Help

ABB SACE – A Division of ABB S.p.A., MK-TO, 2011

# DOC
# Electrical Installation Calculation and Dimensioning

# Contents

# DOC
# Introduction

# Aim of the application



- DOC is the software for Electrical Installations Calculation and Dimensioning
  - Draw single-line diagrams
  - Perform electrical calculation according to the Standards
  - Choose the correct switching and protecting devices (MV and lv devices)
  - Set the trip units and check for discrimination
  - Prepare a complete project documentation

# Target user



- DOC is complete and precise, but smart and flexible and can be used from everyone interested in calculating electrical installation or part of them
  - Consultants
  - Electrical Engineers
  - Panel builders
  - Installers
  - ABB Technical Support

# Product managed



- DOC allows and the selection of a wide range of ABB Products
  - Medium Voltage products
  - Low Voltage products
  - Motors
  - Transformers

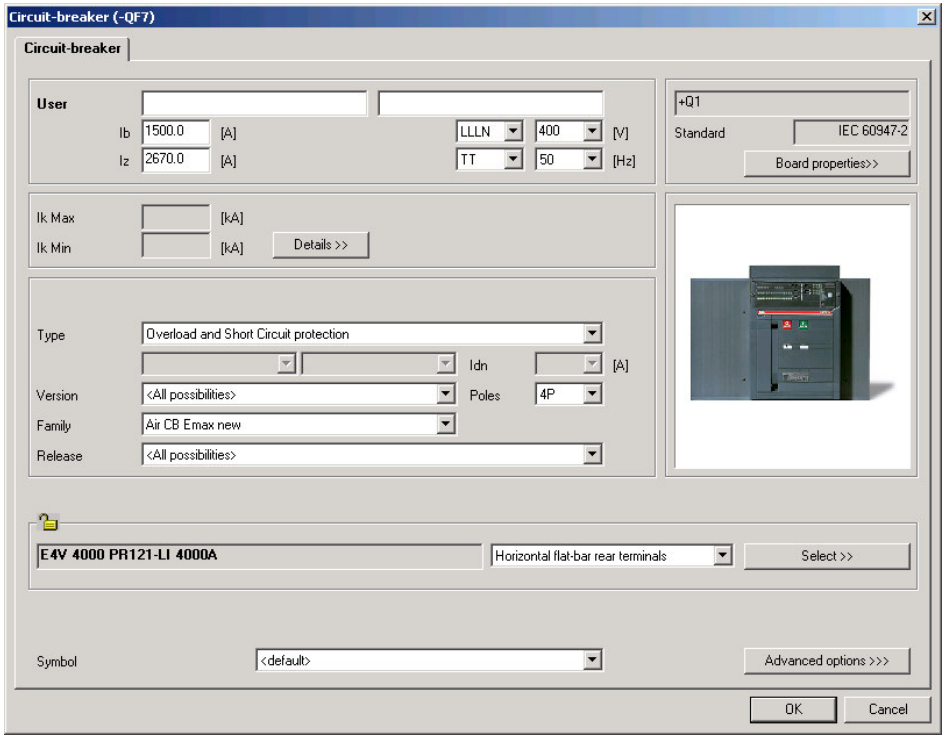
# Product managed

**Introduction**
Aim of the application
Target users
*Product managed*

**How it works**
Features

**Support Tools**
ASD
Assistance
How to obtain the software

- Low Voltage Products
  - Air Circuit- Breakers
    - New Emax
    - Emax



# Product managed

DOC

**Introduction**
Aim of the application
Target users
*Product managed*

**How it works**
Features

**Support Tools**
ASD
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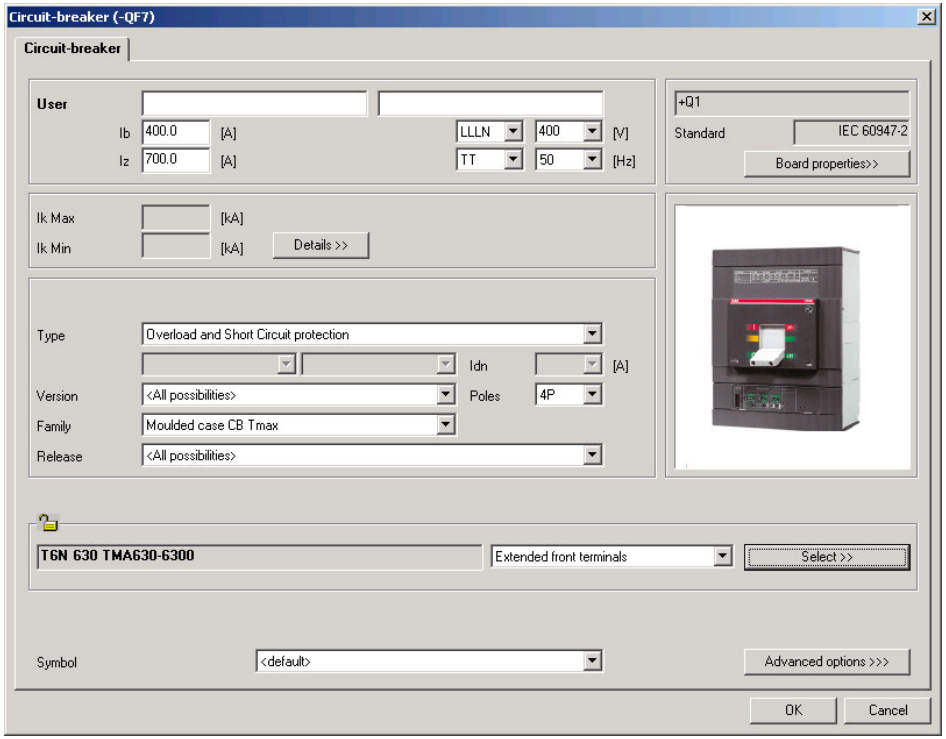
How to obtain the software

- Low Voltage Products
  - Molded Case Circuit Breakers
    - Tmax
    - Isomax
    - Tmax XT NEW!



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# Product managed

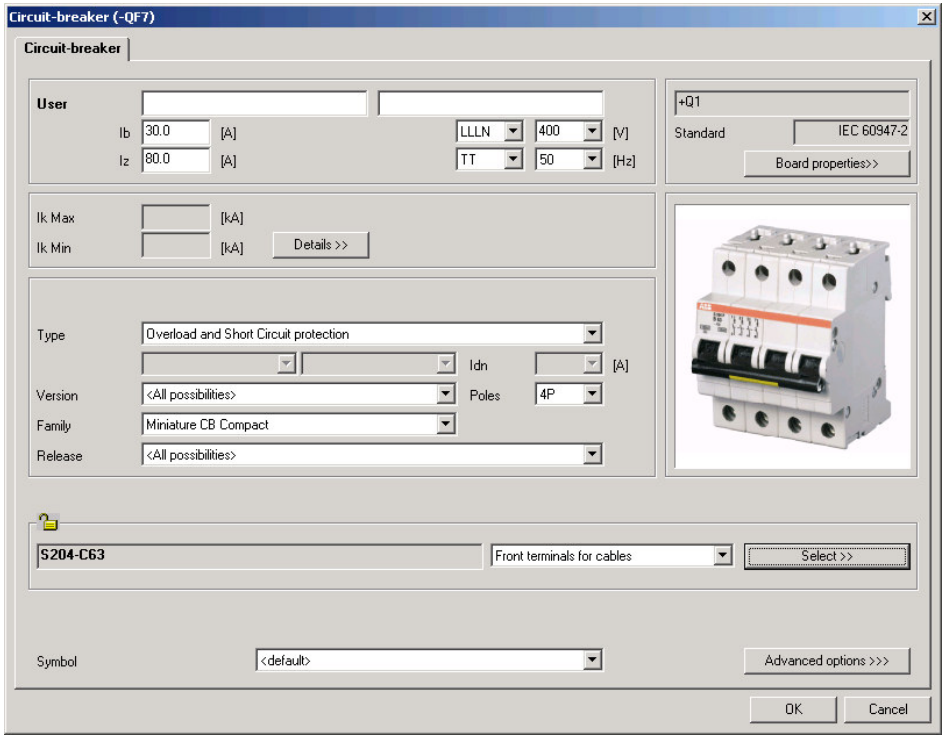
DOC

**Introduction**
Aim of the application
Target users
*Product managed*

**How it works**
Features

**Support Tools**
ASD
Assistance
How to obtain the software

- Low Voltage Products
  - Miniature Circuit Breakers
    - System PRO M
    - System PRO M Compact
    - S800
    - Smissline







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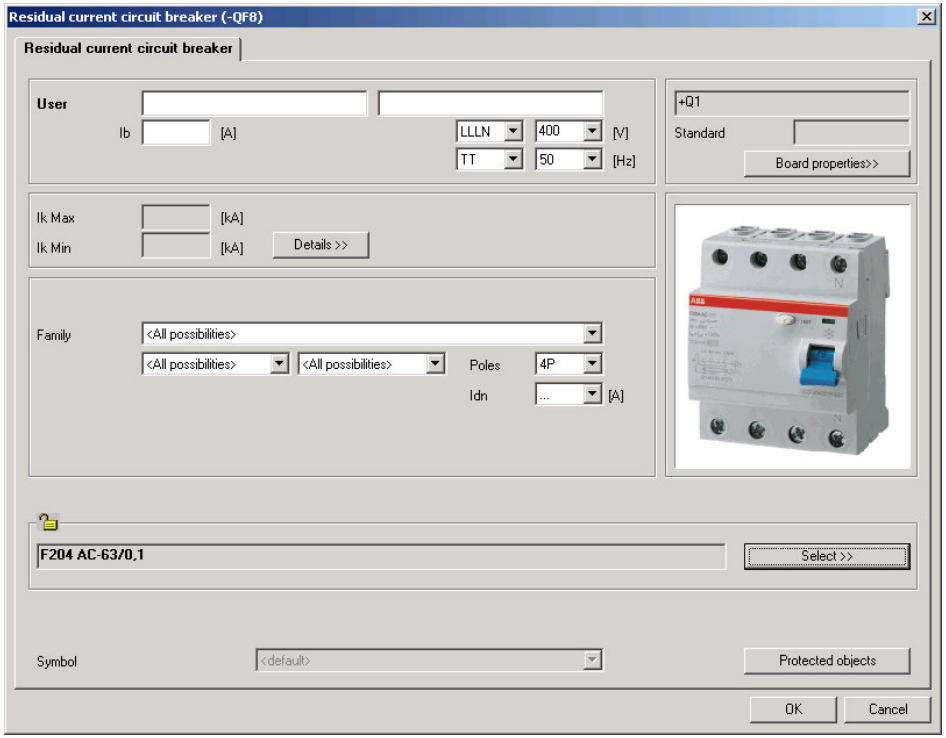
# Product managed

