



LeadSolar Link Gateway™  
Installation & Operation Guide

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Contact Information:  
US Customer Service  
(888) 405-2860

LeadSolar Energy Co, Ltd.  
US Office  
2109-C South Wright St.  
Santa Ana, CA 92705  
(888) 405-2860  
info@leadsolarenergy.com



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## 1.0 LS LINK GATEWAY INTRODUCTION

Welcome to the growing family of LeadSolar microinverter system owners. LeadSolar is proud to offer one of the most advanced technologies for use in utility-interactive photovoltaic applications. This system is highly reliable, highly efficient, and easy to install. The three key elements of a LeadSolar microinvertersystem include:

- The LeadSolar Microinverter
- The LeadSolar Link Gateway™
- The LeadSolar LinkView™ web-based monitoring and analysis software

The LeadSolar microinverter system will benefit the system owner from the initial system design throughout the entire lifetime of the system.

The LeadSolar Link Gateway™ collects performance data from LeadSolar's LS series of microinverters that communicate via PLC and then transmits the data to LeadSolar's LinkView™ monitoring platform either via a local internet network or directly using an optional cellular transmitter. The Link Gateway™ can connect to a network through a wireless router that supports IEEE 802.11b/g/n or through a wired Ethernet connection. An internal battery allows the Link Gateway™ to store data internally during power outages.



Microinverters with the ZigBee chipset require a Digi gateway

### 1.1 Packing List

Each box contains one (1) WiFi enabled LeadSolar Link Gateway™

### 1.2 Interfaces

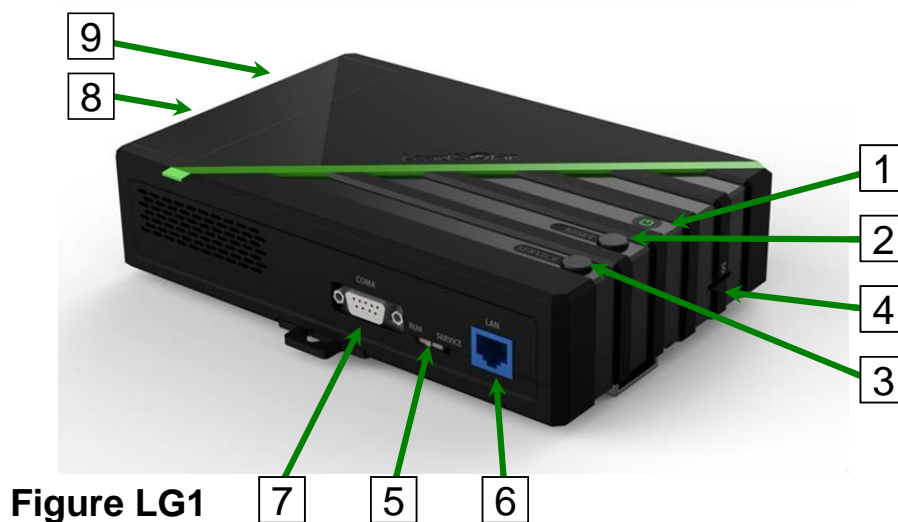


Figure LG1

The Link Gateway™ includes nine interfaces to communicate status and connect the PV system to LeadSolar’s monitoring platform. These include (refer Fig. LG1):

- 1) STATUS indicator LED
- 2) RESET button
- 3) SERVICE button
- 4) Slot for micro SD card
- 5) System DEBUG switch (reserved for future use)
- 6) Ethernet port
- 7) RS232 port (and USB on newer models)
- 8) LINE connect
- 9) LOAD connect

### 1.2.1 Status indicator LED

The status indicator LED (1) undergoes a multi-step sequence during gateway commissioning per the following:

Step	State	Note
1	Flashing Green	Initializing
2	Solid Green	Power supply is functioning properly
3	Flashing Blue	Network port is functioning properly
4	Flashing Blue/Green	Normal operation

### 1.2.2 External User Interfaces

The Gateway comes with two external interface buttons, labeled RESET (2) and SERVICE (3). Pushing the RESET button reboots the gateway. Pushing the SERVICE button causes the gateway to send a service pin message to the microinverters for internal PLC signal debugging. Holding down the SERVICE button for 15 seconds followed by the RESET button for 15 seconds restores the gateway to AP mode with its initial password.



The gateway password must be changed from the initial preset for the reset feature to function.

Button	Function	Note
2	Reset	Reboot Gateway. Turns off and back on
3	Service	PLC communication debug & webpage login reset

### 1.2.3 Communication & Storage Ports

In addition to broadcasting a WiFi 802.11 b/g/n signal, the gateway has both an Ethernet port (6) for direct network connection and an RS232 or USB port (7) to support GPRS cellular devices. A micro SD slot (4) allows for introduction of new software updates via a micro SD memory card (up to 16 GB). The gateway stores power generation data internally. Adding memory to this slot will not allow the gateway to store additional data.

Port	Name	Note
6	Ethernet Port	Ethernet port for web communication without WiFi
7	GPRS	RS232 9-pin serial port for cellular communication
4	TF	Micro SD card for uploading software updates

### 1.2.4 Power Ports

To maximize the integrity of the microinverter's PLC signal, the gateway is designed to be inserted DIRECTLY in the path of the combined microinverter's AC branch circuits (for single phase). It contains an internal filter and can support currents up to 50 A. The lines from the array feed into the LOAD terminals (9): L1, L2, and GND; while the LINE terminals (8): L1, L2 and GND connect to the service panel (typically first going through an AC disconnect switch). For higher amperage systems refer to section 2.2.

