

# Elec Calc

Calculation software for Low Voltage electrical installations

## **Elec Calc is a software tool for calculating and controlling a low voltage electrical installation.**

It processes the calculation of sources, of conductor cross-sections, of short-circuit currents, the study of voltage drops, the sizing and setting and coordination of protections devices.

**Elec Calc** takes care of installations of all sizes – whatever the type and number of sources and the grounding systems – of the calculation of the power budget, and provides support for calculating high voltage networks. It incorporates the technical data of the main manufacturers in the market enabling automatic or manual determination of the distribution apparatus. It includes tools for automatic publishing of calculation notes and generation of single-line diagrams in AutoCAD format, so as to meet statutory requirements.

## **Who is Elec Calc designed for?**

**Elec Calc** can be used at all stages in the life of an electrical installation, from design (design offices) through to maintenance (client) via implementation (installers) and the supervisory bodies.

**Elec Calc** is also highly valued in the field of technical education.



## **Draw and Calculations are done!**

Carrying out the calculations for an electrical installation requires a large number of parameters to be taken into account and needs real expertise.

The use of **Elec Calc** facilitates the work of professionals and takes care of all the standardisation data, enabling concentration on the issues of safety and sizing.

Automatic calculation enables the implementation of real simulations. Simply changing a parameter, such as that for a laying method or an external influence factor, often has really major consequences for sizing and can lead to very different choices, which influence either the safety or the cost of the installation.



he basis of Elec Calc is drawing the block diagram of the installation then launching the calculation in either automatic or manual mode.

The graphic interface was designed to be able to represent the plan of the installation quickly, by dragging the symbols to the plan area from the library or from the toolbar. It has a data entry form, the symbols have intelligent connections, the zoom level is almost infinite and a Delete/Restore function on several levels enables rapid correction of any data input error.

### Support provided for users

Calculation for an electrical installation is complex. To facilitate the designer's work, **Elec Calc** interface has an abundance of information and warnings. Red and green colours are used to display anomalies and conformities. Graphic warnings are widely used to highlight badly sized parameters.

The use of **Elec Calc** is however restricted to users who are experienced in the field of calculations for electrical installations, with some warnings only being able to be properly assessed by an expert.

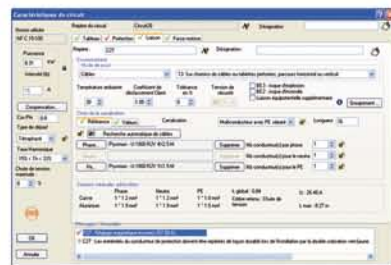
### Symbols

**Elec Calc** has a system of symbols to describe every installation:

- Sources: HV/LV and LV/LV transformers, alternators, low voltage feeds, inverters, (sources inverted with network 1 & 2 processing)
- Distribution: all types of wiring, prefabricated sheaths, all protection devices
- Receivers: lighting, power with or without speed drive, outlets, resistive loads

### Input of parameters

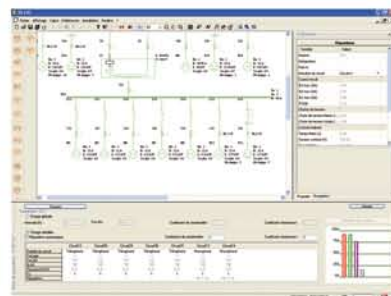
The electrical characteristics of the elements are entered into a dialog box made available by clicking on the element shown. A system of tabs enables rapid navigation to each component part of the circuit being edited. The dialog box for entering the characteristics has an area for help and alerts about anomalies, which guides the user during the input of elements.



Graphic highlighting and an error message automatically inform the user about invalid parameters.

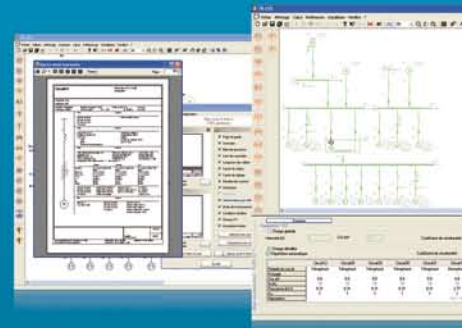
### Power Balance

**Elec Calc** enables the calculation of the power balance of the installation. The loads are described in each table, either globally or by detailing each receiver. Coincidence factor, foreseeable extension factor, power factor and polarity description thus enable the sizing of the installation's various sources.



