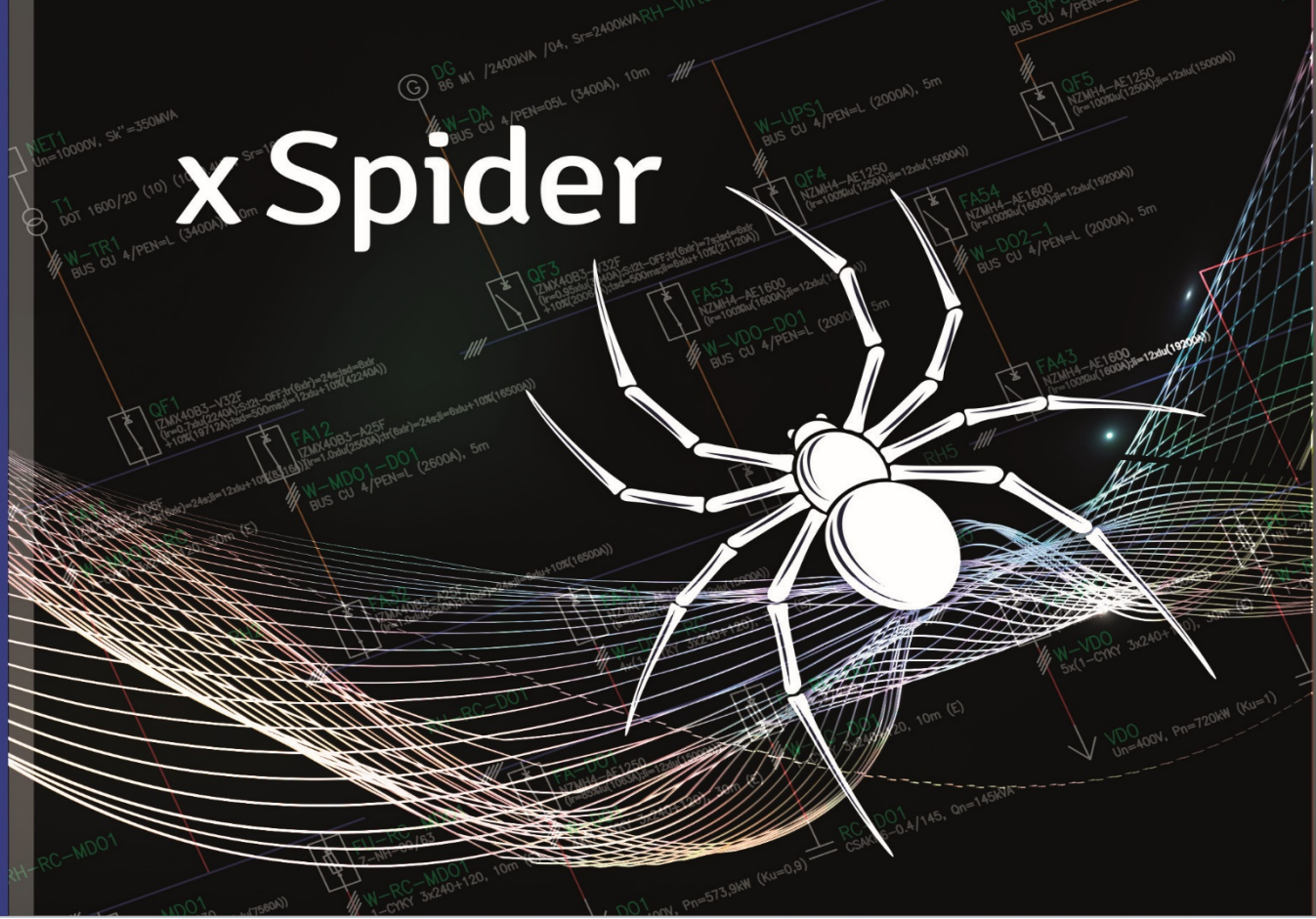
xSpider



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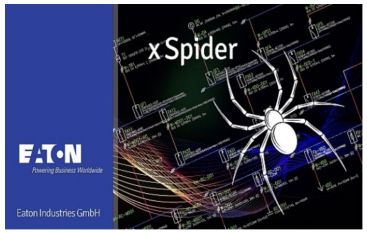
xSpider - General features

- All calculations are based on IEC standards
- Suitable for TN/ IT/ TT network systems up to 1000 V
- Designed for networks supplied from single or multiple power supplies
- Option of simulating various operating states of network by disconnecting individual power sources and loads
- Operation state manager - complex simulation of various operating states, e.g graphically shows circuit breaker ON/OFF status
- Selectivity - tripping characteristics and selectivity tables (tested values)
- Back-up protection (tested values)
- ArcRISK module - evaluation of risks caused by Arc-Flash

How to start with xSpider

How to start with xSpider

- How to obtain xSpider ? www.eaton.com/xspider
- Simple registration of user - use of correct e-mail address
- License number - delivered by server to e-mail address
- How to start with xSpider
  1. Demo drawings - ready for immediate use
  2. Self-learning videos - available on xSpider web pages
  3. Solved exaple - see „User manual“ Part III



Available support materials significantly help with quick use of xSpider functionalities.

