WatchDog®
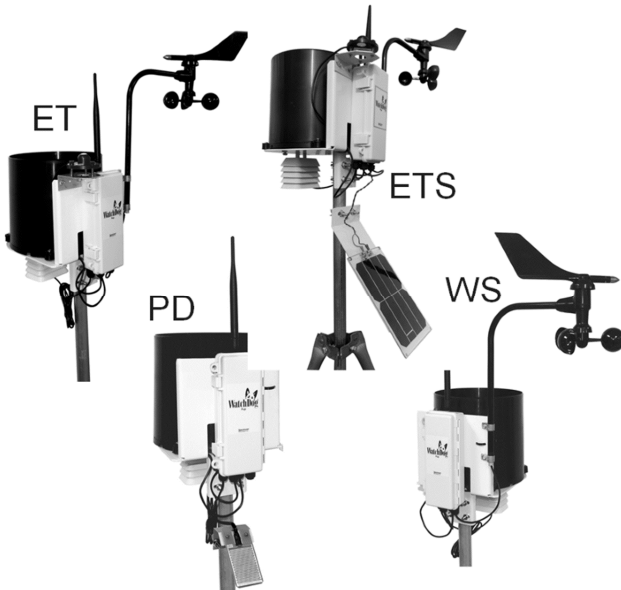
Pup Stations

PRODUCT MANUAL

Model #'s
3900 ET / ETS / WS / PD,
3905 ET / ETS / WS / PD

Spectrum®
Technologies, Inc.

QUICK START

HARDWARE UNBOXING & ASSEMBLY

FIELD INSTALLATION AND CONFIGURATION

This manual will familiarize you with the features and operation of your new WatchDog Pup Station. Please read this manual thoroughly before launching the units.

For customer support or to place an order, call Spectrum Technologies, Inc. at 800-248-8873 or 815-436-4440, FAX at 815-436-4460, or e-mail at info@specmeters.com.

www.specmeters.com

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INTRODUCTION

Thank you for purchasing a Watchdog Pup Station for use in a Retriever & Pup Wireless Sensor Network.

The Sensor Pup component of the Station has been pre-configured to use included sensors. The Pup Weather and the Plant Disease Stations have port "A" available for a sensor of your choice.

The Pup transmits sensor data to the Retriever either directly or via a Repeater Pup.   For details on how to configure the Sensor Pup Station into the network, refer to the "*Retriever and Pup Wireless Network Product Manual*".

PACKAGE CONTENTS

- Assembled Pup Station with sensors as in Table 1 - Pup Station Configurations *(see next page)*

- Bagged items:

  * wind vane with Allen key (except Plant Disease Station)
  * 6 AA alkaline batteries (except solar Powered Station)
  * antenna with stabilizer
  * 2 sets of U-bolt and clamp (3 sets, if solar-powered)

- solar panel for Solar Powered Pup Station (ETS)

- Leaf Wetness Sensor with bracket (PD) (Plant Disease Pup Station only)

SPECIFICATIONS

TABLE 1 - Pup Station Configurations

| Item # | Freq | Name | SENSOR PORT ASSIGNMENT ||||
			A	B	C	D
3900ET	900 MHz	ET Pup Station	Solar Radiation	Anemometer	Rainfall	Temperature/ RH
3905ET	2.4 GHz					
3900ETS	900 MHz	ET Solar Powered	Solar Radiation	Anemometer	Rainfall	Temperature/ RH
3905ETS	2.4 GHz					
3900WS	900 MHz	Weather Station	*available*	Anemometer	Rainfall	Temperature/ RH
3905WS	2.4 GHz					
3900PD	900 MHz	Plant Disease	*available*	Leaf Wetness	Rainfall	Temperature/ RH
3905PD	2.4 GHz					

Sensor	Measurement	Accuracy
Wind Speed	0, 1-200 mph	±2 mph (±3 km/h), ±5%
Wind Direction	0-359°, 1° increments	±3°
Air Temperature	-40° to 212°F	±0.54°F(50-131°F)
Relative Humidity	0 to 100%	±2.5% @ 5° to 50°C
Rainfall	0.01" (0.25mm) resolution	±2% at < 2 in (5 cm) /hr
Solar Radiation	300-1100 nanometers	±5%
Leaf Wetness	0% (dry) 15% (wet)	

Data capacity
  256 data internval records can be stored on the Pup until it is able to send them to the Retriever.

