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AWOS 3000

Automated Weather Observing System

Maintenance Manual

3000-027

Rev. S

allweatherinc

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The information and specifications described in this manual are subject to change without notice.

Latest Manual Version
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Revision History

Revision	Date	Summary of Changes
G	2013 Jan 31	Updated annual maintenance instructions for the unheated (6011) rain gauge to remove Step 1 to disconnect heaters when removing the outer cover (Section 4.4.8) and to add these steps when removing/replacing the outer cover (Section 4.4.9) for the heated (6021) rain gauge. Added laser cautions in Sections 2.3.10 and 3.4.11 for 8339 Ceilometer.
H	2016 Aug 22	Updated for the addition of the 1793 VHF Transmitter
J	2019 Dec 15	Added Information about 6498 Present Weather and Visibility
K	2020 Mar 26	Added Model 6022 series Rain Gauge
L	2020 Feb 14	Updated UHF Data Radio model and voice modem model
M	2020 Apr 30	Updated Zero Wind Chamber name to match updates to Model 2040 User's Manual
N	2021 Mar 12	Added 1192 DCP
P	2021 Apr 23	Added PTB330 BP sensor
R	2021 July 2	Updated 6498-PV & 6498-V Triannual Inspection calibration instructions, added calibration and connection information for 6498 *Direct Connect* sensors, added 6500-DC Thunderstorm/Lightning Detector
S	2021 Dec 21	Added Vaisala sensors

Table of Contents

Chapter 1

1. Overview

This manual provides instructions for inspecting and revalidating All Weather, Inc. (AWI) AWOS 3000 systems. It includes complete maintenance instructions, as well as forms for recording the results of monthly, triannual, and annual maintenance procedures.

1.1 System Description

A full description of the AWOS 3000 can be found in the ***AWOS 3000 System User's Manual*** (3000-001), which includes system drawings, descriptions of software operation and interfaces, and the available sensor and component configurations of an AWOS.

This manual covers all AWOS systems. Please refer to the ***AWOS 3000 System User's Manual*** (3000-001) for the configuration details for each AWOS model.

Selected Vaisala sensors have now been authorized for use with the AWOS 3000. Their maintenance schedules are included in Chapter 6 for completeness, but the details and record keeping for the Vaisala sensors must be followed and recorded according to the ***M211027EN-G AWOS Maintenance Log Book*** as authorized for these sensors.

1.2 System Performance Parameters

System performance parameters are given in the individual sensor and component manuals. Detailed specifications are provided for each component. An overall description of the AWOS system's performance parameters can be found in the ***AWOS 3000 System User's Manual*** (3000-001).

1.3 Scheduled Maintenance

Scheduled maintenance is performed on AWOS systems at three intervals: monthly, triannually, and annually. Records of these procedures, along with any adjustments or repairs made, are recorded on the maintenance forms at the back of this manual.

1.4 Data Recording Forms

Three data recording forms are included with this manual — the *Monthly Technical Performance Record*, the *Triannual Technical Performance Record*, and the *Annual Technical Performance Record*. These forms are used during periodic maintenance, and include space to record the results of scheduled maintenance procedures. In addition to annual revalidation, the *Annual Technical Performance Record* is to be completed at system commissioning and after major repair work. These master forms should be copied and sufficient copies stored at a convenient location in each site's Facility Reference Data File (FRDF).

1.5 Site Preparation

Individual Site Preparation Manuals are available for each AWOS configuration. Site Preparation Manuals contain the instructions and drawings necessary for completing trenching, foundation construction, and other site preparation work required prior to installation of an AWOS.

1.6 Installation & Checkout Manual

The ***AWOS 3000 Installation Manual*** (3000-017) provides complete installation and checkout procedures for all AWOS systems.

1.7 Operating Instructions

Overall system operating instructions can be found in the ***AWOS 3000 System User's Manual*** (3000-001). Operating instructions for individual sensors and components can be found in their respective manuals. The ***Operation*** chapter of each manual provides full instructions for using a component and for interpreting that instrument's data.

1.8 Training Program

AWOS technicians are fully qualified in electronic and electrical applications, and have comprehensive knowledge of the operations, testing, and maintenance of the AWOS to the board component level. They have the capabilities to evaluate and make recommendations for system component changes that would enhance the reliability or functionality of the AWOS.

AWI provides a comprehensive training and certification program for all AWOS technicians to ensure thorough knowledge and competence in working with AWOS systems. The training is documented in the ***AWOS 3000 Maintenance Training Course*** (3000-044).

1.9 AWOS Field Replaceable Units (FRUs)

When an AWOS component or sensor fails, consult the troubleshooting chart in Chapter 5 to identify the Field-Replaceable Unit (FRU) to replace. If the problem persists or cannot be narrowed down from the troubleshooting chart, please contact All Weather, Inc. Customer Service.

Table 1 lists the lowest replaceable units (FRUs) for the AWOS 3000. When a sensor is replaced, the annual procedure for that sensor must be performed.

Table 1. AWOS FRUs

Description	Model/Part No.	Option
DATA COLLECTION PLATFORM		
PCB AWOS 1190 Data Collection Platform	M404804	
Main Daughter Board	M487094	
1190 DCP Firmware	M488290-00	
1192 Sensor Interface Board A.3	M404942-00	
1192 DCP Firmware	M595266-00	
CR2032 battery for RTC in 1192 DCP	M438159-00	
Sensor Interface Controller	M404806	
Ceilometer Interface Firmware	M469075	
Ultrasonic Wind Interface Firmware	M469076-00	
Freezing Rain Interface Firmware	M469066	
Power Supply Assembly	M438210-00	
Fuse 0.5 A Slow Blow	M442060	
Fuse 5 A Slow Blow	M442070	
Fuse 10 A Slow Blow	M442071	
AC Power PCB Assembly	M404802	
Data Link Radio	20980-A or 20981	✓
Barometric Pressure Sensor*	**7150, 7190, or PTB330**	
Quad Plate Pressure Port	M105037	
* The Barometric Pressure Sensor is installed on the Data Collection Platform.		
CENTRAL DATA PLATFORM		
CDP	3000	
Monitor	M482179-00	
CPU Board	M406186-00	
Keyboard/Mouse	M406187-00	
DVD/CD Drive	M406190-00	
Power Supply	M438222-00	
Telephone Modem	M406159-01 or M406227-00	
Microphone	20906	
Data Link Radio	20980-A or 20981	✓
Ground-to-Air Radio (Technisonic)	1792	
Ground-to-Air Radio (VAL Avionics)	1793	
GPS Receiver	M406167-00	
AWOS 3000 Software Installation CD	M595814-00-060	
UPS	20913-F	
UPS Batteries (3 required per UPS)	Minuteman 37000007	

Table 1. AWOS FRUs

Description	Model/Part No.	Option
SENSORS		
Wind Direction Sensor	**2020**	
Tail Vane	T802000	
Potentiometer/Shaft Assembly	T170522	
Bearing Kit	M488140	
Heater	20201	✓
Wind Speed Sensor	**2030**	
Cup Assembly	T800303	
Photon Chopper Assembly	T801600	
Bearing Kit	M488141	
Heater	20201	✓
Ultrasonic Wind Sensor (unheated)	**2040 / 2040C**	
RS-422 Converter	M438205-00	
Ultrasonic Wind Sensor (heated)	**2040H / 2040HC**	
RS-422 Converter	M438205-00	
Fuse 4 A	M442105-00	
Ultrasonic Wind Sensor (high heat)	**2040HH / 2040HHC**	
RS-422 Converter	M438205-00	
Fuse 10 A	M442106-00	
Cable Options for Ultrasonic Wind Sensors with Connectors (2040C, 2040HC, 2040HHC)		
30 m (100 ft) cable	M493080-00	
20 m (70 ft) cable	M493104-00	
10 m (35 ft) cable	M493081-00	
Motor Aspirated Radiation Shield (MARS)	**8190**	
Fan	M444021	
Temperature Sensor/RH Sensor	**5190**	
Rain Gauge (unheated)	**6011-A / 6012-A**	
Rain Gauge (heated)	**6021-A / 6022-A**	
Present Weather Sensor (*Direct Connect*)	**6498-DC-P**	
Visibility Sensor (*Direct Connect*)	**6498-DC-V**	
Present Weather and Visibility Sensor (*Direct Connect*)	**6498-DC-PV**	
Present Weather Sensor	**6498-P**	
Visibility Sensor	**6498-V**	
Present Weather and Visibility Sensor	**6498-PV**	
Fuse 10 A Slow Blow	M442089-00	
6498 Sensor Head	M482243-00	
Universal Power and Communication Module	2715-V	
Universal Power and Communication Module	2715-P	
Universal Power and Communication Module	2715-PV	

Table 1. AWOS FRUs

Description	Model/Part No.	Option
Maintenance Module	M488594-00	
Firmware with SD card	M469095-00	
Visibility Sensor	**8364-E**	
Emitter Head Assembly	M105061-00	
Detector Head Assembly	M105060-00	
Controller Board	M404811	
AC Interface	M404802	
Firmware	M469058	
Fuse 10 A Slow Blow	M442071	
Fuse 5 A Slow Blow	M442070	
Fuse 2 A	M442046	
Fuse 4 A	M442048	
Fuse 0.5 A	M442057	
Ambient Light Sensor	**M488171**	
Day/Night Detector	**M403326-00**	
Cloud Height Sensor	**8339-FAA**	
Optical and Laser Module	M403434-01	
DAQ & Power PCB	M404848-02	
Blower, 110 V AC	83396-00	
Power Supply	M438200-00	
Communication Cable	M491742-00	
Fuse 5 x 20 mm, 5 A, 250 V AC	M442088-00	
Fuse 5 x 20 mm, 10 A, 250 V AC	M442089-00	
Desiccant	M028181-00	
Battery	83395-00	
Present Weather Sensor	**6490**	
AC Interface	M404802	
Fuse 5 A Slow Blow	M442070	
Fuse 10 A Slow Blow	M442071	
Heater Power Supply	M438158	
Sensor Interface Controller	M404806	
Present Weather Firmware EPROM	M469053	
Thunderstorm/Lightning Sensor (*Direct Connect*)	**6500-DC**	
Thunderstorm/Lightning Sensor	**6500**	
AC Interface	M404802	
Sensor Interface Controller	M404806	
Firmware	M469067	
Power Supply	M438152	
Fuse 5 A Slow Blow	M442070	
Fuse 10 A Slow Blow	M442071	
Freezing Rain Sensor	**6495**	
Communication Cable	M491740	

Table 1. AWOS FRUs

Description	Model/Part No.	Option
MISCELLANEOUS EQUIPMENT		
Printer	20910-A	
Printer Ribbon	20911	
UHF/VHF Antenna	M489103	✓

Chapter 2

2. Monthly Procedures

AWOS monthly maintenance consists of a general system check and cleaning of sensor optics. Follow the procedures below, take any required corrective action, and record the results on the *Monthly Technical Performance Record*.

The person performing the monthly maintenance procedures is not required to have any FAA certification. However, the monthly maintenance should be performed by an individual who has attended the User and Maintenance training given by AWI and documented in the ***AWOS 3000 Maintenance Training Course*** (3000-044). This training will familiarize the person with the basic mechanical and electrical orientation needed to perform monthly maintenance.

2.1 Monthly Maintenance Tools and Supplies

The following list gives the tools and supplies required during monthly maintenance of the AWOS.

Description	Part/Model No.	Specifications
Assorted Hand Tools	n/a	n/a
Clean Dry Cloth	n/a	Lint free
Water & Spray Bottle	n/a	n/a
Lightweight Greaseless Oil	n/a	(e.g., 3-in-1 or equivalent)
isopropyl Alcohol	n/a	70%-100%
RTV sealant	RTV 162	n/a
Business Card	n/a	Business card, credit card, driver's license, one U.S. dollar or equivalent in weight and size.
Paint	n/a	White, outdoor enamel. Krylon and Rustoleum are two popular brands
Soap	n/a	Mild – non-scented. Ivory brand soap bars work well.
Sandpaper or Emery Cloth	n/a	120-150 grit suitable for removing surface rust or corrosion.

2.2 General Maintenance

Verify that obstruction lights on the tower are checked. This is generally the responsibility of the airport operator, but since airport personnel will likely be performing the remaining maintenance, it is reasonable that airport personnel confirm the operation of the obstruction lights. The overall condition of the sensor site, including weed heights, things that might interfere with a sensor's ability to perform properly, and the presence of items that may encroach on the siting criteria parameters should also be reviewed at this time.

Inspect all mounting hardware and external surfaces and cable assemblies.

If surfaces require cleaning, use mild soap and water. If surfaces are rusty, preserve them by sanding off the rust and applying paint.

If any cables have developed stress cracks or exhibit other damage that appears to compromise the integrity of the outer protective sheath, report the problem immediately – do not attempt to service any electrical cable.

2.3 Specific Maintenance

2.3.1 Model 1190 and Model 1192 Data Collection Platform

1. Verify that all cables are connected and in good condition.
2. Press the maintenance switch (SW3) (Model 1190 DCP only).

2.3.2 Model 7150/7190 or PTB330 Dual Digital Barometer

1. Visually check the pressure port and clear any debris from within the plate area.

2.3.3 Model 2020 Wind Direction Sensor

1. Visually verify that the vane is moving freely.
2. Verify that the displayed values on the DCP are not static. A small breeze will be necessary. (This is an indication that the internals of the sensors are working properly and are communicating their values to the DCP appropriately.)
3. Verify that the Vane and vane body are clear of large debris, such as bird nests.

2.3.4 Model 2030 Wind Speed Sensor

1. Visually verify that the cups are moving freely.
2. Verify that the displayed values on the DCP are not static. A small breeze will be necessary. (This is an indication that the internals of the sensors are working properly and are communicating their values to the DCP appropriately.)
3. Verify that the sensor is clear of large debris, such as bird nests.

2.3.5 Model 2040 Ultrasonic Wind Sensor

1. Verify that the displayed values on the DCP are not static. A small breeze will be necessary. (This is an indication that the internals of the sensors are working properly and are communicating their values to the DCP appropriately.)

2. Verify that the sensor is clear of large debris, such as bird nests.

2.3.6 Model 5190 Temperature/Relative Humidity Sensor

No additional procedures.

2.3.7 Model 8190 MARS

Maintenance of the MARS is generally limited to periodic cleaning and occasional repainting of exterior surfaces.

1. Check the 8190 air inlet (the narrow end of the MARS) for obstructions and debris.

2. Remove obstructions and debris as necessary.

3. Check the MARS for insect activity (cobwebs, hornet's nests, etc.), as well as birds' nests, and clean out any debris.

4. The exterior surfaces of the MARS should be free of dirt at all times to prevent internal heating of the probe. Clean the surfaces regularly with water and mild soap. Repaint the exterior surfaces as required Surfaces may be scuffed with sand paper to clean them and encourage better paint adhesion.

5. During regular maintenance, check the fan housing for signs of corrosion. Clean the housing and protective grate as necessary. Use only a damp cloth. Do not squirt water into the fan.

6. The inside of the enclosure may also need to be cleaned of excessive dirt drawn in by the fan. Use only a damp cloth. Do not use soap.

7. Check all cables for signs of wear or damage, especially in areas with high velocity winds. Check all mounting hardware for corrosion or looseness, and repair or replace as required. If any cables have developed stress cracks or exhibit other damage that appears to compromise the integrity of the outer protective sheath, report the problem immediately – do not attempt to service any electrical cable.

8. Check the fan for noise that could be a sign of worn bearings.

9. If the MARS fan is in need of repair, report the problem

10. Using a small light-weight object, such as a business card, credit card, driver’s license or one dollar bill, test to ensure the MARS fan is producing adequate air flow. Place the

business card over the small end of the MARS (the air inlet). The card should be held in place by the suction produced by the fan.

11. If the MARS fan is in need of repair, report the problem.

2.3.8 Model 6011/6012 Rain Gauge

1. Remove the screen from the funnel of the rain gauge and gently tap the screen to free any dirt or debris.

2. Check the rain gauge funnel for insect activity (cobwebs, hornet's nests, etc.), as well as birds' nests, and clean out any debris. Be sure to check underneath the instrument as well.

3. Water and a damp cloth can be used to clean the rain gauge as needed. Do not use soap.

4. Never paint the rain gauge. If repairs are needed, report the problem.

5. Reinstall the screen.

2.3.9 Model 6021/6022 Heated Rain and Snow Gauge

1. Remove the screen from the funnel of the rain gauge and gently tap the screen to free any dirt or debris.

2. Check the rain gauge funnel for insect activity (cobwebs, hornet's nests, etc.), as well as birds' nests, and clean out any debris. Be sure to check underneath the instrument as well.

3. Water and a damp cloth can be used to clean the rain gauge as needed. Do not use soap.

4. Never paint the rain gauge.

5. Reinstall the screen

6. If the ambient temperature is below 40°F, feel the rain gauge cover to check operation of the heaters. If they are working, the outer cover should be warm to the touch.