- Low Voltage Products
  - RCCBs
    - System PRO M
    - System PRO M Compact

**Introduction**
Aim of the application
Target users
*Product managed*

**How it works**
Features

**Support Tools**
ASD
Assistance
How to obtain the software



# Product managed

- Low Voltage Products
  - Fuses
    - OFAX
    - OFASB

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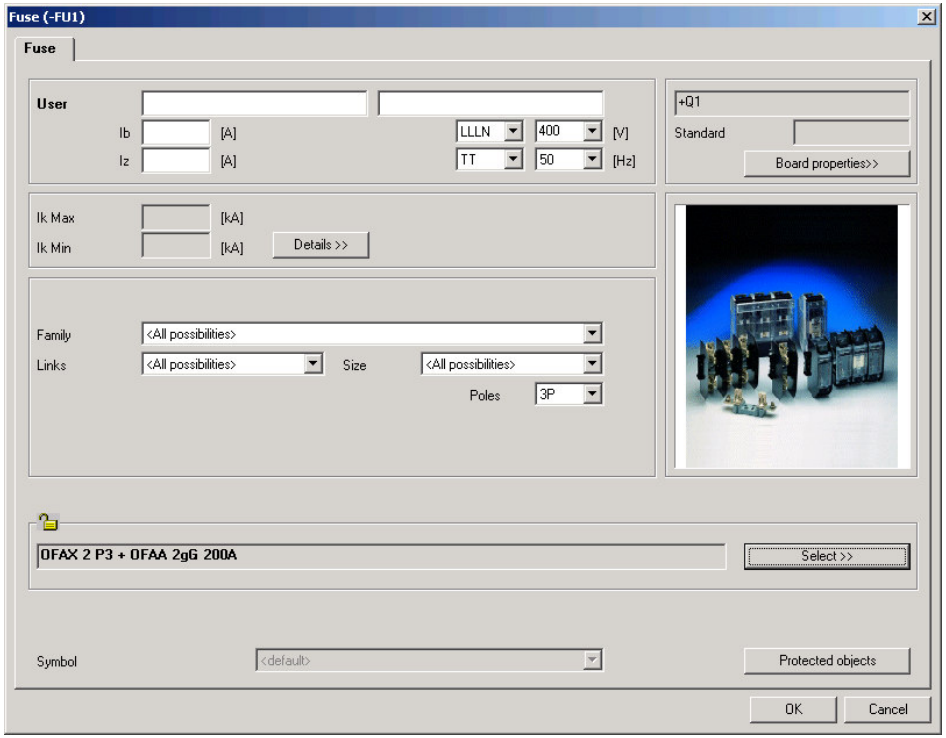
Aim of the application
Target users
*Product managed*

**How it works**
Features

**Support Tools**
ASD
Assistance
How to obtain the software



# Product managed

**Introduction**
Aim of the application
Target users
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Features

**Support Tools**
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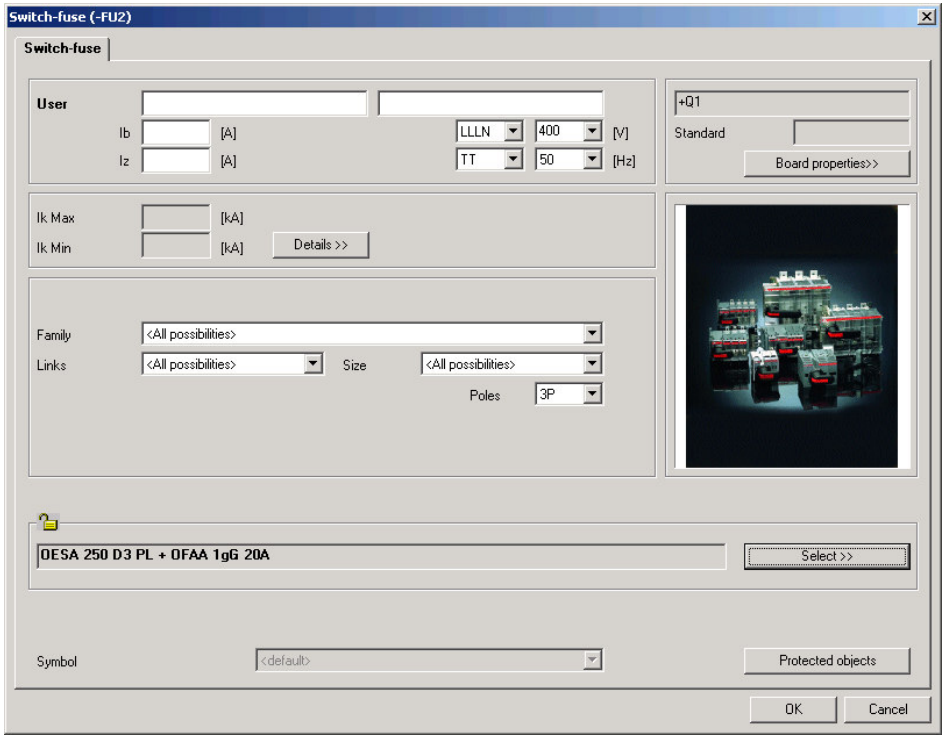
How to obtain the software

- Low Voltage Products
  - Switch Fuses
    - E930
    - OESA
    - OS



# Product managed

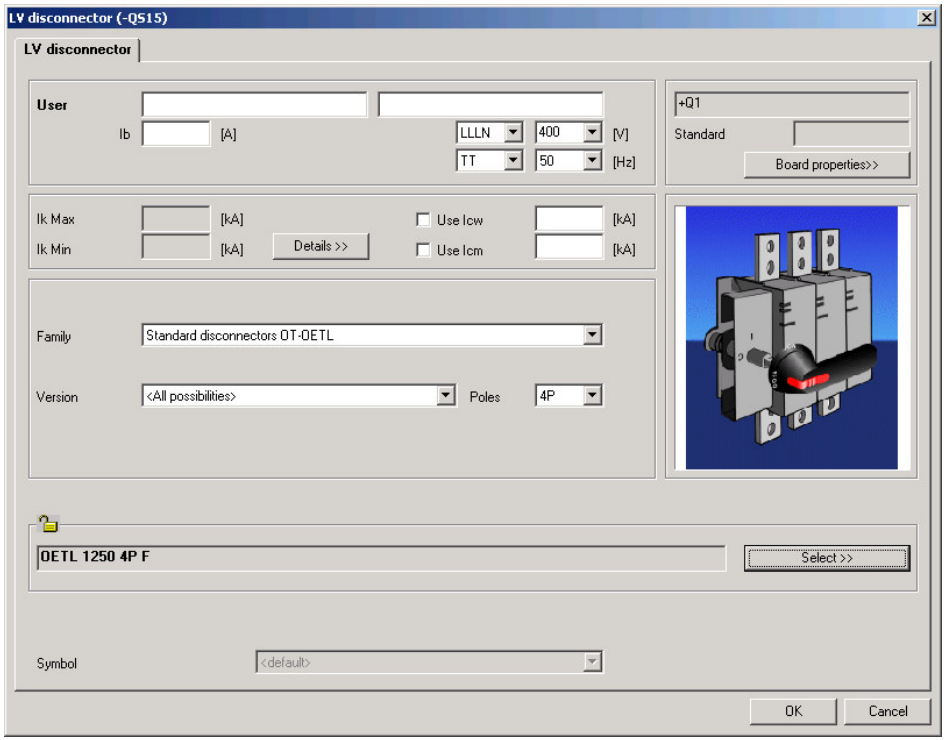
DOC

**Introduction**
Aim of the application
Target users
*Product managed*

**How it works**
Features

**Support Tools**
ASD
Assistance
How to obtain the software

- Low Voltage Products
  - Disconnectors
    - New Emax MS
    - Emax MS
    - Tmax D
    - Isomax D
    - OT
    - OETL
    - E200







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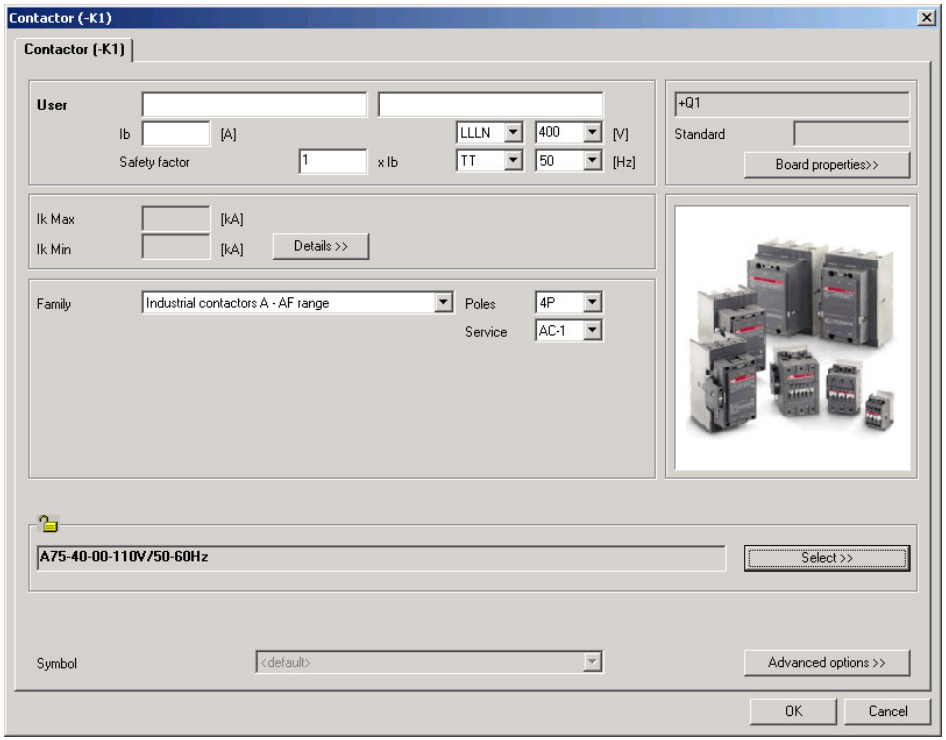
# Product managed

**Introduction**
Aim of the application
Target users
*Product managed*

**How it works**
Features

**Support Tools**
ASD
Assistance
How to obtain the software

- Low Voltage Products
  - Contactors
    - A
    - AF
    - EN
    - ESB
    - E250
    - E259
    - E260



