



Installation and Operation Manual

# Envoy Communications Gateway





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## FCC Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate the equipment.



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## Important Safety Information

### Read this First

This manual contains important instructions to follow during installation and maintenance of the Enphase Envoy Communications Gateway (Envoy).

To reduce the risk of electrical shock, and to ensure the safe installation and operation of the Envoy, the following safety symbols appear throughout this document to indicate dangerous conditions and important safety instructions.



**WARNING:** This indicates a situation where failure to follow instructions may cause a serious hardware failure. Use extreme caution when performing this task.



**NOTE:** This indicates information particularly important for optimal system operation. Follow these instructions closely.

### Safety Instructions

- Perform all electrical installations in accordance with all local electrical codes and the National Electrical Code (NEC), ANSI/NFPA 70.
- Be aware that only qualified personnel shall install or replace the Enphase Envoy Communications Gateway.
- Do not attempt to repair the Enphase Envoy; it contains no user-serviceable parts. If the Enphase Envoy fails, please return the unit to your distributor for maintenance. Tampering with or opening the Envoy will void the warranty.
- Before installing or using the Enphase Envoy, please read all instructions and cautionary markings in the technical description and on the Enphase Envoy.

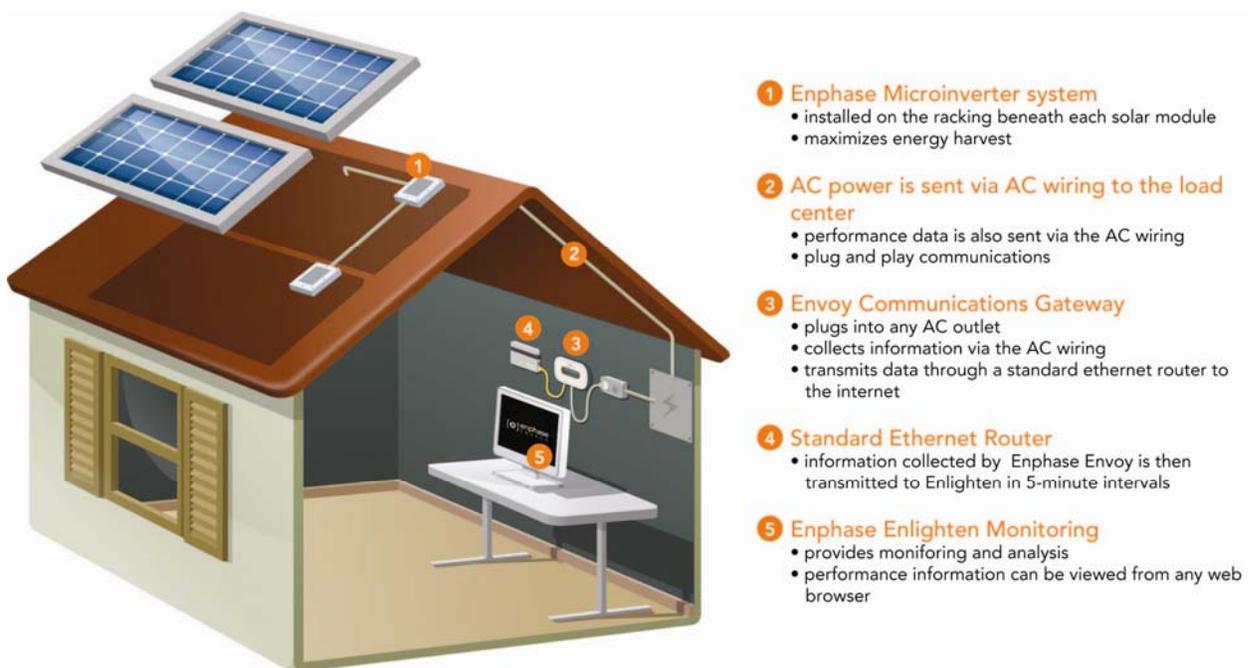


**NOTE:** For Enphase Envoy Warranty Terms and Conditions see the Appendix on page 25 of this manual.

# 1 The Enphase Envoy Communications Gateway

The Envoy is an integral component of the Enphase Energy Microinverter system. It operates between the Enphase Microinverters and the Enphase Enlighten™ web-based monitoring and analysis system. The Envoy functions as a gateway and monitors the microinverters that are connected to the photovoltaic modules. The Envoy collects energy and performance data from the microinverters over in-home AC power lines. It then forwards that data to the Enphase Enlighten web-based monitoring and analysis system, via the Internet, for statistical reporting.

The following diagram shows the Envoy in the system.



## Other Elements in the Enphase System

The **Enphase Microinverter** system is a fully integrated device that converts the DC output of a single solar module into grid-compliant AC power. In addition to performing the DC to AC conversion, it maximizes the modules' energy production by utilizing a sophisticated Maximum Power Point Tracking (MPPT) algorithm. This integrated system maximizes energy harvest, increases system reliability, and simplifies design, installation and management.

The **Enphase Enlighten** web-based monitoring and analysis system analyzes the per-module data collected by each microinverter. Enlighten automatically detects any shortfall in energy production, identifies possible causes, and suggests solutions to correct the problem. The Enphase Enlighten website is constantly monitoring every module on every installation.



## How the Envoy Communications Gateway Works

Installation and operation of the Envoy requires no special computer or networking knowledge, nor any specialized equipment. The Envoy simply plugs into the house router for communications with the Enphase Enlighten monitoring and analysis website. The Envoy communicates with the individual microinverters over the existing power wires in the residence or business. After the Envoy is installed, no additional configuration work is required.

After the Envoy is installed and completes its initial scan, it assembles an internal database of all known Enphase Microinverters at the site it manages. At regular intervals, the Envoy polls each microinverter for its energy data. Using your site's broadband router, the Envoy then forwards that information on to the Enphase Enlighten monitoring and analysis website. The Envoy also reports any error conditions that affect itself or the microinverters. You can view both energy data and error conditions in the Enphase Enlighten web-based monitoring and analysis system.



