USER MANUAL

Ethernet
Gateway
and Node
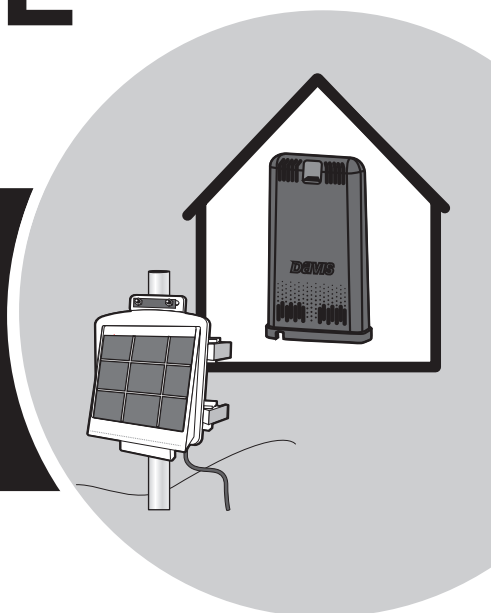
ENVIROMONITOR®

Product number 6810 and 6805

DAVIS®

FCC Part 15 Class B Registration Warning

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.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference, including interference received, including inference that may cause undesired operation.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'appareil doit accepter tout brouillage radioelectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement

Innovation, Science and Economic Development Canada ICES-003 Compliance Label: CAN ICES-3 (B)/NMB-3(B)

Changes or modification not expressly approved in writing by Davis Instruments may void the warranty and void the user's authority to operate this equipment.

FCC ID: IR2DWW6805   IC: 3788A-6805

Contains: FCCID: 2AC7Z-ESPWROOM02   IC: 21098-ESPWROOM02

The antenna used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment on and off, 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 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.

This radio transmitter 3788A-6805 has been approved by Innovation, Science and Economic Development Canada to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.The following antennas are permissible to use with this product:
AMXF-9092-8 8dBi 50 Ohms
AMXF-9092-6 6dBi 50 Ohms
AMXF-9092-5 5dBi 50 Ohms

CE EC-Declaration of Conformity

Directive 2014/53/EU (RED Directive)

Manufacturer/responsible person: Davis Instruments
Compliance Engineer
3465 Diablo Ave., Hayward, CA 94545 USA

Declares that the products: 6805EU, 6805 UK

Comply with the essential requirements of 2014/53/EU, if used for its intended use. The complete Declaration of Conformity is on our website at https://www.davisinstruments.com/legal.

The technical documentation relevant to the above equipment will be held at: Davis Instruments at 3465 Diablo Ave, Hayward CA 94545

Power Output: see page 18: **Specifications**

Welcome to Your EnviroMonitor System

An EnviroMonitor System includes a Gateway and a number of Nodes, each with up to four sensors that form an advanced mesh network operating at 902 - 928 MHz (868 MHz in the EU). The Nodes transmit the sensor data to a "mesh parent," either the Gateway or another Node. The Gateway then sends the data via ethernet connection to WeatherLink.com.

EnviroMonitor can be customized for different sized installations. Each Gateway can receive 20 or more Nodes. Additional Gateways can be added to your account to receive data from another set of Nodes.

A Davis wireless or cabled GroWeather Sensor Suite can also be plugged into the Gateway.

This manual will show you how to set up both the EnviroMonitor Gateway and Nodes. If you are just installing a Node and have already installed the Gateway, you can skip to page 9: **Set Up Nodes and Sensors**.

WeatherLink.com

1 Gateway

Wireless or cabled
GroWeather ISS
(optional)

20+
Nodes
per
Gateway
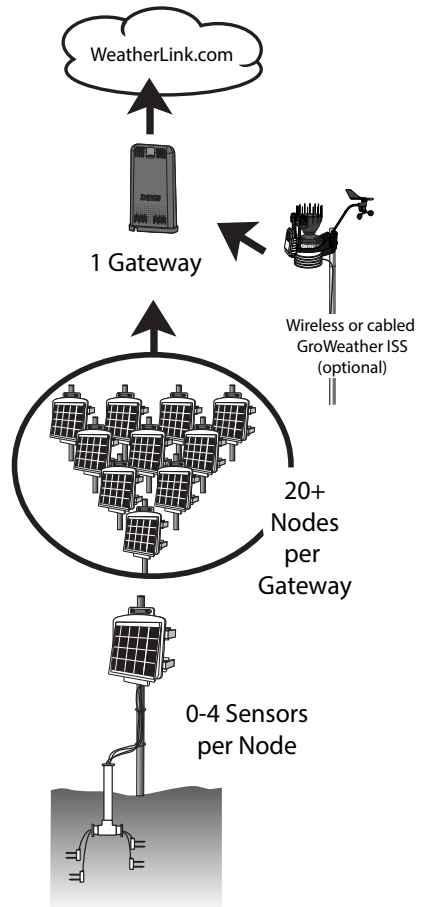
0-4 Sensors
per Node

The steps for setting up your EnviroMonitor system:

