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SIMARIS Planning Tools

-- Easy, fast and safe to plan electrical power distribution

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Outline of the SIMARIS planning tools

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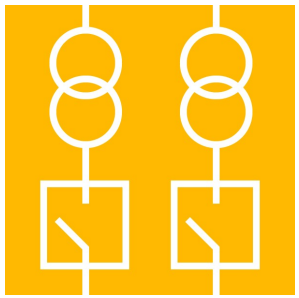
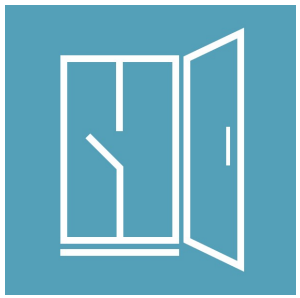
The SIMARIS planning tools provide efficient support in dimensioning an electric power distribution system and determining the equipment and distributing systems for it.



SIMARIS design

for network calculation and dimensioning



SIMARIS project

for determining the space requirements of distributing systems and the budget as well as creating technical specifications

SIMARIS curves

for visualizing characteristic tripping curves, cut-off current and let-through energy curves

Outline of the SIMARIS planning tools

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Highlights

- Intuitive and easy handling with user-friendly documentation options for the planning results
- End-to-end planning for all equipment and systems from the medium-voltage level to the power consumer
- Automatic selection of matching components and distributing systems
- High degree of planning security combined with flexibility in the planning and implementation process

Planning range from MV down to LV in the SIMARIS planning tools

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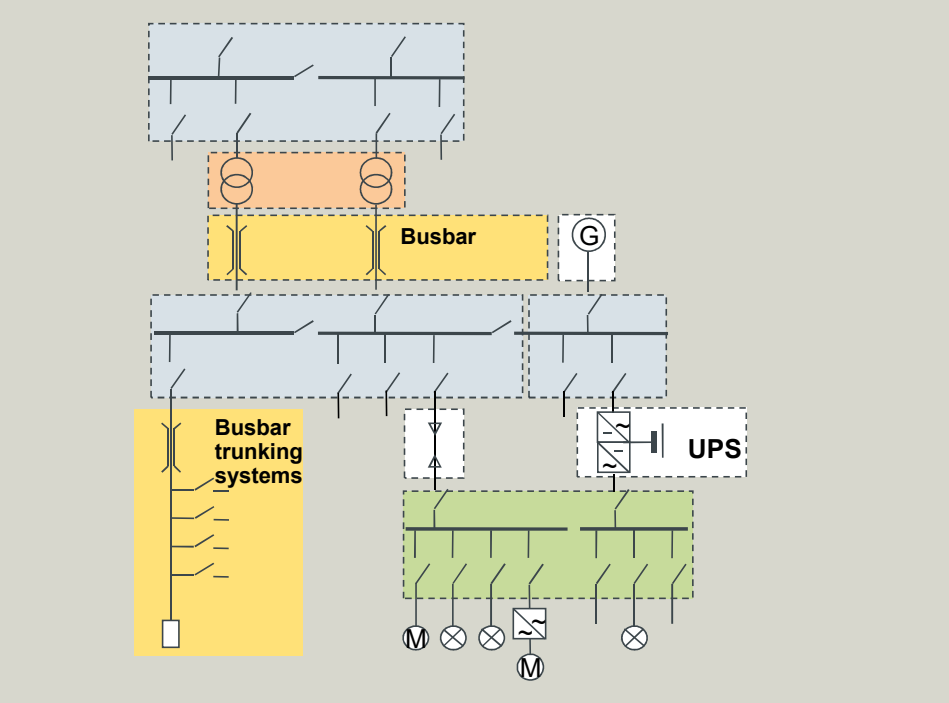

Medium-voltage switchgear

Transformer

Low-voltage main distribution board

Busbar trunking systems

Distribution boards

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SIMARIS design overview

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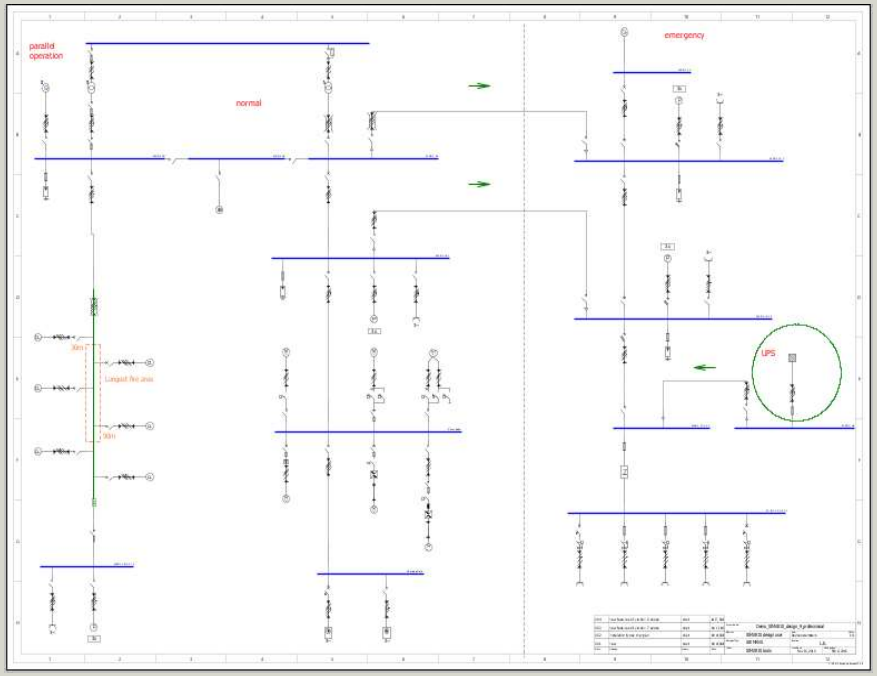
Highlights

- Calculation of short-circuit current, load flow, voltage drop and energy balance
- Consideration of required personal, short-circuit and overload protection, selectivity
- Free definition of network operating modes and switching conditions
- Output planning results: single-line diagram with DWG/DXF/PDF format, and others
- Dimensioning performed according to the accepted rules of good installation practice and all applicable standards (VDE, IEC)



Network Design – Overview

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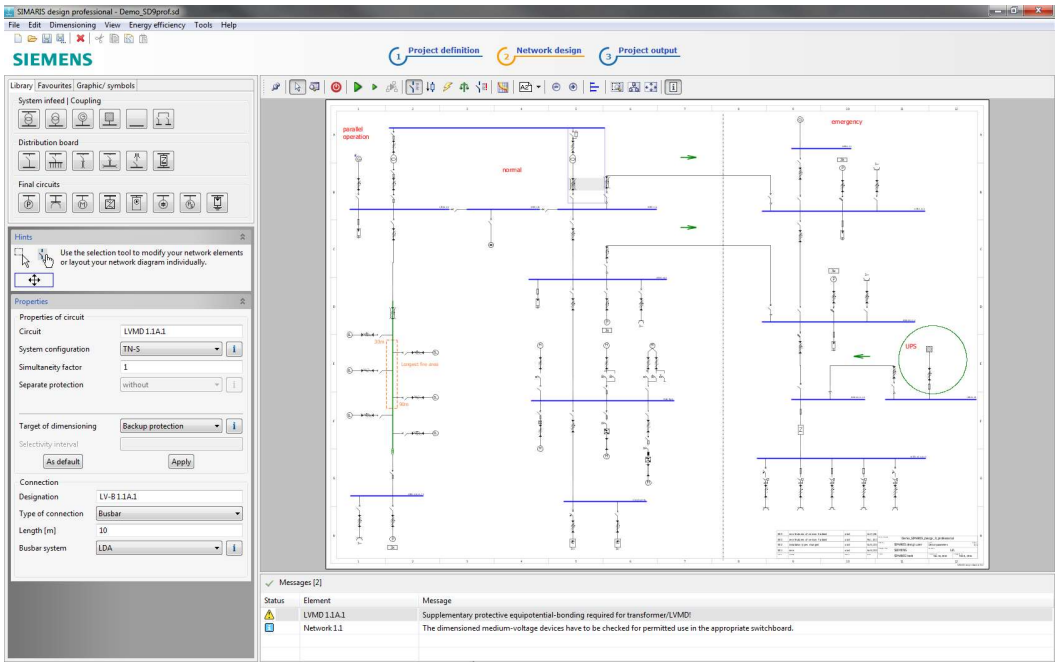
Library
Favorites
Graphic/symbols

Hints

Properties of circuits

Properties of equipment



Tool bar

Graphics window

Message list

Graphic network representation in SIMARIS design

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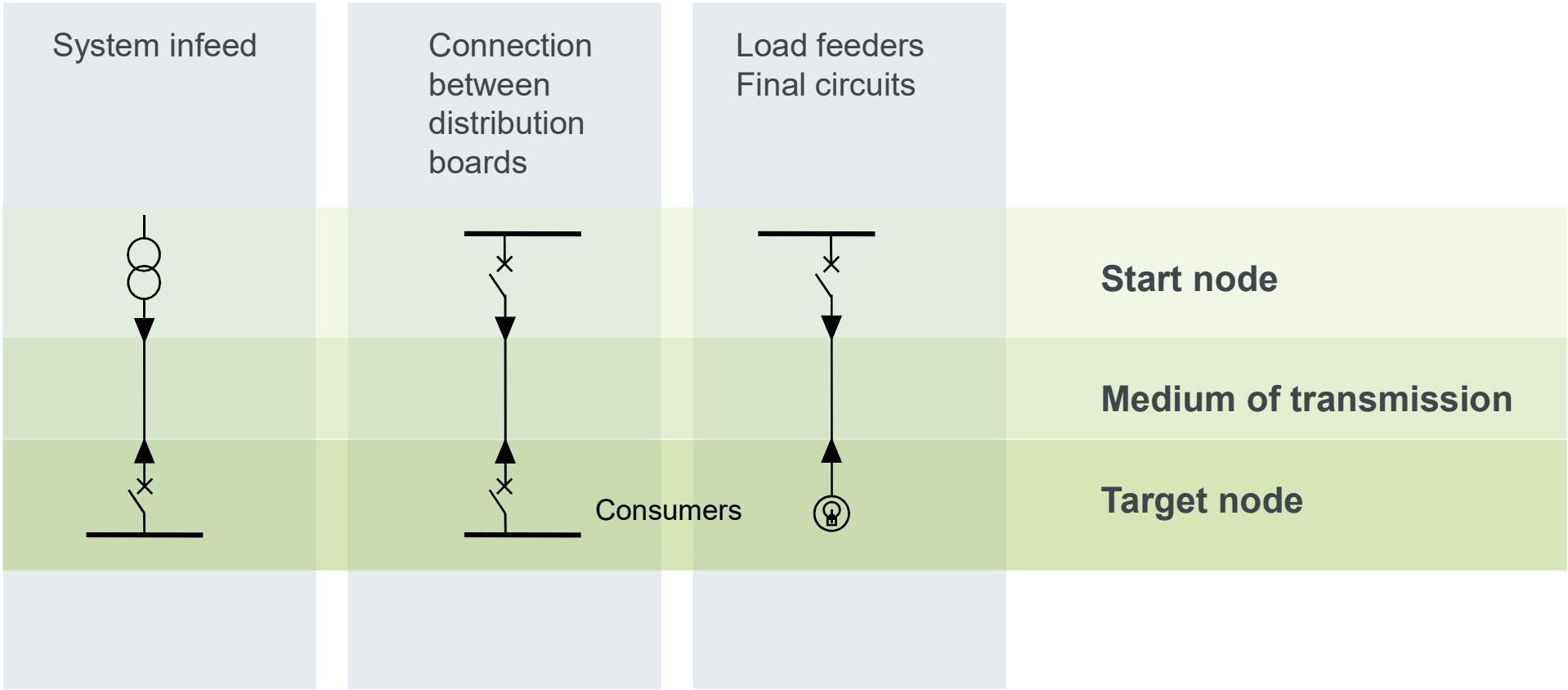

