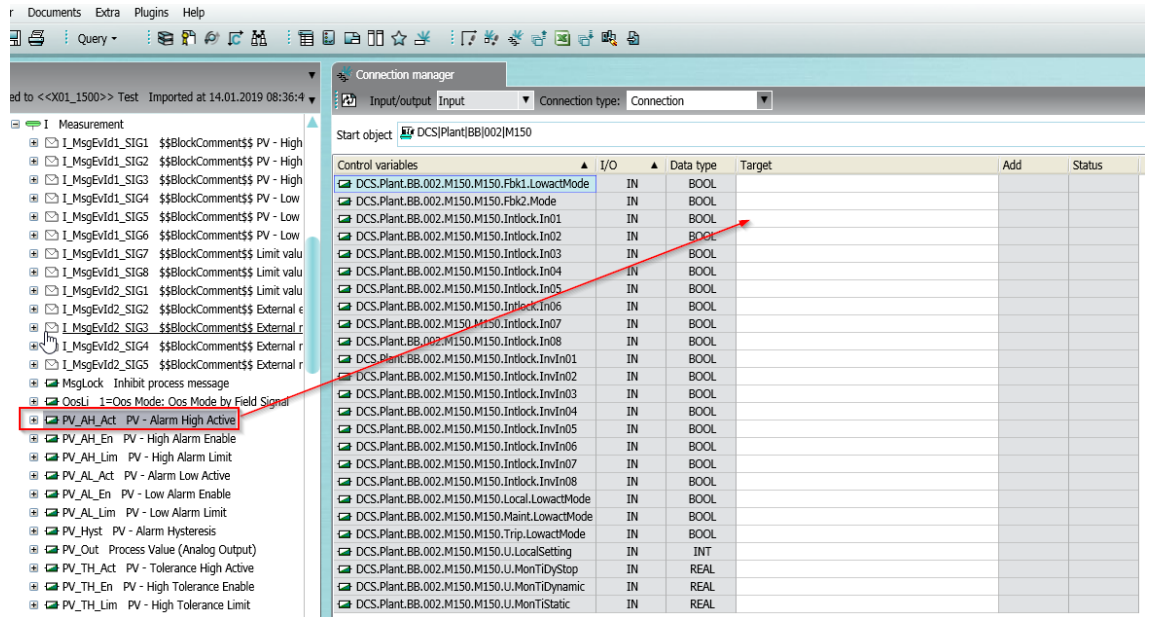
Pay attention to the correct syntax.

2.2.3 Connection

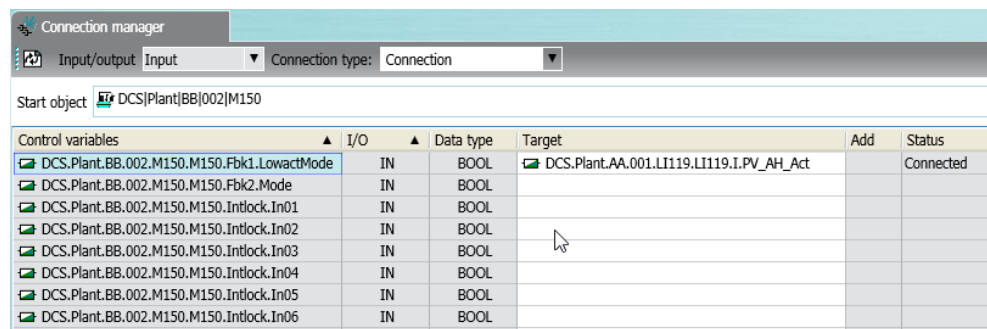
With connections there are 2 ways:

Drag&Drop

1. Drag the parameter to be linked from the navigation area to the parameter in the Connection Manager.



Click apply and the connection will be done. The status is shown in the column on the right.

