DBT

TRANSPORTATION SERVICES

OPERATOR'S MANUAL

F1 AWOS

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0	2023 Jan 2	Pre-release
A	2023 July 15	Initial release
B	2025 March 19	Updated address
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E		
F		

TABLE OF CONTENTS

1. INTRODUCTION

This manual provides information for viewing weather data from the F1 AWOS, adding voice remarks, METAR remarks, and viewing diagnostics and log information. Routine suggested monthly maintenance procedures are provided.

Table 1. Related Manuals

Manual Code	Manual Name
F1 STA-H-017	F1 AWOS H Frame Installation Manual
F1 STA-T-017	F1 AWOS Tower and Pad Installation Manual
F1STA-H-025	F1 AWOS H Frame Site Preparation Manual
F1STA-A-025	F1 AWOS A Site Preparation Manual
F1STA-1-025	F1 AWOS I Site Preparation Manual
F1STA-2-025	F1 AWOS II/A-V Site Preparation Manual
F1STA-3-025	F1 AWOS III & IIIP Site Preparation Manual
F1STA-T-025	F1 AWOS IIIT & IIIPT Site Preparation Manual
F1STA-Z-025	F1 AWOS IV Z Site Preparation Manual
F1STA-027	F1 AWOS Operations and Maintenance Manual
F1STA-093	F1 AWOS Maintenance Log Book
AC 150/5220-16E Change 1	FAA Advisory Circular, Automated Weather Observing Systems (AWOS) for Non-Federal Applications

1.1 CONTACT INFORMATION

Contact DBT Transportation Services for AWOS Technical Support:

Toll Free: 844-343-8328

Email: cs@dbttranserv.com

1.2 OVERVIEW

The F1 AWOS is a modular weather monitoring system that continuously measures an array of weather parameters at an airfield or helipad. The F1 STA outputs the data and broadcasts current conditions over VHF radio to pilots in the vicinity.

Figure 1 shows the main AWOS components.

