

## Multilin 8 Series

# Connecting to 8 Series Devices using Wireless Communications

## Application Note

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### Overview of 8 Series WiFi

WiFi refers to Wireless Local Area Networks (WLANs) that are based on the 802.11 set of standards. WLANs essentially provide Local Area Network (LAN) connectivity but without the need for cables, which makes them more convenient for use in limited spaces. WiFi works on top of the TCP/IP stack, the same as Ethernet. The signal strength and range are determined by the wireless device's antenna technology and standard, with the best being IEEE 802.11n.

WiFi defines two modes of operation, namely ad-hoc mode, used for small deployments, and infrastructure mode, which supports more robust types of security and better capabilities for centralized management. The infrastructure mode requires an Access Point (AP). Devices operating in this mode pass all data through the AP.

### Implementation

The WiFi module integrated into 8 Series devices conforms to IEEE 802.11b/g/n standards. The 8 Series devices operate in infrastructure mode, which means an Access Point (AP) is required. Figure 1 below illustrates operation of the infrastructure mode, where all data is passed through the AP. Signal Range is 30 ft (direct line of sight).

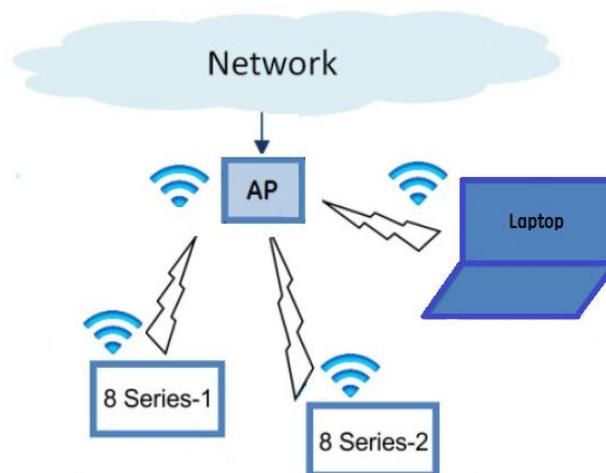


Figure 1: Example of 8 Series WiFi Deployment

Security is optional, but enabled by default and it is advisable that it is left on, as wireless traffic is susceptible to cyber-attacks.

The security technology used in 8 Series relays is WPA2 (Wireless Protected Access version 2), based on the IEEE 802.11i standard for data encryption. WPA2 is an updated version of the WPA technology, designed to solve known security limitations found in one of the encryption algorithms used by WPA, namely TKIP (Temporal Key Integrity Protocol). WPA2 uses CCMP (Counter Mode with Cipher Block Chaining Message Authentication Code Protocol), which provides an enhanced data cryptographic encapsulation mechanism based on AES (Advanced Encryption Standard). CCMP makes WPA2 much stronger and secure than its predecessors, WPA and WEP.

Several forms of WPA2 security keys exist. The 8 Series supports WPA2 PSK (Pre-Shared Key), which utilizes 64 hexadecimal digits. The key may be entered as a string of 64 hexadecimal digits or as a passphrase of 8 to 32 printable ASCII characters. For user convenience, the settings accept the key in the form of a passphrase. Internally the ASCII passphrase is used to derive a 256-bit key.

## Advantages of WiFi

The main advantages of using WiFi instead of a wired LAN or USB connection to communicate with an 8 Series device are:

- Communication is non-intrusive, without physical connections. Users may connect their PCs to the wireless LAN without the need to be in physical proximity of the 8 Series device.
- Users can maintain a safer distance (up to 30 ft.). Most 8 Series devices are installed in metalclad switchgear which can be a dangerous zone due to arc flash hazards. With a wireless connection, users can remain at a safer distance from the 8 Series device and metalclad switchgear, enhancing safety while communicating with the device.

