



3000 Series Wireless Stations

PRODUCT MANUAL

Model #'s

3210MU, 3220MU, 3240MU, 3250MU



Spectrum[®]
Technologies, Inc.

GENERAL OVERVIEW

Thank you for purchasing a WatchDog 3000 Wireless Weather Station. With internal modem/radio, integrated solar power, and Bluetooth connectivity to smartphones running the free WatchDog Mobile app to configure the station and check current conditions, the 3000 Series stations are easy to install and operate.

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INSTALLATION

Preparation

The weather station should be located in an open, unobstructed, grassy area to ensure accurate measurement of wind, rainfall, sunlight, and evapotranspiration.

Mounting hardware is provided to attach the weather station to a mast/pole with a 1.25 to 1.66" (32 to 42mm) outside diameter and a wall thickness of at least 0.13" (3.3mm). The mounting pole should be securely anchored perpendicular to the ground.

For mounting at an approximately 6 foot (1.8m) height, a 1.5 inch (40mm) OD or larger pole should be used for any station with a rainfall sensor. If that size is not available, then the station should be mounted on a tripod, such as Spectrum Technologies item # 3396TPS. Mounting the station at a greater height requires both the 1.5 inch (40mm) OD or larger pole and guy wires to keep the station from swaying in the wind.

If you are using the mounting tripod, open it and place it where the weather station is to be located. The tripod feet can also serve as mounting brackets if the unit is located on a solid surface. Slide the 3' post through both center screw clamps, adjust the height as desired and tighten the screws so that the post is perpendicular to the ground.

Assembly

Tools Required: 1/2 inch (13mm) wrench
 #2 Phillips screwdriver

The majority of the assembly of each 3000 Series Wireless Station is completed prior to shipment. Some parts are not attached to protect them from damage in shipping. The final assembly can be done either at the installation site or on a table for convenience.

If final assembly is being done at the installation site, mount the station to the pole with the provided U-bolts. Use a 1/2 inch (13mm) wrench to tighten the nuts. Face the solar panel south in the Northern Hemisphere or north in the Southern Hemisphere.

INSTALLATION

Assembly — Continued

1. Attach the paddle antenna to the top of the bracket by twisting it into the SMA connector. Tighten finger tight so that the antenna does not unscrew. See images below.



Temperature Alert Station

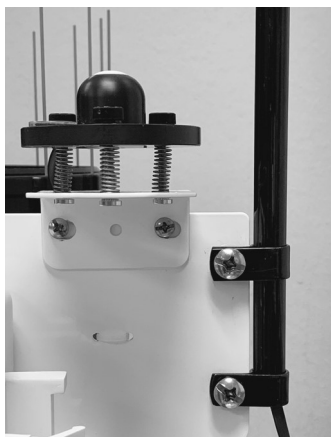


ET Station. The Weather Station and Rain Station have the same design with different sensor sets.

2. For Weather and ET Stations: Attach the anemometer arm to the front of the bracket using the provided screws (see image on facing page). The arm should extend parallel to the bracket (see images above). Attach the wind cups and wind vane using the included Allen wrench.

INSTALLATION

3. For ET Stations: Slightly loosen the left screw and remove the right screw from the Solar Radiation Sensor bracket, then rotate the sensor into position and replace the right screw.
4. For Rain, Weather, and ET Stations: Open the Bird Guard packaging and follow the included instructions.
5. Unlatch the enclosure latches and open the front door of the enclosure. The sensor connection requirements are as follows:



- Temperature/RH: Already connected on all models.
 - Rain: Already connected on Rain, Weather, and ET Stations.
 - Wind: For Weather and ET Weather Stations, connect the cable from the anemometer.
 - Solar Radiation Sensor: For ET Weather Stations, connect the cable from the sensor to the EXT port after station is deployed.
 - Optional external sensor. If one was purchased, connect it to the EXT port (the ET Station does not have an available external sensor port).
6. Confirm that all sensor cable connectors are securely pushed into their sockets.
 7. If not already installed onsite, mount the station to the pole with the provided U-bolts. Use a 1/2 inch (13mm) wrench to tighten the nuts. Face the solar panel south in the Northern Hemisphere or north in the Southern Hemisphere.

INSTALLATION

Initial Power-Up

1. Open the door and turn the power switch “ON”.
2. Monitor the LED. You should see the following signals. The LED will be off for several seconds between these.
 - Long Green to indicate startup is occurring.
 - Fast Green/Amber/Red to indicate startup is complete.
 - Short Amber flash when initial data is sent to SpecConnect.
 - Short Green flash indicating the transmission was successful, or a short Red flash to indicate that it failed.
3. Configure the device with one of the two options: Bluetooth with the WatchDog Mobile app on a smartphone (see page 7) or SpecConnect with computer (see page 10). Please note that for the Weather and ET Stations, the Wind Vane can only be configured (to identify “North”) using WatchDog Mobile.