Port	Name	Note
8	LINE	Connects to grid
9	LOAD	Connects to PV trunk or external filter LOAD



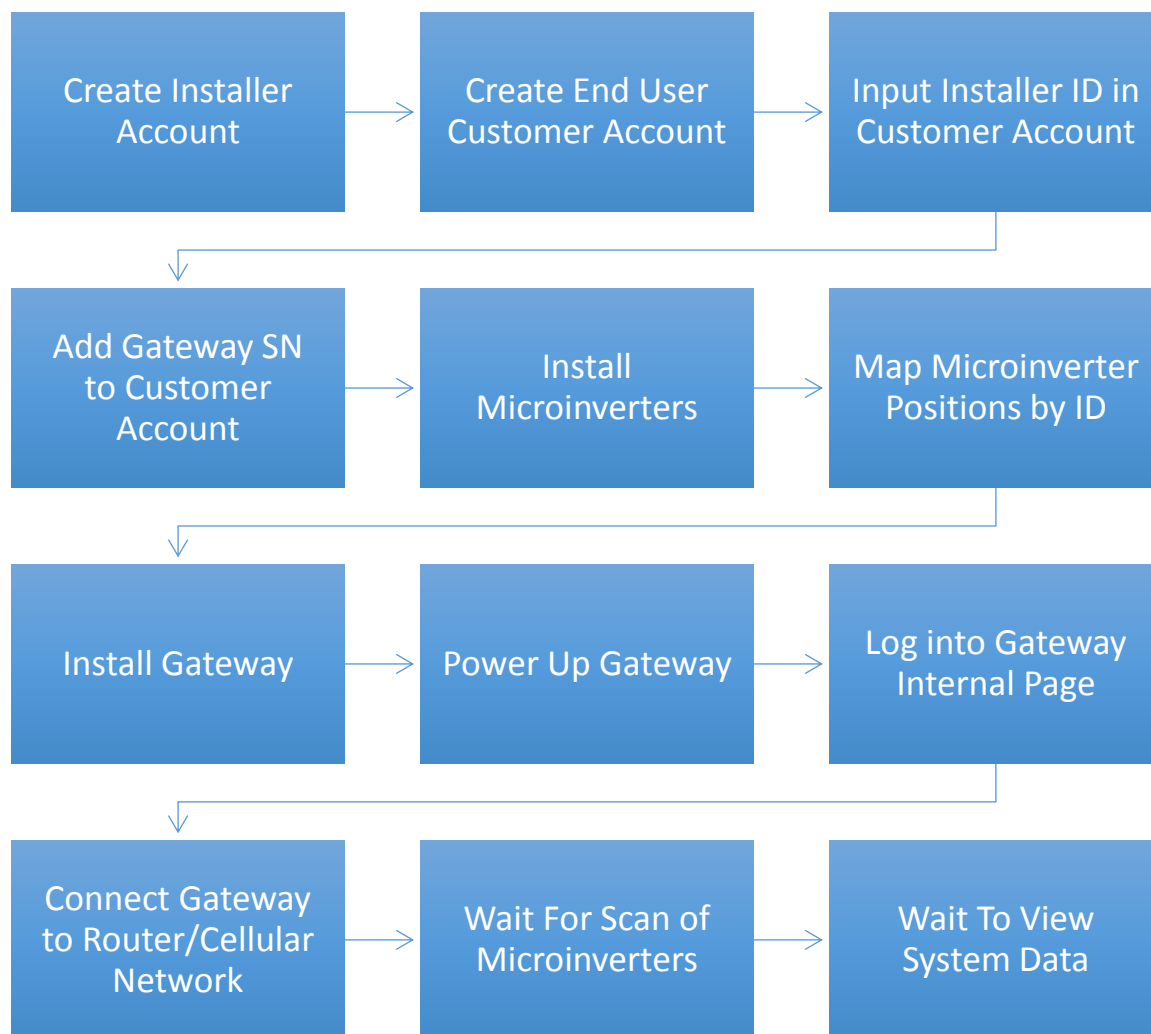
Prior to installation, the gateway may be powered using 120V AC by connecting the hot line to L1 and the neutral to L2 on the LINE side of the gateway power port.

### 1.3 First Time Installers

If this is your first time installing a gateway with a LeadSolar microinverter system, consider following the flow chart on this page. These steps are explained in Section 3 through Section 6.



**RECOMMENDATION:** Add the gateway SN to the customer's online account *before* the installation. This will help expedite the installation process.



## 2.0 CREATE MONITORING ACCOUNTS

Prior to any site deployment the installer must first register as an installer and receive an installer ID from LeadSolar. We recommend doing this at least 72 hours prior to the first project.

