b) **Channel** – This is the Wi-Fi channel on which the access point is accepts connections. If not sure what channel to use, simply select Auto.

c) **Authentication** – This is the security method which the access point is using for connections. Choose the desired security based on the present access point settings.

> **Note ☞** Use WPA2-PSK for the most secure connection. No security can be used to conserve battery power. WPA2-PSK Enterprise is not supported

d) **Passphrase** – If the authentication is WPA2-PSK, then enter a passphrase here.
   • Passphrase restricted characters include " ;
   • The minimum characters that can be used for Passphrase/WPA2 is 8, maximum is 63.

e) **Default Key** – This is the password if authentication is WEP-128.
   • WEP KEY can only use the following characters: **a b c d e f 0 1 2 3 4 5 6 7 8 9**.
   • WEP KEY must be a length of 26 characters.

f) **DHCP** – Check this option if the Transmitter will receive a Dynamic IP address from a DHCP server.

> **Note ☞** For initial configuration, it is recommended to use DHCP for assigning IP Address to the Transmitter. The IP address can be made STATIC from the Virtual Coordinator after the Transmitter starts communicating with it.

g) **IP Address** – Assign a STATIC IP address.

h) **Netmask** – Assign a subnet mask associated with the STATIC IP address.

i) **Gateway Address** – This could be the IP address of your access point or wireless router which the Transmitter is associating with.

j) **Virtual Coordinator IP** – Assign the IP address of the PC on which the VC is installed.

k) **Communication Protocol** – This is the protocol used to communicate with the VC. Either TCP or UDP protocol can be selected. UDP is default and uses less battery power.

l) **Virtual Coordinator Port** – Readings from the sensor (Transmitter) are sent to the VC using this port number. Use the default UDP protocol and port **50002** unless this port is already used on the VC. If TCP protocol is used change this port number to 50006.

m) **Update Period** – Enter the Transmitter's reading transmission frequency in seconds.

n) **Save and Reboot** – Click "Save Changes". Verify the settings and then click "Reboot". The webpage should say that the Transmitter is rebooted.

If your Transmitter has a display, you should now be able to see the sensor readings on the display.

> **Note ☞** The Transmitter stays in AD-HOC mode for a few minutes and then goes to sleep to conserve battery. So the step to put the device into AD-HOC mode and to configure it using a web page needs to be done together.

Also during this time, it is recommended to set the "Update Period" to the default (10 seconds). Once the Transmitter and the VC are communicating properly, the "Update Period" can be changed to the desired value.

3.6. Getting the Readings
If the PC used to configure the Transmitter is the same as the one running the VC, then change its IP address to the STATIC IP address set for the VC. Start a new browser and enter **http://<IP address of PC running virtual coordinator>**

If using a different PC, go to the PC running VC. Open up a web browser and enter **http://<IP address of virtual coordinator>**

Click the button that says readings. Enter the user name as "**user**" and the password as "**12345678**". You should be able to see the readings.

READINGS

http://192.168.0.105/reading_html

| Readings | Chart | Setup | Diagnostic |

00:59:90   192.168.0.111

Temperature/RH

Temperature   29.3 c

Humidity   43.8 %

Signal   ▮▮▮▮▯▯▯   Good
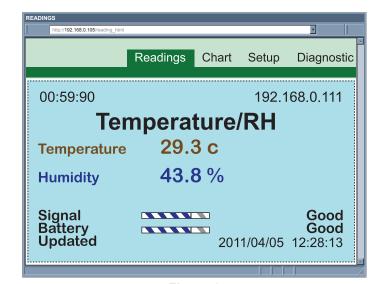Battery ▮▮▮▮▯▯▯   Good
Updated   2011/04/05 12:28:13

Figure 8

TROUBLESHOOTING
Once you apply the steps described above, if you still cannot see the Transmitter on your VC check the following items:

1. **Blue LED** – The Blue LED on the Transmitter blinks every time it transmits data. If the Blue LED is solid on it then means that it's trying to connect and transmit data to the access point with no success.