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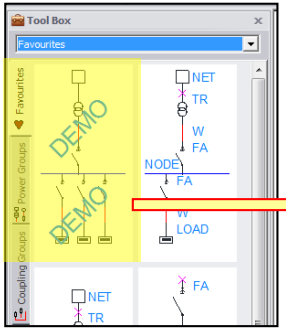
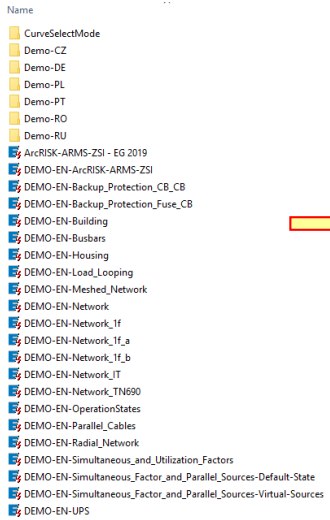
How to start with xSpider

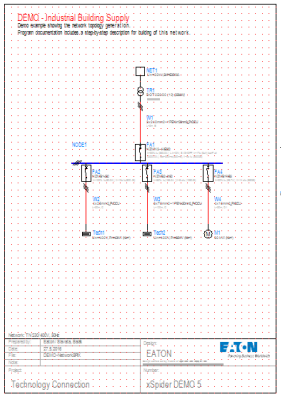
1. Demo drawings

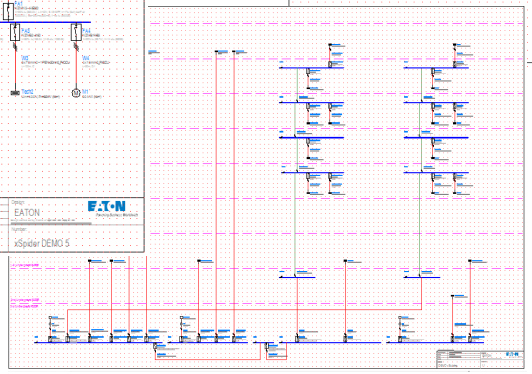
- Typical applications with short description of essential topics
- Easy learning with readymade drawings
- Quick access via Tool box

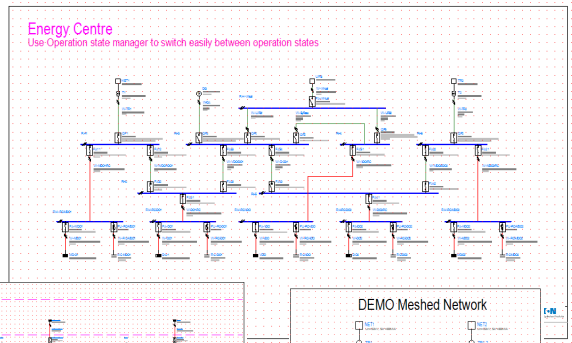


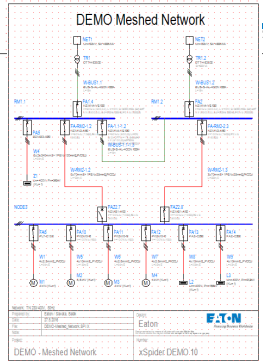
How to open demo example











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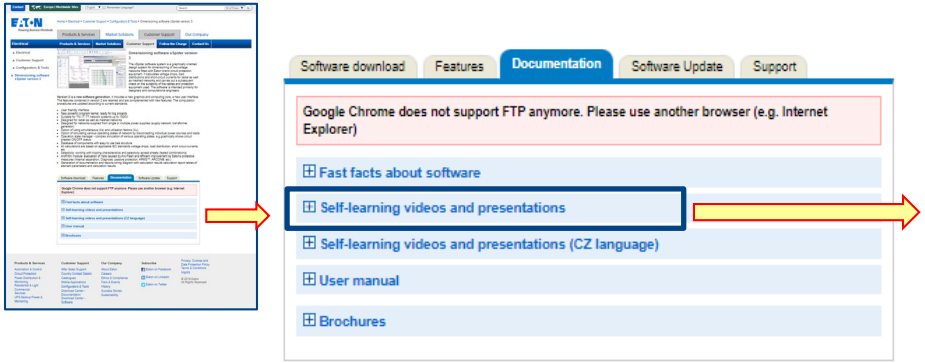
How to start with xSpider

2. Self-learning videos

Available on xSpider web pages

www.eaton.com/xspider



Self-learning videos and presentations

- How to open demo example
- How to check voltage drop
- How to change the paper size
- How to draw wiring diagram
- How to select a symbol and how to edit a symbol's properties
- How to select a device from the database
- How to activate graphic window for zooming
- Automatic dimensioning of cables and protective devices
- How to run a calculation
- How to display a tripping characteristics from the database
- How to display a tripping characteristics from the project
- Selection modes explanation
- xSpider - Generator Load Sharing functionality.
- Export list of devices and import it to other software

ArcRISK (Arc Flash Risk Assessment)

- ArcRISK Part 1 – Introduction
- ArcRISK Part 2 - xSpider ArcRISK module possibilities

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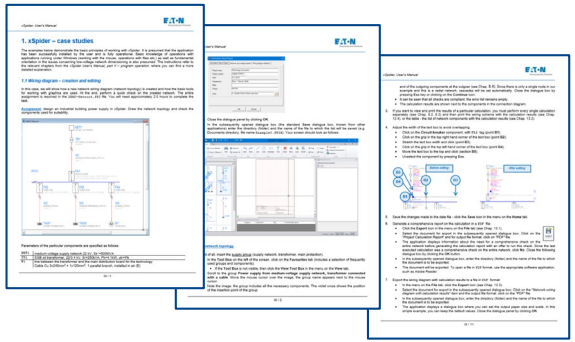
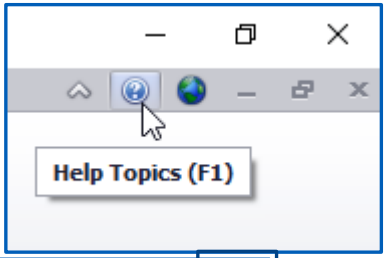
How to start with xSpider

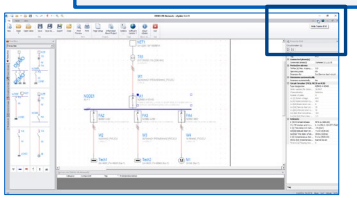
3. Solved examples in User manual

- Available on xSpider web page (pdf format)
- Quick access via icon „Help Topics“ (F1)
- Step by step guide - how to create drawing

„User manual“, Part III, Case studies (12 pages)