## Access Point (AP) and 8 Series WiFi configuration

### Equipment requirements

The following equipment is required to configure 8 Series devices for a WiFi connection:

<p>8 Series relay with WiFi option. Example of 850 order code: 850-EP5NNS5HNNAANGAPCB1ESWBN where <b>W</b> indicates the Wireless Communication option.</p>	
<p>PC with WiFi capabilities (laptop or desktop computer supporting WiFi).</p>	
<p>Access Point (router).</p>	

Each device must have WiFi parameters programmed, including IP Addresses. The next section gives a detailed example of setting WiFi parameters.

### Configuration procedure

To configure the AP and 8 Series devices, follow the steps given in this procedure. For this specific example, the following IP Addresses will be used:

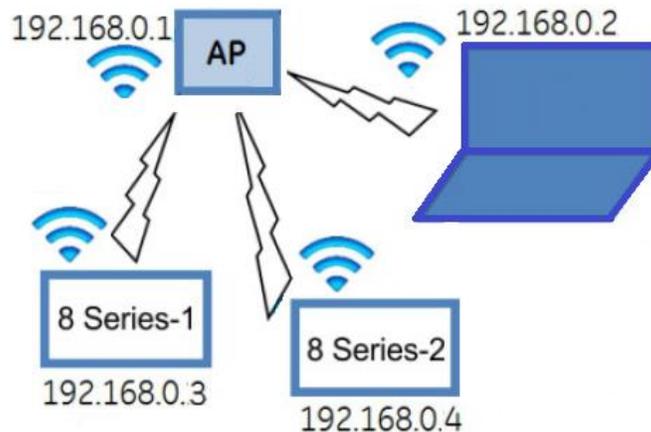


Figure 2: IP Addresses used in 8 Series WiFi deployment example

In this example, a D-Link DIR-810L router is used, with a default address of 192.168.0.1. The configuration procedure will be very similar for other router types.

## Accessing the router configuration

1. Make a direct cable connection between the laptop LAN port and one of the LAN ports on the router.

**NOTE:** This direct connection to the LAN is **only** required during initial setup of the router, and can be removed as noted in the following steps.

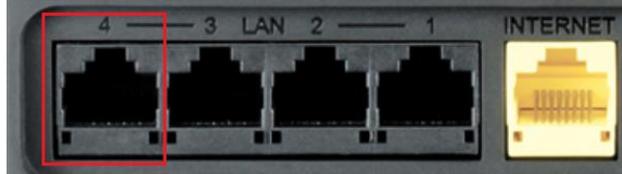


Figure 3: Router LAN port to be connected to computer LAN port, using Ethernet cable

2. The computer LAN adapter must be configured with IP address of similar range as the router, in this case 192.168.0.1. In Windows 7 The LAN adapter settings can be accessed via Windows Control Panel:
  - a) Navigate to **Start > Control Panel > Network and Sharing Center > Change Adapter Settings > Local Area Connection > Properties > Internet Protocol Version 4 (TCP/IPv4)**.
  - b) Select **Properties**.
  - c) Set the following:
    - IP Address: 192.168.0.10.
    - Subnet Mask: 255.255.255.0.
  - d) Click **OK** to Save the Settings.

The Laptop is now configured to access the router configuration.

