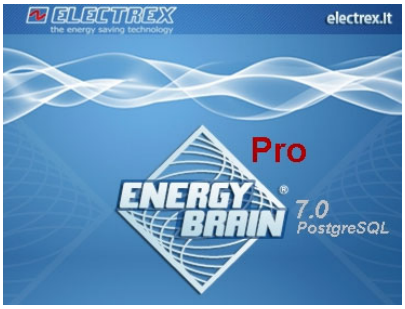
Energy Brain 7.x & Pro 7.x

Software for monitoring and managing energy, environmental and process parameters



Energy Brain is a software application for managing the consumption and production of electrical energy, other energy carriers (gas, water, steam, compressed air, etc.) and environmental and process parameters (lighting level, temperatures, heat energy, statuses, alarms, etc.).

It manages historical data (numerical and graphical reports), online measurements, power quality (PQ), calendars, measurement campaigns, event logs, alarms, cost centers, data export and import, Baseline, EnPI (Energy Performance Indicators), KPI (Key Performance Indicators), and more.

With additional options, it can automatically generate and send emails with various types of customized reports. It can also display and manage, through an internet browser on devices such as PCs, tablets and smartphones, the data, measurements and instantaneous and historical charts acquired from Electrex instruments.

Energy Brain and Electrex devices are the ideal tools for energy audits, continuous monitoring (e.g. ISO 50001) and energy efficiency projects (e.g. Directive 2012/27/EU and White Certificates, or Energy Efficiency Certificates).

WHAT'S NEW IN VERSION 7.X

The main new features introduced in version 7.x are:

- All data is collected in a single database and a single table
- Configuration files and formulas are stored in the database
- Virtual channels / formulas take up no space in the database and do not need to be recalculated every time they are modified
- Internationalization in Spanish and German (English, Portuguese and Polish already available)

The following features have also been introduced in the Pro 7.x version:

- Ability to use the WEB API (Web Application Programming Interface) programming tools
- Ability to transmit data via the MQTT protocol
- Choice of PostgreSQL or Microsoft SQL Server database
- Navigator mode: simplifies navigation between locations and channels
- Multiple chart tabs
- Display of multiple periods in charts
- Validation/Editor of collected data
- Pro Virtual channel management: e.g. calculations and charts for Baseline, EnPI (Energy Performance Indicators), KPI (Key Performance Indicators), etc.
- Import of external data (e.g. hours worked, pieces produced, Baseline, etc.) in Excel or CSV (or in other formats on request)
- Download of Open Log quantities
- Management and interconnection of third-party instruments (real-time measurements, holding registers)
- Data download possible even when Energy Brain is not running; ability to download data from different locations in parallel

MAIN FUNCTIONS

The main functions common to Energy Brain 7.x and Pro 7.x are:

- Configuration of Electrex devices; configuration files and formulas are saved in the database
- Customizable charts (display every minute or multiples of it, standard 15 minutes)
- Real-time measurements
- Formulas for calculating cost centers
- Tariff band calendar
- Multiple selectable measurements page
- Software and instrument event logs
- Export of the data displayed in charts
- Export of measurement campaigns to Excel files
- Power quality management (table of swells, dips and interruptions) and saving of power quality events
- Management of load operating times
- Alarm management
- Time series management to optimize data display and sharing
- Software management of all Electrex instruments, including the new Femto Pro and Pico Pro series and the Milli sensor options
- Multilingual support

COMMUNICATION

The software can communicate with Electrex devices through:

- Local connections (Ethernet via cable or Wi-Fi)
- Remote connections (Internet, GSM)
- Both local and remote connections simultaneously

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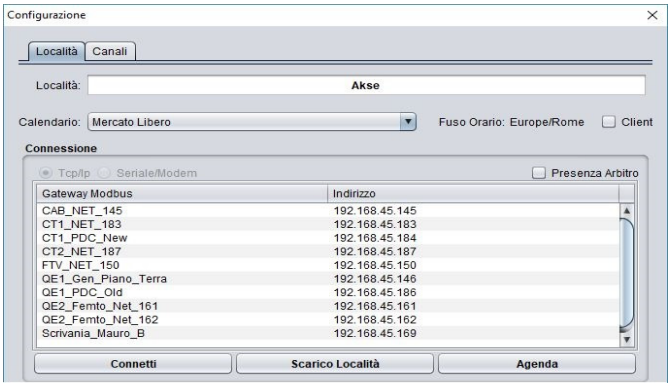
ENERGY BRAIN 7.X FUNCTIONS

Device and schedule configuration

This function, also available as a stand-alone product called Energy Brain 7.x Configurator, lets you configure the network of Electrex devices and the parameters of each device (“channel” in Energy Brain), such as communication speed, Modbus address, CT ratio, etc.
It is the section used to configure the network of instruments and transducers that the software must support.

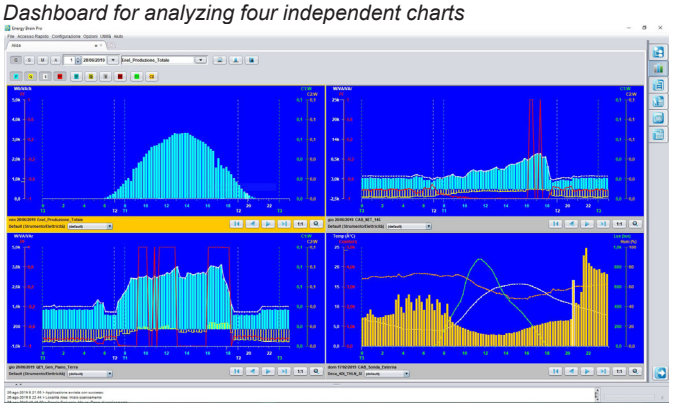


Each location can be assigned different communication modes with specific customizations. Data can be retrieved manually and/or automatically by defining a schedule for timed download. Access to the configuration menu can be password-protected.

