

How to use Options & Variants module in SXP

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Disclaimer: The views and opinions expressed herein do not necessarily reflect those of the ITER Organization

Introduction

Introduction:

This document describes how to use the “Options & Variants” module from SEE Electrical Expert project

Services requirement : SEE Electrical Expert: V4R3 – SP7 and more



Environment: ITER_V4R3_1.0

This How to is only dedicated to IT, IO, DAs and suppliers using See Electrical Expert with the ITER Environment.

Project Example, xml configurations: [ITER D 24JBGJ](#)

Time: 60 minutes

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Version: 1.0

Operating principle

DEFINITION:

- A project contains electrical diagram to describe an electrical installation.
- For an installation, a system can have a multiple configuration defined as options or a project can contain several almost identical defined as variants. In this cases, one project must be create by configuration.
- To simplify this process, this module allows to create only one project which contains different options. User can create a diagram which contains several options.
- To known which option is defined, user has to assign a validity on each element.
- Multiple projects can be created from the master diagram in selecting the options and variants
- To can print a project according to the validity (predefined options)

PRINCIPLE:

- Configuration (different options) defined from a XML file or from the variants editor.
- Possibility to assign a validity to the project, the groups, the sheets, signals, symbols and the symbol connection points.
(Currently, not interaction with PLC module)
- Possibility print or display according to the options selected.
- Possibility to copy a project which contains only sheets linked to a validity

Introduction

Operating principle

SXP DESIGN



Native folder containing all the options of a project
Allows you to generate projects by selecting variants

SXP VIEWER PREMIUM



Allow to read and print an SXP native folder by selecting variants



Save as a project by selecting variants...

... option 1

... option 2

... option 3



Native folder builder with option 1



Native folder builder with option 2



Native folder builder with option 3

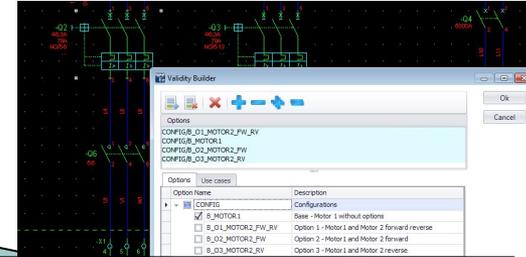
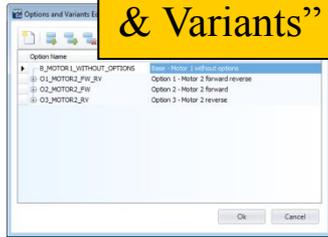
Workflow

```
<?xml version="1.0" encoding="UTF-8"?>  
<IGE-XAO_Variant_Definition XSDversion="1.10">  
  <Variant_List>  
    <Variant_Object Description="Configurations" Name="CONFIG">  
      <Variant_Object Description="Base - Motor 1 without options" Name="B_MOTOR1"/>  
      <Variant_Object Description="Option 1 - Motor1 and Motor 2 forward reverse" Name="B_O1_MOTOR2_FW_RV"/>  
      <Variant_Object Description="Option 2 - Motor1 and Motor 2 forward" Name="B_O2_MOTOR2_FW"/>  
      <Variant_Object Description="Option 3 - Motor1 and Motor 2 reverse" Name="B_O3_MOTOR2_RV"/>  
    </Variant_Object>  
  </Variant_List>  
</Use_Case_List/>  
</IGE-XAO_Variant_Definition>
```

Edit options & variants

From of loading of a Xml file

From the "Options & Variants" editor

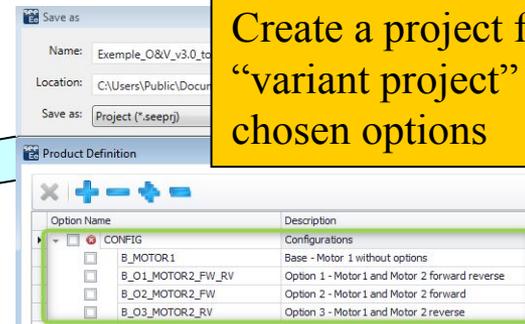


Build the validities in the sheets of detailed wiring diagrams

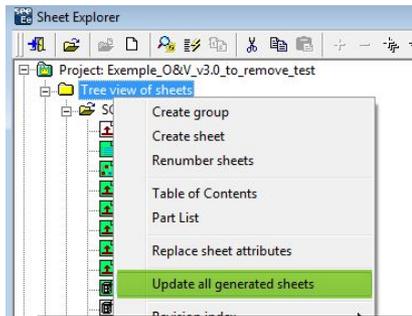
Verify the validites from the "Variant Preview" explorer



Create a project from the save as "variant project" in selecting the chosen options



Update of generated sheets (terminal strips, connectors, parts list, cables list, annexes)