### 2.1 Create Installer Account

- Go to [www.lead solar.net](http://www.lead solar.net) and click **Register For Free**
- Fill in all fields and select **Installer** as the role
- Press **Create Account**
- Wait for an account activation email from LeadSolar
- Click the link provided in the email to activate the installer account
- Wait for verification and receive an installer ID (may take up to 72 hours)

### 2.2 Create Customer Account

- Go to [www.lead solar.net](http://www.lead solar.net) and click **Register For Free**
- Fill in all fields and select **End User** as the role
- Press **Create Account**
- Customer will soon receive an activation email from LeadSolar
- Customer should click the link provided in the email to activate account
- Go to **My Account** and then **My Profile**
- Find the **User's Installer** in the bottom right corner
- Select your unique installer **ID**
- Continue to Section 3 to learn how to register the gateway and microinverters on the client account



## 3.0 ONLINE REGISTRTION PROCESS

To register the gateway and microinverters for monitoring purposes, log into the client's end user account and follow the steps below:

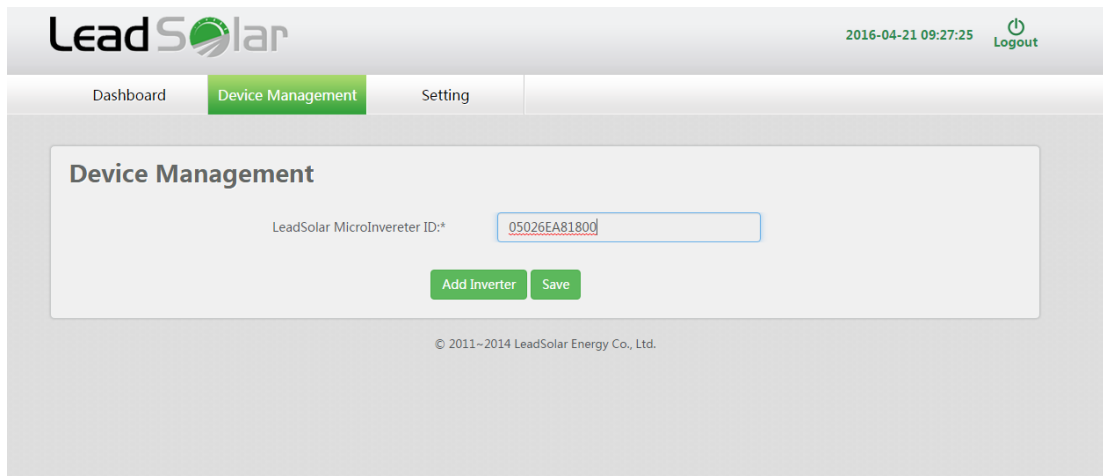
### 3.1 Register Gateway

- Click on **Device Management** and then click **Registration**
- Click **Add New** next to the **LeadSolar Link SN** field
- Fill out all fields on the page and make sure to enter the gateway **SN** correctly
- Click **Register**. Return to the **Registration** page under **Device Management**

### 3.2 Register Inverter

**Note:** The Gateway will automatically scan for inverters ID numbers during the installation process. Use this process to add or replace microinverters.

- Enter microinverter **ID**



LeadSolar

2016-04-21 09:27:25 Logout

Dashboard Device Management Setting

Device Management

LeadSolar MicroInverterer ID:\*

Add Inverter Save

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The microinverter ID is different from its serial number and is included with the QR code located on the product label and on the side of each unit.

- Click **Add Inverter**
- Repeat these steps until all microinverter IDs are entered
- Click **Save**

## 4.0 GATEWAY INSTALLATION

To install the gateway at the site of the PV array, follow the steps below depending on the amperage.

### 4.1 Single phase systems (< 50 A)

If you have not purchased a LeadSolar Smart Junction Box, you can install the gateway in your own junction box (NEMA 3R or 4). The gateway attaches via a DIN rail connection.



Locate the SN on the back of the gateway before attaching to the DIN rail. Record the SN of the gateway for future reference.

- 1) Attach the back of the gateway to a DIN rail (slide back plastic clip)
- 2) Connect the PV system trunk cable to the LOAD port
- 3) Connect the LINE port to the trunk cable going to the electrical panel
- 4) Ensure all ground lines are properly connected and the electrical wire is appropriately sized for system currents (50A max for 6 AWG)



The LS Link Gateway™ must be installed by a trained professional inside a NEMA 3R or 4 enclosure with appropriate safety signage.

### 4.2 Three phase systems

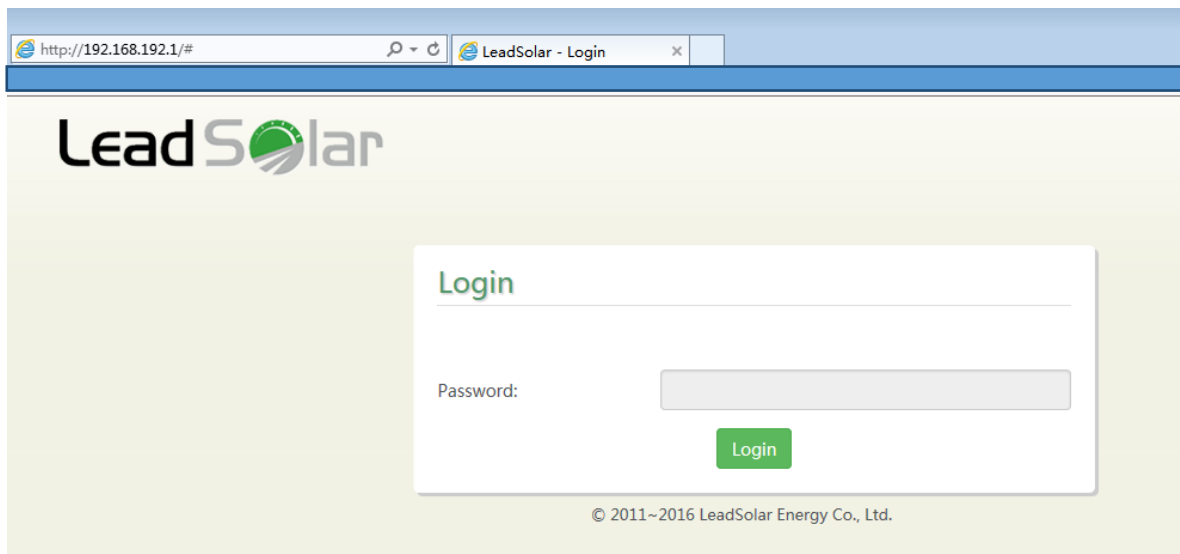
For three phase systems, a separate gateway is needed for each phase. These systems are typically better served by using microinverters with Zigbee communication and a Digi communication gateway.