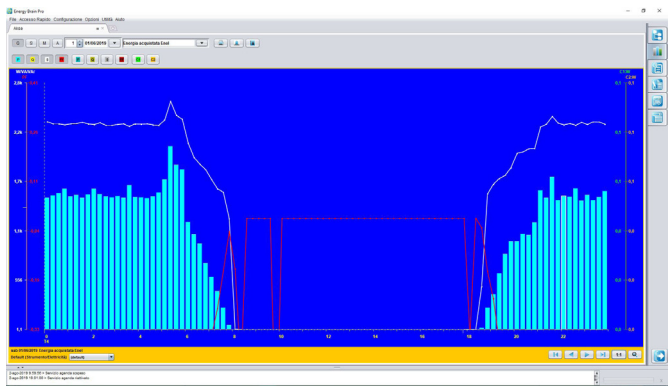
Standard charts

They show daily load/production curves, or consumption/ production on a weekly, monthly or yearly basis. The displayed data can always be exported, and reading and interpretation are made easier by sharing them with an AI system.
Some examples of chart displays:

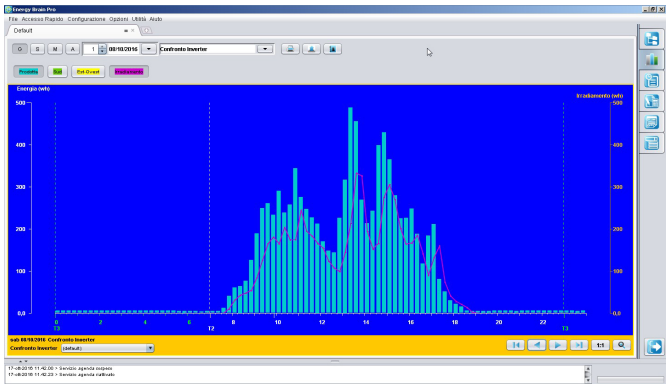
Dashboard for analyzing four independent charts



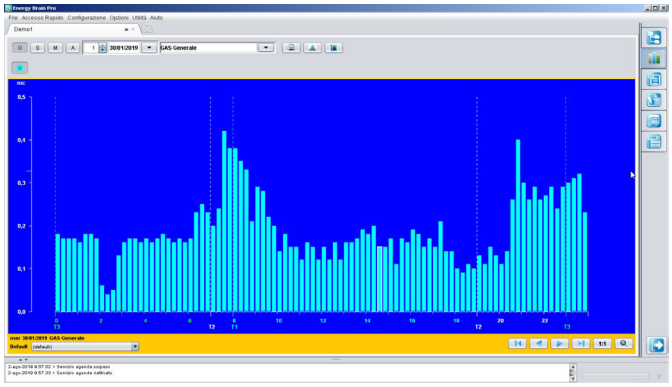
Daily electricity purchased (photovoltaic production)



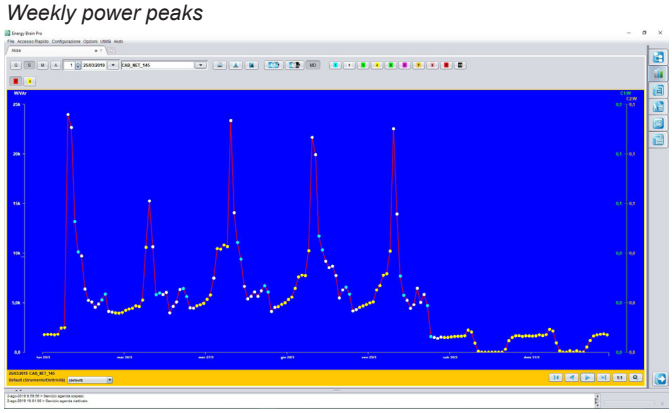
Electricity production trend and irradiation of a photovoltaic plant



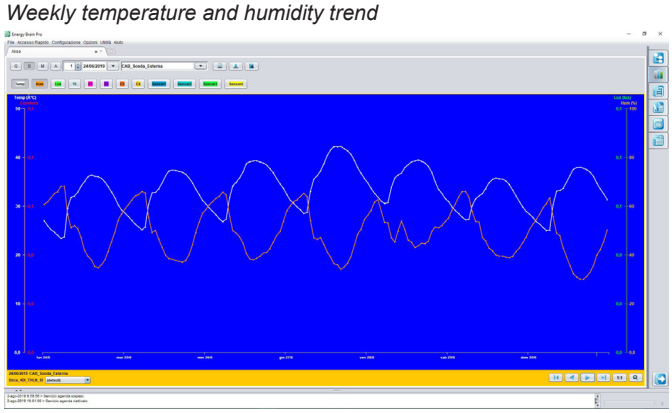
Daily gas consumption



Weekly power peaks



Weekly temperature and humidity trend



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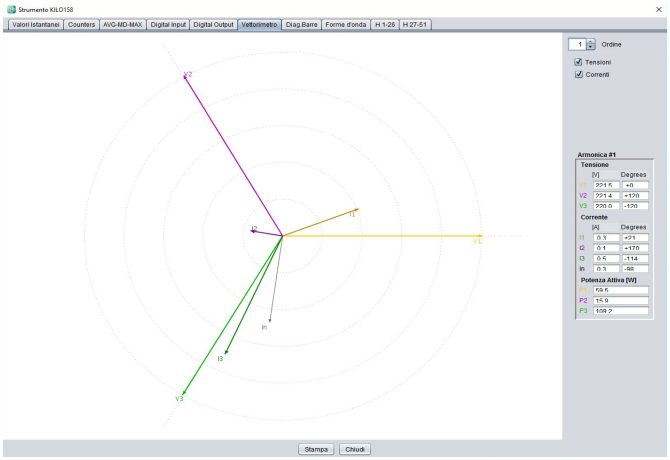
Real-time power quality charts

Manages the charts for instruments with power quality functions. Available when the instruments are connected in real time.

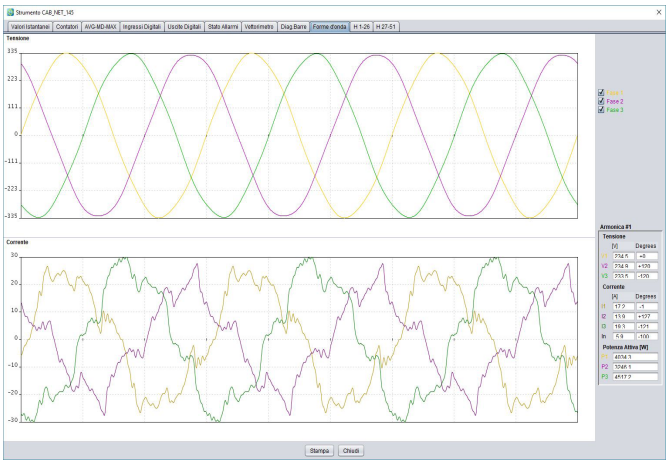
Phasor diagram for voltages and currents



