

Specialist's Factual Report – Attachment 1

Images of the F46 AWOS log book for October 22, 2020.

METEOROLOGY

CEN21LA055

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October 22 2020 log

AWOS Model V-C & V-D Log Book

ANNUAL MAINTENANCE LOG

Checked by

J. R. Rosales

Date:

22 Oct 2020

A. WIND TESTS (MECHANICAL)

1. Wind Direction and Speed sensor bearing condition

Shafts must rotate freely.

Wind Direction ☐

Wind Speed ☐

2. Verification of Wind Speed

Perform Test 1 with Test Set and verify wind speed is consistent with current conditions.

☐

3. Verification of Wind Direction

a. Perform Test 2 with Test Set and verify wind direction is consistent with current conditions.

☐

b. Perform Test 3 with Test Set and rotate vane more than 360°.

Pass ☐ Fail ☐

A. WIND TESTS (ULTRASONIC)

1. Wind Sensor Verification

Install the margin verifier on the sensor and perform Test 1 with the Test Set. Verify that the wind speed displayed is 0 indicating that the wind speed output is less than 0.4 knots.

Pass ☒ Fail ☐

2. Verification of Wind Speed

Perform Test 1 with the Test Set and verify that the reported wind speed is consistent with current conditions.

☒

3. Verification of Wind Direction

Perform Test 2 with the Test Set and verify that the reported wind speed is consistent with current conditions.

☒

4. Verification of Wind Sensor Heaters

Verify that the sensor transducer heaters are operating when the air temperature is below 30°C (86°F).

☒

B. TEMPERATURE AND DEW POINT TESTS**1. Temperature Verification**

Use a Calibrated Temperature/Humidity Standard to determine the ambient temperature in the vicinity of the temperature sensor assembly. If a sling psychrometer is used, refer to Appendix B – Using a Sling Psychrometer Instructions. Perform Test 4 with the Test Set. The displayed temperature must be within $\pm 2^{\circ}\text{F}$ of the ambient temperature.

Manufacturer of calibrated standard: Vaisala

Model: PTB330

Calibration Date: Oct 20 20

Ambient Temp.: 84.0 °F

AWOS Temp.: 83.6 °F

Pass ☒ Fail ☐

2. Dew Point Verification

The reported AWOS dew point temperature must be within $\pm 3^{\circ}\text{F}$. Use a Calibrated Temperature/Humidity Standard and complete sections c., d., and e. If a sling psychrometer is used, refer to Appendix B – Using a Sling Psychrometer Instructions and the AWOS Utilities program (Available on CD-ROM) to determine dew point and complete sections a. and b.

a. Dew Point Temperature Actual (using psychrometer):

Dry Bulb Temperature: _____ °F

Wet Bulb Temperature: _____ °F

Barometric Pressure: _____ hg

Dew Point Temp: _____ °F

b. Perform Test 5 with the Test Set:

Displayed Dew Point: 65.1 °F

Pass ☒ Fail ☐

c. Dew Point Verification (using temperature/humidity standard)

Temperature: 84.0 °F

Humidity: 50.9 %

d. Calculate dew point (using AWOS Utilities program (Available on CD-ROM)).

Calculated Dew Point: 64.1 °F

e. Perform Test 5 with the Test Set:

Compare the calculated dew point with the displayed dew point. The allowable tolerance between the calculated and displayed dew point is $\pm 3^{\circ}\text{F}$.

Displayed Dew Point: 65.1 °F

Pass ☒ Fail ☐

Manufacturer of calibrated standard: _____

Model: _____

Calibration Date: _____

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C. BAROMETER TESTS

For Annual Maintenance the Portable Barometric Standard must be used.

Barometer Verification

Portable Barometric Standard (The pressure reading must be taken at the same height as the AWOS sensor.) Refer to Appendix A for the required accuracy of the portable barometric standard.

Manufacturer:	Vaisala
Model:	PTB330
Calibration Date:	Oct 2020
Pressure Reading:	29.260

AWOS Unadjusted Sensor Pressure Readings:

Test 8 Unadjusted Barometer A:	29.264
Test 9 Unadjusted Barometer B:	29.261

Comparisons

Difference between Portable Standard and Barometer A:	.004
Difference between Portable Standard and Barometer B:	.001

Tolerance = ± 0.02 inHg: Pass ☒ Fail ☐

Altimeter Setting

Verify the reported altimeter setting.

- Note: Altimeter verification is performed after verification of the temperature and pressure.
- Note: The measurements taken at the AWOS site must be taken within a 4-minute period. The calculated altimeter setting need not be determined from these measurements in the same 4 minutes.