### Model plans

An essential and valued function is the possibility of putting all or part of an installation into the library very quickly. This operation is carried out simply by dragging and dropping the circuits into the desired library family



## Elec Calc

### Additional modules

Additional optional modules complete the functions that Elec Calc offers.

#### Cascading module

The sizing of the circuit breaker by its outage power linked to the level of the short-circuit currents can take into account the cascading techniques for a circuit equipped with devices of the same brand. In certain cases, this technique enables the reduction of the size of the circuit breakers and thus the cost of the electrical installation.

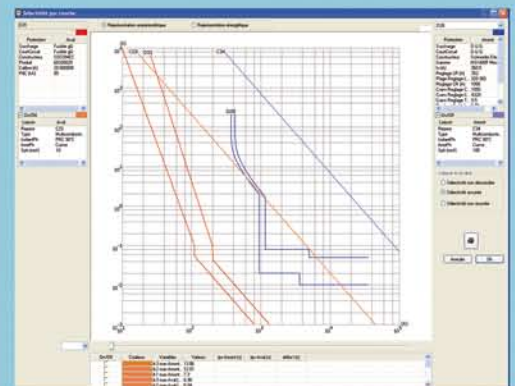
For any modification of the installation, all the operating modes identified are recalculated and/or checked, thus providing considerable time savings in design.

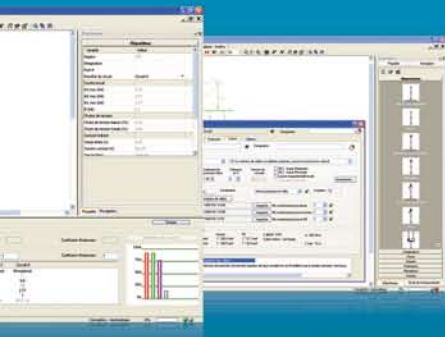
#### Discrimination by graph module

An external module enables discrimination designs to be made by overlaying manufacturers' graphs (on quotation).

Specially designed to meet electricians' requirements, this module enables:

- The control of discrimination between fuses or between circuit breakers, or even between circuit breakers / fuses.
- The multi-manufacturer comparison on equipment discrimination.



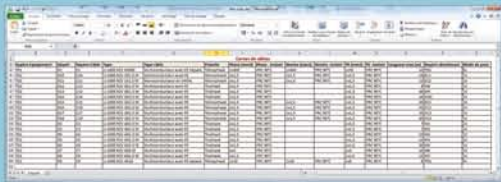


## Calculation software

### Elec Calc Export to Excel Module

Elec Calc project data can be exported and used in a Microsoft Office Excel spreadsheet. All data becomes readily available for use in design phase or in production phase: on-site equipment settings, equipment purchase orders, cost studies, interface with an internal tool...

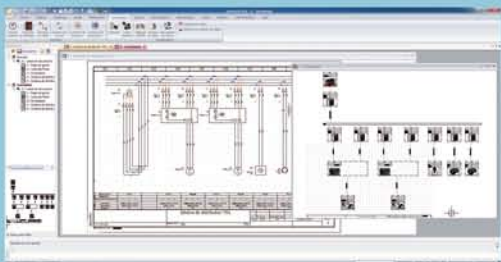
- Edit your BOM and cable list for external use.
- Edit summarized calculations notes in Excel format according to your needs.
- The generation of spreadsheets is done using configurable template files to suit your requirements.



### Elec Calc Export to Elecworks / SolidWorks Electrical Module

After electrical design calculations are done within Elec Calc, they can be recovered to automatically generate multi-line diagrams and general project overviews in Elecworks. All the benefits of a true electrical CAD are then available with Elecworks:

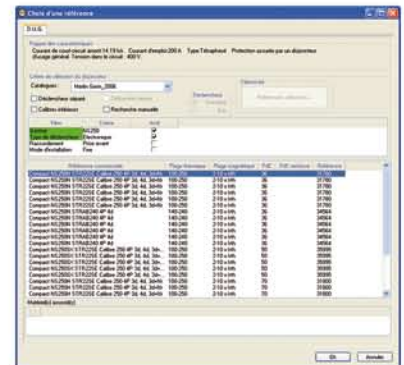
- Handling wire tags and equipment tags according to customer needs.
- The control part of the project (with real-time cross-referencing between the calculated material and the relevant control contacts placed in Elecworks).
- Generation of terminal diagrams, PLC diagrams, reports, ...
- 2D cabinet layout.



