

General

Frequently asked questions regarding general topics.

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Does the eGauge require calibration?

All EG30xx and EG4xxx meters are calibrated during production. Once this initial calibration has been performed, the meter requires no ongoing inspections, maintenance, or calibration.

Although all meters are calibrated to the same standard during the production process, meters may optionally be purchased with a calibration certificate. This certificate can only be generated **at the time of purchase**. For an sample certificate, see [this article](#).

How do I export data to a spreadsheet?

It is possible to export data from the eGauge directly into a spreadsheet file. This file is in the CSV format, which is compatible with most common spreadsheet software. Note that certain software may attempt to truncate rows, which can lead to cells filled with # symbols - if this happens, the cell should be resized to fit the text it contains.

The video tutorial below contains a complete walkthrough for the CSV export functionality.

<https://www.youtube.com/embed/utIfD34JAuk?wmode=opaque>

Where can I find my device name?

Each eGauge meter has a unique device name (also referred to as hostname) that identifies the meter to the egaugenet.com proxy server. You will need this name to access your eGauge via the proxy server. The device name is also required when requesting technical support for a meter. The device name is visible in a number of locations.

For EG30xx and eGauge2 hardware (without external LCD):

- On the front label of the eGauge
- On the packaging included with the eGauge
- On the Installation Sheet included with the eGauge

For EG4xxx (with external LCD):

- Main menu -> Info -> Name using the LCD display ([full user manual](#) for LCD display)
- On the packaging included with the eGauge
- On the Installation Sheet included with the eGauge

If you are viewing the eGauge via the web interface, you can also find the device name by:

- Checking the URL, which is usually in the form **egaugexxxx.egaug.es** or **egaugexxxx.d.egaugenet.com**
- After January 1, 2024 EG4xxx or newer meters may also be found at a URL in the form **egaugexxxx.egaug.io**
- Looking at the value in the "hostname" field (**Settings -> Network Settings**)

If you are unsure of the name of an eGauge that is connected to your network, you can open your router's configuration page and look for a list of active DHCP leases. Assuming the eGauge is connected using DHCP, it should have an entry in this table containing the hostname, current IP address, and MAC address (always starts with F8 2F 5B with the exception of some eGauge2 models, which may start with 00 50 C2). Because of the number of routers available, we cannot offer specific steps to find this information through the router interface; you should contact your router manufacturer or Internet Service Provider for additional support.

Where do I find the MAC address for my device?

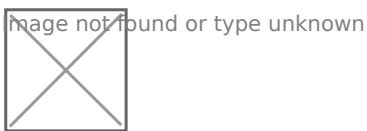
Every eGauge meter has at least one MAC address. The MAC address can be used to identify the meter on a local network. It may also be requested by technical support staff to establish proof of ownership.

Broadly speaking, there are two ways to obtain the MAC address for a meter - either through the user interface (requires valid credentials) or by physically inspecting the meter.

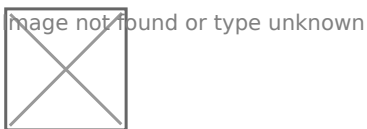
All eGauge Models (EG4xxx, EG30xx)

The MAC address can be obtained through the user interface with valid credentials. To view a MAC address:

1. From the main graph page, select **View** and then **Device Status**



2. On the Status page, locate "MAC Address" (near the bottom of the page).



3. Click the "Look Up" link on this page. If your browser already has valid credentials cached, the link will be replaced with the device MAC address. Otherwise, you will be prompted to enter a valid username and password.

For meters purchased on or after Jan 2021, the factory credentials are printed on the side of the meter.

For meters purchased prior to Jan 2021, the factory credentials are user: **owner** pass: **default**.

Note that these credentials may have been changed.

eGauge support cannot provide the password currently set on a meter or the default password on meters shipped on or after Jan 2021.

4. If "Lookup failed (retry)" appears, it means the credentials used do not have the appropriate permission level to view the device MAC address. If this happens, click the **LAN Access** link in the top right corner of the page, then repeat steps 1-3. Note that the computer must be on the same network as the eGauge for this to work.

EG4xxx (eGauge Core, eGauge Pro)

The EG4xxx has multiple MAC addresses depending on which interface is used.

The MAC address listed on the device label is the MAC address for the HomePlug interface and will be seen in DHCP leases if using HomePlug communication. It can also be found in the LCD screen in Info -> MAC.

If using Ethernet-direct, the MAC address is 2 greater than the MAC on the label.