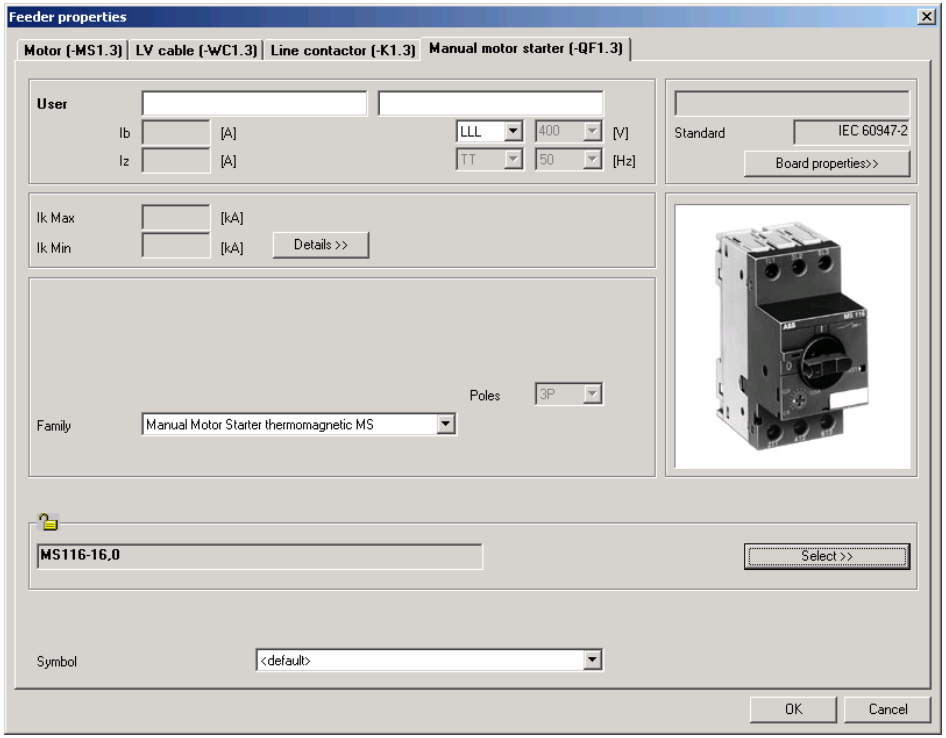
# Product managed

**Introduction**
Aim of the application
Target users
*Product managed*

**How it works**
Features

**Support Tools**
ASD
Assistance
How to obtain the software

- Low Voltage Products
  - Manual Motor Starter
    - MS116, MS325, MS450, MS495, MS496
    - MO325, MO450, MO495, MO496 , MO497



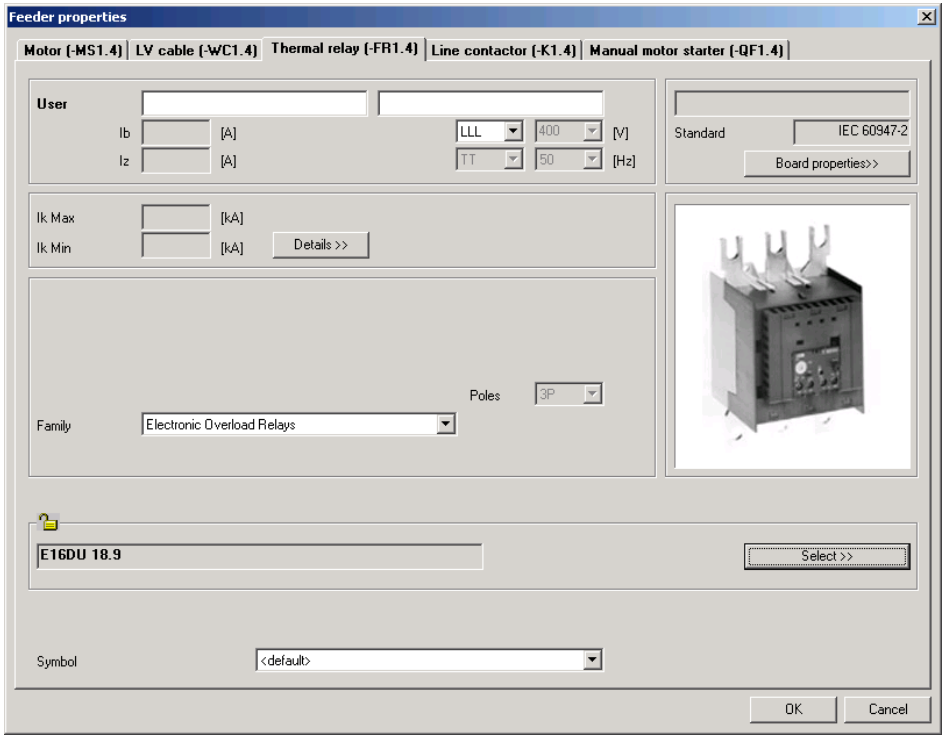
# Product managed

**Introduction**
Aim of the application
Target users
*Product managed*

**How it works**
Features

**Support Tools**
ASD
Assistance
How to obtain the software

- Low Voltage Products
  - Thermal Overload
    - TAxxDU, ExxDU
    - UMC-22



# Product managed

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Aim of the application
Target users
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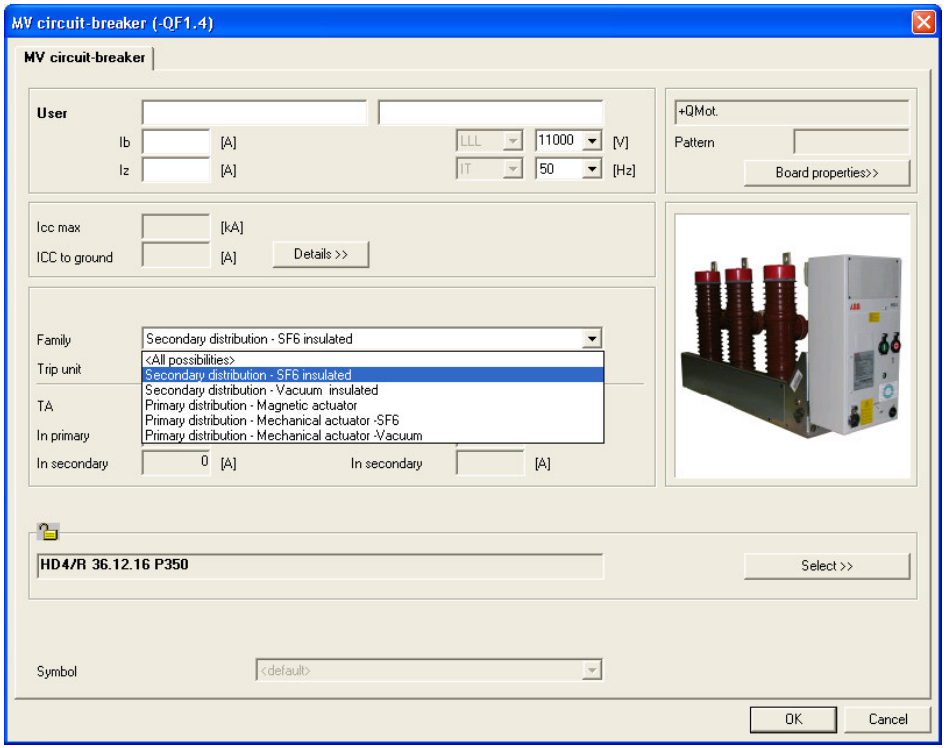
**How it works**
Features

**Support Tools**
ASD
Assistance
How to obtain the software

- Medium Voltage Products
  - Circuit breaker
    - Secondary distribution SF6 and Vacuum up to 24kV 630A 16kA
    - Primary distribution SF6 and Vacuum up to 36kV 3150A 50kA



# Product managed

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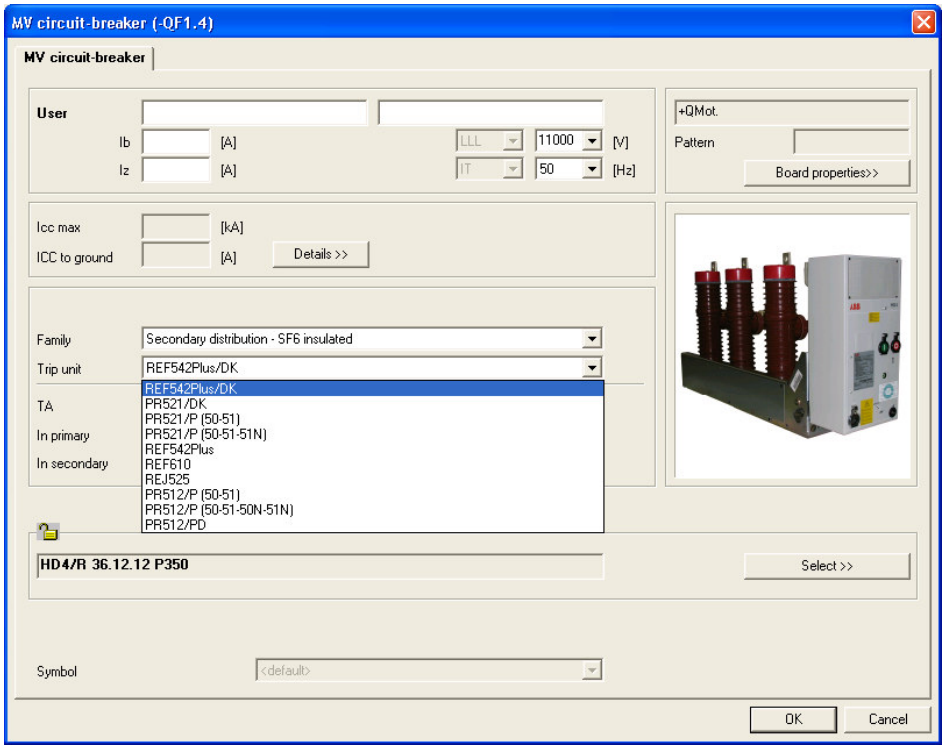
Aim of the application
Target users
*Product managed*

**How it works**
Features

**Support Tools**
ASD
Assistance
How to obtain the software

- Medium Voltage Products
  - Circuit breaker
    - REF542Plus/DK
    - PR521/DK
    - PR521/P (50-51)
    - PR521/P (50-51-51N)
    - REF542Plus
    - REF610
    - REJ525
    - PR512/P (50-51)
    - PR512/P (50-51-50N-51N)
    - PR512/PD



