

Engineering Base

Typical Manager

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1 About the Typical Manager

The **Typical Manager** is an efficient tool to create plants and their documentation in an automated way. By using standardized project templates (modules, components, templates) from a typical project and the functional structure of the target project, you may automatically generate your project including all needed equipment structures and substructures, aggregations, and associations.

Prerequisite for using the **Typical Manager** is the assignment of one or several typical projects to its target project.

The extended functions of the Typical Manager, such as

- copying variants
- update of variants and options
- the specification and the update of the dimensioning
- the action **Replacing** typicals

may only be used with the Advanced Typical Manager license (1166).

How to associate a typical project:

- 1. In the **Properties** dialog of the target project, extend the folder **General** and click on **Typicals**.
- 2. Under **Preferred Typical Project**, click on and select the desired template project. Under **Additional Typical Projects**, you can select up to 8 additional typical projects.
- 3. Click on OK.

1.1 Term definitions

Typical project

Any project used to provide function-based copying templates.

The copying templates are called **Typicals**.

Target project

Project, where the typicals are to be copied.

Typical function (Typical)

Any function within a typical project that is to be copied into the target project. The entirety of all aggregations and associations can be viewed as potential copy quantity.

Target function

Function in the target project into which the typical is to be copied. The memory location of the devices of the typical is specified at the target function via the typical unit and the typical location.

A typical function can be assigned to any target function.

Prerequisites

The typical project must be unambiguous either in the equipment view or the function view. Unambiguousness on the equipment level can be achieved via the **Typical Copy Merge Index**.

If unambiguousness is not given, then objects may be erroneously placed in the target project when copying several typicals.



A sheet or a piece of equipment can always be assigned to only one function. Equipment may have to be created repeatedly in the typical project if it is to be used with several functions or options.

1.2 Functionality

- Only one typical can be assigned to each target function.
- Copying the typical function together with all its sub functions, devices, sheets etc.



Automatic wires are not copied into the target project. They have to be newly created in the target project.

• You can define up to 30 typical unit levels. On copying typicals, the attributes **Typical Unit 1 - 30** are taken into account.



By default, the attributes **Typical Unit 1-10** are available at functions. You can add further typical units via **Define Dialog**.

These typical units serve to assign the storage of the devices of the typical project to the units in the target project. The objects (devices, terminals, etc.) are copied into these units. In this context, Typical Unit 1 has a special function (cf. <u>Options determining the behavior</u>). If there are no units specified in the target project, the units of the typical project are directly copied into the target project.

For simple instrumentations, AUCOTEC proposes the following structure:

Typical Unit 1: Field devices, sensors, field junction box

Typical Unit 2: Jumper board

Typical Unit 3: Transmitter cabinet

Typical Unit 4: Jumper board

Typical Unit 5: Signal processing, SLC cabinets, process control systems

- You can individually adapt the attribute names of **Typical Unit 1 30**. This renaming can only be done with the support of AUCOTEC.
- You can define up to 30 additional typical locations. On copying typicals, the attributes **Typical Location 1 - 30** of the typical project are taken into account.



By default, the attributes **Typical Location 1-10** are available at functions. You can add further typical locations via **Define Dialog**.

The typical locations can be assigned to the locations in the target project. This selection is only possible if the locations aspect is activated in both projects; otherwise a message is shown. All locations associated with the equipment of the typical are copied together with their parents and merged if applicable; in the process, the associations of the typical are attached to the target object. Child objects are handled in the same way. Merging is done based upon the attributes **Type** and **Name**.

- You can specify the filing structure of the documents.
- If the sheets of the typical project are assigned to a typical unit, these associations are also set in the target project.
- If equipment (same name and position) already exists in the target project, the newly copied objects of the typical project are merged with that equipment.

The Typical Manager enables several users to simultaneously access the working project and the typical project.



If the **Typical Manager** is aborted in the main dialog, all changes made since **Apply** was used last are undone.

1.3 Prerequisites for Merging and Copying Objects

1.3.1 Objects to be Compared, Merged, or Copied

- 1. In a first step, all child objects of a typical function are compared, level by level, with the target function. If a match is detected, the functions will be merged; otherwise, the typical function will be copied into the target project.
- 2. Equipment associated with the typical function is compared with equipment of the target function. If an unambiguous match is detected, the data will be merged; otherwise, the equipment will be copied into the target project. When the equipment is copied, its entire structure is inserted. When the option Add the structure of the Typicals to the merge objects and linked Typical Units is activated, also the objects located between the object to be merged and the Typical Unit are transferred.
- 3. Equipment contained in sheets of the typical, but not being part of the typical function, will be compared with the equipment of the target project. If a match is detected, only the associations will be copied. If there is no match, then the equipment will be copied together with the parent structure.
- 4. Finally, the associated typical locations will be compared with those of the target project. If there is a match, then the associations will be transferred to the locations of the target project. There will be no merge! If there is no match, then the typical location will be copied.
- 5. A typical function can contain sheets on which objects are represented which do not belong to the typical function. These objects are copied into the destination project together with the entire parent structures to avoid inconsistent sheets in the target project.

