

Comparison of Communication Options

EG41xx meters with built-in HomePlug communication have been discontinued. If HomePlug communication is required on an EG40xx, one HomePlug adapter may be connected to the eGauge meter's Ethernet port and the other may be connected to the router or modem as in a normal EG41xx setup using HomePlugs.

Overview

The eGauge meter is a flexible piece of hardware. For most use cases bandwidth requirements are quite low (a 500 Kbps connection is the minimum for a good user experience, but the eGauge will function on connections as slow as 128 Kbps). The eGauge can take advantage of many connection types, including direct Ethernet, powerline communication (PLC), WiFi, cellular, and even more exotic hardware such as point to point antennas. As a general rule, if a connection is adequate for a "standard" computing device such as a desktop or laptop computer, the connection will also work with the eGauge meter.

However, there are some pros and cons to various communications options. This article will cover some of the common communications options used with the eGauge meter, with links to hardware supported by eGauge Systems (if applicable). Note that unsupported products may be used, but eGauge Systems cannot guarantee compatibility or functionality of unsupported products.

The eGauge meter will store data even without an active internet connection, although this data will not be visible remotely when the meter is not connected to the internet.

Table of Contents

[eGauge Meter Capabilities](#)

[Ethernet](#)

[HomePlug \(PLC\)](#)

WiFi

Cellular

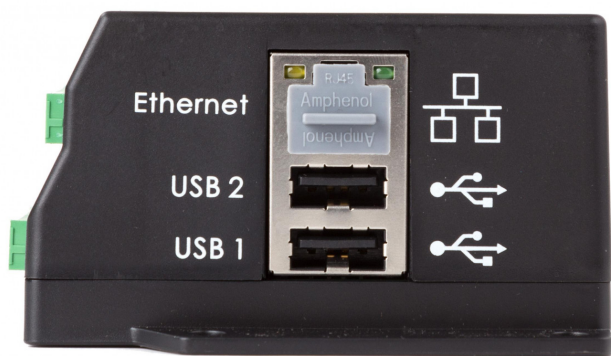
eGauge Meter Capabilities

There are several eGauge hardware revisions, and each revision contains multiple models with different communication options. The following table illustrates the various meter models and built-in communication options. Note that an Ethernet port can be used to connect other devices (such as a WiFi bridge or cellular modem).

Meter Model	Ethernet	WiFi	HomePlug (PLC)
EG4230	X	X	
EG4215	X	X	
EG4030	X		
EG4015	X		
EG4130 (discontinued)	X		X (HomePlug AV)
EG4115 (discontinued)	X		X (HomePlug AV)
EG301x (discontinued)	X		X (HomePlug AV)
EG300x (discontinued)	X		
eGauge2 (discontinued)			X (HomePlug 1.0)

Ethernet

Every eGauge meter currently in production has an Ethernet port, which allows the meter to be connected directly to the customer's network. Ethernet has a distance limit of about 330'/100m. Repeaters can be used to extend this distance in some cases.



EG4130 meter showing Ethernet port (covered with grey protective plug)

An Ethernet connection between the eGauge and the customer's existing network (router or switch) is the most reliable and robust communication option. A wired connection reduces the risk of communication issues due to network changes (such as setting a new password on a WiFi network) or local interference. Ethernet can also be expensive to run, although the cost of running Ethernet is often offset by reduced costs for site visits or troubleshooting time over the life of the meter. A direct Ethernet connection is generally the fastest connection type, although a single meter won't see any substantial benefit from speeds over about 5Mbps. In many cases, a single Ethernet run can support multiple eGauge meters when a powered unmanaged switch is used.

In more secure locations such as hospitals or banks, it may not be possible to connect the eGauge to the customer's network due to network usage restrictions on the customer's end (e.g., only "approved" devices may be connected). Specialized installation and testing tools are generally required for Ethernet installations. It also may be necessary to run the Ethernet cable in suitable conduit depending on code requirements. Ethernet cabling and conduit in large quantities can be expensive, and in residential locations extensive rework may be required to accommodate Ethernet runs.

Pros	Cons
Most stable and reliable, very fast speeds	Expensive to run, requires special tools
Reduce future troubleshooting/support costs	May not be allowed based on network policy

WiFi

[EG42xx](#) model eGauge meters have built-in 2.4 GHz WiFi communication which allows the eGauge meter to connect to nearby 2.4 GHz WiFi networks. WiFi enabled models have an external RP-SMA connector to allow use of the included 3" antenna or a custom high-gain directional antenna for

point-to-point connectivity.

WiFi-enabled eGauge meters also have a "Setup via AP" mode which allows the eGauge to broadcast a wireless network for a one-hour duration to allow initial setup and connection to an existing WiFi network, as well as general use such as temporarily downloading data wirelessly when there is no local network available.

Pros	Cons
No additional Ethernet or power wiring required	May not be usable depending on quality of WiFi coverage

WiFi (external module)

The [EG42xx](#) model meters have built-in WiFi with a larger operating temperature range than external modules such as the AP-WR802N.

The eGauge can be used with a WiFi bridge connected to the Ethernet port, which will allow the eGauge to connect to nearby WiFi networks. eGauge Systems officially supports the [AP-WR802N](#), which can be powered from a USB port and is generally suitable for short distances and residential/small commercial applications. Unsupported WiFi bridges (including directional antennas) may be used, but it may be necessary to obtain configuration assistance from the manufacturer directly - eGauge Systems cannot help with configuration of third party WiFi devices. It is recommended to use the 2.4GHz band whenever possible, as 2.4Ghz has better penetration characteristics and the eGauge can't take advantage of the speeds offered by the 5GHz band.