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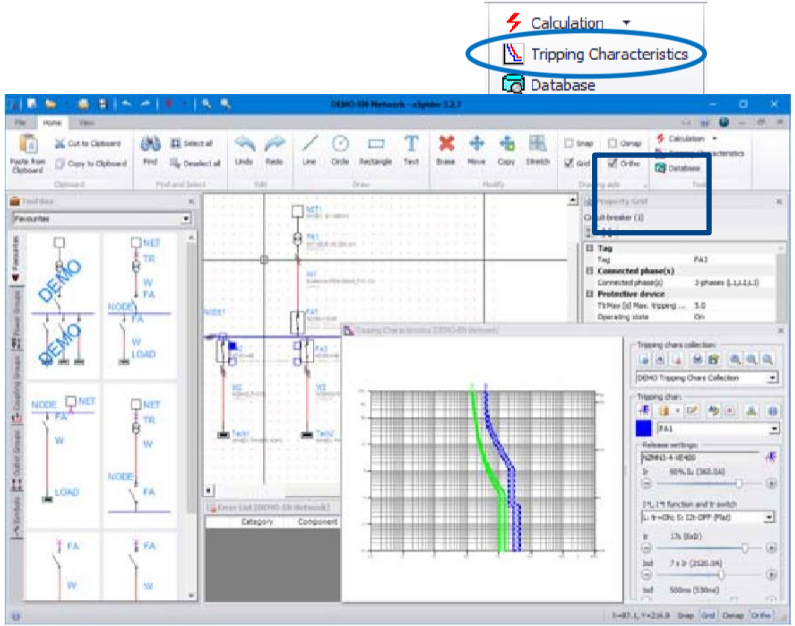
Full mode / Curve select mode

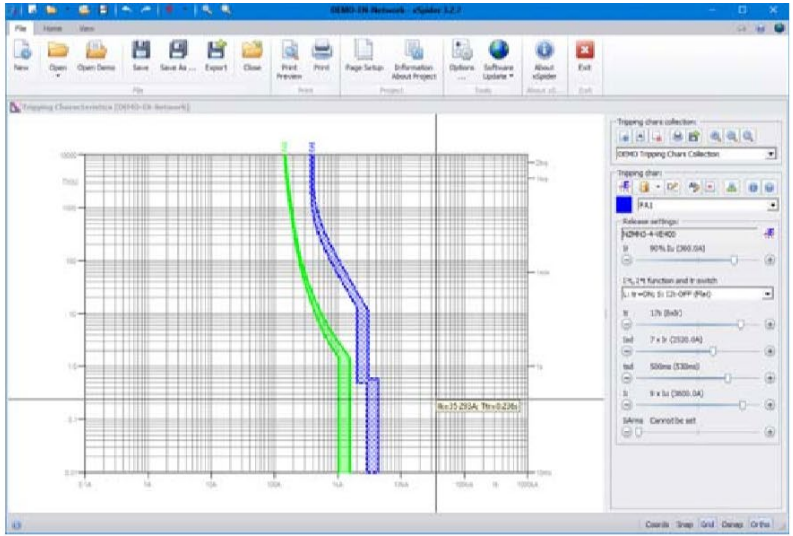
- Full mode – complete functionality of xSpider
- Curve select mode – tripping characteristic module

Full mode/ Curve select mode

Full mode
full functionality of xSpider



Curve select mode
simplified user interface, only functions for working with tripping characteristics



Working with drawings

- Full mode – complete functionality of xSpider

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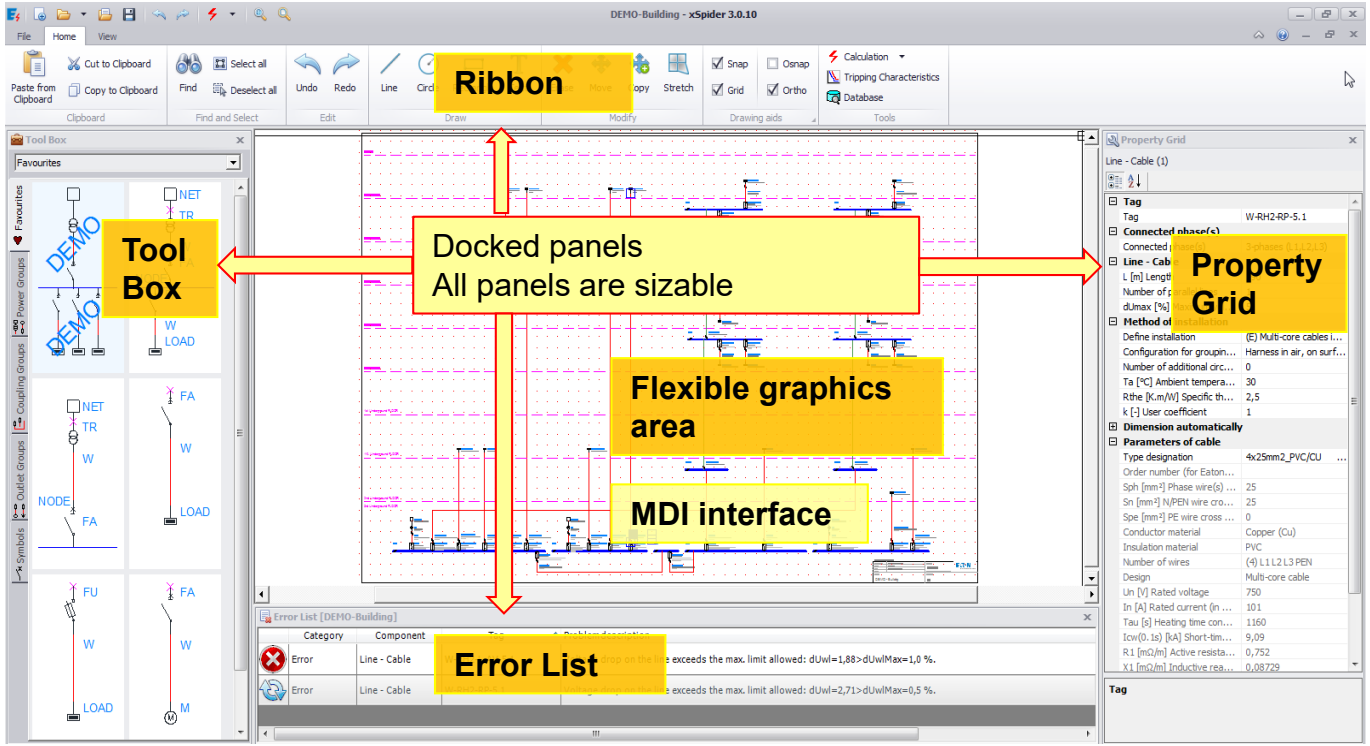
Working with drawings