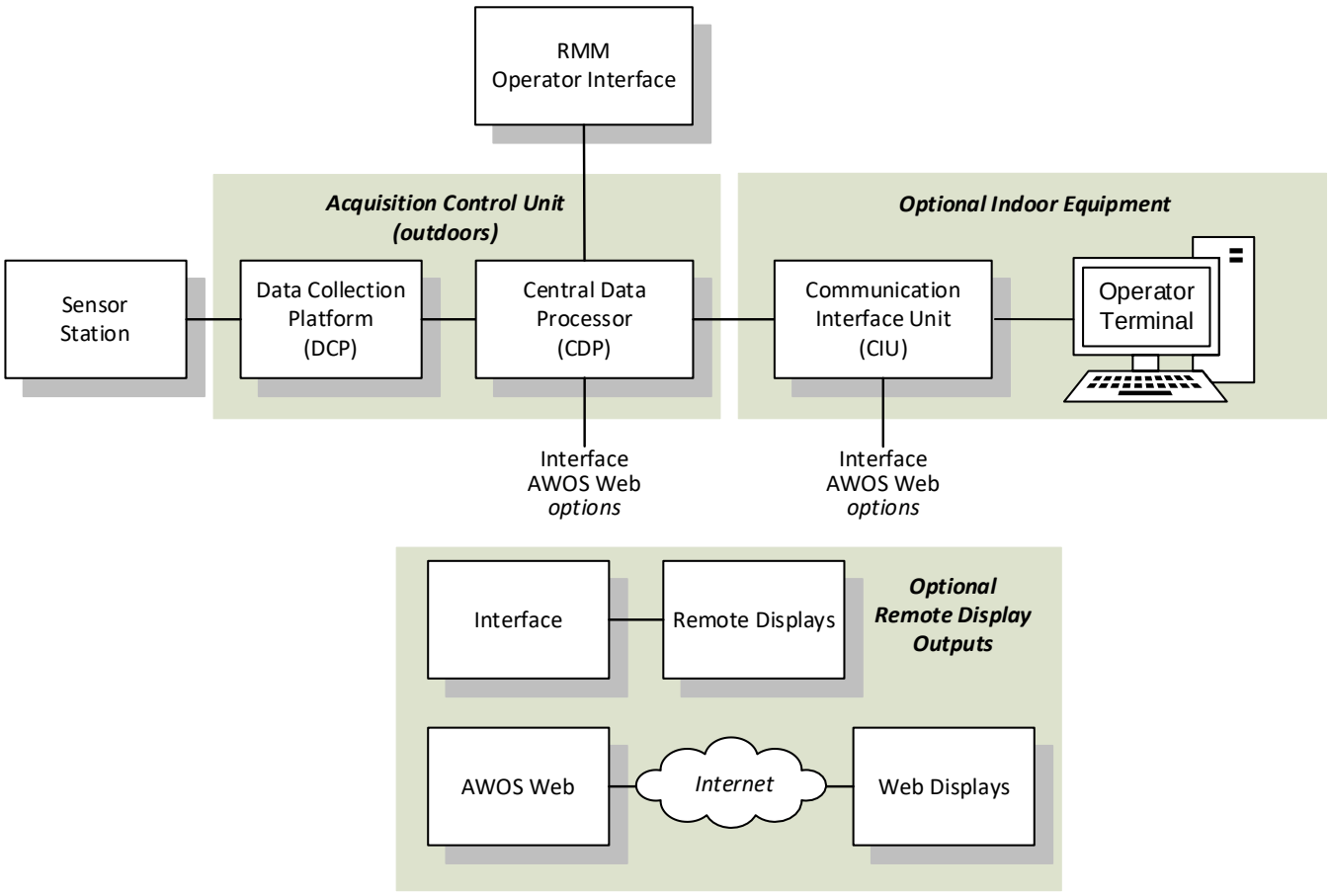


Figure 1. AWOS Components

A sensor station measures meteorological parameters, which are collected by a Data Collection Platform (DCP). Data processing, communications, and overall system operation is controlled by the Central Data Processor (CDP), which also archives and outputs the weather observations.

Optional remote display interfaces are possible.

The F1 STA system can communicate with Cloud-based weather collection and NADIN providers via the AWOS Web interface.

A NADIN connection is possible via a direct connection to the ACU or to the CIU.

1.3 SENSOR STATION

The sensor station measures a full array of meteorological parameters using a configurable suite of sensors. Available sensors include wind speed, wind direction, barometric pressure, air temperature, dew point temperature, relative humidity, rainfall, cloud height and sky condition, visibility, present weather, thunderstorm detection, and freezing rain. The standard configurations are listed later in this chapter.

A self-supporting tower is used as the mounting platform for the wind sensor. An H frame or separate foundations are used to mount the remaining sensors. Additional sensors may be mounted on the tower when separate foundations are the primary means to mount the remaining sensors.

The AWOS is protected by a comprehensive network of lightning and transient surge protection components. Tranzorbs, Gas Discharge Tubes, MOVs, and resistors protect all sensor lines, power lines, telephone lines, and communication lines against lightning-induced surges and power line transients and surges.

1.3.1 AWOS Configurations

The AWOS configurations are grouped based on the combination of observations produced; the observations depend on the actual sensors. The actual sensors installed at a particular airport depend on the AWOS configuration selected for that airport. FAA AC150/5220-16 defines AWOS configurations as follows.

- AWOS A. The AWOS A system measures and reports altimeter only.
- AWOS A-V consists of an AWOS A with a visibility sensor.
- AWOS I. The AWOS I system measures and reports wind data, e.g., speed, direction, and gusts; temperature; dew point; altimeter; and density altitude.
- AWOS II. The AWOS II system measures and reports all the parameters of AWOS I system plus visibility.
- AWOS III. The AWOS III system measures and reports all the parameters of AWOS II system plus precipitation accumulation (rain gauge) and cloud height. AWOS III can have optional sensors such as precipitation type/intensity (present weather, P) and/or thunderstorm/lightning (T). The addition of an optional certified sensor will change the designation to AWOS III P or AWOS III T, or AWOS III P/T.
- AWOS IV. The AWOS IV system measures and reports all the AWOS III P/T (i.e., AWOS III with both present weather and thunderstorm/lightning) parameters plus freezing rain (Z). The addition of an optional certified sensor will change the designation to or AWOS IV Z.