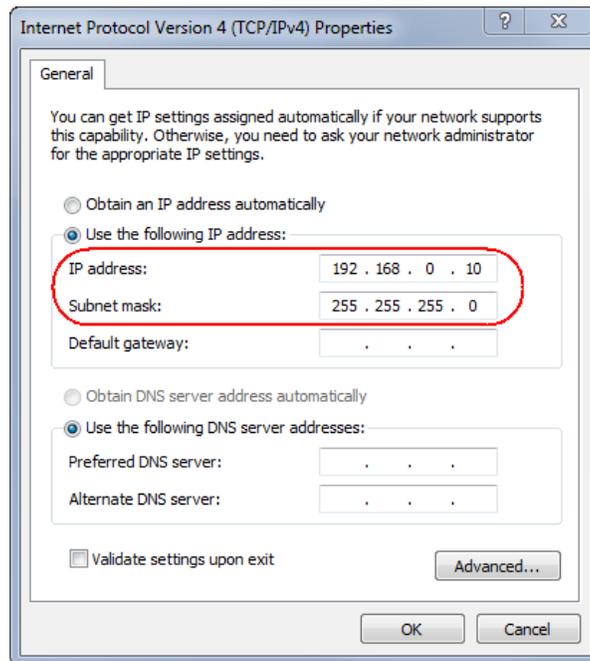


Figure 4: Configuration to allow router connections, Windows 7

## Configuring the router for WiFi communications

1. Open any web browser and type the Router IP Address. 192.168.0.1. (Typically indicated on router)
2. Login to the router with the assigned Username and Password.

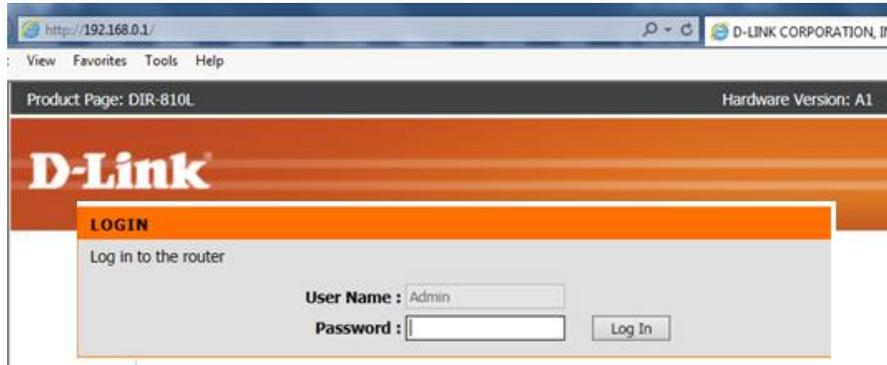


Figure 5: D-Link router configuration

3. Access the **Wireless Setup** page.
4. Set the Network Name (SSID): **Multilin1**, where the SSID is the public name of a wireless network.
5. Select **WPA 2 Personal Wireless Security** mode and enter the following passphrase: **Pa77word**
6. Verify and click **Save** to save your settings.

The Access Point (AP) is now configured.

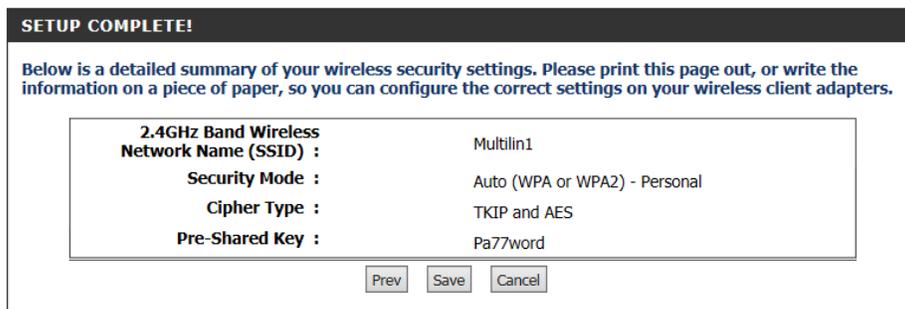


Figure 6: D-Link Router WiFi Settings

**NOTE:** The direct cable connection between the Laptop and the router is no longer needed, and can now be removed.

## Configuring 8 Series device for WiFi communications

Connect a PC with the Energysta 8 Series Setup software installed to an 8 Series device using a USB connection to the front port of the relay. In this example, an 850 relay is used.

1. Access WiFi Settings under the following menu: **Setpoint > Device > Communications > WiFi**
2. Configure the WiFi Settings as shown.