1. **Plan:** What sensors do you need and where? Decide where you will install the Gateway and Nodes. *See page 2:* **Planning Your System**.
2. **Power up** your Gateway. *See page 6:* **Power-up and Connect your Gateway**.
3. **Connect** your Gateway to WeatherLink.com with the EnviroMonitor app.
4. **Power up** the Node. *See page 10:* **Power-up and Connect the Node**.
5. **Connect** the Node to the Gateway with the EnviroMonitor app.
6. **Mount** the Node. *See page 13:* **Mount the Node**.
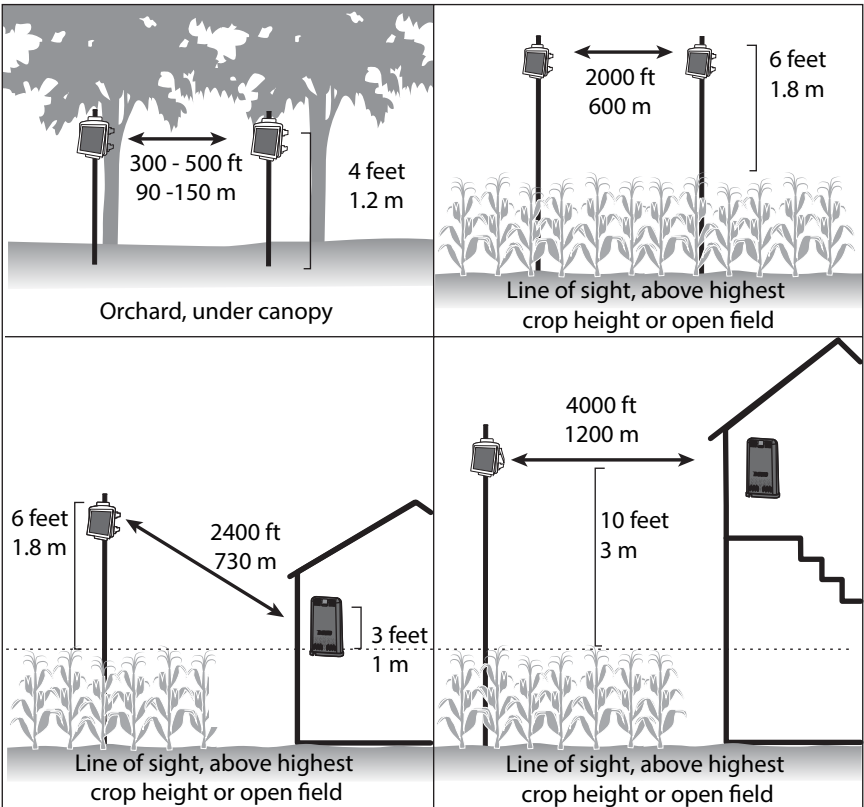7. **Add and Install** the sensors with the EnviroMonitor app.

Planning Your System

Before installation, plan your system. After determining which sensors you want and where you want to install them, make sure you have the correct number of Nodes to support those sensors.

The maximum distance between two Nodes and a Gateway and a Node will vary depending on many factors including environment, height, terrain and RF noise.
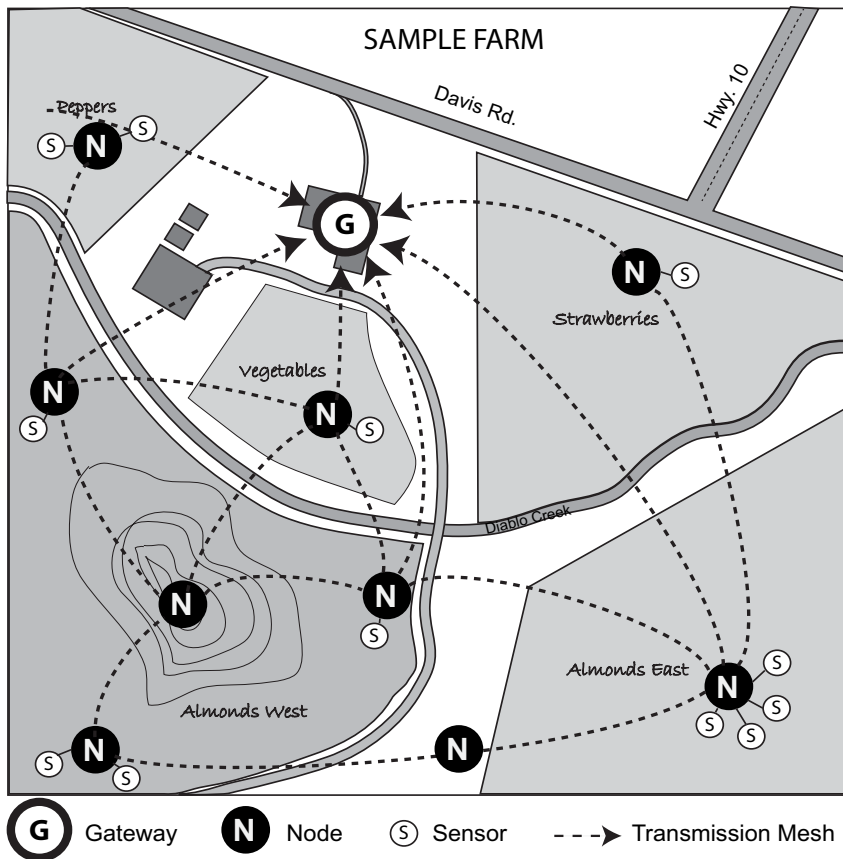
To get optimal transmission range:

- Ideally, locate the devices with unobstructed lines of sight between them. A large hill or large metal barrier will block signals. If transmitting under a canopy or in an orchard, range will be reduced.
- **Mount the devices as high above the ground or the highest crop height as possible**. The higher they are mounted, the longer the transmission distance, as shown below.
- The Gateway should be placed in a window or as close to the outside of the building and as close to the Nodes as possible; higher is better.