**NOTE:** The Envoy will automatically report system performance data to Enphase upon connection to the Internet. Please consult the Enphase privacy policy at <http://www.enphaseenergy.com/privacy/> to learn more about Enphase's use of this data.

## 2 Envoy Installation

### Preparation

Before installing the Envoy, make sure that your site meets the following minimum requirements:

- Broadband is always on with a reliable Internet connection
- Web browser to view Enlighten is available
- Router / LAN with Ethernet port is available
- Standard AC electrical outlet is available

Check the Envoy shipping box for the following items:

- Envoy Communications Gateway
- Ethernet cable
- AC power cord
- User documentation

### Placement

Place the Envoy as close as possible to the Service Panel (load center).



After installing your Envoy, you may want to perform a Communications Check as described on page 16 to optimize the location of your Envoy.

The Envoy can be placed on a table top or it can be wall mounted. For wall mounting instructions, see Wall Mounting on page 9.

### Wall Mounting



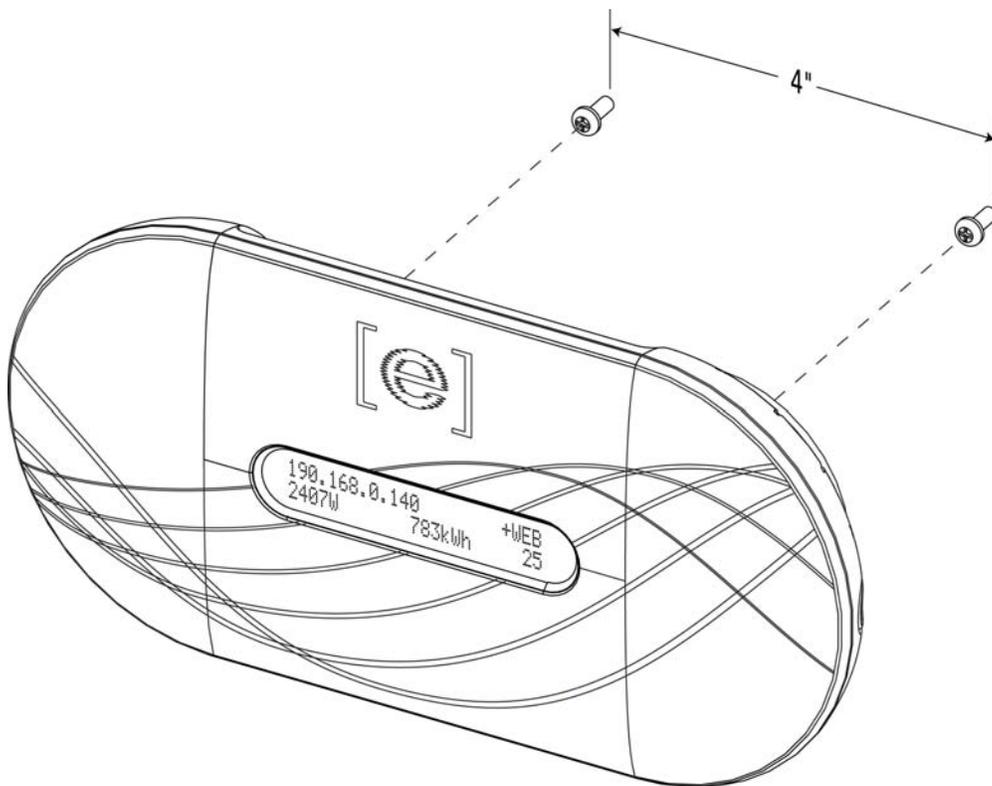
Do **not** plug the Envoy into a power strip, surge protector, or uninterruptible power supply (UPS). The Envoy contains the protective circuits required for long, reliable operation. The surge suppression or filtering components of a power strip or other protective device can substantially diminish communication performance. If possible do not plug a power strip power cord into the same outlet that the Envoy is connected to. The surge suppression or filtering components of a power strip could still interfere with communications if they are close to the Envoy.

Although, you do not necessarily need to place the Envoy near a broadband router, it may be best to do so for convenience of network cabling.

## Wall Mounting

To mount the Envoy on a wall:

1. Select a cool, dry, indoor location to locate the Envoy. Avoid heat generating devices (wall heaters, toaster ovens, etc)
2. Use two drywall screws or wall anchors to affix the Envoy to the wall mounted at the dimensions shown (not included in kit). Maximum screw head diameter is .35", A #8 screw is recommended.
3. Slide the Envoy onto the mounting screws aligning the Envoy screw holes with the screws installed in step 2.