1.4 Structure of the Typical Project

Two variants can be used to define units and locations in the typical project:

- 1. Old method using the object types **Common Unit** and **Location**:
 - Definition of the units using the object type Common Unit. The name is fixed and must be Typical Unit n. For n, integer values between 1 and 30 are permitted.
 - Definition of the locations using the object type **Location**. The name is fixed and must be **Typical Location n**. For n, integer values between 1 and 30 are permitted.
- 2. New method using the object types: **Typical Unit** and **Typical Location**:
 - Definition of the units using the object type **Typical Unit**. The name can be freely selected. An indenture number 1-30 must be assigned to the attribute **Typical indenture number**.
 - Definition of the locations using the object type **Typical Location**. The name can be freely selected. An indenture number 1-30 must be assigned to the attribute **Typical indenture number**.

The object types **Typical Unit** and **Typical Location** can be placed freely in the project.

If the object types **Typical Unit** and **Typical Location** are used in the typical project for projecting, all units or locations must be converted to the object types **Typical Unit** and **Typical Location** respectively. Worksheets can be used for this purpose.

The Typical Manager determines the units and the locations to be handled via the typical object types and the indenture numbers. If the search is unsuccessful, then it is carried out via the former method using fixed names.



A maximum number of 30 typical units and 30 typical locations per typical is possible.



Only one typical unit with the typical indenture number 1 may be available per typical.

1.4.1 Typical Copy Merge Index

Use the attribute **Typical Copy Merge Index** to achieve the unambiguousness on the equipment and function level.

Any combination of characters can be used as Typical Copy Merge Index.

The attribute should be added to all devices, cables/cores and wires, which cannot be determined as equal via the attribute Designation but which should be considered as equal. The consideration of further object types (unit, etc.) depends on the project structure of the target project.

How to add the Typical Copy Merge Index to an equipment type

- 1. Select the desired type in the folder Type Definition in the Engineering Base Tree.
- 2. Select **Define Dialog** in the context menu.

The dialog **Define Dialog** is opened.

3. Under Available Attributes, select the attribute Typical Copy Merge Index and drag it with the pressed left mouse button to the desired dialog box tab in the column Dialog Box Configuration.

In the example, a new Dialog Box Tab with the name Typical Copy Merge Index was created.

Define Dialog [Motor]		X
Dialog Box Configuration Dialog Dial	Available Attributes	
	Ok	Cancel

- 4. Click **OK**, to close the dialog.
- 5. Repeat the steps 1-4 for the desired types.
- 6. Mark the equipment folder of your typical project.
- 7. In the context menu, click **Update Dialog from Type Wizard**.

The newly added attribute is now available for the corresponding equipment.

A unique Typical Copy Merge Index can now be assigned to the equipment. This can be performed most easily in one working step. The attribute must possibly be displayed as column in the representation of the working sheet.



It is recommended that the equipment is provided per function with a unique Typical Copy Merge Index.

1.4.2 Match Conditions

A basic requirement for a match is for compared objects to have equal type and to be part of the same object/function.



Object CID and TID have to be in agrement!

Ranking of attributes to be checked for existence and agreement:

Attribute	Priority
Typical Copy Merge Index (AID 10944)	1
Symbolic Address (AID 10095)	2
Position (AID 261)	3
Pin Position (AID 250)	4
Designation (AID 5)	5

According to their priorities, the attributes are checked for existence and content. If an attribute exists and contains valid content, then the content will be used to check for agreement. If agreement is established, then the attributes with lower priority will not be checked anymore.



If a typical object matches with several target objects, the copying process is canceled issuing a respective message!



If the material number of a typical object doesn't match the materiel number of the target object, then the typical is not copied and a respective message is issued.

Typical Object						Tar	get Obj	ject		
Typical Copy Merge Index	Symbolic Ad- dress	Position	Pin Position	Designation	Match Merge? Typical Copy Merge Index		Merge Index Symbolic Ad- dress		Pin Position	Designation
				А	<>					В
				А	=					А
		5		А	=			5		В
1				А	<>					А
			1	А	<>				2	А
1				А	<>	2				А
1		1		А	<>			1		В
1		1		А	<>			1		А
1		1		А	=	1		2		А

Examples of the comparison of the attributes:

Indicator for match
Indicator for mismatch
Match – not taken into account
Mismatch - not taken into account

1.4.3 Objects on Sheets

A typical function also comprises sheets that may contain objects not part of the typical function. These objects have to be copied into the target project, too, to prevent inconsistent sheets in the target project.

Frames and shapes are treated in a different way.

1.4.3.1 Shapes

The object associated with a shape is copied into the target project. If a match with an existing object is detected, then only the associations are transferred.

1.4.3.2 Frames

A frame often represents the affiliation with a unit, a function, and so on. These objects are called frame objects. In most cases, it is necessary to copy the frame objects together with their parent objects. Child objects are not taken into account, as they are often equipment associated with other typical functions.

If a frame is also a shape, then it will be copied like a shape.

1.4.4 Objects in a Locked Structure

If objects are copied which are part of a locked structure, the entire structure is copied.

Merging is possible if

- the objects in the target project are also part of a locked structure with an identical or smaller structural layout
- the source object with the locked structure is an encompassing object of the target object that is not locked. For example, a terminal block with locked structure can be merged with a single terminal in the target project.