TP-Link AP-WR802N WiFi bridge. The Ethernet and USB (power) ports are not shown.

Like HomePlug, a WiFi bridge doesn't require any additional wiring to be run between the customer's router/switch and the eGauge, which can reduce initial costs. WiFi bridges are also relatively inexpensive. Some WiFi bridges feature external antennas which can be extended to get the best signal without relocating the bridge itself.

However, WiFi adapters require some configuration and testing, which means they're not as easy to install as a HomePlug adapter. 2.4Ghz WiFi adapters have a maximum range of about 150'/45m indoors, but they may need to be positioned in a specific location to get a good signal. In certain areas (for example, mechanical rooms with lots of conduit and wire in the walls, or block/brick/concrete structures), the WiFi signal may be poor or nonexistent, even if the router is nearby. WiFi signal may be degraded or eliminated by nearby sources of electromagnetic interference. Changing the password or SSID of the WiFi network will require the end user to update the configuration on the WiFi bridge, which may be difficult if the bridge is in a hard to reach location.

Pros	Cons
Relatively inexpensive	Requires initial configuration and testing
Moderate to fast speeds	May not be usable depending on quality of WiFi coverage
Can be installed near the eGauge	Must be reconfigured when network settings are changed
Can be used in most commercial/industrial settings	Even under ideal conditions, connection may not be stable

Cellular

The eGauge can be connected directly to a cellular modem with TCP/IPv4 networking capabilities (DHCP is optional, but preferred for ease of use). Currently, eGauge Systems supports one cellular modem: the [InHand IR615](#). This cell modem has built-in routing capabilities and can share a connection with up to four eGauge meters. Using a switch or similar networking hardware allows the modem to support additional eGauge meters.



InHand cellular modems (the model offered may change over time). The antennas are not shown.

The cellular modem requires a dedicated power supply and an active data plan. eGauge Systems offers and supports [data plans from T-Mobile](#), but for other carriers it will be necessary to work with the carrier and modem manufacturer to configure the modem correctly. Other modems can generally be used if they also function as routers, but this is not officially supported. Take care when using data plans not offered by eGauge Systems - other data plans may charge for data overages, so unlimited data plans are highly recommended.

Like HomePlug, a cellular modem doesn't require any additional wiring to be run between the customer's router/switch and the eGauge, which can reduce initial installation costs. Since the cellular modem is essentially a dedicated network with no ability to access the customer's local network, it may be better suited for high security locations where local network access isn't available. A cellular connection removes reliance on the quality and uptime of the customer's network, which may reduce troubleshooting costs. Cellular modems are also well suited for many rural or remote locations or areas where traditional wired internet isn't available or is prohibitively expensive. Most cellular modems feature external antennas, which can be extended to find the best signal without moving the modem itself.

However, cellular modems are more expensive compared to a communication technology which uses the customer's existing network, such as HomePlug or WiFi (with a cellular modem, you're essentially building a second dedicated network for the eGauge). They also require an active data plan (typically an ongoing monthly cost). Like WiFi bridges, cellular modems are prone to communication issues due to poor or nonexistent coverage. The modems ship preconfigured, but may require additional testing to function properly (or additional configuration to use with a different carrier). In certain areas (inside metal/block/concrete buildings, underground etc) a cellular signal may not be available. Cellular signals can be degraded or blocked by external factors, such as inclement weather, power outages, etc. Cellular towers are owned and maintained by cellular providers, who may decide to remove or decommission a tower with no notice. This may leave a site without an active cellular connection.

Pros	Cons
Usable where local network access isn't available	Subject to a variety of external influences
A single InHand modem can support 2 eGauge meters (more if an external switch is used)	Coverage not guaranteed
Suitable for high-security locations	Expensive, with ongoing fees
	May require additional configuration or testing

HomePlug (PLC)

EG41xx meters with built-in HomePlug communication have been discontinued. If HomePlug communication is required on an EG40xx, one HomePlug adapter may be connected to the eGauge meter's Ethernet port and the other may be connected to the router or modem as in a normal EG41xx setup using HomePlugs.

HomePlug is a powerline communication (PLC) standard used to convert data from an Ethernet line into a form which can be transmitted over the electrical wiring of a building. In a typical installation, a HomePlug adapter is placed near the customer's router and connected to the router via an included Ethernet cable. The adapter then establishes a link to the internal HomePlug

adapter built into certain eGauge models. Optionally, the HomePlug adapter may be [paired with the eGauge](#) to increase [security](#).



TRENDnet HomePlug Adapter. Note that HomePlug adapters differ based on manufacturer.

HomePlug adapters are easy to install and relatively inexpensive compared to running Ethernet in an existing structure. However, HomePlug also has some limitations. These include a relatively short range (100'/30m of **wiring distance**) and voltage limitations (most adapters are only rated for 120V installations, making them useless in commercial settings). [External factors](#) such as excessive noise on the electrical lines can also cause problems. In some cases, the customer may forget what the HomePlug adapter is used for and dispose of it.

HomePlug adapters are manufactured by third parties, although [certain models](#) are sold and officially supported by eGauge Systems. Unsupported models should work, but this cannot be guaranteed. A single HomePlug adapter may be used to provide a connection to multiple eGauge meters, provided all of those meters are within range.

Pros	Cons
Easy to install, no special tools required	Relatively short distance
Relatively inexpensive	Prone to interference from a variety of sources
Suited to residential or small commercial applications	Unusable in larger commercial/industrial settings
Single adapter can serve multiple eGauge meters	May run into issues with existing HomePlug devices at site
Moderate to fast speeds, generally stable	May forget what the adapter is for and throw it away

Please visit kb.egauge.net for the most up-to-date documentation.