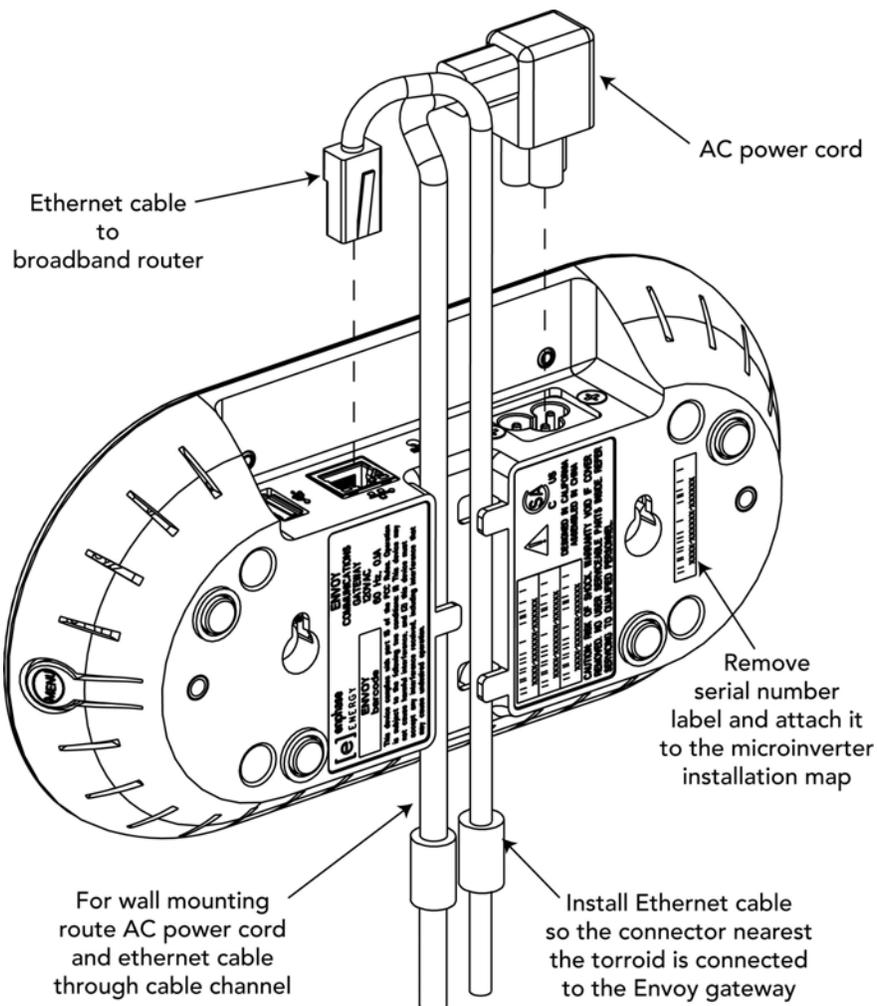
## Install the Envoy Cable Connections

To install the Envoy, perform the steps below while referring to the installation diagram below.

1. Register the Envoy as soon as possible. Call Enphase Customer Support at 877-797-4743 or visit <https://enlighten.enphaseenergy.com/register> and register the Envoy by its serial number.
2. Remove the Envoy removable serial number label as shown in the diagram below and attach it to the microinverter installation map.
3. Plug the AC power cord into the AC input on the Envoy, and then plug the other end of the power cord into an ordinary 120VAC power outlet (not a power strip) located somewhere near your broadband router.



**Reminder:** Do **not** plug the Envoy into a power strip, surge protector, or uninterruptable power supply (UPS). The Envoy contains the protective circuits required for long, reliable operation. The surge suppression or filtering components of a power strip or other protective device can substantially diminish communication performance.





**NOTE:** To the left of the Ethernet port on the Envoy, you will notice a port identified by a USB symbol. Ignore this port as it is not currently used.

4. Plug the Ethernet cable into the RJ-45 port on the Envoy, and plug the other end of the cable into a spare port on the broadband router. The Ethernet cable is manufactured with a torroid molded onto the cable approximately 7" from one of the RJ-45 connectors. The RJ-45 connector nearest the torroid should be connected to the Envoy gateway RJ-45 port.  
This cable doesn't need to plug directly into a router. It could also connect to a normal LAN (Local Area Network) connection as it needs only to be able to obtain a DHCP (Dynamic Host Control Protocol) IP address and have a path to the Internet. The Envoy will only search for a DHCP IP address during power up sequence.
5. Watch the LCD display for progress. Refer to Normal Operation on page 17 for more information.

### **Relocating the Envoy**

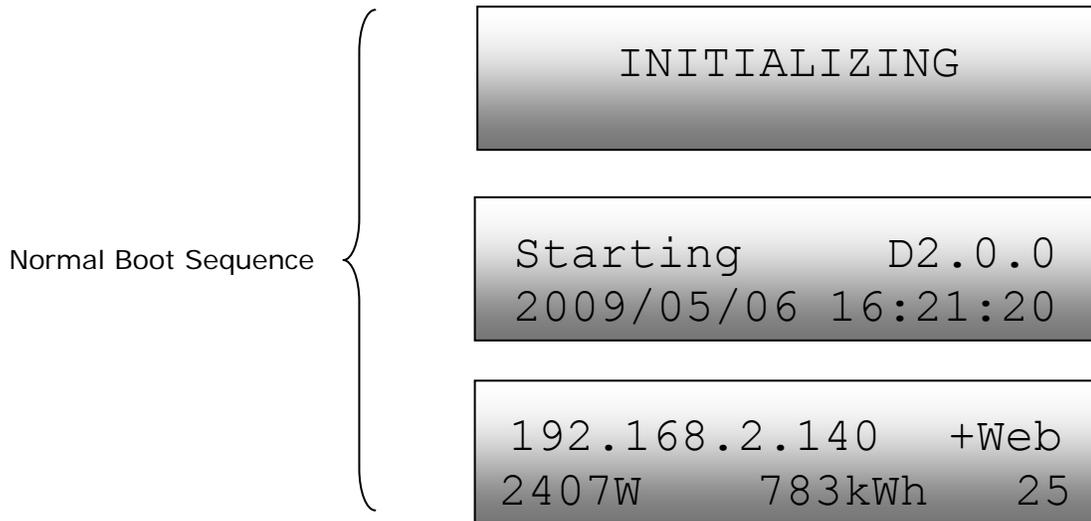
If you ever lose power, or need to relocate the Envoy to somewhere else on the premises, just plug it in (if not already done) and let the Envoy start up again. It will resume operation when power and internet connection are restored.



### 3 Envoy Operation

#### Starting the Envoy

It takes less than five minutes for the Envoy to be ready to work after applying power. This five-minute period is known as a boot sequence. You will know the Envoy has completed booting and has started normal operation when it displays both an IP address and the “+WEB” indication in the LCD window.



After the Envoy establishes an IP address and Internet connectivity, the Envoy contacts an NTP (Network Time Protocol) server so that it can set an accurate, local time.

#### How the Envoy Scans for Microinverters

A newly installed Envoy automatically performs an initial scan to discover its associated microinverters. This initial scan continues to search for new microinverters for one week from initial start up of the Envoy. The purpose of this long scanning period is to account for additional microinverters that may be installed during this initial one-week time-frame. This scan identifies all microinverters at the managed site. This one-time process is not repeated. During the scan, you will notice some of the values increasing on the Envoy's LCD display.



**NOTE:** If the Envoy is power cycled (power turned off and on) during this initial one-week scan, the week-long scan will resume.

The Envoy identifies each microinverter via the unique serial number assigned to each microinverter. If a microinverter is ever added or replaced at your site, you must initiate a new scan so that the Envoy can “see” the new microinverter.