## 5.0 ESTABLISH GATEWAY CONNECTION

The initial configuration of the gateway defaults to AP mode to allow direct access to the device's internal startup page. This page can be accessed on a smartphone, tablet, or laptop with a WiFi connection.

### 5.1 With WiFi Connection

- Turn on the gateway and wait two minutes
- Use your PC, tablet, or smartphone to search for available WiFi signals
- Connect to **LSBOXAP-XXXX** by using password: **12345678** (xxxx=last four digits of Gateway SN)
- The gateway's IP address is 192.168.192.1
- Enter the gateway's IP address into the web browser of your PC, tablet, or smartphone (ex: http://192.168.192.1)
- You will be taken to a page similar to the one below
- Log in with password: **12345678** and continue to section 6



Prior to connecting the gateway to the host's network, the installer must have the SSID name and password of the host's router.

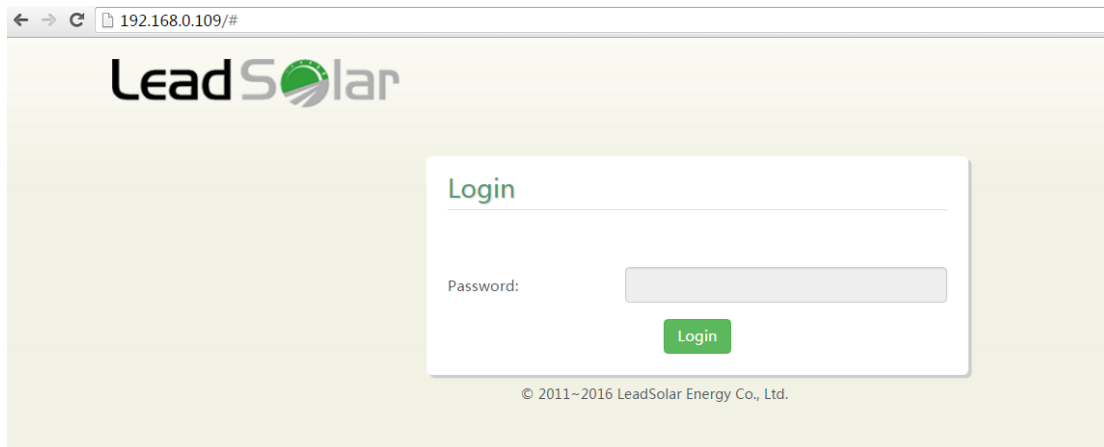
## 5.2 With Ethernet Cable Connection

- If you are using an Ethernet cable to connect the gateway, you must directly connect to the internet router and log in as an administrator. Make sure you have activated the router's DHCP function.
- Turn on the gateway and wait two minutes
- The router will assign a new IP address to the gateway
- When you log in to the internet router you will now see the gateway with its new IP address

In this example, the IP address for LSBOX-0000 is **192.168.5.199**

LSBOX-0000	20-CD-39-F0-42-F8	192.168.5.199	47:56:38
------------	-------------------	---------------	----------

- Make sure your PC, tablet or smartphone is connected to the router
- Input the IP address of the gateway on your device's web browser
- You will be taken to the gateway's internal webpage similar to the one below
- Continue to section 6



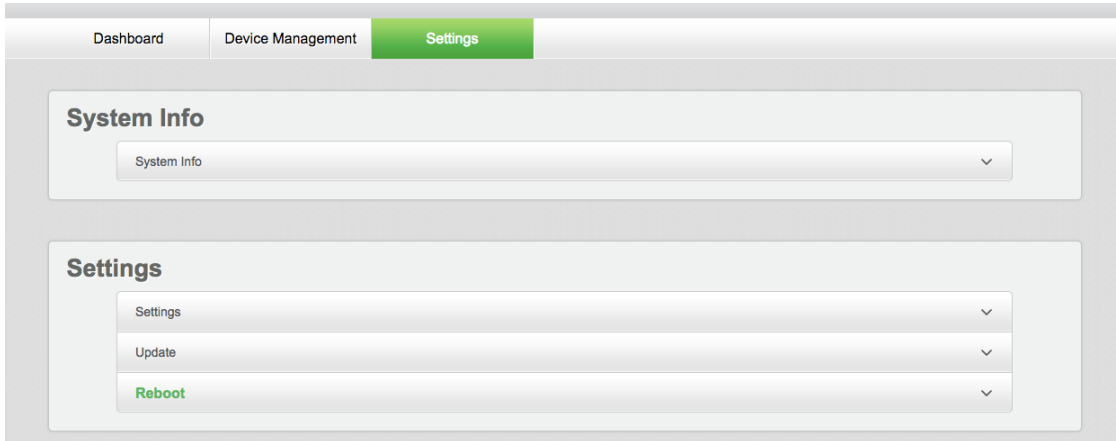
When you use your gateway for the first time, you should connect it to your PC, tablet or smartphone with WiFi or by connecting it to the host's router with an Ethernet cable. You cannot connect the gateway directly to a PC via a LAN cable when in the gateway is in AP Mode.