Reported Altimeter Setting (from Test 10):	29.880	inHg
Airport Elevation:	574	Feet MSL (Mean Sea Level)
AWOS Barometer Elevation:	579	Feet MSL
Temperature: (Perform Test 4 at the AWOS site)	84.1	°F
Local Pressure: (The lower pressure from Tests 8 & 9).	29.260	inHg
Calculated Altimeter Setting: (Obtained by using the AWOS Utilities program (Available on CD-ROM) or by using Table 5-1 "Standard Pressure Altitude," in FAA Order 6560.13B.	29.870	inHg

The Reported altimeter setting must be within ± 0.02 inHg of the Calibrated altimeter setting.

Pass ☐ Fail ☐

D. VISIBILITY TESTS (IF CONFIGURED)1. Day/Night Sensor Verification

Check Day/Night sensor operation by performing Test 11 with the Test Set. In daylight conditions, "DAY" must be displayed on the Test Set. If the Day/Night sensor is covered, simulating night, "NIGHT" must be displayed.

Day Test Display:

Night Test Display:

Pass ☒ Fail ☐

2. Visibility Sensor Inspection

Check that the visibility sensor windows are clean and window heaters are operating. Use Test 55 to turn on the visibility sensor cover heaters. Use Test 50 after windows have been cleaned.

Heater Test: Pass ☒ Fail ☐

Clean Test: Pass ☒ Fail ☐

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3. Visibility Sensor Verification

With the Day/Night sensor uncovered, place the window block into either the receiver or transmitter of the visibility sensor. Perform Test 51 and verify that the reading is 0 Hz $\pm$ 0.1 Hz after at least 2-minute stabilization. Record the value displayed.

Display Reading: -.0040

Remove the window block and place the visibility calibrator in position on visibility sensor. After at least a 2-minute stabilization period, record the value displayed in lower left corner of Test Set display. A "PASS" message is displayed if the visibility frequency is within 3% of the stored frequency of the calibrator. Use Test 52 to calibrate the sensor if the detected frequency and the calibrator frequency differ by more than 3%.

Displayed Frequency: 1050.9770
Calibrator Frequency: 1051
Pass (within 3%) ☒ Fail ☐

4. Precipitation Identification Verification

Perform Test 62 and verify that the displayed sensor crossarm temperature (TS) is within $\pm 5^{\circ}$ F ($\pm 2.8^{\circ}$ C) of the temperature measured with the temperature/humidity standard located close to the visibility/precipitation sensor pole mast.

Display Reading: 85.4
Measured Reading: 83.4
Pass ☒ Fail ☐

Perform Test 63 and verify that the displayed DRD12 rain detector reading is within 850-980 when the rain detector surface is dry. The value should decrease rapidly when the surface becomes wet (fingers touching surface) and gradually increases as the detector heater dries the surface.

Dry Display Reading: 853
Wet Display Reading: 132
Pass ☒ Fail ☐

Perform Test 61 and verify that the displayed precipitation WMO SYNOP code number is consistent with current conditions. Refer to the FD12P Supplementary Manual for a description. If 0000 is displayed, the air is clear or if 71 is displayed for example, light snow is indicated.

Display Reading: 0
Pass ☒ Fail ☐

E. PRECIPITATION ACCUMULATION TESTS (IF CONFIGURED)

1. Tipping Bucket inspection

Check and clean debris from filter, funnel orifice and bucket reservoir and verify that heater is on if ambient temperature is less than 38 degrees Fahrenheit.



2. Tipping Bucket verification

Tip bucket reservoir 10 times with at least one second delay between tips. Perform Test 15 with the Test Set and record the tip accumulation. (1 tip = 0.01 inches)

Accumulation: .03
Pass ☒ Fail ☐

F. CEILOMETER TESTS (IF CONFIGURED)**1. Ceilometer Inspection**

Check to see that the windows are clean and the window blower is operating properly. Refer to section 1.2.3.1.

Month 1 ☒ Month 2 ☒ Month 3 ☒

2. Ceilometer Verification

Check that the ceilometer is not being reported missing and producing a report consistent with current sky conditions. Perform Test 16 with the Test Set to display any ceilometer alarms and Test 17 to display the current hit value. Use Test 53 to turn on the ceilometer blower and heater. Refer to section 1.2.2.4

Alarms (Test 16): Pass ☒ Fail ☐

Current Hit Value (Test 17): 26000

Blower/Heater (Test 53): Pass ☒ Fail ☐

G. THUNDERSTORM REPORTING TESTS (IF CONFIGURED)**1. Thunderstorm Status**

Check that the thunderstorm report is not missing and is consistent with current local conditions by performing Test 59 and Test 60.

Internal Function (Test 16): Pass ☒ Fail ☐

Thunderstorm Reported value (Test 60) Pass

Pass ☒ Fail ☐

H. RUNWAY SURFACE CONDITION TESTS (IF CONFIGURED)**1. Runway Surface Condition Visual Inspection**

Check that the runway surface condition sensor elements are clean and that all parts are in good condition. Clean with mild detergent, when necessary.