300 - 500 ft
90 -150 m

4 feet
1.2 m

Orchard, under canopy

2000 ft
600 m

6 feet
1.8 m

Line of sight, above highest crop height or open field

6 feet
1.8 m

2400 ft
730 m

3 feet
1 m

Line of sight, above highest crop height or open field

4000 ft
1200 m

10 feet
3 m

Line of sight, above highest crop height or open field

Make a Sketch

It is helpful to make a sketch of your installation to get an idea of where the Gateway and Nodes should go.

SAMPLE FARM

Davis Rd.

Hwy. 10

Peppers

Strawberries

Vegetables

Diablo Creek

Almonds East

Almonds West

| G | Gateway | N | Node | S | Sensor | - - -▶ | Transmission Mesh |

Siting the Nodes

- Ideally, the mesh network will be most effective at "self healing" any temporarily impaired transmission paths if each Node has more than one way to reach the Gateway. While the system is designed to handle a mesh, a "star" or nodes in single lines, it is a good idea whenever possible to site each node so that it is within transmission distance of either two (or more) other Nodes, or the Gateway and another Node. A Node can even be installed simply to transmit data from more distant Nodes to the Gateway, without any sensors installed in it. By planning the system's "transmission mesh," data can be relayed in from the most remote corner of your installation.
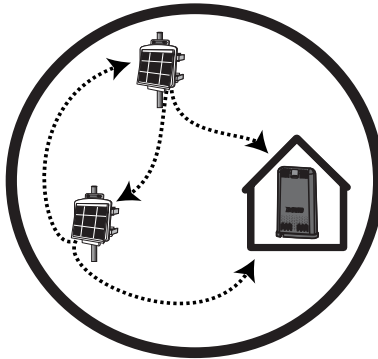
The best installations allow Nodes to transmit to more than one Node or to a Node or Nodes and the Gateway.
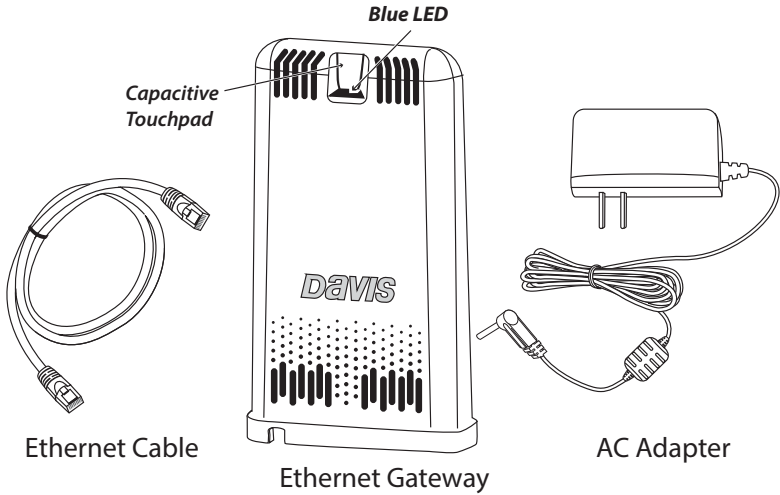
- Nodes can also be used to transmit data around or over obstacles, such as hills.
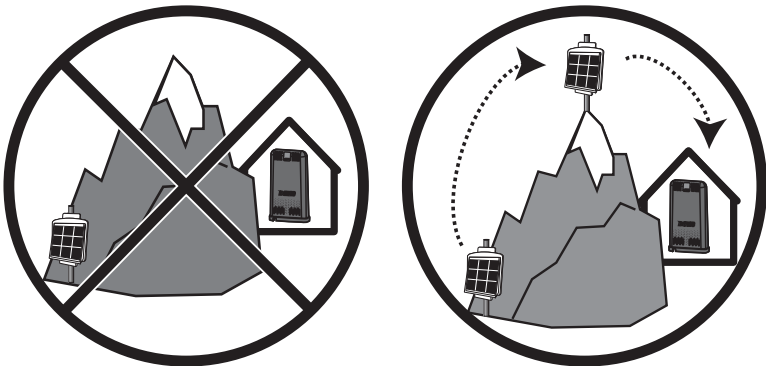
Get around an obstruction by using a Node with no sensors as a relay.