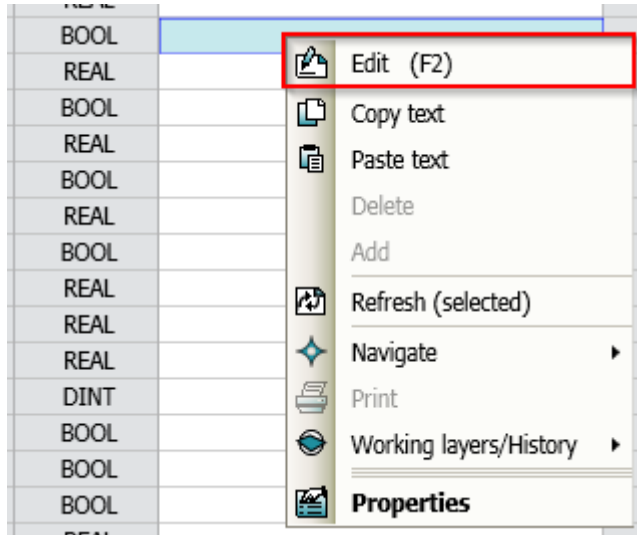


Textual

2. Write the address of the source/destination:

Right click the parameter in the target column and select Edit.

Write the address: **DCS.TH1.TH2....CM.SubCM.Parameter**



NOTE

Pay attention to the correct syntax

2.3 External – with Excel

2.3.1 Basics

Each selected reference/connection type can be exported to Excel from the Connection Manager.

Addresses can be entered in Excel.

The import into the Connection Manager must be done via Copy/Paste. It is essential that the same parameters are displayed in the Excel table in the same order as in the Connection Manager. Otherwise the entries will be placed incorrectly.

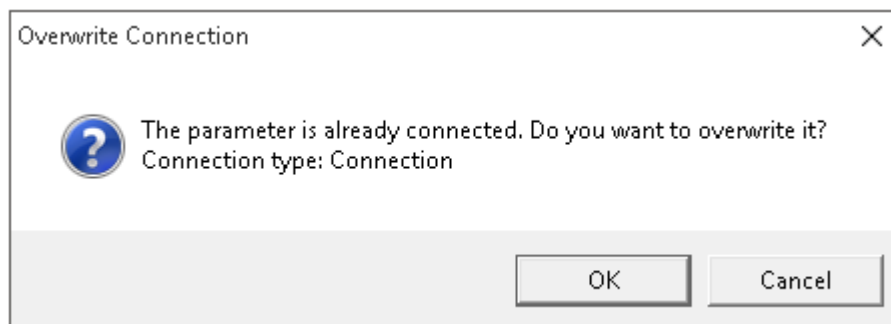
NOTICE Copied empty cells are inserted as empty in the Connection Manager. This is important because existing connections are overwritten by "Blank", i.e. deleted.

The Connection Manager does not display whether a parameter is already assigned to another reference/connection type.

NOTICE There is no general display for a connection or reference existing in another type. The connections and references are only displayed under their type.

If you copy from Excel and paste into the Connection Manager, a note will appear for each entry (also empty entry) in a parameter which is already occupied elsewhere.

The affected connection/reference type is displayed, but not the affected parameter.



- With "Cancel", the existing entry is retained.
- With "OK" the existing entry is overwritten, if necessary, also with "Blank" (empty).

You can only check this by cancelling the import, but you have to acknowledge all messages individually. Then change to the connection type and check and fix. Then return to the original mask and copy/paste again.

2 How to work with references and connections?

- “Query_CSI” which contains basic data
 - “Query”, which contains the exported parameters and values
6. Select the working sheet “Query” and unprotect the Excel workbook.
 7. Enter the connection information (Target or Destination) into column D.