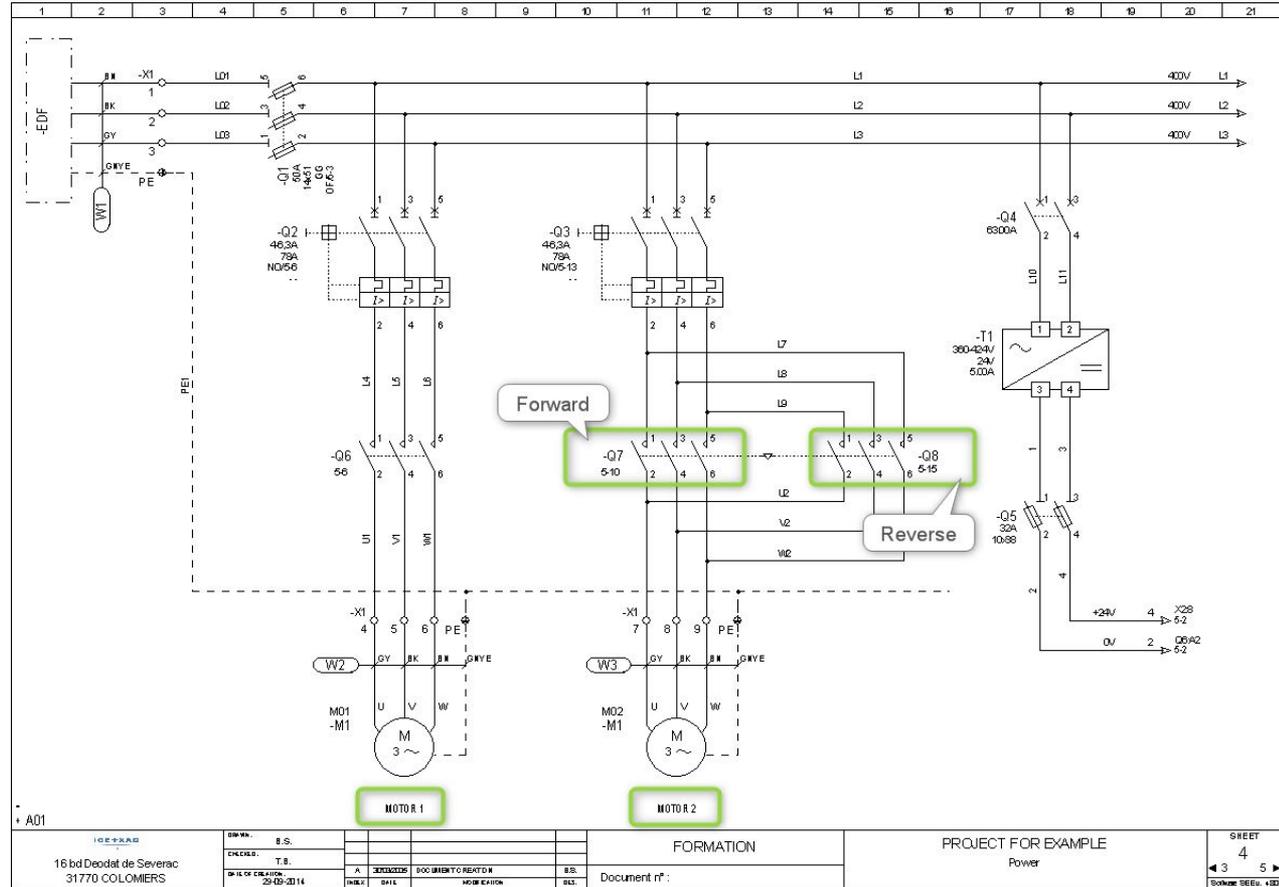
Variants Definition

From the example project delivered with the software, options & variants will be defined to create separately projects in according the following definitions:

Projects list:

- Motor 1
- Motor 1 et Motor 2 (forward and reverse)
- Motor 1 et Motor 2 (forward)
- Motor 1 et Motor 2 (reverse)

All these options will be defined in the same project in order to automatically create a project by choosing a variant



Variants Management

Selected or remove options

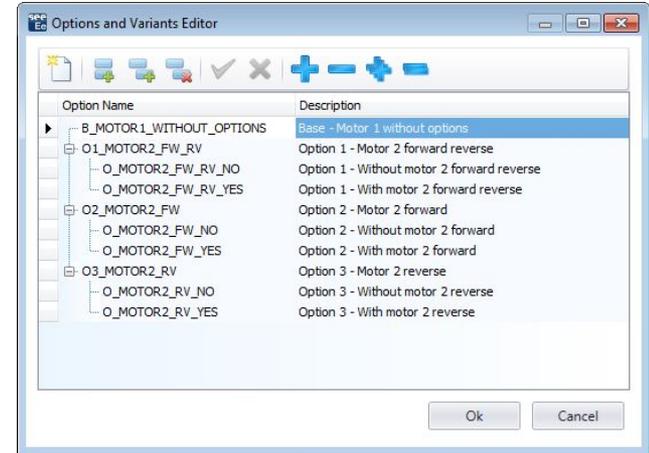
Options & Variants” management can be defined in both possibilities: by options selection or removing.

In the both cases, the goal is to start with the complete wiring diagram containing all configurations possible and to select or remove the options.

For each validity, definition of a name and a description: <Variant_Object Name=“XX_X” Description=“Xxx Xxxx“/>

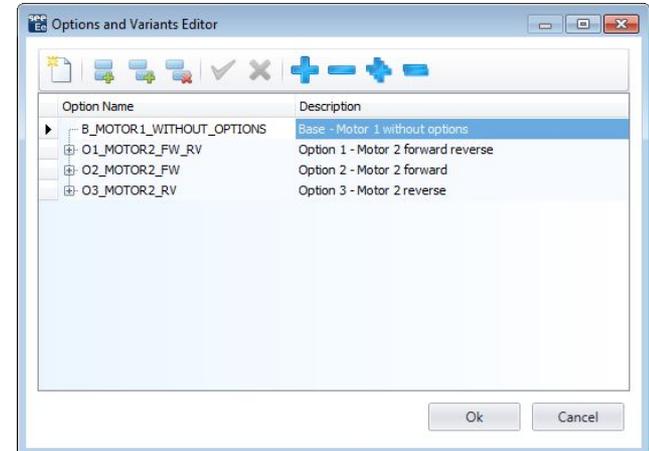
- Options to selected

```
<?xml version="1.0" encoding="UTF-8"?>
<IGE-XAO_Variant_Definition XSDversion="1.10">
  <Variant_List>
    <Variant_Object Description="Without Options" Name="WITHOUT_OPTIONS"/>
    <Variant_Object Description="Motor 2 Forward Reverse" Name="MOTOR2_FW_RV">
      <Variant_Object Description="Without Motor 2 Forward Reverse" Name="MOTOR2_FW_RV_NO"/>
      <Variant_Object Description="With Motor 2 Forward Reverse" Name="MOTOR2_FW_RV_YES"/>
    </Variant_Object>
    <Variant_Object Description="Motor 2 Forward" Name="MOTOR2_FW">
      <Variant_Object Description="Without Motor 2 Forward" Name="MOTOR2_FW_NO"/>
      <Variant_Object Description="With Motor 2 Forward" Name="MOTOR2_FW_YES"/>
    </Variant_Object>
    <Variant_Object Description="Motor 2 Reverse" Name="MOTOR2_RV">
      <Variant_Object Description="Without Motor 2 Reverse" Name="MOTOR2_RV_NO"/>
      <Variant_Object Description="With Motor 2 Reverse" Name="MOTOR2_RV_YES"/>
    </Variant_Object>
  </Variant_List>
  <Use_Case_List/>
</IGE-XAO_Variant_Definition>
```



- Options to remove

```
<?xml version="1.0" encoding="UTF-8"?>
<IGE-XAO_Variant_Definition XSDversion="1.10">
  <Variant_List>
    <Variant_Object Description="Configurations" Name="CONFIG">
      <Variant_Object Description="Base - Motor 1 without options" Name="B_MOTOR1"/>
      <Variant_Object Description="Option 1 - Motor1 and Motor 2 forward reverse" Name="B_O1_MOTOR2_FW_RV"/>
      <Variant_Object Description="Option 2 - Motor1 and Motor 2 forward" Name="B_O2_MOTOR2_FW"/>
      <Variant_Object Description="Option 3 - Motor1 and Motor 2 reverse" Name="B_O3_MOTOR2_RV"/>
    </Variant_Object>
  </Variant_List>
  <Use_Case_List/>
</IGE-XAO_Variant_Definition>
```



Options & Variants Module

Variants Management

“Options & Variants” module function will be presented from the “Example” project of the V4R3 version software. Only this version software allow you to edit the validities from an editor explorer.