# Product managed

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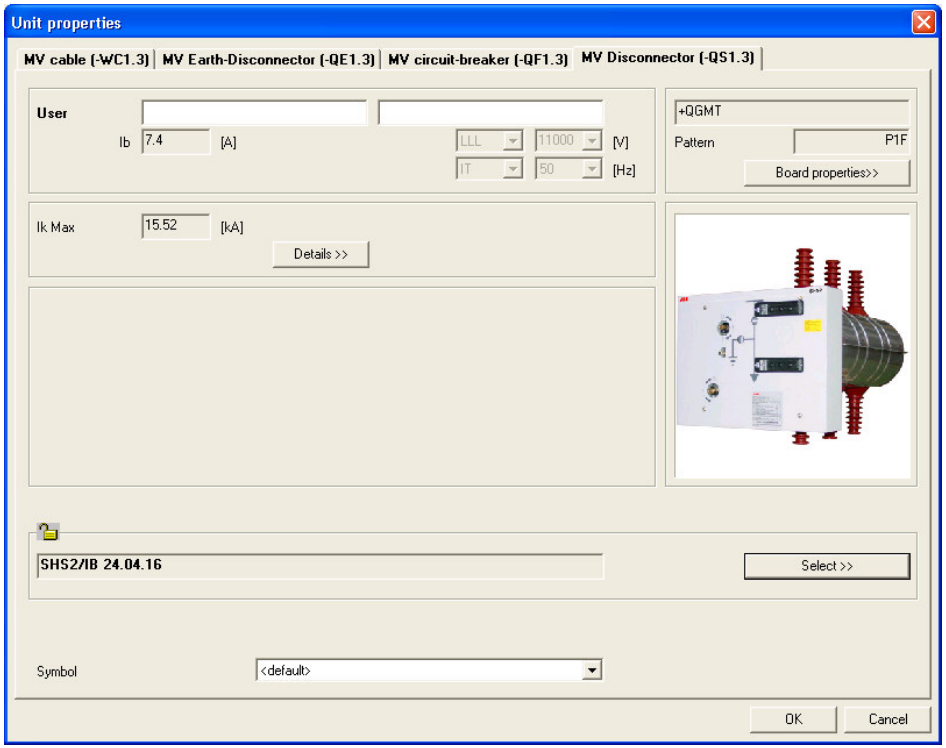
Aim of the application
Target users
*Product managed*

**How it works**
Features

**Support Tools**
ASD
Assistance
How to obtain the software

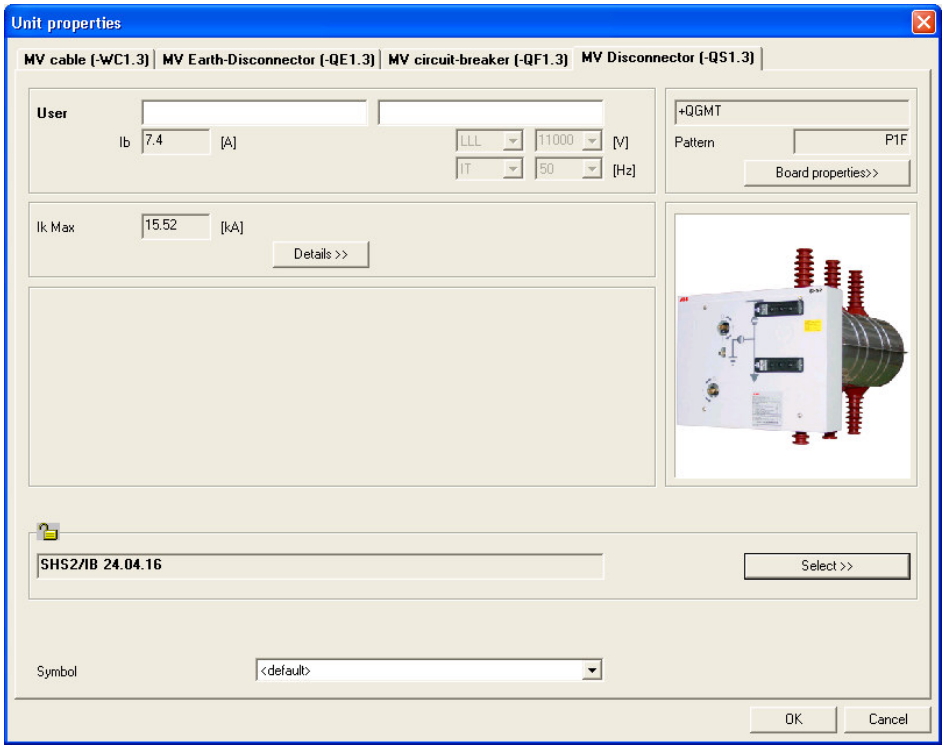
- Medium Voltage Products
  - Disconnectors
    - SHS2/A
    - SHS2/I
    - SHS2/IB
    - SHS2/IF
    - SHS2/N-I
  - Earth Disconnectors



# Product managed



- Medium Voltage Products
  - Switch Disconnectors
    - SHS2/T1
    - SHS2/T1M
    - SHS2/T2
    - SHS2/T2F
    - SHS2/T2M
    - SHS2/T2MF
    - SHS2/N-T1
    - SHS2/N-T1M
    - SHS2/N-T2
    - SHS2/N-T2F
    - SHS2/N-T2M
    - SHS2/N-T2MF



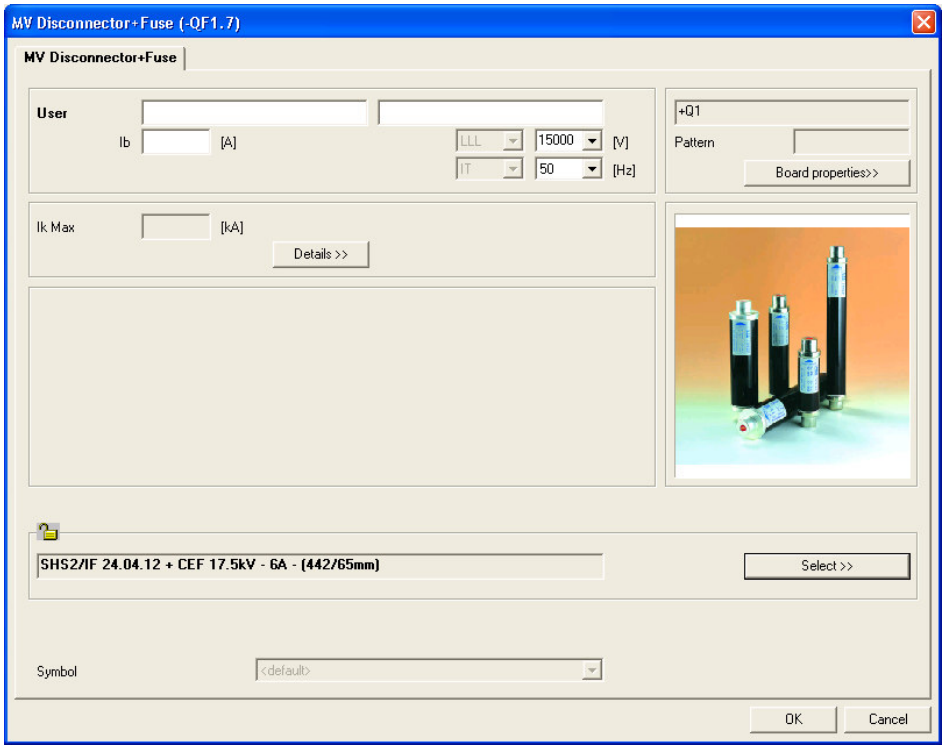
# Product managed

**Introduction**
Aim of the application
Target users
*Product managed*

**How it works**
Features

**Support Tools**
ASD
Assistance
How to obtain the software

- Medium Voltage Products
  - General Purpose Fuses
    - CEF 7.2kV 200A
    - CEF 12kV 125A
    - CEF 17.5kV 100A
    - CEF 24kV 80A
  - Motor Fuses
    - CEM 7.2kV 315A
    - CEM 12kV 100A



# Product managed

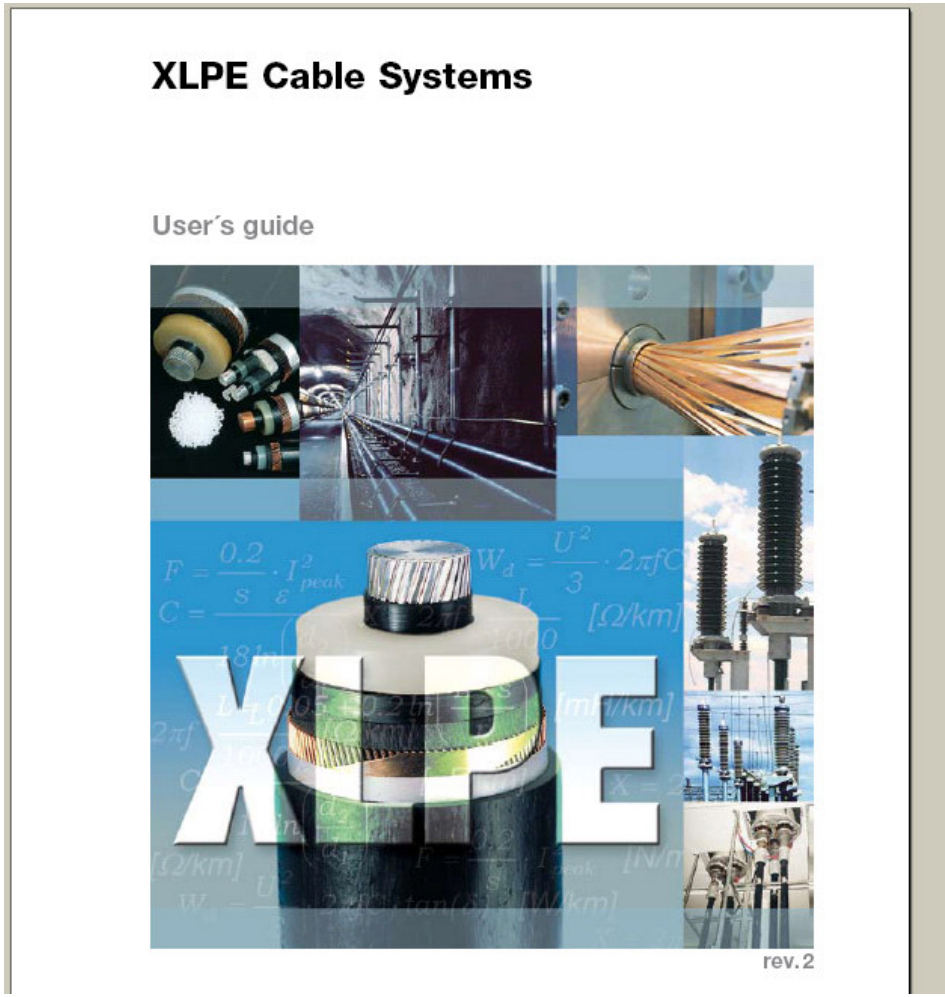
DOC

- Medium Voltage Products
  - Cables
    - Sized according to the ABB “XLPE Cable Systems Users Guide"