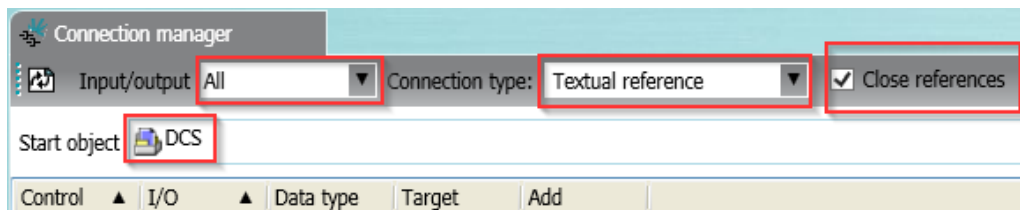
NOTICE Don't change the sorting in the working sheet. You may use filters.
Pay attention to the correct syntax:
For Textual references see chap. 1.1

Example:

67	DCS.Plant.Silo.S101.V101.V101.IF_Ctrl#.ReStru2	IN	REAL	
68	DCS.Plant.Silo.S101.V101.V101.Intlock.In01	IN	BOOL	<Projectname>.Plant.Silo.S101.L101.I.PV_AH_Act
69	DCS.Plant.Silo.S101.V101.V101.Intlock.In02	IN	BOOL	

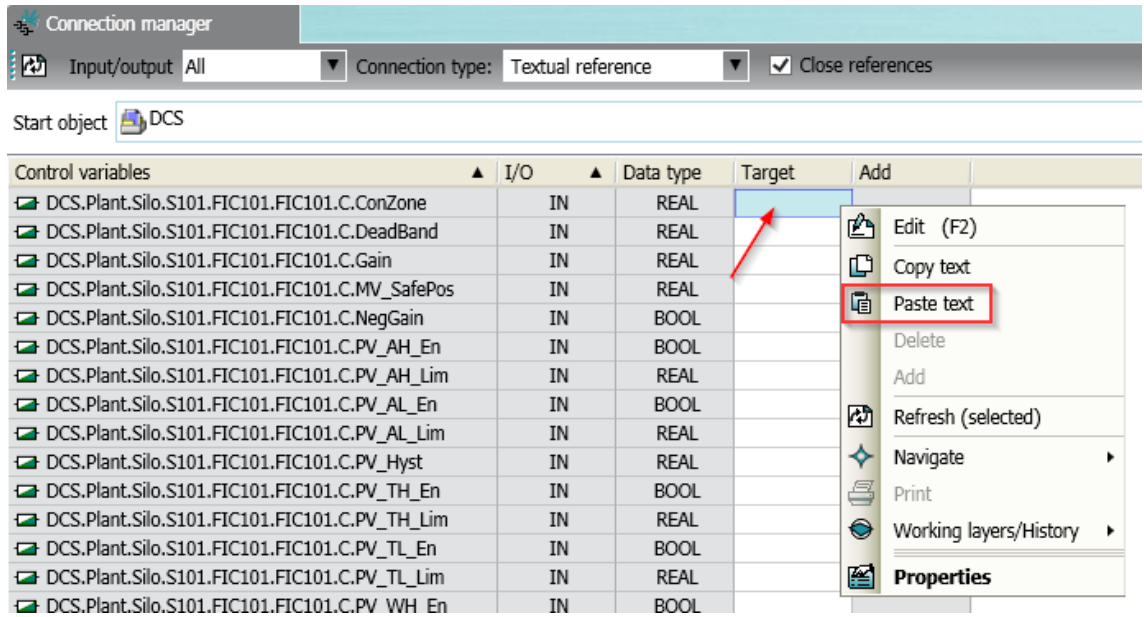
NOTICE Disable all filter settings before importing.

8. Copy the contents of all cells in column D. Start with cell “D3”.
9. Open the connection manager with the same pre-assignment (start object, Input/output, type) as done for the export and select “Close references”.



10. Right click on the first cell in column target and click “Paste text”.

2 How to work with references and connections?



11. All references will be copied to the connection manager.

12. Click "apply".

All references with a partner parameter, will become connections. Closed references are not shown in the connection type "Textual reference", they are now displayed in connection type "Connection".