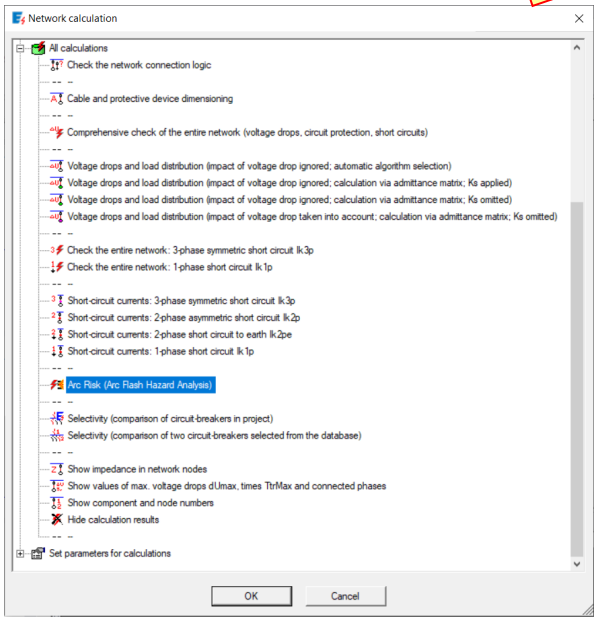
Calculations

- Full mode – complete functionality of xSpider

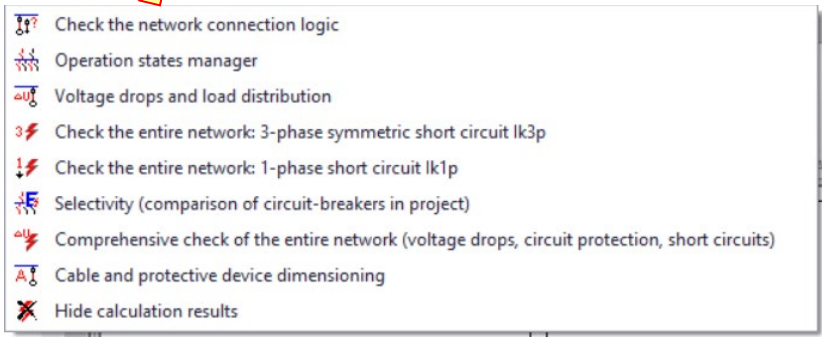
Calculations

Two options:

- **All calculations**



- **Basic calculations**

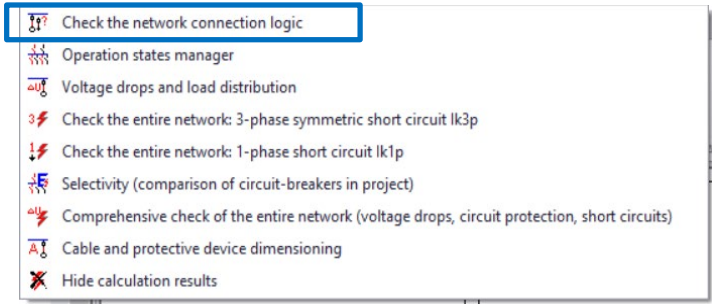


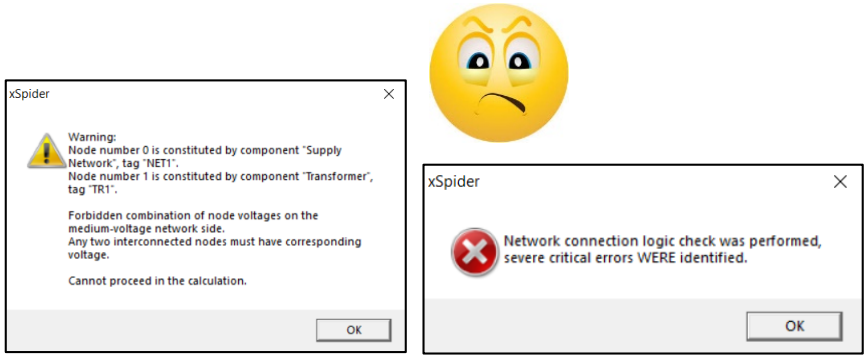
How to run a calculation

Calculations

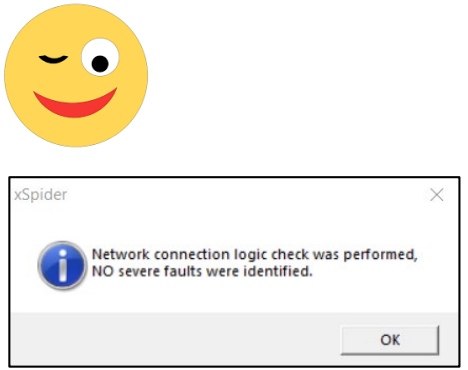
Check the network logic

- Correct logic of wiring diagram is condition for any calculations
- Typical troubles: detected wrong voltage of MV source or not specifieed cable lengths of cables