Bar chart with harmonic distortion



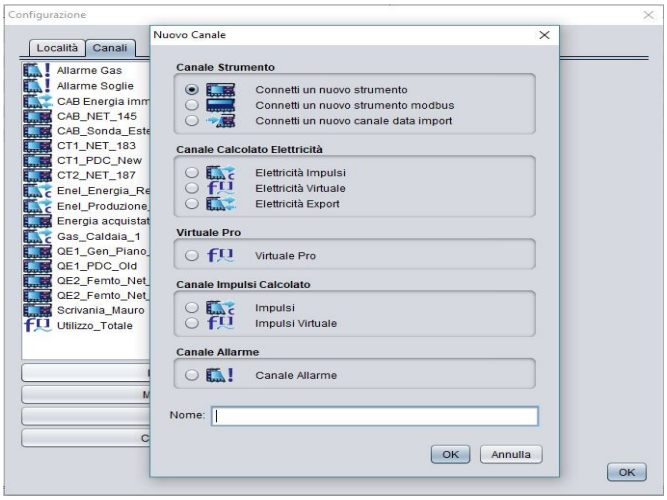
Waveforms



Customizable charts

The software can manage special charts configurable with custom units of measurement. This function makes it possible to display measurements generated by transducers of various energy-related quantities (e.g. gas, water, luminosity, temperature, humidity, steam, heat energy, pressure, etc.). Various instruments in the Electrex range have inputs (or can have them with the relevant input option) to which these transducers can be connected.

Example of a customizable chart configuration panel.



- Electricity pulse / 3i chart: to be used, for example, when the data comes from counting electricity energy pulses from the GME, or from an instrument with 3 single-phase inputs
- Virtual electricity chart: when you want to overlay several electricity curves in the same chart (an electricity multichannel)
- Generic virtual chart: when you want to overlay several curves with different units of measurement, for example electricity, gas and temperature (a mixed multichannel)
- Virtual pulse chart: to be used, for example, when the data comes from counting non-electrical pulses, such as gas, water or heat energy

Formulas

This function is used to generate various formulas. For example, to automatically calculate energy consumption/production and energy costs/revenues, on a daily, monthly or yearly basis or over a period chosen by the customer.

They also make it possible to run cost simulations with different tariff structures, to assess the convenience of different suppliers. Some of the most important uses are the allocation of costs by department or by production process, in order to assess the impact of energy on costs, identify any waste, etc.

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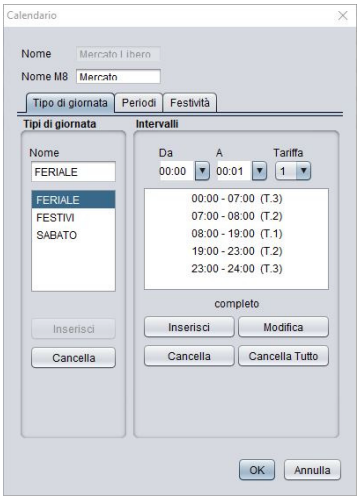
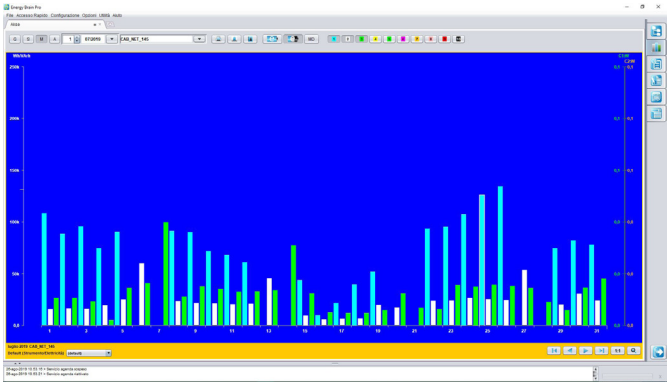
Tariff band calendar

Energy Brain lets you create and apply calendars with different tariff bands over the course of the day and the year.
The tariff structure can be applied to each location or to individual channels.

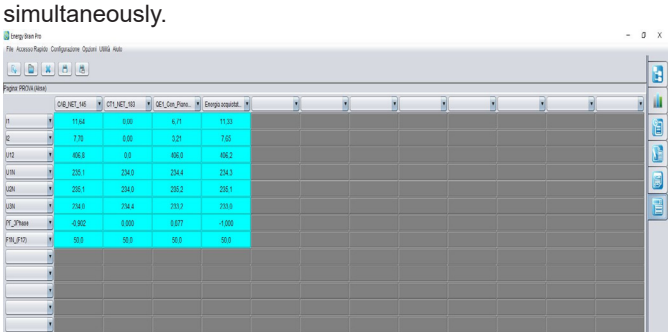


Monthly electricity consumption by tariff band.



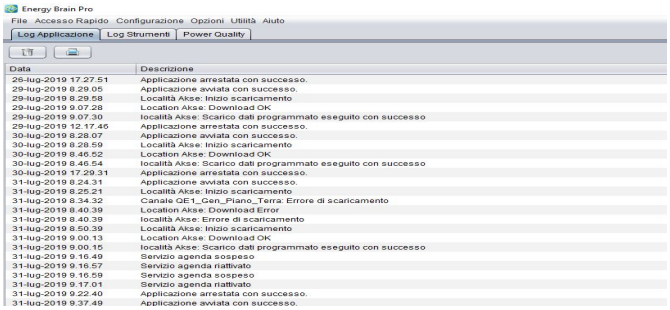
Multiple measurements

You can create dashboards showing the instantaneous measurements of several Electrex devices at the same time. This is useful for monitoring several points of the plant simultaneously.



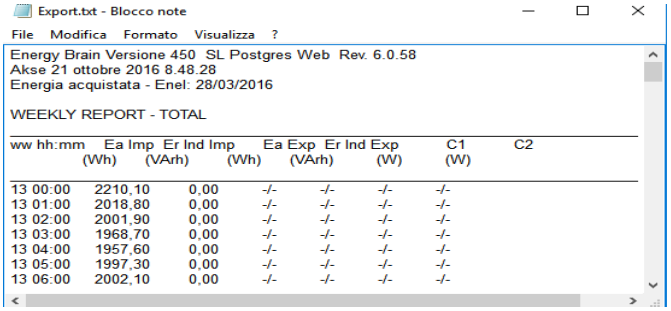
Software and instrument event log

All operations performed and events occurring while the software is in use are recorded. This is very important for identifying erroneous operations, with a log system for monitoring connections to the software.