Checked ☐

2. Runway Surface Condition Test

Note: The sensor must be dry at the beginning of the test. The temperature must be above freezing, and there can be no precipitation.

1. Using the Test Set, perform test 69.
2. Verify that 0101 is displayed indicating that both sensors are reporting "dry".
3. Pour water on the sensors and keep them wet for 15 minutes.
4. Verify that the Test Set display changes from 0101 to 0303 indicating that the sensors are reporting "wet".
5. Thoroughly dry the sensors.
6. Verify that the Test Set once again displays 0101.

Note: The four digit code displayed by Test 69 is described in the *AWOS Operation/ Maintenance/ Installation Manual* (01-22929).

Pass ☐ Fail ☐

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3. Runway Surface Ice Detection Test

Note: The ice detection test must be performed when the temperature is below freezing, therefore it may be performed at a different time than the other tests in the annual verification. The test results shall be recorded in the log book along with the record of the other annual tests.

7. Using the Test Set, perform test 69.
 8. Verify both sensors are **not** reporting 0707 "ice".
 9. Pour water on the sensors and allow it to freeze.
 10. Note: Use the minimum amount of water needed to cover the sensor.
 11. Verify that the Test Set display changes to 0707 indicating that the sensors are reporting "ice".
 12. Remove the ice from the sensors, if possible, so that ice is not reported after testing is complete.
- Pass ☐ Fail ☐

Date Checked: _____

I. **FREEZING RAIN SENSOR TESTS (IF CONFIGURED)**

1. Freezing Rain Sensor Visual Inspection

Check that the freezing rain sensor probe is clean and that all parts are in good condition. Refer to the Freezing Rain Inspection and Cleaning section 1.2.2.6. Clean with isopropyl alcohol when necessary.

Checked ☐

2. Freezing Rain Sensor Test

Perform test 70 and verify that the sensor status is "P" and frequency is between 39985-40015. Refer to the Freezing Rain Sensor Verification section 1.2.2.6 if frequency is outside this range.

Displayed Result: _____

Ambient Temp.: _____ °F

Pass ☐ Fail ☐

J. **SYSTEM CHECK**

1. System Test

Initiate the system test function by performing Test 18 with the Test Set and listen to the voice vocabulary via handset or local speaker. Verify that the vocabulary is reported clearly and correctly. Refer to the AWOS Vocabulary section in the Operation/Maintenance Manual

System Test Pass ☒ Fail ☐

2. NOTAM Program Test

Check NOTAM function for proper operation. Refer to Voice Programming section of the Operation/Maintenance manual.

a. Program test NOTAM message

Pass ☒ Fail ☐

b. Verify test NOTAM message

Pass ☒ Fail ☐

c. Clear test message and verify

Pass ☒ Fail ☐

K. GROUNDING VERIFICATION

Note: Use only instruments designed specifically for earth ground system testing and acceptable for the earth-ground resistance tests. The equipment must be capable of measuring 10 ohms, with a minimum accuracy of $\pm 10\%$.

Note: If any part of the grounding verification fails, the technician must notify the owner in writing that the grounding system for the AWOS is not adequate and should be upgraded. The written notification becomes a part of the official record of the AWOS. The failure of a grounding test does not require the AWOS to be decommissioned.

1. AWOS Site Grounding

Verify that resistance to earth ground is 10 ohms or less at each ground location. Isolate each cable prior to testing by disconnecting it from all connections (Except the lightning down conductor, which must be tested but does not need to be disconnected from the air terminal). Connect the earth-ground test equipment to the ground cables and record the resistance for each of the following:

Resistance

Lightning Down Conductor _____ ohms

AWOS Equipment Frame Ground _____ ohms

Ceiliometer Ground _____ ohms

Thunderstorm Sensor Ground _____ ohms

Pass ☐ Fail ☐

Once the test is complete, reconnect all ground cable after completing the resistance test. Use De-Ox grease to prevent the ground connection from corroding.

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For systems installed after January 2002: Verify that all ground rods are bonded using the following procedure: Using the resistance readings recorded above, verify that there is less than 1 ohm difference from the highest resistance reading to the lowest resistance reading:

Highest Resistance Reading _____ ohms

Lowest Resistance Reading _____ ohms

Difference _____ ohms

Pass ☐ Fail ☐

Using an ohmmeter, verify that there is less than 1ohm difference between the earth-ground connections on all enclosures or ground connection points and the ground cable.