Set up your Gateway

Contents of Gateway

Blue LED

Capacitive Touchpad

Ethernet Cable

Ethernet Gateway

AC Adapter

Ethernet Gateway Requirements & Tools

- Wi-Fi or router Ethernet internet connection
- Wi-Fi password
- Smartphone
- 4 AA batteries (not included)
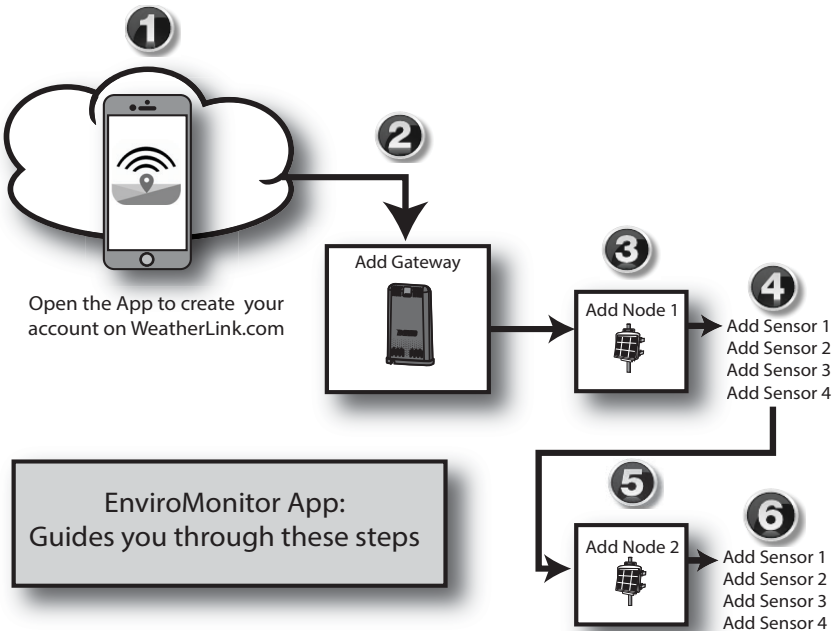
Power-up and Connect your Gateway

Install the EnviroMonitor App

1. Install the EnviroMonitor app on your Smartphone. Find the app by searching for the Davis EnviroMonitor app in the iOS App Store or Google Play Store.

   The EnviroMonitor app will guide you through creating an account on WeatherLink.com, adding the Gateway, adding Nodes to the Gateway, and adding sensors to the Node.

EnviroMonitor App

Open the App to create your account on WeatherLink.com

Add Gateway

Add Node 1

Add Sensor 1
Add Sensor 2
Add Sensor 3
Add Sensor 4

EnviroMonitor App:
Guides you through these steps

Add Node 2

Add Sensor 1
Add Sensor 2
Add Sensor 3
Add Sensor 4

Install the WeatherLink App and Create Your Account

2. Install the WeatherLink mobile app on your smartphone. Find the app by searching for the Davis WeatherLink app in the iOS App Store or Google Play Store.

3. In the app, create your account on WeatherLink.com.

Note: You will use the user name and password you have set up to access your page on WeatherLink.com from your computer as well. You will only have to enter your name and password the first time you open the app unless you log out.

Power Up and Connect Your Gateway

1. Plug the AC adapter into the socket on the bottom of the Gateway and plug the adapter into the wall.

   There are cable channels to the front and back, as well as the side, in which to run the cable.

AC Adapter Socket

Cable Channels
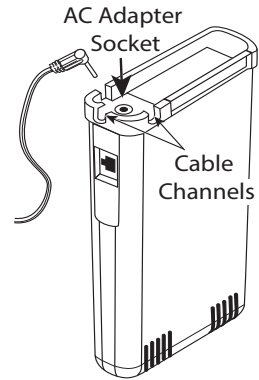
Note: The Gateway is powered by AC power with battery backup. **AC power is required; it cannot be set up or run on batteries alone.** It is highly recommended that you install batteries to prevent loss of data if AC power is lost. If AC power is lost, the Gateway will stop trying to communicate with your network, but it will continue to receive sensor data and store it. When AC power is resumed, it will reconnect with the network and send the records it stored during the outage to your database on the WeatherLink cloud.

2. Install the batteries. Open the battery compartment on the bottom of the Gateway. To do this, slide the cover forward then lift up.

   Insert four AA batteries, making sure you insert them with the positive and negative ends oriented as indicated on the underside of the battery compartment cover.

Insert 4 AA Batteries

To open, slide cover forward then up.
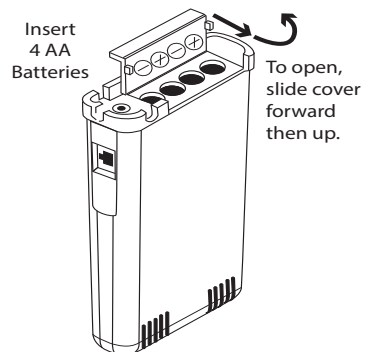
3. Plug the included Ethernet cable into the socket on the Gateway. Connect the other end of the cable to your router. You will see green and amber lights when the connection has been established.
4. The blue LED light will begin flashing indicating that the device is ready to connect to the smartphone app.

Ethernet Cable Socket

Davis
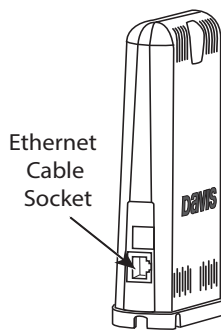
Tip: *The device will "go to sleep" and the blue LED will turn off if you don't connect the device within a few minutes. You can "wake it up" when you are ready to proceed by touching the capacitive touch pad. (See the image on page 1.)*

Connect the Gateway to WeatherLink.com

1. Make sure the Bluetooth function on your smartphone is on.
2. Open the EnviroMonitor app and choose **Sign Up** to create an account, or **Log in** if you have already created an account
3. Tap **Add Gateway**.
4. Bring the phone close to the Gateway.
5. If a message appears that an upgrade has been detected, select **Upgrade**. Upgrading can take several minutes.