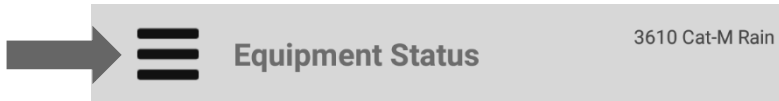
WINTERIZING

If you are removing the station at the end of the growing season and storing it until spring, be sure to open the door and turn the power switch “OFF”. This will preserve the battery until you need it again. Leaving the station powered on without providing sunlight will discharge the battery completely, and destroy at least half of its charging capacity.

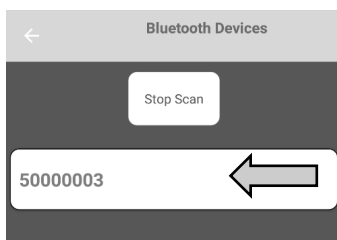
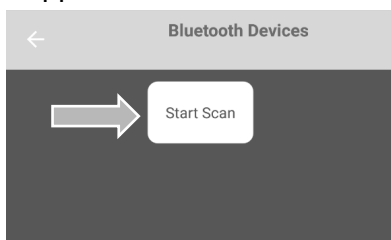
CONFIGURATION

WatchDog Mobile (Bluetooth)

1. If you have not already done so, go to the app store on your phone (Apple or Google Play) and download the free WatchDog Mobile app. If it has been installed for a while, check if you have the latest version installed.
2. Turn Bluetooth on in the station by pressing and holding the red “Select” button until the Status LED lights (less than 1 second). The LED will repeatedly quick flash until it connects to a smartphone. The flash will be green if the battery level is 80% or above, amber if it is below 80%, and red if it is below 20%.
3. Open the WatchDog Mobile app and log in with SpecConnect credentials.
4. Tap the menu button (3 parallel lines) on the top left corner and select “BLUETOOTH” from the list of options.



5. Tap “Start Scan” and select the station’s serial number once it appears.



6. Click on the settings (gear-shaped) icon. This will take you to the configuration page.



CONFIGURATION

WatchDog Mobile - Continued

7. Click the “General” tab located on the top left of the screen.
8. Set Latitude and Longitude by clicking the “Use My Location” button. Alternatively, the “Locate on Map” button can also be used for setting Latitude and Longitude.
9. Set the Time Zone using the drop-down menu at the bottom of the page.

The screenshot shows the 'Configuration' screen for a WatchDog Mobile device. At the top, there is a header bar with a close icon (X) on the left, the title 'Configuration' in the center, and a save icon on the right. Below the header, there are two tabs: 'General' (selected) and 'Ports'. The 'General' tab contains the following fields and controls:

- Description:** A text field containing '3000 Watchdog Rain Station'.
- Sn:** A text field containing '50000016'.
- Latitude:** A text field containing '41.739420'.
- Longitude:** A text field containing '-88.227897'.
- Location Buttons:** Two buttons, 'Locate On Map' (with a location pin icon) and 'Use My Location'.
- Upload Interval (mins):** A dropdown menu set to '15'.
- Logging Interval (mins):** A dropdown menu set to '15'.
- Time Zone:** A dropdown menu set to '(UTC-06:00) Central Time (US &...)'.
- Buttons:** Two buttons at the bottom: 'Edit Write Password' and 'Save Write Password'.

Blue arrows in the image point to the 'Use My Location' button and the Time Zone dropdown menu.

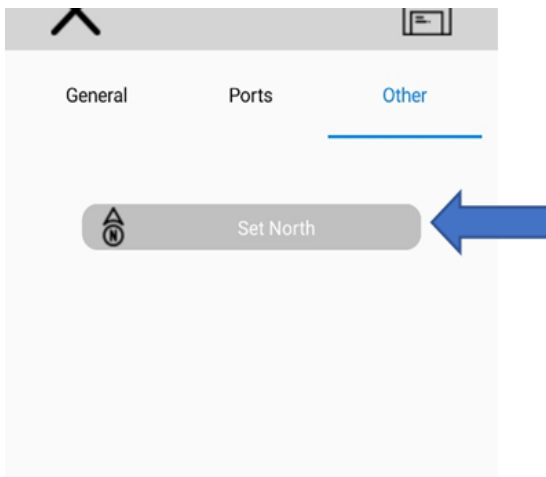
10. If an additional sensor is connected to the “EXT” port, configure it by tapping the “Ports” tab at the top of the page.
11. Once complete, tap the Save icon in the top right corner. Changes will appear in SpecConnect within 5 minutes.

CONFIGURATION

Set North for the Wind Vane

The Wind Vane on the Weather and ET Stations senses where it is pointing with respect to the anemometer arm, not the Earth. You must use the WatchDog Mobile app to configure the station to “know” which way is North.