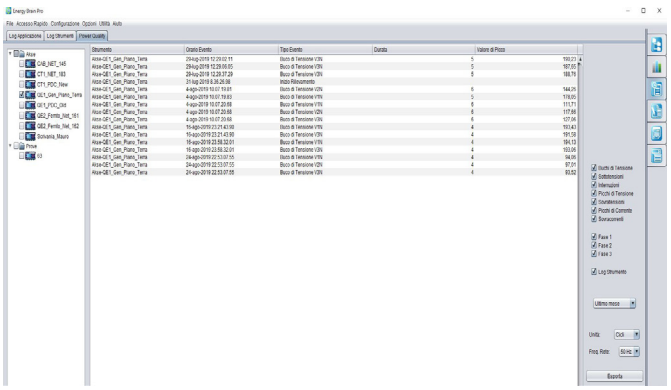
Export of data displayed in charts

In the horizontal toolbar, by clicking the  available buttons you can export to Excel or .txt format the measurements that make up the chart currently displayed.



Power quality management (swells, dips, etc.)

In the vertical selection bar on the left, clicking the status button  opens a window with three tabs, one of which is Power Quality. There you select the desired instrument and set the proposed variables (e.g. dip, swell, interruption, etc., the phase(s), the desired period) to display the events table. You can then export the table (CSV, XLS) using the “Export” button.



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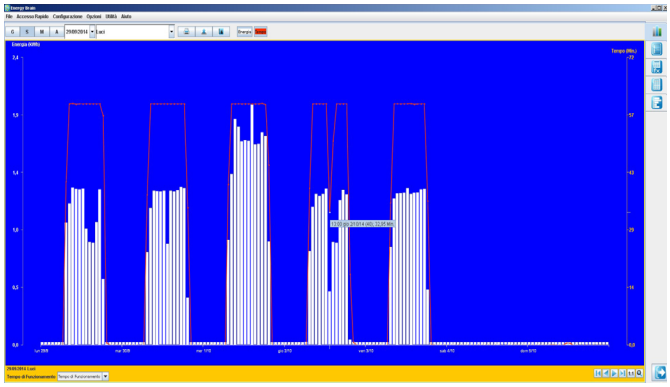
Load operating time management

By configuring the system to record the operating time of the load concerned, based on the state of a switch or on a threshold being exceeded (e.g. the motor of a machine, a lighting system, etc.), you can then display it graphically.

Measurement of a load's consumption in relation to its operating time.



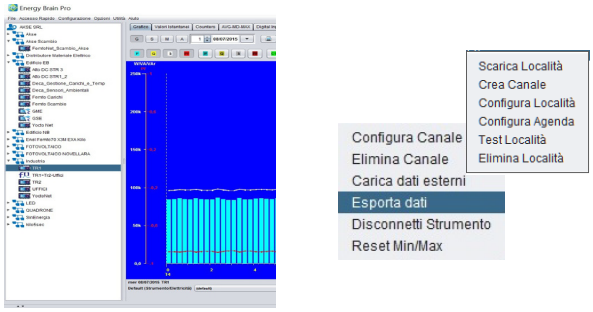
ADDITIONAL FUNCTIONS IN ENERGY BRAIN PRO 7.X

The following features have been introduced in the Pro 7.x version:

Navigator mode

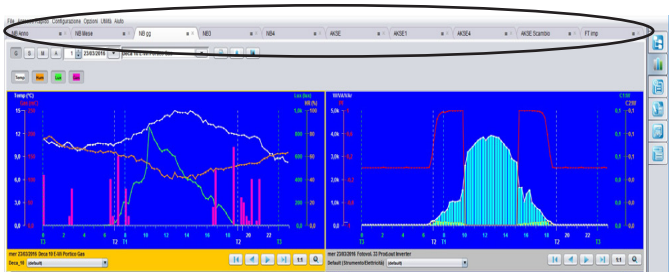


Navigator mode simplifies navigation between locations and channels. The Navigator button (the first at the top) in the button bar on the right opens a left sidebar (Navigator bar) with a tree diagram of the instrument networks configured in your Energy Brain Pro 7.x. After activating the connection with the instruments, right-clicking on the location or device to be managed brings up a shortcut menu with the operations that can be performed.



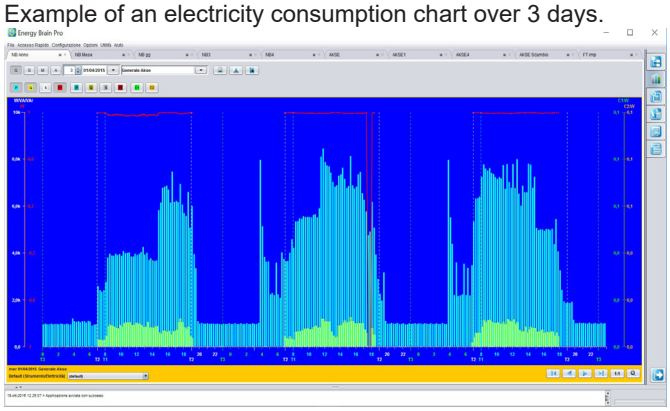
Multi-tab display

In the Pro version you can configure several display tabs, each consisting of 4 simultaneous charts, to speed up visual analysis on networks with many instruments.



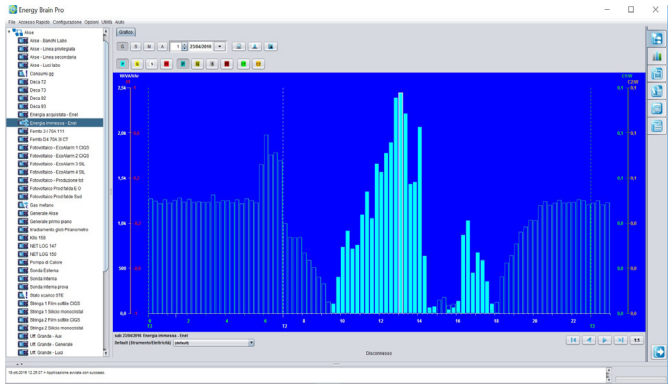
Multi-period display

Multi-period display lets you chart extended periods, for example several days, several weeks, etc.
Example of an electricity consumption chart over 3 days.