2. **Java Runtime Environment (JRE)** – Make sure that the Java Runtime Environment (JRE) is running on the PC on which the VC is installed. If the Java Runtime is not installed on the computer the VC will not display readings from the Transmitters. Should be 32-bit Java version 1.6 or higher.

3. **Wireless Connection –** If you plan to connect on a wireless LAN make sure that the wireless connection on your computer on which the VC is installed is linked to the correct access point. You may want to connect to the same access point to which the Transmitter is connected. You can verify that by looking at the Wireless Connection Manager on your computer.

4. **Wired LAN** – If your computer is on a wired LAN on which the correct access point is also connected, make sure that you can reach the access point from your computer. This can be accomplished by "pinging" the IP address of the access point.

5. **Firewall** – Make sure that the firewall is off or the exceptions are added properly.

6. **Back to AD-HOC Mode** – If you cannot find anything wrong with your computer wireless connection and the access point, then there is a chance that the Transmitter was not configured correctly. To reconfigure the Transmitter you must put the Transmitter back into the AD-HOC mode. To do this, open the case, slide the red Power button to the OFF position. Next, press and hold the white Default button, slide the red Power switch back to the ON position, and release the white button once the blue LED comes up solid. You can now follow from **Step 3.4** of the Transmitter's Initial Configuration section.

7. **Access Point/Wireless Router** – In general, the latest/newest access Points are better than older ones. Also, check to see if your access point has the latest firmware installed.

SPECIFICATION

SENSOR SPECIFICATIONS
RELATIVE HUMIDITY (wTHP, wTHP2, wBTHP)
Accuracy/Range:
±2% for 10 to 90%
±3% for 5 to 10% and 90 to 95%
±4% for 0 to 5% and 95 to 100%
Hysteresis: ±1% RH
Non-linearity: ±3%
Repeatability: ±0.1%
Resolution: 0.1%
TEMPERATURE
Accuracy/Range*:
  wTHP, wTHP2
  ±0.5°C for 5 to 45°C (±0.9°F for 41 to 113°F); up to ±1.5°C for -40 to 5°C and 45 to 124°C (up to ±2.7°F for -40 to 41°F and 113 to 255°F)
  wTP1, wTP2
  ±0.5°C for 10 to 85°C (±0.9°F for 50 to 185°F); ±1°C for -40 to 10°C and 85 to 125°C (±1.8°F for -40 to 50°F and 185 to 257°F)
  wBTHP
  ±0.5°C for 5 to 45°C (±0.9°F for 41 to 113°F); up to ±1.5°C for -40 to 5°C and 45 to 85°C (up to ±2.7°F for -40 to 41°F and 113 to 185°F)
  wBTP
  ±0.8°C @ 25°C (±1.5°F @ 77°F) ±4°C for -40 to 85°C (±7.2°F for -40 to 185°F)
*NOTE: extended temp range is for Probe only, the Controller's operating temp is -10 to 55°C
Resolution: 0.1°C
BAROMETRIC PRESSURE (wBTP, wBTHP)
Accuracy/Range:
±2 mbar for 300 to 1100 mbar @ 0 to 50°C
±6 mbar for 300 to 1100 mbar @ -40 to 85°C
Resolution: 0.1 mbar
ANALOG VOLTAGE & CURRENT INPUT (wVI)
Voltage Input:
Differential; bipolar; ±100 mV, ±1 V, ±10 V
Input Impedance: 38 K ohm for voltage
Current Input:
Differential; bipolar; ±20 mA (5 ohm load)
Accuracy: ±0.1% Full Range @ 25°C
Reading Rate: Periodic (1 sample/update) or continuous (3 samples/second)
Resolution: 16 bits

THERMOCOUPLE INPUT (wTC)
Thermocouple Type (ITS 90):
J, K, T, E, R, S, B, C, N, L
Reading Rate: Periodic (1 sample/update) or continuous (3 samples/second)