### The Envoy Initial Screen Displays

After the Envoy has completed the boot sequence it will scroll through 3 screens initially, the home screen, communication check screen, activation screen.

```
192.168.2.140  +Web  
2407W      783kWh  25
```

```
[ ||| ]  mm:ss  +Web  
LEVEL   Devices: n
```

```
To Activate Call:  
1-877-797-4743
```

The communication check screen will continue to display during the 7 day initial period unless disabled through the panel menu or Admin page of the web interface. The activate screen will continue to display during the 7 day initial period or until the Envoy has been registered using the Enlighten on-line registration page.

### The Envoy LCD Panel Menu

You can access the Envoy LCD panel menu using the Envoy Menu button. Press and hold this button; after two seconds you will enter the Envoy menu. Continue holding the Menu button and Menu items will appear in the following order:

```
Exit Menu
```

```
Enable  
New Device Scan
```

```
Disable  
New Device Scan
```

```
Enable  
Communication Check
```



Disable  
Communication Check

To select a menu item, release the Menu button when the desired menu option appears. The menu continues to cycle as long as you are pressing the Menu button. See the following sections for detailed procedures.



Each microinverter is powered by the photovoltaic module it is connected to, so device scan or communication check can only be successfully performed during daylight hours.

### Initiating a Scan for New Microinverters

To initiate a scan:

1. Press and hold the Envoy Menu button; after two seconds you will enter the Envoy menu. Continue holding the Menu button, when the LCD window displays: "Enable New Device Scan"; release the Menu button.

Enable  
New Device Scan

The LCD window then indicates:

Device scan active  
for **nn****d**:**nn****h**:**nn****m**

2. The Envoy begins a 30 minute scan, if a longer scan is not already in progress, to identify all of the microinverters deployed at the premises.
3. Log into the Enphase Enlighten™ web-based monitoring and analysis to view data on a per microinverter basis (and, hence, a per PV module basis).
4. To disable or cancel a scan, press and hold the Menu button on the front of the Envoy for two seconds to view the Envoy menu on the LCD. When the LCD window displays: "Disable New Device Scan"; release the Menu button.

Disable  
New Device Scan



### Performing a Communication Check

If, when you are installing the Envoy, you are unsure of where it should be located for maximum performance, you may want to install the Envoy in different locations and check signal strength. A communication check starts automatically after an Envoy restart. In addition to this automatic check a user-initiated communication check can be started with the Envoy Menu button or through the administration page when connected to the Envoy local connection with a computer.

To initiate a communication check:

1. Press and hold the Menu button on Envoy for two seconds to bring up the Envoy menu on the LCD window. When the LCD window displays: "Enable Communication Check", release the Menu button.



The LCD window then indicates:



The Envoy begins a 20 minute communication check to assess the signal strength between the Envoy and the devices deployed at your site.

2. Until the Envoy begins detecting devices (microinverters), the display reads:



3. When the Envoy begins detecting devices (microinverters), the display reads:



The "LEVEL" indicator in the LCD window may display any number of bars from zero to five. You can assume that the communication check is progressing normally and that signal strength is acceptable if two to five bars are displayed. If fewer than two bars are displayed, you may want to try the following options:



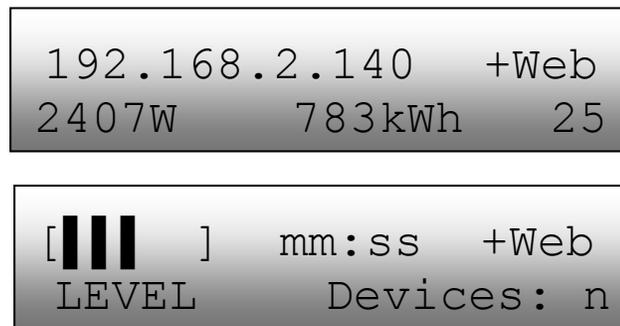
- Relocate your Envoy closer to the electrical service-panel (load-center) as possible. This ensures that the Envoy receives the strongest possible signal from each microinverter.
- Plug the Envoy into another circuit supporting fewer electronic devices, as these devices may interfere with communication between the microinverters and the Envoy.

Remaining minutes and seconds are displayed (“mm:ss” in the example). The “Devices” counter displays the numbers of devices detected and will ascend until all devices are detected. The number of devices detected should match the number of installed microinverters.

After 20 minutes, the communication check times out. If you want to end the communication check before it times out, press the menu button to activate the Envoy menu. When the LCD indicates “Disable Communication Check”, release the menu button.

### Restarting the Envoy

If the utility ever fails, or you need to restart the Envoy, just plug it in (if not already done) and let the Envoy start up again. It will resume operation when power and internet connection are restored. When it resumes operation, the LCD window displays the auto-start sequence. The system performs an automatic communications check. The LCD window alternates between two displays like those shown in the following:



For information on the “Level” and “Devices” indicators, refer to the descriptions in “Performing a Communication Check” on page 16. The auto-start sequence continues for 20 minutes after starting up the Envoy. After this check, normal operation resumes.



## Normal Operation

Once the Envoy completes a scan, it begins or resumes normal operation. At this point, the indicators in the LCD window show current values for your system:



The displayed values are:

- Local IP address, for example: **192.168.2.140** (your actual local IP address will be different)
- Web connection indication: **+Web**



**NOTE:** The following indicators may take several minutes to appear after starting up the Envoy or initiating a scan.

- Indication of the present power-production, in watts: **(n)W** (where n is a number)
- Indication of the life time kilowatt hours reported to this Envoy: **(n)kWh** (where n is a number)
- Indication of the number of online microinverters producing power and reporting in to the Envoy: **(n)** (where n is a number). The number of microinverters displayed will be zero at night.

## Networking/Firewall Info

The Envoy communicates with the Enphase Enlighten website by initiating outbound TCP (Transmission Control Protocol) connections to Enphase over HTTPS (Hypertext Transfer Protocol over Secure Socket Layer) (TCP:443). The Envoy uses NTP (Network Time Protocol) (UDP:123) during boot sequence to synchronize time/date with an external NTP (public) pool of servers. You do not need to open any inbound firewall ports for normal operation.