Open the variants management from the toolbar:

File/Project Properties/Variants Management

A configuration can be edited from:

- **Xml file** “Load Variants” select
- **Options and variants editor** “Edit Variants” select

It’s possible to edit a configuration from the “Options and Variants” Editor and to export this configuration in Xml format

If a new configuration is load, all validities will be deleted in all project

Return in back impossible same with the “Undo/Redo Explorer”

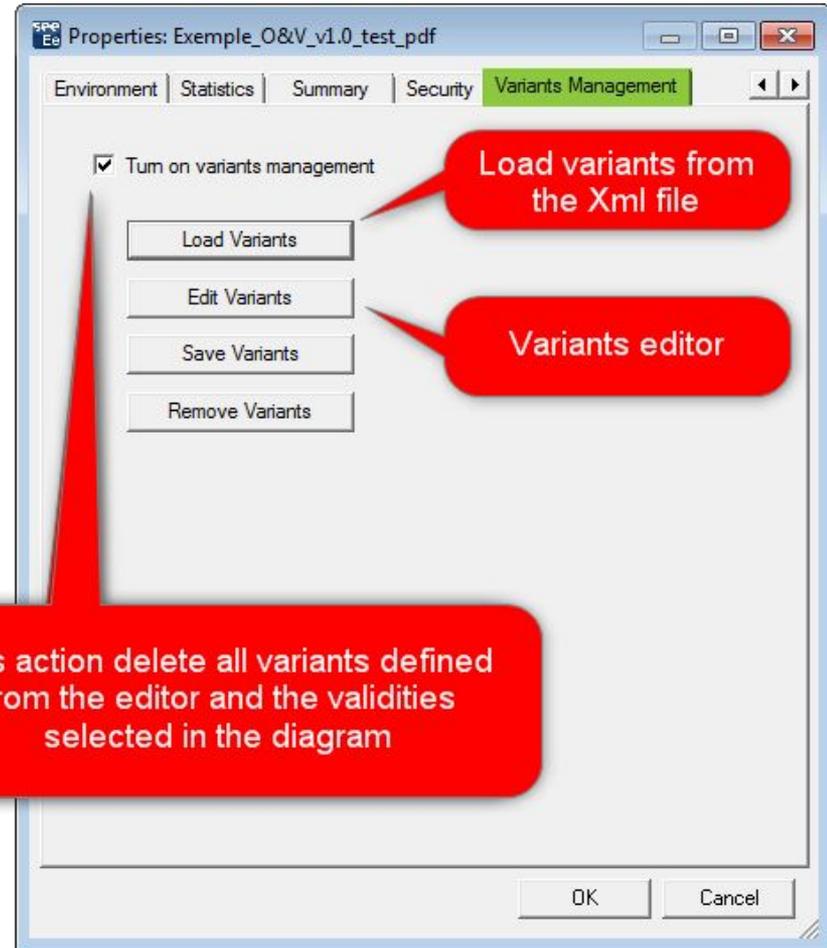
“Turn on variants management” button has the same action to validity

EXERCICE:

Load variants from the project example:

[ITER_D_24JBGJ](#)

“Options to remove” is loaded by default



Variants Visibility

From the Sheet Explorer

Project: Exemple_O&V_v3.0_to_remove

Tree view of sheets

- SCHEMA
 - 1 | Cover Page
 - 2 | List of the sheets
 - 3 | Synoptic
 - 4 | Power
 - 5 | Control
 - 6 | Configuration process control
 - 7 | Input card
 - 8 | Ouput card
 - 9 | Inside of enclosure - A1
 - 10 | Door of enclosure - A1
 - 11 | Console - P1
 - 12 | Drilling enclosure - A1
 - 13 | Drilling console - P1
- BORNIERS
- NOMENCLATURE DE COMMANDE
- NOMENCLATURE DE FABRICATION
- CARNET DES CABLES
- ANNEXES
- 3D Views
 - Panel layouts

Display another project for copy

Attributes Variants Revision Indexes Files Attached

Edit Remove

Validity criteria

Validity Builder

Options

Use cases

Option Name	Description
CONFIG	Configurations
<input checked="" type="checkbox"/> B_MOTOR1	Base - Motor 1 without options
<input type="checkbox"/> B_O1_MOTOR2_...	Option 1 - Motor 1 and Motor 2 forward reverse
<input type="checkbox"/> B_O2_MOTOR2_FW	Option 2 - Motor 1 and Motor 2 forward
<input type="checkbox"/> B_O3_MOTOR2_RV	Option 3 - Motor 1 and Motor 2 reverse

Select a variant

Add Option

Validity Builder

Options

Use cases

Option Name	Description
CONFIG	Configurations
<input checked="" type="checkbox"/> B_MOTOR1	Base - Motor 1 without options
<input type="checkbox"/> B_O1_MOTOR2_...	Option 1 - Motor 1 and Motor 2 forward reverse
<input type="checkbox"/> B_O2_MOTOR2_FW	Option 2 - Motor 1 and Motor 2 forward
<input type="checkbox"/> B_O3_MOTOR2_RV	Option 3 - Motor 1 and Motor 2 reverse