## 6.0 LOG IN AND SETUP GATEWAY MODE

After connecting to the gateway with a laptop, tablet, or smartphone, log in to the gateway's internal webpage.

### 6.1 Log in to Internal Webpage

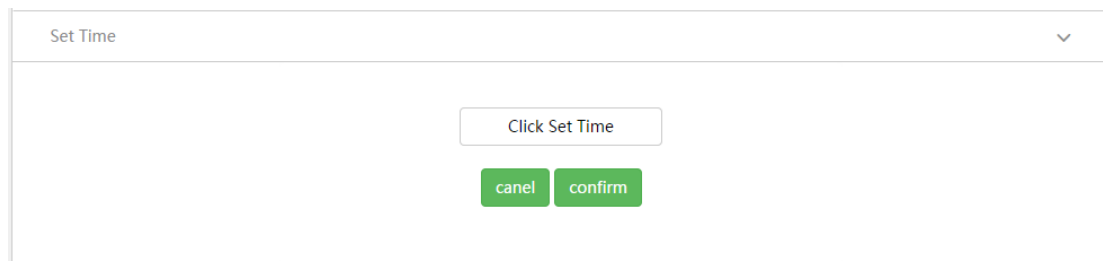
- Log in with password:**12345678**
- You will be taken to the **Dashboard** page
- Click on **Settings** in the menu at the top of the page (shown in green below)



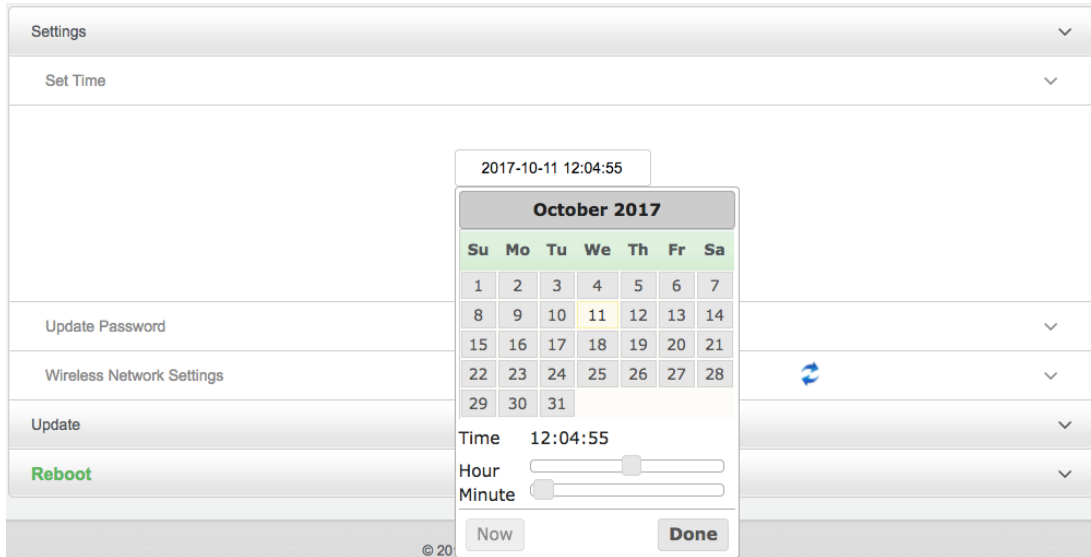
- Now click the **Settings** drop-down menu and continue



- Set the Gateway time and date by clicking **Set Time** in the **Settings** drop-down menu. Then press **Click Set Time**



- By pressing the **Now** button, the gateway will automatically receive the time from your PC or mobile device
- Make sure the date and time are correct

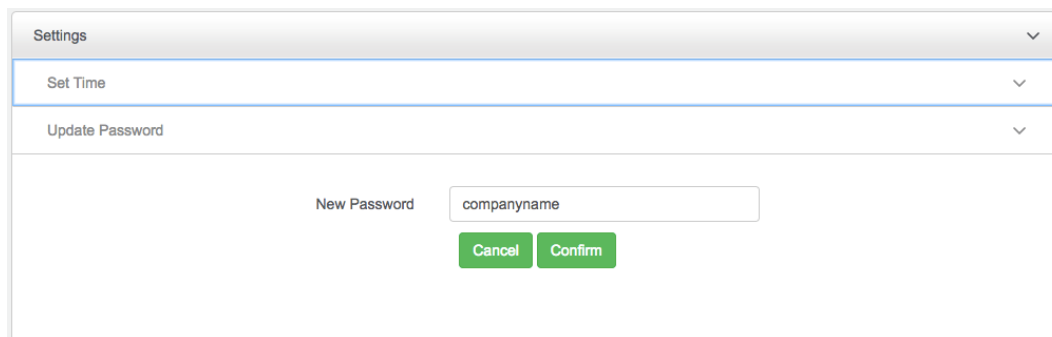


- Finalize this step by pressing **Done** and then press **Confirm**



Make sure the date and time are correct. Otherwise, the monitoring platform cannot accurately display power generation information.