1.4 ACQUISITION CONTROL UNIT (ACU)

The sensor station is paired with a Data Collection Platform (DCP), which is mounted in the Acquisition Control Unit (ACU) with the Central Data Processor (CDP). The DCP collects data from the sensors, performs error detection on the received information, converts the sensor data into engineering units, and transmits message packets containing sensor data and status information to the CDP every 5 seconds. The CDP ignores data that are not received correctly and reports the appropriate transmission error.

The dual barometric pressure sensor is housed within the ACU. A keypad and display built into the DCP allow for on-site viewing of data and sensor maintenance.

The ACU is mounted either on the H frame or near the base of the tower with the wind sensor.

Data processing, communications, and overall system operation is controlled by the Central Data Processor (CDP). The CDP is mounted inside the ACU enclosure with the DCP..

1.4.1 Voice Output

A VHF transmitter broadcasts AWOS data in voice format to aircraft. Remote users can also listen to weather information over a phone line.

The CDP generates the voice stream. The operator may append voice remarks to the audio message..

1.4.2 Data Quality

The CDP performs quality checks on the data to ensure that the data received is accurate and complete, and that the associated equipment is working properly. If data from any sensor is erroneous or missing (e.g. sensor power loss), the parameter and all other parameters derived from the missing parameter are reported "missing" in the weather observation. The CDP continues monitor data. If the error condition is corrected, the weather parameter is restored in the AWOS report.

1.4.3 Data Archiving

The CDP stores collected AWOS data in data logs covering all aspects of AWOS operation. The logs are grouped as follows.

Observer position (FlexClient):

- One Minute Logs
- METAR and Voice Logs

Technician position (FlexMon), plus Observer position (FlexClient):

- Raw logs
- AWOS data
- AWOS Voice phone data
- AWOS VHF data
- Data Logger data

Chapter 4 describes how to access and save the log files.

1.5 COMMUNICATION INTERFACE UNIT (CIU)

An optional Communication Interface Unit (CIU) may be installed in a secure indoor location. The CIU receives AWOS products and reports from the ACU. In addition to supporting the configuration of external interfaces, the CIU also allows optional Operator Terminals (OTs) to be connected. An OT allows an operator to interact with the AWOS without having to visit the ACU, for example, to look at the current weather.

1.5.1 Printer

An optional dot matrix printer may be connected to the OT. The printer prints out the one minute log files automatically in a continuous cycle.

1.6 REMOTE DISPLAYS

Remote displays are simply additional operator terminals. If the display is intended purely as an informational display, for example a display in a pilot's lounge, then the keyboard and mouse must either be removed from the OT or physically secured to prevent unauthorized access.

1.6.1 Web Displays

Web displays allow remote users to view the AWOS data on any compatible computer using a standard Web browser. To access these views, visit:

- www.awosnet.com
- www.usawosnet.com

The F1 STA will deliver data to a web server over an AWOS Web interface. To set this up, contact customer service, see Section 1.1.

1.7 AWOS CONFIGURATIONS

AWOS systems are available in several configurations. The configurations differ primarily in the sensors included and the weather products that are output.

1.7.1 AWOS A

AWOS A is a minimal system requiring only a Barometric Pressure sensor. The AWI AWOS A provides FAA certified data for the following parameter.

- Barometric Pressure

As long as the Altimeter Setting is calculated using the *certified* Barometric Pressure, the resulting Altimeter Setting is considered to be *certified*. This is the calculation that must be used for the AWOS A to be FAA certified. See Section 1.7.3 for more information.