## 4 Troubleshooting

The following sections describe possible problems. For information on system status and event messages see Event Messages on page 22.

### Potential Problems and Solutions

**IP ADDRESS Problem:** If the IP address displayed on the Envoy's LCD window does not match the DHCP subnet on your internal network and shows something beginning with "169.254.x.x", this means that it was unsuccessful in obtaining a DHCP lease from your router.

- Check network connectivity to the router or other DHCP server. You may also wish to contact your Internet Service Provider or refer to your router documentation for assistance.

**LCD Window displays "-Web":** This means that the Envoy could not connect to the Internet to find an NTP server and could not connect to the Enlighten website.

- Check network connectivity to the premises router or switch. You may also wish to contact your Internet Service Provider or refer to your router documentation for assistance.

**LCD Window displays "Envoy Failure +Web or -Web":** This message displays after the Envoy has tried unsuccessfully three times to initialize. At this point, the Envoy attempts to open a VPN tunnel to allow Enphase to perform remote diagnostics addressing the problem. This attempt to open a tunnel occurs every hour on the hour. If successfully opened, the tunnel stays open for 50 minutes. The Envoy displays "**Envoy Failure +Web**" to indicate that the tunnel is open. After the 50 minute period, the tunnel is closed and the "**-Web**" indication may again be displayed.



**NOTE:** Attempts to open a tunnel continue until recovery takes place, at which point the Envoy resumes normal operation.

**Microinverter count doesn't match number of installed units:** This message may indicate that the Envoy is not done scanning/discovering the entire array. It may indicate that the Envoy is having difficulty communicating over the power lines. It could also be a result of low light levels and the module voltage is too low for the microinverter to power-up.

- Try plugging the Envoy into an electrical socket in a different location, closer to your main electrical panel. Also, make sure that the Envoy is plugged directly into the wall and **not** into a power strip or surge protector.

## 5 Envoy Local Interface

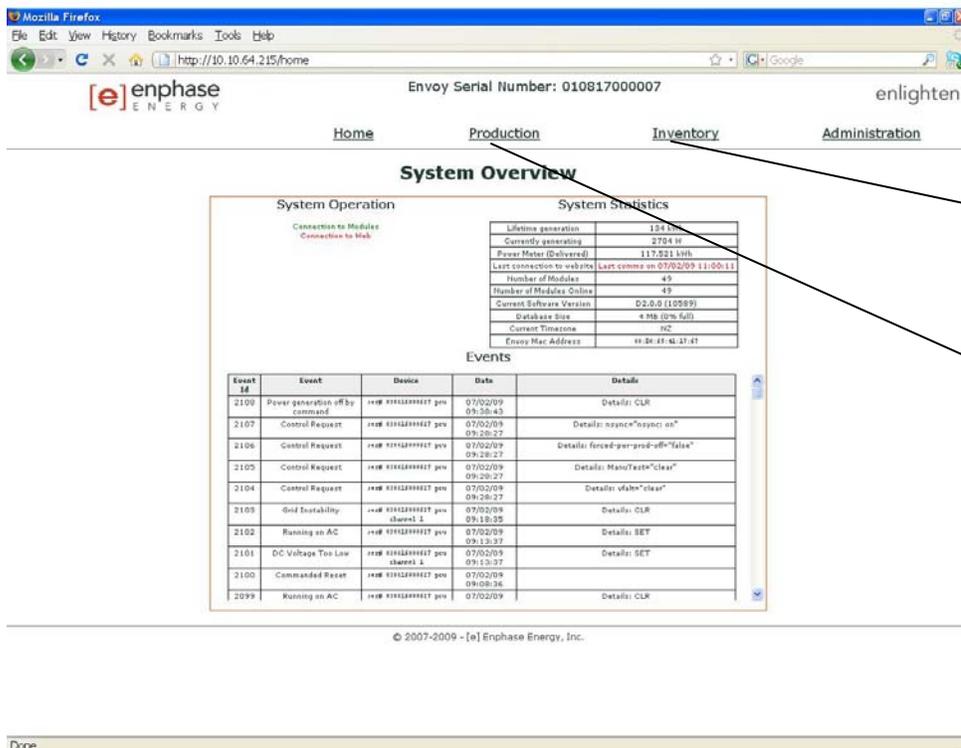
Connection to the Enphase Enlighten™ web-based monitoring and analysis website requires an Internet connection. However, if there is no Internet access at the installation site, it is still possible to communicate directly with the Envoy using the Ethernet port and a personal computer with a web browser. The following steps describe how to access the Envoy and the data that is available through the local connection.

1. Connect one end of the Ethernet cable supplied with the Envoy to the Envoy port labeled "Ethernet".
2. Connect the other end of the Ethernet cable to the RJ45 network port of the computer.
3. Open the Internet browser application on the computer.
4. In the browser address window enter the IP address displayed in the LCD window of the Envoy (192.194.2.141 in this example).

If you fail to make a connection at this point, you can try to manually configure your subnet to 169.254.120.2, Subnet Mask 255.255.0.0 If this does not correct the problem, call Enphase Customer Support at 877-797-4743.

### Home Screen

Once the browser has successfully connected with the Envoy, the following screen is displayed in the browser. This home screen provides a system overview and shows the current status of the inverters that have been identified by this Envoy. From this screen, you can access other screens in the interface.



The screenshot shows a Mozilla Firefox browser window displaying the Enphase Enlighten web interface. The address bar shows the URL http://10.10.64.215/home. The page title is "enlighten" and the Envoy Serial Number is 010817000007. The navigation menu includes Home, Production, Inventory, and Administration. The main content area is titled "System Overview" and is divided into two sections: "System Operation" and "System Statistics".