Project editing procedure in SIMARIS design

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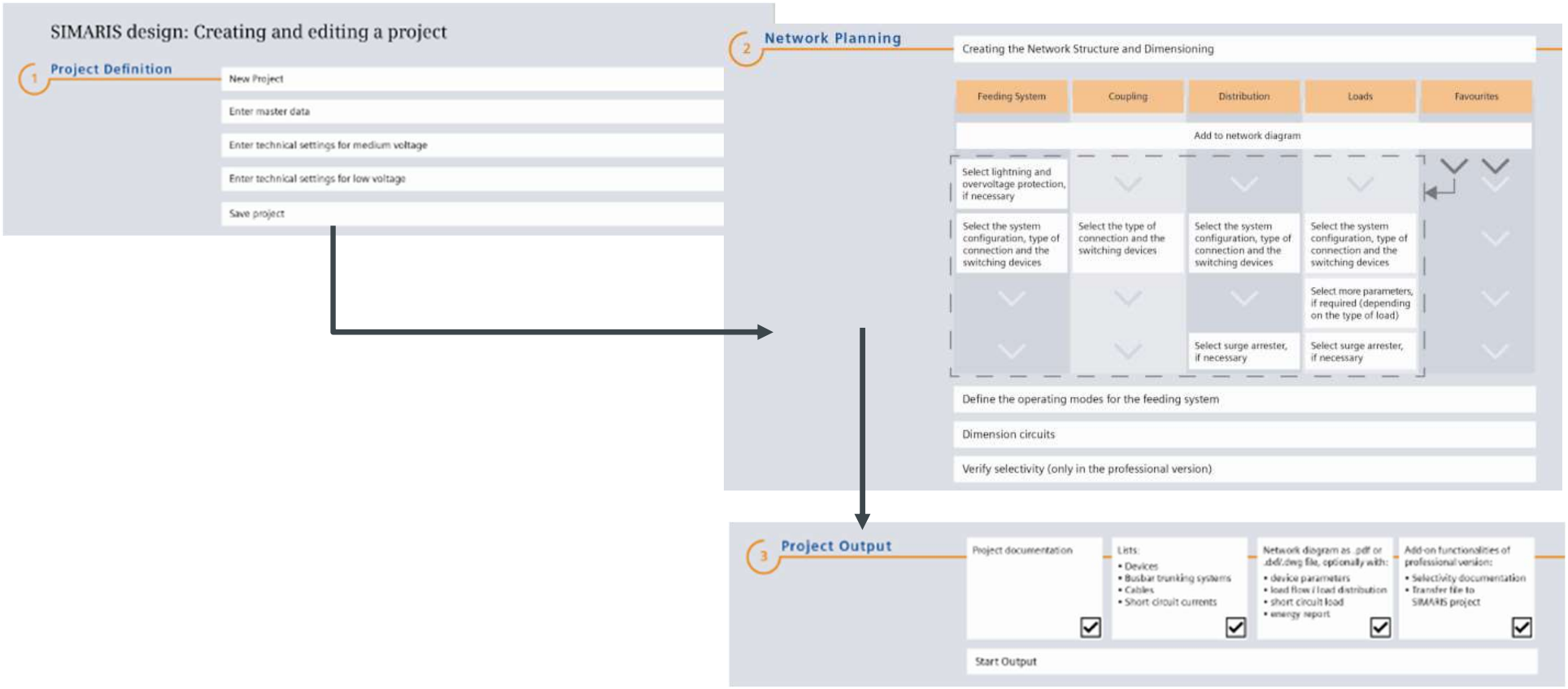

SIMARIS design

East, fast to calculate the electrical data based on IEC standards

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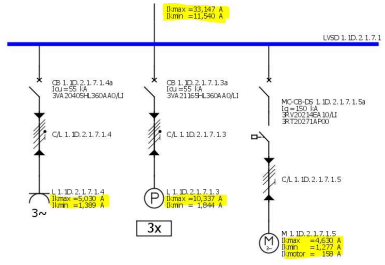
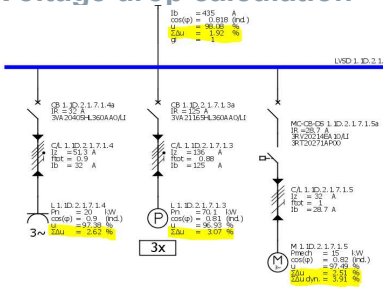
Network calculation

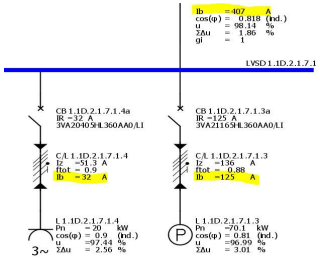
Short circuit calculation



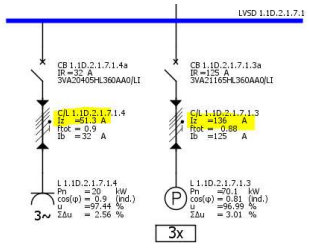
Voltage drop calculation



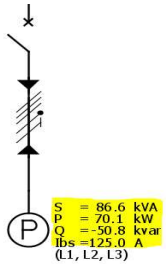
Load flow calculation



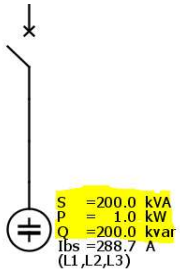
Cables/wires dimensioning



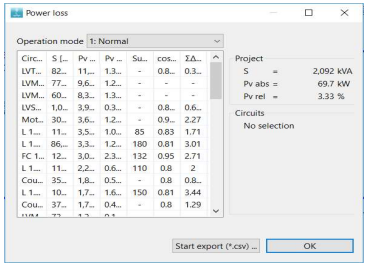
Energy balance calculation



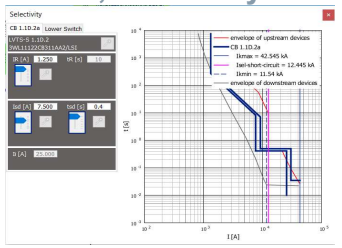
Power compensation



Power loss calculation



Overload and short circuit protection, selectivity



Short circuit calculation

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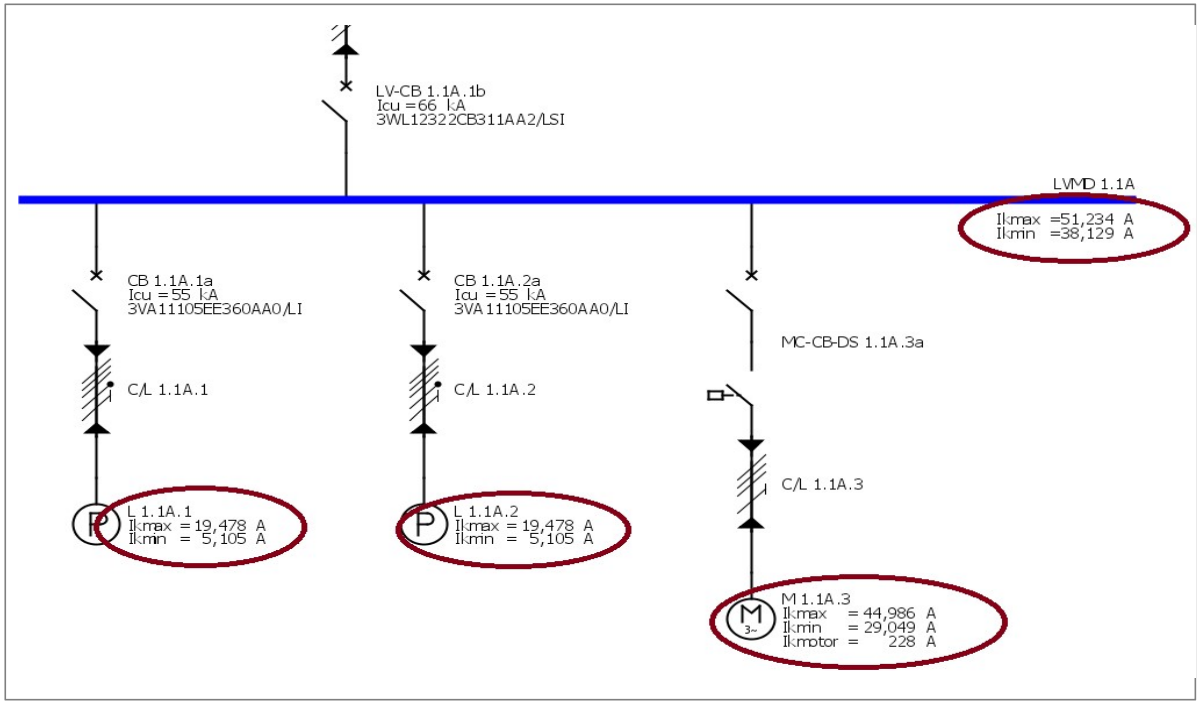
Highlight: calculate all types of short-circuit currents for each feeder based on IEC60909