**Introduction**
Aim of the application
Target users
*Product managed*

**How it works**
Features

**Support Tools**
ASD
Assistance
How to obtain the software



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# Product managed

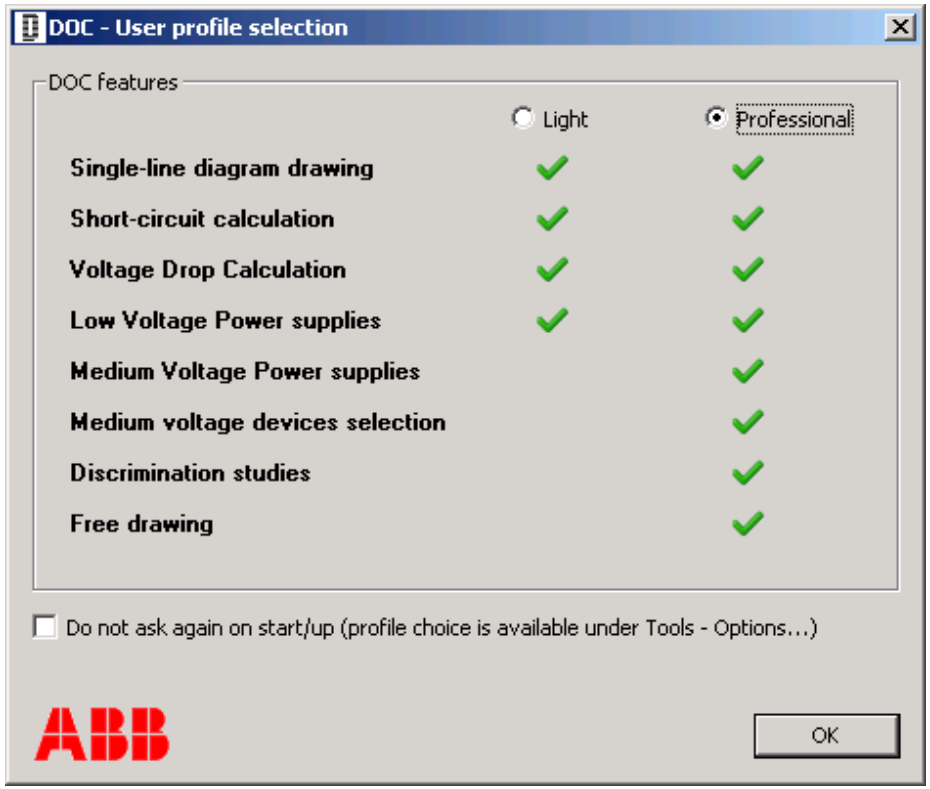

- Other Products
  - Motors
    - M2xxx
    - M3xxx
  - Transformers
    - Oil Distribution Transformers
    - RESIBLOC

# DOC
# How it Works

# Features - Professional and Light Profiles



- DOC can be used with 2 different profiles
- Depending on the user needs and skills it can be recommended to use the Light Profile which hides the advanced and complex features
- DOC Light is for ...
  - ... first time, unskilled DOC users
  - ... installers – panel builders who need a simple tool to draw and verify small networks
- DOC Professional is for ...
  - ... skilled DOC users
  - ... customers working on industrial applications
  - ... engineering companies – OEM's looking for a powerful calculation and design tool



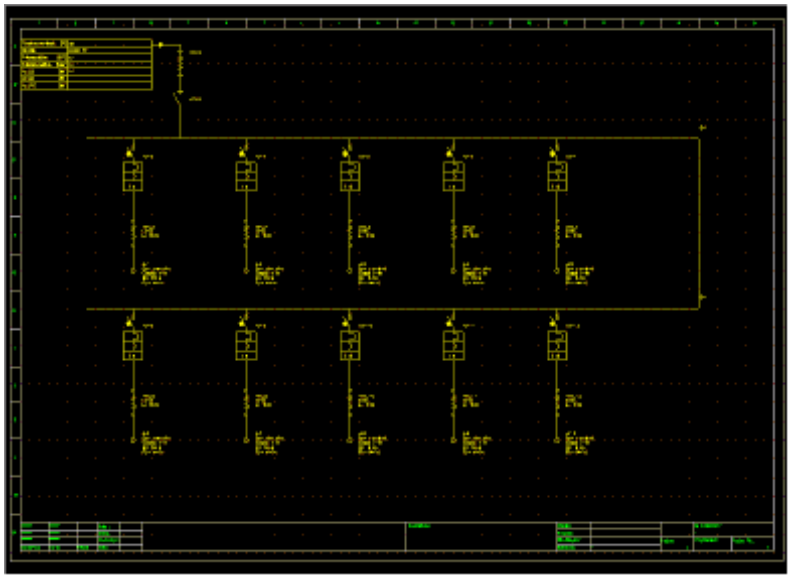
# Features - Single line diagram drawing

**Introduction**
Aim of the application
Target users
Product managed

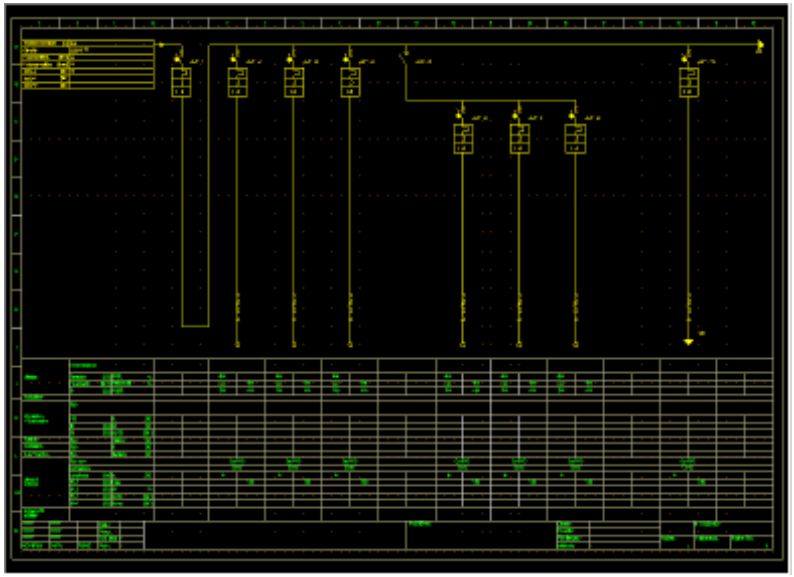
**How it works**
*Features*

**Support Tools**
ASD
Assistance
How to obtain the software

- Different layout available:
  - Blank Page
    - More flexible
    - Allows representing rings and meshes
    - Main project data available beside the objects



  - Column Page
    - Faster and easier drawing
    - Main project data available in the grid



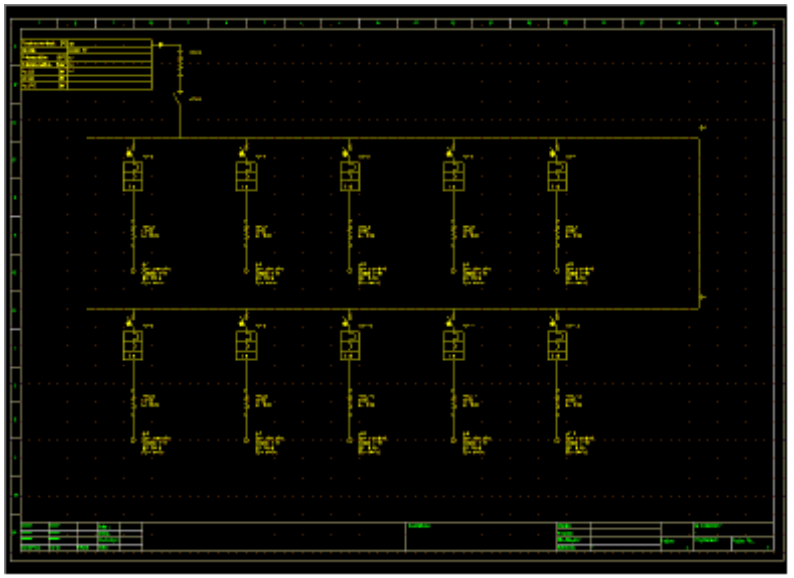
# Features - Single line diagram drawing

**Introduction**
Aim of the application
Target users
Product managed

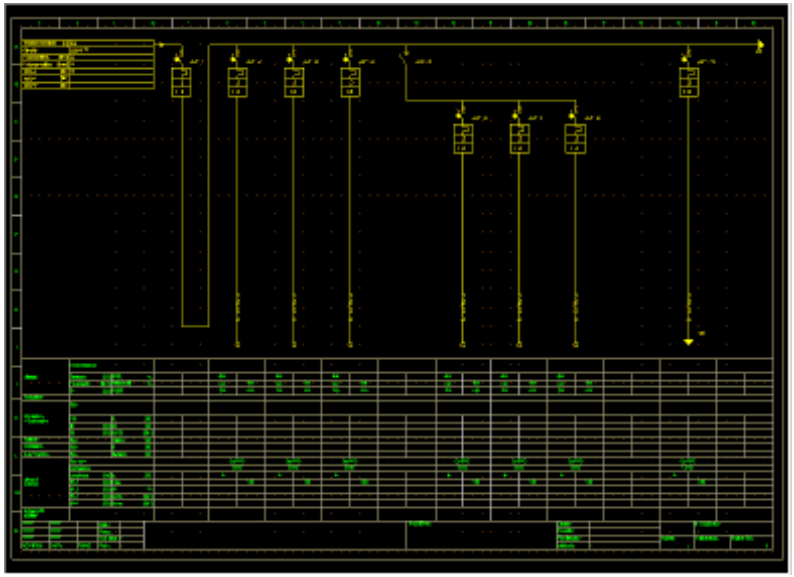
**How it works**
*Features*

**Support Tools**
ASD
Assistance
How to obtain the software

- Different ways to draw the symbols:
  - By Single Objects
    - More flexible
    - Allows representing rings and meshes



  - By Macros
    - Faster and easier drawing
    - Note: it is possible to use Single Objects and Macros independently from the layout