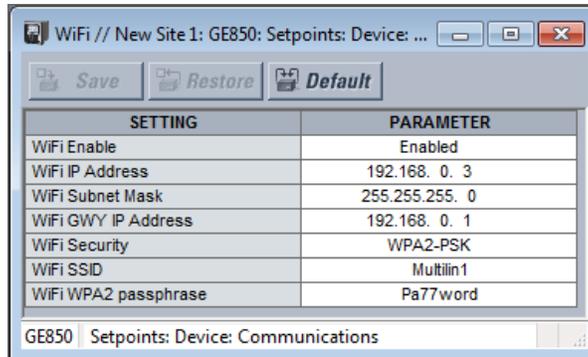


Figure 7: 8 Series WiFi Settings

3. Click **Save** to save the changed settings to the relay.

**NOTE:** The 8 Series relay must be rebooted after saving the communications settings; After the relay is rebooted, the USB connection may be disconnected.

**NOTE:** The default WiFi WPA2 passphrase is: Ge1wx9s3123!4. The WPA2 Passphrase is used for generating the encryption key. The same passphrase must be set on AP and on all devices communicating on the same WLAN. If this passphrase is left unchanged, a warning Target message will appear: “WiFi Default Setting”. The passphrase must be changed to remove this message.

## Configuring a PC for WiFi communications

The PC (laptop or desktop) Wireless Network Adapter needs to be configured with proper IP Address.

In Windows 7 The WiFi adapter settings can be accessed via the Windows Control Panel.

1. Follow the following path to configure the Wireless Network Connection: **Start > Control Panel > Network and Sharing Center > Change Adapter Settings > Wireless Network Connection > Properties.**
2. Select **Internet Protocol Version 4 (TCO/IPv4)** and select **Properties.**
3. Set the following:  
 IP Address 192.168.0.2  
 Subnet Mask 255.255.255.0
4. Click **OK** to save your settings.

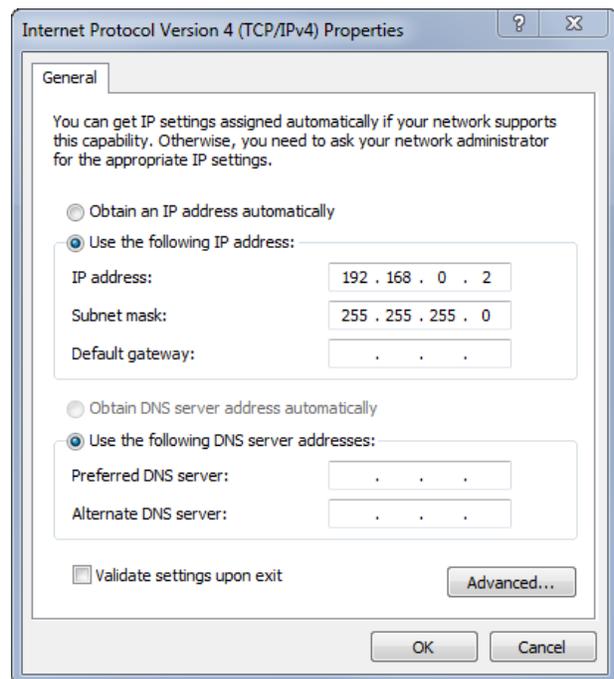
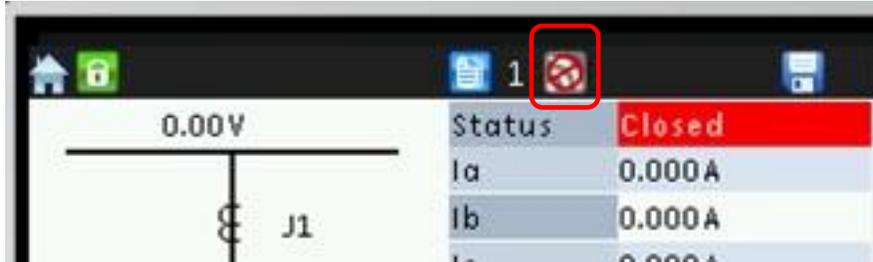