Tip: *The blue LED flashes to show that the Gateway's BLE is on. If it is not flashing, press the recessed touch pads. See the illustration on page 5:* **Contents of Gateway** *for the location of the recessed touch pads.*
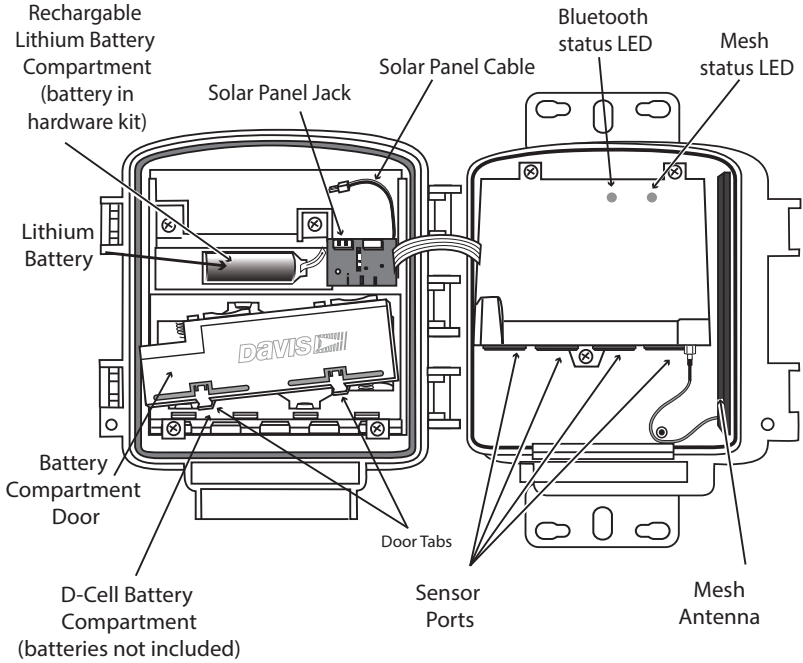
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6. The LED will turn solid blue when the Gateway has successfully connected to your smartphone.
7. Once connected, enter a name for this Gateway. Choose a name based on the use or location so you can easily identify this Gateway if you install others.
8. Follow the prompts to finish adding the Gateway.
9. Once done, you will be prompted to add a Node. Before adding a Node, however, you should mount the Gateway.

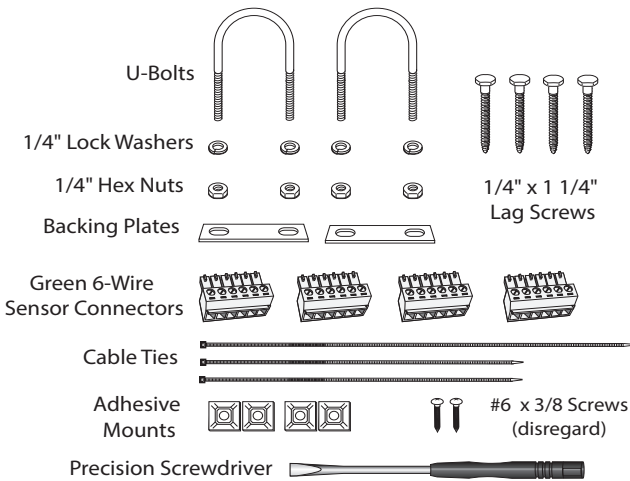## Add a GroWeather Integrated Sensor Suite (optional)

You can add a cabled or wireless Vantage Pro2 integrated sensor suite (ISS), such as GroWeather (product number 6820 or 6820C), to your system, which will report rain, wind, temperature, humidity and solar radiation data to the Gateway.

Set Up Nodes and Sensors

Contents of Node

Rechargable
Lithium Battery
Compartment
(battery in
hardware kit)

Solar Panel Jack

Solar Panel Cable

Bluetooth
status LED

Mesh
status LED

Lithium
Battery

DAVIS

Battery
Compartment
Door

Door Tabs

D-Cell Battery
Compartment
(batteries not included)

Sensor
Ports

Mesh
Antenna

Hardware Kit

U-Bolts

1/4" Lock Washers

1/4" Hex Nuts

1/4" x 1 1/4"
Lag Screws

Backing Plates

Green 6-Wire
Sensor Connectors

Cable Ties

Adhesive
Mounts

#6 x 3/8 Screws
(disregard)

Precision Screwdriver

### Requirements & Tools for Installation of Nodes and Sensors

- Included precision/miniature slotted screwdriver; ideal size: 2.5 mm or 3/32"; see actual size image of screw head and screwdriver blade at right.
- Four D-cell batteries
- Smartphone with EnviroMonitor app installed. *See page 6:* **Install the EnviroMonitor App**.
- Wire cutter/stripper and wrench
- Mounting pole or post

Note: You should install Nodes starting with the Node that will be closest to Gateway, then working outward to the Node furthest from Gateway. This allows each Node to establish a connection with the Gateway or a Node that has already been installed.

Power-up and Connect the Node

Make sure the EnviroMonitor app has been installed on the smartphone you will be using to install the Node. It will guide you through adding Nodes to the Gateway that has already been installed.
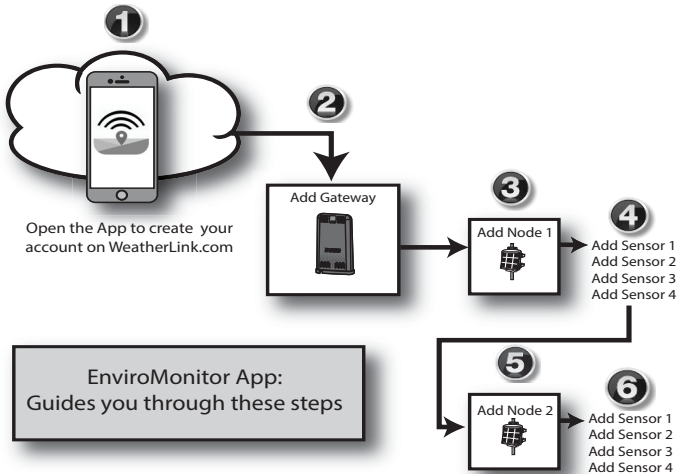
Power Up the Node: *See illustration on page 9:* **Contents of Node**.

