

Generality

Job order management, network projects sharing, backup and recovery.
EG Cloud is a service for saving and sharing projects efficiently and securely.
Management of user profiles for conditional access to the common database and library.
Management of interface styles (dark theme) and HDPI screens.

Power supply

Power supply LV without power limit.
Definition of supply points with the electrical parameters of the cutting section.
Power supply HV or MV with isolated, compensated or on the grounded neutral conductor.
Use of HV/MV and MV/LV transformers with definable data; transformers can be connected in parallel.
Management of TN, TT and IT electrical system.
Multi-supply: possibility to connect the grid to several power points in LV, MV and HV.

Generators and UPS and storage

Insertion of synchronous or asynchronous generators, UPS, storage systems; they can be located in any point of the grid, with different operating state (stand-by or running). It is possible to set the nominal values of a device or to choose a device marked from a large archive available in the Devices database.
Management of P/Q capability curves for generators and inverters, also according to the manufacturer's model, with point-based curves.
Determination of the P/Q capability curve of the system.

Grounding system

Definition of the grounding system with ground rod, collectors, impedances and connection elements.
Choosing the type of terrain and calculation of earth resistance.
Ground connections with neutral forming transformers.

Panels setup

Wizard for panel setup with assignment of protections, carpentry and data for the panel overtemperature check-up.
Drawing of panels blocks diagram.
Setup and calculation of bars inside the switchboard according to CEI UNEL 01433.

Integrations

CADelet Impianti, Eplus: electrical system engineering.
CADelet Schemi, iDEA: wiring diagrams for industrial automation.

with continuous or discrete automatic adjustment. 3-Windings transformers (TWT with dual secondary). Transformers with zig-zag secondary.
Environmentally friendly transformers according to EU regulation n.548 / 2014.
Use of connectors between any transformers.
Setup of cable lines, busbars or lines with known impedance. Setup of the maximum operating temperature on cables.
Methods of distribution and connection of the protective conductor. Management of the neutral conductor and PE common to more units.
Method of laying in accordance with tables reported in CEI-UNEL 35024/1 - 35024/2 - 35026, IEC 364 (1983), IEC 60364-5-52 and IEC 448.
Method of laying in accordance with French standard NF C 15-100, Spanish standard UNE 20460-5-523, English standard BSI 7671 and Brazilian standard NBR 5410 and American standard NFPA 70: NEC with cables in AWG standard.
Management of more laying for each units.
Laying of cable lines in medium voltage according to CEI 11-17 and CEI-UNEL 35027.
Method of laying in accordance with IEC 60502-2 (MV cables) and IEC 61892-4 (oil&gas and offshore cables). Various types of loads are handled: generic, lighting, motor, capacitive.
Synchronous or asynchronous motor with startup mode setup: direct, star-delta or with soft starter or inverter.
Distributed type loads on power risers.
Setup of preferential loads. Setup of accessory elements and related functional diagrams.
Setup of generic auxiliary units.
Management of a typical user profile archive.
Tabular multiple editing of units.
Importing project files defined in CAD, with acquisition of units data.

PV systems

Management of photovoltaic modules and grid-connected inverters multi tracker. Analysis of the electrical components of the photovoltaic field.
Importing pv plant projects from Solergo.

Harmonic profile

Setup of harmonic profile on load, UPS and inverter.
Transfer down-up of the harmonic content, considering the effect of transformer and UPS.

Units setup

Unit denomination and assignment of zone and panel. Automatic marking of units as stated by customizable profiles.
Assigning units characteristics: power consumption, cos-fi, length, proximity and laying conditions, ambient temperature, maximum voltage drop and type of conduit.

Transformer HV/MV, MV/MV, MV/LV and LV/LV

Calculation of the distortion factor THD.
Check lines, protection and panels according to the harmonic profile.

Grid setup

Managing lines, or parts of the grid, in parallel.
Ring grid. Busbars or cables shared by more units.
Mesh of grid by drag & drop units.
Inserting parts of grid, previously meshed in CAD.
Copy-paste of one or more unit or whole panels or zones. Importing electrical grid processed in other projects.
Management of locked and uneditable panels.
Calculation of current and power of the grid according to the vector method.
Automatic propagation of power at various levels of the distribution boards, taking account of any coefficients of simultaneity, use and transfer of the units or downstream panels.
"Multiproject" mode to share a job with other operators or for complex grid.
Highlight of the grounding line grid.