7. If repairs are needed, report the problem.

2.3.10 Model 6498-P, 6498-V, 6498-PV, 6498-DC-P, 6498-DC-V, 6498-DC-PV Present Weather and Visibility Sensor

1. Clean the sensor windows using a soft cloth and water.

2. Clean the Day/Night sensor optics (6498-V, 6498-DC-V, and 6498-PV, 6498-DC-PV).

2.3.11 Model 8364-E Visibility Sensor

1. Clean the Visibility Sensor windows using a soft cloth and water.

2. Clean the Day/Night Sensor optics.

2.3.12 Model 8339 Ceilometer

WARNING

The Model 8339 Ceilometer uses a Class I laser configuration, which is eye-safe in all conditions except when viewed through optical instrumentation, such as binoculars or any other condensers. Never view the optical radiation through such devices or serious eye damage may result.

CAUTION

Use clean water and a soft cloth to clean the windows. Commercial cleaners containing ammonia will degrade the optical coating on the windows, resulting in degraded sensitivity (higher altitude clouds will no longer be detected).

1. Clean the transceiver windows at least once per month (more frequently if local conditions warrant), or when the status message so indicates. Note that a dirty window warning message may also appear during rain, snow, and fog conditions, whenever the internal electronics measure a certain level of window opacity.

2. Each time the windows are cleaned, check blower operation by covering the receiver window, shown in Figure 1, with a diffuse reflective object (such as a sheet of white paper) and verifying that the blower turns on. This may take up to 30 seconds.

Figure 1. The right hand side is the receiver

2.3.13 Model 6490 Present Weather Sensor

1. With a clean finger, touch the lenses in front of the disc-shaped heaters which are bonded to the upper and lower inside surface of lenses. The lens surfaces should be slightly warmer to the touch than the ambient temperature.

2. If the lens is not warm to the touch, the sensor must be repaired or replaced.

3. Clean the lenses by first spraying water on the lens and then wiping gently with a lint-free cloth to prevent scratching the glass optics.

2.3.14 Model 6500/6500-DC Thunderstorm/Lightning Sensor

1. Check the antenna for dents, cracks, or punctures.

2. Remove all dirt and grease from surface areas using a soft cloth moistened with mild soap and water.

2.3.15 Model 6495 Freezing Rain Sensor

WARNING

The freezing rain sensor probe assembly will be hot if the sensor recently completed a deice cycle. Ensure that the probe assembly has cooled before cleaning the probe. While in the deice mode, the probe will radiate a significant amount of heat. This can be observed by placing a hand close to, but not on, the sensor probe. Always avoid direct contact of the probe with skin to avoid a potential burn hazard.

CAUTION

Do not touch the probe with bare hands, as oil residue from skin will affect the performance of the sensor.

1. Visually inspect the surface of the probe for contaminants such as dirt, oil, fingerprints, etc.

2. If any contaminants are present, clean the probe using isopropyl alcohol and a soft cotton cloth.

2.3.16 Central Data Processor (CDP)

1. Check display operation.
2. Check keyboard operation.
3. Check printer operation as necessary. If the printer has been printing normally during the past hour, it is not necessary to perform this test.
4. Log in as an operator
5. Go to the **File > Printer Setup** menu
6. Click the "Print Test Page" button and verify that the test page was printed
7. Check the printer ribbon and replace as necessary.
8. Check the printer paper and replace as necessary.
9. Check microphone operation by recording a voice remark. Delete the remark when done. To delete a voice remark, record a short (approximately one second), empty remark over it, and set "enabled" to "off."
10. Check dial-up telephone operation by dialing the CDP from an outside line.
11. Verify VHF radio operation by listening to the AWOS voice output over a remote receiver.
12. Check the system clock against a known standard. If the difference is greater than 10 seconds, report the problem.
13. Check speaker operation.
14. Check UPS operation by disconnecting the AWOS power cable. The AWOS should not shut down.

2.4 Record AWOS Observations

The final portion of the AWOS Monthly Technical Performance Record provides room to record AWOS readings and to note any irregularities. This provides a written snapshot in addition to the logs generated automatically.

- Time and Date
- Wind Direction
- Wind Speed
- Visibility
- Sky Condition (Clouds)
- Precipitation
- Present Weather
- Thunderstorm/Lightning
- Freezing Rain
- Temperature
- Dew Point
- Altimeter Setting
- Note any "missing" parameters or any other obvious failures

Chapter 3

3. Triannual Procedures

AWOS triannual maintenance is performed three times per year. Follow the procedures below, take any required corrective action, and record the results on the *Triannual Technical Performance Record*.

Only an FAA authorized technician of record for the site may perform triannual procedures.

3.1 Triannual Maintenance Test Equipment

The following list gives the test equipment required during triannual maintenance of the AWOS. This is in addition to that required for monthly procedures.

Description	Part/Model No.	Specifications
Calibration Disk with Calibration Bungs 6498 Only	M482254-00	
Visibility Calibrator 8364 Only	M104744	
2 pieces of opaque black foam 8364 Only	n/a	Opaque black foam 1” to 4” inches thick., approximately 4” x 6”
Psychrometer*	Model 5211 (Sling), Model 5230 (Assmann) or equivalent	±0.67° F (±0.37° C)
Psychrometric Calculator*	Model 5282-A or equivalent	°F
Digital Temp/RH Sensor*	Rotronics HC2-S3 or equivalent	±0.67 °F (±0.37 °C), 1% RH
Reference Pressure Sensor	Z003919 or equivalent	±0.0067 in Hg (±0.02%)
* Use either psychrometer & psychrometric calculator *or* Digital Temp/RH sensor.		

3.2 Triannual Maintenance Tools and Supplies

The following list gives the tools and supplies required during triannual maintenance of the AWOS. This is in addition to that required for monthly procedures.

Description	Part/Model No.	Specifications
Extension Cord	n/a	50', 16-3 or larger
Digital Voltmeter	n/a	4-1/2 digit
Scientific Calculator	Hewlett Packard HP-35, Texas Instruments TI-30 or equivalent	Basic scientific calculator capable of performing square-roots and exponent math – FX260, FX-300ES, EL-501, HP-10S, HP-11C, HP-15C, HP-32S, HP-35, TI-30, and TI-84 are all popular models
8339 Ceilometer Desiccant	M028181-00	

3.3 Perform Monthly Procedures

As part of triannual maintenance, perform the monthly maintenance procedures detailed in the previous chapter. Only those procedures unique to triannual maintenance are provided in this chapter.

3.4 Specific Triannual Maintenance

Constant vibration over time at certain sites such as oil platform sites may loosen the screws and bolts used to secure the sensors and controller boxes to mounting struts or poles. Check these screws and bolts as part of the triannual maintenance if the weather station is located at such a high-vibration location, and retighten them as necessary.

3.4.1 Model 1190 Data Collection Platform

1. Press the maintenance switch (SW3).
2. On the DCP display, navigate to the analog-to-digital reference voltage screen ("ADC Vref-" and "ADC Vref+").
   - Verify that ADC Vref- is in the range 0–5.
   - Verify that ADC Vref+ is in the range 4090–4095.

3.4.2 Model 1192 Data Collection Platform

Check the battery voltage for the real-time clock by looking at the `System Detail` screen as explained in the ***Model 1192 Data Collection Platform User's Manual***. The RTC backup battery should be replaced when the RTC battery voltage drops below 2.0 V.

The real-time clock CR2032 battery (M438159-00) is located in a battery holder on the Main Board. The Serial Interface Board has to be removed to access the battery holder.

1. Turn the power off to the DCP with both the circuit breaker and the ON/OFF switch.
2. The Serial Interface Board is secured to the Main Board using spacers and screws. Remove the screws and unplug the Serial Interface Board, being careful not to bend the pins that are plugged into the Main Board sockets. The terminal block plugs for the sensors may be left plugged in. Set the screws and washers aside.
3. Slide out the old CR2032 battery and replace it with a fresh battery.
4. Align the pins of the Serial Interface Board with their sockets on the Main Board and carefully plug the Serial Interface Board into the sockets on Main Board.
5. Secure the Serial Interface Board using the screws and washers set aside previously.
6. Turn the circuit breaker and the ON/OFF switch on to restore power to the DCP.
7. Check the RTC voltage to verify the battery was replaced correctly and is working.

3.4.3 Model 7150/7150 or PTB330 Dual Digital Barometer

The digital barometer is located in the top-right corner of the DCP.

1. Remove the quad plate pressure port drain plug (the Phillips screw on the underside of the bottom plate) using a Phillips screwdriver, and drain any accumulated moisture.
2. Remove both flexible tubes from the barometer inlets and blow gently into the tubes to clear any accumulated debris.
3. Replace the tubes and drain plug.

When performing the pressure check below, the reference pressure sensor (Z002919 or equivalent) should be lifted up until it is at the same level as the digital barometer. If the wind is blowing, the reference sensor may deliver different readings, depending on which way it is facing and where it is located. The quad-plate pressure port on the bottom of the DCP enclosure minimizes the effect of wind on the pressure reading from the digital barometer. If the reference sensor does not have a similar wind compensation port, you may not be able to get accurate readings on windy days.

4. A keypad and LCD display screen are located inside the 1190 DCP enclosure, and are used to view sensor data and perform maintenance checks. Use the * and # keys on the keypad to move through the screens—press the # key to move to a higher numbered screen, or press the * key to move to a lower numbered screen. Screen 8 shows the readings for the two pressure transducers using inHg units. The 1192 DCP has a keypad and a rotary knob to scroll through the display screens.

   Note the difference in readings for each pressure transducer from the pressure standard. If either of the pressure transducer readings in the digital barometer differs from the reference sensor reading by more than 0.02 inHg, replace the sensor.

3.4.4 Model 2020 Wind Direction Sensor

No additional procedures.

3.4.5 Model 2030 Wind Speed Sensor

No additional procedures.

3.4.6 Model 2040 Ultrasonic Wind Sensor

No additional procedures.

3.4.7 Model 5190 Temperature/Relative Humidity Sensor

Triannual maintenance of the Model 5190 Temperature/Relative Humidity Sensor consists of performing the monthly maintenance tasks, cleaning the dust filter, and checking the accuracy of the 5190 against readings made using a reference sensor or psychrometer, as explained below.

While performing the accuracy check, keep these provisions in mind.

- For both temperature and dew point, it is important that the reference sensor be subject to the same conditions as the Model 5190. If the reference sensor is in the sun, near your body, or downwind from you, it is greatly affected. This will result in the reference sensor and the 5190 delivering very different results. Even if the reference sensor is removed from direct sun, reflected light (from snow or sand, for example) can affect the measurements.

- On cloudy, breezy days, there is usually no problem getting good reference readings. You only need to be sure to stay downwind of the MARS and the reference sensor.

- On sunny or calm days, it is often necessary to place the sensing element of the reference sensor inside the MARS intake. This ensures that both sensors are sampling the same air conditions. The reference sensor can be held in place in the MARS intake using a bungee cord, wire, string, or tape. The reference sensor should not touch the sides of the MARS tube or the 5190. The reference sensor must not block the MARS airflow.

- The reference sensor can take up to ten minutes to stabilize, as the sensor body may have absorbed or lost heat from contact with your body or from storage conditions. As you observe the readings, the two sensors may start out several degrees apart, but will slowly approach each other. Do not take any official reading until after the temperatures have settled.

- Differences in response time between the two sensors can also make field temperature comparisons difficult. As wind changes direction, it can change humidity and temperature. One sensor will always react faster than the other. Taking measurements in changing conditions is not recommended.

- Use of a sling psychrometer as a field reference sensor is strongly discouraged for anyone except an experienced meteorologist. Electronic temperature/relative humidity sensors and motor aspirated sensors are recommended for field use.

Triannual Model 5190 Temperature/Relative Humidity Sensor Procedures

1. Position the reference sensor as described above. Allow a minimum of 20 minutes for the sensor to stabilize before proceeding.

2. Record the temperature and dew point temperatures from both the reference sensor and the AWOS at 1 minute intervals for 5 minutes (5 readings).

3. Compare the reference sensor temperature reading to the AWOS reading in each set. At least three sets must have readings within ±1°F (±0.56° C) of one another. If fewer than three sets are within this range, take a second round of readings (5 readings at 1-minute intervals). If this second round fails to yield at least three sets of readings within ±1°F (±0.56° C) of one another, the sensor must be replaced.

4. For each set of readings meeting the above requirement, subtract to find the difference between the two temperatures and square the result.

5. Take the average of the square root of the average of the squared results obtained in the previous step. If the result is within ±2°F (±1.1° C), the sensor passes. Otherwise, the sensor must be replaced.

6. Compare the reference sensor dew point reading to the AWOS reading in each set. At least three sets must have readings within ±0.5°F (±0.28°C) of one another. If fewer than three sets are within this range, take a second round of readings (5 readings at 1-minute intervals). If this second round fails to yield at least three sets of readings within ±0.5°F (±0.28°C) of one another, the sensor must be replaced.

7. For each set of readings meeting the above requirement, subtract to find the difference between the two dew point values and square the result.

8. Take the average of the square root of the average of the squared results obtained in the previous step. If the result is within ±3°F (±1.7° C), the sensor passes. Otherwise, the sensor must be replaced.

3.4.8 Model 8190 MARS

1. Remove the MARS fan fuse (F1) in the 1190 DCP and verify that the DCP indicates a fan failure.

2. Replace fuse F1 in the 1190 DCP.

3. Use the toggle switch on the 1192 DCP to check MARS fan operation. Hold the spring-loaded toggle switch down long enough for the fan failure to be displayed.

3.4.9 Model 6011/6012 Rain Gauge

No additional procedures.

3.4.10 Model 6021/6022 Heated Rain and Snow Gauge

No additional procedures.

3.4.11 Model 6498-P/6498-DC-P Present Weather Sensor

Display the present weather data screen on the DCP display using the * and # keys.

- The present weather field (W___) should not contain any data (two underscores) if there is no precipitation falling. As long as there is no precipitation falling and the present weather field displays anything other than two underscores, report the problem.

- The status fields should all read zeros (S0000) if the sensor has been operating (and not reset by a power interruption) for at least 5 minutes. If the status fields are not all zeros, refer to the ***Model 6498 User's Manual*** for an interpretation of the possible problem.

3.4.12 Model 6498-V, 6498-DC-V, 6498-PV, and 6498-DC-PV Present Weather and Visibility Sensor

The Present Weather and Visibility Sensor is calibrated during triannual maintenance. This must be performed when there is at least 7 miles visibility with calm wind conditions. Refer to the ***Model 6498 Present Weather/Visibility Sensor User's Manual*** for further details on setting up the laptop for the configuration.

Model 6498-V and 6498-PV

This calibration is performed using a laptop with an USB cable connection to the maintenance port on the bottom of the electronics enclosure with an open terminal program.

If the computer being used to perform the calibration has not been used before for this purpose, you must download the USB drivers from https://www.ftdichip.com/Drivers/VCP.htm. Click on the Windows or Mac OS version, depending on the operating system, for the processor architecture on your computer; select the 64-bit architecture if you are unsure. Follow the instructions provided with the driver download to install the driver,

Currently Supported VCP Drivers:

Operating System	Release Date	x86 (32-bit)	x64 (64-bit)
Windows*	2017-08-30	2.12.28	2.12.28
Linux	-	-	-
Mac OS X 10.3 to 10.8	2012-08-10	2.2.18	2.2.18
Mac OS X 10.9 and above	2020-08-13	-	2.4.4

1. Connect one of the computer's USB ports to the Sensor 1 maintenance port on the bottom side of the enclosure (see Figure 2).
2. Identify the COM port related to the USB cable connection on the computer. To identify the COM port related to a USB cable in a computer running Windows 7 or 10, open the Device Manager located in the Control Panel. Go to the Ports (COM & LPT) area and expand the tree. Unplug the USB cable, wait for 30 seconds or so, and then plug the USB cable back in. A communications port will appear in the device manager when the USB cable is connected. This is the communications port directly related to the USB cable.
3. Open a terminal emulation utility such as TeraTerm and select the serial COM port related to the USB cable.