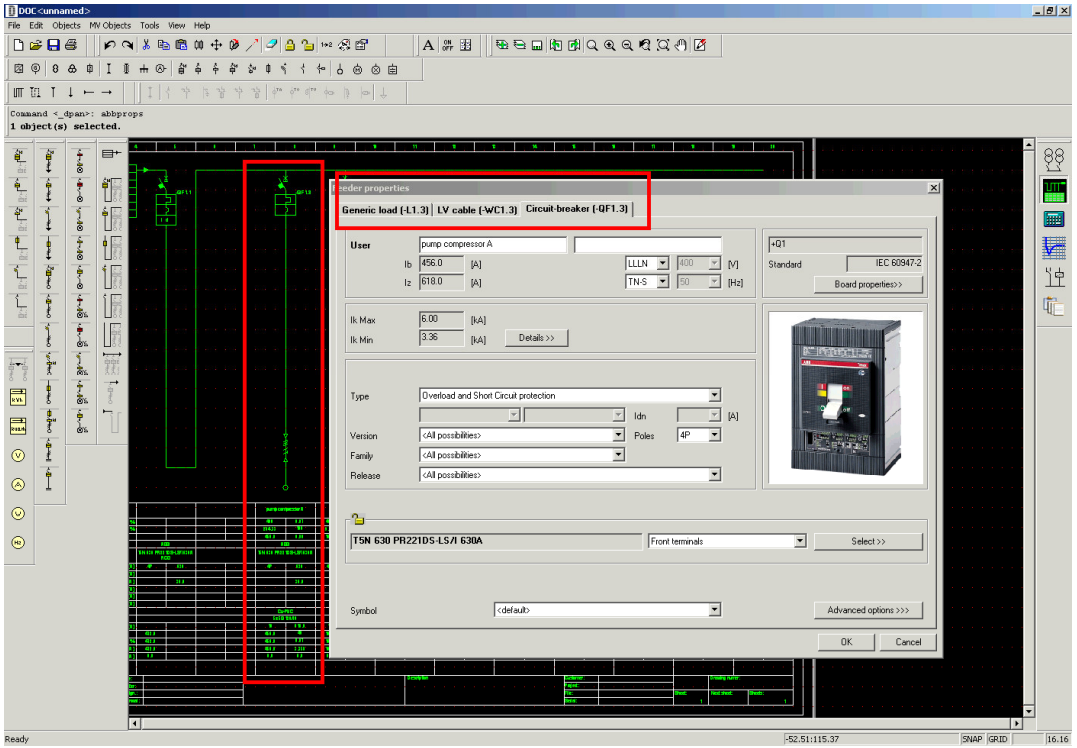
# Features - Single line diagram drawing

**Introduction**
Aim of the application
Target users
Product managed

**How it works**
*Features*

**Support Tools**
ASD
Assistance
How to obtain the software

- When using the Column layout, Objects are numbered by Page & Column
  - All the object in the same feeder have the same number
  - I.e: Page =1, Column=3 leads to QF1.3+ WC1.3 +L1.3

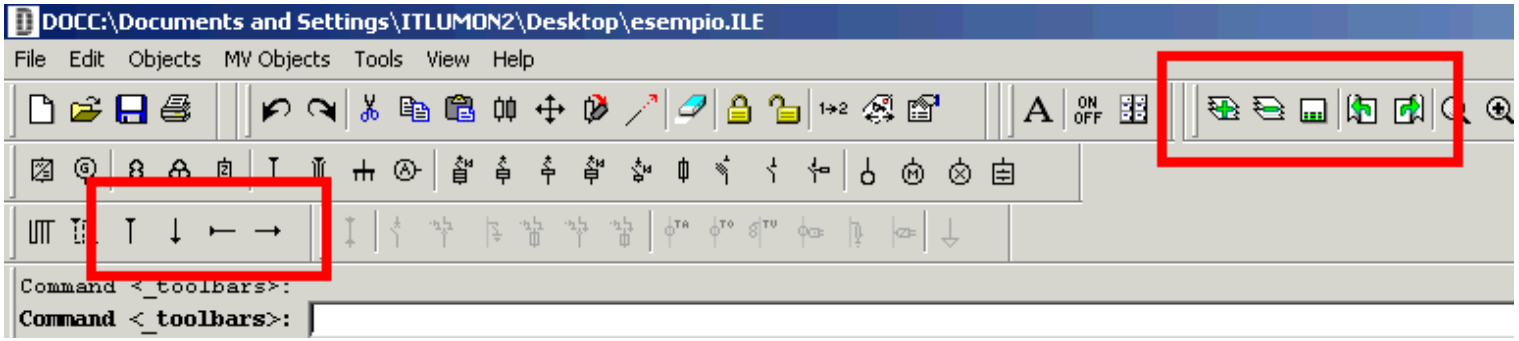


# Features - Single line diagram drawing

DOC

- It is possible to draw one scheme on more than one page
  - Use the ‘Add Sheet’ and ‘Change layout’ commands to prepare new empty pages
  - Use the Cross References to connect two objects
  - Use the ‘Previous/Next Sheet’ commands to turn the pages









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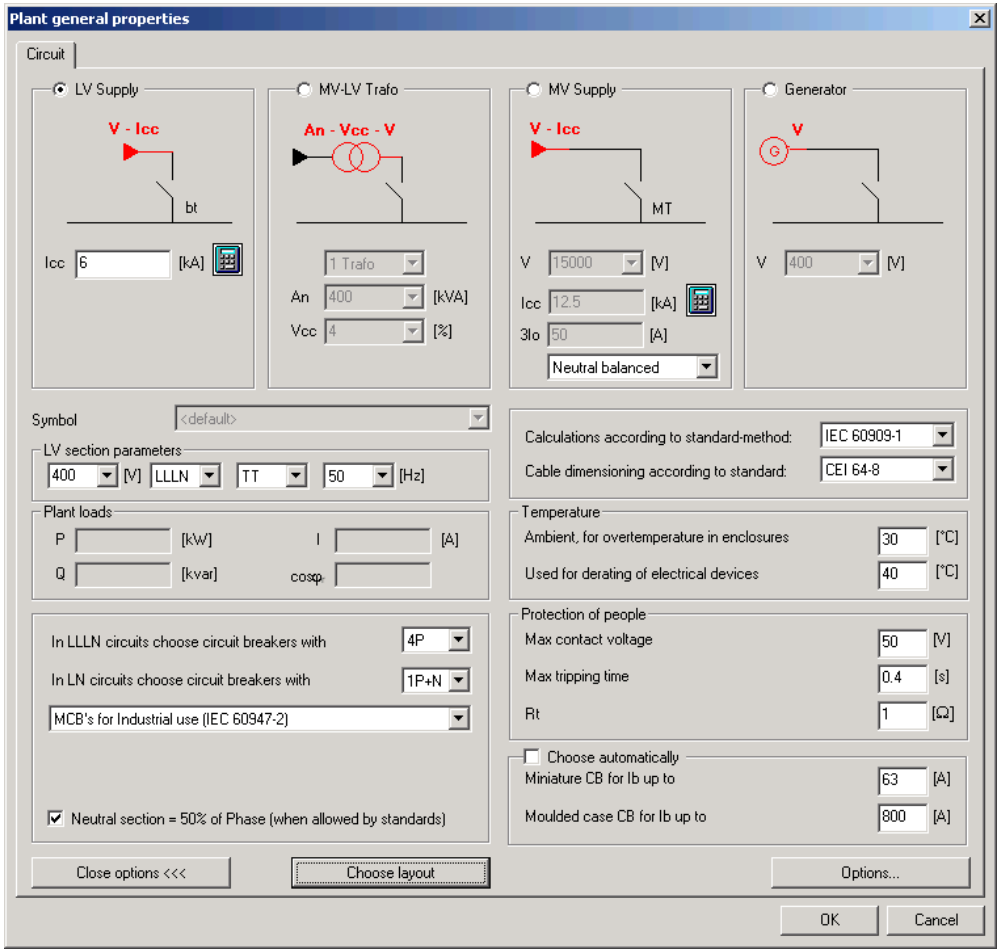
# Features - Plant General Properties Window

**Introduction**
Aim of the application
Target users
Product managed

**How it works**
*Features*

**Support Tools**
ASD
Assistance
How to obtain the software

- This window is shown when starting a new project. Set all the options carefully to spare time when drawing and calculating the electrical installation
- Main options:
  - Power supply definition
  - Voltage level
  - Default distribution system
  - Default number of phases
  - Method for SC calculations
  - Method for cable sizing
  - Options for addressing the device selection



# Features - Suggested Workflow

DOC

- A toolbar on the right side of the working area suggests the preferred way to develop a project with DOC

**Introduction**
Aim of the application
Target users
Product managed

**How it works**
*Features*

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ASD
Assistance
How to obtain the software

- MV diagram drawing
- LV diagram drawing
- Calculation and automatic project dimensioning
- Protection and discrimination verification thru the curves
- Auxiliaries scheme drawing
- Switchboard configuration NEW!
- Printouts

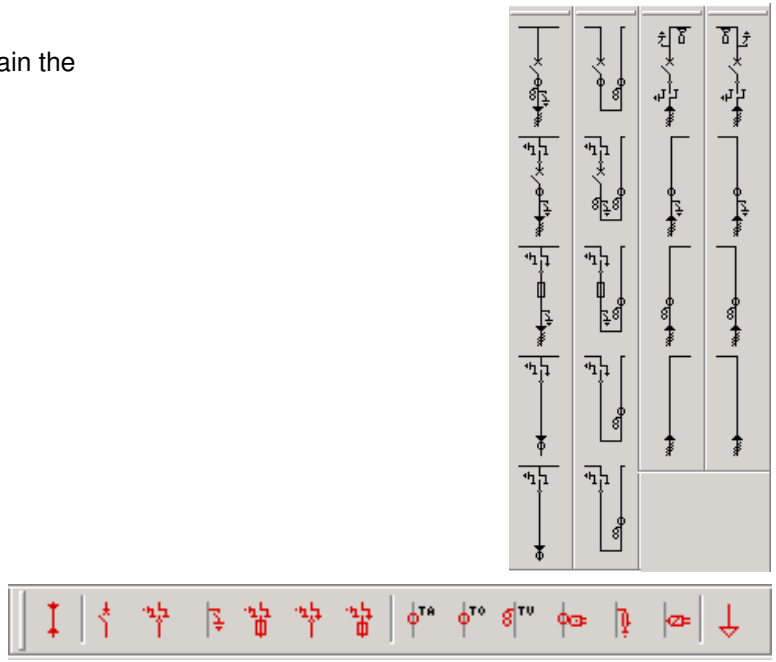
# Features - MV Diagram Drawing

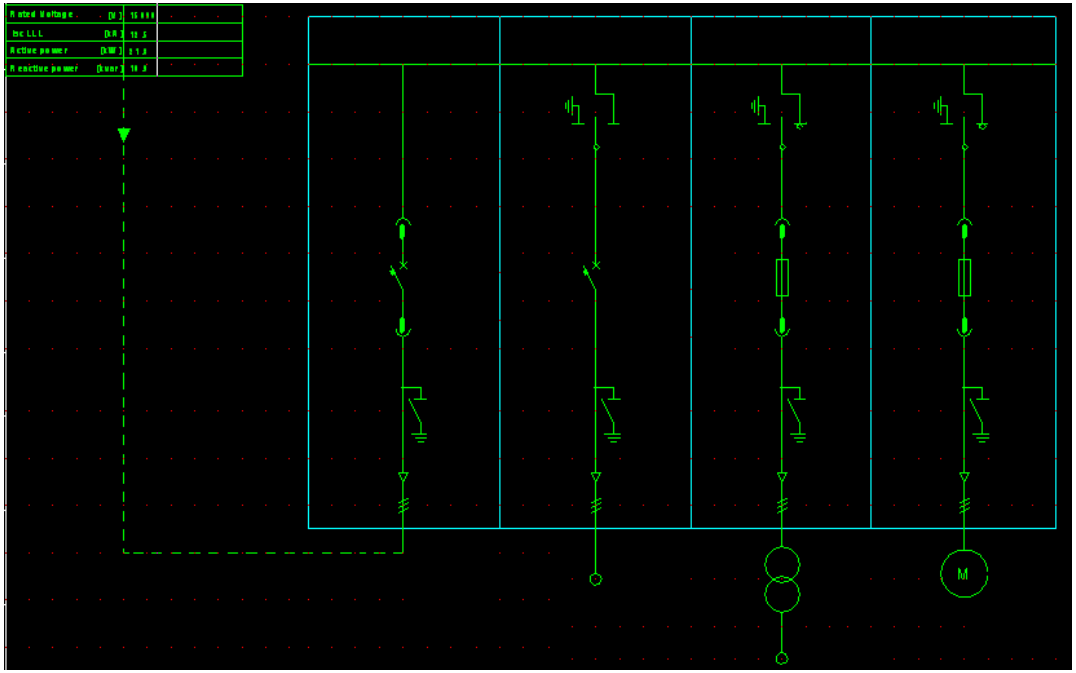
**Introduction**
Aim of the application
Target users
Product managed