Max. short circuit current: Ikmax

Min. short circuit current: Ikmin

3-pole short-circuit current proportion of the motor: Ikmotor



Voltage drop calculation

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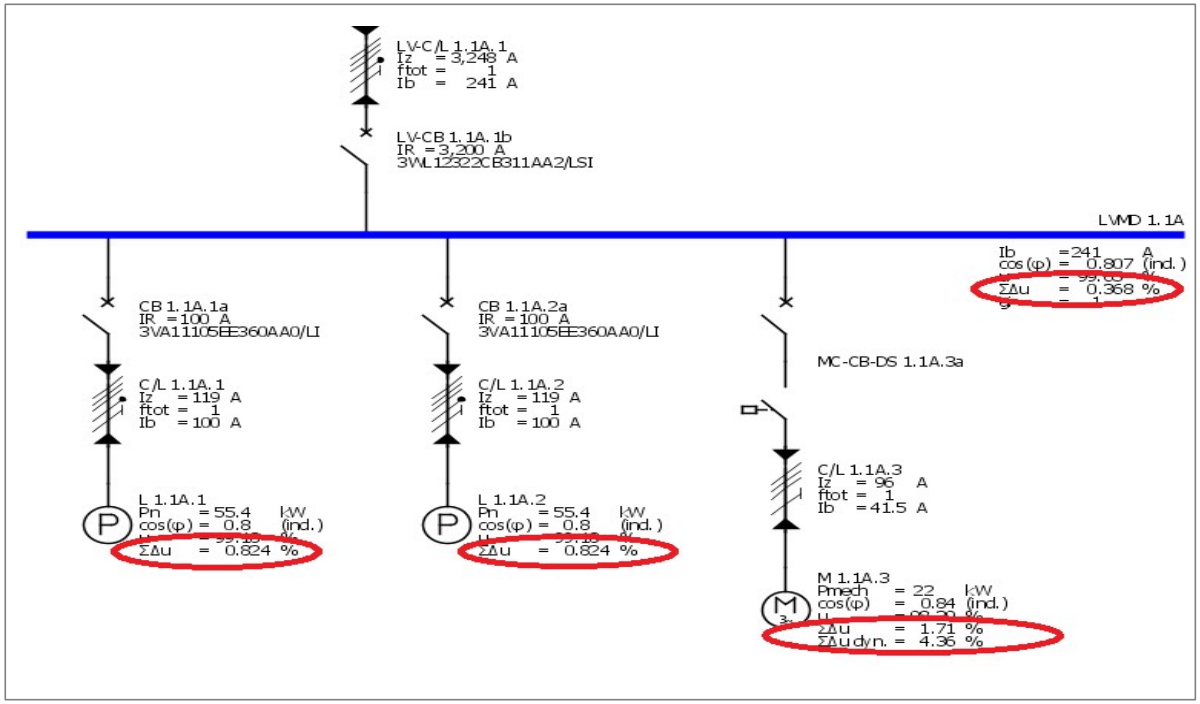
Highlight: calculate voltage drop of cable/busbar trunking system with temperature setting

- **The maximum permissible voltage drop** for power consumers must be taken into account for cable rating.
- Owing to the high inrush current for accelerating the centrifugal mass and due to the fact that the inductive motor resistance is greatly reduced in the instant of on-switching**, the dynamic voltage drop must be considered** in this operating case in addition to the **static voltage drop**.
- Voltage tolerances for equipment and installations are defined in IEC60038



Load flow calculation

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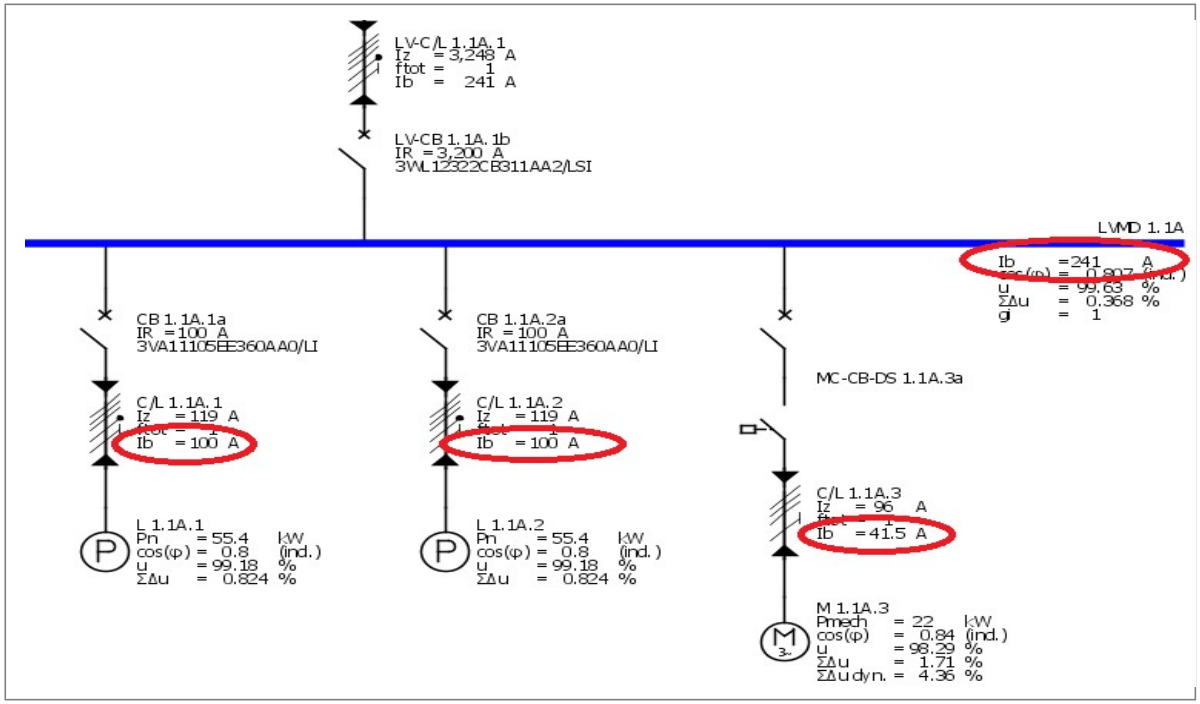
Highlight: calculate load currents considering simultaneity and capacity factors

- Simultaneity and capacity factors are considered for load current calculation
- The **simultaneity factor gi** is the ratio of maximum power required compared to installed capacity.
- The **capacity factor ai** describes the load share which is taken into account in the energy balance of the network.
- If a capacity factor (ai) is selected for the loads and a simultaneity factor (gi) at distribution board level, these factors are multiplied in the energy report.



Cables/wires dimensioning(1)

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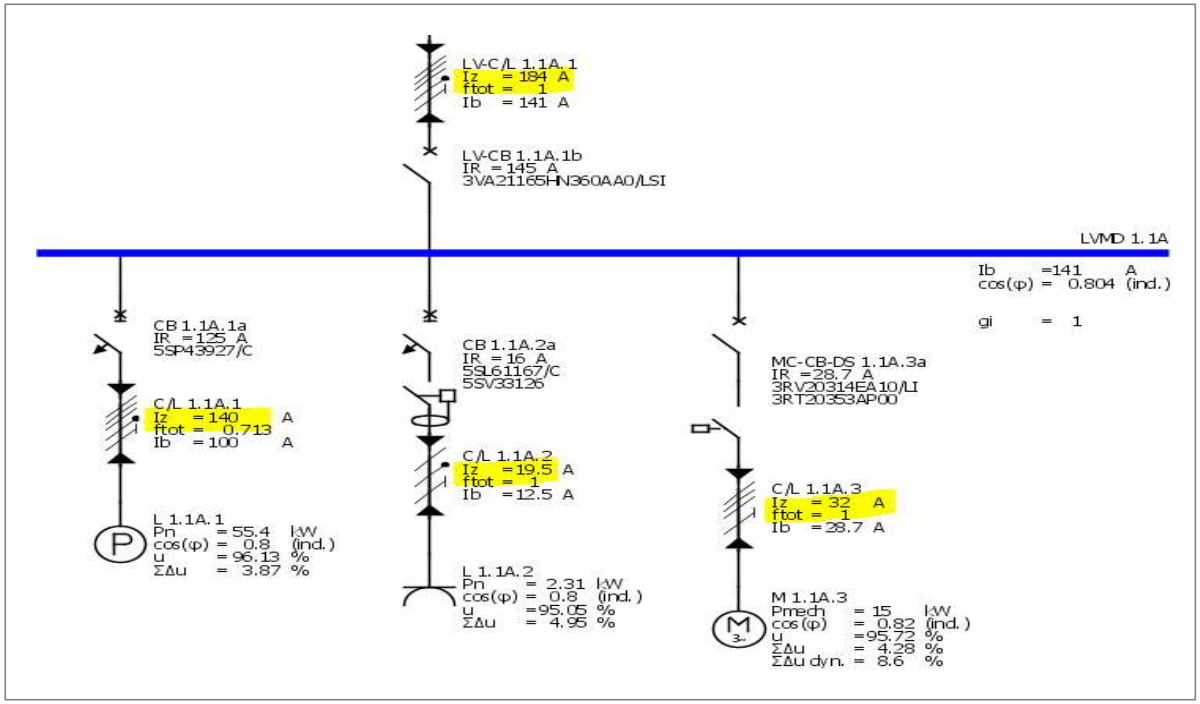
Highlight: the permissible load capacity IZ of cables or wires can be determined in accordance with the real wiring conditions.

- When dimensioning cables and wires, SIMARIS design takes into account **the installation type** by means of appropriate adjustment factors in accordance with the international **standard IEC 60364-5-52**
- The selection of the installation type automatically factors in the appropriate rated values Ir for the cable's current carrying capacity in reference installation type A1, A2, B1, B2, C, D1, D2, E, F or G. A distinction is made according to **conductor material and conductor insulation material.**
- According to the standards relating to the permissible current carrying capacity, conversion factors for deviating conditions must additionally be factored in. $Iz=Ir\cdot\Pi f$



Cables/wires dimensioning(2)

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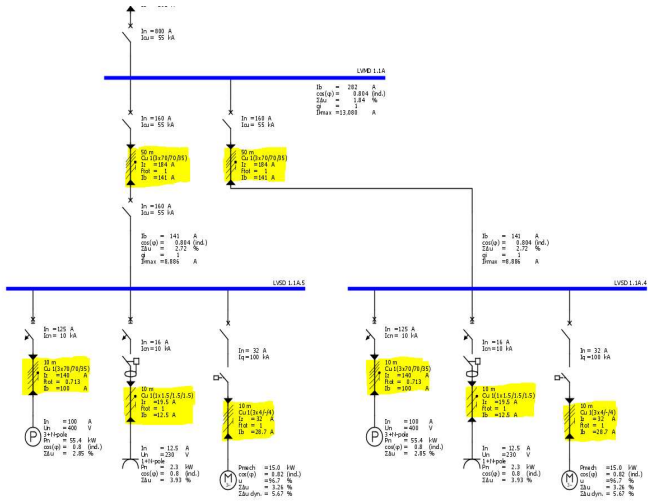
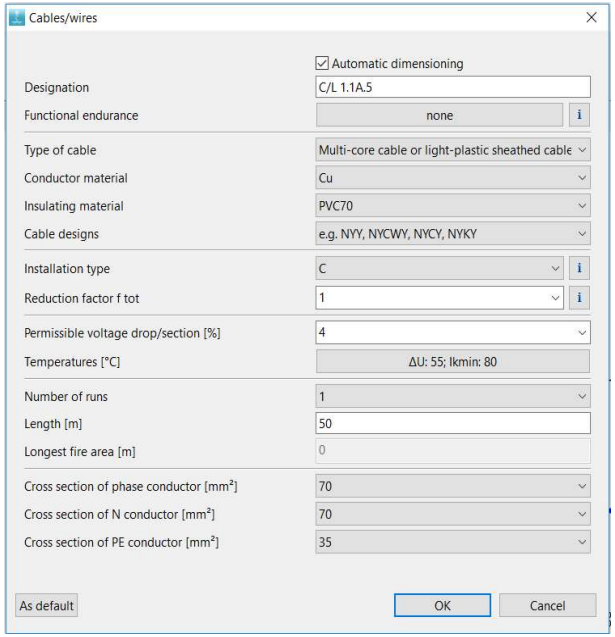
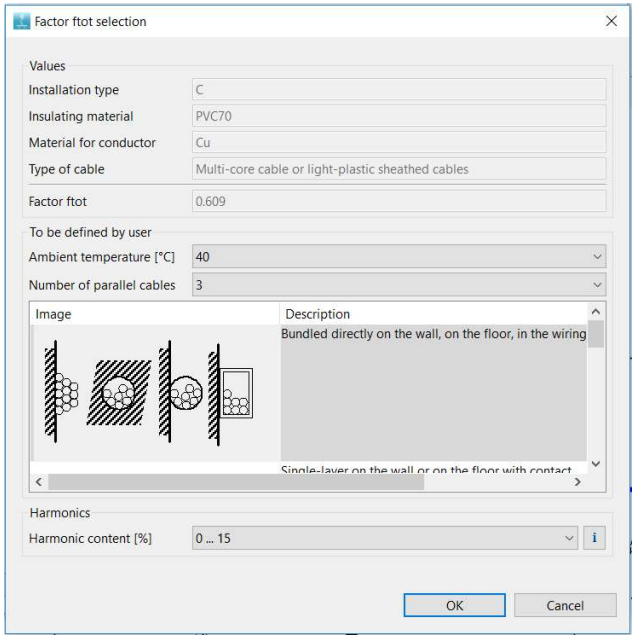
Configurable view