Dimensions:
  20.5 in (57.07 cm) H x 18 in (45.72 cm) L x 11 in (27.94 cm) W.
  With solar panel: 30.5 in (77.47 cm) H x 18 in (45.72 cm) L x 19 in (48.26 cm) W.

Weight
  5.75 lbs (2.61 kg)
  With solar panel: 6.33 lbs (2.87 kg)

Power Source
  6 AA batteries (alkaline or lithium)
 Solar-powered: Rechargeable NIMH, 6V total, 2450 mAHr

Battery Life
 6 months with alkaline batteries

Installing the Wind Vane

This procedure applies only to the Pup Stations that include the Digital Anemometer (3900/3905 ET/ETS/WS).

1. For shipping, the anemometer arm is tucked down into the rainfall bucket. Lift the anemometer arm up as high as possible within the 2 loop clamps. Oriente the arm as shown on Figure 1.

FIGURE 1

TOP VIEW
PUP STATION

ANEMOMETER
ARM ORIENTATION
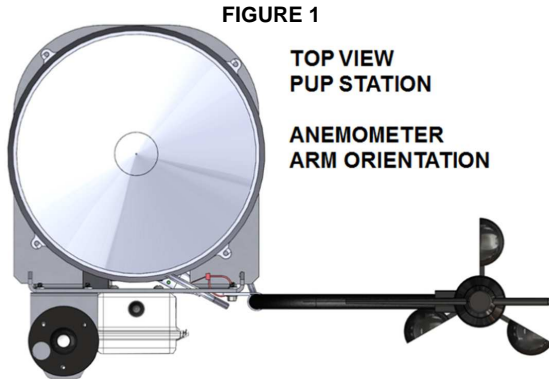
2. Remove the Wind Vane from the bag and take the Allen key off the vane.

3. Install the wind vane on the anemometer shaft (see Figure 2). Use the Allen wrench provided to tighten the set screw on the side of the wind vane.

FIGURE 2

Wind Vane

Wind Vane Shaft

Anemometer Head
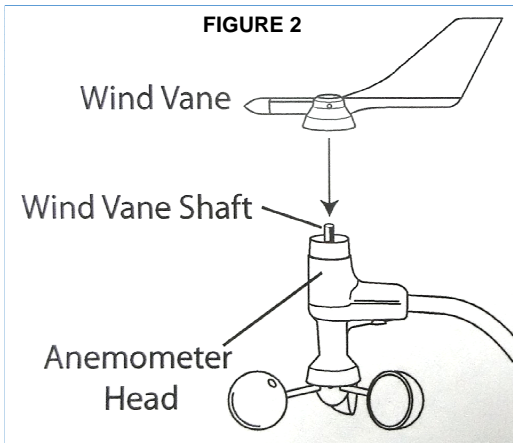
4. Tape the Allen key at a convenient location inside the Sensor Pup's housing.

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Installing Batteries

FIGURE 3

Solar-powered stations use a rechargeable battery pack. All other Pup Stations come with 6 AA batteries.

Ensure correct polarity of all AA batteries when placing them in the battery holder. *Refer to Figure 3.* The battery holder also has markings that indicate the polarity.

The Pup's batteries will last for about 6 months under normal Retriever-Pup network operation.
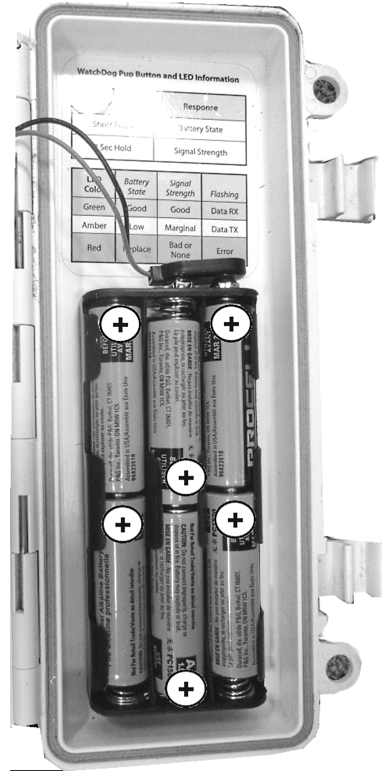
Checking Battery Level

To view the battery level, briefly press the button inside the Pup and the battery state will be shown by the color of the status LED: Green = Good; Amber = Low; Red = Replace.

To remotely check the battery level of the Pup, use either RPLU software on a PC connected to the Retriever or online via the

Pup Station Installation

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

If you are using the mounting tripod (item # 3396TPS), open it and place it where the Pup Station is to be located. Slide the 3' post through both center screw clamps, adjust the height as desired and tighten the screws such that the post is perpendicular to the ground.