**How it works**
*Features*

**Support Tools**
ASD
Assistance
How to obtain the software

- The Medium Voltage section of the project can be drawn by the Macros of the typical units of the Unimix switchboard or by Objects for more flexibility
- To pass to the Low Voltage section it is necessary to use the transformers (when a low voltage section is not needed, the drawing can be completed with MV Loads or Motors)





# Features - Lv Diagram Drawing

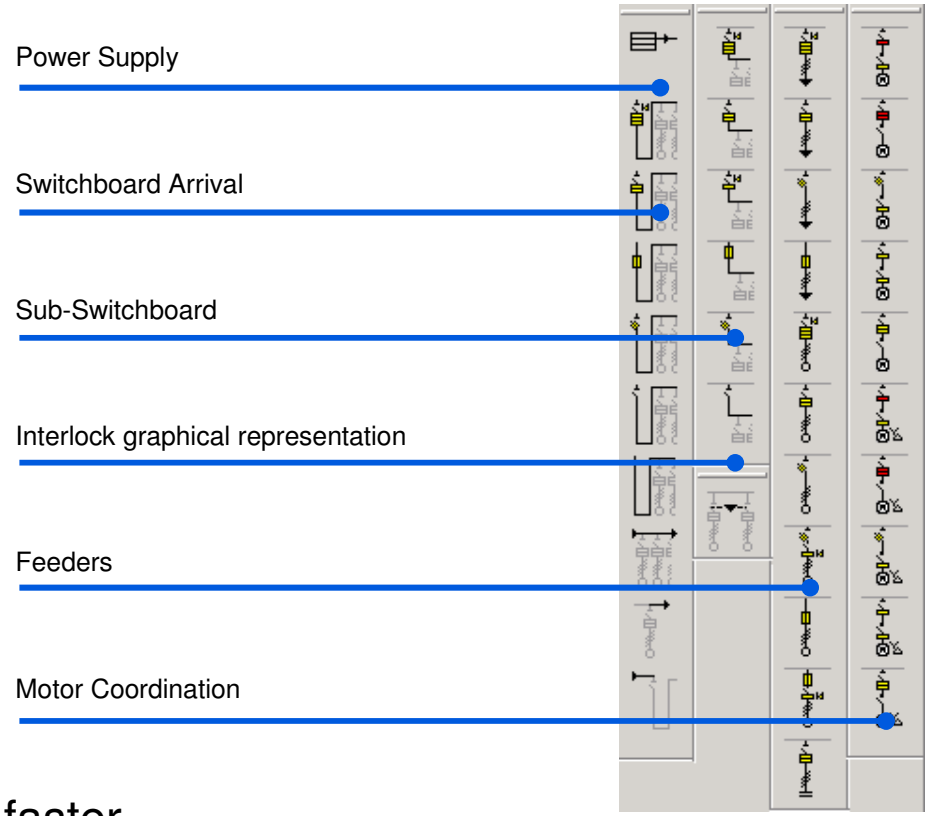
DOC

**Introduction**
Aim of the application
Target users
Product managed

**How it works**
*Features*

**Support Tools**
ASD
Assistance
How to obtain the software

- The Low Voltage section of the project can be drawn by the Macros or by Objects for more flexibility
- The Macros available represents the most common Objects combinations; not available combinations can be realized using the Objects
  - 1 Macro = 1 Feeder = Many single objects
    - I.e.: CB+Cable+Load
    - I.e.: Fuse+Cable+Load
  - Faster drawing
- Pop-up window
  - When drawing a feeder it is possible to insert the main data making the drawing phase faster







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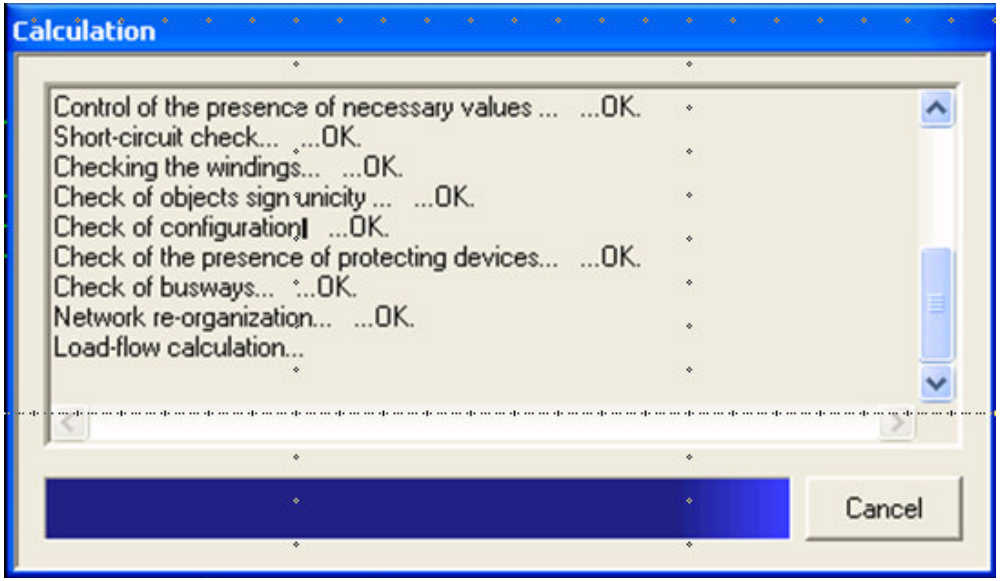
# Features - Calculation and automatic dimensioning

**Introduction**
Aim of the application
Target users
Product managed

**How it works**
*Features*

**Support Tools**
ASD
Assistance
How to obtain the software

- Load-Flow
  - DOC can calculate the current distribution, the voltage profile and the voltage drop profile in load condition considering:
    - Section with different number of phases
    - Unbalanced loads (automatic balance is optional)
    - Transformer Voltage Regulator
    - Cable dimensioning
    - Presence of meshes
    - More distribution systems



# Features - Calculation and automatic dimensioning



- Cable dimensioning
  - Given the power required by the loads and the motors, DOC is able to size the cables in an iterative process bringing to the section optimization and the current profile calculation
  - DOC implements several calculation methods
    - IEC 60364
    - CEI 64-8
    - VDE 298
    - NFC 15-100
    - UNE  20460
    - IEC 60092

# Features - Calculation and automatic dimensioning


- Short Circuit
  - DOC can calculate the maximum and minimum short circuit currents, with or without the motor contribution, for symmetrical and not symmetrical faults, for different times
  - DOC implements several calculation methods
    - IEC 60909
    - IEC 60363
    - NFC 15-100
    - Symmetrical components method

**Introduction**
Aim of the application
Target users
Product managed

**How it works**
*Features*

**Support Tools**
ASD
Assistance
How to obtain the software

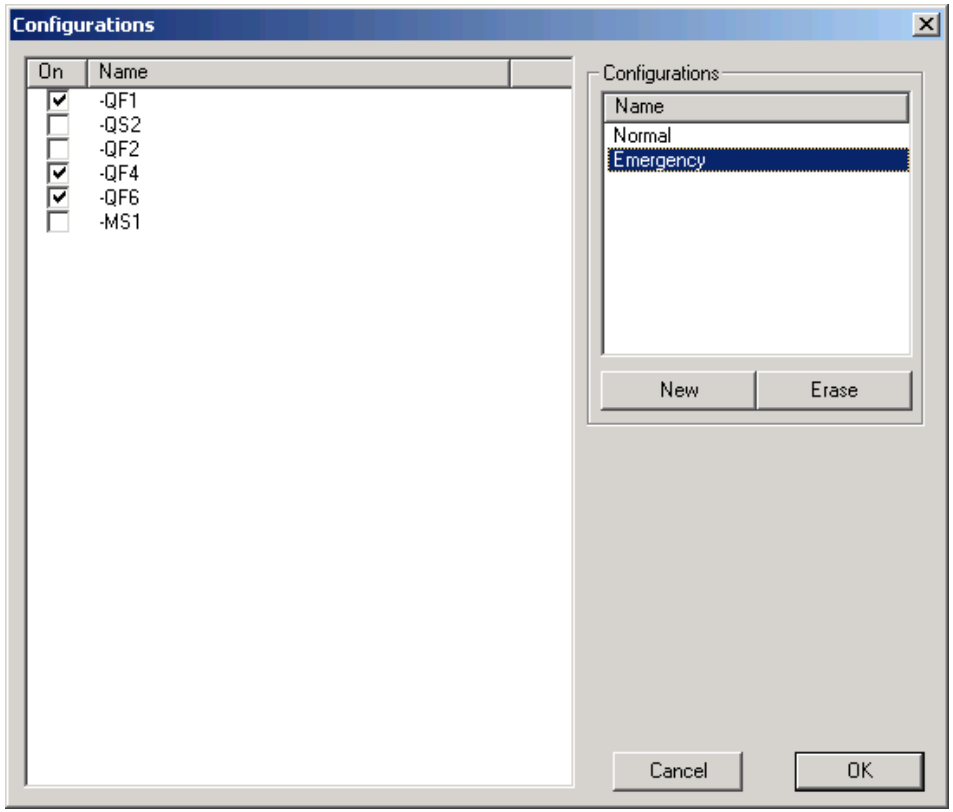
# Features - Calculation and automatic dimensioning

**Introduction**
Aim of the application
Target users
Product managed

**How it works**
*Features*

**Support Tools**
ASD
Assistance
How to obtain the software

- Configuration Management
  - In DOC it is possible to simulate different scenarios for the electrical installation defining the open/closed position for the switching and protecting devices
  - The calculation are performed in the worst condition



