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Wi-Fi Basics

The connection process

When connecting your inverter to your home Wi-Fi network, there is a communication and acceptance process that takes place, before the two units can operate together.

The process goes like this:

Your router/modem transmits a signal, introducing itself ([SSID or Name](#))



Your device (in this case, the inverter) receives that signal



You (via your device) make the request to connect to the router



The router and device communicate (this is 'association')



You input the [appropriate password](#) for the router



The router checks that password and if it is correct (this is 'authentication'), connects to the device and assigns that device an [IP address](#).

What is an 'IP address'?

An IP address is a numerical label assigned to each device on a network. It appears as four numbers separated by dots, eg <http://192.168.1.105>

The inverter web page can be accessed by entering the inverter's IP address into a web browser (such as Chrome, Safari, Internet Explorer, etc.) on a device (eg, computer, tablet or smartphone) connected to the network. When the inverter is connected to a network, its IP address will be displayed on the LCD's *Network* screen.

IP address changes

Typically, routers incorporate software known as DHCP, where the D stands for 'dynamic'. This means that over time, your router automatically updates the IP



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addresses assigned to the various devices connected to it. See [here](#) for more information.

Wi-Fi coverage and signal strength

The frequencies that Wi-Fi operates at is 2.4GHz and 5 Ghz: most new routers transmit on both, but older units only on 2.4. The EnaSolar GT Inverter **only operates at 2.4GHz**, so ensure that your new router is transmitting on that band.

A note about radio theory: at these high frequencies, the signal finds its way (propagates) through the air in a direct path. It bounces off the walls of the house and penetrates through some materials. As it does this it loses its strength (attenuates) until it is so weak it's no longer usable.

Therefore don't position your router a long way from the devices that use it (eg don't position your router in garage, when your bedrooms are at the other end of the house where the kids want to surf the internet).

What users of Wi-Fi don't see is the data re-trying to send/receive. If things get a little bit slow (eg videos loading slower), that could be an indication of interference or a poor signal. The router and device (laptop, tablet, inverter) are having to re-send data backwards and forwards until it's received clearly.

Router manufacturers have recognised this and you can now get routers that have multiple aerials and multiple transmitters so that the best signal can be transmitted and received. These *may* work better, but the best solution is to ensure there is an even coverage throughout the house, so position your router centrally.

Would a bigger aerial help? Not necessarily. Aerials are a science in themselves. A "bigger" aerial does not mean better signal. An aerial has to be tuned to a certain frequency, and there are many different options available. Using 'any old aerial' will make things worse.

Would an extender help? Before getting an extender, be aware of the following:

Same or separate SSID?: Most extenders work by receiving the master signal and re-transmitting it on a different channel (to avoid same-channel interference). You typically push some buttons and it self-configures to the master router. It picks up the same SSID and passphrase from the router so that the user has a seamless Wi-Fi roaming experience.

A problem occurs in the overlap area of the two transmitters (main router and extender). Within this overlap area, devices will scan for the best signal and lock on to it. If the signal is a similar strength from both, then the device will hunt backwards and forwards and this may be seen as a slow-down of data transfer and operation. This is contrary to what you would



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have expected by adding an extender.

So, while it may cure the Wi-Fi problem for the inverter connection (because it sees only one transmitter as the strongest) it could create connection reliability problems with other devices in the house.

If you configure the extender with a different SSID, then the user would have to manually connect and disconnect between the main router and the extender.

It's like having two separate wireless networks operating at the same location.

This is more cumbersome to operate, but would allow for a more solid Wi-Fi connectivity.

The best solution for poor signal coverage is to place the router in a central position to where coverage is needed. Don't bury it in a cupboard; place it as high as possible.

A good idea is to install a separate access point on the ceiling. **Please contact your Wi-Fi service provider or installer** to scope the requirements for this.

Wi-Fi terminology

Here are a couple of websites that have great Wi-Fi glossaries:

<http://www.gfi.com/blog/wi-fi-glossary-71-terms-you-need-to-know/>

<http://wireshark.com/wifi-terminology.html>

General

Will the Wi-Fi work when the inverter is not generating?

Yes, the inverter can be interrogated at any time both on the front panel and over the Wi-Fi, since it is powered via the AC connection during night or at low light conditions.

Why does the IP address on my inverter change occasionally?