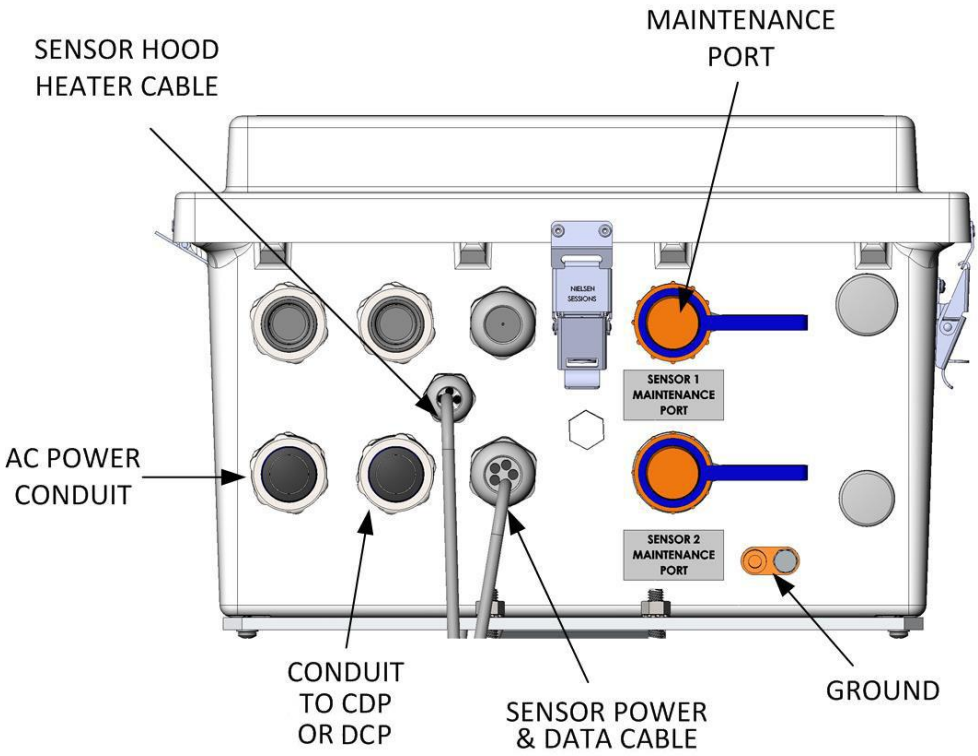
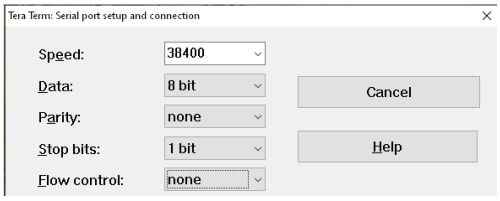


Figure 2. External Connections at Enclosure Bottom for Standalone Sensors

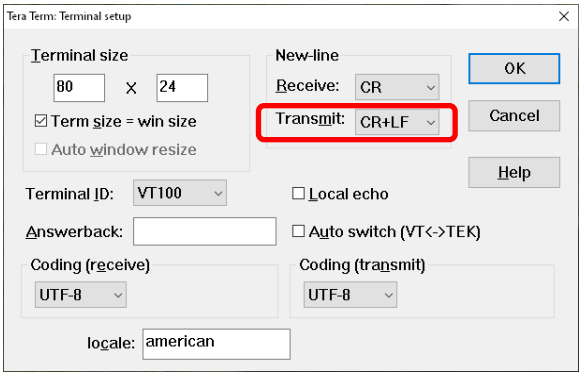
4. Set up the terminal emulation utility serial port as follows.

   Baud Rate: 38400
   Data Bits: 8
   Parity: None
   Stop Bits: 1
   Flow Control: None



5. Click **OK**.

6. Set Transmit in the Terminal Setup to CR+LF. Leave Local echo unchecked.

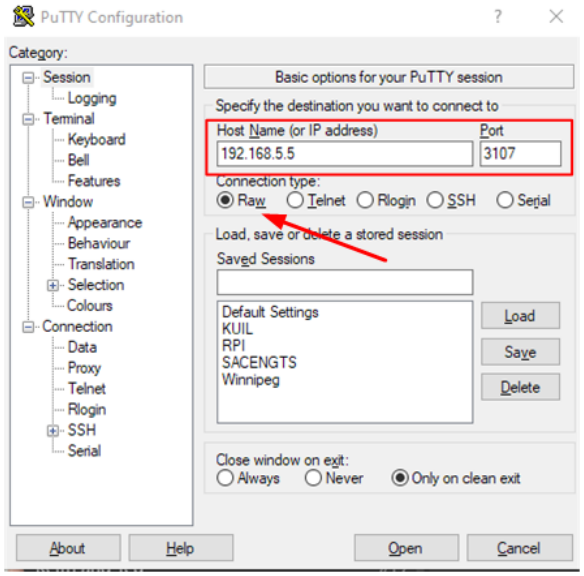


7. Click **OK**. The 6498 setup menu will appear.

Model 6498-DC-V and 6498-DC-PV

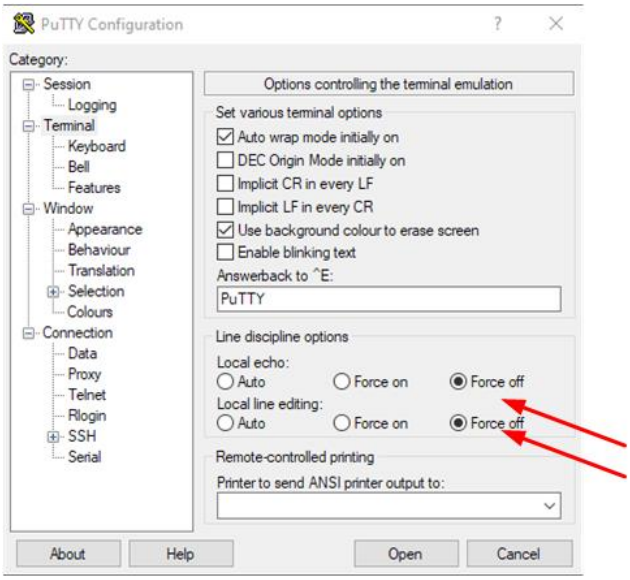
This calibration is performed using a laptop with a CAT 5/6 cable connection to the Ethernet port on the Model 1192 DCP with an open terminal program.

1. Connect a laptop to the DCP using a standard CAT5/6 cable. (Administrator access is required to perform the steps in this procedure.)
2. Navigate to the *Control Panel > Network and Sharing Center* and then click on **Change Adapter** settings.
3. Right-click on the network adapter connected to the DCP and click **Properties**.
4. Select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties**.
5. Enter the information shown here.
   IP Address: 192.168.5.20
   Subnet mask: 255.255.255.0
   Default gateway: 192.168.5.1
   DNS information can be left blank.
   Click **OK**.
6. Click **Close**.
7. Open a terminal emulation utility such as Putty on the test computer.
8. Enter 192.168.5.5 for the host name and 3107 for the port. port.



The screenshots were obtained using Putty v 0.71 on a Windows 10 computer. Other terminal emulation utilities and operating systems may be used. Please contact AWI Customer Service for additional assistance if needed.

9. Click on Terminal in the list on the left and set Local echo to **Force off** and Local line editing to **Force off**.



10. Click **Open**. The 6498 setup menu will appear.

Calibration

1. Type the following command in the terminal emulation utility and click **Enter** to access the menus.

   ```
   open 0
   ```

   Note: The "*0"* corresponds to the Sensor ID number. The sensor ID is always 0 for the 6498 sensor.

2. The setup menu should now be displayed. If the menu does not appear, check the terminal emulation utility settings, then type the command again.

   Note: If the sensor does not answer to "*open 0*", poll all of the other sensor IDs. To poll the other IDs type "*open 1*" press enter, then type "*open 2*" and repeat until you reach "*open 9*". If the sensor answers to a sensor ID other than 0 the sensor ID should be changed to 0. If the sensor ID is set to the wrong ID it will not answer to *open 0*.

   ```
   WELCOME TO THE AWI 6498 SETUP MENU
   ID 0
   S/N 1003
   (1) Message output menu
   (2) User alarm menu
   (3) Calibrate AWI 6498
   (4) System information
   (5) Communications setup
   (6) System configuration

   (9) Exit and save
   (0) Exit and don't save
   ->
   ```

3. If there is no record of the previous calibration values, and this is not the first calibration being done, type *4* to access the system information and write down the *Scale Change* and the *Offset Change*. Type *0* to return to the main menu.

4. Type *3* to access the calibration menu. The following text should now be displayed.

   ```
   CALIBRATION - MENU 3
   ID 0
   S/N 1009
   (1) Perform calibration
   (2) Restore the factory calibration
   (3) Perform dirty windows zero offset calibration
   (4) Restore dirty windows factory calibration
   (9) Refresh
   (0) Return to main menu
   ```

5. Type *1* to start the calibration. You will then be asked to confirm that you would like to perform a calibration.

   ```
   Do you want to perform a calibration Y/N?
   ```

6. Type *Y* to start the calibration. *You do not have to press return.* Once you have entered yes at this point, you will not be able to exit until the test is complete. However, power cycling the unit at this point will have no adverse effect on the sensor.

7. Once you have started the tests, you will be asked for the calibrator serial number and calibrator constant with a confirmation at each step giving you the chance to correct typing mistakes.

   If the ambient temperature at which the calibration is being performed is not between 0ºC and 50ºC, adjust the calibrator constant, σ, of the calibrator using the following equation, where *T* is the ambient temperature in degrees Celsius, to get σ_T, the calibrator constant at the current ambient temperature.

$$\sigma_T = \sigma - 0.001(20 - T)\sigma$$

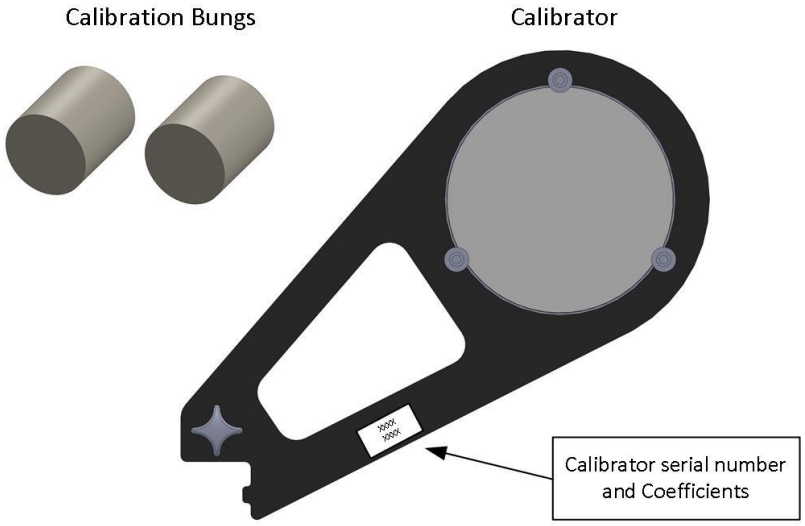


Figure 3. 6498 Calibration Equipment

```
CALIBRATION - MENU 3
Starting calibration.
Input the calibrator serial number ->12345
Is 12345 correct? (Y/N)?
Input the calibrator constant ->10000
Is 10000 correct? (Y/N)?
Place one calibration bung into each hood, then
press any key.
```

8. When you have entered the calibrator information, the sensor will wait for you to place the calibration bungs into the sensor hoods. The inserts are designed to block all light from the outside reaching inside the head. Place one insert into each hood. If either of the inserts is damaged or appears to have any gaps around the edge, please contact All Weather Inc.

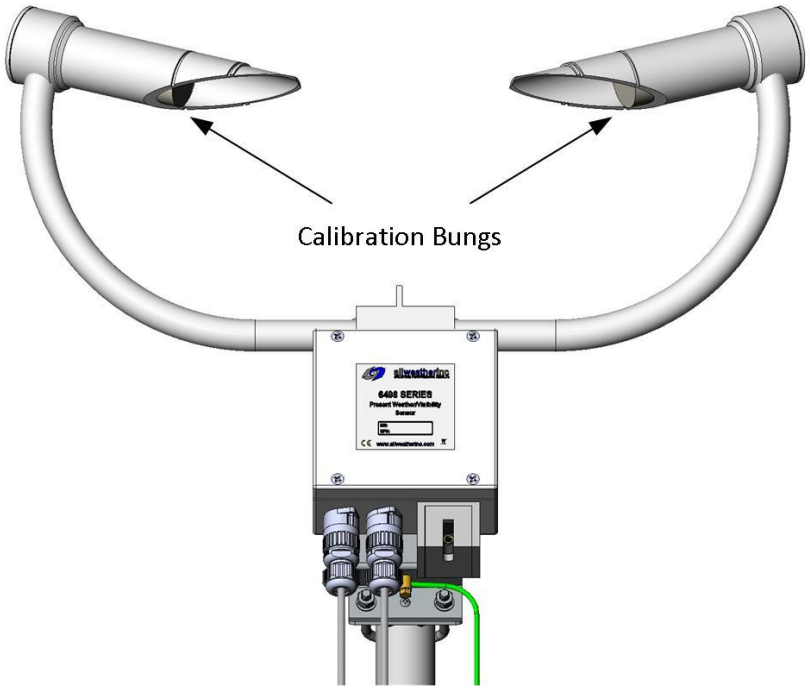


Figure 4. 6498 with the Calibration Bungs installed

9. Press any key once the calibration bungs are in place.

```
Starting dark level calibration.
This test will take approximately two minutes
```

10. This part of the test will take approximately two minutes. Every ten seconds a dot should appear, indicating that the test is progressing as normal. The message below appears once this test has been completed.

```
Dark level test complete. Please remove the bungs.
Now place the calibrator into the sampling volume.
Press any key once this is done.
```

11. Remove the calibration bungs and install the calibrator into the sampling volume by fastening it to the central mounting point as shown in Figure 5.

    Note that this is also a good time to clean the lenses or at least verify they are clean.

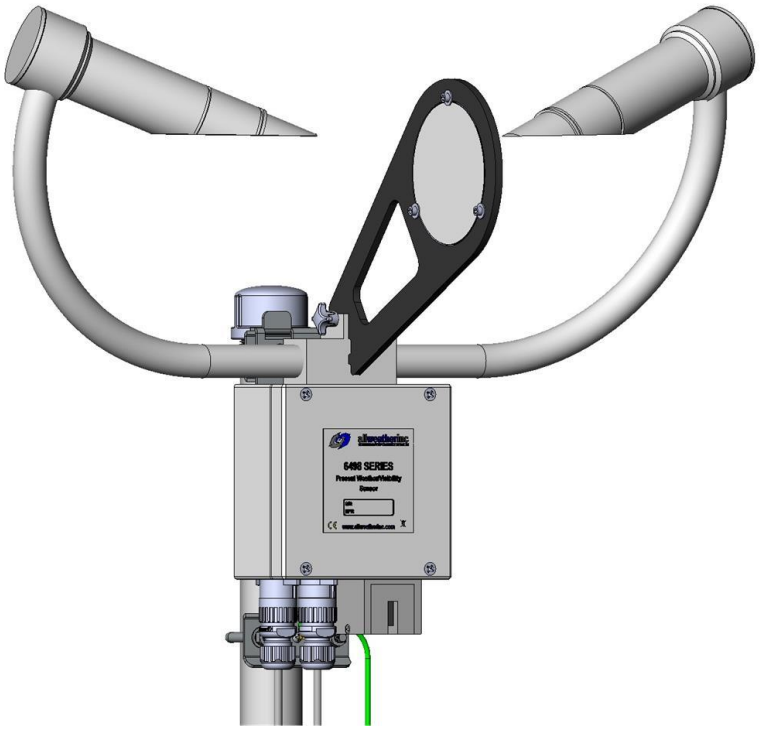


Figure 5. 6498 with the Calibrator Installed

12. Press any key once the calibrator is in place and the lenses are clean.

```
Starting light level calibration.
This test will take approximately two minutes.
```

13. This part of the test will take approximately two minutes. Every ten seconds a dot should appear, indicating that the test is progressing as normal. The message below appears once this test has been completed.

```
Calibration is now complete.
Saving user settings
Press any key to exit.
```

14. Press any key to exit.

15. Once the test has been completed, the new calibration values are saved automatically. Both the factory and the saved calibration values can be viewed from menu item 4 from the main menu once the test is completed.

```
AWI 6498 INFORMATION - MENU 4
 ID 0
 S/N 3051
 OS version: 007648v3
                                  Alarm   Value
- Last visibility reading:       -       63004M
- Overall system status:         0       No faults
.
.
.
- AWI 6498 Calibrator Serial No: -       2000
- AWI 6498 Calibrator Constant:  -       23.7
- Calibration value Fac offset:  -       -0.004
- Calibration value Fac scale:   -       0.02099
- Calibration value Cal offset:  -       -0.004
- Calibration value Cal scale:   -       0.02099
.
.
.
(8) Get debug
(9) Refresh
(0) Return to main menu
->
```

16. View and record the new saved calibration values if needed for analysis or for an inspection record.

17. Remove the calibrator, close the terminal emulation utility, and disconnect the computer. If you had to remove a cover to access the maintenance port, replace the cover.

If a Day/Night sensor is installed, check its operation as follows.