**System Statistics**

Lifetime generation	124.1 kWh
Currently generating	2754 W
Power Meter (Delivered)	117,521 kWh
Last connection to website	Last comm on 07/02/09 11:00:11
Number of Modules Online	49
Current Software Version	02.0.0 (10589)
Database Size	4 MB (0% full)
Current Timezone	UTC
Envoy Mac Address	01:50:53:4b:17:41

**Events**

Event ID	Event	Device	Date	Details
2109	Power generation off by command	HW043124990127 gen	07/02/09 09:38:43	Details: CLR
2107	Control Request	HW043124990127 gen	07/02/09 09:28:22	Details: nrsnce"nsync: on"
2106	Control Request	HW043124990127 gen	07/02/09 09:28:22	Details: forced-pwr-prod-off"false"
2105	Control Request	HW043124990127 gen	07/02/09 09:28:22	Details: ManuTest"Clear"
2104	Control Request	HW043124990127 gen	07/02/09 09:28:22	Details: vfdm"clear"
2103	Grid Instability	HW043124990127 gen	07/02/09 09:18:25	Details: CLR
2102	Running on AC	HW043124990127 gen	07/02/09 09:13:27	Details: SET
2101	DC Voltage Too Low	HW043124990127 gen	07/02/09 09:13:27	Details: SET
2100	Commanded Reset	HW043124990127 gen	07/02/09 09:08:36	Details: CLR
2099	Running on AC	HW043124990127 gen	07/02/09	Details: CLR

Annotations on the screenshot indicate: "Click to view Inventory screen" pointing to the "Inventory" link in the navigation menu, and "Click to view Production screen" pointing to the "Production" link in the navigation menu.

## Production Screen

To view system energy production statistics for your system, click "Production" from the Envoy home screen to navigate to the production screen.



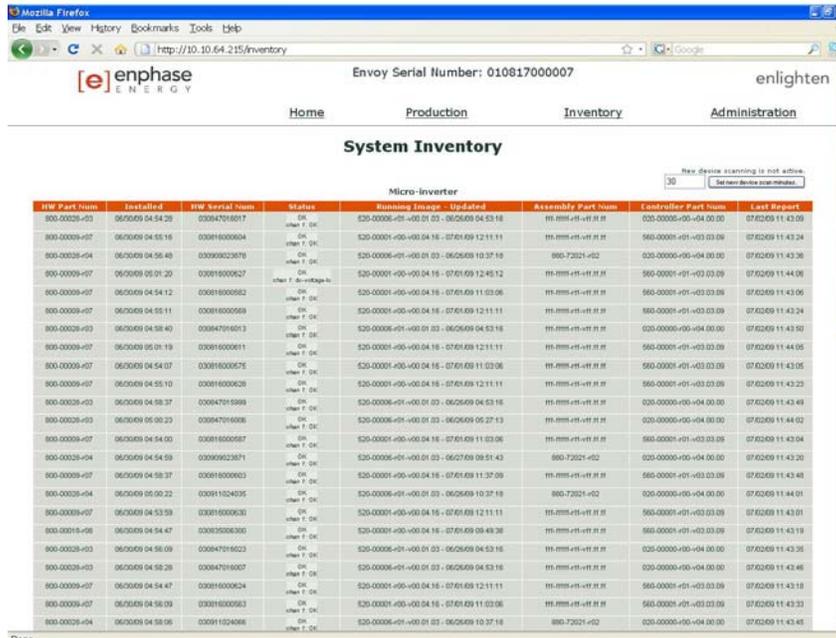
New Period	Energy Generated
Currently	2704 W
Today	50 kWh
Past Week	124 kWh
Since Installation	124 kWh

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Done

## Inventory Screen

To view a listing of the microinverters in your system, click "Inventory" from any screen to navigate to the inventory screen.