For example,

HomePlug: f8:2f:5b:01:26:e1

Ethernet: f8:2f:5b:01:26:e3

HomePlug: f8:2f:5b:00:2b:c8

Ethernet: f8:2f:5b:00:2b:d0

EG30xx (and older)

The eGauge has one or two MAC addresses, depending on model. The first address is for Ethernet network communication (through the router or local area network). The second MAC address is associated with HomePlug power-line communication, and is only present in the EG301x model line.

The Ethernet MAC address (for EG300x and EG301x) may be found:

- On the back of the eGauge main unit
- On the installation information sheet (if EG300x)
- Displayed on the "Status" page (<http://DEVNAME.egaug.es/status.html> - requires username and password, replace **DEVNAME** with the [device name](#) of your device)
- On the packaging sleeve included with the eGauge (if EG300x)

The HomePlug MAC address (for EG301x) may be found:

- On the installation information sheet
- On the packaging sleeve included with the eGauge

Either MAC address may be used for device registration or verification of ownership. The MAC address associated with a HomePlug adapter (not the eGauge unit) may **not** be used for this purpose.

What can I do if I've lost my device password?

Passwords may be reset **through eGuard**. The eGuard user must have manager or administrative access to the meter in their portfolio.

First, make sure you are accessing the eGauge correctly. By default, the factory credentials on the eGauge can only be used from a computer connected to the same network as the eGauge *and* after clicking on the **LAN Access** button in the top right corner of the main graph page. As a general rule, if you can see a proxy server address in your browser's address bar (http://**devname**.egaug.es or http://**devname**.d.egaug.net or https://**devname**.egaug.io) the factory credentials may not work depending on the permission level set on the owner account.

For meters purchased on or after Jan 2021, the factory credentials are printed on the side of the meter.

For meters purchased prior to Jan 2021, the factory credentials are **owner / default**.

eGauge support cannot provide the password currently set on a meter *or* the default password on meters shipped on or after Jan 2021.

If these credentials do not work (for example, if they were changed in the past and you no longer remember your password), you can request a password reset from eGauge support. Simply email support@egaug.net with your **device name** and **MAC address**. Both pieces of information are required. Also note that your eGauge must be online and connected to the proxy server in order to perform a remote password reset. eGauge support does not have the ability to view or recover previously set passwords.

You may be able to register your device in eGuard and perform a password reset through there. See [this article](#) for more information.

Note that the credentials used to access egaug.net are *not* the same as the credentials used to access a specific meter. The password reset functionality on egaug.net will only reset the password for egaug.net, and will not change the password used to access a specific meter.

How do I power cycle the eGauge?

"Power Cycling" means to briefly remove power from the eGauge in order to cause a hard reboot. No stored data is lost when performing a power cycle. Power cycling is most often done in situations where the eGauge webserver interface is not responding. However, power cycling may be recommended in other cases - for example, if network changes invalidate the DHCP lease, power cycling the eGauge will cause it to request a fresh lease and become available faster.

In most installations, the eGauge meter (not to be confused with the [HomePlug adapter](#)) is powered directly from a circuit breaker or breakers. In your breaker-panel, locate the breaker to which the eGauge is wired. This breaker should be labelled "eGauge Disconnect" or something similar. In a residential installation, it is usually a two pole breaker (similar to that used by a stove or dryer). In buildings with three phase power (typically large commercial/industrial settings), it will be a three pole breaker or three single pole breakers. Some services outside the United States may only use a single pole breaker (single phase power).

The EG4xxx model eGauge can be rebooted from the LCD screen by navigating to **Tools -> Reboot**. This will usually result in the same outcome as actually power cycling the eGauge.

Once you locate the breaker, trip it so power is off, wait 5 seconds, then turn it back on. Normally, there is a single multi-pole breaker for eGauge, but in some cases there may be two or three separate breakers (one per phase/leg). In the latter case, turn off all eGauge breakers, leave them off for 5 seconds, then turn them all back on.

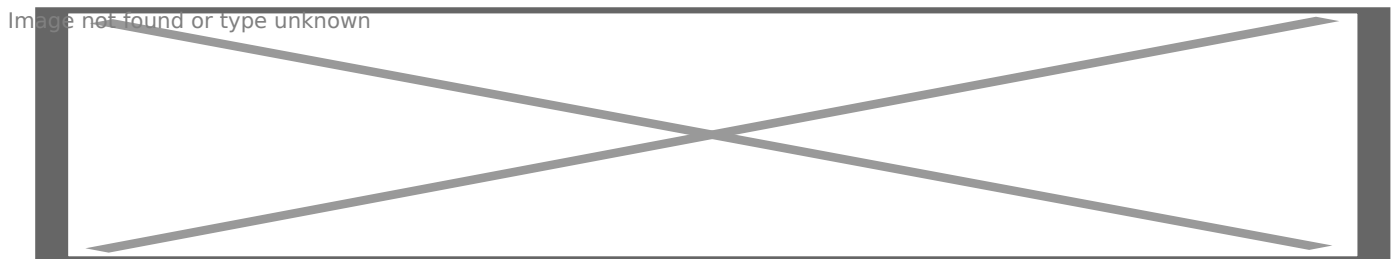
How do I perform a backup and restore of the eGauge data?