1.7.2 AWOS I

AWOS I systems provide data for the following parameters.

- Wind Speed and Gust
- Wind Direction and Variable Wind Direction
- Temperature
- Relative Humidity
- Dew Point
- Barometric Pressure
- Altimeter Setting
- Density Altitude

1.7.3 AWOS A-V

AWOS A-V is a minimal system requiring only Barometric Pressure and Visibility sensors. The FAA has certified the AWI AWOS II as an AWOS A-V. The AWI AWOS A-V provides FAA certified data for the following parameters.

- Barometric Pressure
- Visibility and Variable Visibility

The remaining parameters reported by the AWOS A-V are considered to be advisory.

- Wind Speed and Gust
- Wind Direction and Variable Wind Direction
- Temperature
- Relative Humidity
- Dew Point
- Density Altitude
- Rainfall

There are two ways to calculate the Altimeter Setting — with and without temperature.

- If the calculation uses the *advisory* Temperature with the *certified* Barometric Pressure, the resulting Altimeter Setting is considered to be *advisory*.

- If the calculation uses only the *certified* Barometric Pressure, the resulting Altimeter Setting is considered to be *certified*. This is the calculation that must be used for the AWOS A-V to be FAA certified.

1.7.4 AWOS II

AWOS II systems add a visibility sensor and a day/night detector to the AWOS I array. The system provides data for the following parameters. A rain gauge is required if the 8364-E visibility sensor is used.

- Wind Speed and Gust
- Wind Direction and Variable Wind Direction
- Temperature
- Relative Humidity
- Dew Point
- Barometric Pressure
- Altimeter Setting
- Density Altitude
- Visibility and Variable Visibility
- Rainfall
- Day/Night Detection

1.7.5 AWOS III

AWOS III systems add a rain gauge and a ceilometer to the AWOS II array. The system provides data for the following parameters. The rain gauge will already be present if the 8364-E visibility sensor is used.

- Wind Speed and Gust
- Wind Direction and Variable Wind Direction
- Temperature
- Relative Humidity
- Dew Point
- Barometric Pressure
- Altimeter Setting
- Density Altitude
- Visibility and Variable Visibility
- Rainfall
- Sky Condition and Cloud Height, up to 3 layers

1.7.6 AWOS III P

AWOS III P systems add a present weather sensor to the AWOS III array. The system provides data for the following parameters.

- Wind Speed and Gust
- Wind Direction and Variable Wind Direction
- Temperature
- Relative Humidity
- Dew Point
- Barometric Pressure
- Altimeter Setting
- Density Altitude
- Visibility and Variable Visibility
- Rainfall
- Sky Condition and Cloud Height, up to 3 layers
- Present Weather (rain, snow, drizzle, mist, fog, freezing fog, haze)

1.7.7 AWOS III P/T

AWOS III P/T systems add thunderstorm detection to the AWOS III array. The system provides data for the following parameters.

- Wind Speed and Gust
- Wind Direction and Variable Wind Direction
- Temperature
- Relative Humidity
- Dew Point
- Barometric Pressure

- Altimeter Setting
- Density Altitude
- Visibility and Variable Visibility
- Rainfall
- Sky Condition and Cloud Height, up to 3 layers
- Thunderstorm/Lightning Detection

2. F1 STA SOFTWARE USER INTERFACES

The software displays AWOS data in a combination of text and graphics in three types of data supplied by two user interfaces, with each interface geared toward a specific Position User.

A series of buttons allows users to access log files, record voice remarks, augment METARs, and access archived data. User access is based on credentials (username and password) associated with these position users.

- Weather View (default at system startup)
- Observer
- Technician
- Factory

Weather View The default Weather View FlexClient interface provides a view of weather parameters of interest to Tower operations, including a graphic display of wind conditions. This display is of primary interest to the Observer position user. METARs can be augmented with METAR remarks and weather observation logs can be accessed. See Chapter 3 and Chapter 4.