HW Part Num	Installed	HW Serial Num	Status	Running Inverter - Updated	Assembly Part Num	Controller Part Num	Last Report
800-00026-03	06/06/09 04:54:28	03094701807	OK	520-00006-01-0001.03 - 06/06/09 04:53:16	111-1111-01-01-01	020-00000-00-004.00.00	07/02/09 11:43:09
800-00009-07	06/06/09 04:55:16	03091600004	OK	520-00001-00-0001.04.16 - 07/01/09 12:11:11	111-1111-01-01-01	960-00001-01-003.03.09	07/02/09 11:43:24
800-00026-04	06/06/09 04:56:40	030909023676	OK	520-00006-01-0001.03 - 06/06/09 10:37:18	880-73021-002	020-00000-00-004.00.00	07/02/09 11:43:36
800-00009-07	06/06/09 05:01:20	030916000527	OK	520-00001-00-0001.04.16 - 07/01/09 12:45:12	111-1111-01-01-01	960-00001-01-003.03.09	07/02/09 11:44:06
800-00009-07	06/06/09 04:54:12	030916000582	OK	520-00001-00-0001.04.16 - 07/01/09 11:03:06	111-1111-01-01-01	960-00001-01-003.03.09	07/02/09 11:43:06
800-00009-07	06/06/09 04:55:11	030916000589	OK	520-00001-00-0001.04.16 - 07/01/09 12:11:11	111-1111-01-01-01	960-00001-01-003.03.09	07/02/09 11:43:24
800-00026-03	06/06/09 04:58:40	03094701807	OK	520-00006-01-0001.03 - 06/06/09 04:53:16	111-1111-01-01-01	020-00000-00-004.00.00	07/02/09 11:43:50
800-00009-07	06/06/09 05:01:19	030916000611	OK	520-00001-00-0001.04.16 - 07/01/09 12:11:11	111-1111-01-01-01	960-00001-01-003.03.09	07/02/09 11:44:05
800-00009-07	06/06/09 04:54:07	030916000576	OK	520-00001-00-0001.04.16 - 07/01/09 11:03:06	111-1111-01-01-01	960-00001-01-003.03.09	07/02/09 11:43:05
800-00009-07	06/06/09 04:55:10	030916000628	OK	520-00001-00-0001.04.16 - 07/01/09 12:11:11	111-1111-01-01-01	960-00001-01-003.03.09	07/02/09 11:43:23
800-00026-03	06/06/09 04:58:37	03094701809	OK	520-00006-01-0001.03 - 06/06/09 04:53:16	111-1111-01-01-01	020-00000-00-004.00.00	07/02/09 11:43:49
800-00026-03	06/06/09 05:00:23	03094701808	OK	520-00006-01-0001.03 - 06/06/09 05:27:13	111-1111-01-01-01	020-00000-00-004.00.00	07/02/09 11:44:02
800-00009-07	06/06/09 04:54:00	030916000587	OK	520-00001-00-0001.04.16 - 07/01/09 11:03:06	111-1111-01-01-01	960-00001-01-003.03.09	07/02/09 11:43:04
800-00026-04	06/06/09 04:54:59	030909023671	OK	520-00006-01-0001.03 - 06/07/09 09:51:43	880-73021-002	020-00000-00-004.00.00	07/02/09 11:43:20
800-00009-07	06/06/09 04:58:37	030916000603	OK	520-00001-00-0001.04.16 - 07/01/09 11:37:09	111-1111-01-01-01	960-00001-01-003.03.09	07/02/09 11:43:48
800-00026-04	06/06/09 05:00:22	030911024035	OK	520-00006-01-0001.03 - 06/06/09 10:37:18	880-73021-002	020-00000-00-004.00.00	07/02/09 11:44:01
800-00009-07	06/06/09 04:53:39	030916000630	OK	520-00001-00-0001.04.16 - 07/01/09 12:11:11	111-1111-01-01-01	960-00001-01-003.03.09	07/02/09 11:43:01
800-00018-06	06/06/09 04:54:47	030935000300	OK	520-00001-00-0001.04.16 - 07/01/09 08:49:38	111-1111-01-01-01	960-00001-01-003.03.09	07/02/09 11:43:19
800-00026-03	06/06/09 04:58:09	030947018023	OK	520-00006-01-0001.03 - 06/06/09 04:53:16	111-1111-01-01-01	020-00000-00-004.00.00	07/02/09 11:43:35
800-00026-03	06/06/09 04:58:28	030947018027	OK	520-00006-01-0001.03 - 06/06/09 04:53:16	111-1111-01-01-01	020-00000-00-004.00.00	07/02/09 11:43:46
800-00009-07	06/06/09 04:54:47	030916000624	OK	520-00001-00-0001.04.16 - 07/01/09 12:11:11	111-1111-01-01-01	960-00001-01-003.03.09	07/02/09 11:43:18
800-00009-07	06/06/09 04:58:09	030916000563	OK	520-00001-00-0001.04.16 - 07/01/09 11:03:06	111-1111-01-01-01	960-00001-01-003.03.09	07/02/09 11:43:33
800-00026-04	06/06/09 04:58:06	030911024066	OK	520-00006-01-0001.03 - 06/06/09 10:37:18	880-73021-002	020-00000-00-004.00.00	07/02/09 11:43:45

Done

## Event Messages

The table below lists messages that the Envoy can produce to indicate certain conditions. These messages appear on screen when your computer is connected to the Envoy local interface. These messages can provide Enphase Customer Support with valuable information, should you need to call for assistance.

Where message is displayed:		
Home Screen	Inventory Screen	Description
AC Frequency Out Of Range	ac-freq-oor	The frequency of the AC grid has exceeded the limits specified by UL 1741.
AC Voltage Out Of Range	ac-voltage-oos-p# (# = 1, 2 or 3)	The voltage of the indicated AC phase (relative to neutral) has exceeded the limits specified by UL 1741.
Audible alarm active	audible-active	The inverter's buzzer is active, either due to an internally detected error or by user command.
Bad Flash Image	bad-flash-image	The inverter is not producing power because one of its flash memory images is corrupt. Contact Enphase Energy customer support at 877-797-4743 for assistance.
Commanded Reset	commanded-reset	The inverter has reset, either following a successful image download or by user command.
Control Request		This event logs a user control request made using the Administration > Device Conditions and Controls page or via Enlighten.
Critical Temperature	critical-temp	The inverter is producing less power in an attempt to not overheat (see Over Temperature)
DC Too High	dc-voltage-hi	The DC input voltage to the inverter is too high; check that the PV module and inverter are compatible.
DC Too Low	dc-voltage-lo	The DC input voltage to the inverter is too low; this is a normal condition at night, but during the day may indicate a bad or missing DC connection to the inverter.
Download to module begun		The Envoy has begun an image download to the indicated inverter.
Download to module ended		The Envoy has successfully downloaded an image to an inverter.
Download to module failed		The Envoy was unable to successfully download an image to an inverter.

Where message is displayed:		
Home Screen	Inventory Screen	Description
GFI Tripped	gfi-tripped	An inverter has detected ground fault current greater than one amp. The error can only be cleared via the Envoy after the ground fault condition has been remedied. The GFI can be cleared using the Device Conditions and Controls page unless the failure is permanent. Contact Enphase Energy customer support at 877-797-4743 for assistance.
Grid Gone	grid-gone	The AC utility grid is no longer present.
Grid Instability	grid-instability	The inverter is not producing power due to one or more of these conditions: AC Frequency Out Of Range, AC Voltage Out Of Range, or Grid Gone. Note that Grid Instability will remain for about 5 minutes after the underlying conditions clear.
Module added		The Envoy has detected and is now associated to a new inverter.
Module failed to report		The Envoy has not received a response to the last three messages sent to an inverter.
Module Sleeping		Inverter is off for the night
Over Temperature	over-temp	The inverter is not producing power, because it is too hot.
Power generation off by command	forced-pwr-prod-off	The inverter is not producing power by user command.
Power On Reset	power-on-reset	The inverter has powered on after having both AC and DC disconnected.
Shutdown		The Envoy shut down its internal processing.
Skipped Cycles	skipped-cycles	The inverter has not produced power for more than 5% of the most recent production interval; this may be due to real problems in the grid, or a hardware failure of the inverter.
Startup		The Envoy started its internal processing.