If a merge is not possible, the entire locked structure is copied into the target project.

2 Working with the Typical Manager

By the use of predefined typicals from a typical project and the functional structure of your working project, you can automatically create your project including all required equipment structures and substructures, aggregations and associations.

How to work with the Typical Manager

- 1. Use the Explorer to select a function or a number of functions of your choice.
- 2. In the context menu, click on **Typical Manager**.

The **Typical Manager** dialog for the selected functions is opened.

0	Typical Manag	ger V2.2.0.22											0	×
Γ		Y A			Y A	Y A:	Y A:	Y A:						
	State	Action	Execute	Typical function	Function name	Comment	Туре	Dimensioning	Typical Unit 1	Т	т	Typical Location 1		
1	Predefined	Сору		Instrumentierungen IEC-	P01.BD L013		Measuremen		+NB01			Buildings 1		*
2				I	P01 .BD L013 LAH 📔		Signal							
3					P01 .BD L013 LAL 🧉		Signal							
4					P01 .BD L013 LI 🛛 📓	009	Signal				-			
5					P01 .CW1 T001 🛛 📓		Measuremen				-			
6					P01.CW1 V01 🛛 📓		Actuator Tag							
7					P01 .CW2 T002		Measuremen							
•	4						Actuator Tao		_	1-	_		\Box	- *
	Options Apply Ok Cancel													

The function name, the type and the comment are taken on from the target project.

You can sort and select in the columns Action, Typical function, Function name, Comment, Type and Dimensioning.

If you mark the checkbox in the first line of the **Execute** column, then all checkboxes of the selection are marked.

Possible messages in the Status column

Default	 In the attribute Typical of the target function, a typical is entered. In the Typical Manager the target function has been associated with a typical.
Conied	The typical has already been conied into the target function
Copied	
Changed	• A typical already copied has been changed by the Typical Manager.
	• The dimensioning of a typical already copied has been changed by the Typical Manager.
	• The dimensioning of the copied function received a different value in the target project.

Invalid Setting	• The typical specified in the attribute Typical of the target function is not available in the associated typical project.
	• The function type entered does not correspond to the func- tion type of the target function.
	The dimensioning selected is not valid.
	• The Typical Unit s and the Typical Location s are initialized with the values from the selected typical project
	The related incorrect input in column Typical Function, Dimen- sioning, Typical Unit 1-n or Typical Location 1-n is marked in the dialog with red color.
Type Mismatch	A typical not corresponding to the function type of the target function is entered manually.

Possible messages in column Action

Сору	The selected typical may be copied into the target project.				
Replace	For a typical already copied into the target project, the typical function has been changed. The existing function in the target project will be overwritten with the changed typical function.				
Delete	A typical already copied into the target project is deleted in the target project. In this process, all objects belonging to the function (aggregated and associated) will be deleted, and objects that have been merged while copying will be separated. The deletion of devices may be prevented by checking the attribute Protected .				
Update Dimen- sioning	If the dimensioning has been changed in the dialog Advanced Typical Manager or in the dialog Modify , then the dimension- ing will be updated (only Advanced Typical Manager).				
Update Variant	A different variant was selected for a typical already copied into the target (only Advanced Typical Manager). In the target project the functions, devices, sheets, and refer- ence points not belonging to the new variant well be removed. Functions, devices of the old variant being part of the new vari- ant, too, will be merged. Sheets of the old variant being part of the new variant, too, will be maintained in the project. These sheets well be updated to that effect, to remove the elements of the old variant from the sheets Visio groups containing the refer- ence points of the old variant will be remove, too, or rather re- placed by the Visio groups of the new variant. The update of variants is not possible if: • The function or variant to be updated has not been copied with the same assistant and data- base version being currently in use. • The option Add Typicals instead of replacing				

- 3. To set or edit options for the **Typical Manager**, click on <u>Options</u>.
- 4. Click on to select the typical of your choice in the column **Typical function**.



The dialog **Select typical** is opened.

The **Select Typical** dialog shows on the left typical projects that were defined in the project properties. Only typicals are shown that correspond to the function type of the target function. If the target function is of the type unspecified function, then all function types of the typical projects are shown.

Available options:

Show all function types	If this option is marked, then all function types of the typical projects will be displayed.
Take over the defined typical units and loca- tions for the typical selection	If this option is marked, then in the dialog Typical Manager the Typical Unit and the Typical Location will be initialized with the values from the selected typical project. These initialized values will be highlight in red. The status receives the value Invalid setting , till all initialized typical units and typical locations have been processed. Either remove the initialized value us- ing the popup menu of a cell highlighted in red or as- sign a location or unit of the target project (see points 7. and 8.).
	Once all typical units and typical locations highlighted in red have been processed, then the status will be set to Predefined and the typical may be copied to the target project.

If variants are available there, then these are shown but cannot be selected without the **Advanced Typical Manager** license. If the license is activated, then variants can only be selected if the typical actually contains variants. If the typical has no variants, then the former functionality is likewise available.

On the right, the available information for the typical is displayed.