Figure 8: PC WiFi Settings

## Verifying WiFi communications

1. Ensure that router is powered up and running programmed configuration. (Some routers might require a reboot after configuration settings were changed).
2. Verify the status of the 8 Series WiFi connection by checking the color of the WiFi icon shown in the top bar of the HMI window, as shown:



**NOTE:** The icon color indicates connection to the Access Point only. The green icon, for example, indicates that the connection to Access Point exists. This does not mean the user is connected to the 8 Series device, only that it is connected to the router. Icon states are described in the following table.

Description	Icon
Icon is grey and crossed out by a red line. WiFi is disabled.	
Icon is orange. The relay is in the process of connecting to the Access Point.	
Icon is grey. The relay is disconnected from the Access Point.	
Icon is green. The relay is connected to the Access Point.	

## Connecting the PC to the Access Point

In Windows 7, follow this path to access the WiFi connection:

1. Navigate to **Start > Control Panel > Network and Sharing Center > Change Adapter Settings**.
2. Click **Wireless Adapter Connection**.
3. Right-click and connect to the wireless network. In this example, we connect to the 'Multilin 1' network.
4. Enter the passphrase that was previously setup for the Access Point.

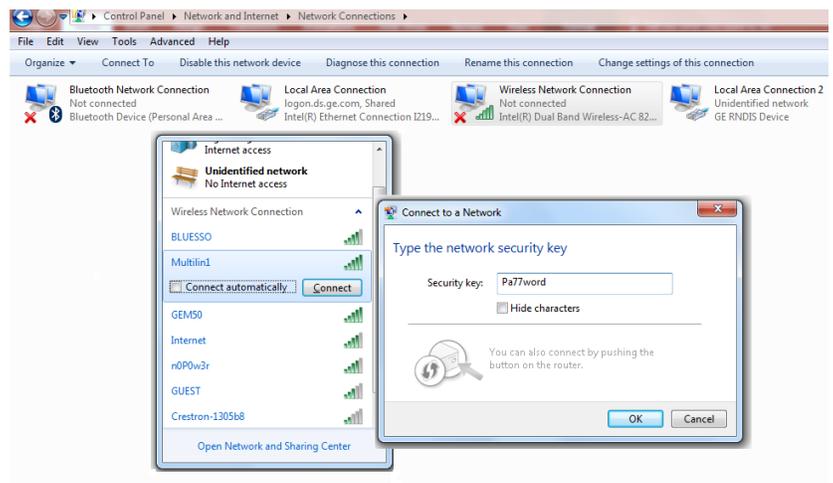


Figure 9: Connecting a PC to the Access Point (Router)

## Verifying the PC connection to the Access Point

Check the Wireless Network Connection Status:

- Under **Start >Control Panel> Network and Sharing Center** the network name, 'Multilin1' in this example, will be displayed.
- Alternatively, right-click the wireless adapter icon located at the bottom-right of the desktop screen, then click **Open Network and Sharing Center**.