1. During daytime, set the DCP's LCD display to show Day/Night status.

2. Verify that the display shows the sensor is reading "day."

3. Cover the lens with an opaque black bag. Within 5 minutes, the output should switch to the "night" state.

4. Uncover the lens, and verify that the output switches back to the "day" state.

Present Weather Sensor Check

Display the present weather data screen on the DCP display using the * and # keys.

- The present weather field (W___) should not contain any data (two underscores) if there is no precipitation falling. As long as there is no precipitation falling and the present weather field displays anything other than two underscores, report the problem.

- The status fields should all read zeros (S0000) if the sensor has been operating (and not reset by a power interruption) for at least 5 minutes. If the status fields are not all zeros, refer to the ***Model 6498 Present Weather/Visibility Sensor User's Manual*** for an interpretation of the possible problem.

3.4.12.1 Analyzing the Calibration Values

Calibration values are analyzed by comparing them with the values recorded previously or with the factory values if the calibration is being done for the first time.

$$Scale\ Change = \frac{Old\ Scale\ Value - New\ Scale\ Value}{Old\ Scale\ Value} \times 100\%$$

$$Offset\ Change = New\ Offset\ Value - Old\ Offset\ Value$$

Validity

Determine whether the saved calibration values are valid.

1. The calibration is valid if the *Scale Change* is less than 3% and the *Offset Change* is less than 0.05.
2. Record the *Scale Change* and the *Offset Change* and repeat the calibration if either the *Scale Change* or the *Offset Change* is greater than these values.
3. Check the following before repeating the calibration.
    a. Verify the lenses have been cleaned
    b. Perform the Dirty Window Zero Calibration (see Section 8.3 in ***the Model 6498 Present Weather and Visibility Sensor User's Manual***) if this has not been done in the last two years
    c. Verify visibility is > 10 km
    d. Verify that the calibrator constant, σ, has been corrected for temperature if the outside temperature is not between 0ºC and 50ºC
4. Repeat the calibration and check whether the new calibration is valid using the *Scale Change* and the *Offset Change* recorded in Step 2 as the old values in the change equations.
5. Record the *Scale Change* and the *Offset Change* values used to determine validity if needed for an inspection record.

Sensor Ageing

Assess whether the sensor is ageing normally. Calculate the *Scale Change* and the *Offset Change* values by using the values from the previous inspection as the old values in the change equations.

The sensor is ageing normally if the annual *Scale Change* is less than 5% and the *Offset Change* is less than 0.1.

Record the *Scale Change* and the *Offset Change* values used to determine sensor ageing if needed for an inspection record.

- Contact All Weather, Inc, if the ageing calculation *Scale Change* is more than 5% or the *Offset Change* is more than 0.1.
- The *Calibration Offset* (shown as Cal Offset) should be less than 0.3. Contact All Weather, Inc, if the *Calibration Offset* is above 0.3.

3.4.13 Model 8364-E Visibility Sensor

The Visibility Sensor is calibrated during triannual maintenance. This must be performed when there is at least 7 miles visibility with calm wind conditions. The calibration paddle is traceable to Air Force Geophysics Laboratory reference transmissometers. Equivalent extinction coefficient values are printed on each paddle.

1. If the sun is shining directly or is being reflected into the emitters or detectors, note the original orientation of the Visibility Sensor, then loosen the crossmember mounting bolt and rotate the entire head assembly so that no direct or reflected sun shines into the emitters or detectors.

2. Press the # key on the DCP keypad repeatedly until the 8364-E calibration screen appears.

   Note: If more than a few minutes have elapsed since the maintenance switch was originally pressed, it may be necessary to press it again to enable access to the visibility calibration screens.

   Cal 8364E Vis Sensor
   1 to Cont or # to Exit

   Figure 6. Visibility Calibration Screen

3. Enter the Cal I.D. # shown on the calibration paddle label.

4. A routine will be executed by the visibility controller to ensure proper operation prior to calibration measurements. You will be prompted to perform routine maintenance, such as removal of obstructions in the optical paths and cleaning of the sensor windows, during this routine. While you are performing the requested maintenance, the sensor will operate alternately in both modes to keep the optical emitters at thermal equilibrium. When you press a key to continue, as prompted, the controller may take up to one minute to respond. The sensor will then begin its calibration measurements.

5. The initial measurement takes five minutes. When the five minute interval is complete, you will be prompted to insert the calibration paddle.

6. Insert the calibration paddle. Hit the # key to continue.

7. After a second five minute measurement interval, you will be prompted to remove the calibration paddle and block the emitters (“COVER EMS”).

8. Remove the calibration paddle at this point and insert a piece of black foam over each emitter opening so that no emitted radiation will reach the detectors. Press the # key to continue.

   Note: If the emitters cannot be completely covered, the calibration procedure will not be able to reliably get within the required 3% accuracy. If this happens, the emitters may be disconnected at the controller instead of being covered. The emitters should be left disconnected until after the test is complete, at which time the Visibility Sensor should be

turned off, the emitters reconnected, and the Visibility Sensor turned back on. It is safe to disconnect the emitters with power applied.

9. Following a further set of measurements, a new set of calibration coefficients are generated for the sensor. The new coefficients are stored in a protected EEPROM. This calibration method requires no fine adjustment of analog circuitry, nor opening of the emitter or detector heads.

10. Upon completion of the measurement cycle, the display will show the old and new calibration values. You will be given the option to accept or reject the new value. Press the # key to accept it. The value should only be rejected if the technician believes the value is bad due to a problem during calibration (the foam block falls from the emitter, for example).

11. If the difference between the old and new values is more than 3%, you must repeat the calibration process until the difference is less than 3%. In normal operation, when the sensor is calibrated on a regular basis (every 3–4 months), the calibration difference will rarely exceed 3%. If a long period has elapsed since the last calibration, the difference may exceed 3%. This is normal.

12. Record the old and new calibration values in an ongoing log for future reference.

13. Once the calibration value has been accepted, the visibility controller will return to normal measurement mode using the newly calculated calibration values.

14. If the calibration procedure is not followed correctly or there is a fault with the sensor, the calibration process will abort and the Visibility Sensor will return to normal operation. If this should happen, follow the troubleshooting procedures in the ***Model 8364-E User's Manual*** to isolate the problem.

15. Once the Visibility Sensor has been operating for 10 minutes, verify there are no improper status errors reported at the DCP.

16. Verify that the entire head assembly and crossarm are back to the original position noted in Step 1, and then tighten the crossmember mounting bolt in the base of the crossmember so that it does not rotate.

If a Day/Night sensor is installed, check its operation as follows.

1. During daytime, set the DCP's LCD display to show Day/Night status.

2. Verify that the display shows the sensor is reading "day."

3. Cover the lens with a black bag. Within 3–5 minutes, the output should switch to the "night" state.

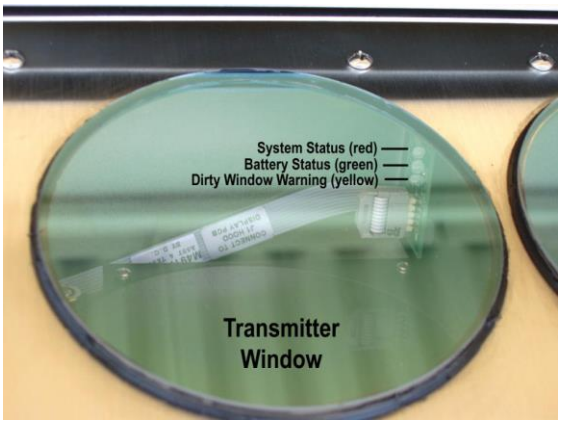
4. Uncover the lens, and verify that the output switches back to the "day" state.

3.4.14 Model 8339 Ceilometer

1. Clear the Heater/Blower air intake and output nozzle of any impediments, such as spider webs, leaves, or other matter.

WARNING **The Model 8339 Ceilometer uses a Class I laser configuration, which is eye-safe in all conditions except when viewed through optical instrumentation, such as binoculars or any other condensers. Never view the optical radiation through such devices or serious eye damage may result.**

2. Check the status LEDs visible from outside the Ceilometer through the transmitter window.



- The red System Status LED alternates between on and fast blinking when the Ceilometer is operating normally.
- The green Battery Status LED is on when the DC power (battery) is good.
- The yellow Dirty Window LED is off when the window is clean.

3. Replace the desiccant package at each triannual maintenance visit. If the enclosure door is opened during maintenance or service at any time, replace the desiccant package (M028179-00) before closing the door for the final time. To preserve the desiccant material, the package is sealed within a plastic bag during shipment. Remove and discard the plastic bag.

3.4.15 Model 6490 Present Weather Sensor

1. Check the strength of the carrier signal by displaying the present weather status screen on the DCP display (press the * or # keys until the screen below is displayed).

XnnnLnnnKnnnHnnnTnnn

2. The carrier raw data field (Xnnn) should be in the range of 405–420. If it needs to be adjusted, refer to the Model 6490 User's Manual.

The remaining tests should be performed when there is no precipitation and after the sensor has stabilized for at least 30 minutes.

3. The following values should be observed on the status screen.

   - Lnnn - The one-minute low channel reading should read in the range of -30 to 50.
   - Knnn - The one-minute particle channel reading should read in the range of 0 to 150.
   - Hnnn - The one-minute high channel reading should read in the range of 40 to 120.
   - Tnnn - Temperature should be representative of the ambient temperature, with a tolerance of ±5°C. The temperature probe is thermally connected to the electronics enclosure, so it generally reads warmer than the ambient temperature because of internal heating of the enclosure.

   If any of the values is outside the allowed range, report the problem.

4. Display the present weather data screen on the DCP display using the * and # keys.

   - The present weather field (W___) should not contain any data (two underscores) if there is no precipitation falling. As long as there is no precipitation falling and the present weather field displays anything other than two underscores, report the problem.
   - The status fields should all read zeros (S0000) if the sensor has been operating (and not reset by a power interruption) for at least 5 minutes. If the status fields are not all zeros, refer to the ***Model 6490 User's Manual*** for an interpretation of the possible problem.

3.4.16 Model 6500/6500-DC Thunderstorm/Lightning Sensor

1. Check the sealant around the antenna base and mounting bolts, and reapply as necessary (use RTV 162).
2. Check all hardware for corrosion and ensure that all bolts and connectors are tight.
3. Ensure that the cable connections are sound between the sensor and DCP.

3.4.17 Model 6495 Freezing Rain Sensor

No additional procedures.

3.4.18 Central Data Processor (CDP)

No additional procedures.

Chapter 4

4. Annual System Revalidation

Annual system revalidation is carried out yearly. These procedures are also required at commissioning and after major repair work— replacement of a sensor or any part of a sensor, or adjustment of any part of the sensor circuit (e.g., adjusting the carrier level on the present weather sensor). Follow the procedures below, take any required corrective action, and record the results on the *Annual Technical Performance Record*.

Only an FAA authorized technician of record for the site may perform the annual system revalidation procedures.

4.1 Annual Revalidation Test Equipment

The following list gives the test equipment required during annual revalidation of the AWOS. This is in addition to that required for monthly and triannual procedures.

Description	Part/Model No.	Specifications
Wind Direction Calibrator	Model 1249-A	For Model 2020 vane
Wind Speed Calibrator	Model 1231	for Model 2030 anemometer
Integrity Check Chamber	M105548-00	for 2040 Ultrasonic Wind Sensor
Radio Test Equipment:		
Power Meter	Bird Watt Meter Model 43 or equivalent	
Forward/Reflected Power Tester	Bird Watt Meter Model 43 w/ 10C (VHF) and 5D (UHF) elements or equivalent	
Frequency Meter	Aeroflex 3500 or equivalent	
Modulation Meter	Aeroflex 3500 or equivalent	
Deviation Meter	Aeroflex 3500 or equivalent	

4.2 Annual Revalidation Tools and Supplies

The following list gives the tools and supplies required during annual revalidation of the AWOS. This is in addition to that required for monthly and triannual procedures.

Description	Part/Model No.	Specifications
Allen Wrench	n/a	1/16"
Scientific Calculator or Software	Hewlett Packard HP-35, Texas Instruments TI-30 or equivalent; Microsoft Calculator, Excel or equivalent	Basic scientific calculator or software capable of performing square-roots and exponent math
Non-corrosive Lubricant	Loctite Silver Grade anti-seize compound or equivalent	
Corrosion Protection Coating	M402010-00 corrosion block spray or equivalent	

4.3 Perform Monthly and Triannual Procedures

As part of annual maintenance, perform the monthly and triannual maintenance procedures detailed in the previous chapters. Only those procedures unique to annual maintenance are provided in this chapter.

4.4 Specific Annual Maintenance

4.4.1 Model 1190 Data Collection Platform

1. Press the maintenance switch (SW3).

4.4.2 Model 1192 Data Collection Platform

No additional procedures.

4.4.3 Model 7150/7190 or PTB330 Dual Digital Barometer

1. Using the barometric pressure value obtained with the reference pressure sensor during triannual maintenance, calculate the Altimeter Setting using the formula below:

$$Alt.\,Setting\ \ (in\ Hg) = \left(BP^{\alpha} + SE \cdot 1.313 \times 10^{-5}\right)^{5.25486}$$

where:

$\alpha = 0.1903$

$SE = Sensor\ elevation\ above\ sea\ level\ in\ \ feet$

$BP = Barometric\ \ pressure\ in\ in\ \ Hg$

2. Record the calculated altimeter setting and that reported by the AWOS.

3. If the difference between the calculated altimeter setting and that reported by the AWOS is more than 0.02 in Hg, please advise AWI Customer Service at 1(916)928-1000.

4.4.4 Model 2020 Wind Direction Sensor

1. Remove the sensor from the mounting bracket by loosening the clamp screw located at the base of the unit. Leave the cable connected and, if present, also leave the heater cable connected. These cables will ensure that, if the sensor is dropped, the device will not fall.

2. Clean the drain hole on the bottom of the vane body to ensure that debris does not prevent water from draining out of the sensor.

3. Spread non-corrosive lubricant on the clamp screw and reinstall the sensor. The vane mounting hole should be aligned with the pin on the base of the mounting bracket.

4.4.4.1 Alignment

The Model 1249-A Wind Direction Calibrator is required when aligning the sensor on both the stationary or foldover tower types.

1. Locate the direction benchmark determined in the initial site survey. It should be approximately 100 to 150 feet from the tower in one of the four cardinal points referenced to true north. Align the vane using the procedure below for either the stationary or foldover tower. When the vane is installed on a foldover tower, it will be necessary to raise and lower the tower several times during alignment.

2. Separate the two halves of the Model 1249-A Wind Direction Calibrator by pulling the two discs apart.

3. Slip the bottom half of the calibrator (containing the knurled knob) onto the stationary portion of the vane's housing near the rotating cap. Loosen the knob, if necessary, to do this; then tighten the knob until the unit is secured.

4. Hold the vane's tail shaft and place the top half of the calibrator onto the shaft and sensor cap. Notice that the top half is recessed to accommodate the counter weight, and that there is a groove for the tail shaft and a cutout for the top of the vane cap.

5. Rotate the top plate until the four pins are aligned with the holes in the bottom plate. The bottom half of the calibrator may require adjusting if it is too high or too low on the vane housing. Loosen the knurled knob and position the bottom half as needed.

   Note that the next steps for aligning a sensor require two people when the sensor is on a stationary tower—one person on the ground to observe the DCP's LCD display, and the other on the tower.

6. While observing the LCD display inside the DCP, loosen the knurled knob slightly and rotate the entire calibration unit (along with the sensor tail) until the DCP indicates 180°. (If the benchmark is located at East or West, rather than North or South, rotate the vane until the display reads 90 or 270.) Securely tighten the knurled knob to hold the vane in this position.

7. With the sensor locked in position, stand at the direction benchmark and verify that the tail of the vane is aligned with the vane body. If the vane is not aligned, loosen the mounting screw located at the bottom of the Unistrut, align the vane (and vane body) with the benchmark, and tighten the mounting bolt.

8. Lift the top half of the calibrator and rotate it and the vane tail 90° to the next position. Verify that the DCP display agrees with the new direction. Continue rotating the vane to each of the remaining cardinal directions and verify that the vane position and DCP display agree.

   If the DCP display does not match the vane position, replace the Model 2020 Wind Direction Sensor.

9. Remove the calibrator.

10. Rotate the vane slowly through a full 360°, noting the reading on the LCD display (if on a foldover tower, the tower can be in the lowered position during this procedure). As the vane is turned, the displayed values should change smoothly, with no sudden jumps or dropouts. Note, however, that there is a 10° deadband at North where the DCP reading shows a steady value of 359°–001° in the 355°–005° deadband. This behavior is normal near North, but in any other direction indicates a potentiometer failure. If the sensor fails any part of this test, report the problem.

11. Verify that the vane's movement is free and smooth. If it is not, replace the bearings. The shaft should turn freely at all times.