Corrections of wiring diagram



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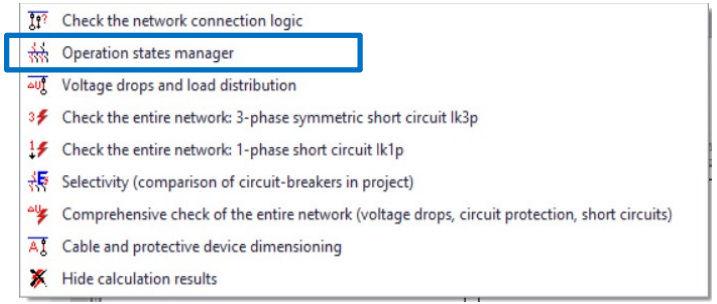
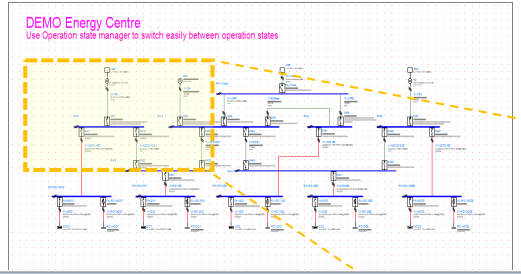
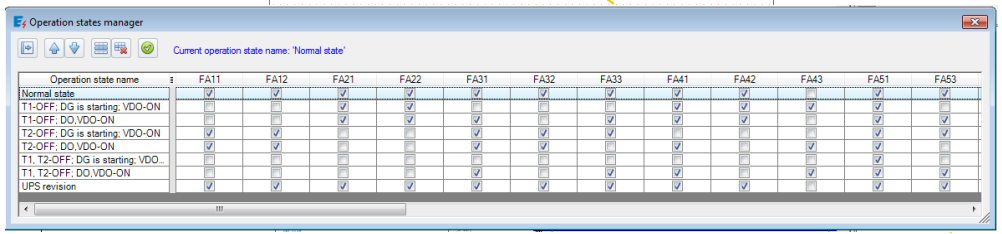
Calculations

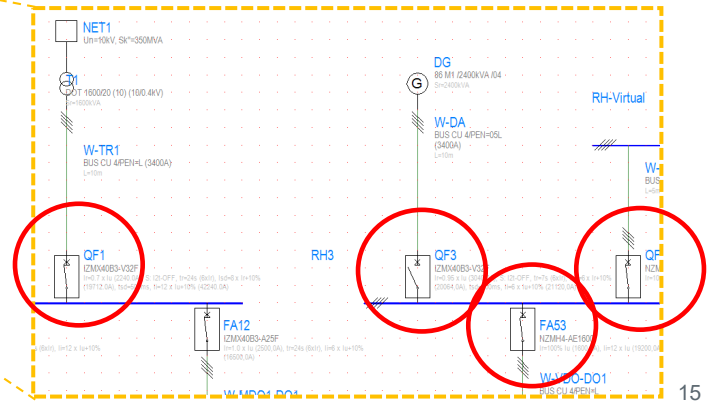
Operation state manager

- Simulation of various operation states of the network
- Disconnecting power sources and loads
- Each switching component has: On / Off
- Each motor has two operating states: Start / Run









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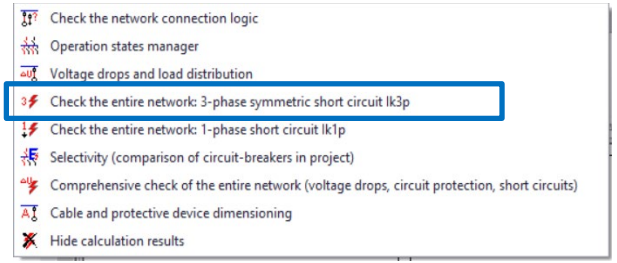
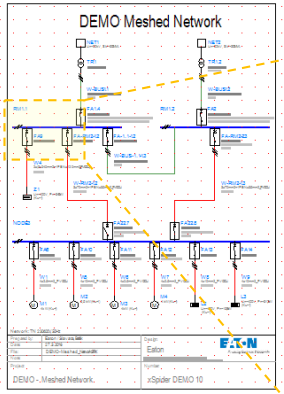
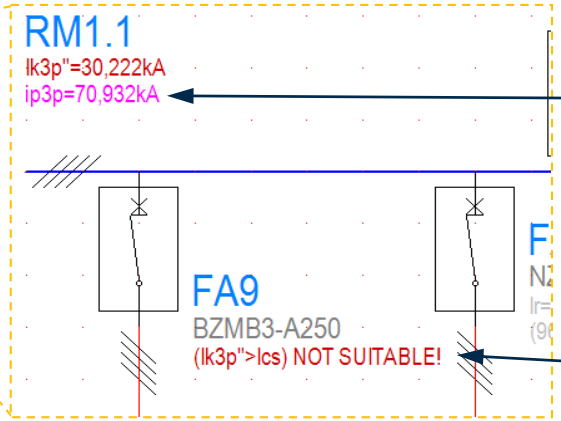
Calculations

Three-phase short circuit current

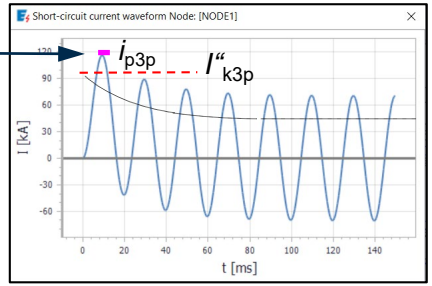
- Maximum short-circuit current (I_{kmax})
- Correct dimensioning of the circuit protection (breaking capacity I_{cu} or I_{cs}) and conductors (I_{cw})
- Check of whole network or fault in selected node

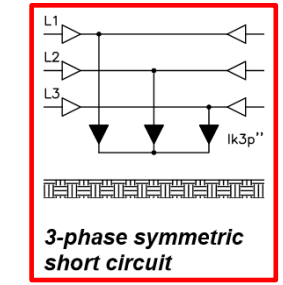






Correct interpretation of displayed results !