# Features - Calculation and automatic dimensioning

**Introduction**
Aim of the application
Target users
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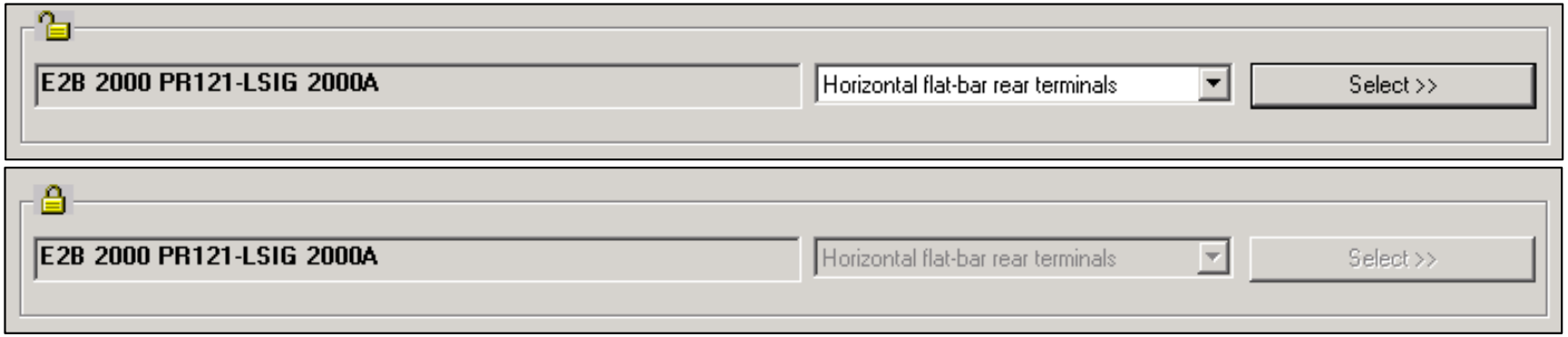
**How it works**
*Features*

**Support Tools**
ASD
Assistance
How to obtain the software

- Devices Selection
  - The calculation leads to an automatic proposal for all the devices drawn in the scheme
  - When more than one product is technically suitable, DOC proposes the cheapest one
  - It is possible to change the solution proposed by DOC and to lock the user choice thanks to the padlocks present in all the selection windows



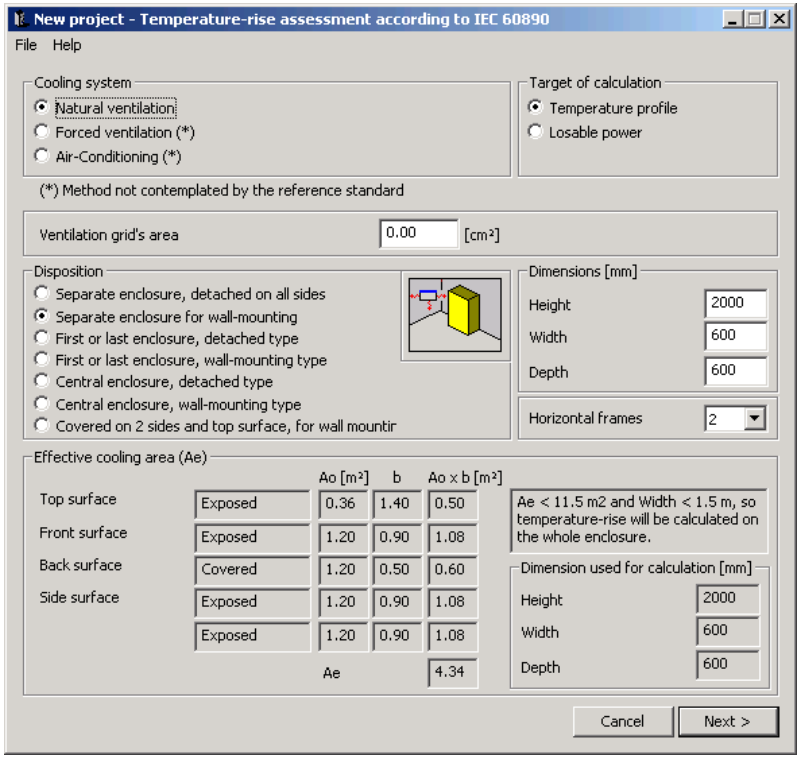
# Features - Calculation and automatic dimensioning

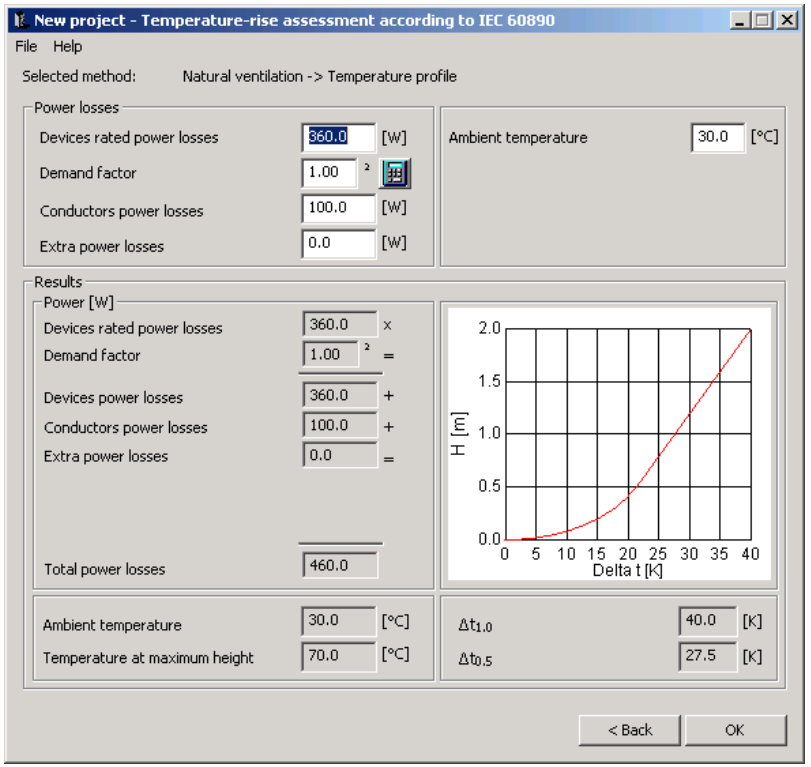
**Introduction**
Aim of the application
Target users
Product managed

**How it works**
*Features*

**Support Tools**
ASD
Assistance
How to obtain the software

- DOC gives the possibility to perform the temperature rise-assessment according to IEC 60890 in a early stage of the installation design



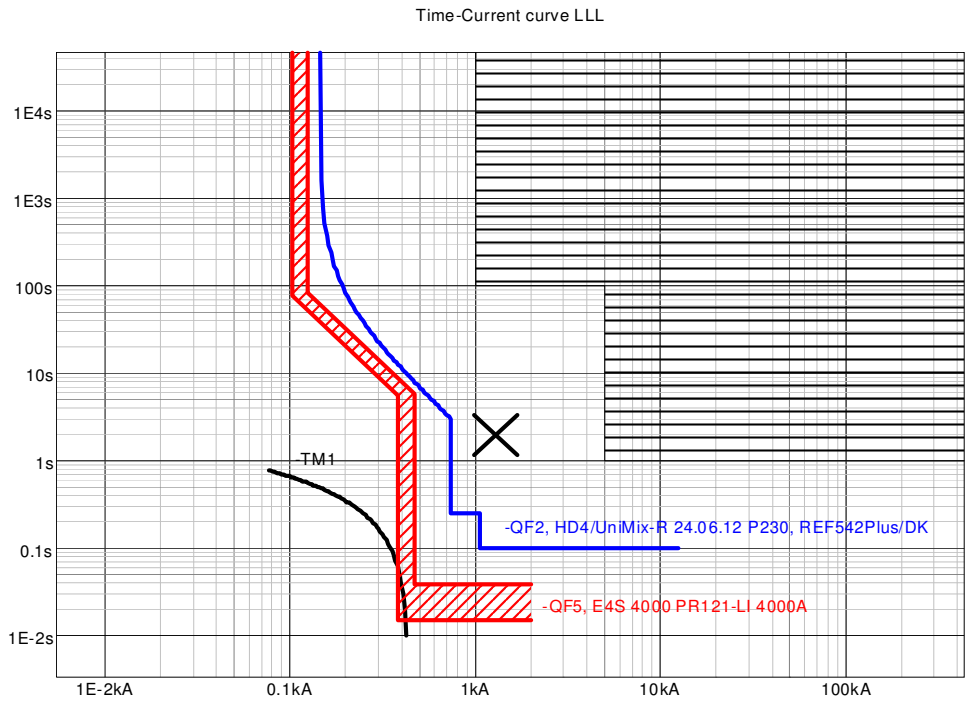
# Features - Curves

**Introduction**
Aim of the application
Target users
Product managed

**How it works**
*Features*

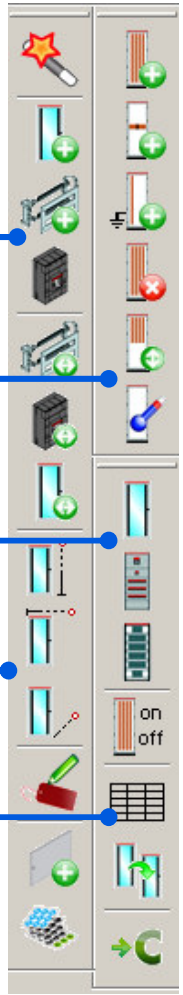
**Support Tools**
ASD
Assistance
How to obtain the software

- With DOC it is possible to manage
  - Time-current diagrams for the devices present in the scheme
  - Set the thermomagnetic and electronic trip units
  - Realize discrimination studies involving MV and lv devices
  - Verify the cable protection



# Features – Switchboard configuration

- With DOC it is now possible to configure switchboard:
  - By using a Wizar configuration: three steps guide procedure to create a switchboard.
  - By using a toolbar on the left side of working area:
    - Insert and move column, Kit and device
    - Tracking busbar system and temperature rise assessment
    - Layer management (door, panel and plate layer, show hide busbars)
    - Modify switchboard dimension
    - Smart commands (switchboard table, labels, accessories)



# Features - Project documentation


**Introduction**
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- Different reports sections allows the creation of a unique file documenting the project
  - The report sections can be added/removed according to the needs
    - Calculation hypothesis
    - Short circuit calculations
    - Cable Protections
    - MV / lv devices list and settings
  - Export in MS Excel is available
  - The report language can be different from the current language

# How to obtain the software

- DOC & CAT collection is available ONLINE
  - You can download DOC & CAT from Business On Line portal, in technical area / work tools. http://bol.it.abb.com/
  - To download the software it is necessary to specify the UserId and the password received after the sign up procedure to Business On Line site.
  - Here below you can find “DOC & CAT” FAQ:


FAQ DOC&CAT

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