- Tab **Elements**: All elements are shown which are associated with the typical and copied. If the selected typical is a variant, then these are the devices of the associated options.
- Tab **Sheets**: All sheets are shown which belong to the selected typical or the variant. Sheets with a source reference point are sorted to the sheets that have a corresponding target reference point. A click on a sheet starts a preview with all items represented on this sheet.
- 5. Use the tree structure to select the function you want to copy and have the information about the function displayed.
- 6. Click on **OK**, to select the function and to close the dialog.

The selected typical is now predefined (column **State**) and can be copied (column **Action**).

- 7. Click the related in column **Dimensioning**, to choose the <u>Dimensioning</u> (lay out design) of the selected typical (only **Advanced Typical Manager**).
- 8. Click on the appropriate in the columns **Typical Unit 1**, **Typical Unit 2**,... to select the respective units in the target project to which the objects of the typical project associated there with the typical units 1-10 are to be copied.
- Click on the appropriate ... in the columns Typical Location 1, Typical Location 2, ... to select the respective locations in the target project to which the objects of the typical project associated there with the typical locations 1-10 are to be copied.
- 10. Activate or deactivate the checkbox **Execute** to select or deselect the respective typical for copying.
- 11. Click **Apply** to run the **Typical Manager** or click **OK**, to in addition close the dialog.

The typical functions together with all devices and sheets are copied into the target project. A progress indicator shows the number of typicals already copied and how many typicals still have to be copied.



If you click **Cancel** in the main dialog, the **Typical Manager** will completely undo all changes in the target project.

When the Typical Manager is finished, information about the actions carried out is written into the Notes folder. Date and time are recorded.

🖃 🔟 Messages

- 🗉 퉬 Typical Manager
 - E 02.03.2015 10:19:39
 - 🗉 📳 000001: Info: cmi;Sensors Minimal Var1;;Copy typical to target function Atest.
 - 🗉 📳 000002: Info: cmi;ge1;Electrical;The object has been merged.
 - 🗉 🖽 000003: Info: cmi;ge2;Electrical;The object has been merged.
 - 🗉 📳 000004: Info: cmi;ws1;Electrical;The object has been merged.
 - 🗉 📳 000005: Info: cmi;ws2;Electrical;The object has been merged.
 - 🗉 🗓 000006: Info: cmi;Process / Fluid;Process / Fluid;The object has been merged.
 - 🗉 📕 000007: Info: cmi;TT ;Sensor, Transducer general;The object has been merged.
 - 🗉 🧾 000008: Info: cmi;TAH;Signal;The object has been copied to Atest.
 - 🗉 🖪 000009: Info: cmi;TI;Signal;The object has been copied to Atest.
 - 🗉 🗒 000010: Info: cmi;1 (Minimal);Unspecified Sheet;The object has been copied to Atest.

2.1 Reversal of all Changes Applied to the Target Project

All changes applied by the Typical Manager to the target project may be reversed. Click **Undo** in the menu **Edit**.



3 Options

Several options are available for optimally adapting the **Typical Manager**. The available options are arranged under three tabs, namely General, Behavior and Messages.

The settings of the options are stored in a configuration file with the name **Typical Manager** in the database under **Templates/Configurations**. For a project-based storage, the configuration file has to be copied under **Templates/Configurations** in the project.



Up to EB Version 6.7.0, the storage of the settings of the options was user-based. In the existing databases, the configuration file is created in the database folder Templates/Configurations only after the settings in the options have changed.

In the options dialog, the storage location for the configuration file, in which changed settings are stored, is indicated:

- Storage location in the database: database name Templates Configurations Typical Manager.
- Storage location in the project: project name Templates Configurations Typical Manager.

Options
Setting: Typical manager Templates Configurations Typical Manager
General Behavior Messages
Visible Functions
Show units per typical 6
Show locations per typical 6
Only load selected functions
Post-processing Macro 0_Tool_ATM_PostProcessing.Module1.Test X
Ok Cancel

3.1 General options

Visible Functions

By checking the listed functions you determine the function types to be displayed in the target project.

You can show or hide the following functions of the target project:

Unspecified Function Plant Measurement Tag Load Tag Actuator Tag Tag Function Logic Variant Signal Diagram Group Sequence Sequence Step Selection Counter Start warning Loop Control Generic Parameter Application Library Application Library Parameter Hardware Library Hardware Library Parameter Mechanical Tag Civil Tag Electrical Tag

Show units per typical

Determines the number of typical units to be displayed in the **Typical Manager**. The maximum is 10.

Show locations per typical

Determines the number of typical locations to be displayed in the Typical Manager. The maximum is 10.

Only load selected functions

In the Typical Manager only the functions of the target project are listed without substructure, on which the Typical Manager was started.

If you start from the folder **Functions**, all the contained functions will be displayed without their substructures.

Post-processing Assistant

Directly after closing the Typical Manager you can start an assistant to edit the data in the destination project.

1. Click on the 🗔 button.

A list of the available assistants is displayed.

2. Select the assistant of your choice and click **OK**.

The assistant is displayed in the field **Post-processing Assistant**.

A selected assistant can be removed with 🔀

The typical manager passes the following parameters to the specified assistant:

- TypicalManager
- OID: Function name1
- OID: Function name2

• ...

The OID is transferred in hexadecimal form.