The eGauge meter has the ability to back up data recorded on the device, and restore it to any eGauge meter with the same register configuration. This includes eGauge meters from different hardware revisions - for example, a backup file from EG30xx hardware can be applied to EG4xxx or eGauge2 hardware. The register configuration must be **identical** (including spelling, capitalization, spacing, etc). Registers that do not exist on the destination device will be ignored, and registers that **do not have a match in the backup file** will be overwritten with zeros.

For saving data to a spreadsheet, please see our [video tutorial](#) on exporting data as a CSV file. Note that a backup file cannot be viewed or edited directly.

To save a backup to a USB device, please see our article on [USB Export Functionality](#).

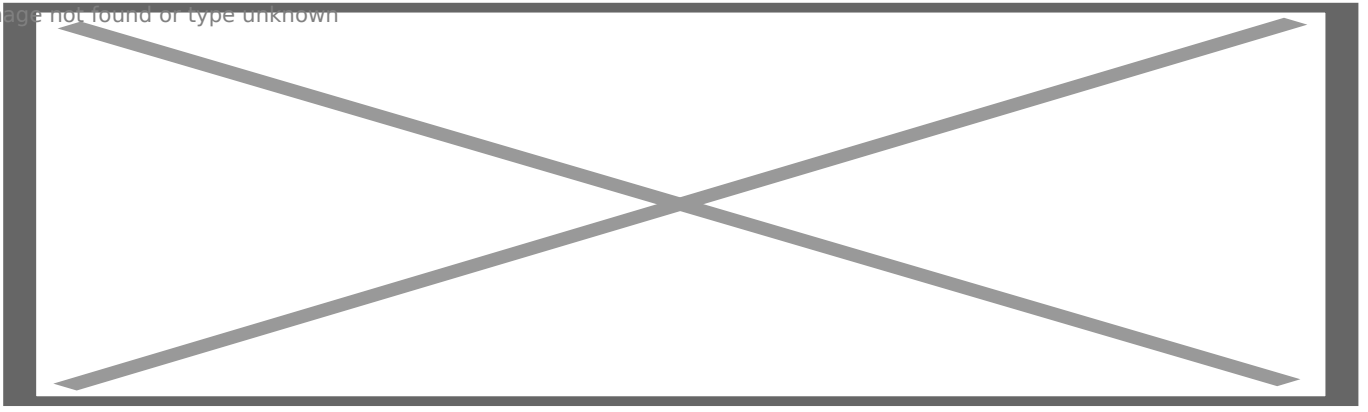
The backup tool is found in **Tools > Backup**. From here, you can choose whether to perform a full backup, or partial backup. If performing a partial backup, choose the time range for the data to be backed up from. The backup file will be named backup-**DEVNAME**.bin where **DEVNAME** is your [eGauge device name](#). This file is only used for restoring data to the eGauge; it cannot be processed or modified. CSV and .bin files are **not** interchangeable.



Backup page

To restore a backup file, navigate to **Tools > Restore**. From here, you can choose a full restore (all data in the backup file is restored), or a specific range. When choosing full restore, note that the backup file will overwrite any data on the device. This means if the backup file includes a date range where the eGauge has blank data (eg, prior to configuration, or due to a power outage), this blank data will overwrite potentially valid data in the same time period on the device.