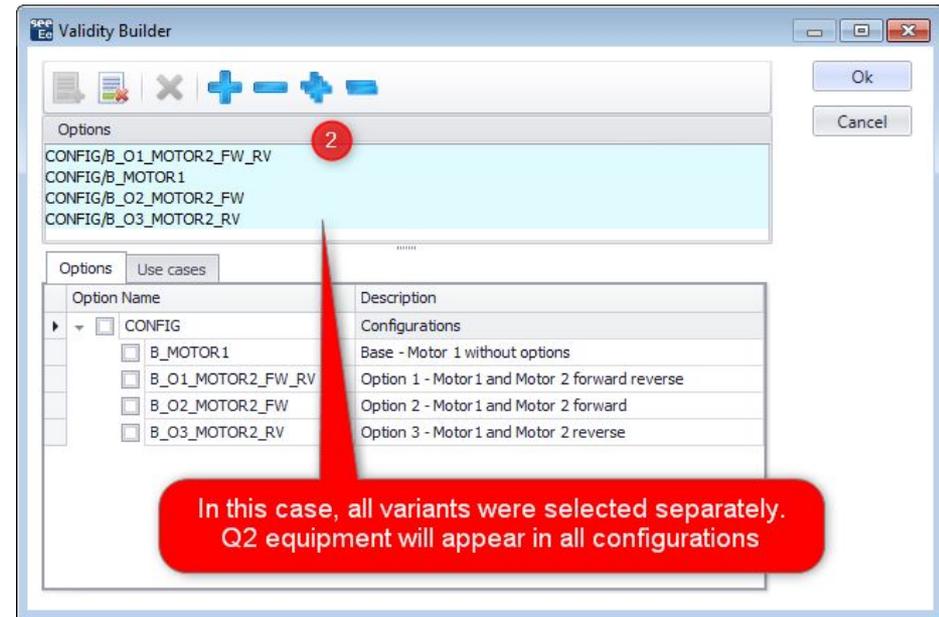
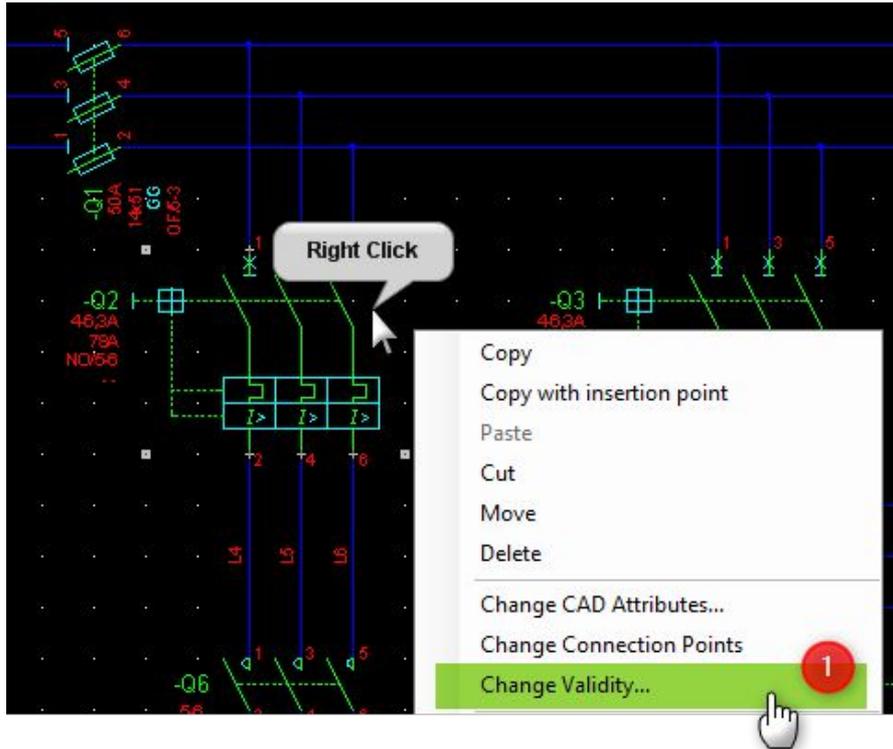
This validity applies to all the sheet, it's possible to add several validities

Variants edit is available on all structure from "Sheet Explorer"

Same functionalities to the validities assignment between "to selected" or "to remove" options

Variants Visibility

From the wiring diagram sheet

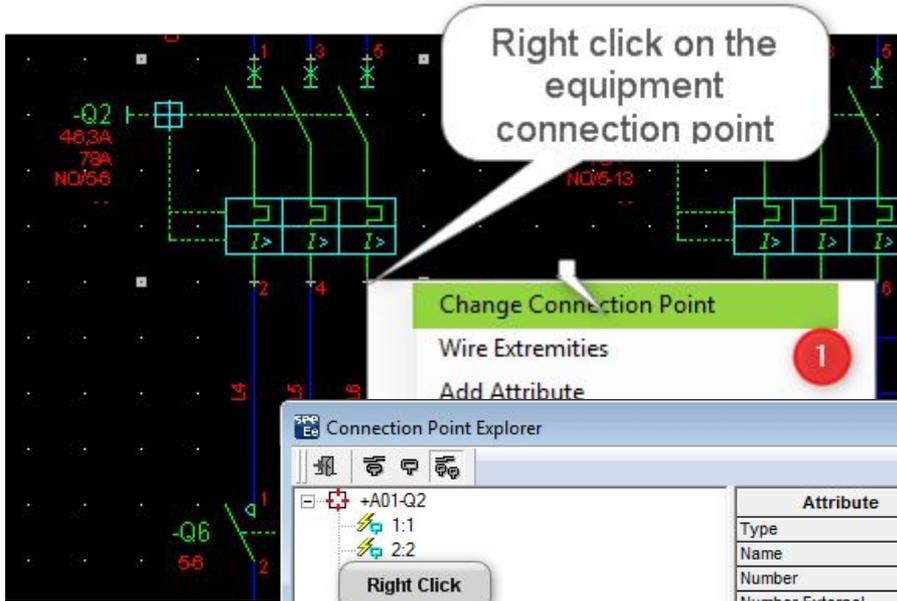


Several devices can be selected in groups in order to assign validities

Same functionalities to the validities assignment between "to selected" or "to remove" options

Variants Visibility

From the wiring diagram sheet



Several equipment can be selected in group in order to assign the validities

Connection Point Explorer

Right Click

Change Name
Change Number
Extremities
Change Validity...

2

Attribute	Value
Type	Output
Name	6
Number	6
Number External	NO
Connectable	YES
Section Min	0
Section Max	0
Maximum number of wires	1
Keep Links	YES
Wire Connection	Wire extremity is connected at connection point
Signal Direction	
Validity	CONFIG/B_01_MOTOR2_FW_RV+CONFIG/B_MOTOR1+CONFIG/B_02_MOTOR2_FW+CONFIG/B_03_MOTOR2_RV

The validities assembly can be appear in differents form, here with a "+" between each validity

Same functionalities to the validities assignation between "to selected" or "to remove" options

Variants Visibility

From the variants viewer

This step is mandatory and must be performed on each sheet to check the consistency between each configuration

Open the variants viewer from the toolbar:

View/Variants Selection

Product Definition

Option Name	Description
CONFIG	Configurations
B_MOTOR1	Base - Motor 1 without options
B_O1_MOTOR2_FW_RV	Option 1 - Motor1 and Motor 2 forward reverse
B_O2_MOTOR2_FW	Option 2 - Motor1 and Motor 2 forward
B_O3_MOTOR2_RV	Option 3 - Motor1 and Motor 2 reverse

Variant Preview

Electrical schematic diagram for Motor 1. Components include: EMERGENCY STOP (S1), ON MOTOR 1 (S2), OFF MOTOR 1 (S3), relays (W4), and a motor (MOTOR 1). The diagram shows the wiring connections between these components and the power supply (+24V and 0V).