All devices that are connected to your router/network are automatically assigned an IP address. Should that device no longer require connection, then the assigned IP address is no longer needed. As a matter of housekeeping, your router cleans up its stored memory of IP addresses and reorganises all those that remain into a nice orderly sequence. This all happens in the background and you would normally never know it happens, unless you try to access a particular IP address. The router is configured to do this automatically: the time between clean-ups varies between router types (1-10 days).



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For example, if you have a houseguest and you let them use your Wi-Fi, they will connect to your network and therefore be assigned an IP address. When that guest leaves, the IP address they were assigned is now redundant, so it is relinquished for future use.

I 'bookmarked' my inverter IP address in my browser so don't have to remember it but now I can't see my inverter data. What's happened?

Because most Wi-Fi routers use DHCP to dynamically assign (and re-assign) IP addresses frequently, the IP address associated with the inverter may change and therefore your bookmark will not work.

Your options are to

- fix your IP address, or
- assign a name to your inverter

How do I find out which IP address the inverter has been assigned by my Wi-Fi router?

The inverter IP address is visible on the inverter display. Knock on the metal front panel to toggle between information screens on the inverter. The IP address will have been dynamically assigned to the inverter by the Wi-Fi router. It may change from time to time.

The inverter is being assigned a different IP address every other day. Can we assign a static IP address to the inverter so that it remains the same and I don't have to keep looking on the inverter LCD?

Most Wi-Fi routers use DHCP to dynamically assign IP addresses to all devices that connect to the Wi-Fi router and, as explained earlier, the router can dynamically update these IP addresses. If your inverter has been mounted in an inaccessible place, it is inconvenient to repeatedly check your inverter panel for the new IP address. To avoid this, your installer can fix your IP address so it doesn't update.

Please refer to *Technical Documents* [5J](#) and [5K](#) or contact your installer.

Using a name instead of an IP address

An alternative to using the IP address is to give your inverter a name (known as a 'hostname') and link through that name instead. Then the router can reallocate IP addresses whenever it likes and you won't lose your connection.

By default, the hostname is ENASOLAR-GT, meaning the you can enter 'http://ENASOLAR-GT' into a web browser to view the inverter web page. When choosing a hostname, please note that it:



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- may be up to 15 characters long
- can include letters (A through Z, and these are not case sensitive)
- can include numbers (0 through 9)
- can include hyphen(s)
- cannot include spaces

If multiple inverters are being installed the hostname should be unique for each inverter.

Once you have decided on your hostname, your installer can set it for you.

Note: modern web browsers try to think for you. So if you gave your inverter a host name of SOLAR, and enter SOLAR into the address line of a browser, your search engine will do a **search** on 'solar', rather than go direct to your inverter web page.

So, when you enter a host name into most web browsers (Chrome, Firefox, Edge, Safari), add a '/' after the hostname, **eg SOLAR/**
You may need to add 'http://' before the name, **eg http://SOLAR/**

Once you have set this all up, you can now add this URL to your bookmarks and thereby allow easy single-click access to the inverter reporting pages.

Resetting the Web Administrator Username/Password

The settings section of the inverter web page requires a username and password known as the *Web Administrator Username/Password*. The default username is 'Admin' and password 'Admin1', but these can be changed in the *Network* section of the inverter web page, or in the *Advanced Settings, Network* tab in the Inverter Configuration Software.

If you have changed your username and password in the past, but have now forgotten it, the only way to reset this is by connecting to the inverter via USB and going through the set up process. Please refer to [Technical Document 5W](#) for detailed instructions.



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Wi-Fi Configuration

Inverter/Wi-Fi set-up

How do I set up the inverter to be Wi-Fi connected?

Please refer to [Technical Document 5J](#) for full instructions or contact your installer.

I tried to set up the inverter Wi-Fi but got stuck. Is there a reset button anywhere?

No, there is no reset button. Please refer to your installer or refer to *Technical Documents* [5J](#) or [5W](#)

USB Configuration

Note: Because this process exposes you to live AC and DC voltages, USB configuration should only be attempted by qualified installers and electricians. Under no circumstances should an unqualified individual attempt this configuration.

Please refer to [Technical Document 5J](#) for full instructions.

Can I get (download) a copy of the EnaSolar inverter configuration software tool so that I can connect to the unit via USB?

Yes, please download from [here](#) and refer to [Technical Document 5J](#) for full instructions.

Note that there are two versions of the configuration software:

1. The 'Wi-Fi Lite Configuration Software' version incorporates the essential elements to allow changes to the date/time and network/Wi-Fi settings.
2. The 'Wi-Fi Full Configuration Software' version is the comprehensive configuration software that is **used by installers** and incorporates detailed configurable parameters **that should only be modified by trained personnel**. Downloading and using this version allocates responsibility to yourself.