- Click **Update Password** and enter new desired password
- Press **confirm** to save new password





The gateway password must be changed by the installer for the reset to function properly in the future.

## 6.2 With Internet Connection

If an Internet connection is available, choose **Wireless Network Settings**

**Connecting with WiFi:** Select the **Wireless Network Settings** dropdown list. You will see a list of all available wireless local networks. Click on the refresh button if a full list does not initially appear.

Select the correct WiFi network.

Enter the correct network password twice and press finish

Prior to gateway set up, the installer must have the client's WiFi name and password for the local internet router to be used as a wireless network connection.

The screenshot shows the 'Settings' menu with the following options: 'Settings', 'Set Time', 'Update Password', and 'Wireless Network Settings'. The 'Wireless Network Settings' option is expanded, showing a refresh button and a dropdown list of available networks. The selected network is 'OceanStructure\_T18', which has a green Wi-Fi signal icon. Below the network name are two input fields for 'Password' and 'Confirm Password', followed by 'Finish' and 'Cancel' buttons.

**Connecting with Ethernet cable:** Make sure you have activated the DHCP function on the router and plug the Ethernet cable into the LAN port on the gateway and the router.

## 6.3 Without Internet Connection

If you do not have Internet connection, keep the gateway in default mode (AP Mode). The installer should set the gateway time and date and change the password. While the gateway will not be able to upload data to the LinkView™ monitoring platform, it will continue to store data which can always be viewed locally. System owners and installers can view the PV system power generation data locally through the gateway's built-in webpages.

- Set the Gateway time and date by clicking **Set Time** in the **Settings** drop-down menu. Then press **Click Set Time**
- By pressing the **now** button, the gateway will automatically receive the time from your PC or mobile device. Make sure the date is correct
- Finalize this step by pressing **Done** and then press **Confirm**

- Click **Update Password** and enter new desired password
- Press **confirm** to save new password
- 

## 7.0 SYSTEM PERFORMANCE DATA

System performance data can be viewed either via the gateway’s internal webpage or if network connected via the LinkView™ monitoring software at [www.lead solarenergy.com](http://www.lead solarenergy.com)

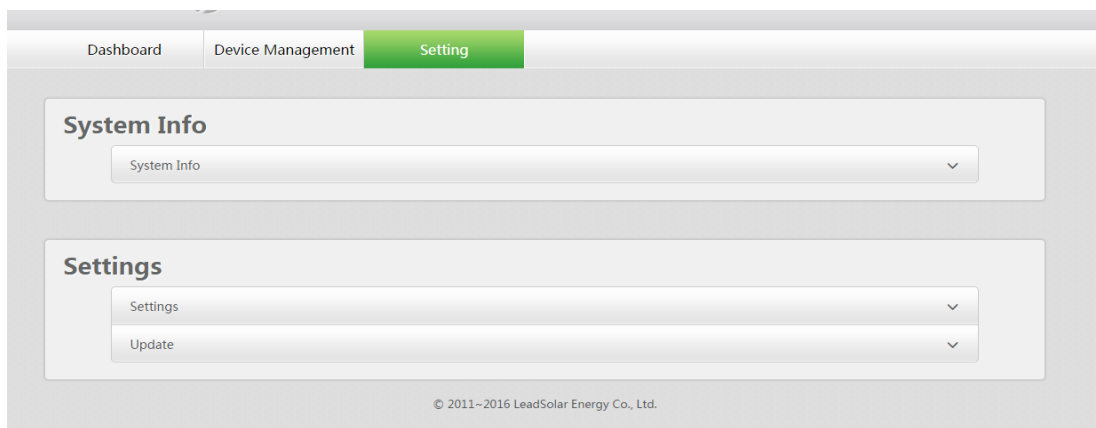
### 7.1 Acquisition Time

- Power generation data is generally available three to thirty minutes after registering the microinverter IDs on the built-in web pages or the online monitoring platform.



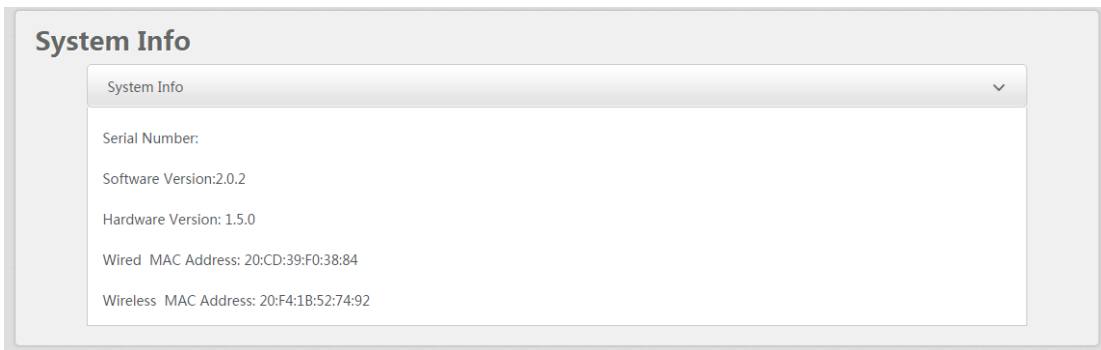
## 8.0 OTHER CONFIGURATIONS

- You can view more information about the gateway on the “**Setting**” page





- **System Info** shows gateway hardware and software information



- You can set Gateway Mode, Time, and Password in the **Settings** drop-down menu