Image not found or type unknown



Restore page

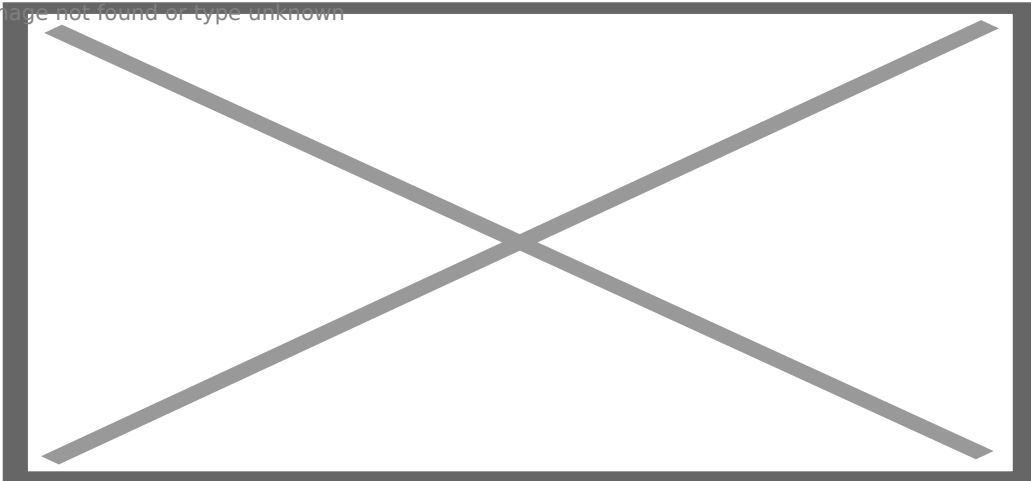
If uncertain about how much data is in the backup file, only restore the range of data necessary (ie, the data that is missing).

If restoring fails or hangs, please attempt the restore from the same LAN the eGauge resides on. This is done by using a computer connected to the same network as the eGauge, and clicking on **LAN Access** in the top right of the main graph page before performing the restore.

Why do I see negative generation overnight?

Inverters require power to function, even in standby mode. When there is no production (for example, during the night or when panels are covered with snow) this power is drawn from the utility. Thus, inverters will show negative generation (actually inverter consumption) during periods where there is not enough production to offset inverter consumption. If an eGauge is properly configured, this overnight consumption will be reflected in the total site usage and does not need to be added back in manually.

Image not found or type unknown



Example of "negative production" (inverter standby consumption)

What is proof of ownership, and why do I need to provide it?

eGauge meters may be registered to a specific individual or company, or they may be unregistered. In either case, when a request is made for a password reset, configuration change, or group change, **proof of ownership** may be required. Proof of ownership generally establishes that the individual requesting device changes is authorized to make those changes to a specific eGauge meter. Furthermore, this prevents inadvertent changes to the wrong device (this could happen if a device name was typed incorrectly, for example).

At least one of the following pieces of information are required to establish proof of ownership:

- [Device name](#) **and** [MAC address](#)
- Photo of device clearly showing device name
- Invoice number for device purchase (if purchased through eGauge)
- An email from the current registrant of the device

Instances where the above cannot be provided are addressed on a case by case basis. eGauge support cannot make any changes to a device without proof of ownership.

What is excess?

Excess is a value that results from a master eGauge losing contact with certain remote registers, such as power values from a remote, secondary eGauge. It generally does not appear on eGauges without remote devices.

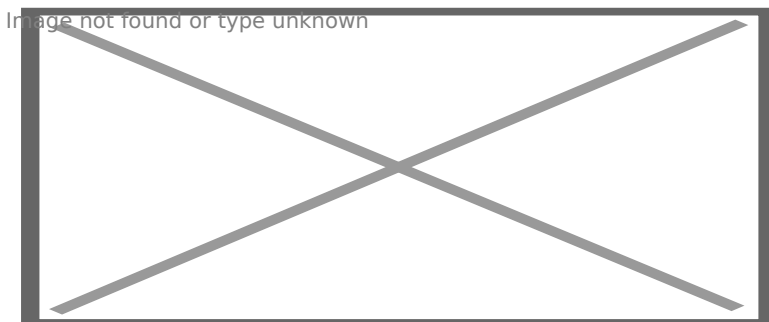
When a master eGauge re-establishes communication with a lost device, cumulative values (energy or kWh) on the master eGauge need to "catch up" to the remote device's cumulative values. This ensures that the data imported from the remote eGauge and the data measured by the master eGauge match at second granularity.

The master eGauge "catches up" to the remote device by adjusting the instantaneous (power or kW) values +/- a maximum of 10%, until the cumulative values (kWh) match. The amount difference between the master eGauge and its remote register is considered excess.

This allows cumulative values like kWh (energy) to match between the master and remote device, even though there was a loss of communication. To summarize, when there is excess after communication loss, the instantaneous values on the master are adjusted +/- 10% until cumulative values match.

How do I check for excess?

Excess values for a register can be checked at <http://DEVNAME.egaug.es/cgi-bin/egaug?teamstat>, where **DEVNAME** is the [device name](#) of the master eGauge. Any value other than 0 in the <excess> tags indicates an accumulation of excess for that register. Local registers, such as power calculations, will always have an excess value of zero.



Output from <http://DEVNAME.egaug.es/cgi-bin/egaug?teamstat> - no excess is present on the Grid register

How do I get rid of excess?