METER SPECIFICATIONS
Supported Protocols (Transmitter): TCP/IP, UDP, ARP, ICMP, DHCP, HTTP and FTP
Supported Protocols (VC):
TCP/IP, UDP, HTTP, FTP, SMTP and Telnet
WIRELESS COMMUNICATION
Standard: IEEE 802.11 b/g
Frequency: 2.4 GHz (2402~2483.5 MHz)
Range: 60m (200') indoor line-of-site or more depending upon sensitivity, data rate, wireless access point and environmental considerations
Radio Power Output Level (Class 1): 91.4 mW EIRP (19.6 dBm EIRP)
Modulation:
  802.11b compatibility: DSSS (CCK-11, CCK-5.5, DQPSK-2, DBPSK-1);
  802.11g: OFDM (default)
Channels: 1 to 13; Channel 14 for Japan use only and is not certified.
Channel Spacing (Bandwidth): 20 MHz
Transmission Rate (Over the Air):
  802.11b: 1 to 11 Mbps for
  802.11g: 6 to 54 Mbps
POWER (wSERIES AC POWER)
Power Input: 5 Vdc
Consumption: 0.7 W max
Safety Qualified AC Power Adapter (included):
  Nominal Output: 5 Vdc @ 0.6 A
  Input: 100 to 240 Vac, 50/60 Hz
Back-up Alkaline Battery:
One AA 1.5 Vdc, supplied
POWER (wSERIES-CCELL)
Alkaline Battery: Two C-CELL 1.5 Vdc, supplied
Lifetime: Estimate of 2.4 years (wTC/wVI) and 4.3 years (wTxxP/wBxxP) with frequency of 1 reading per 1 minute
Dimensions:
96.5H x 146.3W x 50.8D mm (3.8 x 5.76 x 2"), not including connectors or antenna
Operating Temperature:
-10 to 55°C (14 to 131°F), 90% RH non-condensing
  AC Power Adapter: 0 to 40°C (32 to 104°F)

→ **SETUP GUIDE**

wSeries ⚠

Wi-Fi
wireless Sensor System
802.11b/g Wireless Ethernet

Wireless Transmitter

ΩE **OMEGA**™

omega.com info@omega.com

Servicing North America:
U.S.A. Headquarters: Omega Engineering, Inc.
Toll-Free: 1-800-826-6342 (USA & Canada only)
Customer Service: 1-800-622-2378 (USA & Canada only)
Engineering Service: 1-800-872-9436 (USA & Canada only)
Tel: (203) 359-1660   Fax: (203) 359-7700
e-mail: info@omega.com

For Other Locations Visit omega.com/worldwide

This Quick Start Reference provides information on setting up your instrument for basic operation. The latest wSeries manual can be found at **www.omega.com/manuals** and the latest software, including the "Virtual Coordinator" can be found at **www.omega.com/software**

BEFORE YOU BEGIN

Parts Included:
- Transmitter
- Antenna
- Batteries and/or AC adapter
- Sensor (for models with an included digital sensor)
- CD with Virtual Coordinator Software, check our website for latest version.

Hardware/System Requirements:
You will need a computer, tablet, or smart phone that has Wi-Fi infrastructure and is Ad hoc capable.

System Requirements: Windows XP, Vista, Windows 7 32/64-bit, Windows Server 2008 32/64-bit, Java 32-bit version 1.6 and above, Processor: 1GHz, RAM: 2GB, Browser: IE9 or Mozilla Firefox

Access Point/Wireless Connection:
You will need an Access Point / Wireless Router.

You will need the following information to ensure your device works correctly:
- Wireless Access Point SSID
- Passphrase/Security Settings
- IP Address (for transmitter)
- Netmask
- Gateway Address
- IP Address of computer that will run the "Virtual Coordinator" service.

OVERVIEW

wSeries wireless Transmitters take readings from the attached sensors, and transmit data on a wireless Ethernet 802.11b/g network commonly referred to as "Wi-Fi." These Transmitters are not "stand-alone" devices, they transmit data to the Virtual Coordinator.

The wSeries wireless sensor system provides Web-based monitoring of Analog Current and Voltage, Temperature, Humidity, and Barometric Pressure.

As with all Wi-Fi devices, the wSeries "Transmitters" are assigned unique IP addresses and connect to the LAN through a Wireless Access Point/Router.