Cables/wires property



Reduction factor ftot



Energy balance calculation

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Highlight: calculate power including S, P, Q in each feeder

- the following information is displayed at every main distribution, sub-distribution and power consumer:

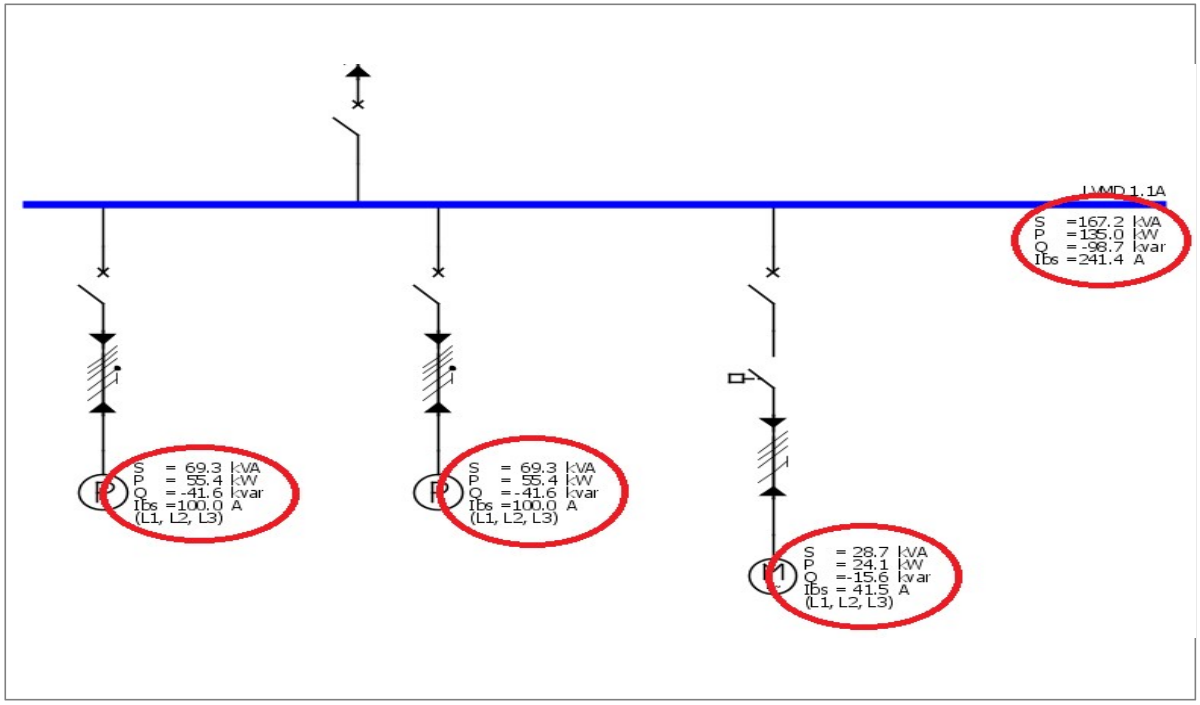
  -apparent power

  -active power

  -reactive power

  -rated apparent current

  -loaded phase conductors



Motor protection design

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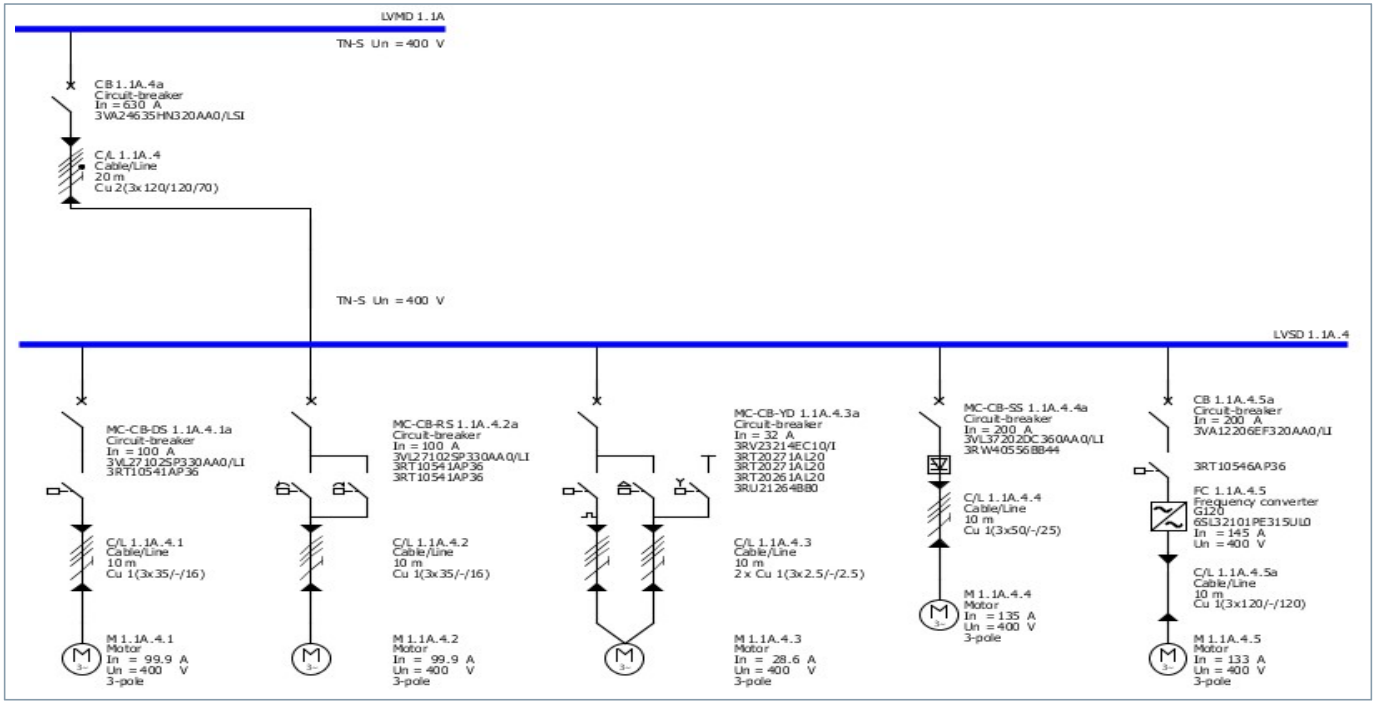
Highlight: motor starter combination with type-tested device combination

- Since motor starter combinations are type-tested device combinations which must not be changed, the technical data of the dimensioned switching devices are only displayed. once it has been selected and dimensioned (**direct on-line starter, reversing mode, star-delta starter or soft starter**).



Product configuration and selection

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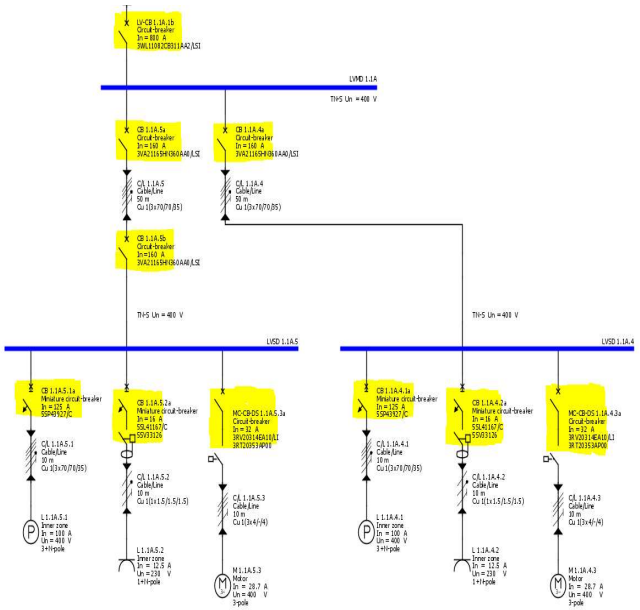
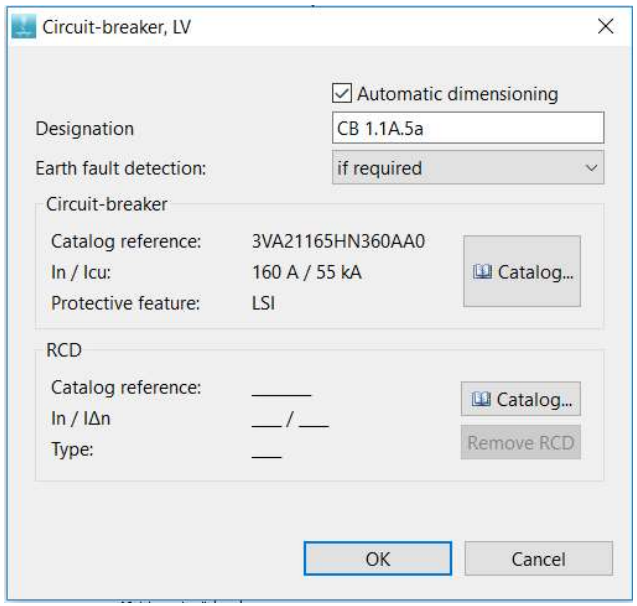
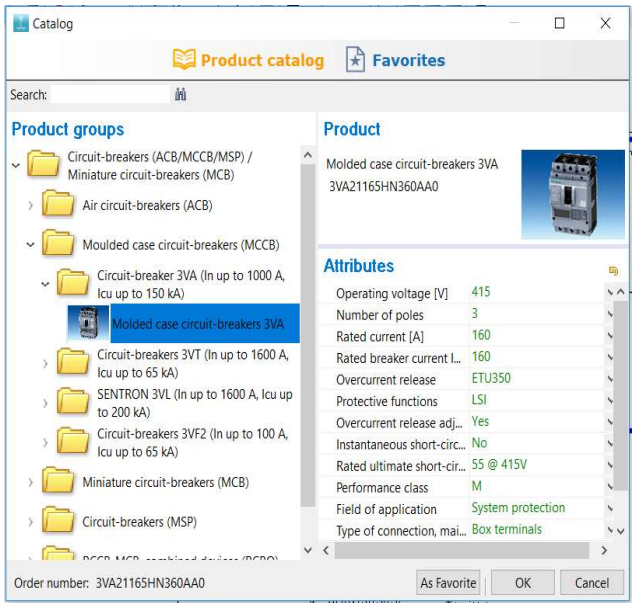
View with device parameters