1. Install 4 D-cell batteries according to the + and - marks in the battery compartment. The Node will power up. The mesh status LED will indicate connection.

IMPORTANT: Install the D-cell batteries **FIRST. Make sure they are firmly installed and not tilted outward.**

2. Remove the battery pull tab from the factory-installed lithium battery.

3. Plug in the solar panel cable.

Connect Node to Gateway

1. Take the Node and smartphone to the general location in which you wish to install your Node. Make sure the phone's Bluetooth is on.
2. Open the app on the smartphone.
3. Open the door of the Node. (This turns the Node's Bluetooth on.) The Bluetooth status LED will blink blue. See the illustration on page 9: **Contents of Node**.
4. In the app, select the Gateway to which this Node will send its data.
5. Tap **Add Node**.
6. Bring the phone close to the Node.
7. Follow the prompts in the app as it finds the Node and connects it to the Gateway. This transmits the Gateway's identifying information to the Node and allows its data to be received by the Gateway. Having specific identification for each Gateway/Node pair allows you to have multiple Gateways without cross transmission.

    Using the app, you will be see this Node's serial number appear on the list for the Gateway.

    You will know the Node has found its "mesh parent" (a Gateway or another Node) when you see the Bluetooth status LED go solid blue. If it cannot "find" its parent, try moving the Node to a different location. If the location of the Node cannot be changed, consider installing another Node closer to the parent, to act as a repeater. It does not need to have any sensors installed.

    When the connection is complete, the mesh status LED will turn solid green. See the illustration on page 9: **Contents of Node**.

Install the Sensor(s)

The list of sensors your EnviroMonitor system supports is constantly growing. Check www.davisinstruments.com/em-sensors for the current list.

Note: Wiring diagrams for each sensor are shown in the EnviroMonitor app.

Each Node has four sensor ports.You can install the sensors before or after mounting the Node. For example, if you plan to mount the node on a tower, you will want to install the sensor first.

1. Install the sensor in the environment per the manufacturer's instructions, making sure the sensor is installed within cable reach of the Node when it is mounted.

Wire each sensor as directed in the App

2. On your smartphone, open the EnviroMonitor app and select this Node. Tap **Add Sensor**. From the menu, first select the sensor type, then the specific sensor. Follow the wiring diagram in the app to correctly wire the sensor into one of the green 6-wire sensor connectors. Using a 2.5mm (3/32") precision slotted screwdriver, loosen the appropriate screws and insert the bare wires.

3. Tighten the screws very tight.

4. Insert the 6-wire sensor connector into the sensor port indicated by the app. Make sure it is aligned properly and not offset.
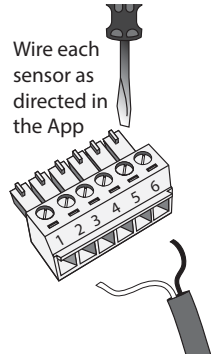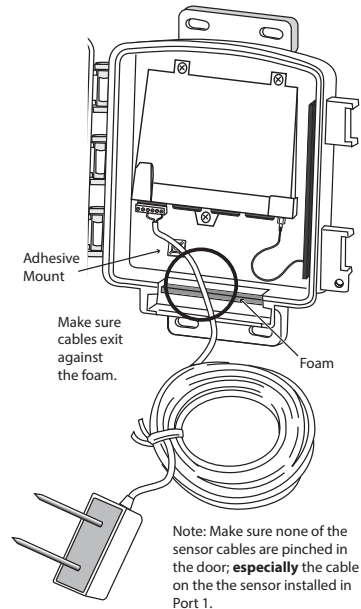

Note: If the Davis sensor has an RJ-plug on its cable, use the Davis RJ Adapter, product number 6860. Or, you can remove the plug and strip the wires.

RJ Adapter, #6860
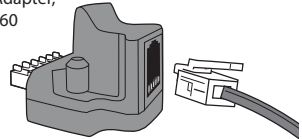
Try not to strip the covering back so far that the bare wires can touch each other when the connector is plugged in, but make sure the clamp in the sensor port is closing on wire, not plastic. (About 1/4" [6.4 mm] of exposed wire is ideal.)

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5. Run the sensor cable down and out of the box through the bottom. **Make sure it will be enclosed by the foam when the Node door is closed.**

6. When all sensors are installed, close the Node door, making sure all cables are against the foam and not the hard plastic of the door. Use included zip ties and adhesive mounts if desired.

Adhesive Mount

Make sure cables exit against the foam.

Foam

Note: Make sure none of the sensor cables are pinched in the door; **especially** the cable on the the sensor installed in Port 1.

Mount the Node

The Node can be mounted on a pole or a flat surface such as a wall or a wooden post.

It is important that the Node be mounted so that the solar panel gets the greatest amount of sunshine -- the solar panel should be facing south (in the Northern Hemisphere) or north (in the Southern Hemisphere).