12. Inspect all mounting hardware and cable assemblies for wear and damage. Replace as necessary.

13. Apply corrosion protection coating to the connector shell after the connector is attached and in place. Use a non-corrosive lubricant on all screws and fasteners whenever disassembly is required. The use of these lubricants will make future servicing easier.

14. If heaters are installed, verify they are working by holding your hand close to the heater. The heater is always on, and should be warm.

4.4.5 Model 2030 Wind Speed Sensor

1. Remove the anemometer cup assembly by loosening the two set screws on the cup assembly collar using a 1/16" Allen wrench.

2. Connect a Model 1231 run-up motor to the anemometer shaft and power the motor on. The DCP display should read between 79 and 81 knots.

3. Spin the shaft as fast as you can, using your thumb and middle finger. If the bearings are good, the shaft will spin for a minimum of 30 seconds. If the bearings feel rough or fail to spin for the 30-seconds, replace the bearings as described in the ***Model 2030 Sensor User's Manual***.

4. Replace the cup assembly.

5. Inspect the anemometer cups for damage, and replace if necessary.

6. Remove the sensor from the mounting bracket by loosening the clamp screw located at the base of the unit. Leave the sensor cable and, if present, the heater cable connected. These cables will ensure that, if the sensor is dropped, the device will not fall.

7. Clean the drain hole on the bottom of the sensor to ensure that debris does not prevent water from draining out of the sensor.

8. Use an anti-seize thread compound on the clamp screw and reinstall the sensor. The sensor mounting hole should be aligned with the pin on the base of the mounting bracket.

9. Inspect all mounting hardware and cable assemblies for wear and damage. Replace as necessary.

10. Apply corrosion protection coating to the connector shell with the connector attached and in place. Use a non-corrosive lubricant such as bee wax on all screws and fasteners. The use of these lubricants will make future servicing easier.

11. If heaters are installed, verify they are working by holding your hand close to the heater. The heater is always on, and should be warm.

4.4.6 Model 2040 Ultrasonic Wind Sensor

During annual maintenance, perform a Field Zero Wind Check as described below. The Zero Wind Chamber consists of a split shell that opens into two halves placed around the wind sensor.

1. Insert the flat piece that is provided with the Zero Wind Chamber into one of the two Wind Chamber halves are that are placed around the Model 2040 wind sensor.
2. Place two halves of the Zero Wind Chamber around the Model 2040 wind sensor. Secure the chamber is in place with the strips provided.
3. View the wind speed value displayed at the DCP. The value must not exceed 0 knots. If the wind speed displayed exceeds 0 knots, contact All Weather, Inc.
4. The sensor's alignment mark (the blue/white divide on the serial number label) must be aligned with the direction benchmark. Visually check the sensor's alignment by either
   - sighting along the sensor arms from the tower and verifying that the arms align with the benchmark, or
   - have an assistant stand at the marker and check that the arms align with the benchmark.
5. If the alignment needs to be adjusted, loosen the sensor mount and turn the entire sensor until the arms are aligned exactly with the benchmark, then tighten the mount.

4.4.7 Model 5190 Temperature/Relative Humidity Sensor

No additional procedures.

4.4.8 Model 8190 MARS

No additional procedures.

4.4.9 Model 6011/6012 Rain Gauge

1. (Model 6011) Remove the outer cover by removing two 1/4" bolts.

   (Model 6012) Remove the collection funnel thumbscrews (Model 6022).
2. Check the sensor level by viewing the bubble level provided on the base. Adjust if necessary to level it by adding washers under the feet.
3. Inspect the interior of the rain gauge for physical lightning damage.
4. Remove any dirt or debris that may be present inside the sensor.
5. Note the precipitation quantity on the DCP's LCD display. Toggle the bucket assembly one cycle (2 tips). Again read the precipitation quantity on the LCD display. It must be 2 counts greater than before.

   If this count incrementation does not happen as described, examine the tipping bucket assembly, the counter, and the sensor cable connections between the sensor and the DCP.
6. Replace the outer cover or collection funnel, and the bolts or thumbscrews. Coat the bolts or thumbscrews with anti-seize compound. Replace the screen.

4.4.10 Model 6021/6022 Heated Rain and Snow Gauge

1. (Model 6021) Remove the outer cover by removing two 1/4" bolts.

   (Model 6022) Remove the collection funnel thumbscrews (Model 6022).

2. (Model 6021) Unplug the 3-conductor Molex connector (P1) from the power distribution housing (J1) in order to completely separate the outer cover from the base.
3. Check the sensor level by viewing the bubble level provided on the base. Adjust if necessary to level it by adding washers under the feet.
4. Inspect the interior of the rain gauge for physical lightning damage.
5. Remove any dirt or debris that may be present inside the sensor.
6. (Model 6021) Place your hand close to the outlet orifices to detect whether heat is emanating from the two orifice heaters. If the outlets are warm, then the heater system is powered up. If the ambient temperature is below 40°F, feel the rain gauge cover to check operation of the heaters. If they are working, the outer cover should be warm to the touch.

   (Model 6022) If the ambient temperature is below 40°F, feel the rain gauge funnel and bottom to check the operation of the heaters. If they are working, the outer cover should be warm to the touch.

7. Note the precipitation quantity on the DCP's LCD display. Toggle the bucket assembly one cycle (2 tips). Again read the precipitation quantity on the LCD display. It must be 2 counts greater than before.

   If this count incrementation does not happen as described, examine the tipping bucket assembly, the counter, and the sensor cable connections between the sensor and the DCP.

8. (Model 6021) Reconnect the 3-conductor Molex connector (P1) to the power distribution housing (J1).
9. Replace the outer cover or collection funnel, and the bolts or thumbscrews. Coat the bolts or thumbscrews with anti-seize compound. Replace the screen.

4.4.11 Model 6498-P, 6498-V, 6498-PV, 6498-DC-P, 6498-DC-V, 6498-DC-PV Present Weather and Visibility Sensor

No additional procedures.

4.4.12 Model 8364-E Visibility Sensor

No additional procedures.

4.4.13 Model 8339 Ceilometer

No additional procedures.

4.4.14 Model 6490 Present Weather Sensor

No additional procedures.

4.4.15 Model 6500/6500-DC Thunderstorm/Lightning Sensor

No additional procedures.

4.4.16 Model 6495 Freezing Rain Sensor

No additional procedures.

4.4.17 Radio Annual Revalidation

When VHF antenna cables are longer than 50 feet, tests must be repeated at the antenna end of the cable. UHF radio tests at the radio end are sufficient regardless of the length of the antenna cable.

4.4.17.1 Model 1792 or 1793 Ground-to-Air VHF Radio

Power Level

1. Remove AC power from the radio by turning the power switch on the radio's front panel off.
2. Connect the power meter to the connector on the radio and terminate with the antenna or a dummy load.
3. Indicate the VHF radio output power level on the Annual Technical Performance Record.

VSWR (at transmitter)

If RF cables must be disconnected when switching between power level and VSWR tests, turn the radio off using the switch on the radio's front panel.

1. Insert a VSWR or forward/reflected power tester.
2. Measure the VSWR and enter the value on the Annual Technical Performance Record. If you measure forward and reflected power, calculate the VSWR using the following equation.

$$VSWR = \frac{1+\sqrt{\frac{reflected\,power}{forward\,power}}}{1-\sqrt{\frac{reflected\,power}{forward\,power}}}$$

Sample Calculation:
Reflected power = 0.02 W
Forward power = 2.5 W

$$VSWR = \frac{1+\sqrt{\frac{reflected\_power}{forward\_power}}}{1-\sqrt{\frac{reflected\_power}{forward\_power}}} = \frac{1+\sqrt{\frac{0.02}{2.5}}}{1-\sqrt{\frac{0.02}{2.5}}} = \frac{1+\sqrt{0.008}}{1-\sqrt{0.008}} = \frac{1+0.0894}{1-0.0894} = \frac{1.0894}{0.9106} = 1.1964$$

Frequency

CAUTION

Use isolators or attenuators as needed to protect the test equipment.

If RF cables must be disconnected when switching between frequency and modulation tests, turn the radio off using the switch on the radio's front panel.

1. Log the assigned frequency on the Annual Technical Performance Record.
2. Insert a frequency meter.
3. The radio transmits for approximately 30 seconds, followed by an off time of five seconds. While the radio is transmitting, measure the frequency.
4. Record the frequency on the Annual Technical Performance Record.

Modulation

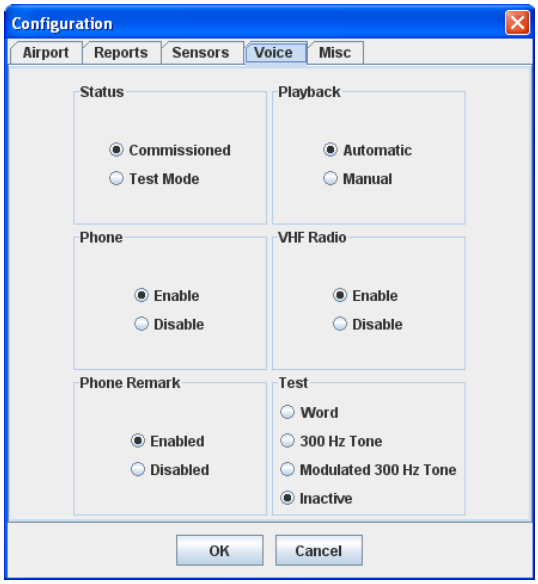
CAUTION

Use isolators or attenuators as needed to protect the test equipment.

If RF cables must be disconnected when switching between frequency and modulation tests, turn the radio off using the switch on the radio's front panel.

1. Log in as an administrator on the CDP display and insert a AWOS Security Key CD. You will be able to access the menus once the optical drive light stops blinking, indicating that the AWOS Security Key CD has been read.
2. Connect a modulation meter to the VHF radio. Set the modulation meter to the instantaneous mode.

3. Access the *Edit* > *Configuration* > *Voice* tab on the CDP display and click the ***300 Hz tone*** option in the **Test** panel.



4. Use the modulation adjustment potentiometer on the VHF radio to adjust the modulation depth to 90%.

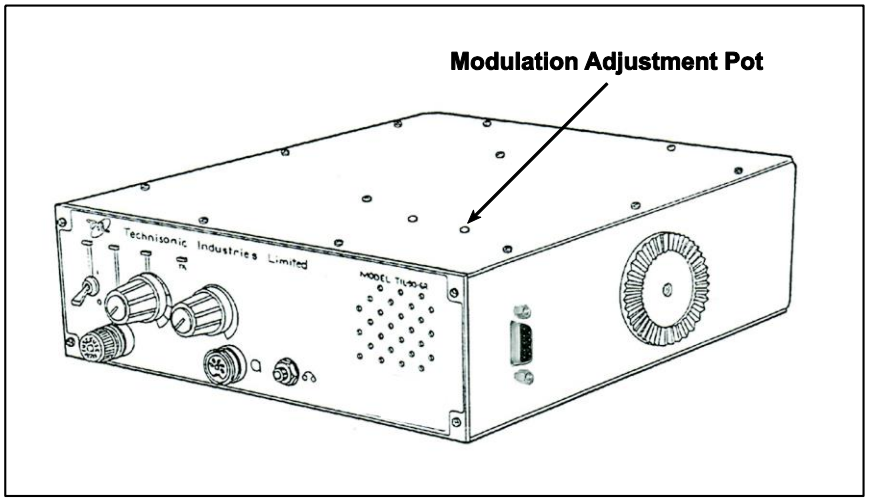


Figure 7. 1792 VHF Radio Modulation Adjustment Potentiometer

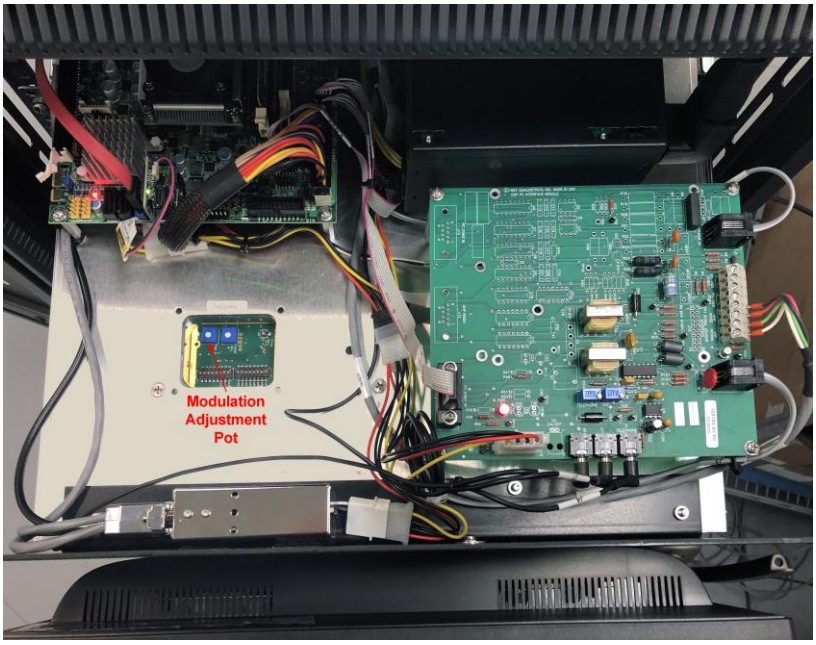


Figure 8. 1793 VHF Radio Modulation Adjustment Potentiometer

5. Use the VHF adjustment potentiometer on the CDP peripheral interface board to lower the signal level until the modulation decreases to 80%.

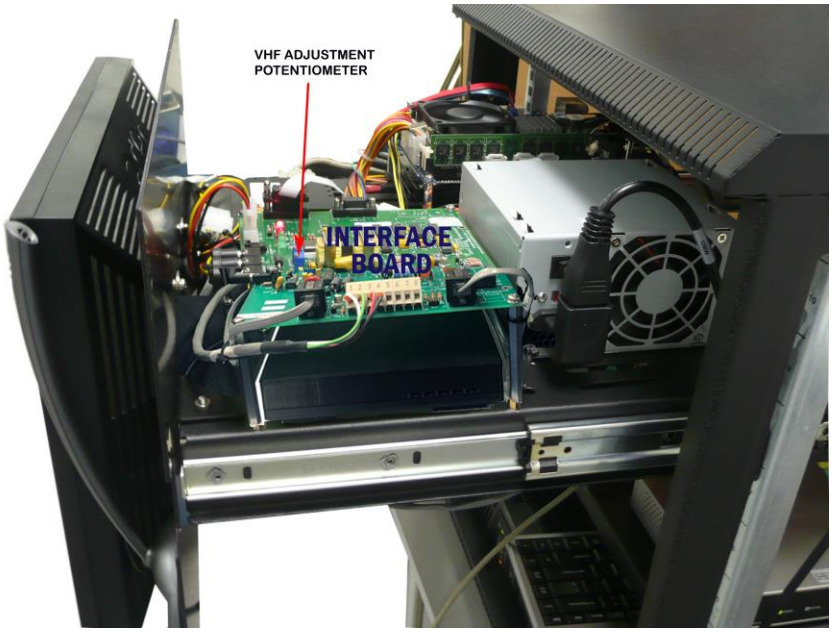


Figure 9. VHF Adjustment Potentiometer on CDP Peripheral Interface Board

6. Use the modulation adjustment potentiometer on the VHF radio to adjust the modulation depth to 60%.

7. Set the modulation meter to the "peak hold" mode.

8. Access the *Edit > Configuration > Voice* tab on the CDP display and click the ***Modulated 300 Hz tone*** option in the **Test** panel.

9. Reset the modulation meter and wait until the modulated tone stops.

10. Verify that the peak modulation reading does not exceed 95%. If it does, adjust the modulation adjustment potentiometer on the VHF radio and recheck the peak modulation reading.

11. Access the *Edit > Configuration > Voice* tab on the CDP display and click the ***Word*** option in the **Test** panel.

12. Reset the modulation meter and wait until the words stop. Verify that the peak modulation reading does not exceed 95%. If it does, adjust the modulation adjustment potentiometer on the VHF radio and recheck the peak modulation reading.

13. Enter the final modulation meter reading on the Annual Technical Performance Record.

14. Turn the radio off using the front panel switch. Disconnect the test equipment and cables, and reconnect the antenna. Turn the radio on.

15. Remove the CD Key from the CDP optical drive.

4.4.17.2 Model 20980-A or 20981 UHF Data Link Radio

Perform the following procedures on both the DCP and CDP UHF radios.

Power Level

1. Remove power from the UHF radio by disconnecting the DB9 connector.
2. Connect a power meter to the radio connector and terminate with the antenna or a dummy load.
3. Reconnect the DB9 connector to restore power to the UHF radio.
4. Measure the forward power on the power meter and record on the Annual Technical Performance Record.

VSWR (at transmitter)

If RF cables must be disconnected when switching between power level and VSWR tests, remove power from the radio by disconnecting the DB9 connector.