3.2 Options determining the behavior

Equipment

• If Typical Unit 1 is not mapped, copy equipment into units named like the function.

If the option is checked and the Typical Unit 1 is not configured, then the devices of the unit will be filed in the functional structure of the Typical.

• Add the structure of the Typicals to the merge objects and linked Typical Units.

In addition to the associated equipment, objects superordinate to them are also imported and merged with the already existing objects.

Documents

• Giving a drawing the full name of the function

The drawings where the sheets are placed get the full name of the function.

• Store drawings in folders

The subordinate options are only available if the option is marked.

• Create one folder per functional level

A folder is created for each functional level of the copied typical.

In the Documents folder, a folder structure is generated that corresponds to the functional structure of the project. The sheets copied from the typical project are stored in the folder that corresponds to the function.

• Use document structure of the typical project

When this option is activated, the sheet structure is taken from the typical project. Non-existing structural elements are created.

• Renumber sheets

The sheets copied to the target project get a new numbering.

- If the sheets in the target project are already numbered, the sheet numbering is continued for the new sheets added in the order in which they were stored.
- If the attribute **Position** is defined at the sheets in the typical project the sheets are numbered according to this position.

• Refresh wiring on sheet

After copying, all newly copied sheets will be opened and updated including wiring and passive shapes.

Locations

Ignore associated locations

When this option is deactivated, all associations with the locations (name, type ...) are adopted from the typical project into the target project. If the locations are already present in the target project, then these are used, and the references are transferred. Otherwise the locations are copied form the typical project into the target project.

Add Typicals instead of replacing them

When this option is marked, then the typical manager offers the action **Add** instead of **Replace**. Thus you can copy several typicals into one target function.



Please note that only the typical copied last can be dimensioned. If several dimensioned typicals are copied on top of each other, then you may run into problems due to no longer unambiguous dimensioning indices.

Calculate Automatic Wires after performing the Typical Copy operation

On the newly imported sheets the automatic wires will be calculated anew.

3.3 Options for messages

Show event log

After starting the Typical Manager with **Apply** or **OK**, copying starts. Subsequently a log is shown that tells you which actions were carried out.

Hide location warning

If the typical project contains associations with locations and if the location aspect is not activated in the target project, then no warning is shown.

4 Advanced Typical Manager

When configuring a project, the **Advanced Typical Manager** enables you to compose the data to be copied from a multitude of functional components. The functions of the **Advanced Typical Manager** are only available with the license **Advanced Typical Manager** (1166).

4.1 Term definitions

Typical Function (Typical)

For each typical there can be several variants, but only one variant may be selected for copying.

Once a variant is present in a typical, a variant has to be selected. It is then no longer possible to select the typical function.

Target Function

Function in the target project into which the typical has to be copied. The amount of data to be copied is defined by the variant if a variant is present.

Typical Option

Options are functions with a special object type. They comprise a set of objects that may optionally be added to the typical. An option contains links to plan components (including their reference points) that may be grouped on sheets within the typical project; it may contain or rather represent further objects (e.g. equipment, signals, etc.). The option is provided with information about what plan component is to be placed on what target sheet (and reference point). Options may comprise complete sheets. After starting the Typical Manager, these will be transferred to the target project in their entirety.

A typical option may be part of several typical variants. Options can e.g. be different measurement tags (temperature, flow and pressure measurements) on a container stored as sub circuits/plan components. Such options may then be combined to different types of variants (containers with temperature and pressure measurements etc.).

Typical Variant

Variants are special objects, to be created only underneath a function.

A variant is a variant of the typical function comprising associated options. If a variant is copied, then the complete typical function is used, excepting however the typical variants and the typical option objects (including associated objects and children) that do not belong to the selected variant and its options. The typical option objects carried along with the variant selected are deleted and all children and associations are appended to the parent function (typical function). In the process of copying and merging objects into a target project, the rules of the Typical Manager apply.

Reference points

Reference points are new shapes to be found in stencils under Circuit Components/Circuit Components reference points. With their assistance, devices or complete circuit components can be copied from a template sheet (source) to another sheet (destination).

Plan components

Plan components fulfill a function similar to circuit components but are placed on a sheet of their own that is associated with an option. The plan component must be grouped and provided with a reference point (source) to allow for the complete content to be placed on the target sheet of the typical at the corresponding reference point. It is possible to place the plan component repeatedly. To avoid transmitting the sheet with the plan component to the target project during copying, the attribute **Template** (part of the sheet attributes) must be marked. To create plan components, all drawing types may be used.

Dimensioning

The dimensioning defines the lay out design of the devices in the typical project to be copied into the target project.

4.2 Variants and Options

By means of so-called variants and options, the typical project can be structured so that it enables high flexibility in composing the project data.

To subdivide existing functions into functional components, the functional components to be optionally used must be associated with an option as plan component (e.g. temperature measurement, pressure measurement). The different combinations of options are then integrated with variants. Thus e.g. variant 1 of a tank may contain a metering point for temperature and variant 2 may contain a metering point for temperature and pressure.