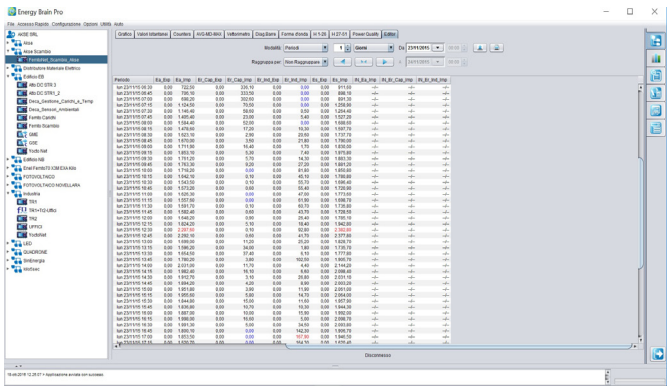
Import/Export energy display

If measured downstream of the bidirectional meter, for example because you have a photovoltaic system or a biogas generator, with Energy Brain 7.x you can display the consumption and grid feed-in charts as two separate charts, while with Pro 7.x you can display them on the same chart.



Data validation editor

Sometimes measurements are missing for a certain period (for example, the instrument was switched off by accident) or are incorrect (for example, the CT ratio or the multiplier coefficient was entered wrongly). In these cases the problem can be remedied. Missing data can be inserted/edited, and it is saved differently to ensure traceability. For internal purposes, the various calculations you then perform will be closer to reality.



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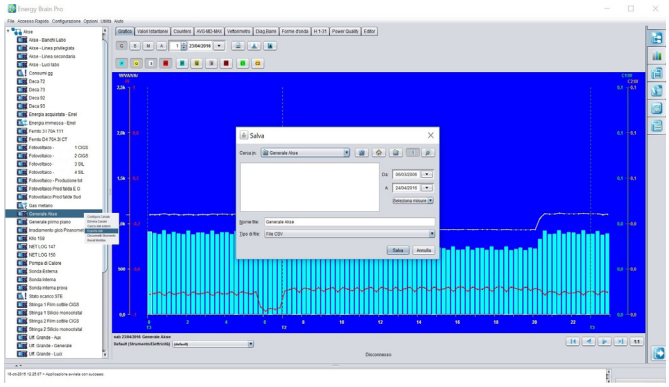
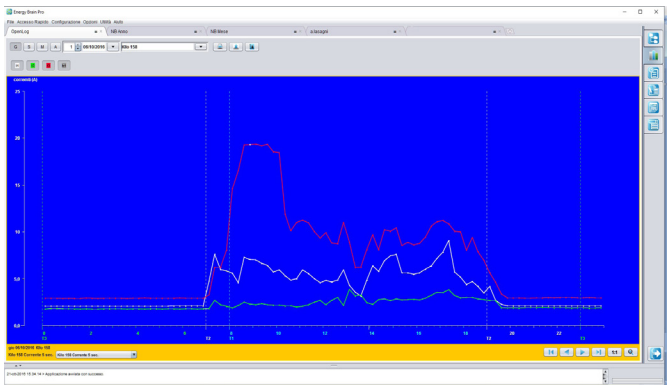
Database export with filter

From the shortcut menu of an instrument in the Navigator bar you can select Export data. A Save window appears where you can choose the period, the type of measurements, the file type (e.g. CSV) and where to save it.



Download of Open Log quantities

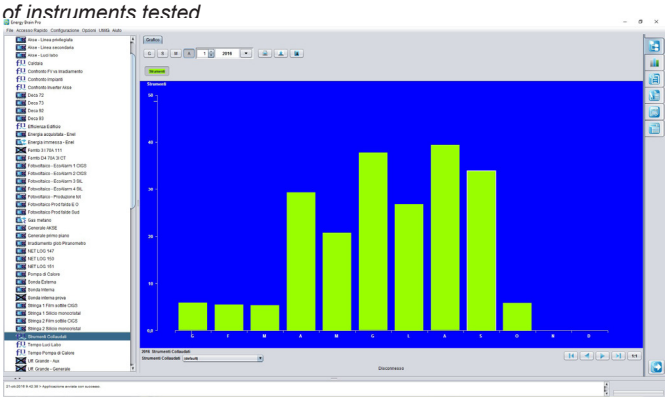
Energy Brain Pro also stores measurement parameters other than energy carriers, with a sampling time different from the quarter hour, allowing them to be displayed graphically. An example is the chart below, showing the three phase currents sampled every minute.



Import of external data

In the Pro version you can import into a channel CSV / Excel files with a specific structure, to add a chart with data external to the measurement, such as hours worked, pieces produced, Baseline, etc. You can also create tools and channels to import data from management systems via database connections, file access or the API protocol.

Example of a chart created from an Excel file with the daily quantities of instruments tested

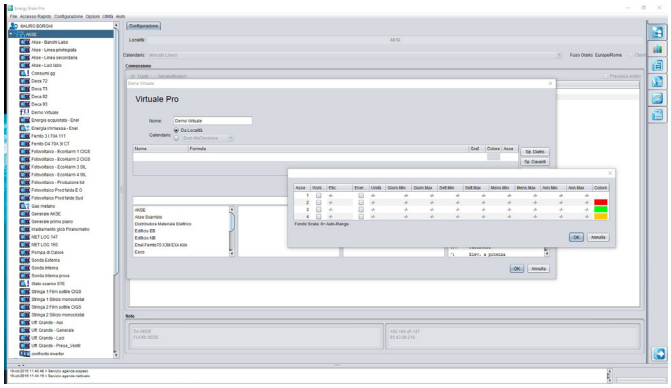


You can also export the data of previous years to Excel, rework it taking into account the variables that will affect the current year, correct it if needed for the shift of Saturdays and Sundays, and then re-import it as a forecast chart.

Special virtual channel management

With Pro 7.x you can create special virtual channels containing formulas, for example arithmetic, algebraic, conditional, etc. This is very useful for creating elaborate charts such as EnPIs (Energy Performance Indicators) or KPIs (Key Performance Indicators).

Example of a special chart configuration.



Example of a forecast chart of energy consumption, with the current year as a line chart and the previous year as a bar chart.