Take (2) sets of U-bolt, clamp and nuts from the bag. Assemble them on the bracket below the Pup. Finally, attach the Pup Station to the post by sliding the U-bolts over the top of the center post (Figure 4).

Do not tighten the U-bolt nuts until you have oriented the station (next page).

FIGURE 4
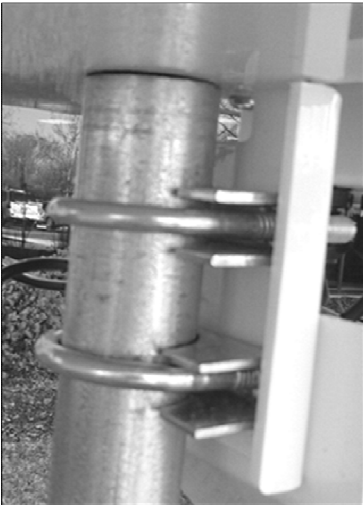
FIGURE 5

**3900 / 3905 ETS
on the 3396TPS tripod**

ORIENTING THE STATION

Once the Pup Station is on location, mounted on its post, it needs to be oriented properly.

There is no restriction in orienting the Plant Disease and the Pup Weather stations.   For all stations with an anemometer, if the arm is not facing true north, the wind vane will have to be calibrated.

For ET and solar-powered stations, the solar radiation sensor and the solar panel should be facing towards the equator *(southward in the Northern hemisphere).*

Figure 7 below shows the top view of a couple of options for installing the Pup Station with an anemometer.   If set up as in Figure 7a (arm points north), there is no need to recalibrate the wind vane. If set up as in Figure 7b (arm is not pointing north), then the vane needs to be calibrated. (*Refer to the section, Setting the Wind Vane Direction, on page 11).*

Tighten the nuts on the U-bolts and the anemometer arm clamp screws to hold them securely.
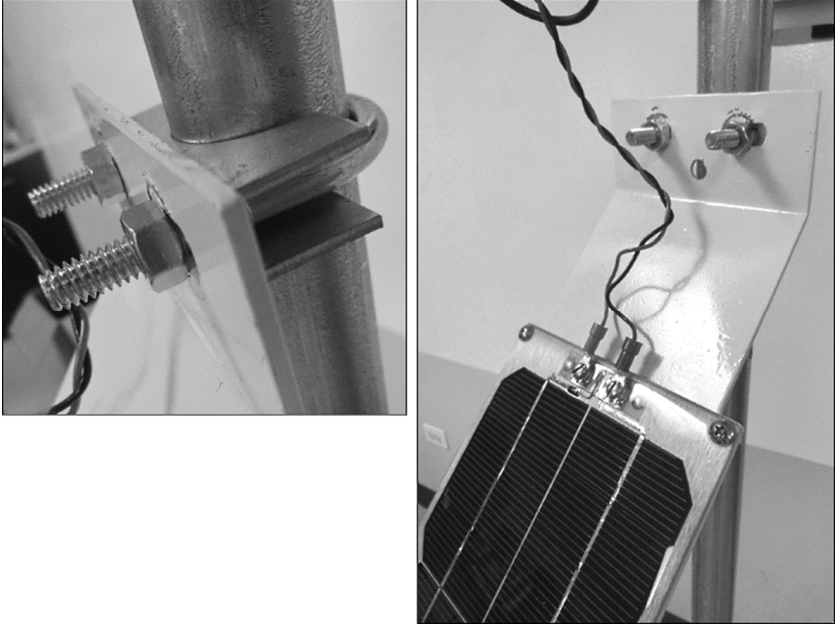
FIGURE 7a