Excess will naturally decrease as the instantaneous values are adjusted +/- 10% until it reaches zero. If it is undesirable to allow the excess to decrease naturally, excess can be cleared immediately by visiting <http://DEVNAME.egaug.es/cgi-bin/protected/egaug-cfg?clearexcess> where **DEVNAME** is the name of your eGauge. This may be the case if there was an unreasonably long loss of a remote device, such as several months. Note your device must be running firmware v3.01 or greater to clear excess.

This command will *immediately* release excess in the form of a spike on the graph. Cumulative values (like energy/kWh) will now match between the master eGauge and remote devices. The resulting spike will be proportional to the missing kWh, and since it will be recorded in a one-minute granular entry, it will appear to be erroneously high. However, looking at the time from from when the remote device was lost, to the point of the spike or later, both cumulative (kWh/energy) and instantaneous averages (kW/power) values are correct.

If cumulative values on the master eGauge are unimportant and the spike is undesired (for example, if excess was generated as part of the initial configuration process), you may see our tutorial on [clearing spikes](#) for information on how to clear this data from the device. Keep in mind, the spike and excess essentially contain the data that *would* have been written to the register over time, so erasing excess or spikes will invalidate data used for billing and other purposes.

What settings should I avoid changing?

The eGauge has a number of settings which can be modified by the end user. Some of these are relatively benign, while others can impact accuracy or even break network connectivity outright. This article is intended to provide first-time users with a brief overview of which settings can be experimented with and which settings should be left alone, along with sample consequences for changing these settings. Note that this list is not exhaustive - only the most serious examples are included here (changes that will ruin meter data, break connectivity, or cause similar major problems).

Settings under **Settings -> Preferences** are generally related to appearance, and can be safely modified. However, it's prudent to make a backup (screenshot) of this page before making major changes.

Settings that can cause **accuracy** issues:

Changing anything under **Settings -> Installation** can cause massive accuracy issues. Most of these changes will cause incorrect readings from the time they are applied moving forward. Generally, these settings should be properly configured when the eGauge is first installed and then left alone. Incorrectly recorded data cannot be adjusted or recovered.

Changing the "Date & Time" under **Settings -> Date & Time** will cause data to be recorded with incorrect timestamps. Depending on the change, it may cause the eGauge to "roll back" and write over data which has already been recorded. This setting should be automatically managed if the eGauge is connected to an NTP server.

Settings that can cause **connectivity** issues:

Changing "Proxy server hostname" under **Settings -> General Settings** or *any* setting under **Settings -> Network Settings** can cause a loss of communication. This can be limited to the proxy server connection (meaning the meter would still be accessible over the local network) or can also impact the local connection (eg, invalid static IP addressing) making the meter inaccessible over the local network as well.

Pairing the eGauge with the wrong HomePlug adapter under **Settings -> HomePlug** can completely break HomePlug (powerline) communication. If in doubt, it's usually not necessary to

pair the eGauge with a HomePlug.

Making changes to **Settings -> BACnet** or **Settings -> Modbus Server** can break communication with remote devices which read data *from* the eGauge. The effects of this might not be noticeable through the eGauge UI itself.

Settings that can cause **other** issues:

Modifying alerts under **Settings -> Alerts** can break expected alert behavior. For example, adding a new alert with a higher priority level can prevent lower priority alerts from sending a notification in a timely manner. However, these settings can be safely experimented with if a copy (screenshot) of the original settings is made, as they have no impact on communication or stored data.

Changing the "System Language" setting under **Settings -> General Settings** can be annoying if a language is selected which is not understood by the user, but has no major impact on device functionality.

Changing the "Min. interval for public usage data" under **Settings -> General Settings** will cause the Channel Checker to display no values and may cause the graph to look "choppy" unless valid credentials are used to log in to the eGauge meter. This is the intended behavior of this setting. The stored data on the meter is not affected by this change, and it can always be turned off if desired.



(EG4xxx) How do I interpret the status toolbar on the LCD?

The status toolbar at the top of the LCD display provides a quick overview of device status. When navigating the LCD menus this information is usually available, although a few menus won't display the status toolbar. The page numbers in the top right corner are only displayed when multiple menu pages are available. For a full overview of the LCD display functionality on the EG4xxx, see our [LCD Tutorial](#).



Aside from the page number, there are three primary pieces of information which are always displayed, as described below:

Heartbeat indicator

Alternates between full  and empty  indicating that the unit is active and display is working. This should always be blinking - if it is not, it may indicate an error with the eGauge software or hardware.