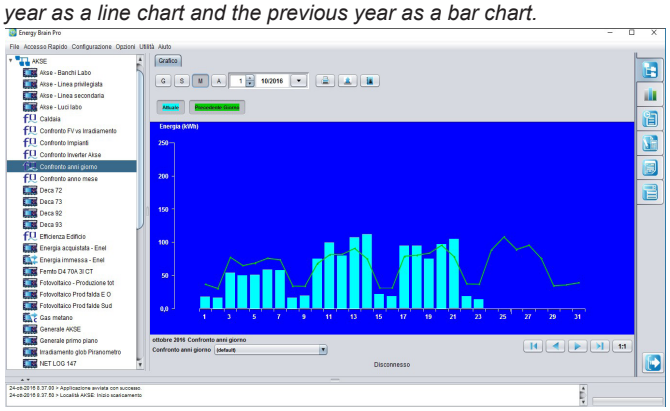
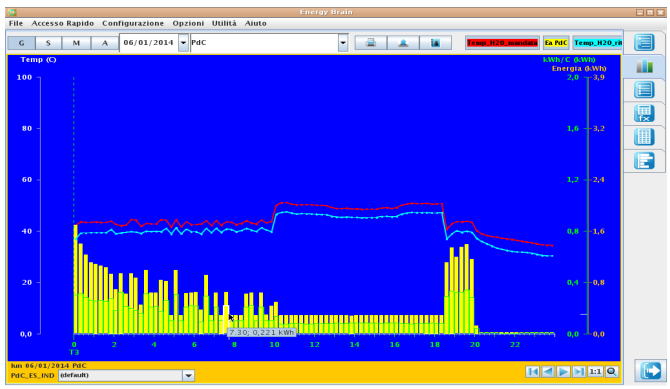


Chart of the efficiency of an electric heat generator, defined as the ratio between temperature difference (Delta T) and the generator's consumption.



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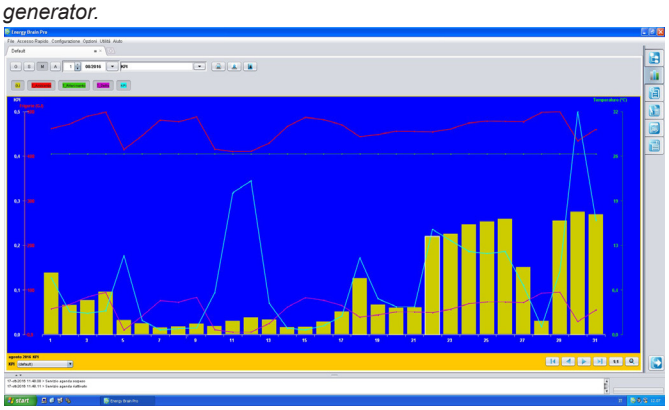
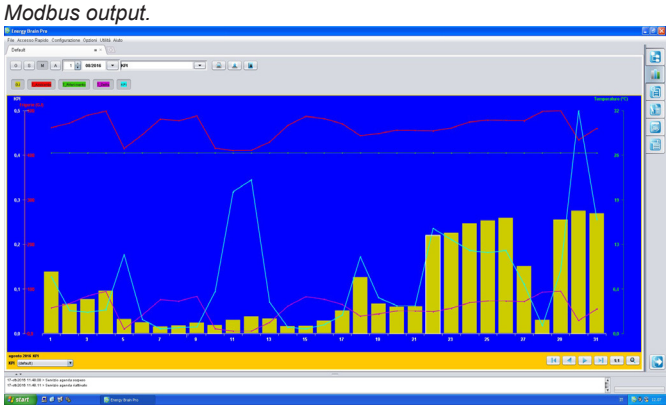
KPI (Key Performance Indicator) calculation for a gas-fired heat generator.



Energy Brain Pro 7.x Custom

An option of the Energy Brain PRO 7.x software with PostgreSQL database that makes it possible to integrate up to 4 identical standard Modbus RTU devices into the Energy Brain Pro 7.x software (the same number of channels must already be available in Energy Brain Pro). For standard Modbus RTU devices that differ from each other, one Custom Option must be purchased for each. The customer must provide the register map and the register types.

Example of measurements acquired from a battery charger with Modbus output.



Energy Brain Master or Client

The software is available in both Master and Client mode. If there are several PCs with Energy Brain on the network, only one can be the Master.
The Energy Brain Client version cannot configure the parameters of individual devices or the clock/calendar, but it can perform all the other functions described above.

Energy Brain Client can be used in the following modes:

- *Instrument Client: has the same functions as the Master version, but cannot change the instrument configuration. It can therefore configure the network structure, download instrument data automatically or manually, and generate its own database completely independent of the Master. The configured network structure can be the same as the Master's, or part of it.*
- *Database Client: can be used for data analysis on different PCs connected to the Ethernet network. The Clients use the data in the Master's database.*

Versions by maximum number of channels

The software is available in the following versions, defined by the maximum number of channels that version can manage (channels meaning real instruments and devices):

- **Energy Brain 4: manages up to 4 channels**
- **Energy Brain 8: manages up to 8 channels**
- **Energy Brain 16: manages up to 16 channels**
- **Energy Brain 32: manages up to 32 channels**
- **Energy Brain 300: manages up to 300 channels**
- **Energy Brain > 300: contact the sales office for more details**

You can start from the base version, Energy Brain 4, and expand it at different times up to Energy Brain 300 or beyond.

Energy Brain is available with hardware protection via USB key, or with software protection tied only to the PC on which it was installed.

System requirements

- Minimum hardware requirements: PC with 2 GHz processor, 4 GB RAM, 500 GB hard disk, USB port, network card.
- System software requirements: Windows 10, Windows 7 SP1, Windows Server 2008, Windows Server 2012, Windows Server 2016, Windows Server 2019.
- Virtual servers: the same hardware and software requirements listed above apply.
- For the version with a hardware USB protection key, make sure a physical USB port is available.

Upgrading from versions prior to 7.x

Energy Brain software versions prior to 7.x (for example 5.21) can be upgraded to 7.x or Pro 7.x, subject to conversion of the database to the current PostgreSQL structure and, if necessary, replacement of the protection key.

For particularly old versions of Energy Brain, a double conversion is required. Contact the sales office for more details.

EB PRO 7.x with PostgreSQL or Microsoft SQL Server

Energy Brain Pro 7.x software can be ordered with the standard PostgreSQL database or with a Microsoft SQL Server database (the customer must hold the Microsoft SQL Server license). Conversion from PostgreSQL to Microsoft SQL Server is possible.

ADDITIONAL OPTIONS

Energy Brain can be expanded with the following additional options.