Grid configurations and analysis

Setup of grid configurations with different units operating mode (on/off, preferential,...) or different use factor.
Management of multiple configurations with real-time project recalculation.
Assignment of consumption profile (daily, weekly, seasonal or annual) to the units.
Analysis of the grid over time, varying the assigned load profile.
Monitoring of current, power used and power failures.

Variable frequency

Setup of AC/DC, AC/AC and DC/AC converters.
Management of converters database.
Analysis of grid in DC and at any frequency up to 1kHz.

Grid currents balancing

Routine to solve the grid currents balancing problem. Automatic setting of single-phase and two-phases load connections in order to minimize neutral currents overall the power grid.
Panels and sub-panels can be balanced one by one or all together; a result printout lists all the phases to be changed in the project.

Power factor correction

Automatic power factor correction of the grid in order to obtain the required cos-fi, in global mode, for single loads or for a single distribution board. The software calculates the required capacitor and let the operator to choose it from the Capacitors database.
Determination of the right protection to install in the compensation unit.

LV cable sizing

Reference standard IEC 60364, CEI 64-8 (Italy), NF C 15-100 (France), UNE 20460 (Spain), BSI 7671 (English) and NBR 5410 (Brazil) and NFPA 70: NEC (USA). Compliance with EU regulation no. 305/11 for the use of construction products (CPR cables). Automatic section calculation for neutral and protective conductors and section reduction.
Section calculation for protective conductor according to the through energy method.
Cables with flow rate stored in the archive.
Possibility to set and lock section and formation of any cable in the system.
Calculation of current eligible, Joule integral,



working temperature, impedance and voltage drop lines. Optimization of power failures in order not to exceed the maximum expected load drop. Check of neutral currents on three-phase grid in result of unbalanced loads.

MV grid sizing according to EN 61936-1

Use of MV cells with typical combined elements and accessories. MV cables database management with editable flow rate and derate value. Automatic selection of the cable to use. Calculation of the fault in MV, and management of the 67 or 67N directional type protections. Calculation of the total earth voltage UE on the primary of MV transformers in fault conditions.

Dimensioning of busbars

Customizable busbar database with more than 1.800 bars by leading manufacturers (Graziadio, Moeller Electric, Pogliano, Siemens, Telemecanique and Zucchini) already available. Check of overload, short circuit and short-time pulse current.

Power loss in the grid

Optimization of the cable operating temperature. Calculation of the thermal dissipation of the network and related operating costs.

Protection devices

Protections devices with all the electrical, thermal and size characteristics; action chart, limitation and and derating in temperature and frequency chart are included.

Management of regulation steps on currents and times with relative tolerances. Assignment of mechanical opening times of MV circuit breakers.

More than 93,000 devices, among the most frequently used series, made by the leading manufacturers on the market: ABB, AEG, BTicino, Chint, Dossena, Eaton, General Electric, Gewiss, Hager Lume, Italewer, Legrand, Moeller Electric, Sarel, Schneider Electric, Siemens and Thytronic.

Selectivity and backup tables allows to set the co-ordination between protections. For electric motor protection a database with specifically coordinated devices, taken from manufacturers specification, is available. Database of coordinated devices and soft starter or inverter VFD for motor starter.

Management of coupled protection, motor starter, fuse holder, switch disconnector and switch disconnector with fuse.

Management of switches with electronic disconnector. Time-current characteristic curve (to checking selectivity) and let-through Joule energy curve (for checking short circuit fault currents) are provided for each device.

New devices can be defined by the operator inserting the required electric values and the protection curves acquired from bitmap image. Composition of protection with one switch and more circuit breakers.

Electronic circuit breakers

Use of electronic releasers, with ANSI / IEEE functions C37.2. Fine setting of MV circuit breakers according to EN 62271-100. Management of correction coefficients for thermal, magnetic, differential break, for operation in DC or with frequency different from 50 Hz, with automatic adaptation of the action curves.

Measuring and protection transformers

Management of Current Transformer, Voltage Tran-

sformer and Zero Sequence CT in MV, with specific archive. Association of CT, VT and Zero Sequence CT with definition of the insertion point of indirect CT, VT and Zero Sequence CT. Choice of the correct type of CT, VT and Zero Sequence CT and check of saturation according to CEI 0-16 for CT and Zero Sequence CT with analysis on all types of fault current.

Lines and protections check

Management of coordination between conductors and protection devices.

Protection device assignment guided by the software that filters the protection database in order to propose the best solution for every unit.

Automatic protection assignment according to profiles set by the operator, that includes nominal current ranges, manufacturer, series, intervention curve, switching power (according to EN 60947 or EN 60898 standard), price range.