To conserve battery power, the Transmitters wake up, take readings, transmit data and quickly go back to sleep. The user can select the frequency of transmissions. Less frequent transmissions result in longer battery life. In applications where battery life is not an issue, the wSeries device can transmit continuously, up to three sensor readings per second.

The wireless transmitter mount discretely on the wall in clean rooms, laboratories, museums, computer server rooms, warehouses, and any remote facility.

THE VIRTUAL COORDINATOR "VC" WEB SERVER

The "Virtual Coordinator" is a data logging software application running on a Windows or Linux computer somewhere on the network. The "VC" logs/collects data from the wireless Transmitters.

The VC includes a Java-based Web server that can display readings, charts, and record data sent by the transmitters. The readings, data, and charts are viewed from a Web browser.

The browser accessing the VC Web server, can be the same computer on which the VC is installed-- or any other device with Web browsing capabilities on the local network or the Internet (a computer, tablet or smart phone).

For Windows PC's

The VC runs as a "Service" in the background, rather than a "Program". As long as the computer and its network connection is functioning correctly, the VC will collect data from the transmitters and serve it to Web browsing clients as requested. The VC can also provide data to popular Data Acquisition and Process Control programs running elsewhere on the network. Meanwhile, the computer running the VC server can be used for other tasks.

Chart scales are fully adjustable on the fly. For example, the chart can display one minute, one hour, one day, one week, one month or one year. Temperature and humidity can be charted across the full span (-40 to 125°C, and 0 to 100% RH) or within any narrow range such as (20 to 30°C).

The OPC Server software makes it easy to integrate the wSeries wireless sensor system with many popular Data Acquisition and Automation programs offered by Omega, Wonderware, iConics, Intellution, Rockwell Automation, and National Instruments, among others.

CONFIGURATION

1. Configuring the computer running Virtual Coordinator Software (VC)

1.1. Disable Power Safe Options:
The computer running VC software needs to be running continuously. To do that:

a) Go to Control Panel>System and Security>Power Options. Choose the Power Plan>Change Plan Settings>Change Advanced Settings. Then choose the Hard Disk>Turn Off Hard Disk Option. Reduce this number from 20 to **0** (Never). Save the settings.

b) These settings may be different on Windows XP. Choose the Option to Never Turn Off Hard Disks and Never Put the System to Standby.

Figure 1

1.2. Java Runtime Environment:
This PC needs to have the latest Java Runtime Environment (JRE) installed. First check the JRE installed.

Go to Control Panel and look for the icon named Java. Clicking that will start the Java Control Panel. Go to the Java tab and click on View button.

Note the Version number. It should be something like 1.6.0.x. If the version number is anything less than 1.6 then go to **www.java.com**, download and install the latest version of JRE.

1.3. Firewall Exception:
This computer may have a firewall running which will block the readings sent from the sensor (transmitter) to the VC Software.

Configure the firewall to allow this data to go through. Refer to Appendix K and L in Operators Manual to configure the firewall.

1.4. IP Address:
If this computer is used to run the VC only and not to configure the Transmitter, then set a desired STATIC IP address.

If this PC is used for configuring the Transmitter then set up a STATIC IP address of **169.254.1.2** for AD-HOC.

> **Note** It is recommended to have the computer running VC hard-wired to the access point/wireless router.
>
> For initial setup it is recommended to place the Transmitter and the VC close to the wireless access point/wireless router. Once the configuration is done the Transmitter can be mounted to the desired location.
>
> This configuration applies to Windows PC. For Linux, visit our website or read the instructions in the CD.
>
> One can also use a mobile device with a wireless (Wi-Fi) to configure the Transmitter.

2. Installing Virtual Coordinator Software
Find the setup.exe in the accompanying CD or on the web. Double click that to install it.

The setup process is typical to any Windows program and asks you to choose the installation path and whether it is a new installation or an upgrade You must have the Administration Rights to the PC when installing the VC.