Energy Brain WEB API

An Energy Brain Pro option that makes it possible to use the programming tools known as WEB API (Web Application Programming Interface) to access the Energy Brain Pro data archive and/or Electrex instruments of the NET series quickly and effectively.
Queries are made via HTTP commands formatted in JSON. The responses, also JSON-formatted, can contain historical values (e.g. energy purchased in one day grouped by quarter hour, temperature, humidity and lux of one day grouped by hour) or instantaneous values (e.g. instantaneous power, temperature, counters, etc.).
This option simplifies the interconnection of the Electrex system with other systems, for example the company's production management system.

Energy Brain MQTT/MQTTS

An Energy Brain Pro option that makes it possible to receive data via the MQTT/MQTTS protocol.
The messages sent to the MQTT broker are JSON-encoded and contain the measurements and the identifiers that make it possible to trace both the individual instrument that measured them and the variable measured. The set of measurements sent is configurable. An encrypted connection (TLS) can be used. Channels, messages, alarms and tools have been implemented to retrieve data from third-party systems or instruments that use the same protocol.

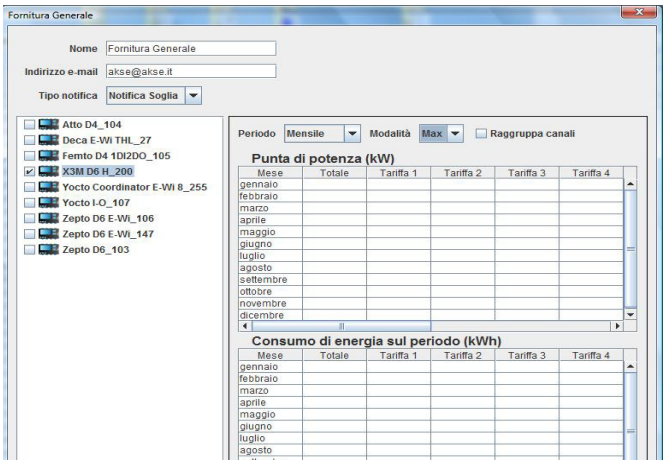
Energy Brain Counters

An Energy Brain option, but also stand-alone software. It is used to generate reports containing the energy counter values of all the instruments in any location of the network. The report can be exported in HTML or CSV format and imported into Excel. The Windows scheduler can be set up to launch the application at regular intervals.

Energy Brain Log Report

Enables automatic sending of emails with three types of report:

- Report on download errors
- Report on user-defined threshold exceedances
- Report on energy consumed / produced



Energy Brain Personal Report

For anyone who wants to automate the sending of energy reports, such as energy consultants.

The option automatically produces and sends periodic reports (daily, weekly, monthly and yearly) based on the data collected in the Energy Brain database.

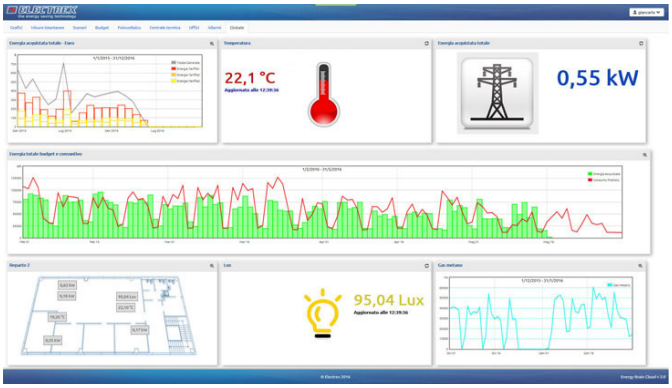
Since Energy Brain version 5.12, the measurement table for the report can be configured directly from the software. The report exported as an Excel file (which can also contain several channels and different locations) is then available for final layout using a template made ad hoc, for example to add logos, charts, images, etc. The report exported to Excel can also be included as an attachment in an email or saved automatically via FTP.



Energy Brain Cloud e Option Personal Cloud

Makes it possible to view and manage, through an internet browser on devices such as PCs, tablets and smartphones, the data, measurements and instantaneous and historical charts acquired from Electrex instruments. For further information, see the relevant product sheet.

The Energy Brain Personal Cloud option is also available and can be added to an Energy Brain application license. It is a single-user version of Energy Brain Cloud that can only be used on the PC where the Energy Brain application is installed.







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ELECTREX the energy saving technology

Engineered and manufactured in Italy
Made in Italy
Pensato, progettato e prodotto in Italia

ORDERING CODES

TYPE	CODICE
Energy Brain 7.0 Configurator	PFSW300-006
Energy Brain 7.x Versions	
Energy Brain 4 7.X HK PostgreSQL	PFSW312-PH7
Energy Brain 4 7.X SK PostgreSQL	PFSW312-PS7
Energy Brain 8 7.X HK PostgreSQL	PFSW310-PH7
Energy Brain 8 7.X SK PostgreSQL	PFSW310-PS7
Energy Brain 16 7.X HK PostgreSQL	PFSW315-PH7
Energy Brain 16 7.X SK PostgreSQL	PFSW315-PS7
Energy Brain 32 7.X HK PostgreSQL	PFSW200-PH7
Energy Brain 32 7.X SK PostgreSQL	PFSW200-PS7
Energy Brain 300 7.X HK PostgreSQL	PFSW190-PH7
Energy Brain 300 7.X SK PostgreSQL	PFSW190-PS7
Energy Brain PRO 7.x Versions	
Energy Brain Pro 8 7.X HK PostgreSQL	PFSWP310-PH7
Energy Brain Pro 8 7.X SK PostgreSQL	PFSWP310-PS7
Energy Brain Pro 32 7.X HK PostgreSQL	PFSWP200-PH7
Energy Brain Pro 32 7.X SK PostgreSQL	PFSWP200-PS7
Energy Brain Pro 300 7.X HK PostgreSQL	PFSWP190-PH7
Energy Brain Pro 300 7.X SK PostgreSQL	PFSWP190-PS7
Energy Brain CLIENT 7.x Versions	
Energy Brain 8 Client 7.X HK PostgreSQL	PFSW320-PH7
Energy Brain 8 Client 7.X SK PostgreSQL	PFSW320-PS7
Energy Brain 32 Client 7.X HK PostgreSQL	PFSW250-PH7
Energy Brain 32 Client 7.X SK PostgreSQL	PFSW250-PS7
Energy Brain 300 Client 7.X HK PostgreSQL	PFSW240-PH7
Energy Brain 300 Client 7.X SK PostgreSQL	PFSW240-PS7
Energy Brain PRO CLIENT 7.x Versions	
Energy Brain Pro 8 Client 7.X HK PostgreSQL	PFSWP320-PH7
Energy Brain Pro 8 Client 7.X SK PostgreSQL	PFSWP320-PS7
Energy Brain Pro 32 Client 7.X HK PostgreSQL	PFSWP250-PH7
Energy Brain Pro 32 Client 7.X SK PostgreSQL	PFSWP250-PS7
Energy Brain Pro 300 Client 7.X HK PostgreSQL	PFSWP240-PH7
Energy Brain Pro 300 Client 7.X SK PostgreSQL	PFSWP240-PS7
UPGRADE from Energy Brain to Energy Brain 7.x	
Upgrade EB 4 to EB 4 7.X PostgreSQL	PFSW396-007
Upgrade EB 8 to EB 8 7.X PostgreSQL	PFSW396-017
Upgrade EB 16 to EB 16 7.X PostgreSQL	PFSW396-027
Upgrade EB 32 to EB 32 7.X PostgreSQL	PFSW396-037
Upgrade EB 300 to EB 300 7.X PostgreSQL	PFSW396-047
UPGRADE from Energy Brain CLIENT to Energy Brain CLIENT 7.x	
Upgrade EB 8 Client to EB 8 Client 7.X PostgreSQL	PFSW396-C17
Upgrade EB 32 Client to EB 32 Client 7.X PostgreSQL	PFSW396-C37
Upgrade EB 300 Client to EB 300 Client 7.X PostgreSQL	PFSW396-C47
UPGRADE from Energy Brain to Energy Brain PRO 7.x	
Upgrade EB 4 to EB Pro 4 7.X PostgreSQL	PFSWP397-007
Upgrade EB 8 to EB Pro 8 7.X PostgreSQL	PFSWP397-017
Upgrade EB 16 to EB Pro 16 7.X PostgreSQL	PFSWP397-027
Upgrade EB 32 to EB Pro 32 7.X PostgreSQL	PFSWP397-037
Upgrade EB 300 to EB Pro 300 7.X PostgreSQL	PFSWP397-047