The device to be used as plan component gets a reference point and is shifted from the original sheet to the option sheet that has an associated option. Instead of the device, a reference point will be placed on the original sheet. If the option is chosen while copying the typical, the plan component will be copied onto the original sheet as an intermediary step. Thereby the two reference points will be placed on top of each other and the plan component will be placed in the respective position. During copying, the original sheet will then be transferred to the target project together with the plan component.

To structure a typical with several variants and options, a placeholder in form of a structural folder may be created. This folder has the same properties as an ordinary folder, but will be removed from the hierarchy when copying the typical.

How to create a variant

- 1. In the folder **Functions**, select an object (measurement tag, load tag, actuator tag, plant, mechanical tag, or unspecified function) for which you want to create variants.
- 2. Use the shortcut menu to select **New** and then **Variant**.
- 3. Enter the name of the new variant and a comment of your choice.
- 4. Confirm your input with **OK**.

The variant is displayed at the respective position in the project tree.

In the example this is the Variant 1 below the measurement tag high-pressure flash drum.



How to create an option

- 1. In the folder **Functions**, select the object (measurement tag, load tag, actuator tag, plant, mechanical tag, or unspecified function) for which you want to create an option.
- 2. Use the shortcut menu to select **New** and then **Function**.
- 3. Enter the name of the option and a comment of your choice. Select the value **Option** for the attribute **Type**.
- 4. Confirm your input with **OK**.

The option is displayed at the respective position in the project tree.

In the example, the options Level, Pressure and Temperature were created below the measurement tag high-pressure flash drum.

Demo Instrumentation Standard - Typical-Project



How to associate an option to a variant

- 1. Mark the option you want to assign to a variant.
- 2. Press the right mouse button, drag the option down onto the desired variant and release the mouse button.
- 3. In the shortcut menu, select New Association.

The option is now associated with the variant. Options may be associated with multiple variants.



The association of an option with a variant is also possible using the left mouse button. To do this, mark the option and pull it with the pressed mouse button down onto the desired variant, then press the ALT key.

When the icon = appears, release the ALT key and the mouse button.

How to insert the structural folder Placeholder

- 1. Mark a function in the Engineering Base tree.
- 2. In the popup menu, first select **New** and then **Placeholder**.
- 3. Enter name and optional comment for the new placeholder.
- 4. Confirm you input with **OK**.

Example Measurement Tag Flash Drum with 3 Variants in the Typical Project:



Result after copying Variant 2 with the Advanced Typical Manager into a metering point of the target project.



Creating an option with plan component

- 1. In the project you want to use as a typical project, create a function with drawings and all related equipment (150% project planning). You can optionally insert a device shown on a sheet. This sheet is then named the original sheet.
- 2. Create an option under the function on the device level.
- 3. Create an option sheet (with Visio) and check the system attribute **Typical Template** in the sheet dialog **Modify**. This signals that only the content of the option sheet is to be merged with the drawing. The option sheet itself is then not transferred to the target project during copying. Associate the option sheet with the option by marking the option and dragging it with the pressed mouse button onto the desired sheet. Select in the popup menu **New Association**.
- 4. Place the **Reference point Source** (SRC) on the original sheet next to the shape of the device to be optionally inserted. Enter an unambiguous text at the reference point. When copying with the Advanced Typical Manager, this text enables the association of the source and target reference points.



For complex devices, it may be advisable to draw auxiliary lines through the source reference point to later on simplify the positioning of the target reference point.

- 5. On the original sheet, mark the device including the reference point, pull it onto the option sheet, and create a group (SHIFT+STRG+G) for the device including the reference point.
- 6. Associate all equipment on the option sheet with the option by changing the respective system attribute **Associated Function** accordingly, or shift sub functions belonging to the plan component to under the option.
- 7. In the position on the sheet where the newly created plan component has been placed, place the **Reference point destination** (DST), and enter a text identical to that at the source reference point of the plan component.

If the created option is to be copied with the Advanced Typical Manager, then the plan component will be copied to the original sheet of the typical. Thereby, the source and target reference points will be laid on top of each other.

4.2.1 Examples

Example1: P&I diagram of a flash drum with optional measurement tags

The function .FD from the demo project Instrumentation Standard was used as basis. At the flash drum, up to 3 measurement tags for measuring the temperature (TT), the filling volume (LT) and the pressure (PT) can be defined.



The three sensors are to be defined as function blocks in the typical project.

There are to be three possible variants of the flash drum.

To create the options, the individual sensors are defined as plan components. For this purpose set a source reference point at the connection point of the sensor and the drum. This is assigned the text "TT".



In the project, an option "Temperature" with an associated option sheet "Template temperature" was created. Mark the complete device for temperature measurement in the source sheet and drag it onto the option sheet. In the option sheet, the complete device including reference point is defined as a group.



In the source sheet, specify the target reference point instead of the device.



The subfunctions for temperature measurement are moved to the option "Temperature".

Temperature
 TAH
 TAL
 TI
 Flash Drum Temperature Template
 Typical Unit 1 TT
 Typical Unit 1 FD1 1N27

If all optional devices are defined as plan components, then the source sheet now only contains the boiler with the three reference points.



In the typical project, the options are assigned to the three variants.





If the Typical Manager is started with the above typical project, then the variants are shown in the dialog **Select Typical**.