Product property



Product catalog



Vivid selectivity evaluation

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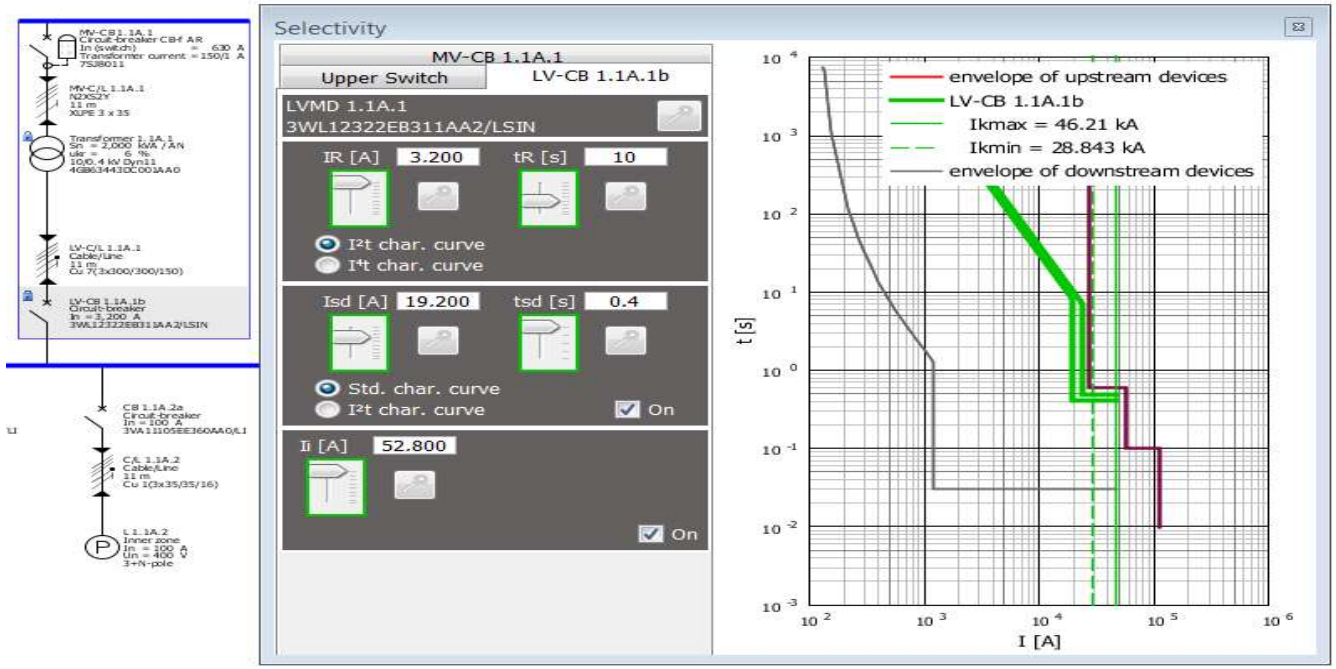
Highlight: automatic selectivity evaluation, optimize selectivity with visualization

- The selectivity view displays the characteristic curves of the elements currently selected in the network diagram in the corresponding circuit.
- Selectivity evaluation is performed on the basis of existing limit values in the overload range < $Ikmin$ and in the short-circuit range > $Ikmin$. The upper tolerance band of the respective switching device is compared to the envelope curve of the lower tolerance band of all upstream switching devices.



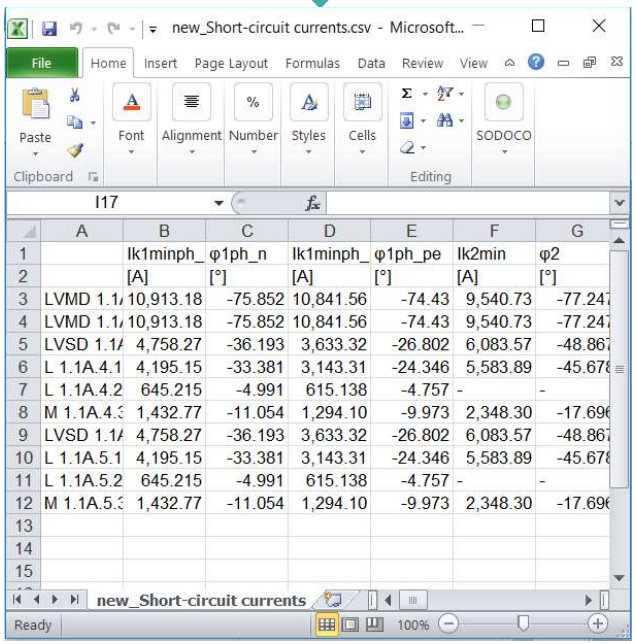
Project output

Options of documentation

Documentation types

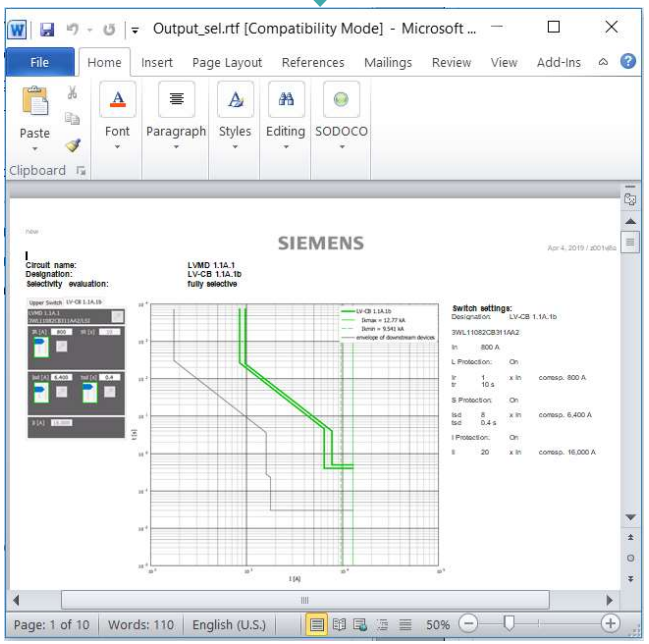
- [x] Project documentation
- [x] Device list, sorted by distribution
- [x] Device settings
- [x] List of busbars
- [x] List of cables
- [x] Short-circuit currents
- [x] Selectivity documentation
- [x] Network diagram (PDF)
- [x] Network diagram (DWG/DXF)
- [x] SIMARIS exchange file (SX)

Short circuit currents



	A	B	C	D	E	F	G
1		Ik1minph_	φ1ph_n	Ik1minph_	φ1ph_pe	Ik2min	φ2
2		[A]	[°]	[A]	[°]	[A]	[°]
3	LVMD 1.1/	10,913.18	-75.852	10,841.56	-74.43	9,540.73	-77.247
4	LVMD 1.1/	10,913.18	-75.852	10,841.56	-74.43	9,540.73	-77.247
5	LVSD 1.1/	4,758.27	-36.193	3,633.32	-26.802	6,083.57	-48.867
6	L 1.1A.4.1	4,195.15	-33.381	3,143.31	-24.346	5,583.89	-45.678
7	L 1.1A.4.2	645.215	-4.991	615.138	-4.757	-	-
8	M 1.1A.4.3	1,432.77	-11.054	1,294.10	-9.973	2,348.30	-17.696
9	LVSD 1.1/	4,758.27	-36.193	3,633.32	-26.802	6,083.57	-48.867
10	L 1.1A.5.1	4,195.15	-33.381	3,143.31	-24.346	5,583.89	-45.678
11	L 1.1A.5.2	645.215	-4.991	615.138	-4.757	-	-
12	M 1.1A.5.3	1,432.77	-11.054	1,294.10	-9.973	2,348.30	-17.696
13							
14							
15							

Selectivity documentation



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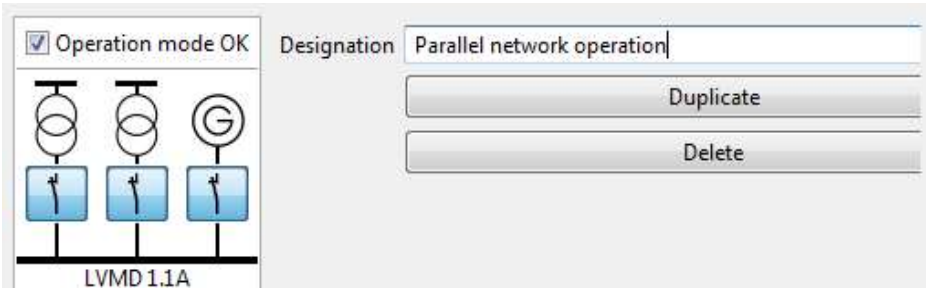
- **Parallel network operation:**
  different power sources (e.g. transformers and generators) can be operated in the same network

- **Isolated networks:**
  Isolated networks can be planned and displayed within one project.