1. Insert a VSWR or forward/reflected power tester.
2. Measure the VSWR and enter the value on the Annual Technical Performance Record. If you measure forward and reflected power, calculate the VSWR using the following equation.

$$VSWR = \frac{1+\sqrt{\frac{reflected\ power}{forward\ power}}}{1-\sqrt{\frac{reflected\ power}{forward\ power}}}$$

Sample Calculation:
Reflected power = 0.02 W
Forward power = 1 W

$$VSWR = \frac{1+\sqrt{\frac{reflected\_power}{forward\_power}}}{1-\sqrt{\frac{reflected\_power}{forward\_power}}} = \frac{1+\sqrt{\frac{0.02}{1}}}{1-\sqrt{\frac{0.02}{1}}} = \frac{1+\sqrt{0.02}}{1-\sqrt{0.02}} = \frac{1+0.1414}{1-0.1414} = \frac{1.1414}{0.8586} = 1.3293$$

Frequency

CAUTION

Use isolators or attenuators as needed to protect the test equipment.

If RF cables must be disconnected when switching between VSWR and frequency tests, remove power from the radio by disconnecting the DB9 connector.

1. Log the assigned frequency on the Annual Technical Performance Record.
2. Insert a frequency meter.
3. Measure and log the frequency on the Annual Technical Performance Record.

Deviation

CAUTION

Use isolators or attenuators as needed to protect the test equipment.

If RF cables must be disconnected when switching between VSWR and frequency tests, remove power from the radio by disconnecting the DB9 connector.

1. Insert a deviation meter.
2. Enter the meter reading on the Annual Technical Performance Record.
3. Remove AC power from the radio, disconnect the test equipment and cables, reconnect the antenna, and restore AC power.

4.5 Central Data Processor (CDP)

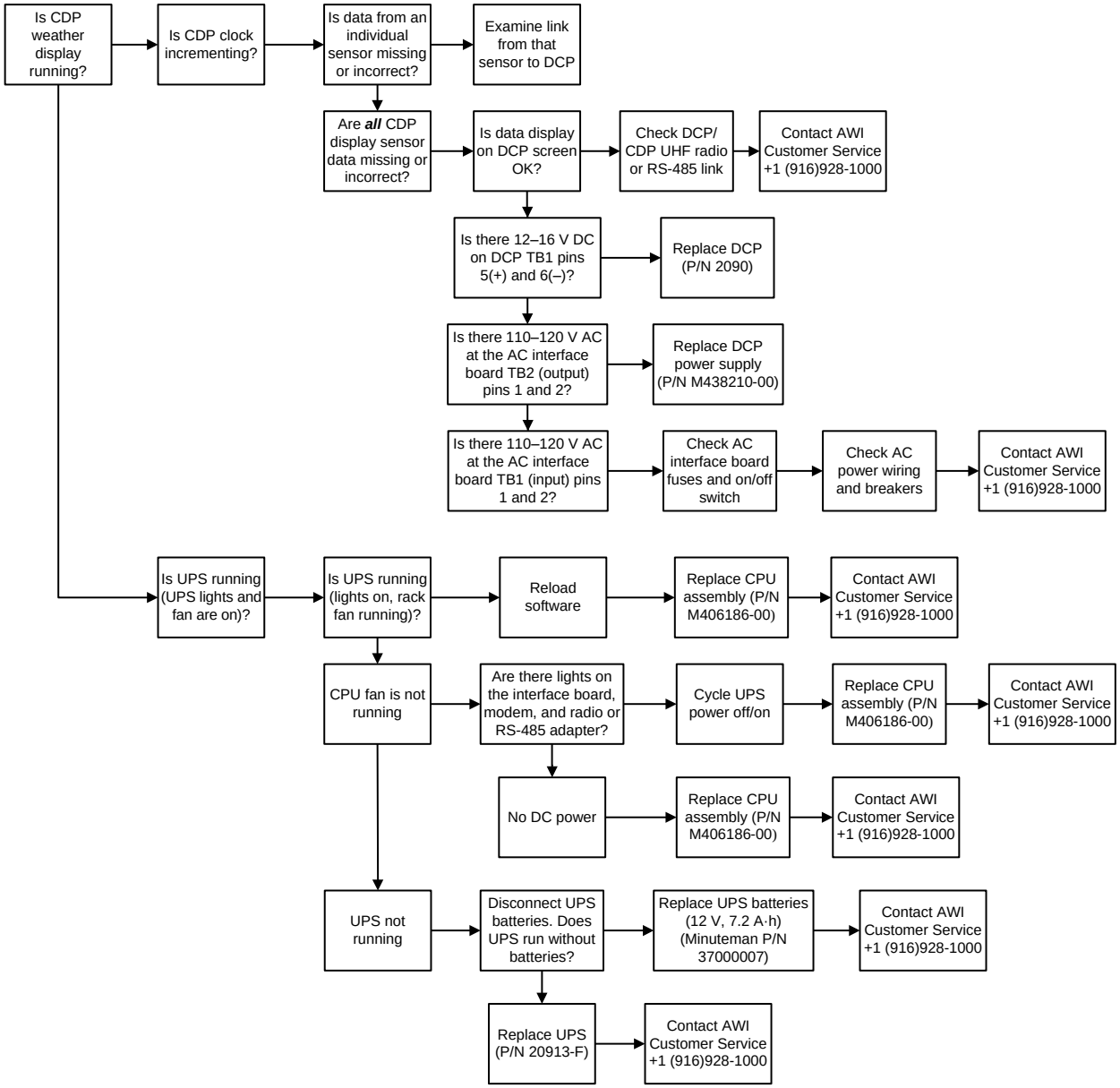
1. Verify that no active alarms are present.
2. If active alarms are present, delete the alarms (after performing all annual procedures) and verify that the alarms do not recur. If alarms persist, report the problem to the Airport Manager.

Chapter 5

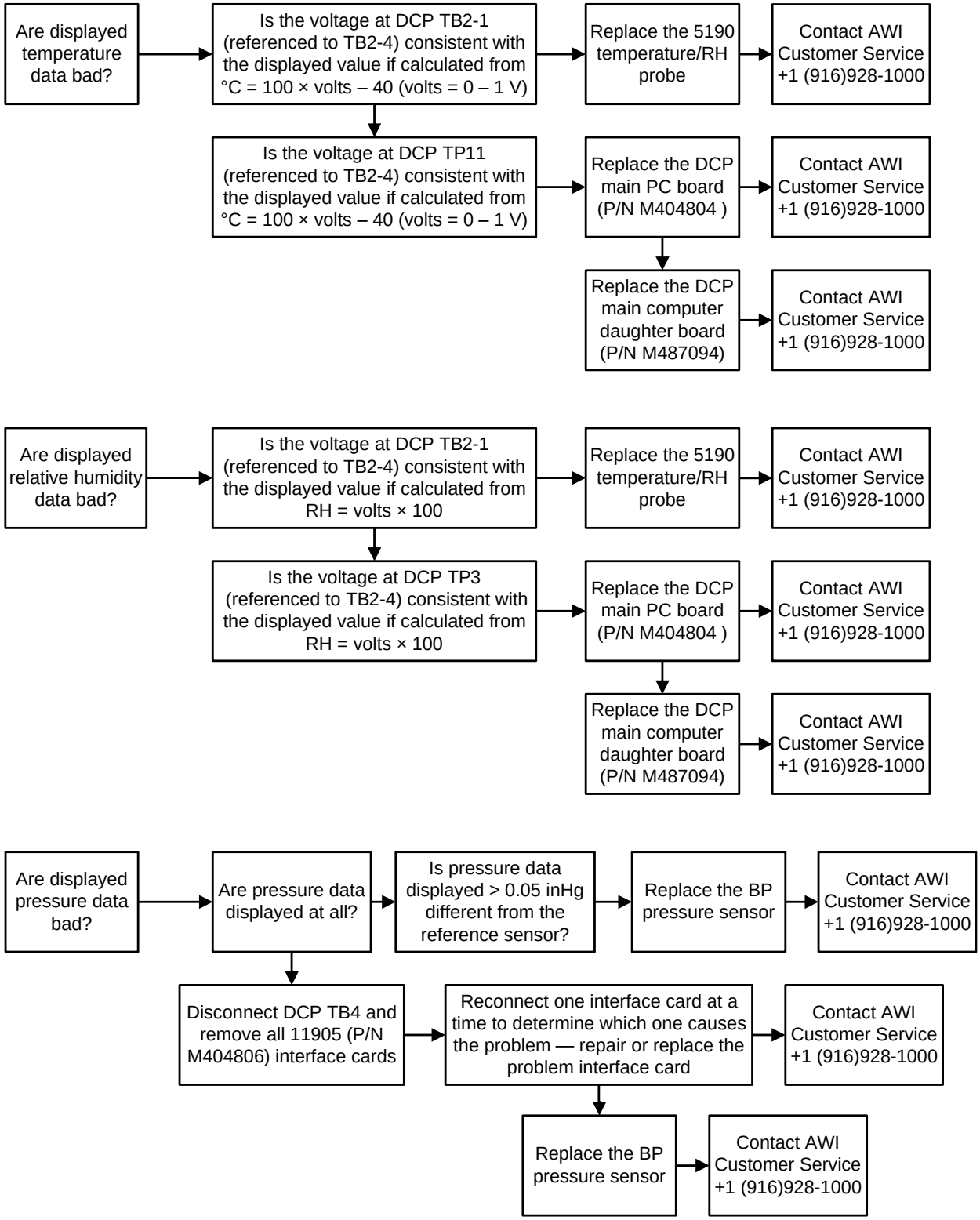
5. Troubleshooting Guide

The following pages provide troubleshooting steps for the various AWOS 3000 sensors and major system components.

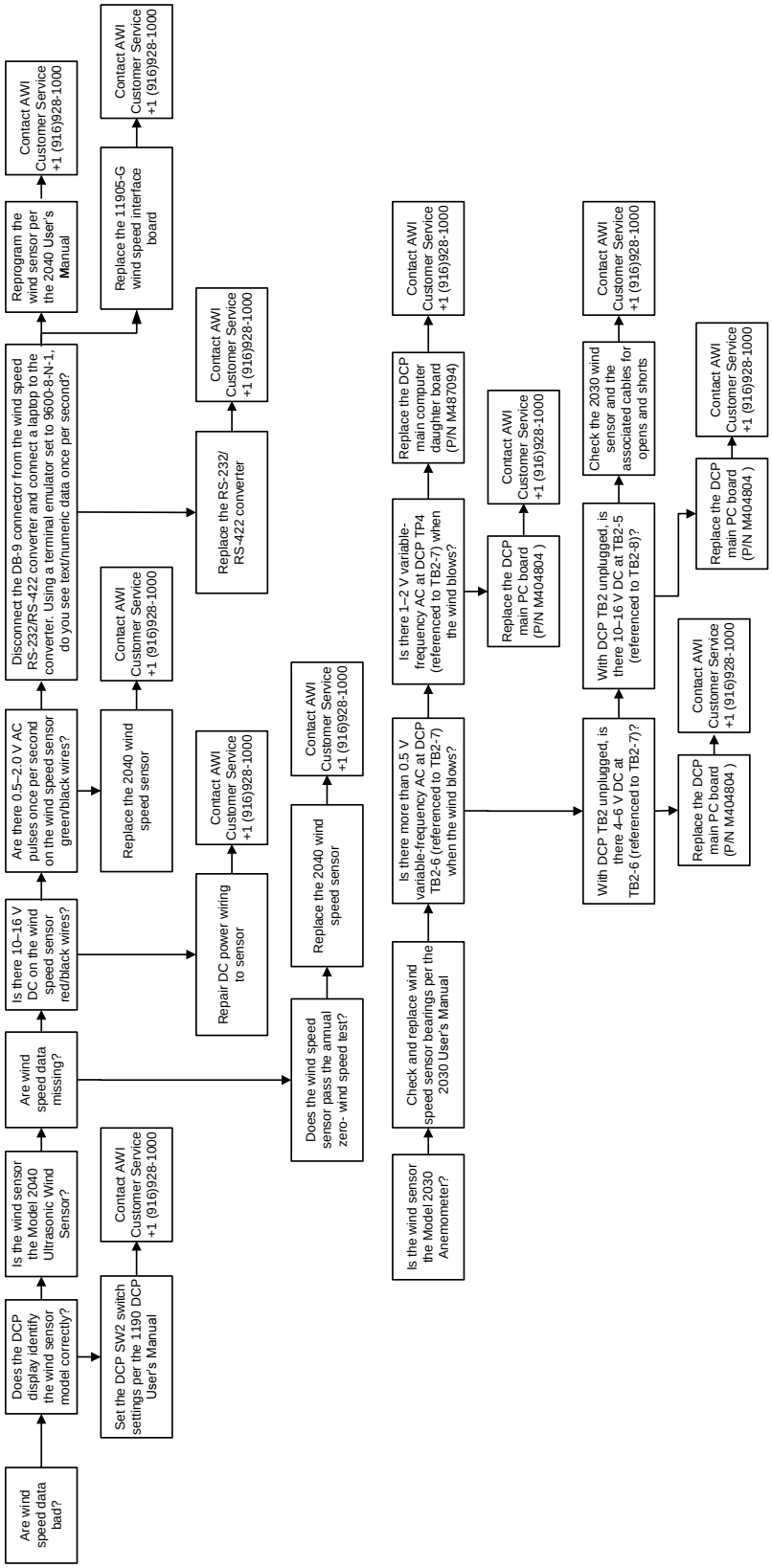
5.1 Central Data Processor (CDP)



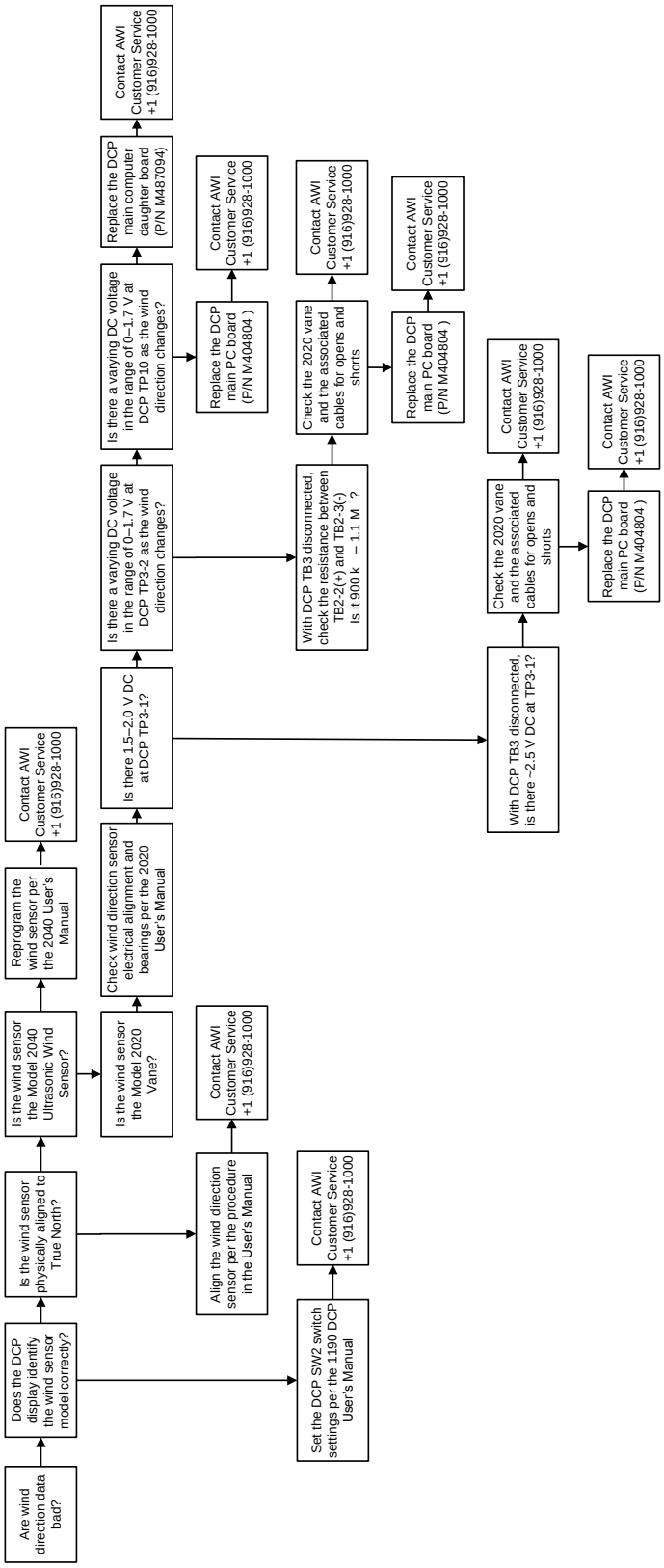
5.2 Temperature/Relative Humidity/Barometric Pressure Sensors