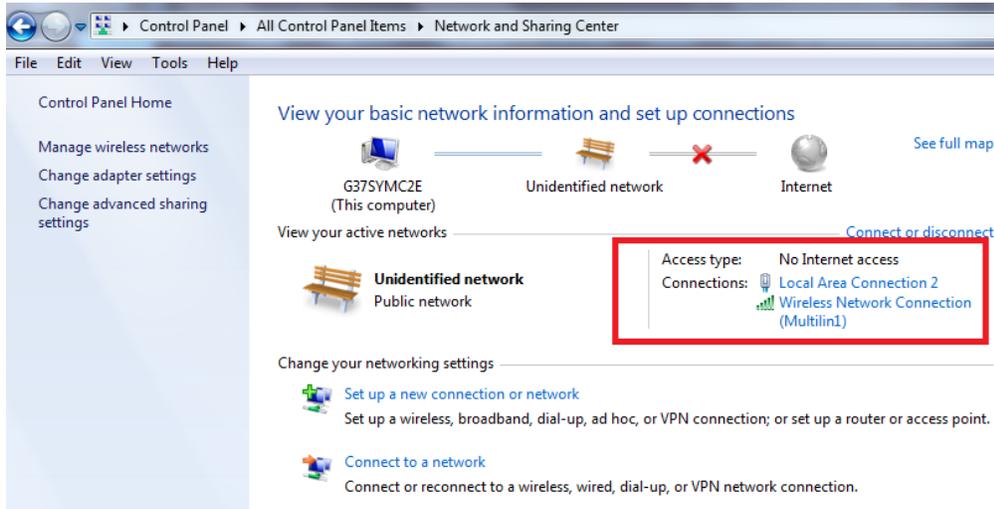


Figure 10: Verify PC connection to Access Point (router)

Click the Network name to display the **Wireless Network Connection Status** window. Signal quality is indicated by Green bars, with five bars indicating the best quality.

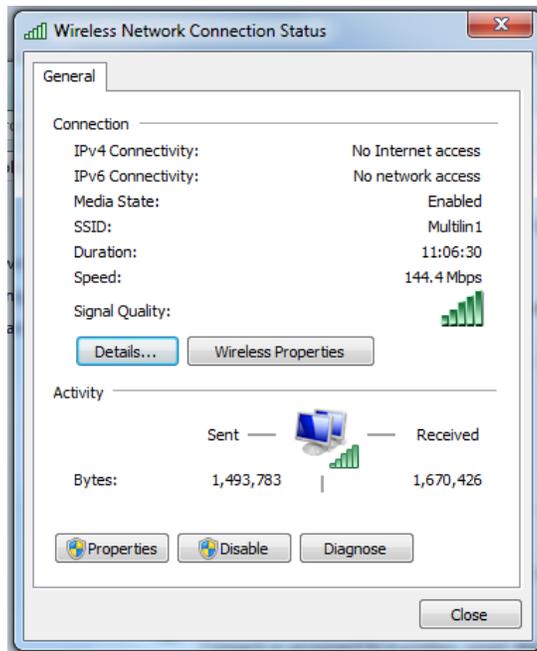


Figure 11: PC connection to Access Point (router)

## Connecting to the 8 Series device via WiFi Access Point

- In the EnerVista 8 Series Setup software installed on a PC, click **Device Setup > Select 850 Device > Set Interface to WiFi**, then click the **Discover** button.

All 8 Series devices detected through the configured WiFi connection are added automatically. The scan takes approximately 90 seconds. Once all relays have been detected, select a relay and click **Read Order Code** to initialize the connection.