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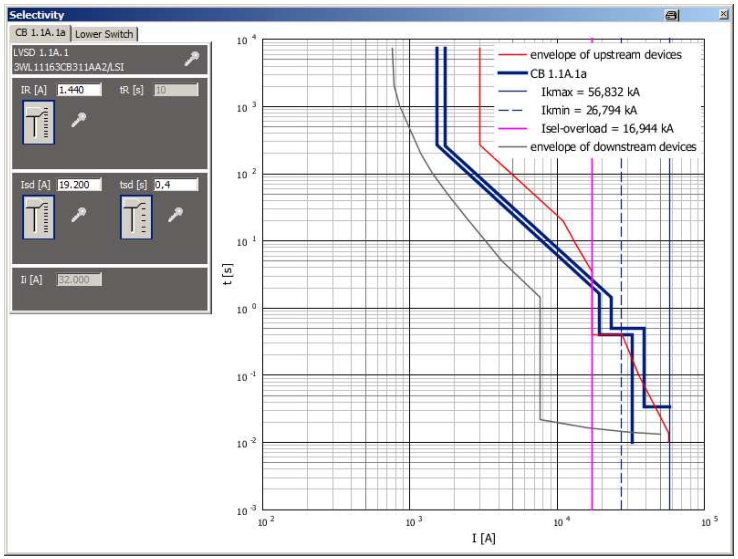
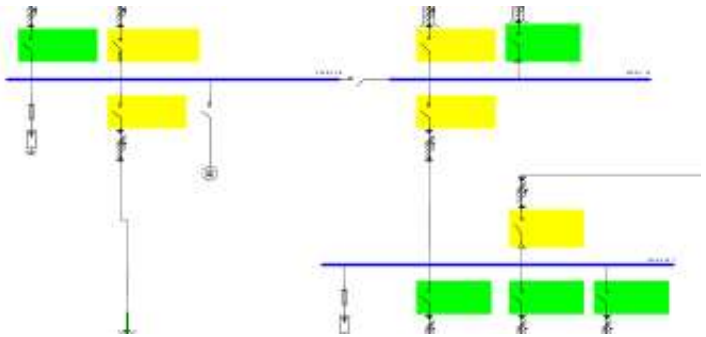
- **Automatic selectivity evaluation:**
  Selectivity limits are shown automatically in addition to the current-time characteristic and the corresponding envelope curves.

With activated selectivity evaluation,
- the fully selective devices are marked green,
- the partially selective devices are marked yellow

in the network diagram.





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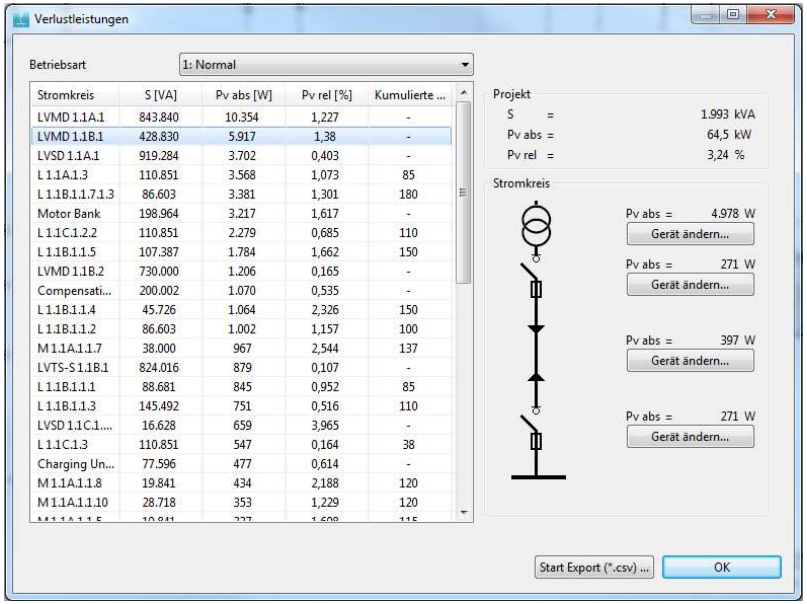
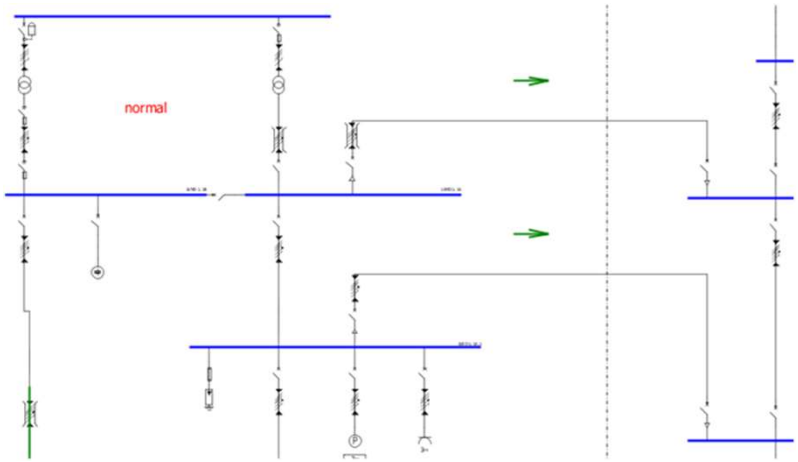
- **Possibility for consideration and optimization of energy efficiency for the planned network**



- **Active changeover in the emergency power supply:**
  Integration of normal (= bidirectional) and unidirectional couplings (tie breakers) into the network diagram – also at the sub-distribution board level.



SIMARIS design comes in two variants

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	Every functionality for dimensioning electric networks	Special electrical engineering features	Online registration
SIMARIS design professional	✓	✓	Nominal charge
SIMARIS design	✓	—	**Free of charge**

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SIMARIS project overview

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Highlights

- Fast overview of the budget and the space requirements inside buildings necessary for a power distribution system that ranges from the medium-voltage switchgear, transformers, low-voltage switchboards and busbar trunking systems to the distribution boards.
- Automatic system selection and placement based on the parameters that were entered
- Convenient output variants for documentation purposes, e.g. graphic views and technical specifications

Project editing procedure in SIMARIS project

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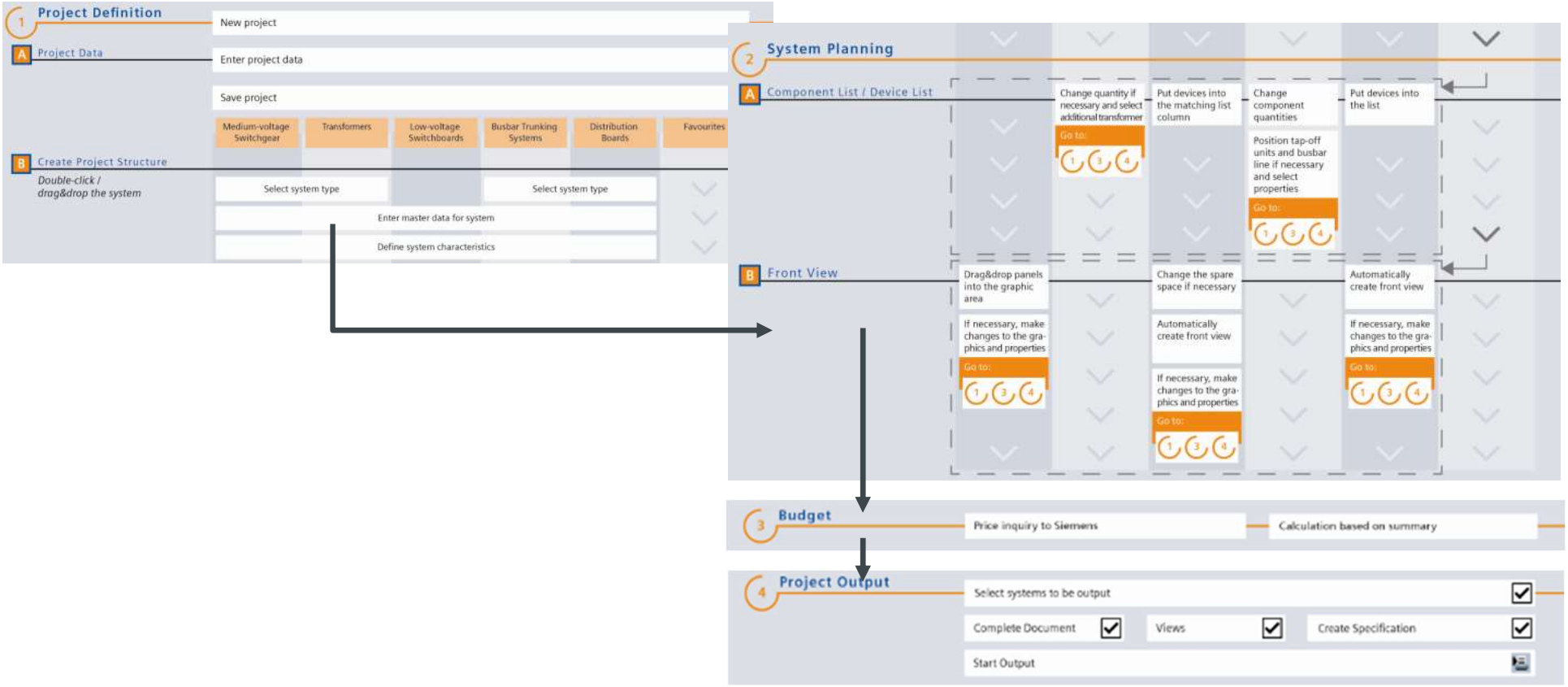

Overview of the project structure

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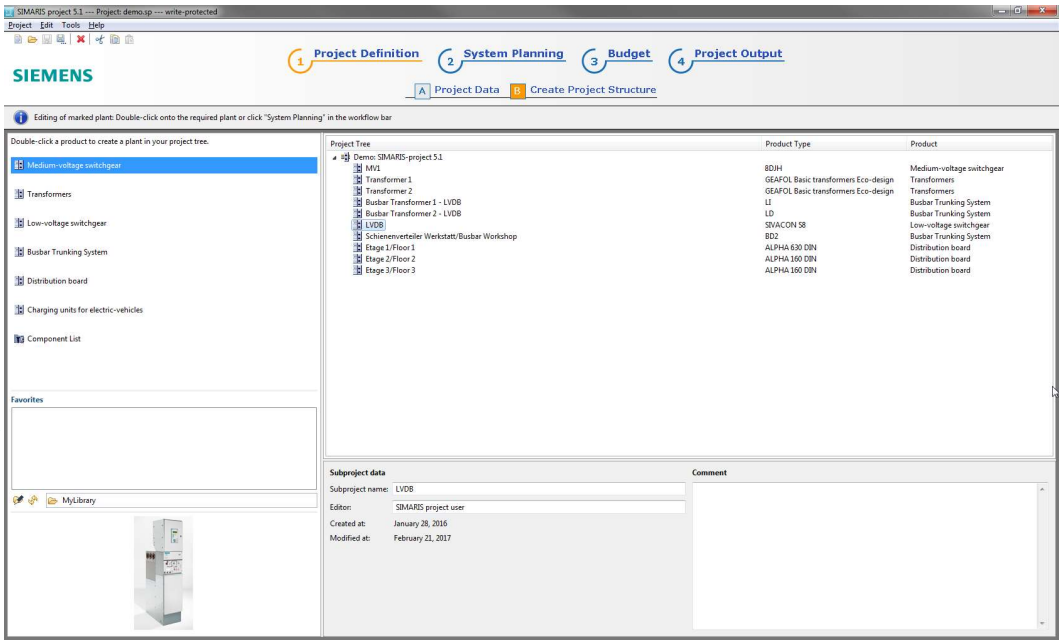
Systems library