Router Configuration

I have bought a new Wi-Fi router, what do I do?

If you change your Wi-Fi router, you need to re-connect the inverter to the new router's Wi-Fi network. Please refer to [Technical Document 5V](#) for detailed instructions.



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NOTE: In order to follow these instructions, you need to leave your existing router connected. The instructions will tell you when to decommission the old one and connect the new. Otherwise, follow the process for a new set-up ([Technical Document 5W](#))

I want to change the Wi-Fi network password in my router

Before changing the password in the router, you will need to:

1. a) Log in to the inverter's webpage
 b) Change the wi-fi password in the inverter

2. Change the password on the router

If you have already changed your Wi-Fi's network password in the router, you will need to temporarily change it back again in order to re-configure the inverter.

Please refer to [Technical Document 5V](#) for detailed instructions.

Replacing the Wi-Fi router

Please refer to [Technical Document 5V](#) for detailed instructions.

NOTE: In order to follow these instructions, you need to leave your existing router connected . The instructions will tell you when to decommission the old one and connect the new.

Ad-hoc Configuration

If the inverter does not have a connection to a router, then it will default to (and be available for) *ad-hoc* connectivity. *Ad-hoc* means that two devices can talk directly to each other, rather than through a router. Please refer to [Technical Document 5W](#) for details.

Since the inverter will not be available for ad-hoc connections while it is connected to an Infrastructure Wi-Fi network, the inverter may first need to be disconnected from the customer's Wi-Fi network. The simplest approach is to turn off the customer's Wi-Fi access point (router, modem, etc.) until an ad-hoc connection with the inverter has been established.



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Network Configuration

Will the inverter Wi-Fi work with 'Hide SSID' enabled on my Wi-Fi router?

Yes, but this will have to be enabled during Wi-Fi set-up and only for inverters with serial numbers after 1232451694.

Please note: for earlier inverters (up to serial number 1232451694) the inverter Wi-Fi connection cannot be made with 'Hide SSID' enabled: they only work if the SSID is 'open'.

Monitoring your EnaSolar PV system when you are out and about ('port forwarding' your router)

To monitor your EnaSolar GT Inverter while away from home, your modem/router can be configured to allow a direct path to your inverter reporting pages. This means that you will be able to view all of the same data as if you were connected to your home network. For more information, please refer to [Technical Document 5U](#).



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Trouble Shooting

I cannot access my inverter's webpage.

Please check the following:

Is your Wi-Fi connected?

Knock on the front panel of your inverter to check the connection status.

If it is connected you should see a message on screen with the IP address and signal strength.



```
IP Address  
10.0.0.1  
  
Signal: 58%
```

If the inverter is not connected to a Wi-Fi network the display indicates that an access point has not been found.



```
WiFi Access  
Point Not Found  
Key: 56398
```

If your inverter is not connected, please refer to [Technical Document 5W](#) and start the set-up process again.

Signal strength



```
IP Address  
10.0.0.1  
  
Signal: 58%
```

The wireless signal strength must be a minimum of 30%, this will be displayed on the same screen as the IP address. If the signal strength is less than 30%, please refer to our section on [Wi-Fi coverage and signal strength](#).

The IP address that is being searched for matches the one displayed on the screen.

This must have the prefix of 'http: //' entered into the web browser when typing the IP address.



TECHNICAL DOCUMENT

ref: 3Hv2

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The computer that is being used to search the webpage is on the same local network as the inverter.

Check the inverter config is set for 'FCC'.

This is a setting within the router that requires specialist knowledge to configure it.

Please consult your installer

Check the access point is configured in 'mixed mode' with 'b' compatibility enabled.

This is a setting within the router that requires specialist knowledge to configure it.

Please consult your installer.

Transmission rate

The transmission rate of the router should be **no faster than 2Mb/s.**

Please consult your installer.

This is a setting within the router that requires specialist knowledge to configure it.

*Check that the Wi-Fi is transmitting at **2.4GHz**.*

Most routers now do both 2.4 and 5GHz (normally at the same time, but you can turn them on and off individually).
The inverter only works with 2.4GHz.

Please consult your installer.

This is a setting within the router that requires specialist knowledge to configure it.

Are there a lot of wireless devices being used?