Verification of the maximum voltage drop on motor startup. Coordination of the magnetic characteristics with the inrush current of a motor. Setup of motor coordination and its starter system. Selectivity check on several levels by comparing the action curves of the protections or by the manufacturer's selectivity tables.

Adjustment of the protections according to customizable steps, with representation of the release bands. Verification of the MV/LV selectivity.

Fault conditions

Fault calculation by sequential phase analysis according to IEC 60909 and Cenelec R064 standards: model with fault near or far from the generator, in a permanent and transitory state (in AC).

Calculation of the symmetrical and homopolar short-circuit current for the purposes of short-circuit and indirect contact protection of the line, taking into account the contribution of any motors and generators.

Calculation of maximum, minimum, and transient short-circuit currents in direct current, according to standard IEC 61660-1, taking into account the actual contribution of each source and development of the approximate curve of the fault current.

Faults calculation according to IEC 61363-1 for naval plants. Faults calculation according to IEEE 141-1993 for the American standard.

Calculation of short-circuit impedance Z_k and Z_o' for TT, TN or IT systems, and impedance on fault loop for TN or IT systems, at any point in the system.

Verification of breaking and closing capacity and protection against indirect contact and short-circuit.

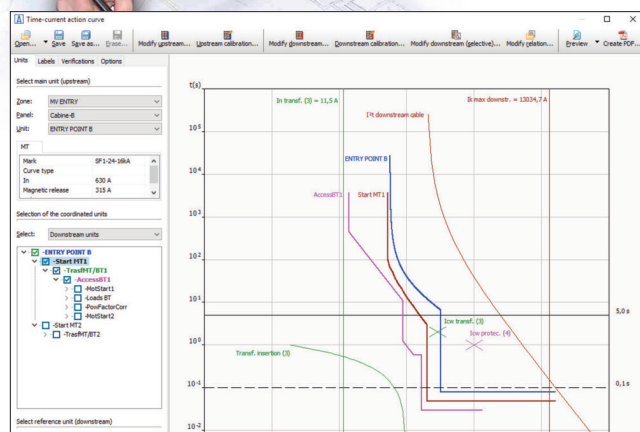
Comparison between the let-through Joule energy curve of the protection and the Joule integral of the cable, for phase, neutral or ground conductor.

Electrical panels

Calculation of panel overtemperature according to CEI 17-43 and CEI 23-51 standards.

Arc Flash analysis according to IEEE 1584-2018 standard and printing of electric arc risk labels.

Drawing of the panel layout, with placement of the carpentries and used devices (boxed or modular), without the need for external CAD resources, and saving on .dwg files (*).



Calculation reports

Introductory report with standard reference and method of calculation.

Table report about cables and busbars sizing, protections choices, fault conditions in different points of the grid, presence of motors and power supply conditions. Customization of the printing model for the tabular documents.

Extended report for each units that fully documents all load characteristics, cables sizing, parameters of fault-line and the chosen protection device.

Chart of the let-through energy curve of protection related with the Joule integral of cable.

Selectivity chart and protection calibration data. Tables of analysis about trends over time of customizable monitored values.

Wiring diagrams

Automatic generation of single-line and multi-line diagrams as DWG and PDF.

Functional diagrams related to auxiliary elements of the devices can be included, also. Produced DWG is compatible with CAdet, Eplus and iDEA.

Printouts

All reports can be printed or saved inside the project folder. Generation or concatenation of all reports in a single PDF file in order to obtain the general document report of the project. Saving reports as XLS, RTF, TXT, WMF, HTML and CSV.

Ampère Mobile

Application for iOS or Android smartphone or tablet to view, edit and add note on the grid project.

Interoperability

Data exchange for the automatic drawing of single-line diagram or the distribution panels radial scheme and their layout in CAdet, Eplus and iDEA environment. Export estimation data to Sigma (optional module, italian only).

Import photovoltaic plan file from Solergo.

Parametric exportation of project data to Microsoft EXCEL and importation.

EGlink

Plug-in for equipments and electric circuits data exchange between Ampère Professional and Revit® BIM environment.

Calculation of the route and the length of the cables through the cable duct system. Export in Revit® environment of data with annotations and size estimation.

Ampère multi-project related to the Revit project.

System requirements: Computer with 3 GHz or higher processor.
At least 8 GB RAM. Hard disk with at least 6 GB free space. 1024x768 screen resolution. USB port, mouse, printer or plotter.
64-bit O.S. Windows 10 or 11.