## 6 Technical Data

<b>Communications Interface</b>	
Powerline	Enphase Proprietary
Ethernet	10/100 Auto-sensing, Auto-negotiation
<b>Power Requirements</b>	
AC Outlet	120 VAC, 60 Hz
Power Consumption	2.5 Watts typical, 7 watts maximum
<b>Mechanical Data</b>	
Dimensions (WxHxD)	8.8" x 4.4" x 1.7" (222.5 mm x 112mm x 43.2mm)
Weight	12 oz (340g)
Ambient Temperature Range	-40°C to +65°C (-40° to 149°F)
Cooling	Natural Convection – no fans
Enclosure Environmental Rating	Indoor - NEMA 1
<b>Features</b>	
Standard Warranty Term	1 year
Compliance	UL 60950, EN 60950, FCC Part 15 Class B

## 7 Appendix

### Limited Warranty

Enphase Energy Inc. ("**Enphase**") has developed a highly reliable Envoy Communications Gateway that is designed to withstand normal operating conditions when used for its originally intended purpose in compliance with the Enphase User Manual supplied with the originally shipped system. The Enphase limited warranty ("**Limited Warranty**") covers defects in workmanship and materials of the Envoy Communications Gateway ("**Defective Product**") for a period of one (1) year from the date of original purchase of such Envoy Communications Gateway at point of sale to the originally-installed end user location (the "**Warranty Period**"). During the Warranty Period, the warranty is transferable to a different owner as long as the Envoy Communications Gateway remains installed at the originally-installed end user location.

During the Warranty Period, Enphase will, at its option, repair or replace the Defective Product free of charge, provided that Enphase through inspection establishes the existence of a defect that is covered by the Limited Warranty. Enphase will, at its option, use new and/or reconditioned parts in repairing or replacing the Defective Product. Enphase reserves the right to use parts or products of original or improved design in the repair or replacement of Defective Product. If Enphase repairs or replaces a Defective Product, the Limited Warranty continues on the repaired or replacement product for the remainder of the original Warranty Period or ninety (90) days from the date of Enphase's return shipment of the repaired or replacement product, whichever is later.

The Limited Warranty covers both parts and labor necessary to repair the Defective Product, but does not include labor costs related to un-installing the Defective Product or re-installing the repaired or replacement product. The Limited Warranty also covers the costs of shipping repaired or replacement product from Enphase, via a non-expedited freight carrier selected by Enphase, to locations within the United States (including Alaska and Hawaii) and Canada, but not to other locations outside the United States or Canada. The Limited Warranty does not cover, and Enphase will not be responsible for, shipping damage or damage caused by mishandling by the freight carrier and any such damage is the responsibility of the freight carrier.

To obtain repair or replacement service under this Limited Warranty, the customer must comply with the following policy and procedure:

- All Defective Product must be returned with a Return Merchandise Authorization Number (RMA) which customer must request from Enphase. Before requesting the RMA, however, the customer should contact an Enphase technical support representative to evaluate and troubleshoot the problem while the Envoy Communications Gateway is in the field, since many problems can be solved in the field.
- If in-field troubleshooting does not solve the problem, Customer may request the RMA number, which request must include the following information:
  - Proof-of-purchase of the Defective Product in the form of (1) the dated purchase receipt from the original purchase of the product at point of sale to the end user, or (2) the dated dealer invoice or purchase receipt showing original equipment manufacturer (OEM) status, or (3) the dated invoice or purchase receipt showing the product exchanged under warranty
  - Model number of the Defective Product.
  - Serial number of the Defective Product.
  - Detailed description of the defect.

- Shipping address for return of the repaired or replacement product.
- All Defective Product authorized for return must be returned in the original shipping container or other packaging that is equally protective of the product.
- The returned Defective Product must not have been disassembled or modified without the prior written authorization of Enphase.

The Enphase Envoy Communications Gateways are designed to withstand normal operating conditions and typical wear and tear when used for their original intent and in compliance with the installation and operating instructions supplied with the original equipment. The Limited Warranty does not apply to, and Enphase will not be responsible for, any defect in or damage to any Enphase Envoy Communications Gateway: (1) that has been misused, neglected, tampered with, altered, or otherwise damaged, either internally or externally; (2) that has been improperly installed, operated, handled or used, including use under conditions for which the product was not designed, use in an unsuitable environment, or use in a manner contrary to the Enphase User Manual or applicable laws or regulations; (3) that has been subjected to fire, water, generalized corrosion, biological infestations, acts of God, or input voltage that creates operating conditions beyond the maximum or minimum limits listed in the Enphase Envoy Communications Gateway specifications, including high input voltage from generators or lightning strikes; (4) that has been subjected to incidental or consequential damage caused by defects of other components of the solar system; or (5) if the original identification markings (including trademark or serial number) of such Envoy Communications Gateway have been defaced, altered, or removed. The Limited Warranty does not cover costs related to the removal, installation or troubleshooting of the customer's electrical systems. The Limited Warranty does not extend beyond the original cost of the Enphase Envoy Communications Gateway.

THE LIMITED WARRANTY IS THE SOLE AND EXCLUSIVE WARRANTY GIVEN BY ENPHASE AND, WHERE PERMITTED BY LAW, IS MADE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, STATUTORY OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF TITLE, QUALITY, MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OR WARRANTIES AS TO THE ACCURACY, SUFFICIENCY OR SUITABILITY OF ANY TECHNICAL OR OTHER INFORMATION PROVIDED IN MANUALS OR OTHER DOCUMENTATION. IN NO EVENT WILL ENPHASE BE LIABLE FOR ANY SPECIAL, DIRECT, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES, LOSSES, COSTS OR EXPENSES HOWEVER ARISING, WHETHER IN CONTRACT OR TORT, INCLUDING WITHOUT LIMITATION ANY ECONOMIC LOSSES OF ANY KIND, ANY LOSS OR DAMAGE TO PROPERTY, OR ANY PERSONAL INJURY.

To the extent any implied warranties are required under applicable law to apply to the Envoy Communications Gateway, such implied warranties shall be limited in duration to the Warranty Period, to the extent permitted by applicable law. Some states and provinces do not allow limitations or exclusions on implied warranties or on the duration of an implied warranty or on the limitation or exclusion of incidental or consequential damages, so the above limitation(s) or exclusion(s) may not apply. This Limited Warranty gives the customer specific legal rights, and the customer may have other rights that may vary from state to state or province to province.





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