Connection type

Shows the communication technology in use. There are four possible connection types:

 **Unknown** (generally shown immediately after reboot)

 **WiFi**

 **Ethernet**

 **HomePlug**

If the Connection Type icon is flashing on and off, it indicates the eGauge meter is connected to the proxy server and accessible remotely on the internet via it's proxy URL. If solid, it indicates the eGauge is unable to connect to the proxy server and will not be accessible remotely via the proxy URL.

Link quality

A bar indicating connection strength. A single dot indicates 0% signal. The taller the bar, the stronger the signal.

indicates 0% signal
Image not found or type unknown

indicates 20% signal
Image not found or type unknown

indicates 40% signal
Image not found or type unknown

indicates 60% signal
Image not found or type unknown

indicates 80% signal
Image not found or type unknown

indicates 100% signal
Image not found or type unknown

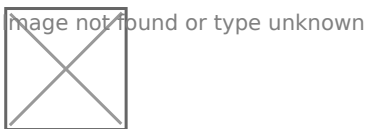
Note that this value updates every couple of seconds, so it may lag behind the actual connection strength.

The full LCD manual [may be found here](#).

(EG4xxx) How do I change what registers display on my LCD?

The EG4xxx model eGauges have a built-in LCD display. One of the features is that it will "scroll through" and display instantaneous and cumulative values for existing registers. By default, instantaneous and cumulative values for **all** configured and newly added registers will be displayed in the rotating LCD list.

To configure which registers appear on the LCD, navigate to **Settings -> LCD**. In the below example, Generation is not selected because there is no generation, and the cumulative value for "Voltage L1" is not displayed because volt-hour values are not useful. The "Usage", "Grid" and "Subpanel 1" registers will all display the instantaneous (kW) and cumulative (kWh) values in the LCD display.

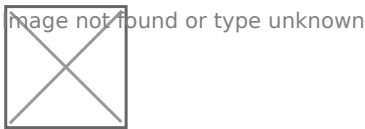


Note that some register types may not make much sense when displayed as cumulative values (voltage) or instantaneous values (pulse counts). This tool allows the user to set which registers are displayed, and whether those registers show cumulative, instantaneous, or both values. This tool does not have any impact on the data displayed on the main graph page, and does not effect the data recorded by the eGauge. This feature is exclusive to EG4xxx models.

The full LCD manual [may be found here](#).

How much data can the eGauge store?

The eGauge hardware (including models in the eGauge2, EG30xx, and EG4xxx model lines) have a variety of database configuration options. Database options are denoted by the number of available registers (typically either 16 or 64). You can determine the database you are using by viewing the number of registers in **Settings -> Installation**. Installers can also view the database configuration of registered devices through [eGuard](#). The eGauge records data in a circular database; when it is full, the oldest data point is dropped to make room for the newest (incoming) data point.



Register header on the Installation page of a 16 register device

EG4xxx hardware

By default, all EG4xxx hardware comes with the 64 register database option. Data is stored as follows:

64 Register database

- 1 hour second-granular data (*typical*)*
- 1 year minute-granular data
- 10 years 15 minute-granular data
- 60 years of day-granular data

When there is over one year of data, the oldest minute-granular values are compressed 15 minute-granular intervals to make room for the newest minute-granular values to be written.

** Second-granular data is stored in volatile memory and cleared on power cycle or reboot. Starting in firmware v4.0.16, the total length of second-granular storage depends on the number of configured registers and update frequency.*

The amount of second-granular volatile storage for a meter using a 64 register database and the default 1Hz update frequency is described below (note that these values may change slightly between firmware versions):

64 registers in use: approximately 4.5 hours.

32 registers in use: approximately 9 hours.

16 registers in use: approximately 18 hours.

2 registers in use: approximately 72 hours.

eGauge2 and EG30xx hardware

All eGauge2 and EG30xx devices have the most recent 10 minutes of second-by-second data stored in volatile memory (reboot or power cycle will clear the 10-minute history).

16 Register database

- 10 minutes of second-granular data
- 1 year minute-granular data
- 30 years 15-minute-granular data

When there is over one year of data on the 16 register device, the oldest minute-granular values are compressed to 15 minute-granular intervals to make room for the newest minute-granular values to be written.

64 Register database

- 10 minutes of second-granular data
- 1 year minute-granular data
- 6 years hour-granular data

When there is over one year of data on the 64 register device, the oldest minute-granular values are compressed to hour-granular intervals to make room for the newest minute-granular values to be written.