Log files The FlexClient interface allows the Observer position to access weather observation logs (Chapter 4) and the Technician position can use the FlexMon interface to access stored weather observation logs (Chapter 4).

Additional Functions Additional functions may be accessed by the Observer position user to add voice remarks and METAR remarks and to edit a METAR. The Technician position user has a Test Tone available to help set or test the VHF radio modulation.

These functions are described in Chapter 5.

Diagnostics The FlexMon interface (Chapter 7) also allows the Technician position to access diagnostics to maintain and troubleshoot the system. These displays provide a comprehensive view of the system and sensor status.

Configuration All configuration is done either by the factory or by the Technician of Record.

The following chapters explain each of the views and the available menu options in detail.

3. WEATHER VIEW ON THE OPERATOR TERMINAL

Figure 2 shows the FlexClient Weather View. This is the default view and does not require logging in. Additional features are available by logging in with Observer or Technician credentials, and are described in Chapter 5.

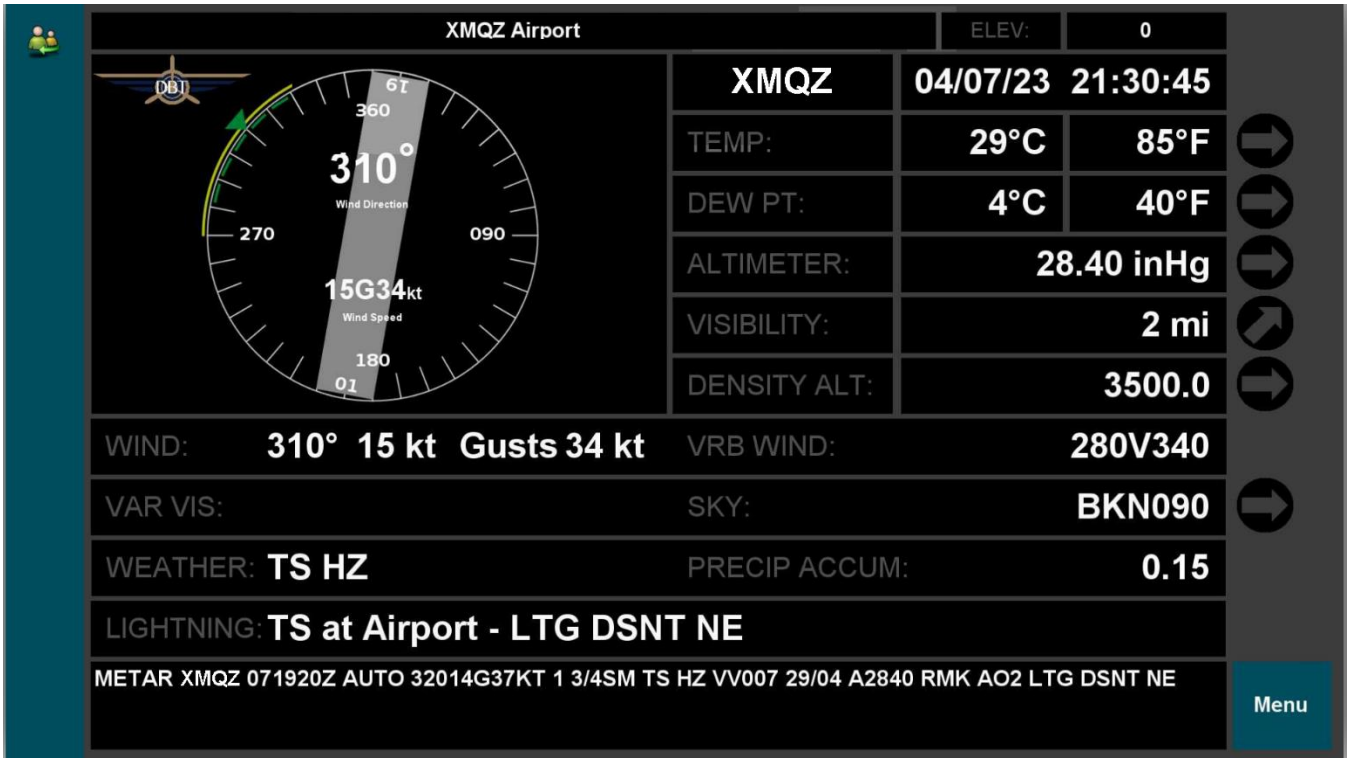


Figure 2. Weather View (Default Dark Mode)

There is also a Light Mode view available. First, click the **Menu** button (Figure 3) to access it.