Component with error
(breaking capacity of circuit breaker is low)

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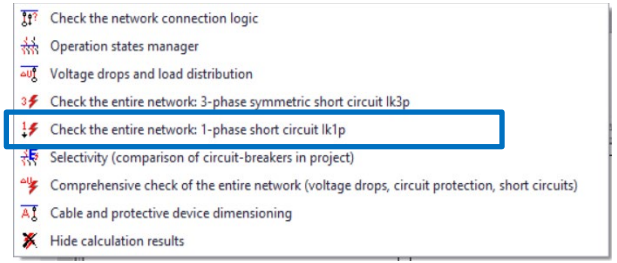
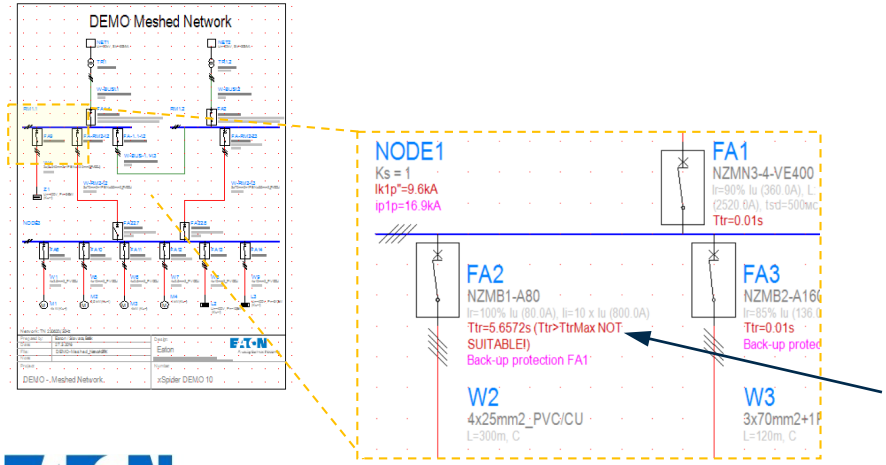
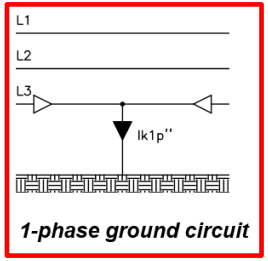
Calculations

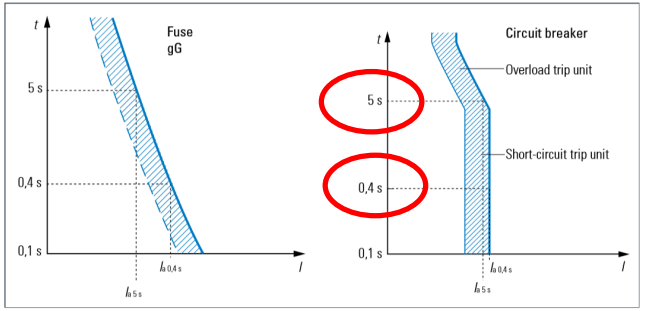
Single-phase short circuit current

- Minimum short-circuit current (I_{kmin}) during earth fault;
- Calculation of disconnection time (T_{tr});
- Check of whole network or fault in one node;







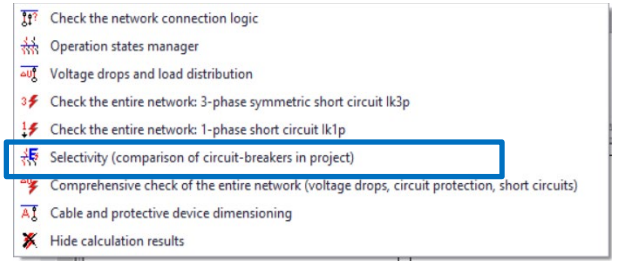


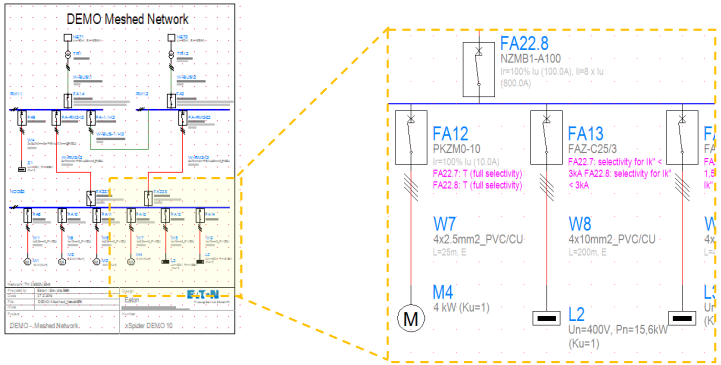
Component with error – tripping time of selected circuit breaker FA2 is too long

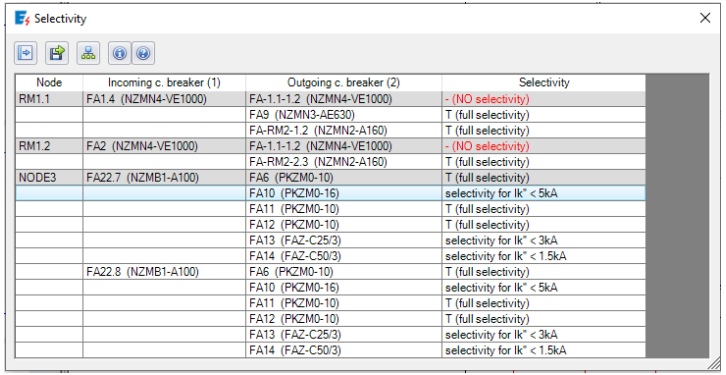
Calculations

Selectivity

- Comparison of circuit breakers in project
- Selectivity assessment according to tested values (see Selectivity Guide)