Example 2: loop diagram with temperature meter and optional acoustic signal transducers

Either a loudspeaker or a siren is to be connected to the temperature meter.

In the original plan (loop diagram 2), first of all the variants with loudspeaker (including all associated equipment) were planned.



The plan component loudspeaker was moved together with the source reference point "Signal" to an option sheet (loop diagram loudspeaker) that is assigned to the option loudspeaker. All of the pertinent equipment was associated with the option.



Then the variant with the siren was planned in the original plan, and this plan component was moved together with the source reference point "Signal" to an option sheet (loop diagram siren) associated with the option "Siren". All of the pertinent equipment was likewise associated with the option.



The two options were assigned to 2 variants in the typical project.



In the source sheet (loop diagram 2) the target reference point "Signal" is set at the point where the plan component was separated (at terminal 19 of the terminal block K1).



You can now use the Typical Manager to select the variant of your choice (with loudspeaker or siren). During copying, in an intermediary step the option with the desired variant is copied to the source sheet and this is then transferred into the target project.

4.3 Dimensioning

Based on the so-called dimensioning, a specific material may be associated on a per device level with the function of a typical project. Like this it is possible to copy the variants with variable device combinations into the target project. If in the preferred catalog a preferred master shape has been assigned to the material, then this master shape will be transferred to the target project through the copying process.



To allow for a correct copy of the dimensioning and the master shapes into the target project, both projects have to have been assigned the same catalog containing the master shapes as preferred catalog.

You may combine the dimensioning of device groups to enable structured working.

Preconditions

Dimensioning Index

In the typical project, devices to receive a different lay out design have to be associated with the attribute **Dimensioning Index** using the dialog **Define.**

Within a dimensioning group, the dimensioning indices must be unambiguous, otherwise the assignment of the individual designs is impossible. If no dimensioning groups are assigned, then the dimensioning index within a typical must be unambiguous.

Dimensioning Group

To combine the dimensioning of device groups, the devices must be assigned the attribute **Dimensioning Group** via **Define dialog**.

The name of the dimensioning group is freely selectable; the characters ";" and "\" are not permitted.

Devices having no value in the attribute Dimensioning Group are combined in the dimensioning group **Default Group**.

How to add the attributes Dimensioning Index and Dimensioning Group to the attributes of a device

- 1. In the Engineering Base Explorer, select a device to receive several lay out designs.
- 2. Open the dialog **Define Dialog** via **Edit/Define Dialog**.
- 3. Mark on the right side below **Available Attributes** the attribute **Dimensioning Index** and pull it with the left mouse button pressed to the left side below **Dialog Box Configuration** onto a tab. Drag the attribute **Dimensioning Group** to the same tab using the same procedure.
- 4. Click on **OK**.

The easiest way to assign dimensioning indices and dimensioning groups is using a worksheet. Open e.g. the worksheet Devices at a typical. Add the columns Dimensioning Index and Dimensioning Group to the worksheet and assign the indices and groups to the devices.

The definition of the lay out designs is carried out on the typical using the module **Con-figure Dimensioning** of the **Typical Manager**.

4.3.1 Configuration of Dimensioning

The configuration of the dimensioning is carried out using the assistant **Typical Man-ager/Configure Dimensioning**. Using the tabulated representation of the devices of a typical, you can check the unambiguousness of the dimensioning indices and the assignment of the devices to a dimensioning group.

How to configure a dimensioning

- 1. Select the desired typical.
- 2. In the popup menu, click **Select Assistant**, select the assistant **Typical Manager/Configure Dimensioning**, and click **Run**.



If there should be no device with a dimensioning index, then a respective message will be displayed.

The dialog **Configure Dimensioning** opens.

Onfigure Dimensioning V2.3.5.5				
Typical function: Flash Drum				
Dimensioning				
>> Default Group << 🛛 💠	Device	Comment	Туре	Dimensioning Index
	Typical Unit 1 Flash Drum LT 🛛 📔		Sensor, Transducer general	1
	Typical Unit 1 Flash Drum PT 🛛 📔		Sensor, Transducer general	2
	Typical Unit 1 Flash Drum S1 (🧉		Signalling Device	3
	Typical Unit 1 Flash Drum S2 (🧉		Signalling Device	4
	Typical Unit 1 Flash Drum S3 (📔		Signalling Device	5
	Typical Unit 1 Flash Drum TT 🛛 📔		Sensor, Transducer general	6
			Apply	Ok Cancel

The dialog shows all devices possessing the attribute dimensioning index. You can sort the individual columns via the header line.

If no dimensioning groups are defined, then all devices are assigned to the **Default Group**.

If the dimensioning index within a group is not unambiguous, the values are underlaid in red.

3. Click on to create a new dimensioning **New**.

An additional column **New** is inserted in the table.

- 4. Click on \checkmark to give the dimensioning the name of your choice. The column header of the new column is changed accordingly.
- 5. Allocate material to the devices as desired.
- 6. Click **Apply**, to confirm the allocations and to continue to define dimensioning, or **OK**, to store the allocations and to close the dialog.