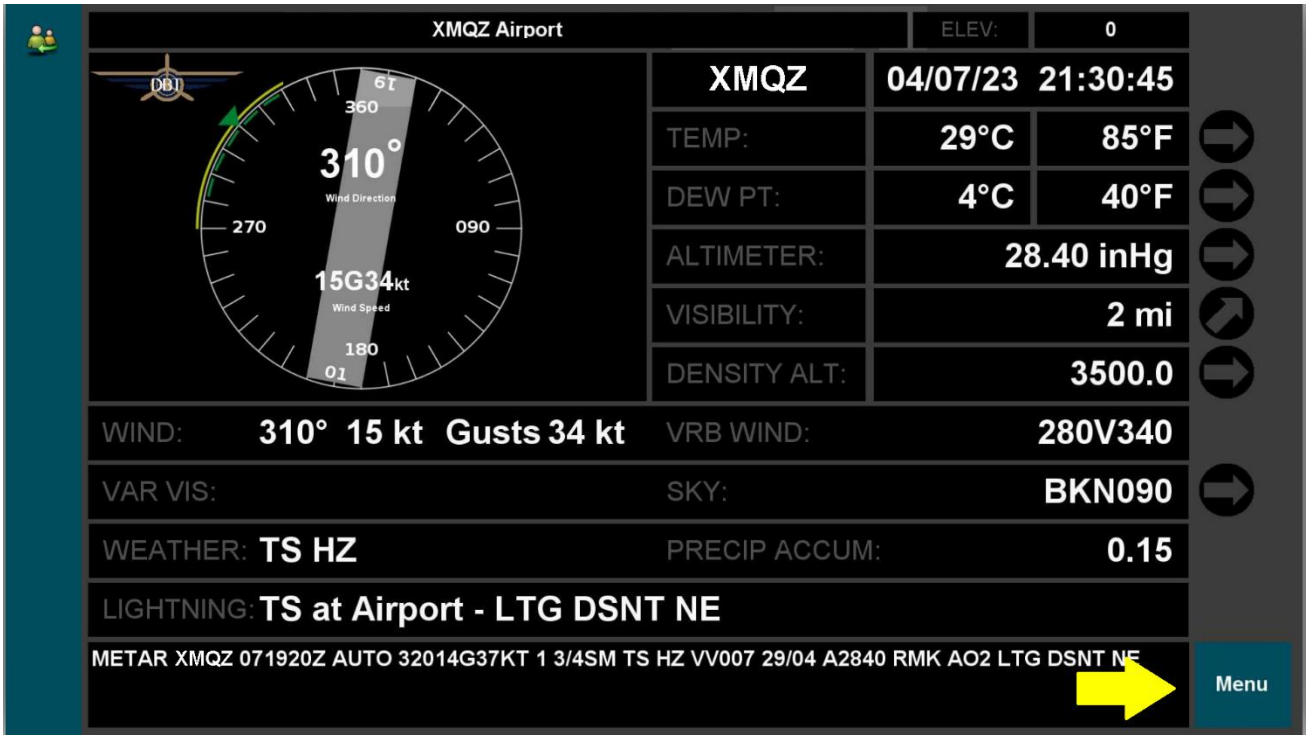


Figure 3. Click the Menu Button to Access Further Options

Click the Light Mode button to change the view to the Light Mode.