Advanced

It is possible to view the current database capacity of most eGauge meters by appending /cgi-bin/get?db to the end of the URL used to access the meter. For example:

Via proxy server - <https://egaugexxxxx.egaug.es/cgi-bin/get?db> for meters connecting to the Classic proxy (eGauge2, EG3xxx models, EG4xxx shipped prior to January 2024)

<https://egaugexxxxx.egaug.io/cgi-bin/get?db> for meters connected to the eGauge.io proxy (EG4xxx shipped after January 1, 2024)

Via hostname on local network - egaugexxxxx.local/cgi-bin/get?db

Via IP address on local network - 192.168.1.55/cgi-bin/get?db

Note that 'egaugeXXXXX' and '192.168.1.55' must be replaced with the actual [device name](#) or IP address of your specific meter. The information returned should look something like this:

```
egauge-logger: database has space for 64 registers:  
    1.0 year of minutely data  
    10.0 years of quarterly data  
    60.0 years of daily data
```

This summary page does not include the second-granular data stored in volatile memory. EG4xxx meters store one hour of second-granular data, EG30xx and older meters store ten minutes of second-granular data.

NOTE

Some devices may have special ordered databases not listed here. Contact your purchaser. Capacity and granularity are based on the number of **possible** registers, not the number of registers in use. This means a 64 register database will always hold 6 years of hour granular data, regardless of the number of registers actually in use.

eGauge Support Library

Welcome to the eGauge Support Library! Here, you will find all sorts of information related to the eGauge meter hardware, eGauge software, other eGauge products, and supported third party hardware.

Meters sold after June 1, 2023 may default to the Modern User Interface which requires a device login. For more information, please click [here](#) for documentation.

If you want to explore, try clicking "[Shelves](#)" in the upper right-hand corner of the screen, typing something in the search bar at the top of the screen, or choose a shelf below.

Getting Started:

Installation and Configuration
Overview, tips and tricks for a
successful installation

Click [HERE!](#)





Frequently Asked Questions



Hardware Shelf



Software and Configuration

How do I factory reset the eGauge?

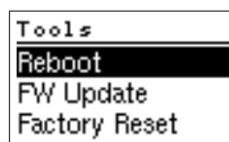
In certain situations, it may be necessary or desirable to perform a factory reset on an eGauge meter (for example, when moving a meter to a new site, or if the meter is set with an unknown static IP address). The process to perform a factory reset varies based on the meter model.

A factory reset will erase all historical data stored on the meter and will revert all settings to their default values. This should be an option of last resort.

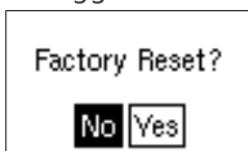
EG4xxx meters

EG4xxx meters feature an external multi-position switch and an LCD display. The factory reset option can be accessed through the LCD menu.

1. Press the multi-position switch in.
2. Toggle left or right until the "Tools" option appears. Press the multi-position switch in.



3. Toggle left or right until "Factory Reset" is selected. Press the multi-position switch in.
4. Toggle left or right until "Yes" is selected. Press the multi-position switch in.



The meter will factory reset after "Yes" is selected. This will restore the meter's settings to the factory defaults, including everything on the **Settings**, **Network Settings**, and **General Settings** pages.

EG30xx meters

EG30xx meters feature an internal pushbutton. A .7mm diameter or smaller probe or tool is required to reach the push button (a small paperclip works well for this purpose).



To perform the factory reset, hold down the push button with the paperclip for about 30 seconds until the Status LED on the front of the meter alternates between green and red. Timing is crucial here - if the button is released too early or too late the meter may not factory reset. It may take multiple tries to successfully perform a factory reset.

There are other blinking patterns which will appear while waiting for red/green, continue to hold the push button when these appear.

This will restore the meter's settings to the factory defaults, including everything on the **Settings**, **Network Settings**, and **General Settings** pages.

Note that there are several push button options available - care should be taken to ensure the correct option is selected. Otherwise, it's possible to accidentally unpair the eGauge from the HomePlug adapter (if this happens, a factory reset will resolve the issue).

Push Duration	Status LED	Description
0.5 - 3 seconds	rapidly blinks blue/off	Join Mode: eGauge will attempt to pair with an existing HomePlug AV network
13 - 16 seconds	rapidly blinks red/blue	Leave Mode: eGauge will randomize its HomePlug AV key, effectively unpairing the meter

20 - 30 seconds	rapidly blinks red/green	Factory Reset: eGauge restores itself to factory settings
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Older meters

Older eGauge meters (eGauge2 and original eGauge1 meters) do not have a factory reset option.

What is a Register?