Now go to Start>All Programs>Newport>Virtual Coordinator Manager. Click on Install Services **twice** and wait until it prompts you to reboot the PC. Reboot the PC to start all the services of Virtual Coordinator. Once the PC reboots, open up a web browser like Internet Explorer, type in your PC's IP Address and a Virtual Coordinator web page should show up. This means that the Virtual Coordinator web-server is running.
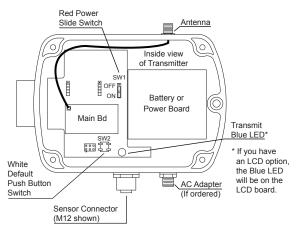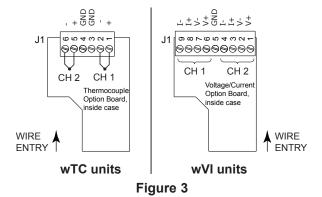

Figure 2

3. Configuring the Transmitters
Attach the antenna.

3.1. Connecting Sensors
Connect the sensors: digital probes, thermocouples, or analog inputs.

The digital probes for temperature, humidity, and barometric pressure use a NEMA 4, IP65 M12 connector.

Thermocouple wires and analog voltage & current wires thread through the NEMA 4, IP65 cable gland to the J1 terminals as shown in **Figure 3**.

Figure 3

3.2. Battery Installation
Install batteries or connect the AC adapter (depending on model), you will need to open the transmitter's cover, refer to **Figure 2**.

3.3. There are two ways for set-up: 1) Using Transmitter's Factory Default Settings. 2) AD-HOC mode. Refer to main operators manual for Default Set-Up instructions.

3.4. Powering ON the Transmitter

⚠ **IMPORTANT**
The first time you power on the transmitter, you must follow this sequence or risk corrupting the firmware. If the firmware gets corrupted, the unit must be returned to the factory to have the firmware reinstalled.

- **6.1.** Make sure the red power switch is OFF. See diagram in **Figure 2**.
- **6.2.** Install two C-cell batteries, or connect AC adapter and install backup AA battery.
- **6.3.** Press and hold white reset button (labeled "SW2").
- **6.4a.** While continuing to press the white reset button, slide the red power switch ("SW1") to ON.
- **6.4b.** Do not release the white reset button until the blue LED comes on solid (not blinking).
- **6.5.** The transmitter is now in AD-HOC mode for initial wireless configuration.

3.5. AD-HOC Mode using a Windows PC or iOS (iPhone/iPad)
You can use a PC or an iOS device to configure your Transmitter. While in AD-HOC mode, Transmitters with an LCD display will show the last 4 characters of its Mac address (part of SSID) on the display.

Figure 4

3.6 Finding the Transmitter
For the AD-HOC to synch with the PC it usually takes 2-3 minutes after the Transmitter is powered ON. For iOS Devices it is much quicker, a few seconds. Check the Wireless Network on the PC or Wireless Settings/Wi-Fi on the iOS device that is used to configure the Transmitter.

This configuration software for wireless networks will show a network TXABCD (ABCD are the last four characters in the MAC address of the Transmitter).

Figure 5 - Windows PC Wi-Fi Settings

Figure 6 - iPhone Wi-Fi Settings

The Transmitter which is in AD-HOC mode is running this wireless network.

Connect to this network by double clicking it. Once connected it should show the status CONNECTED.

Start up a web browser and type in the IP address of **http://169.254.1.1** and you should see a webpage for Initial Configuration. Enter the settings here. Refer to **Figure 7**
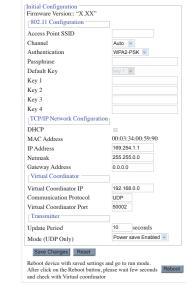

Figure 7 - Screen of Windows PC or iOS Device

3.7. This is the only page in the Transmitter's Web server designed for important parameters needed to initially configure the Transmitter. Later, you will have a chance to make changes in the Transmitter through the VC if needed.

a) **Access Point SSID** – This is the name that the access point/wireless router is broadcasting on your Wi-Fi wireless network. In order for the Transmitter to associate itself with the access point, enter the access point's SSID.
- SSID restricted characters include   ? " $ [ ] \ + ;
- SSID cannot begin with ! or #.
- The length of SSID is 1 to 32 characters.