### Manufacturer data

Elec Calc is enhanced by multi-manufacturer databases. Depending on the result of the calculations and the constraints imposed by the user, it proposes a list of references from which the user can choose the most appropriate (discrimination by tables whatever the number of protection devices set upstream).

Making available manufacturers' catalogues is a permanent process to ensure our users have up-to-date references and to enable the largest number of manufacturers to be present in the product.



### Operating modes

Operating modes can be defined to manage the load shedding scenarios by simply indicating the active sources for each mode. Each of the installation's protections can be declared open or closed.

The sources can have different power and be located at different levels of the installation.

### Cables

The cable references can be chosen automatically according to the configuration defined by the user. It is also possible to define the wiring structure on a case-by-case basis.

### Inverters

Elec Calc calculates installations with inverters by simulating network 1, network 2 and bypass modes.

The calculations that take into account the inverters were made with inverter manufacturers, and in particular the SOCOMEC and LIEBERT companies

### Variable speed drives

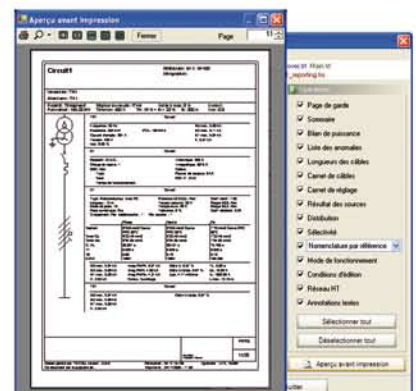
Elec Calc enables the sizing of installations with variable speed drives. It is thus possible to calculate circuits containing a drive which supplies one or more motors.

### Calculation notes / Single-line diagram and Exports

As required by legislation, the calculation notes generated make up a full report both for the verifying authority and for the installation manager, who has the diagrams, calculation notes and the cable schedules at his disposal.

The diagram and calculation elements can easily be exported in various formats or be incorporated into installation or inspection documentation. The following are thus available:

- Export of the block diagram of the installation in DWG format
- Export of the single-line diagram to the electrical wiring software Trace Elec Pro or to AutoCAD
- Export of the single-line diagram of the installation in DWG format: automatic generation of folios in DWG format or export that can be configured by the user to export all the information in the form of AutoCAD attributes..



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## Calculation methods

Different calculation modes are available

### Manual calculation

In manual mode the user inputs the various characteristics of the installation. The calculations are carried out in real time and the user is informed of any anomaly by graphic highlighting: the wrongly sized element changes colour, the parameter in question is indicated and a message enables identification of the problem.

### Automatic calculation

Automatic calculation enables design of a complete installation based on the sizing hypotheses made by the user, in particular: the maximum permissible voltage drop, the constraints on the choice of manufacturers and the constraints for the neutral and PE conductors. The user enters the cable lengths, **Elec Calc** then does the calculation for the whole installation by studying the various operating cases defined by the user.

### Standards and specifications

The calculation methods used in **Elec Calc** are based on standards, calculation guides and good practices in use, as well as on the legislation for protection of people, depending on the countries or the specifications applicable for an installation.

For France, **Elec Calc** complies with the NF C 15-100 standard and the specifications of the European guide, CENELEC R 064-003 (C15-500 calculation guide).

For Belgium, it follows the RGIE recommendations.

For other countries, the calculations are based on harmonisation rules, which use the CEI60364 international standard as a basis.

The short-circuit currents are calculated according to the CEI60909 international standards.

## Elec Calc's assets

Graphic and visual approach, educational approach.

Rapid creation of blocks' diagram.

Automatic sizing according to the users' configuration.

Integrated power budget.

Management of the various operating modes.

Rich catalogues of equipment and cables.

Multi-source calculations.

Calculations for installations with inverters.

Sizing of motor starters with or without variable speed drives.

Multi-standard calculations (several standards in same installation).

Discrimination and cascading of circuit breakers.

Library of scalable model plans.

Complete calculation note that complies with the requirements of the supervisory authorities.

Trace Elec Pro and AutoCAD exports.

Support with HV calculation.

Multilingual.

Elec Calc is available for Windows XP, VISTA and 7 operating systems.



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