The eGauge meter stores data points in **registers**. Each register contains a cumulative value for a given data point. Any value stored by the eGauge is assigned a register, regardless of the source (raw reading from a sensor/voltage input, calculated values such as power, or values imported from other devices). A register is a single numerical value with an associated unit type, and cannot be de-aggregated. For example, a power register is calculated from the line voltage multiplied by amperage multiplied by power factor, but only a single value for power is stored in the register itself, meaning that amperage could not be derived from a power value. This can be represented by the equation $V \cdot I \cdot PF = X$; the register only stores the value X , and it's not possible to calculate a value for V , I , or PF with just X .

The eGauge has a finite number of register "slots" available. On most EG4xxx meters there are 64 registers available; most EG30xx meters have either 16 or 64 registers available. For more information on database capacity, see [this article](#).

It's often helpful to use analogies to discuss registers and associated concepts. Registers can be visualized as columns in a spreadsheet, where each row is the cumulative value of the register at a given date and time. Consider the following example, using dollar values:

Date	Food	Utilities	Misc Expenses
1/4	\$70	\$250	\$895
1/3	\$55	\$250	\$655
1/2	\$40	\$250	\$584
1/1	\$25	\$100	\$522
12/30	\$10	\$100	\$500

Each column is a register (Food, Utilities, Misc Expenses), and each row contains the cumulative value for each register at a given date and time.

Let's focus on the Food column. The cumulative value of the Food column increases every day by \$15. You can find the amount spent on food over a given period by finding the difference between any two values in the Food column. For example, from 12/30 to 1/4, the total spent on food was $\$70 - \$10 = \$60$, or an average of \$15 per day over four days.

In contrast, Utilities and Misc expenses don't change by a fixed value every day. The Utilities register value increases by \$150 between 1/1 and 1/2, but doesn't increase after that. The Misc

Expenses value increases by a different amount each day. However, the earlier concepts still hold true - to find the amount spent over a given period, simply find the difference between the starting value and ending value for that period.

Now, let's move on to some more complex concepts. Most registers are **bidirectional**, meaning their value can increase *or* decrease depending on the measurement. This is common with solar production - the register value increases during the day as the PV array produces power, but then decreases overnight by a small amount due to inverter draw in standby mode. In our monetary example, a negative value might indicate a return or refund on a specific day.

It's also important to note that registers are not **retroactive**, meaning they'll only record values from the time they're created moving forward. For example, if the meter is initially installed and configured on 1/1 but a new register is added on 1/5, all original registers will contain data from 1/1 onward but the new register will only contain values from 1/5 onward.

Date	Food	Utilities	Misc Expenses	Coffee
1/6	\$100	\$250	\$910	\$10
1/5	\$85	\$250	\$865	\$5
1/4	\$70	\$250	\$895	
1/3	\$55	\$250	\$655	
1/2	\$40	\$250	\$584	
1/1	\$25	\$100	\$522	
12/30	\$10	\$100	\$500	

In the example above, a new register was added to track expenditures on Coffee. Since this register was added on the 1/5, there is no historical data on coffee spending. On 1/4 there was also a refund in the Misc Expense register, so the cumulative register value actually decreased on that day.

The relationship between registers can also be calculated using virtual registers. This essentially allows the user to add or subtract register values from one another without using another register slot on the eGauge meter. In the monetary example above, let's say the user is interested in their total consumable cost (Food + Coffee), so they create a virtual register to track the total of those two registers.

Date	Food	Coffee	Total Consumables
1/6	\$100	\$10	\$110
1/5	\$85	\$5	\$90
1/4	\$70		\$70
1/3	\$55		\$55

Since Coffee wasn't created until 1/5, the value of Total Consumables is the same as the value of Food prior to that period ($X + 0 = X$).

All of these concepts can be applied to actual eGauge data. In the example below, we have total site usage and EV charger usage expressed in kWh:

Date	Usage (kWh)	EV Charger (kWh)
1/5	17368	429
1/4	17326	429
1/3	17205	420
1/2	17164	420

The EV charger isn't used every day, so the cumulative value doesn't necessarily change from day to day. However, the building as a whole draws power every day, so that value is continually increasing.

To find the building usage on the 3rd:

$$17326 - 17205 = 121 \text{ kWh}$$

The EV charger usage over the same period is:

$$429 - 420 = 9 \text{ kWh}$$

On the 4th, the EV charger didn't run at all. The total building usage is:

$$17368 - 17326 = 42 \text{ kWh}$$

But the EV charger usage is now zero:

$$429 - 429 = 0 \text{ kWh.}$$

These are very simple examples designed to convey some basic concepts. For more advanced reading, please see:

[Interpreting XML Data](#) (focus on XML data, but the concepts apply to CSV data as well)