Tip: Mounting the Node may be easier if done by two people.

Mounting On a Fence Post or Pole

Mount the Node onto a fence post or a pole with an outside diameter of 0.84" to 1.84" (21 mm to 27 mm) using the U-bolts, backing plates, washers, and hex nuts provided.

Note: For mounting on larger diameter pipes, the housing can accommodate U-bolts with 5/6" (8 mm) threads for pipes up to 2.40" (61 mm) outside diameter (not provided).
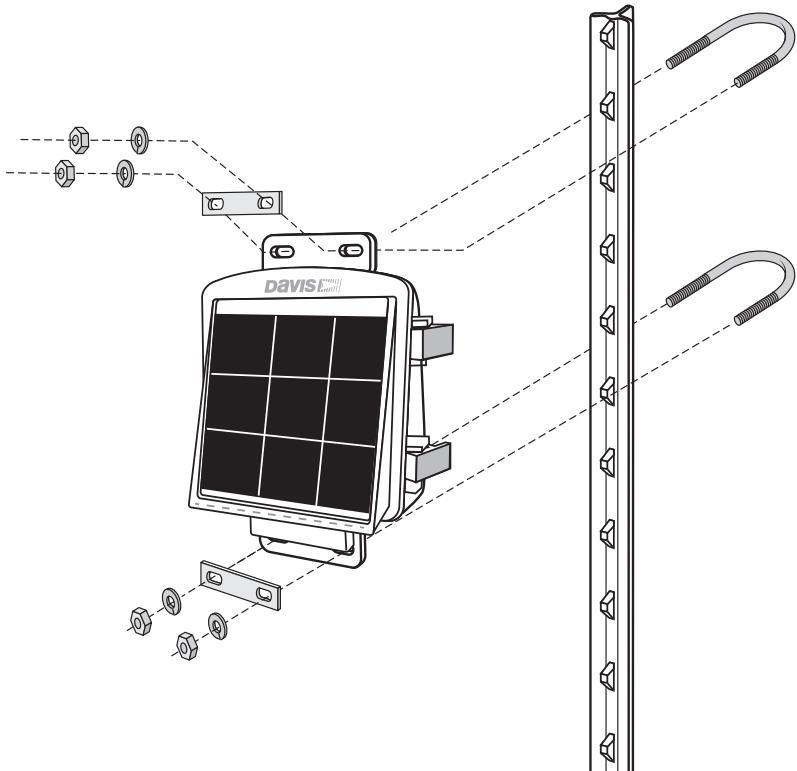
Mounting on a Flat Surface

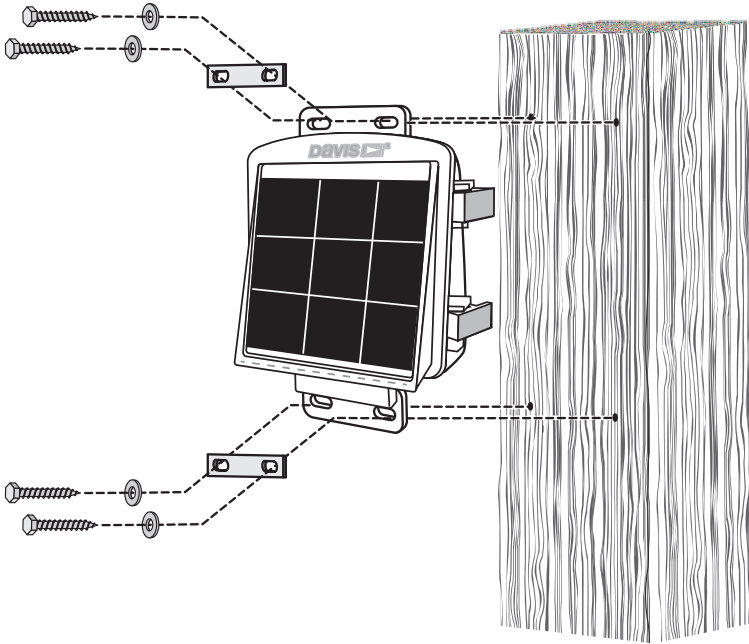Attach the Node to the mounting surface in the desired location using the lag screws and backing plates as shown below. Use a pencil or a center-punch to mark the location of the pilot hole.

Manage Your Data

Log on to WeatherLink.com to view and manage your data.

You can also use view and manage your data on your smartphone with the Mobilize app. Find the app by searching for Davis Mobilize in the iOS App Store or Google Play Store.

You can also use Davis's Integrated Pest Management (IPM) software with EnviroMonitor to manage pest and disease risk for your specific crop. Available for Grapes, (prod. no. 6571), Apples and Pears (prod. no. 6572), Stone Fruits (prod. no. 6573), and Nut Trees (prod. no. 6574).

Download the
Mobilize App

Maintenance

The solar panel on your Node will perform well even with dust on it. However, keep the panel charging optimally by periodically cleaning any bird droppings, heavy dust, dirt, snow, leaves, or insect nests or webs from the solar panel. Cleaning frequencywill depend on your installation, but at least once a year. Those near roads or railroad tracks, for example, may collect more dust and dirt than those in the center of a field. Use a soft, damp cloth to remove any debris from the solar panel.