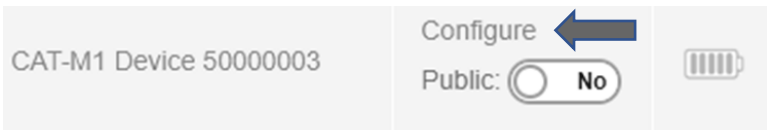
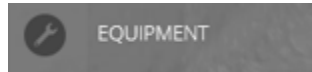
1. If you configured your station using SpecConnect, please follow all the instructions on page 7 to use the WatchDog Mobile app with Bluetooth connectivity.
2. Click the “Other” tab located on the top right of the configure page. A button will appear to “Set North”.
3. Tap the “Set North” button.
4. Point the wind vane in the north direction. When the “Are you ready?” prompt appears, tap “Yes”.
5. You should see “Success—North Set”. Tap OK, then tap the Save icon in the top right corner.



CONFIGURATION

SpecConnect

1. Open a web browser and navigate to www.specconnect.net. Log in with credentials.
2. Click on the “Equipment” tab on the left side of the screen.
3. Navigate to the device on the equipment page and click the “Configure” button.



4. Set the time zone.
5. If an additional sensor is connected to the “EXT” port, configure it in Port D.
6. Make any other desired changes including station or sensor .
7. Once complete, tap the save button in the bottom left corner.
8. The device is now set up, except that North needs to be set for the wind vane. This must be done at the installation site using a Bluetooth connection to the WatchDog Mobile app on a smartphone (see page 9).

A screenshot of the device configuration form. It includes fields for Device Name, Latitude, Longitude, Altitude, Logging Interval (mins), Upload Interval (mins), Time Zone, and Port# (A, B, C). Each port has a sensor selection dropdown and a "Sensor Nickname" field. There are "Cancel" and "Save" buttons at the bottom.

Device Name
CAT-M1 Device 50000003

Latitude: 41.739755 Longitude: -88.227753 Altitude:

Logging Interval (mins): 15 Upload Interval (mins): 15

Time Zone: (UTC-06:00) Central Time (US & Canada)

Port#

A Rainfall (3665) ✕
Sensor Nickname

B Temp/RH (3613THS/ARS)
Sensor Nickname

... 1 Temperature ✕

... 2 Relative Humidity ✕

C WaterScout SM 100 (6460) ✕
Sensor Nickname

Cancel Save

EXTERNAL SENSORS

The WatchDog 3000 Wireless Stations have an external port for additional sensor input. The following table lists some of the available optional sensors. See www.specmeters.com for a complete list. Most sensors include a 6-foot cable with pin-type connector. Items 3667-20, 6460-20, 6470-20 and 6450WD20 have 20 foot cables.

Item #	Description	Measurement Range	Accuracy
3665R	Tipping Bucket Rain collector	N/A	±2%
3666	Leaf Wetness Sensor	0(Dry) - 15(Wet)	N/A
3667, 3667-20	External (Soil) Temperature Sensor	-40 to 185°F -40 to 85°C	±1.1°F ±0.6°C
3670i	Silicon Pyranometer	1-1250 W/m ²	±5%
3668i, 3668i3, 3668i6	Quantum Light Sensor and Sensor Bars	0-2500 μmol m ⁻² s ⁻¹	±5%
3676i	UV Light Sensor	0-200 μmol m ⁻² s ⁻¹	±5%
6460, 6460-20	WaterScout SM 100 Soil Moisture Sensor	0% to saturation (typically 50%)	±3%
6470, 6470-20	WaterScout SMEC 300 Soil Moisture/EC/Temperature Sensor	VWC: 0% to sat. EC: 0 to 10 mS/cm, Temp: 0 to 122 °F (-18 to 50 °C)	VWC ±3% EC: ±2% Temp: ±1.4 °F (0.8 °C)
3669	Soil Moisture Transducer	0-100 kPa	±2%
6450WD 6450WD20	Watermark Soil Moisture Sensor	0 - 200 cbars	N/A
6451	Irrigation Sensor	Switches at 5 psi	±1 psi
3673 3674	Input Cables for user-supplied sensor	0-2.5V 4-20mA	±0.005V ±1%

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RAIN COLLECTOR ADJUSTMENT

If rain collector is not reading correctly (or at all):