REV.	REV.	REV.	REV.	REV.	REV.
1	2	3	4	5	6

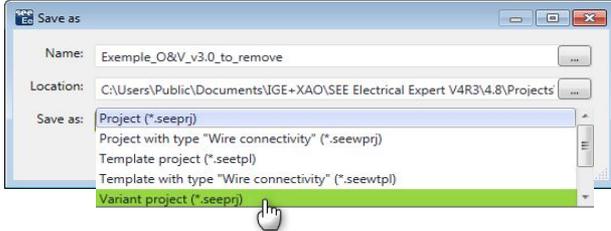
FORMATION

Control

Document n°:

Project Creation by Validities

Operating principle



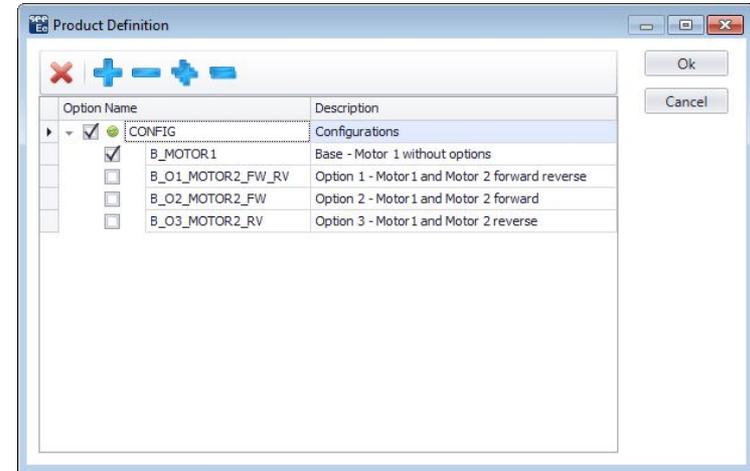
Open the variants project from the toolbar:
File/Save as... Variant project (.seepjr)*

TO REMOVE:

All configurations are predefined by options when the base project is created, each validity is completed in the wiring diagram.

When creating a validity project, the following window opens and only one option can be selected

The variant project can be created when the button next to the checkbox is green (Option Name column)

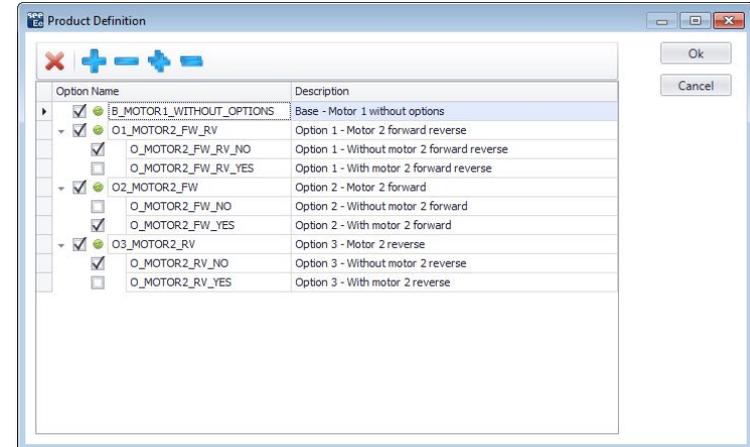


TO SELECTED:

Each configuration are detailed by options when the base project is created, each validity is completed in the wiring diagram.

When creating a validity project, the following window opens and all options can be selected to create a configuration

The variant project can be created when all buttons next to the checkboxes are green (Option Name column)



Project Creation by Validities

Support for automatic updates

The variant project is automatically open after the creation, an update must be performed following this list

Sheets Kind	Update ?	Comments
Table of contents	YES	Update from the <i>Sheets Explorer</i>
Synoptic	NO	Sheet deleted of project, not supported
Wiring diagram	NO	Update manually of OPR, oriented connections, cross referencing
PLC	NO	Channels comments management is not supported according to the choice of options. Update from PLC module
Terminal strip / Connectors	YES	Terminals not used are deleted, not renumbering automatic
Panels 2D	YES	Not automatic rebuild
Drilling	NO TEST	Module unavailable in the ITER configuration
Part lists	YES	Update from the <i>Sheets Explorer</i>
Cables list	YES	Update from the <i>Sheets Explorer</i>
Wiring list	YES	Symbol not connected but present, manual deletion
List of labels, List of I/O PLC	YES	Update from the <i>Sheets Explorer</i>
List of wires	YES	Update from the <i>Sheets Explorer</i>
List of routing	YES	Update from the <i>Sheets Explorer</i>
Cable and connection sheets	YES	No update possible, manual deletion before a new generation

Project Creation by Validities

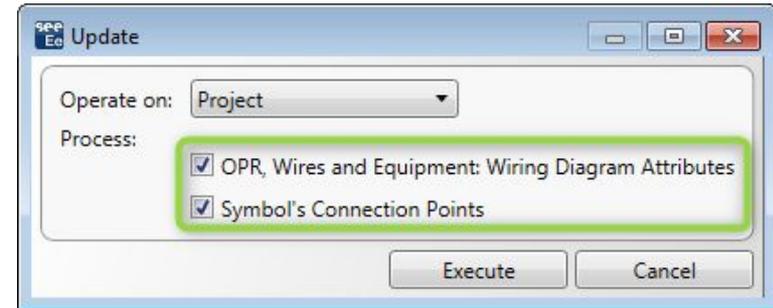
Update project

Wiring diagram

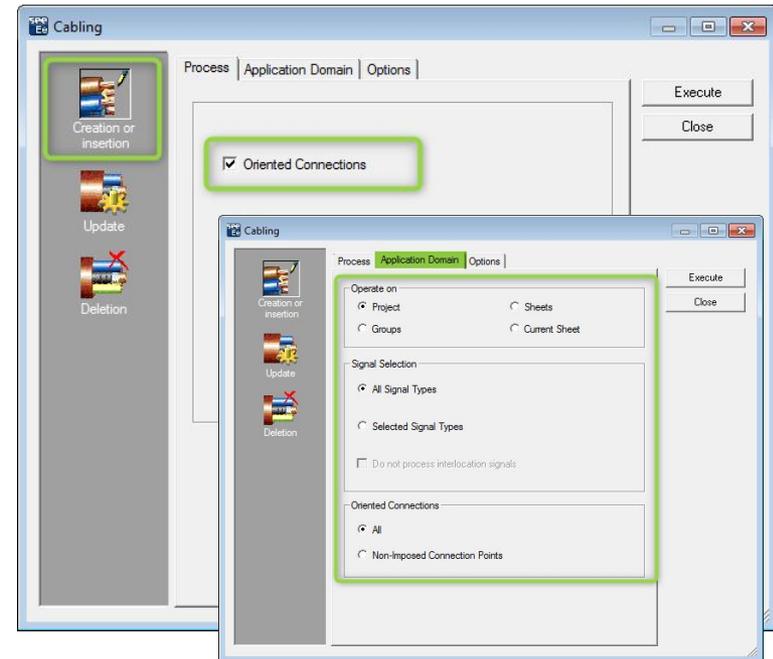
NO

Update manually of OPR, oriented connections, cross referencing

Open the OPR, Wires and equipment from the toolbar:
Process/Update WD attributes and connection points of symbol