Favoriten



Project tree

System data

Overview of the System Planning step → Front view

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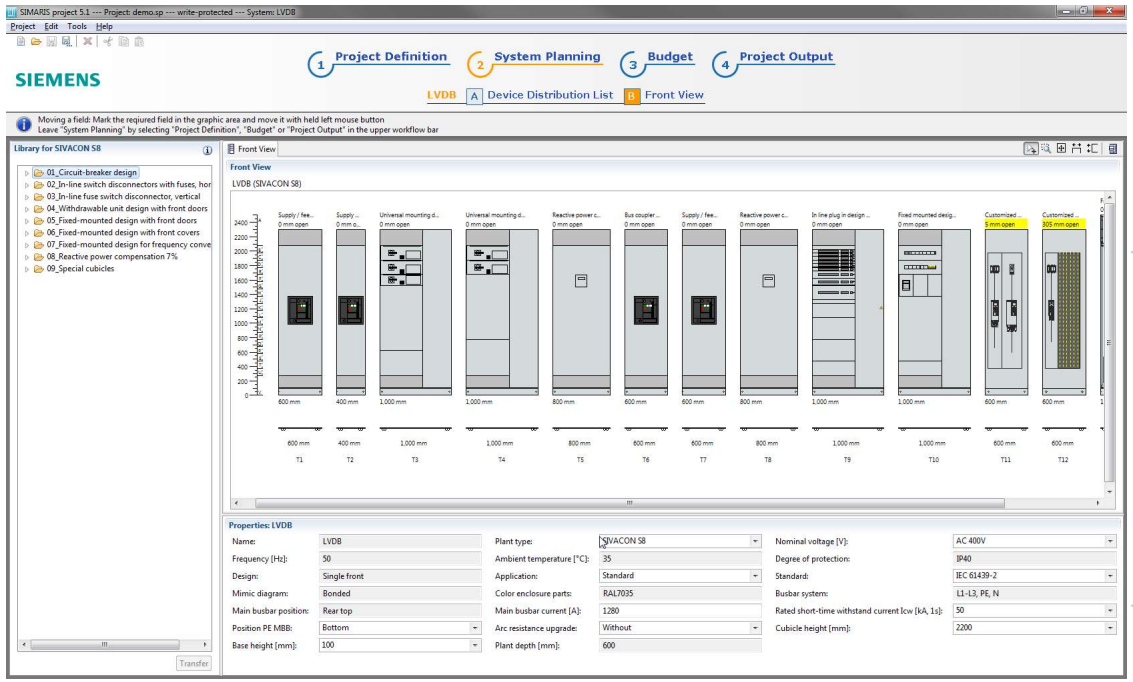
Library



Graphics window

Properties

BIM output with SIMARIS project 5.2

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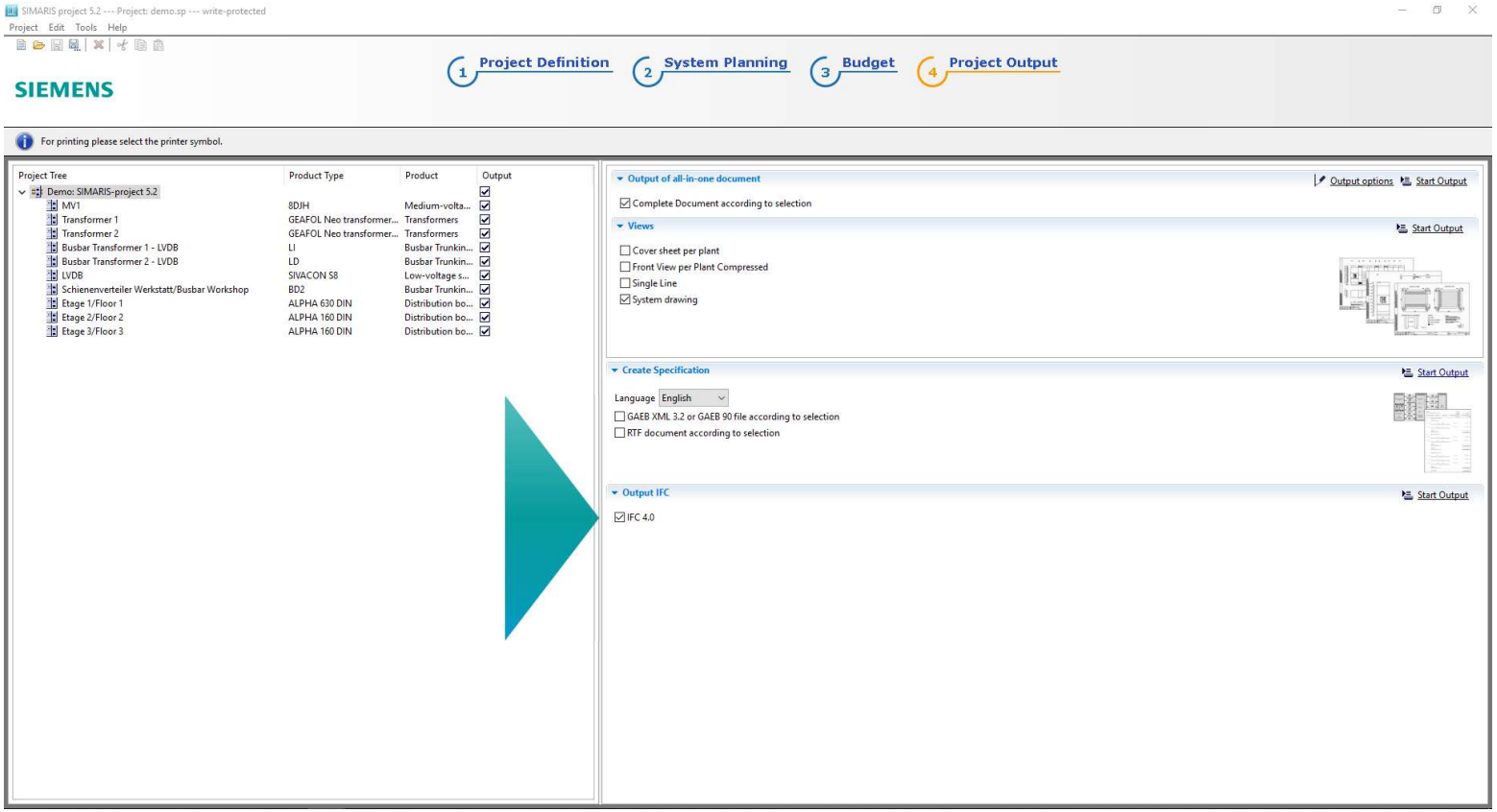

New output: IFC for Building Information Modeling

SIMARIS BIM Plug-In for Autodesk Revit available at www.siemens.com/simarisproject/bim

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SIMARIS curves

- Visualization and evaluation of tripping characteristics including the option to simulate device settings
- Visualization of characteristic cut-off current and let-through energy curves
- Device selection per order number or easy-select feature
- Saving selected devices as favorites
- Saving several characteristic curves plus settings as overall project

Display of characteristic curves in SIMARIS curves 5.2

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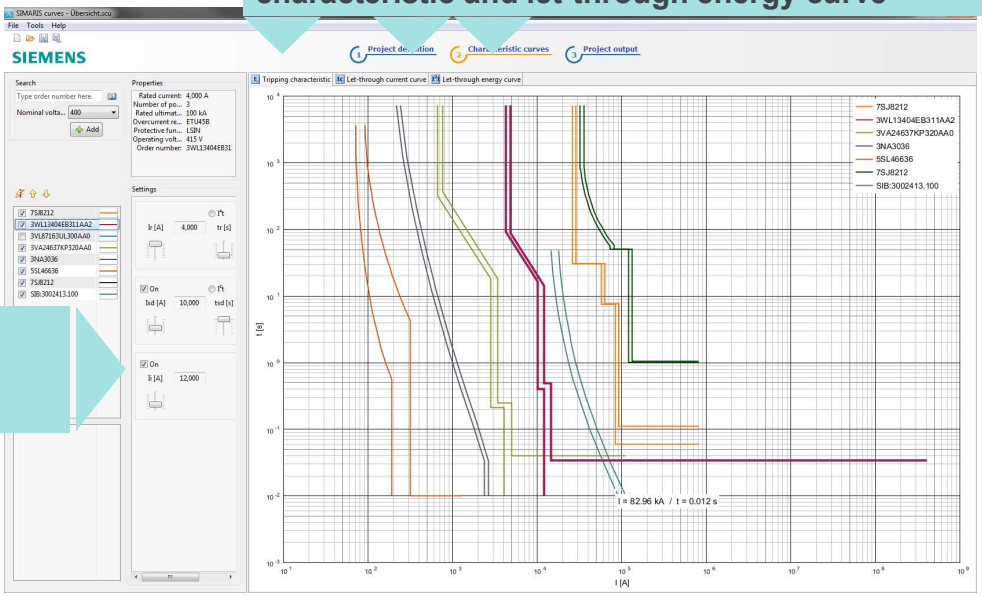
Display of tripping characteristic, cut-off current characteristic and let-through energy curve

Product selection per order number or catalogue

Simulation of device settings



Product selection from the catalogue in SIMARIS curves 5.2

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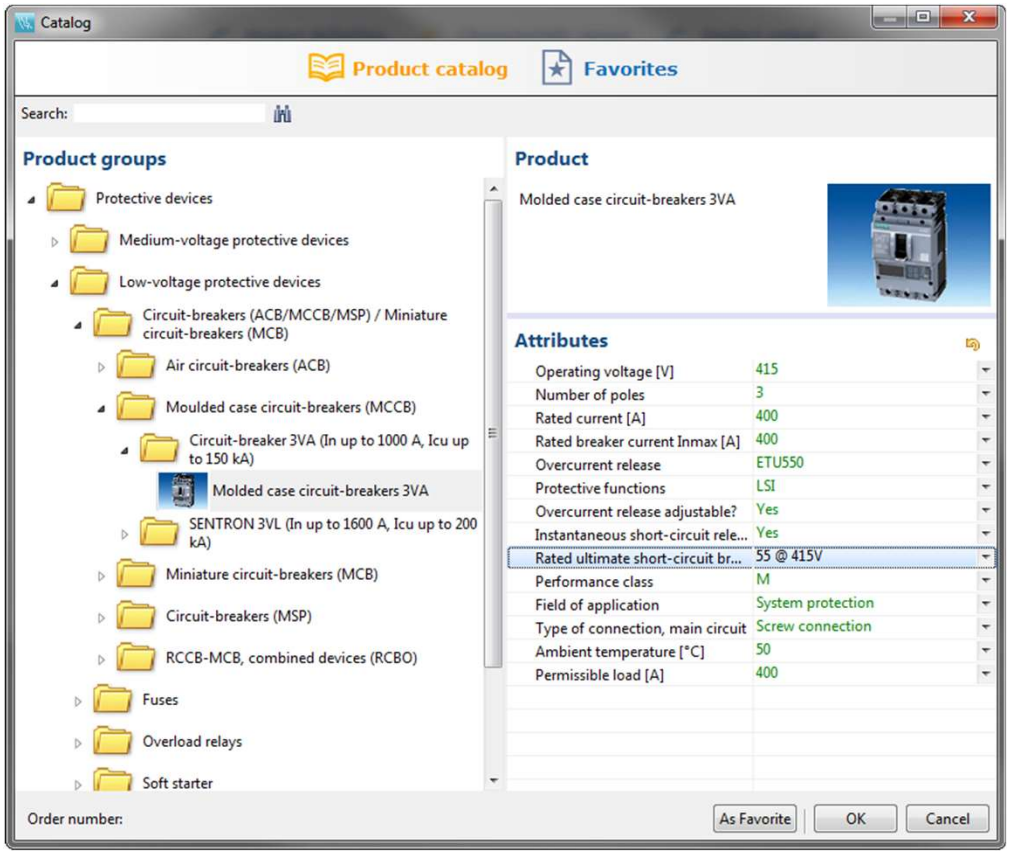

Product specification based on technical data

SIMARIS curves app

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SIMARIS curves

is also available as app for apple and android devices (smartphones and tablet PCs).