**NOTE:** You can also enter the IP Address directly, without using the discover function.

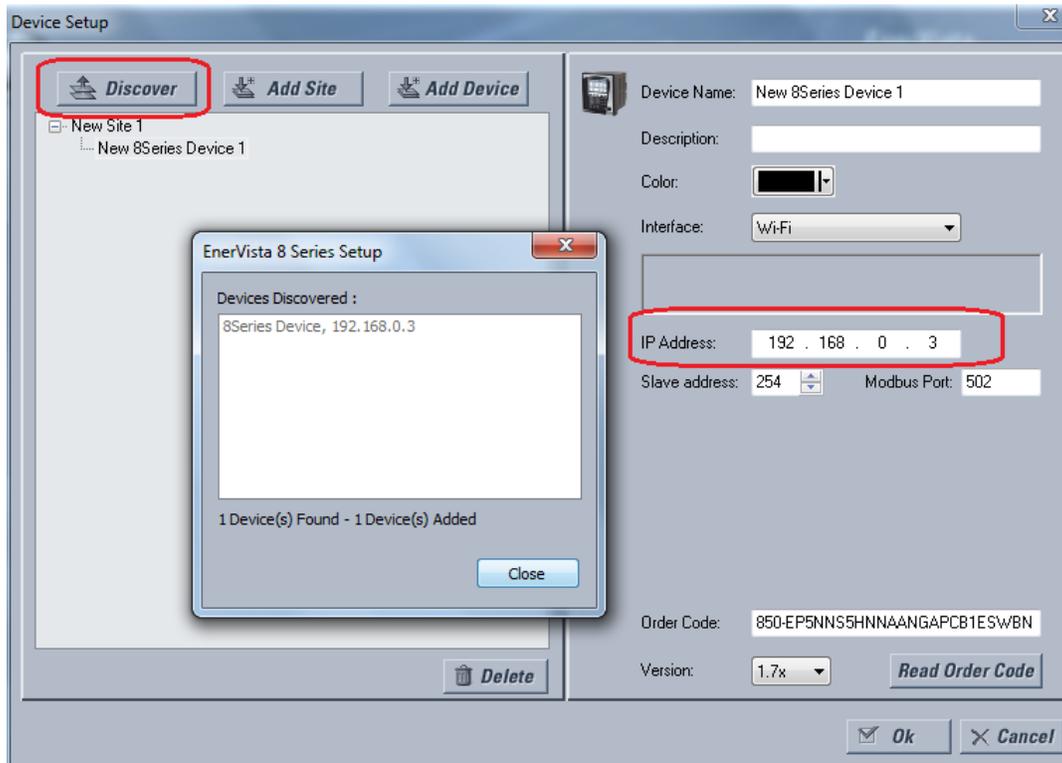


Figure 12: EnerVista 8 Series Setup configuration

Upon successful connection, access the Device Definition to check the relay order code, firmware version, serial number and IP Address. The connection interface type will indicate WiFi.

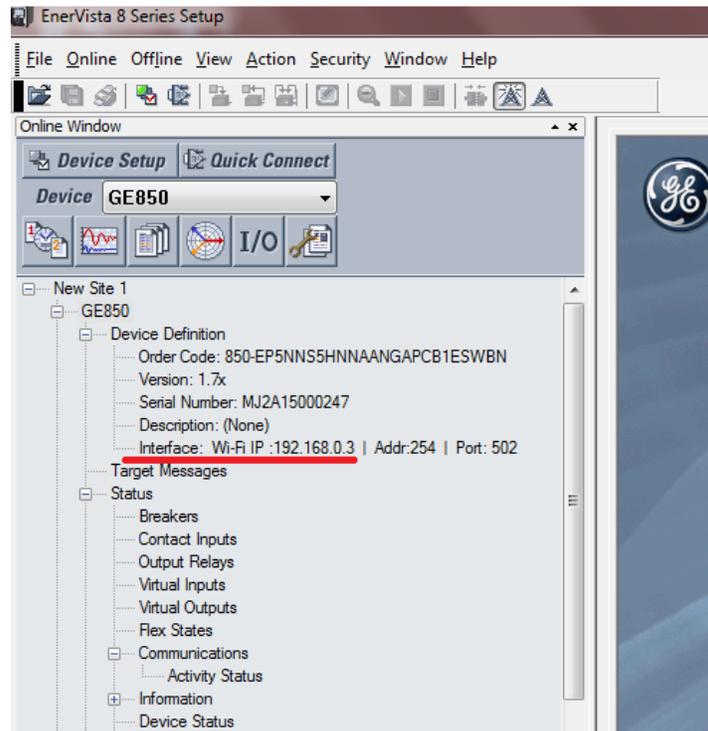


Figure 13: Successful EnerVista 8 Series WiFi connection

You are now connected and can configure the 8 Series device settings, as well as accessing Service Reports, Event Recorder, Oscillography files and other records in the same manner as through a USB or Ethernet connection.

**NOTE.** The relay Event Recorder records all WiFi connections by recording WiFi Connected and WiFi Disconnected events.

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## For further assistance

For product support, contact the information and call center as follows:

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