Troubleshooting the Gateway

? *What do the Gateway status LEDs indicate?*

Gateway Status LEDs		
LED Behavior	**Indicates**	**What to do**
No blue Led.	BLE radio is in low-power mode.	Touch the recessed touch pads. See the illustration on page 6: **Contents of Gateway**.
LED flashes blue.	Gateway is ready to connect to the EnviroMonitor app.	Use the EnviroMonitor app to configure the Gateway.
LED is solid blue.	The Gateway is connected to the EnviroMonitor app.	

? *My Gateway can't access WeatherLink.com*

Have you configured your Gateway in the EnviroMonitor app? If you have done so, you may need to relocate the Gateway or contact Technical Support. See page 17: **Contacting Davis Technical Support**.

? *I'm not getting data from my node to the Gateway?*
- Make sure the D batteries in the Node are installed all the way in. Sometimes the appear to be but are actually tilted outward, preventing connection.
- Make sure the green sensor adapters in the Node are aligned properly and not offset.
- Make sure the screws on the sensor adapters are very tight.
- Make sure none of the sensor cables are pinched in the Node door.

If these steps don't solve the problem, consider mounting the Node and Gateway higher above the canopy. See "To get optimal transmission range:" on page 2.)

Troubleshooting the Node

? *My Node can't connect to the Gateway or mesh parent.*

Give the Node more time, at least 15 minutes, to negotiate a connection to the mesh network. If it still cannot connect, the Node is not within transmission distance to a parent. To solve this you can relocate the Node closer to the Gateway or another Node, or you can install another intermediate Node between it and the mesh parent to help it connect to the mesh network.

? *How can I tell if my Node batteries are getting too low?*

The mesh LED will be solid or blinking amber to show that the Node's batteries are low. See the table above. You can also see the battery power in the app: choose this Node's Gateway, then this Node, then Node Power.

? *What do the Node status LEDs indicate?*

Node Status LEDs		
LED Behavior	**Indicates**	**What to do**
No BLE LED.	BLE radio is in low-power mode.	Close, then open the door to activate the BLE radio.
BLE LED flashes blue.	Node is ready to connect to the EnviroMonitor app.	Use the EnviroMonitor app to configure the Node.
BLELED is solid blue.	The Node is connected to the EnviroMonitor app.	
No Radio LED.	The radio LED has timed out to save power.	Close then open the door to activate the radio LED.
Radio LED is solid amber for 3 seconds when powering up.	The Node is powering up.	
Radio LED is blinking green.	The Node is trying to connect to a mesh parent.	Wait for the LED to turn solid green. See below: **My Node can't connect to the Gateway or mesh parent.**
Radio LED is solid green.	The Node has connected to a mesh parent.	
Radio LED is blinking amber.	The Node is trying to connect to a mesh parent and the Node's batteries are low.	Replace the D-cell batteries and see below: **My Node can't connect to the Gateway or mesh parent.**
Radio LED is solid amber.	The Node is connected to a mesh parent and its batteries are low.	Replace D-cell batteries.
Radio LED is solid red.	The Node has not been configured.	Configure the Node using the EnviroMonitor app.

Contacting Davis Technical Support

For questions about installing or operating your Gateway or Nodes, please contact Davis Technical Support. We'll be glad to help.

Online   **www.davisinstruments.com**

See the Weather Support section for copies of user manuals, product specifications, application notes, software updates, and more.

E-mail   **support@davisinstruments.com**

Telephone   (510) 732-7814

Monday - Friday, 7:00 a.m. - 5:30 p.m. Pacific Time.

Specifications

Gateway

Operating Temperature.	32° to +140°F; 0° to +60°C
Current Draw	Average: 100 mA; Peak 700mA
Housing Material.	Rugged ASA Plastic
Backup Batteries	4 AA (not included)
Battery Life	5 days
AC Adapter	5 VDC, 1000 mA
Wi-Fi Frequency Range & Power	2412-2472 MHz, 802.11b/g/n; less than 72mW
BLE Frequency Range & Power.	2402-2480 MHz, less than 1mW
Certifications:	FCC CE IC

Sensor Data (internal sensors)

Barometric Pressure

Resolution and Units	0.01" Hg, 0.1 mm, 0.1 hPa, 0.1mb. (user selectable)
Range.	16.00" to 32.50" Hg, 410 to 820 mm Hg, 540 to 1100 hPa or mb
Elevation Range	-1500' to +15,300' (-460 m to 4670 m)
Update Interval	1 minute

Weather Station Wireless Communications

Range
Line-of-Sight	up to 1000 feet (300 m)
Through Walls	200 to 400 feet (60 to 120 m)

Node

Operating Temperature.	-4° to +140°F (-20° to +60°C)
Storage Temperature	-40° to +140°F (-40° to +60°C)
Current Draw	12mA typical
	Housing MaterialRugged ASA Plastic
Dimensions (width x height x depth) .	8.25 X 11.25 X 5.5 inches (21.00 X 28.58 X 14.00cm)
Weight	3.40 lbs. (1.54 kg) (without batteries)
Batteries.	Four D-cells (LR20, not included), One lithium-ion (18650, included)
Certifications:	FCC CE IC

Gateway and Node Mesh Frequency Range and Output Power

USA	902 - 928 MHz FHSS, <25 mW
EU	868.0 - 868.6 MHz FHSS, <25 mW
Australia, Brazil	918 - 926 MHz FHSS, <25 mW
New Zealand, Peru	921 - 928 MHz FHSS, <25 mW
India	865 - 867 MHz FHSS, <25 mW

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