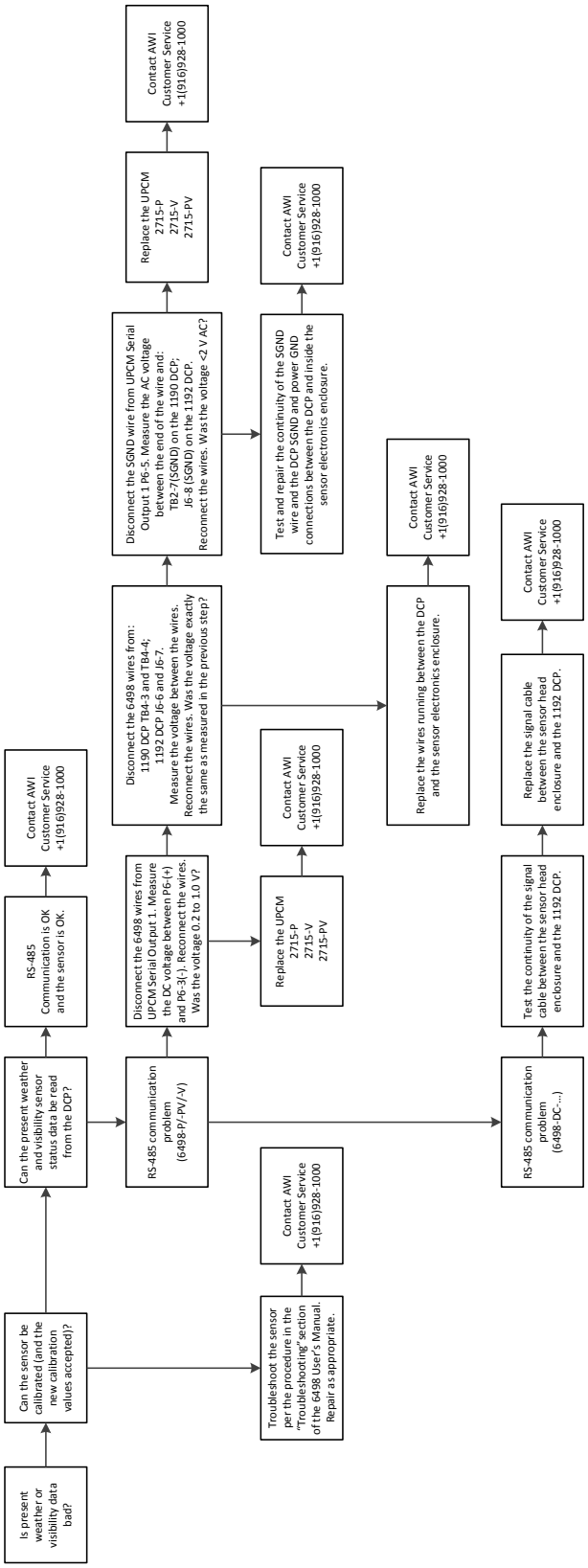
5.3 Wind Speed Sensors



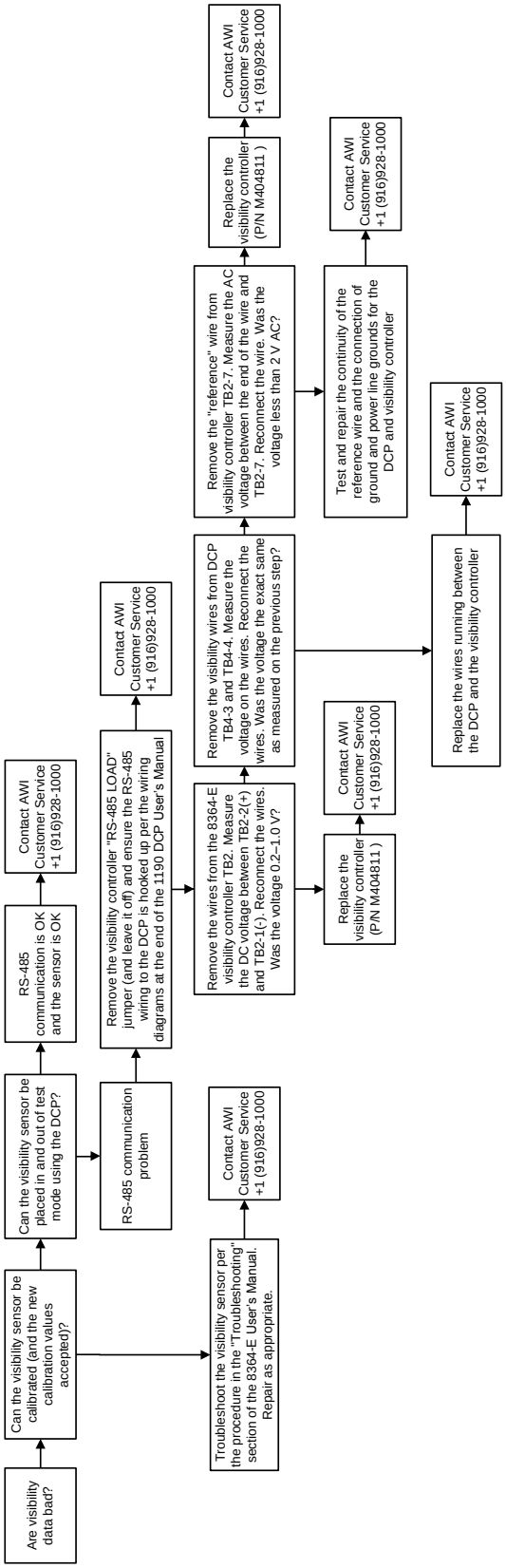
5.4 Wind Direction Sensors



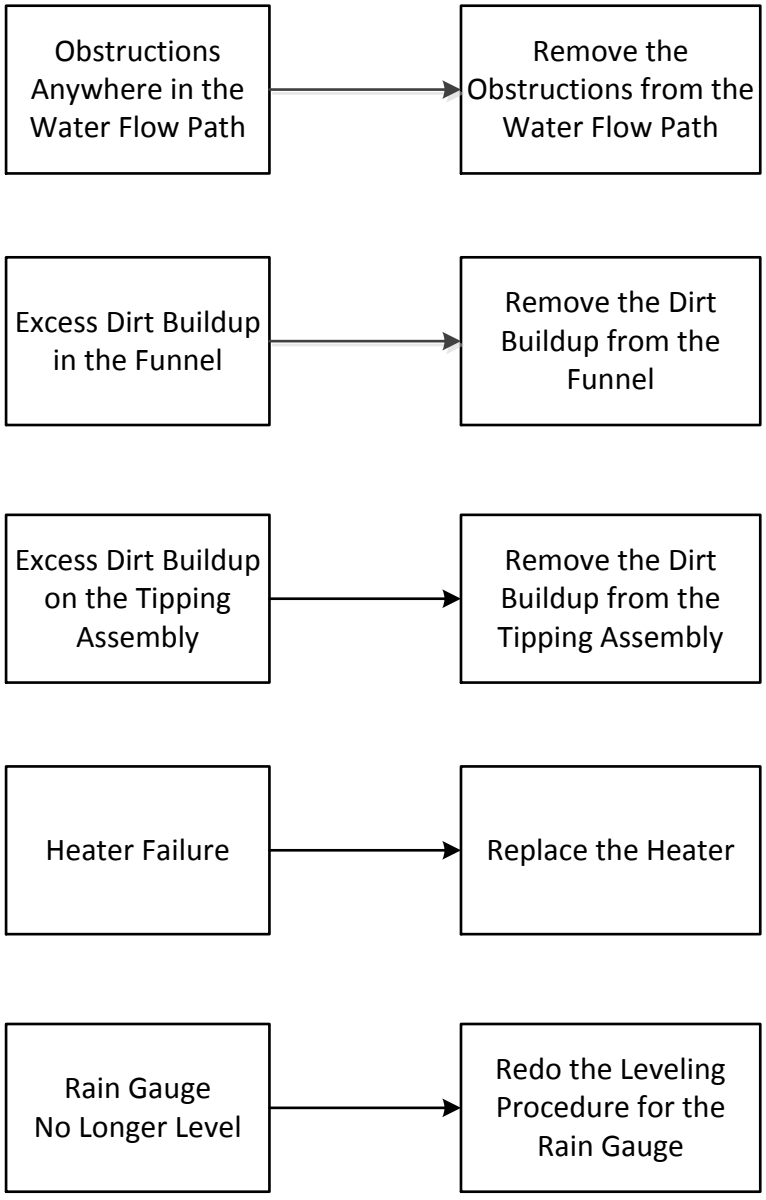
5.5 Model 6498 Present Weather and Visibility Sensors