□ Open the Oriented connections from the toolbar:
Process/Automatic creation of wires and cables/Creation or Insertion



Project Creation by Validities

Update project if incoherence

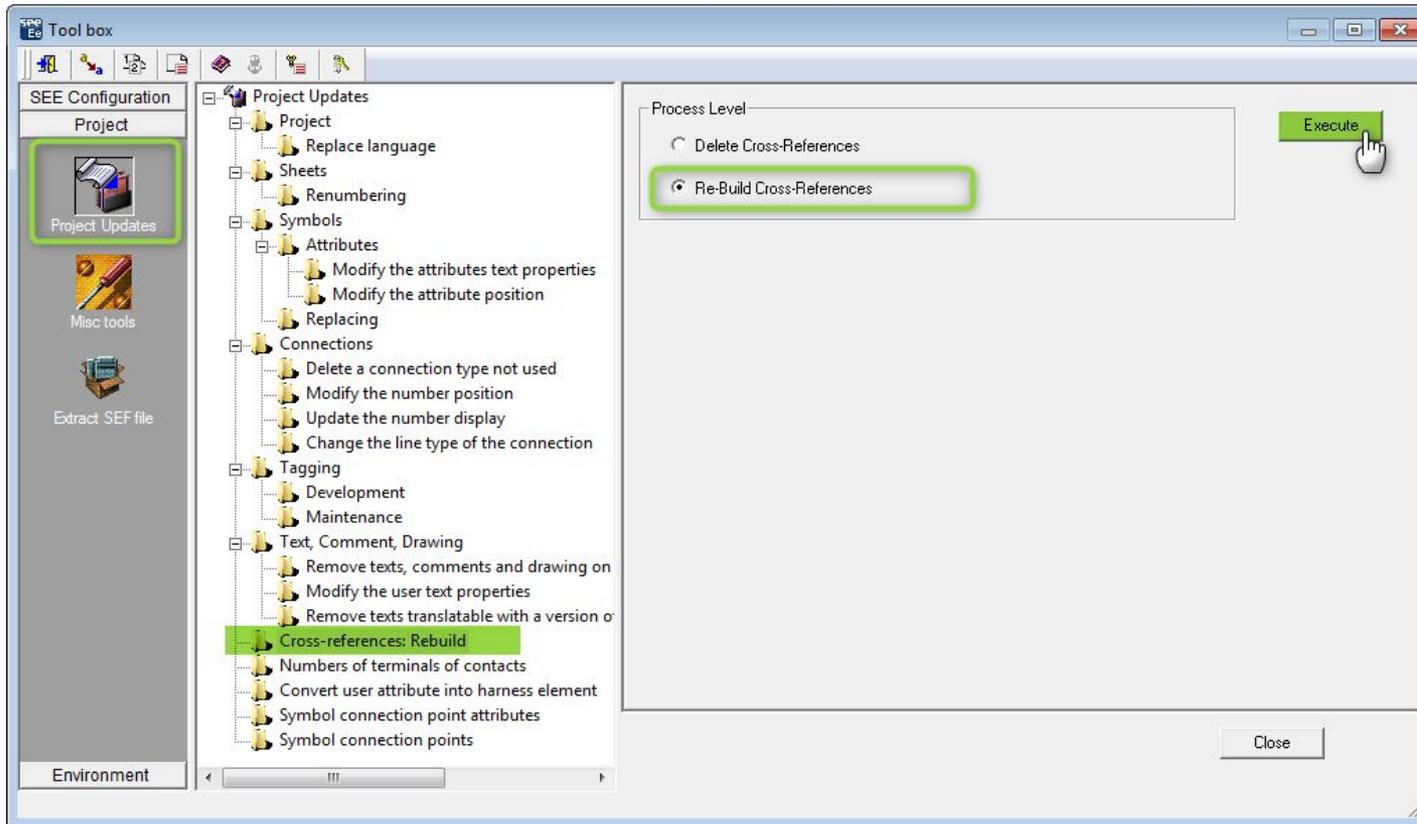
Wiring diagram

YES

Update manually of OPR, oriented connections, cross referencing

Open the Cross-references Rebuild from the toolbar:

Tools/Toolbox/Project Updates/Cross-references Rebuild



Project Creation by Validities

Update project if need

PLC

NO

Channels comments management is not supported according to the choice of options. Update from PLC module

Open the Cross-references Rebuild from the toolbar:
Process/PLC IO Manager

Select the cards and change the comments from the Input/Output toolbar

N°	Di	Address	Mnemonic	Comment	Channel schema
0	I	100.0	I00.0	MARCHE M1	for module plclex
1	I	100.1	I00.1	MARCHE AVANT M2	for module plclex
2	I	100.2	I00.2	MARCHE ARRIERE M2	for module plclex
3	I	100.3	I00.3	LIBRE	
4	I	100.4	I00.4	LIBRE	
5	I	100.5	I00.5	LIBRE	
6	I	100.6	I00.6	LIBRE	
7	I	100.7	I00.7	LIBRE	