AP Mode: If you are **NOT** connected to the internet, activate **AP Mode** to connect your PC, tablet or smartphone to receive power generation data



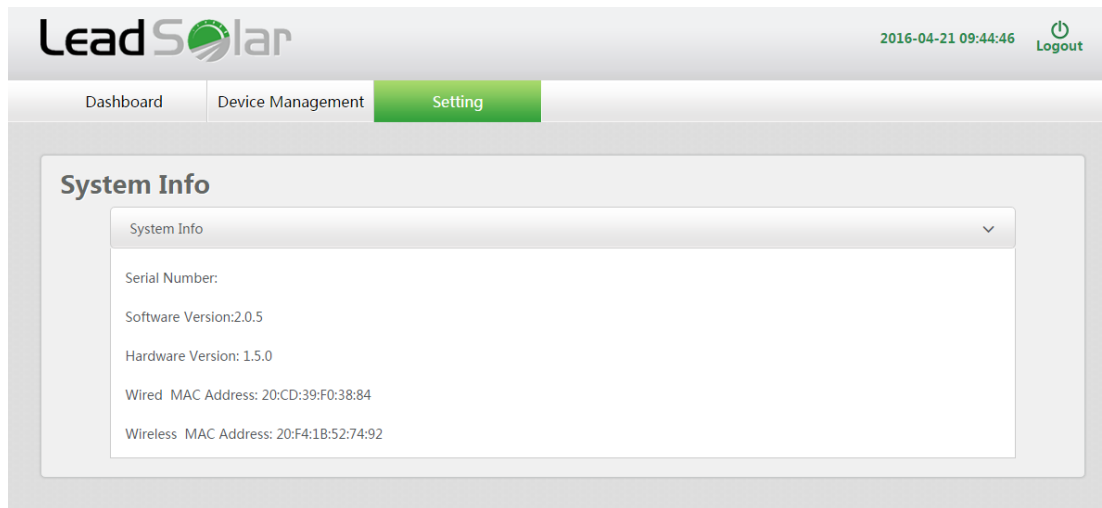
Client Mode: If you **ARE** connected to the internet, activate **Client Mode** to connect the gateway to the router. This allows system data to be received by LeadSolar web monitoring servers.

## 9.0 SYSTEM UPDATES

System updates are made periodically. To ensure that you have the latest version of software, follow these steps:

### 9.1 View Software Version

- The version of software that the gateway is currently operating on can be checked in the **System Info** drop-down menu on the **Setting** page



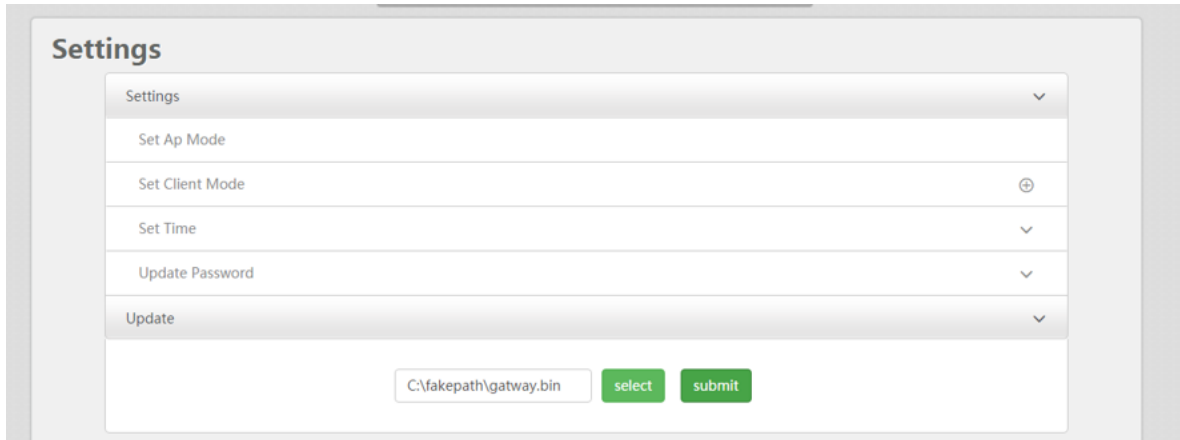
The screenshot shows the LeadSolar web interface. At the top, the LeadSolar logo is on the left, and the date and time '2016-04-21 09:44:46' along with a 'Logout' button are on the right. Below the header is a navigation bar with three tabs: 'Dashboard', 'Device Management', and 'Setting' (which is highlighted in green). The main content area is titled 'System Info' and contains a dropdown menu labeled 'System Info'. Below the dropdown, the following information is displayed: 'Serial Number:', 'Software Version: 2.0.5', 'Hardware Version: 1.5.0', 'Wired MAC Address: 20:CD:39:F0:38:84', and 'Wireless MAC Address: 20:F4:1B:52:74:92'.



Always keep the gateway connected to the Internet. LeadSolar will do regular remote upgrading for the LS Link Gateway™ software.

### 9.2 Software Upgrade

- From your PC, tablet or smartphone, download a file called “**update.bin**” from [www.leadsolarenergy.com](http://www.leadsolarenergy.com).
- Once downloaded, the gateway software can be updated by clicking the **Update** drop-down menu



- Press the **select** button to choose the file “**update.bin**” and press the **submit** button to upgrade your gateway software
- It will take approximately 5 minutes for the upgrade to complete. If the upgrade fails, you will see a dialog box alerting you. Try upgrading again.
- When the upgrade has completed successfully, you will see a dialog box that will inform you.