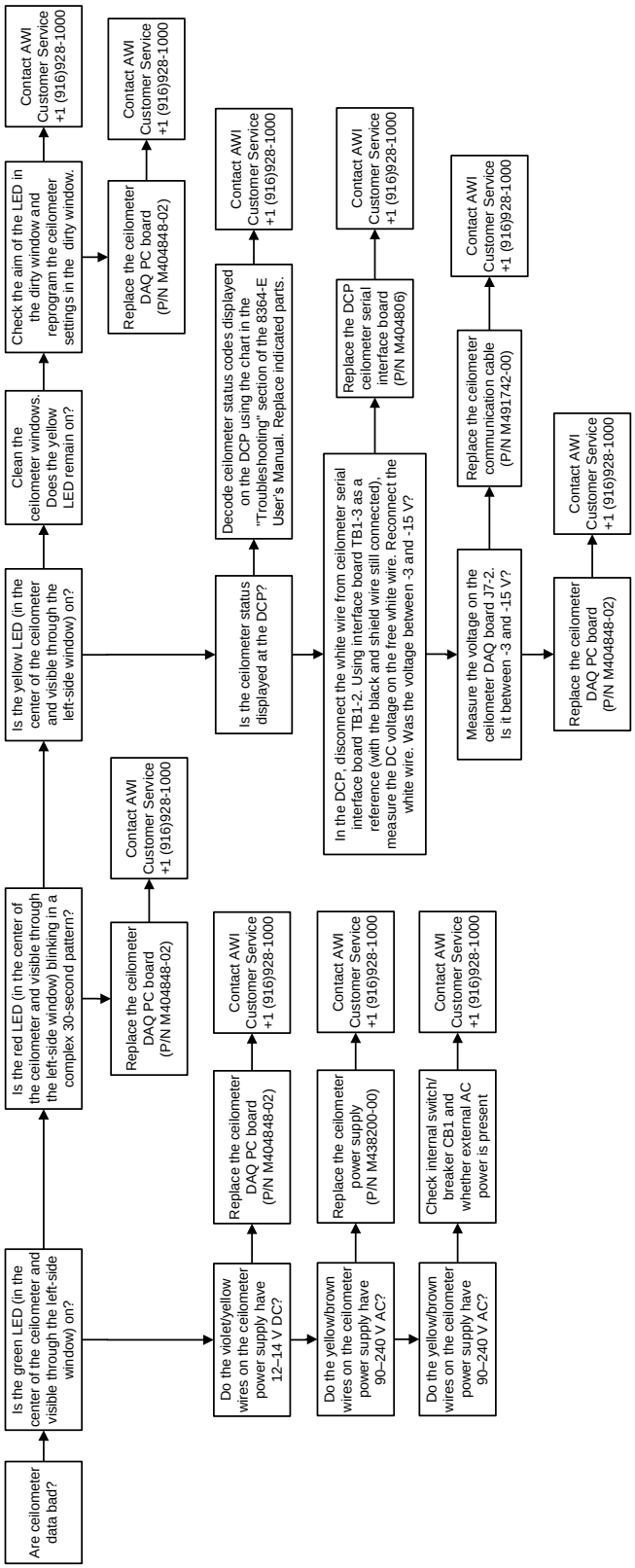
5.6 Model 8364-E Visibility Sensor



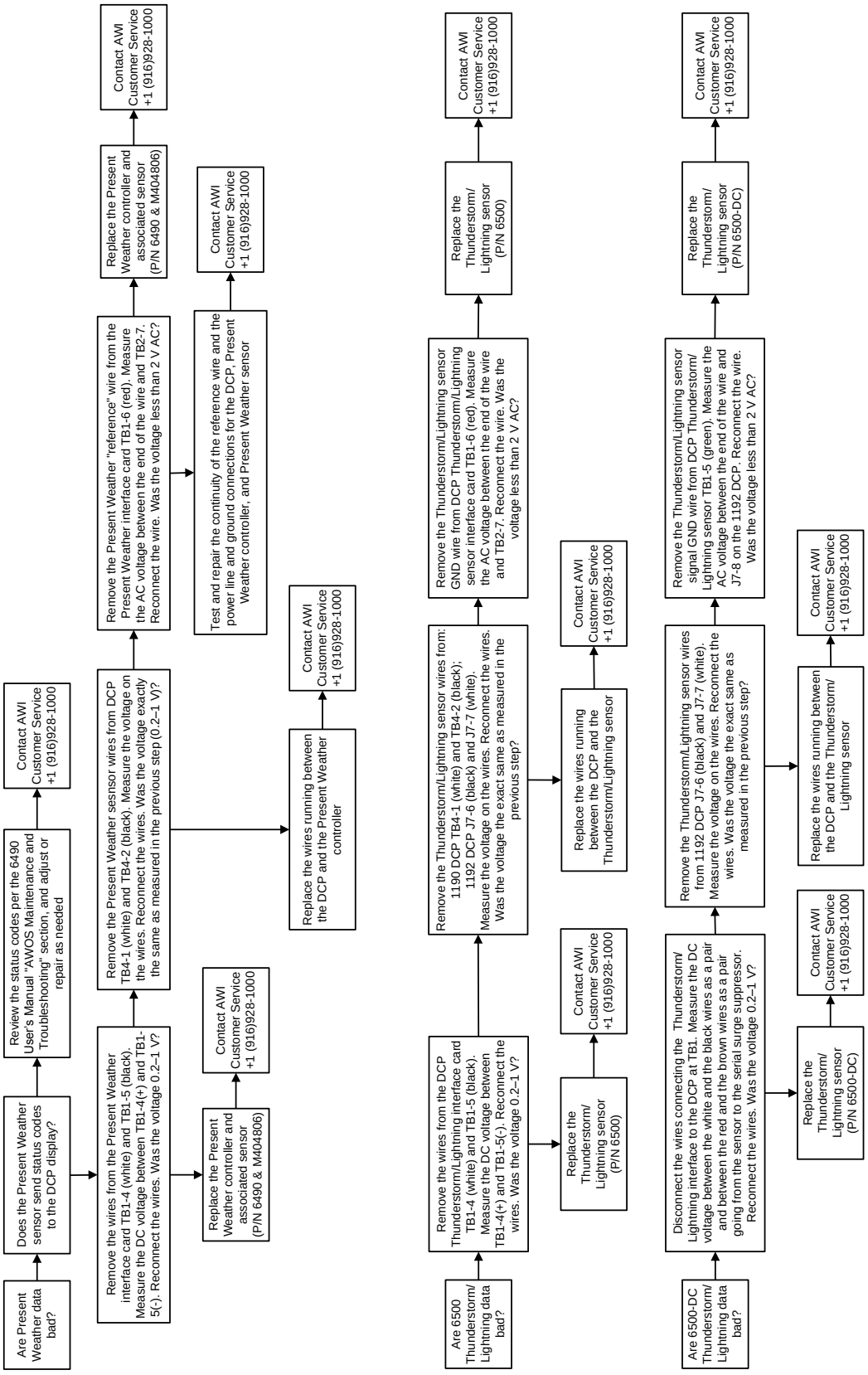
5.7 Rain Gauges



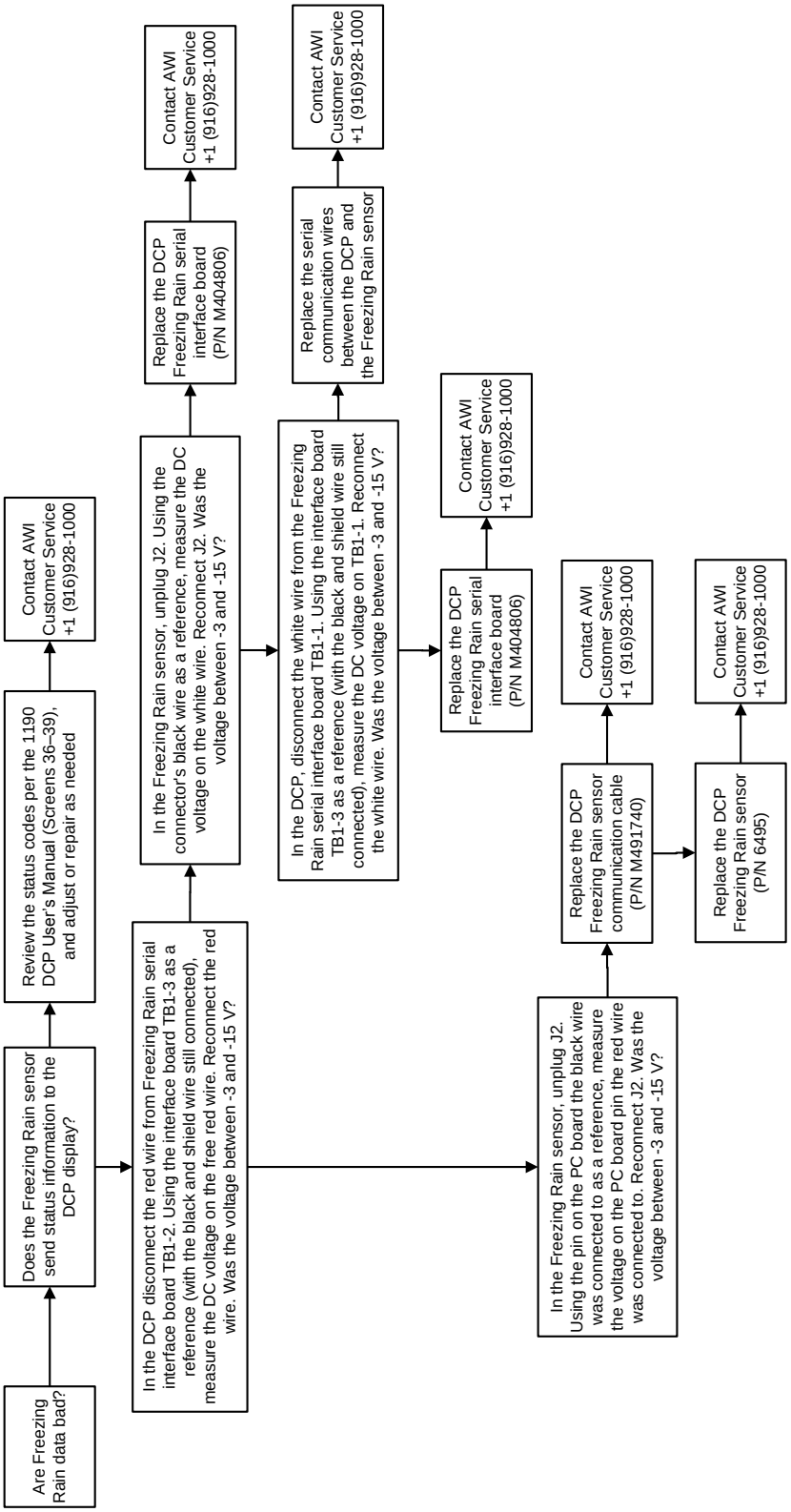
5.8 Ceilometer



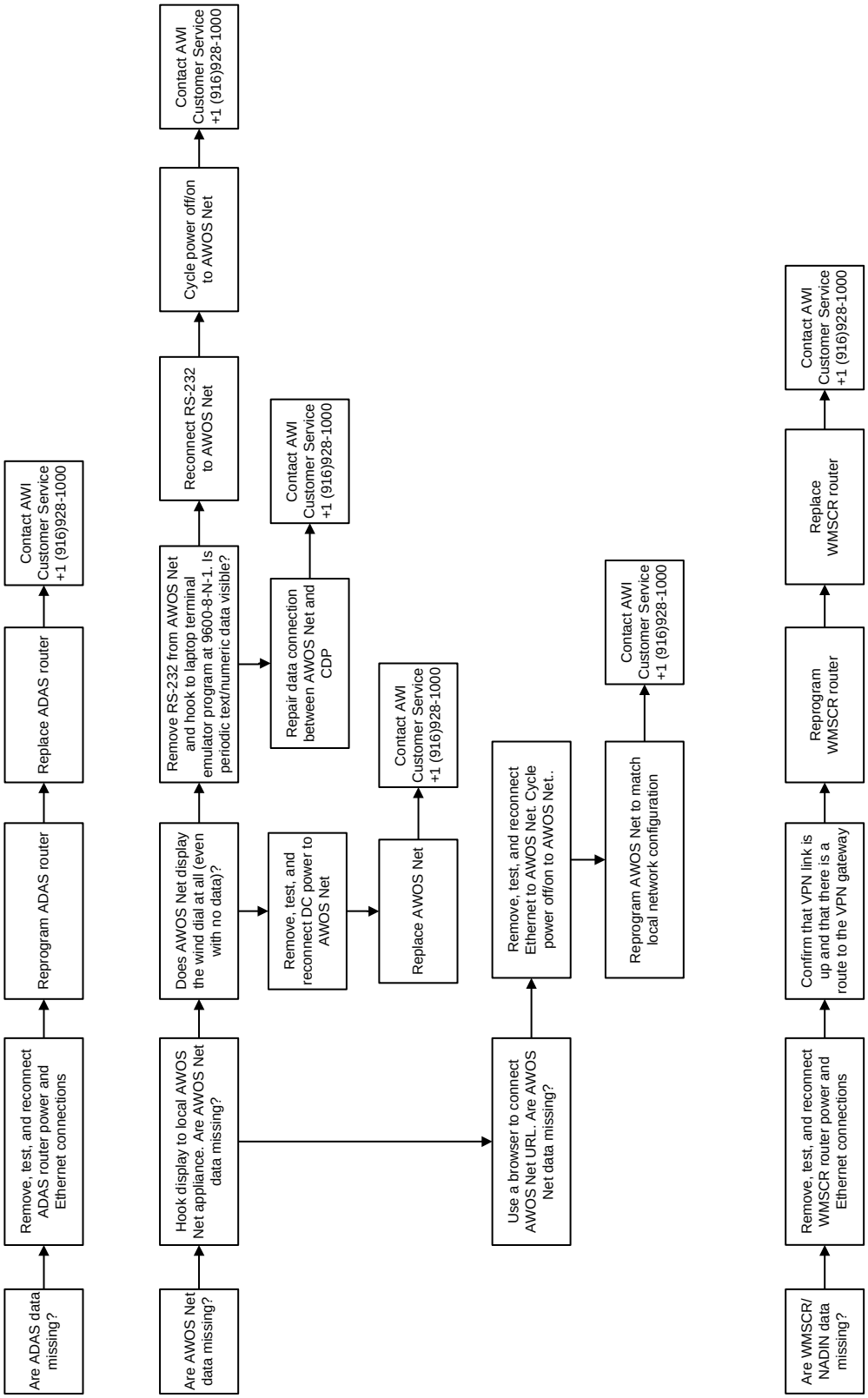
5.9 Present Weather and Thunderstorm/Lightning Sensors



5.10 Freezing Rain Sensor



5.11 Data Networking



Chapter 7

6. Vaisala Sensors

Table 2. Maintenance Frequency for Vaisala Sensors

TEST	SENSOR/MODULE TESTED	FREQUENCY
Bearing Condition for Mechanical Wind Speed and Direction Sensors	Mechanical Wind Sensors	1 year
Wind Direction and Speed for Mechanical Wind Sensors	Mechanical Wind Sensors	1 year
Wind Sensor Operation for Ultrasonic Wind Sensor	Ultrasonic Wind Sensor	1 year
Wind Direction and Speed for Ultrasonic Wind Sensor	Ultrasonic Wind Sensor	1 year
Wind Sensor Heater/Thermostat for Ultrasonic Wind Sensor	Ultrasonic Wind Sensor	1 year
Ambient Air Temperature	Temperature/Humidity Sensor	1 year
Ambient Dew Point Temperature	Temperature/Humidity Sensor	1 year
Thunderstorm Sensor Checks	Thunderstorm Sensor	1 year
Visibility/Present Weather Detector and Day/Night Sensors Checks	Visibility, PWD and Day/Night sensors	1 year
Present Weather Detector TS Sensor Check	PWD TS Sensor	1 year
Verify Ceilometer Backup Battery	Ceilometer battery	1 year
Ceilometer Check	Ceilometer	1 year
Visibility/PWD and Day/Night Sensors Inspection and Cleaning	Visibility, PWD and Day/Night sensors	120 days (& Initial)
Ceilometer Cleaning	Ceilometer	120 days
Visual Inspection of Sensors & Overall System Check	system	120 days
Check Thunderstorm/Lightning Detector	Thunderstorm/Lightning Detector	120 days
Replace Bearings on Mechanical Wind Speed and Direction Sensors	Mechanical Wind Sensors	2 years
Mechanical Wind Direction Sensor Alignment	Mechanical Wind Sensors	2 years (& Initial)
Ultrasonic Wind Sensor Alignment	Ultrasonic Wind Sensor	2 years (& Initial)
AWOS Site Grounding Testing	Site grounding	2 years (& Initial)
Ceilometer Battery Replacement	Ceilometer internal battery	3 years

Chapter

7

7. Forms

The following pages contain master forms for recording maintenance data. These master forms should be copied and sufficient copies stored at a convenient location in each site's Facility Reference Data File (FRDF). The *Annual Technical Performance Record* is to be completed at system commissioning, after major repair work, and during annual revalidation.

AWOS Monthly Technical Performance Record

Site Name and Location _____ Date _____

General	**Completed**
Notify local users AWOS may be missing or unreliable during inspection	_____
DCP/Tower	**Pass (Y/N)**
Press maintenance switch (1190 DCP only)	_____
Remove debris from all sensors	_____
Check for mechanical damage	_____
Check for movement of wind speed and direction sensors (2020/2030)	_____
Check operation of MARS fan	_____
Check obstruction lights	_____
Sensors	**Pass (Y/N)**
Check all sensor hardware and cables	_____
Clean Rain Gauge funnel	_____
Check Rain Gauge heaters (6021/6022)	_____
Clean Present Weather/Visibility Sensor optics (6498-P/-V/-PV, 8364-E)	_____
Clean Day/Night Sensor optics	_____
Clean Ceilometer optics	_____
Check Ceilometer blower	_____
Clean Present Weather Sensor lenses (6490)	_____
Clean Thunderstorm/Lightning Sensor surface	_____
Clean Freezing Rain Sensor probe	_____
Central Data Platform	**Pass (Y/N)**
Check display operation	_____
Check keyboard and mouse operation	_____
Check printer operation, replace ribbon and paper as necessary	_____
Check system clock	_____
Check microphone by recording a voice remark	_____
Check dial-up by dialing the CDP from an outside line	_____
Check VHF by listening to AWOS voice output from a remote receiver	_____
Check speaker operation	_____
Check UPS operation	_____
Record AWOS Observations	**Data**
Time and Date	_____
Wind Direction	_____
Wind Speed	_____
Visibility	_____
Sky Condition (Clouds)	_____
Precipitation	_____
Present Weather	_____
Thunderstorm/Lightning	_____
Freezing Rain	_____
Temperature	_____
Dew Point	_____
Altimeter Setting	_____

Note any "missing" parameter or any other obvious failures:

_____

_____

System Checked By: _____ Date/Time: _____

AWOS Triannual Technical Performance Record

Site Name and Location _____ Date _____

General				**Completed**
Notify local users AWOS may be missing or unreliable during inspection				_____
Complete AWOS Monthly Technical Performance Record				_____
DCP/Tower		**Expected**	**Measured**	**Pass (Y/N)**
Drain and clean pressure port				_____
ADC Vref-		0 – 5	_____	_____
ADC Vref+		4090 – 4095	_____	_____
AWOS wind direction seems reasonable		± 30º	_____	_____
AWOS wind speed seems reasonable		± 5 kts	_____	_____
BP1 (Reference Pressure) – (Sensor Pressure)		±0.02 inHg	_____	_____
BP2 (Reference Pressure) – (Sensor Pressure)		±0.02 inHg	_____	_____
(AWOS Temp) – (Measured Temp)		±2°F	_____	_____
(AWOS Dew Point) – (Measured Dew Point)		±3°F	_____	_____
1190 DCP shows “MARS Fan Fail” with fuse F1 pulled				_____
1192 DCP shows “MARS Fan Fail” when switch toggled				_____
6498-V & 6498-PV Visibility *(includes 6498-DC-V & 6498-DC-PV)*	**Measured Difference**	**Expected Difference**	**Calculated Difference**	**Pass (Y/N)**
Calibration Scale	_____	<±3%	_____	_____
Offset Change	_____	<0.05	_____	_____
Day/Night Sensor changes state				_____
8364-E Visibility Sensor		**Expected**	**Measured**	**Pass (Y/N)**
Calibration Difference		<±3%	_____	_____
Day/Night Sensor changes state				_____
Cloud Height Sensor				**Pass (Y/N)**
Inspect and clean blower intake and outlets				_____
System status LED (red) alternates between on and fast blink				_____
Battery Status LED (green) is on				_____
Dirty Window LED (yellow) is off				_____
Replace internal desiccant				_____
Present Weather Sensor		**Expected**	**Measured**	**Pass (Y/N)**
Heater check		lens is warm		_____
Carrier raw data field (Xnnn) (Not used for 6498)		405–420	_____	_____
Lnnn (Not used for 6498)		-30 to 50	_____	_____
Knnn (Not used for 6498)		0 to 150	_____	_____
Hnnn (Not used for 6498)		40 to 120	_____	_____
Tnnn (Not used for 6498)		ambient ±5°C	_____	_____
Data field (W__)		blank	_____	_____
Status field (S0000)		all zeros	_____	_____
Thunderstorm/Lightning Sensor *(includes 6500 & 6500-DC)*				**Pass (Y/N)**
Check sealant				_____
Freezing Rain Sensor				**Pass (Y/N)**
Check hardware and cables, clean as necessary				_____

System Checked By: _____ Date/Time: _____

AWOS Annual Technical Performance Record

Site Name and Location _____ Date _____

General			Completed
Notify local users AWOS may be missing or unreliable during inspection			_____
Complete AWOS Monthly Technical Performance Record			_____
Complete AWOS Triannual Technical Performance Record			_____
DCP/Tower	**Expected**	**Measured**	**Pass (Y/N)**
Model 2020/2030 Vane/Cup			
Wind direction align to benchmark			_____
Wind direction linearity 90º;	±3º, no dropouts or irregularities	_____	_____
Wind direction linearity 180º	±3º, no dropouts or irregularities	_____	_____
Wind direction linearity 270º	±3º, no dropouts or irregularities	_____	_____
Wind direction linearity 360º	±5% (DCP reading shows 359°–001° in 355°–005° deadband), no dropouts or irregularities	_____	_____
Wind speed	79 – 81 knots	_____	_____
Wind vane and anemometer bearings turn freely			_____
Model 2040 Ultrasonic Wind			
Zero Wind Check	0 knots	_____	_____
Rain Gauge			**Pass (Y/N)**
Check for level using built-in bubble level			_____
Check two outlet orifices for heat (Model 6021 only)			_____
Inspect and clean interior			_____
Toggle bucket assembly one cycle and verify initial count increments by +2			_____
VHF Radio	**Expected**	**Measured**	**Pass (Y/N)**
Perform the following at the VHF radio			
Output Power Level	2.5 W, ±0.5 W	_____	_____
Reflected Power		_____	_____
VSWR	Initial: 3.0:1 max. Operating: 3.0:1 max.	_____	_____
Frequency	Assigned: ±1.0 kHz	_____ _____	_____
Modulation	65–95%	_____	_____
Perform the following at the VHF antenna when cable runs are longer than 50 ft			
Output Power Level	1.0 W, ±0.5 W	_____	_____
Reflected Power		_____	_____
VSWR	Initial: 3.0:1 max. Operating: 3.0:1 max.	_____	_____

AWOS Annual Technical Performance Record (cont'd)

DCP UHF Radio	Expected	Measured	Pass (Y/N)
Power Level	1 W, ±0.5 W	_____	_____
Reflected Power		_____	_____
VSWR	Initial: 3.0:1 max. Operating: 3.0:1 max.	_____	_____
Frequency	Assigned:	_____	
	±2.0 kHz	_____	_____
Deviation	≤3.0 kHz	_____	_____
CDP UHF Radio	**Expected**	**Measured**	**Pass (Y/N)**
Perform the following at the UHF radio			
Power Level	1 W, ±0.5 W	_____	_____
Reflected Power		_____	_____
VSWR	Initial: 3.0:1 max. Operating: 3.0:1 max.	_____	_____
Frequency	Assigned:	_____	
	±2.0 kHz	_____	_____
Deviation	≤3.0 kHz	_____	_____
Perform the following at the CDP UHF antenna when cable runs are longer than 50'			
Power Level	0.2W, ±0.15W	_____	_____
Reflected Power		_____	_____
VSWR	Initial: 3.0:1 max. Operating: 3.0:1 max.	_____	_____
CDP			**Pass (Y/N)**
No active alarms/alarms cleared			_____

Comments/Notes:

_____

_____

_____

_____

_____

_____

_____

_____

System Checked By: _____ Date/Time: _____

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