This allows for mobile use, e.g. to transmit device settings determined during plant installation.

The link for app download can be found at:
www.siemens.com/simariscurves

Table of content

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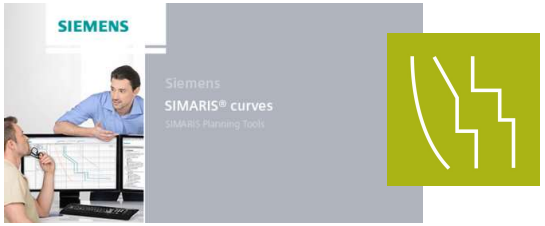
www.siemens.com/simaris/download

Download option for:

All of the 3 tools can be requested per download.

SIMARIS design 9.2

SIMARIS project 5.2



SIMARIS curves 5.2

SIMARIS design and **SIMARIS curves** are automatically updated online

Download / Registration process SIMARIS planning tools

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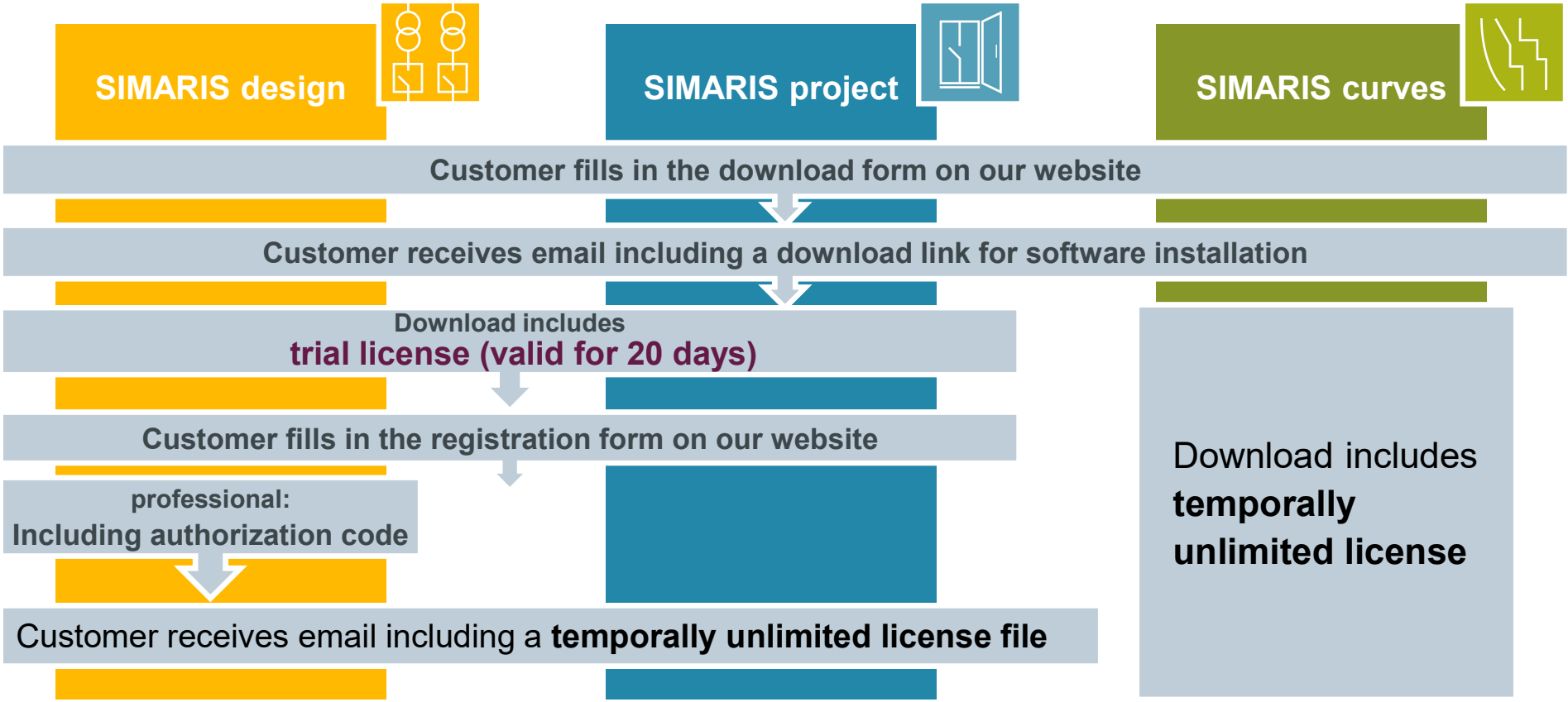
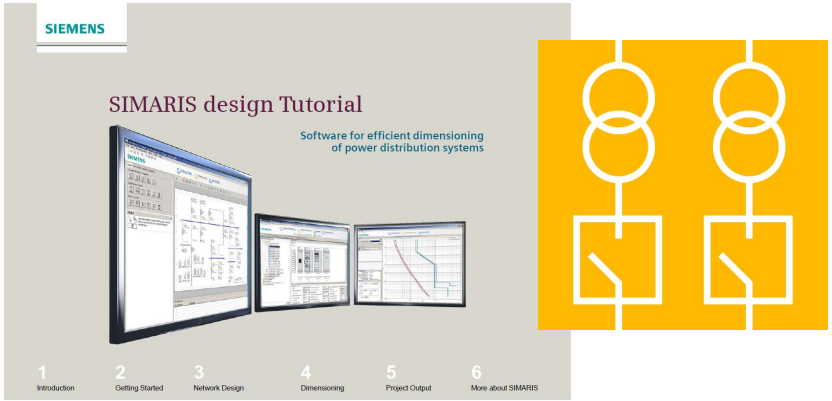
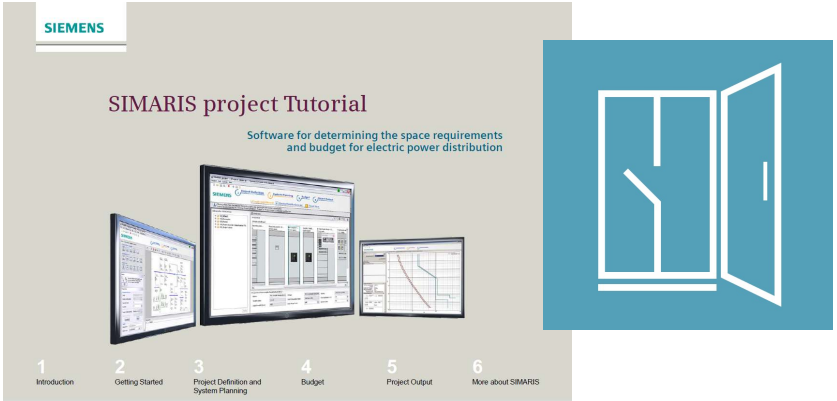


Tutorials

- You can open these tutorials via the Help menu → "Tutorial", or download them from www.siemens.com/simaris/tutorial.
- Tutorial for **SIMARIS design 9** available in English
- Tutorial for **SIMARIS project 5** available in English



SIMARIS design



SIMARIS project

Technical Manual
SIMARIS planning tools

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Contents

- Basic and specific information about network calculation and system planning using the SIMARIS planning tools
- Specific technical information about network calculation using **SIMARIS design**
- Specific technical information about network calculation using **SIMARIS project**
- Available in **English**

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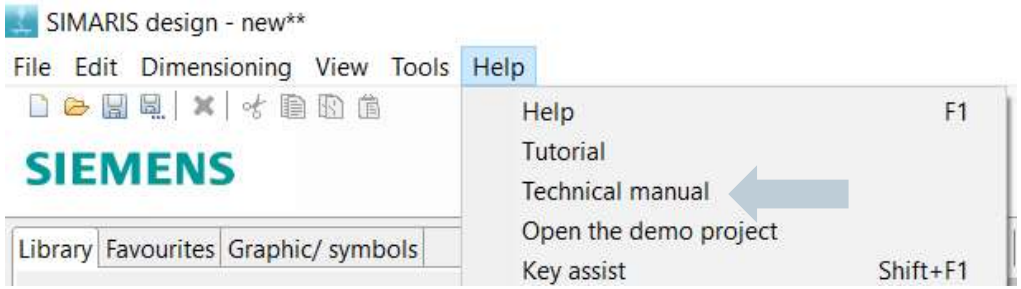

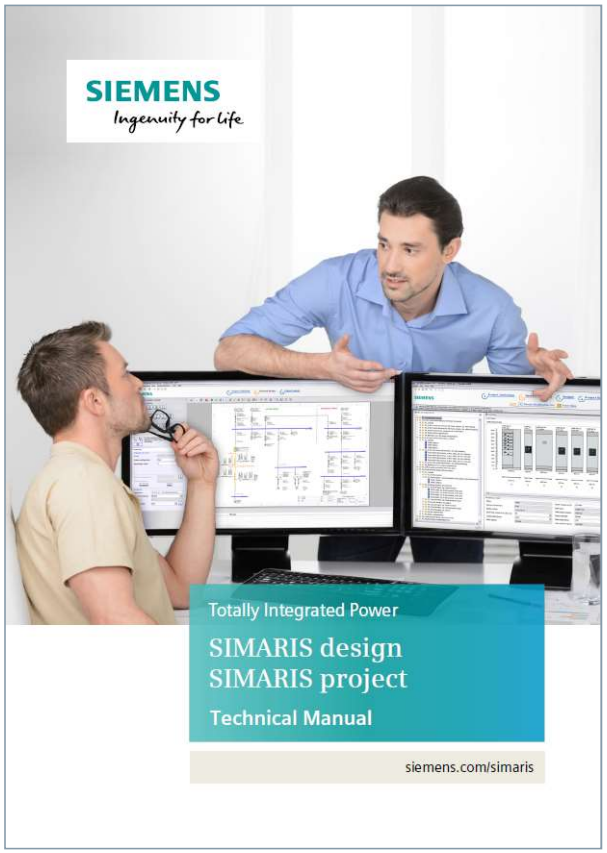

Thanks for your attention

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