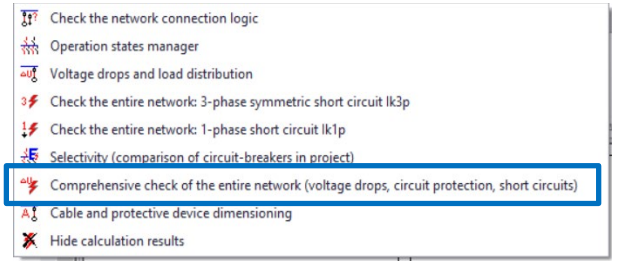
Node	Incoming c. breaker (1)	Outgoing c. breaker (2)	Selectivity
RM1.1	FA1.4 (NZMN4-VE1000)	FA-1.1-1.2 (NZMN4-VE1000)	- (NO selectivity)
		FA9 (NZMN3-AE630)	T (full selectivity)
		FA-RM2-1.2 (NZMN2-A160)	T (full selectivity)
RM1.2	FA2 (NZMN4-VE1000)	FA-1.1-1.2 (NZMN4-VE1000)	- (NO selectivity)
		FA-RM2-2.3 (NZMN2-A160)	T (full selectivity)
NODE3	FA22.7 (NZMB1-A100)	FA6 (PKZM0-10)	T (full selectivity)
		FA10 (PKZM0-16)	selectivity for Ik" < 5kA
		FA11 (PKZM0-10)	T (full selectivity)
		FA12 (PKZM0-10)	T (full selectivity)
		FA13 (FAZ-C25/3)	selectivity for Ik" < 3kA
		FA14 (FAZ-C50/3)	selectivity for Ik" < 1.5kA
	FA22.8 (NZMB1-A100)	FA6 (PKZM0-10)	T (full selectivity)
		FA10 (PKZM0-16)	selectivity for Ik" < 5kA
		FA11 (PKZM0-10)	T (full selectivity)
		FA12 (PKZM0-10)	T (full selectivity)
		FA13 (FAZ-C25/3)	selectivity for Ik" < 3kA
		FA14 (FAZ-C50/3)	selectivity for Ik" < 1.5kA

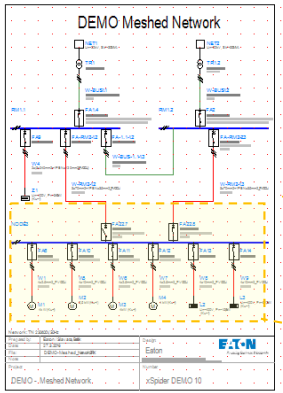
Comprehensive selectivity evaluation including tripping characteristics is available in the „Tripping characteristics“ module.

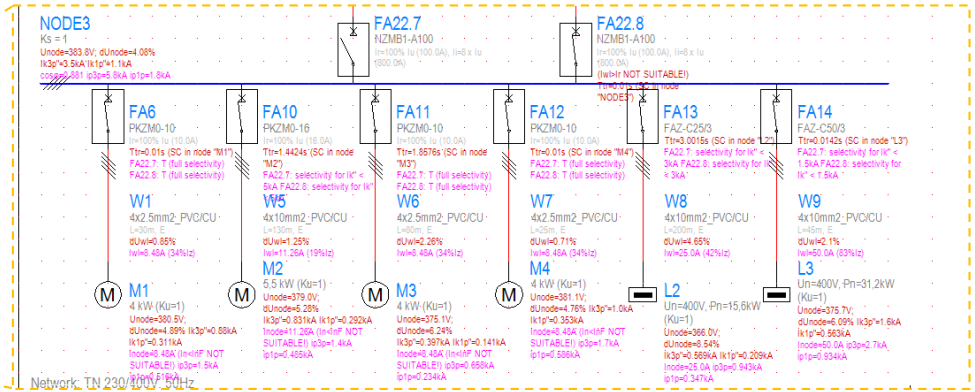
Calculations

Comprehensive check of the network

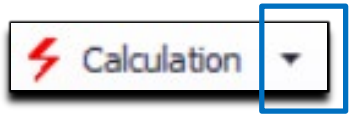
- All available calculation results are displayed (voltage drop, circuit protection, short circuits);
- Final calculatuin mode – suitable after all individual calculations were done well;



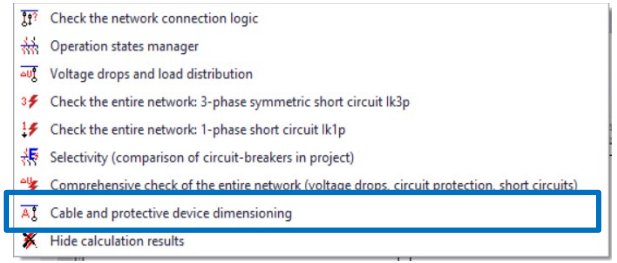




Calculations



Cable and protective devices dimensioning



<u>Two options for parameter selection</u>

Control mode (Manual Dimensioning)

- Recommended way of work for bigger projects;
- Parameters of all elements are set by the user

Design mode (Automatic Dimensioning)

- Parameters will be automatically determined;
- Suitable mode for simple projects
- Final manual optimization can be done always by use of „Control mode“ accordingly;

How to draw wiring diagram

Automatic dimensioning of cables and protective devices

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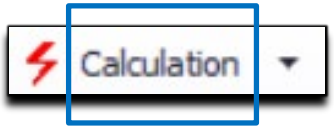
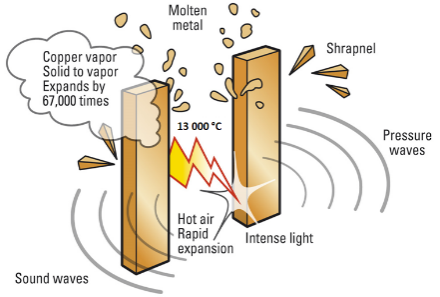
Calculations