ORDERING CODES

TYPE	CODE
UPGRADE from Energy Brain CLIENT to Energy Brain PRO CLIENT 7.x	
EB 8 Client to EB Pro 8 Client 7.X PostgreSQL	PFSWP397-C17
EB 32 Client to EB Pro 32 Client 7.X PostgreSQL	PFSWP397-C37
EB 300 Client to EB Pro 300 Client 7.X PostgreSQL	PFSWP397-C47
UPGRADE from Energy Brain 7.X to Energy Brain PRO 7.X	
EB 4 7.X PostgreSQL to EB Pro 4 7.X PostgreSQL	PFSWP398-007
EB 8 7.X PostgreSQL to EB Pro 8 7.X PostgreSQL	PFSWP398-017
EB 16 7.X PostgreSQL to EB Pro 16 7.X PostgreSQL	PFSWP398-027
EB 32 7.X PostgreSQL to EB Pro 32 7.X PostgreSQL	PFSWP398-037
EB 300 7.X PostgreSQL to EB Pro 300 7.X PostgreSQL	PFSWP398-047
UPGRADE from Energy Brain CLIENT 7.X to Energy Brain PRO CLIENT 7.X	
EB 8 Client 7.X PostgreSQL to EB Pro 8 Client 7.X	PFSWP398-C17
EB 32 Client 7.X PostgreSQL to EB Pro 32 Client 7.X	PFSWP398-C37
EB 300 Client 7.X PostgreSQL to EB Pro 300 Client 7.X	PFSWP398-C47
Energy Brain expansions by number of manageable channels	
Upgrade EB 4-8	PFSW332-00
Upgrade EB 8-16	PFSW335-00
Upgrade EB 16-32	PFSW337-00
Upgrade EB PRO 32-300	PFSW350-P00
Energy Brain CLIENT expansions by number of manageable channels	
Upgrade EB Client 8-32	PFSW340-00
Upgrade EB Client 32-300	PFSW355-00
Energy Brain software options	
Option Energy Brain Log Report	PFSW430-00
Option Energy Brain Personal Report	PFSW400-00
Bundle Personal Report, Log Report, Counters	PFSW440-00
Energy Brain software options for Custom Modbus-RTU devices	
Option Energy Brain Pro 7.X Custom 4	PFSWP399-007
Option Energy Brain Pro 7.X Custom 8	PFSWP399-017
Option Energy Brain Pro 7.X Custom 16	PFSWP399-027
Option Energy Brain Pro 7.X Custom 32	PFSWP399-037
Energy Brain 7.x (or CLIENT) BUNDLE with software options	
EB 32 7.X Bundle, Personal Report	PFSW0E0-017
EB 32 7.X Bundle, Personal Report, Log Report, Counters	PFSW0E0-027
EB 300 7.X Bundle, Personal Report, Log Report, Counters	PFSW0E0-037
EB 32 Client 7.X Bundle, Personal Report, Log Report, Counters	PFSW0E0-C27
EB 300 7.X Bundle, Personal Report, Log Report, Counters	PFSW0E0-C37
Energy Brain PRO 7.x (or CLIENT) BUNDLE with software options	
EB Pro 32 7.X Bundle, Personal Report	PFSWP0E0-017
EB Pro 32 7.X Bundle, Personal Report, Log Report, Counters	PFSWP0E0-027
EB Pro 300 7.X Bundle, Personal Report, Log Report, Counters	PFSWP0E0-037
EB Pro 32 Client 7.X Bundle, Personal Report, Log Report, Counters	PFSWP0E0-C27
EB Pro 300 7.X Bundle, Personal Report, Log Report, Counters	PFSWP0E0-C37

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ORDERING CODES

TYPE	CODE
Energy Brain Cloud 6.X 32-100 SK	PFSWEC1-SK6
Energy Brain Cloud 6.X 300-1000 SK	PFSWEC2-SK6
Energy Brain Personal Cloud option	
Option Energy Brain Personal Cloud	PFSWEC0-020
Energy Brain WEB API option	
Option Energy Brain WEB API	PFSW470-00
Energy Brain MQTT option	
Option Energy Brain MQTT	PFSW480-00
DB conversion from PostgreSQL to Microsoft SQL Server	
Conv. PostgreSQL a Microsoft SQL Server	PFSWSQL-00
Energy Brain PRO versions with Microsoft SQL Server database	
Codes as for the previous Energy Brain Pro PostgreSQL versions, but with "M" as the fifth letter instead of "P". Example:	
Energy Brain Pro 300 7.X SK M.SQL Server	PFSWM190-PS7

NOTES

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