If there are a number of devices such as: cordless phones, Bluetooth and other wireless devices that use the same frequency (2.4GHz) these may have an effect on the signal strength as interference.



TECHNICAL DOCUMENT

ref: 3Hv2

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Error Messages

<i>Access Point Not Found</i>	Check that the router/access point is switched on. Check the antenna connections on the inverter and router/access point. Move the router/access point and inverter closer together if possible.
<i>Security Not Matched:</i>	Check that the wireless security settings match with the router. Both the router and the inverter need to be configured for the same security level – typically WPA2-PSK.
<i>Failed to Join Network:</i>	Check that the wireless settings match with the access point.
<i>Failed to Authenticate:</i>	This message usually indicates that the Wi-Fi password that the inverter is trying to use is incorrect. Check that the WEP key and WEP authentication type (or WPA passphrase) match with the router. This would quite often require an installer to reconfigure.
<i>Failed to Associate:</i>	This message indicates that the security settings are not matched correctly between inverter and Wi-Fi router. This would quite often require an installer to reconfigure. Check the WEP key and WEP authentication type (or WPA passphrase) match with the router. Check that MAC filtering is not enabled on the access point. If it is, disable it or add the MAC address of the inverter to the allowed list.
<i>Ad-hoc Connected:</i>	A user is connected to the inverter by the <i>ad-hoc</i> connection.
<i>Failed to get an IP Address:</i>	<p>If there is no DHCP server on the network, disable DHCP and manually enter the default IP address, DNS IP and Gateway IP in the <i>Advanced Settings</i> page of the Inverter Configuration Software.</p> <p>If there is a DHCP server on the network, then the user's access point may be transmitting wireless broadcasts at the wrong rate. Change the base transmit rate of the access point to 2 Mb/s. Look at the documentation for the access point on how to do this. Otherwise, set the inverter to have a static IP and manually enter the default IP address, DNS IP and gateway IP in the <i>Advanced Settings</i> page of the Inverter Configuration Software.</p>



TECHNICAL DOCUMENT

ref: 3Hv2

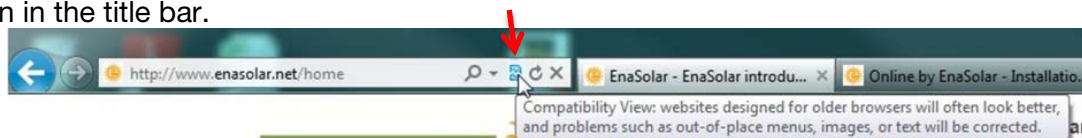
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<i>Web page can't be accessed using the IP address:</i>	Check that the IP address has been entered correctly and that both the inverter and device (from which the web page is being accessed) are successfully connected to the same network.
<i>Web page can't be accessed using the hostname as the address:</i>	Try to access the web page using the IP address displayed on the network page on the Display Module. If the IP address gives access to the inverter web page, but the hostname does not, then your device or web browser may not support the protocol used to access the inverter by hostname.
Lost or Forgotten Password:	The username and password 'Admin' and 'Admin1' will allow access to the <i>Settings</i> section of the inverter web page (unless you have previously changed the username and/or password) when connected via ad-hoc. Once connected, the web administrator username and password can be changed in the Network Settings section. See here for more information.

Miscellaneous

My graphs do not show when searching using Internet Explorer 9

Check that the compatibility mode is turned on. This is indicated with a broken page icon in the title bar.



How do I know what an SSID is and how do I know this is the right one?

Typically the client's router has the SSID and password/passphrase are noted on the underside of the router or with the supplied packaging.

For example:



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Where do I find the Password/Passphrase/PIN?

Usually on the underside of the router.

For example:



What is the Difference between WEP, WPA and WPA2-PSK?

These are different types of wireless security.

- | | |
|-----------------|---|
| WEP | WEP is an older open (and not secure) protocol. |
| WPA | WPA is a later, secure protocol. |
| WPA2-PSK | WPA2-PSK is the most secure and common protocol used by almost all routers. |

My Wi-Fi will not connect

1. Power cycle the Wi-Fi router (turn it OFF, then ON again)
2. Check you have at least 30% signal strength. If not, see [here](#).
3. Verify you have the right SSID and password/passphrase combination (use your laptop to verify you can connect to the internet). See [here](#) for more information.

My Wi-Fi does not stay connected

1. Check that you have at least 30% signal strength. If not, see [here](#) for more information.
2. Check for obstacles to the wireless signal. See [here](#) for more information.