Lightning Down Conductor	Pass ☐	Fail ☐	
AWOS Equipment Frame Ground	Pass ☐	Fail ☐	
Ceilmeter Ground	Pass ☐	Fail ☐	NA ☐
Thunderstorm Sensor Ground	Pass ☐	Fail ☐	NA ☐

Verify the voltage at the site with all of the AWOS equipment turned on, including the obstruction lights.

Measure the voltage between hot and neutral at the AWOS outlet (located in the AWOS enclosure).

Acceptable Range: 110 – 125 VAC Pass ☐ Fail ☐

Measure the voltage between neutral to ground at the AWOS outlet.

Acceptable Range: less than 2.0 VAC Pass ☐ Fail ☐

2. AWOS Indoor Equipment Grounding

Verify that the protected entrance terminal (PET) is directly grounded to an earth-ground using a minimum of #8 AWG wire.

Pass ☐ Fail ☐

Verify that there is less than 1 ohm resistance between the PET ground and the outlet strip ground.

Pass ☐ Fail ☐

Verify the voltage with all of the indoor equipment turned on.

Measure the voltage between hot and neutral on the AWOS electrical outlet strip.

Acceptable Range: 110 – 125 VAC Pass ☐ Fail ☐

Measure the voltage between neutral to ground on the AWOS electrical outlet strip.

Acceptable Range: Less than 2.0 VAC Pass ☐ Fail ☐

L. VISUALLY INSPECT SENSORS & OVERALL SYSTEM

Inspect equipment both at the site and indoors.

M. OBSTRUCTION LIGHT CHECK (IF CONFIGURED)

Observe that the obstruction lights operate properly.



N. CALL SYSTEM AND VERIFY TELEPHONE ANSWERING

System answers telephone prior to completion of second ring.



Voice is clear and intelligible.



System disconnects when weather observation has completely transmitted twice.



O. CHECK RADIO BROADCAST

Have pilots listen to voice transmission and report on voice transmission clarity and intelligibility.

Pass ☒ Fail ☐

VHF radio (if configured)

To key the radio and accurately verify the frequency, output power, and modulation, use the Test Set to perform Test 37 to initiate a 1 kHz tone. Note: To quit the 1kHz tone, exit the test.

		Tolerance			
Frequency:	121.250	±1 kHz	Pass	☒	Fail ☐
Output Power:	121.2501	3 watts/2 watts	Pass	☒	Fail ☐
Modulation:	2.5w	Upper 95%	Pass	☒	Fail ☐
	92%	Lower 65%			
VSWR at Transmitter:		2.0:1 maximum	Pass	☒	Fail ☐
VSWR at antenna:		2.0:1 maximum	Pass	☐	Fail ☐
Transmission Line Loss:		2.7 dB/100 ft max	Pass	☐	Fail ☐

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UHF radio (if configured)

To key the UHF radio, close the E1 jumper located on the iBi. Note: Key the radio for as short a period of time as possible. Do not key the UHF radio longer than 15 seconds. Field adjustments to the UHF frequency and deviation are prohibited on the model TEKK radio.

Outdoor UHF Radio	453.4375	Tolerance		
Frequency:	453.4376	±2 kHz	Pass ☒	Fail ☐
Output Power:	380mw	Upper 1 watt	Pass ☒	Fail ☐
		Lower 0.25 watt		
Frequency Deviation:	Ref. Section 1.2.1.6 2.7	±1 kHz	Pass ☒	Fail ☐
VSWR at Transmitter:		3.0:1 maximum	Pass ☒	Fail ☐
Note**: Power output should be limited to the minimum necessary to accomplish the job and should not exceed 1 watt.				

Indoor UHF Radio	453.4375	Tolerance		
Frequency:	453.43750	±2 kHz	Pass ☒	Fail ☐
Output Power:	240mw	Upper 1 watt	Pass ☒	Fail ☐
		Lower 0.25 watt		
Frequency Deviation:	Ref. Section 1.2.1.6 2.26	±1 kHz	Pass ☒	Fail ☐
VSWR at Transmitter:		3.0:1 maximum	Pass ☒	Fail ☐
Note**: Power output should be limited to the minimum necessary to accomplish the job and should not exceed 1 watt.				

P. VERIFY OPERATOR TERMINAL FUNCTION

Check keyboard and display operate properly.
Check archiving operation. Refer to the Archive Status in the Operations/Maintenance manual.



Q. VERIFY PRINTER FUNCTION (IF OPTION PRESENT)

Verify that the printer is making an observation log once an hour.



R. VERIFY REAL TIME CLOCK

Check the accuracy of the real time clock.



S. CHECK LOCAL OPERATIONAL PERFORMANCE

Interview local personnel (e.g. fixed base operator) to determine satisfaction with system operation.



T. VERIFY UPS BACK-UP

Shut off commercial power and verify that the AWOS functions properly on UPS power.

Failed, Bad Batteries

Indoor ☐ Outdoor ☒