FIGURE 7b
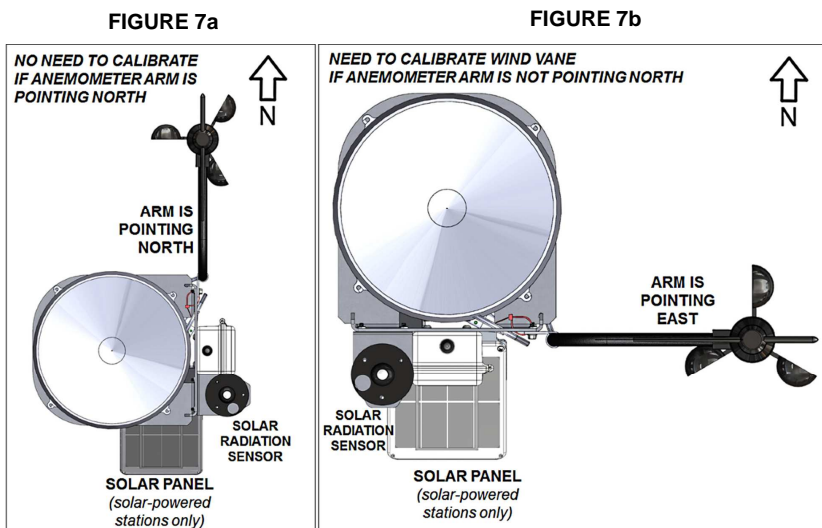
Mounting the Solar Panel

1. Remove the solar panel and bracket from the bubble bag. Take care not to disconnect the red and black wires which are connected to the Pup.
2. Remove the U-bolt, clamp and nuts from the other bubble bag.
3. Put the U-bolt and clamp around the mounting post below the Pup and attach the solar panel bracket with the nuts as shown on Figure

FIGURE 6

LEVELING THE SOLAR RADIATION SENSOR

FIGURE 7

CENTERED / LEVELED

Once the Pup Station is installed on location, the solar radiation sensor needs to be leveled to measure accurately.

Adjust the spring mounting screws of the sensor to center the bubble as shown on Figure 7.

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SETTING THE WIND VANE DIRECTION

If the anemometer arm is not pointed North, the wind vane must be calibrated.

1. Obtain a strong magnet, such as those used on re-frigerators. Flat, flexible business-card types are not useable; hard, disk-type magnets (such as rare-earth magnets) are preferred.

2. Align the wind vane such that tip points toward the north. A compass or map reference should be used to ensure accurate direction (Figure 8)

3. While the vane points North, hold the magnet just below the LED of the molded adapter. See Figure 9 for proper positioning of the magnet.

4. The LED on the molded adapter of the cable will light up when the magnet is on the right position.

5. Keep the magnet in place for until the LED flashes (about 5 seconds). The new North direction has been

FIGURE 8

FIGURE 9
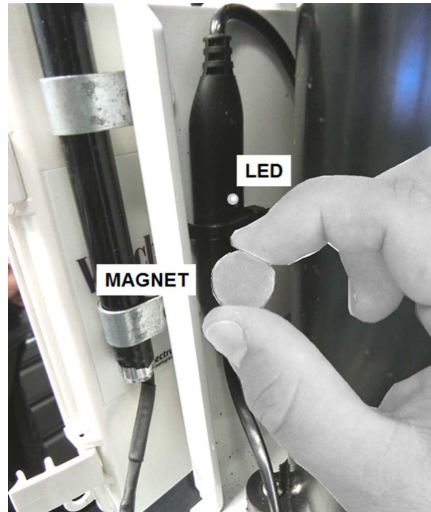
Rain Collector Adjustment

If the 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 and 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. Manually move the tipping spoon back and forth several times. After the next logging interval completes, check SpecConnect online or RPLU on a PC connected to the Retriever, to see if the tips were counted.

3. If the tips are being counted, skip to step 4.

   If any or all of the manual tips of the spoon are not shown on the logs, 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 2 cams on the base of the rain collector that can be rotated to move the tipping spoon closer to or further away from the read switch. Make this adjustment and repeat step 2. If not, the sensor may need to be sent in for service.

4. 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.

   Count the tips or check them as done on step 2. If the tipping count or the logged count 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 neces-

Connect the Pup Station to the Retriever Network

The Pup Station collects data from the sensors connected to its ports. The Pup sends logged data to the Retriever at the interval configured for the network.

Refer to the *Retriever and Pup Wireless Network Product Manual* for detailed instructions.

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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

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DECLARATION OF CONFORMITY
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Model Numbers:	3905 ET / ETS / ETA / WS / PD
Description:	Watchdog Pup Stations
Type:	Electrical equipment for measurement, control and laboratory use
Directive:	2014/30/EU EMC
Standards:	EN 61000-6-1: 2007
	EN 61000-6-3: 2007
	IEC 61000-4-2: 2008
	IEC 6100-4-3: 2006 +A1: 2007 +A2:2010
	EN 55022: 2010

Paul Martis, HW Engineering Manager   March 11, 2015

USA and Canada Conformity Standards:
FCC Part 15 CFR Title 47: 2014
ICES-003: 2012 Digital Apparatus (Industry Canada)

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