Example with two dimensioning groups

0	Configure Dimensioning V2.3	1.5.6								- • •
Typical function: Flash Drum										
Din	iensioning									
	>> Default Group <<	+	Device	Comment	Туре	Dimensioning Index	Dimensioning 1	Dimensioning 2	New	
	Dim 1	Z 🔓 🗕	Typical Unit 1 Flash Drum S3 📷		Signalling Device	5	SIE_3SB-001	MOE_M22LC-004		
	Dim 2	Z 🗈 🗕	Typical Unit 1 Flash Drum S1 📷		Signalling Device	3	SIE_3SB-003	MOE_M22LC-005		
4	Signal	+							-	
	Dimensioning 1	Z 🗈 🗕								
	Dimensioning 2	🗡 📭 🗕								
	New	🔀 l'e 🗕								
4	Sensor									
	Dimensioning 1	🗡 lîg 🗕								
0]							Apply	Ok	Cancel

Buttons

Apply	The association of material with the devices of the dimensioning is stored. The dialog remains opened.
ОК	The dialog is closed.
Cancel	The dialog closes without storing the last associations of material.

Structure of the Dialog

Dimensioning

Here, the name of the dimensioning may defined. If dimensioning are already specified, they will be displayed. Click on a dimensioning group to display the objects assigned to this group.

Add Dimensioning	A new dimensioning may be added. Each new dimensioning re- ceives the name New or New 1 to New n , if New was already added. For each new dimensioning, a column is added to the table.
-	Removes the currently displayed dimensioning.
Delete	
Dimensioning	
Rename Dimensioning	The dimensioning displayed may be renamed using the dialog Di- mensioning.
Copy Dimensioning	The marked dimensioning is copied The copy gets the name Copy of

Table of associated devices with dimensioning index

The table displays devices with comment, type and dimensioning index. For each defined dimensioning, another column with the name of the dimensioning is added.

- **Column Device:** Using the button if needed, the dimensioning index or the dimensioning group may be changed.
- **Dimensioning Columns:** Using the button opens the dialog **Replace**, where material from the catalog may be allocated to the device.

In the process of selecting the typical function with the **Advanced Typical Manager**, you may select also the dimensioning to be transferred when copying to the target project. You can select several dimensioning from different dimensioning groups for a target function.

The dimensioning used in the copying process will be written to the attribute **Dimensioning** of the function created in the target project.

The devices of the typical will be copied to the target project together with the material allocated via dimensioning.

Example selection of the dimensioning in the Typical Manager.

Associated Specification

Select Dimensioning V2.3.5.6					- • ×		
Function: P1 U2							
Dimensioning							
A >> Default Group <	Device	Comment	Туре	Dimensioning Index	Material		
Dim 1	Typical Unit 1 Flash Drum S3		Signalling Device	5	SIE_3SB-001		
▲ Sensor	Typical Unit 1 Flash Drum S1 (Flash Drum Level) Signalling		Signalling Device	3	SIE_3SB-003		
Dimensioning 1	E						
▲ Signal							
Dimensioning 1							
Dimensioning 2							
Ok Cancel							
			_				
Modify [P1 U2]							
System Attributes Process Data	Operating Data Typical Units Graphic						
Part of	P1						
Function Name	U2		_				
Comment	Example Drum						
Туре	Measurement Tag		_				
Typical	Flash Drum Variant 2 TT + LT						
Dimensioning	Dim 1; Sensor Dimensioning 1; Signal Dimensioning 1;						
Protected	Protected						

4.3.2 Changing the Dimensioning in the Target Project

Changing the dimensioning of devices in the target project is carried out in two steps.

- Change of the dimensioning of the required function in the target project.
- Allocation of the material of the new dimensioning to the respective objects in the target project using the **Advanced Typical Manager**. In the process of exchanging the material, the pins and the structure will be accounted for. Unused object will be deleted.

How to change a given dimensioning in the target project

In the target project the selected dimensioning may be changed.

- 1. Mark the function in the target project for which the dimensioning shall be changed.
- 2. In the popup menu, click **Select Assistant**, select the assistant **Typical Manager/Dimensioning**, and click **Run**.

Select Dimensioning V2.3.5.6							
Function: P1 U2							
Dimensioning							
▲ >> Default Group <<		Device	Comment	Туре	Dimensioning Index	Material	
Dim 1		Typical Unit 1 Flash Drum S3		Signalling Device	5	SIE_3SB-001	
Dim 2		Typical Unit 1 Flash Drum S1 (Flash Drum Level)		Signalling Device	3	SIE_3SB-003	
A Sensor	=						
Dimensioning 1 Signal							
Dimensioning 1							
Dimensioning 2							
New	*	٠				•	
					Ok	Cancel	

The dialog **Select Dimensioning** opens.

- 3. Below **Dimensioning**, select the dimensioning to be used.
- 4. Click **OK**, to store the dimensioning allocation.
- 5. Run the **Typical Manager**.

The dialog Advanced Typical Manager opens. **Changed** in the column **Status** indicates a change has occurred in the function of the target project. The message **Update Dimensioning** in column **Action** indicates the dimensioning has been changed. The changed dimensioning is displayed in the column **Dimensioning**.

6. Click **OK**, to change the dimensioning of the function in the target project. Thereby, the material of the selected dimensioning is assigned to the devices in the target project.