Gateway software updates can also be delivered via micro SD card inserted into the micro SD slot on the gateway.

## 10.0 APPENDIX

### 10.1 Explanation of Technical terms

- AP Mode – Access Point Mode - is the default, most common mode for all wireless routers, also called Infrastructure mode. In AP Mode, your router acts as an central connection point, which wireless clients can connect to.
- DHCP – Dynamic Host Configuration Protocol - is a client/server protocol that automatically provides an Internet Protocol (IP) host with its IP address and other related configuration information such as the subnet mask and default gateway.
- PLC – Power Line Communication - is a communication method that uses electrical wiring to simultaneously carry both data, and electric power
- QR Code – a machine-readable code consisting of an array of black and white squares, typically used for storing URLs or other information for reading by the camera on a smartphone
- SD Card–Secure Digital Card - is an ultra small flash memory card designed to provide high-capacity memory in a small size. The gateway can accommodate up to a 16GB micro SD card.
- SSID - Each BSS or ESS is identified by a service set identifier (SSID) - a 1 to 32 byte string. This is normally a human-readable string and thus commonly called the "network name". In an IBSS, the SSID is chosen by the client device that starts the network, and broadcasting of the SSID is performed in a pseudo-random order by all devices that are members of the network.

For residential applications, the SSID is the name of the wireless internet network. The LeadSolar LS Gateway needs the correct SSID and password to connect with the router via WiFi. There should be no space before or after the SSID.

## 11.0 DATASHEET: LEADSOLAR LINK GATEWAY

Link Gateway		Product Specifications	
<b>TECHNICAL DATA</b>			
Input voltage (AC)		208 -240 V	
Nominal operating frequency		50 Hz/60 Hz	
Power consumption		3 W	
Communication interface		PLC or ZigBee	
Accuracy		± 2.5%	
Maximum pass thru current		50 A	
Maximum inverters supported <sup>1</sup>		200	
<b>EXTERNAL INTERFACE</b>			
Power interface		240V AC Power Supply	
Network interface		802.11b/g/n, 802.3, Cat5E (or 6) UTP Ethernet cable	
GPRS <sup>2</sup> interface		Connection to cellular devices	
Micro SD card interface		Slot to insert standard or HD SD card	
Service pin button		Log-in restore/send Service Pin message	
Reset button		Reboots device	
<b>MECHANICAL DATA</b>			
Operating ambient temperature range		-40° C to 65° C	
Dimensions ( W x H x D)		19.6 cm x 12.8 cm x 4.8 cm (7.7 in x 5.0 in x 1.9 in)	
Weight		676 g (1.49 lbs)	
Cooling		Convection (no fan required)	
Enclosure environmental rating		NEMA 1	
<b>INTERNET CONNECTION OPTIONS</b>			
Integrated WiFi		802.11b/g/n	
Ethernet		802.3, Cat5E	
<b>OTHER FEATURES</b>			
User interface		Built-in web pages	
Local data storage		Up to 10 years	
Firmware upgrading		Via remote or local connection	
Software		LeadSolar LinkView™	
<b>COMPLIANCE</b>			
Compliance		FCC PART 15, CAN/CSA C22.2 NO. 60950-1	

<sup>1</sup>. Gateway with external filter- device with internal filter subject to 50A limit

<sup>2</sup>. GSM General Packet Radio Service

To obtain additional information, visit [leadsolarenergy.com/contactus](http://leadsolarenergy.com/contactus)

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## 12.0 FAQ

- Q: Should I connect the LS Link Gateway™ to my router for monitoring?  
A: Yes, if you wish to receive detailed system production information, or if you wish to monitor your PV system on your PC, tablet or smartphone. Alternatively, cellular option is available to do this.
- Q: Can I use my PC, pad or mobile to connect with the gateway by WiFi?  
A: Yes. All will work. Please set the gateway to Client Mode first.
- Q: How many microinverters can be connected to the LS Link Gateway™?  
A: The gateway supports connection of up to 25 LeadSolar LS600 microinverters. For larger systems it is recommended to use micros with ZigBee communication and a Digi gateway.
- Q: What to do if I get a “Windows Unable to Connect” or “No Connection Available” message?  
A: This means there is difficulty with the WiFi connection to the gateway due to either poor signal strength or interference from other devices. Try repositioning the gateway antenna and/or moving your connection device. If the difficulty persists please initially connect directly to the system owner’s router with an Ethernet cable.
- Q: Can I use the LeadSolar Link Gateway™ with other microinverters brands?  
A: No.
- Q: How long can the Link Gateway™ record and store data from microinverters?  
A: Total system production is stored for approximately 10 years.
- Q: Can I turn off the gateway?  
A: Yes. However, the gateway does not receive data from microinverters when it is not powered and “on”.
- Q: I have installed the PV system, configured the LS Link Gateway™ network, and registered all IDs but the Gateway is not communicating with the microinverters. What can I do?  
A: Please check the IDs of the microinverters you have registered on your account, reboot the gateway, and wait for 3-30 min, depending on system size.
- Q: Shall I install the gateway inside of my house?  
A: No. The gateway should be installed in a NEMA 3R or 4 junction box outside of your house and marked with appropriate safety signage.