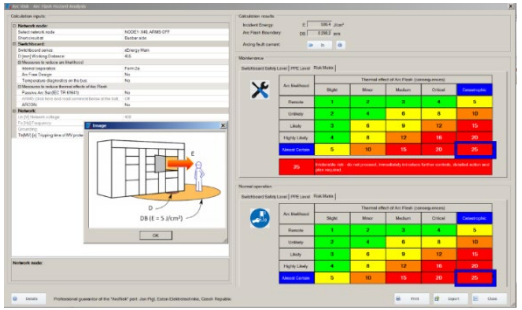


ArcRISK module

Evaluation of Arc Flash Hazard Analysis

- Calculation of incident energy
- Hazard analysis according to IEEE 1584™ (see also EN 50110-1,-2)
- Safety improvements with Eaton‘s solutions (Diagnose, ARMS™, ARCON)
- Unique feature of xSpider !!
- Access password on request
- Application training on request





- ArcRISK Part 1 – Introduction
- ArcRISK Part 2 - xSpider ArcRISK module possibilities

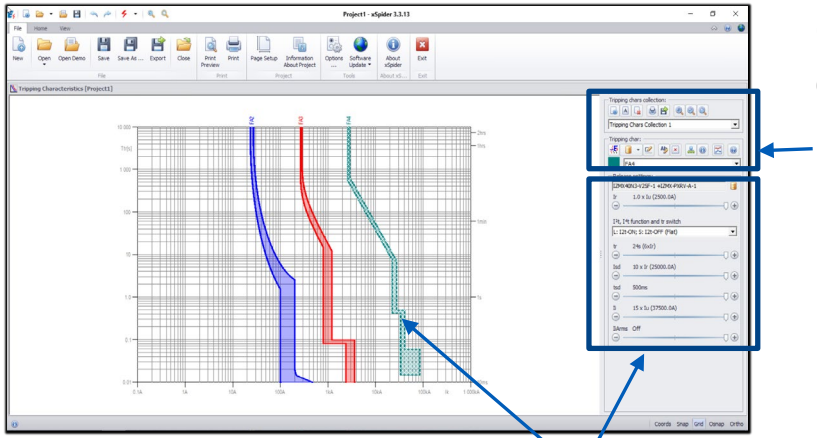
Tripping characteristics module

- Full mode
- Curve select mode

Tripping characteristrics module

Ribbons

Selected icons for quick access to mostly used functionalities



Tripping characteristics features

One project may include multiple collections of characteristics.

Parameter settings of displayed device

How to display a tripping characteristics from the database
How to display a tripping characteristics from the project

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Tripping characteristics module

Tripping characteristics features

Add Tripping characteristic from Project (Full mode only)

Add tripping characteristic from Database

Help

Current limiting characteristics

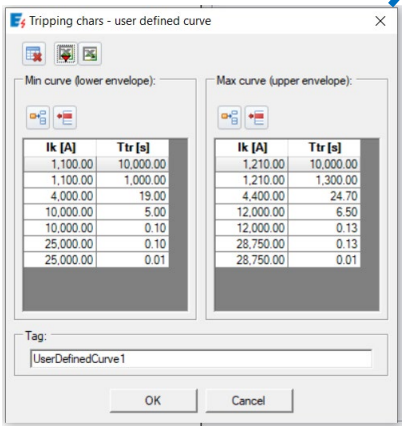
Information about selectivity

Selectivity and back-up

Delete tripping chars from collection

Rename tripping chars in collection

User defined curves



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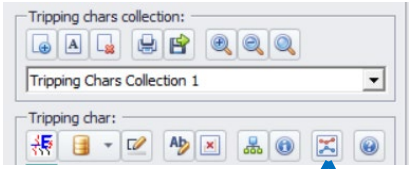
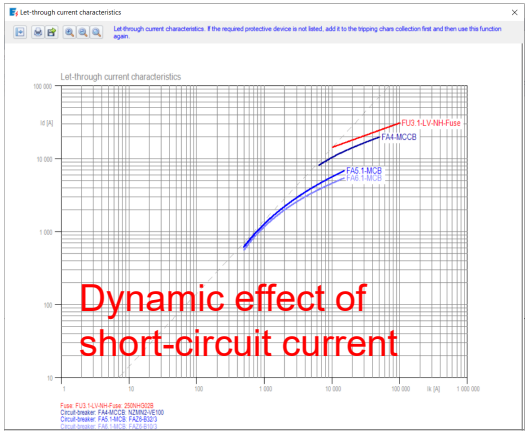
Tripping characteristics module

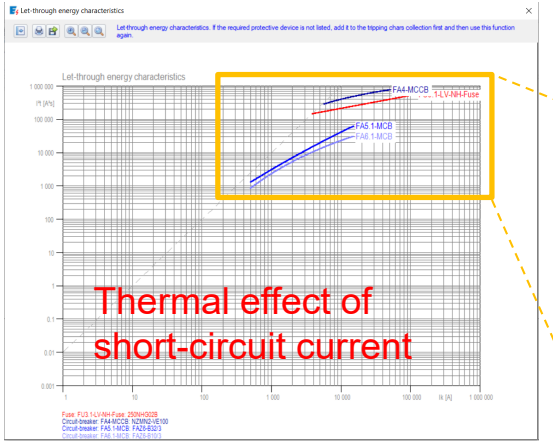
Current limiting characteristics



Let-through current (cut-off) characteristics

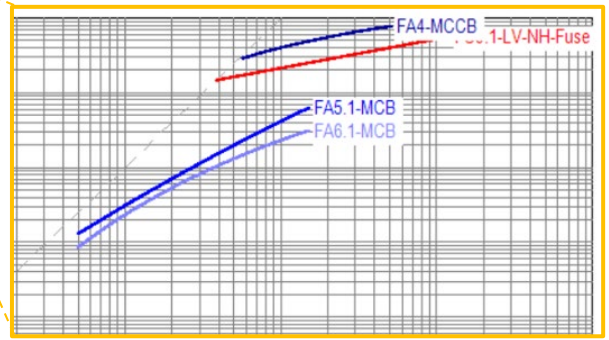


Let-through energy characteristics



Current limiting devices:

- MCBs
- RCBOs
- Fuses
- Motor starters (PKZ..)
- Current limiter (CL-PKZ)
- MCCBs up to 630 A



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