1. Check the inside of the rain bucket for debris such as leaves that may be blocking the grid at the bottom of the bucket. Remove the rain bucket from the base by loosening the four screws, rotating the bucket slightly counter-wise, and lifting it off. Check for any obstacles (spider webs, debris, etc.) that may be preventing the tipping spoon from moving freely. If the hole beneath the grid gets clogged with dirt, the cotter key can be removed to allow it to be cleared.
2. Using the WatchDog Mobile app, connect to the station via Bluetooth using steps 1 through 5 of the instructions on page 7. Then tap the current conditions (thermometer) icon.
3. Note the current rainfall value. Manually move the tipping spoon back and forth several times. Wait up to 20 seconds for the rainfall value to change. Check that these tips have been recorded. Do this several times.
4. If the tips are being counted, skip to step 6.
5. If the app is not showing any or all of the manual tips of the spoon, it may be that the magnetic sensor on the tipping spoon is too far from the read switch or that the sensor cable is bad. There are two cams holding the axle of the tipping spoon that can be rotated to move the tipping spoon closer to or further away from the read switch. Make this adjustment and repeat step 3. If the app shows that the station recorded the manual tips of the spoon, proceed to step 6. If not, the sensor may need to be sent in for service.
6. If all the tips are being counted, replace the rain bucket and trickle a known amount of water into the bucket. 84 ml of water should register 0.1 inches of water (2.5 mm). This is equivalent to 10 tips of the tipping spoon. The best results are attained when the water is added slowly. It is recommended that the water be put in a ziplock bag which is then punctured with a pin to allow the water to slowly enter the rain bucket.
7. If the reading is slightly high or slightly low, the sensor can be calibrated. When the spoon tips, it lands on screws on either side. If sensor is reading high, lower the screws. If it is reading low, raise the screws. It is recommended to adjust the screws a quarter turn and again run a known amount of water through the bucket to determine if additional adjustment is necessary.

SPECIFICATIONS

Included Sensors by Model

	3210 Temp Alert	3220 Rain Station	3240 Weather Station	3250 ET Station
Air Temperature	✓	✓	✓	✓
Relative Humidity	✓	✓	✓	✓
Rainfall	Optional	✓	✓	✓
Wind Speed	✗	✗	✓	✓
Wind Direction	✗	✗	✓	✓
Solar Radiation	Opt. (ext. port)	Opt. (ext. port)	Opt. (ext. port)	✓
Available External Sensor Ports	1	1	1	0

	Measurement Range	Accuracy
Air Temperature	-40° to 257°F (-40 to 125°C)	±0.54°F (-40 to 194°F) ±0.3°C (-40 to 90°C)
Relative Humidity	10% to 100%	±2% @ 77°F (25°C)
Rainfall	0.01" (.0254mm) resolution	±2% at <2" (5 cm) /hr
Wind Speed	0, 1 to 200 mph (0, 1 to 322 km/h)	±2 mph (±3 km/h), ±5%
Wind Direction	0 to 359°, 1° increments	±3°
Solar Radiation	0 to 1500 W/m ²	±5%

SPECIFICATIONS

Modem/Radio	Cellular LTE-M (CAT-M1, NB-IoT)
Bluetooth 5.2	For WatchDog Mobile app on smartphones
External Interfaces:	USB Type A Port, for Flash Drive AUX Port, Modular connector (RS-232 9600bpi, 6VDC Power out) Power In, 5.5/2.1mm Barrel, 12VDC
LED	3-color (Red, Amber, Green)
External Sensor Port	1 x 2.5mm stereo jack , 0 to 3.0VDC analog input
Data Capacity	30,000 records (312 days at 15 minute inter- vals)
Power	Integrated 3.5W solar panel, optional 12VDC, Rechargeable 6V/4.5AH SLA battery
Battery Life	14 days minimum with no solar power
Waterproof	IP65
Operating Temperature	-22° to 130°F (-30° to 55°C)
Dimensions (HxLxW)	12x19.5x11.25in (30.5x49.5x28.6cm) (Without 7.25 in (18.4 cm) antenna)
Weight	9.90 lbs. (4.49 kg)

WARRANTY

This product is warranted to be free from defects in material or workmanship for one year from the date of purchase. During the warranty period Spectrum will, at its option, either repair or replace products that prove to be defective. This warranty does not cover damage due to improper installation or use, lightning, negligence, accident, or unauthorized modifications, or to incidental or consequential damages beyond the Spectrum product. Before returning a failed unit, you must obtain a Returned Materials Authorization (RMA) from Spectrum. Spectrum is not responsible for any package that is returned without a valid RMA number or for the loss of the package by any shipping company.

DECLARATION OF CONFORMITY



Spectrum Technologies, Inc.
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Aurora, IL 60504 USA

Model Numbers: 3210MU, 3220MU, 3240MU, 3250MU
Description: WatchDog 3000 Wireless Station
Type: Electrical Equipment for Measurement, Control, and Laboratory Use

The undersigned hereby declares that the above referenced product is in conformity with the provisions of:

Directive: 2014/30/EU
Standards: EN 55032: 2015
EN 55035: 2017
EN 61000-6-1: 2019
EN 61000-6-3: 2007+ A1:2011/AC:2012

Michael J. Dunning
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October 30, 2020

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