PLC Generation Options

Sheet parameters

Sheet generation destination group

Generated sheets numbering

Generate at end of list

From sheet

Number: 1

Sheet location

Title block

1

Replace existing sheets

Generation options

Create rack sheets

Regroup rack sheets

Create module sheets

Create deported module sheets

View channel comments

Maximum number of characters per line: 24

Advanced Settings Channel update Generate Cancel

Project Creation by Validities

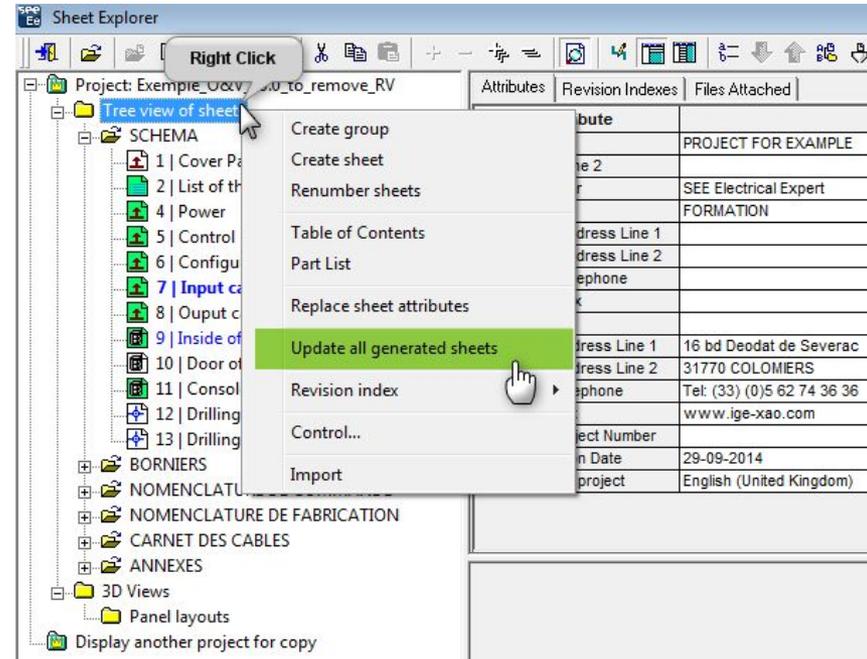
Update project if incoherence

Table of contents	YES	Update from the <i>Sheets Explorer</i>
Part lists	YES	Update from the <i>Sheets Explorer</i>
Cables list	YES	Update from the <i>Sheets Explorer</i>
List of labels	YES	Update from the <i>Sheets Explorer</i>
List of wires	YES	Update from the <i>Sheets Explorer</i>
List of routing	YES	Update from the <i>Sheets Explorer</i>

Open the Explorer Sheet from the toolbar: *File/Open Sheet*

Possibility to update all generated sheets from the tree view of sheet or to select each sheet to generated independently

Possibility to update all generated sheets from the tree view of sheet or to select each sheet to generated independently



Traitement	
Générer sommaire des folios	▶
Générer folios liste	▶
Générer folios d'interconnexion	▶

Project Creation by Validities

Update project if incoherence

Table of contents	YES	Update from the <i>Sheets Explorer</i>
Part lists	YES	Update from the <i>Sheets Explorer</i>
Cables list	YES	Update from the <i>Sheets Explorer</i>
List of labels	YES	Update from the <i>Sheets Explorer</i>
List of wires	YES	Update from the <i>Sheets Explorer</i>
List of routing	YES	Update from the <i>Sheets Explorer</i>

Open the Part List Explorer from the toolbar:

Process/Generate...

- Generate Table of Contents Sheet ▶
- Generate List Sheets ▶
- Generate Interconnection Sheets ▶

The screenshot shows the 'Part list: Equipment' window. On the left is a sidebar with icons for Equipment, Cables, Symbols, and Cover page. The main area displays a tree view with 'List of the cables' selected. Below the tree is a table of attributes:

Attributes	Content
TITLE	List of the cables : [DEBUT] to [FIN]
SUBTITLE	
DESCRIPTION	List of the cables
PARAMETER SETTINGS	EQUIPMENT: 50.1 - Cernet cables (Rep_Type_Tenant_About_Obs)
FILTER ON EXTRACTION	Cables
SOURCE	*
GENERATION DESTINATION	CARNET DES CABLES\
DESTINATION SETTINGS	At END
EXTRACTION LEVEL	Listed Groups
EXTRACTION METHOD	Direct

A red callout box points to the 'PARAMETER SETTINGS' row with the text: 'Available paramets sheets from the project environment'.

Watch out:

Parameter sheets used for the update must be available in the active environment

Project Creation by Validities

Update project if incoherence

Cable and connection sheets

YES

No update possible, manual deletion before a new generation

DELETE

□ Open the Explorer Sheet from the toolbar:

File/Open Sheet



GENERATE

Launch the cables creation from the command:

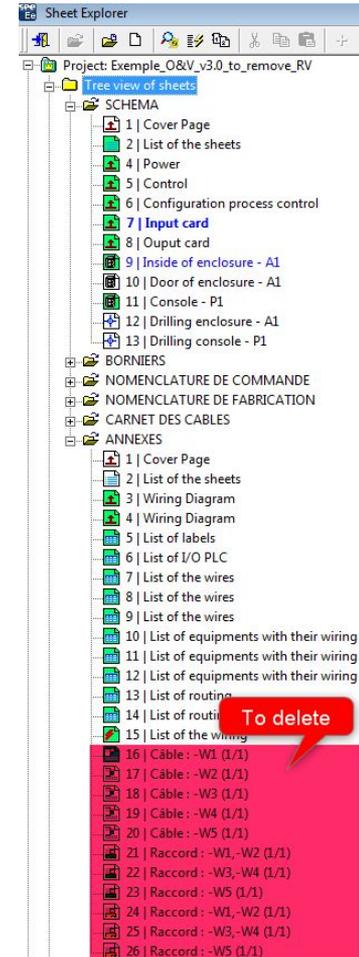
Process/Generate Interconnection Sheets/Cables/All

Launch the connection creation from the command:

Process/Generate Interconnection Sheets/Cables on location/All

PURGE PROJECT

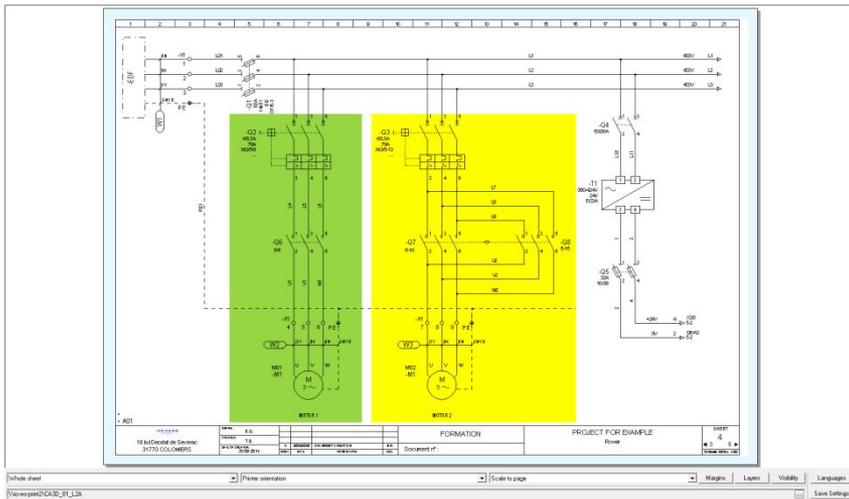
File/Purge/Purge project



Preview Example by Validities

B_01_MOTOR2_FW_RV

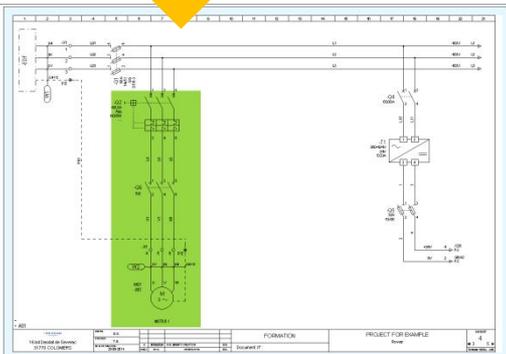
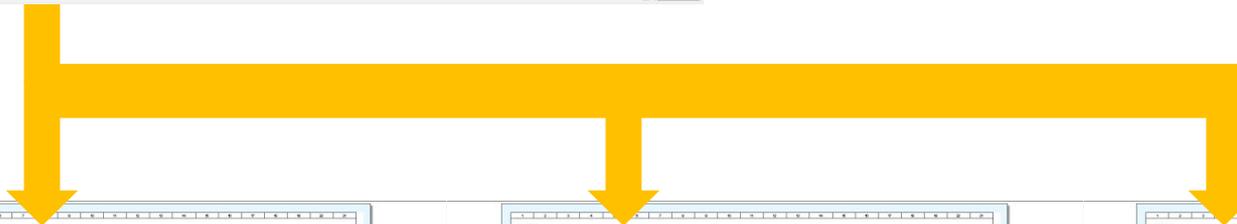
Complete master project containing all variants



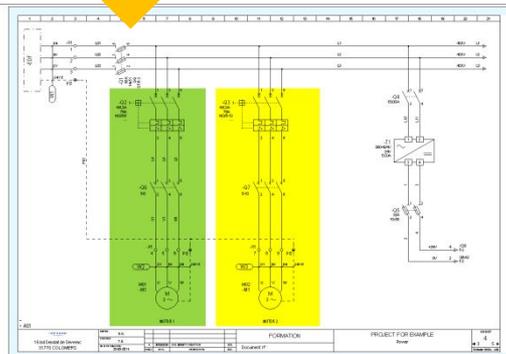
Product Definition

Option Name	Description
CONFIG	Configurations
<input type="checkbox"/> B_MOTOR1	Base - Motor 1 without options
<input checked="" type="checkbox"/> B_01_MOTOR2_FW_RV	Option 1 - Motor 1 and Motor 2 forward reverse
<input type="checkbox"/> B_02_MOTOR2_FW	Option 2 - Motor 1 and Motor 2 forward
<input type="checkbox"/> B_03_MOTOR2_RV	Option 3 - Motor 1 and Motor 2 reverse

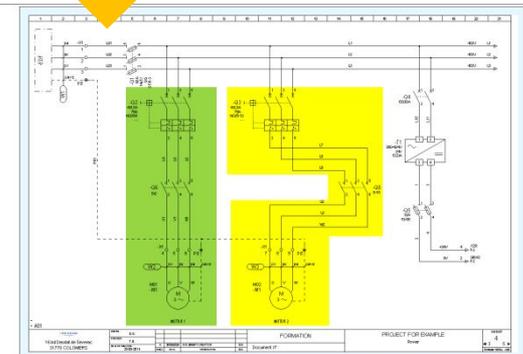
Ok
Cancel



B_MOTOR1



B_02_MOTOR2_FW



B_03_MOTOR2_RV

Print by Validities

From the master project

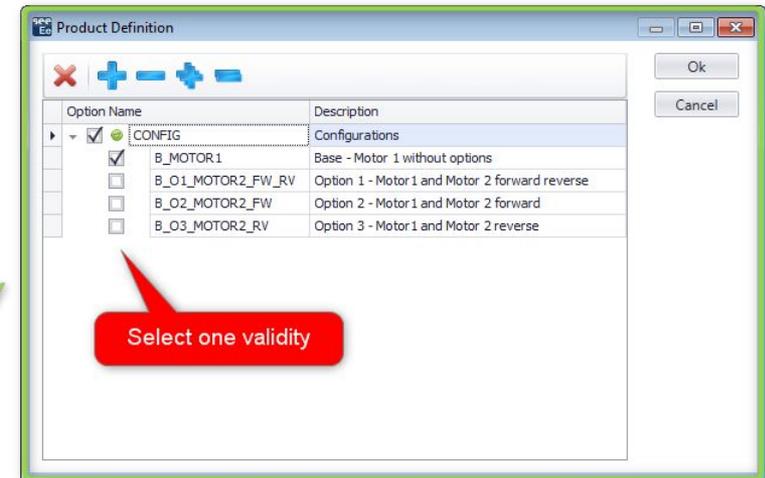
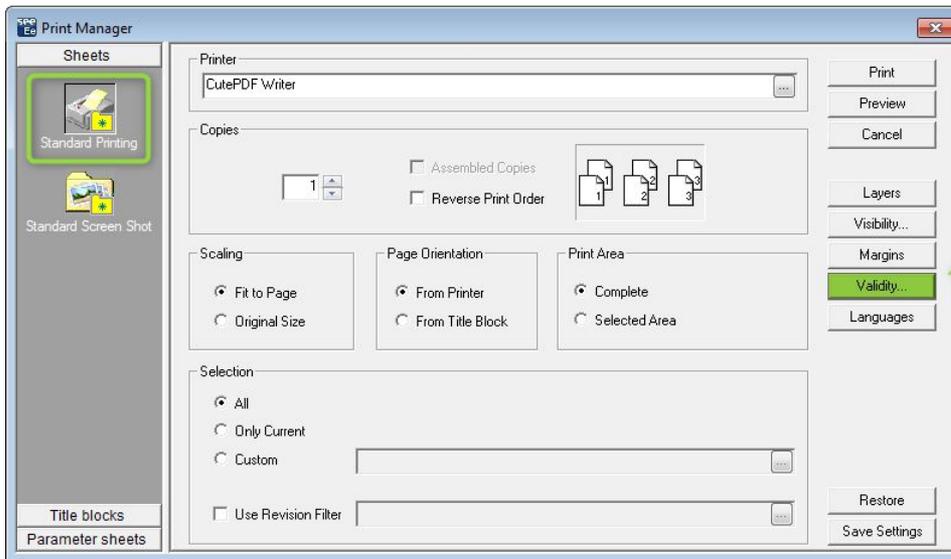
A master project containing all validities can be printed by selecting only one option.

The visibility of the variants will apply exclusively to the detailed wiring diagram, never will the update be made on the generated sheets and the management of cross-references.

PRINT MANAGER

□ Open the Print Manager from the toolbar:

File/Print



Conclusion

Options & Variants module result

“Options & Variants” module is validated.

Requests are being processed by the IGE+XAO editor to fix modifications related at:

- PLC comments update.
- manage the channels not used from the PLC module.

END