Figure 4. Click to Select Light Mode

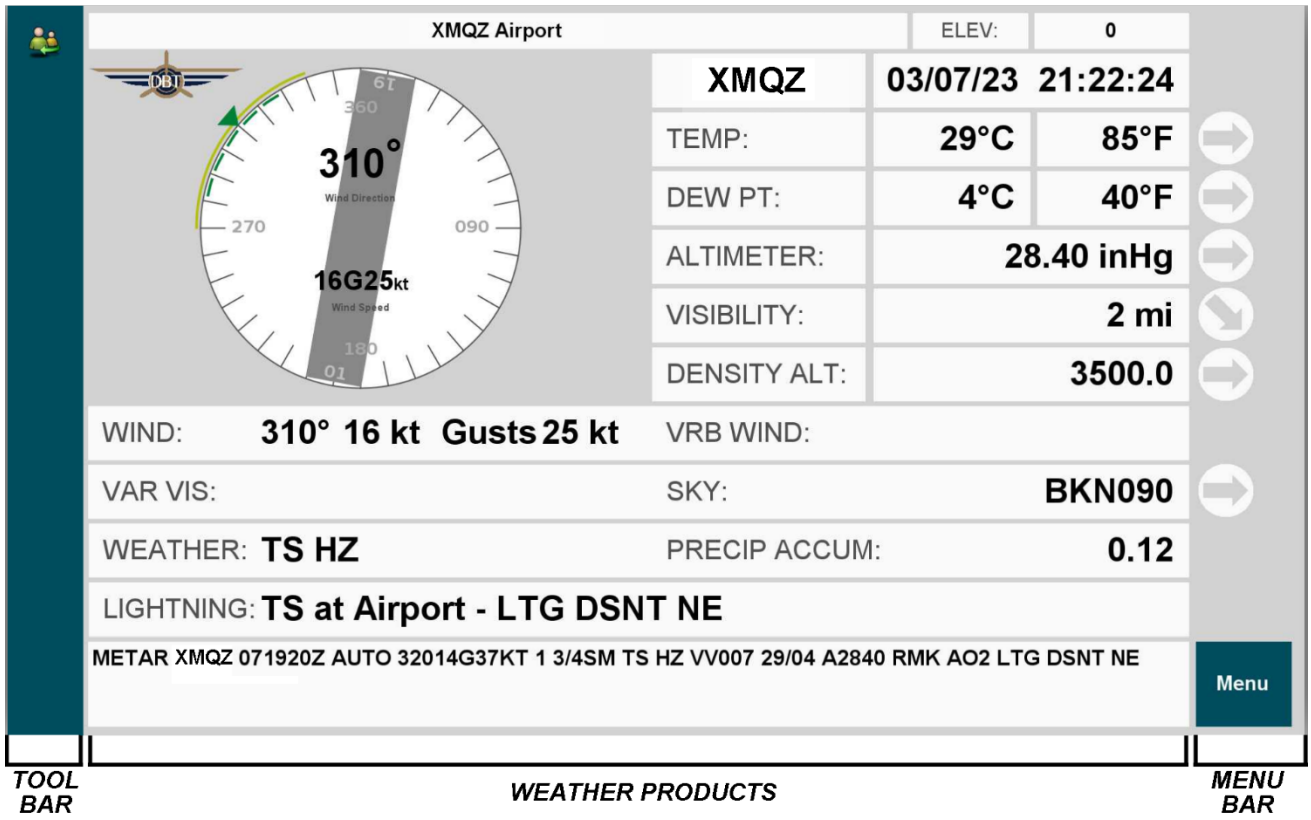


Figure 5. Weather View (Light Mode)

The Weather View has three sections:

- the Logijn/Logout button in the teal tool bar at the left;
- the weather products in the middle; and
- the Trend and Menu items in the gray menu bar — the Menu items vary depending on the privileges of the position user that is logged in.

3.1 LOGIN/LOGOUT BUTTON

If there is a need to change access to Observer or Technician credentials, log out of the current screen by clicking the logout button shown in Figure 6.

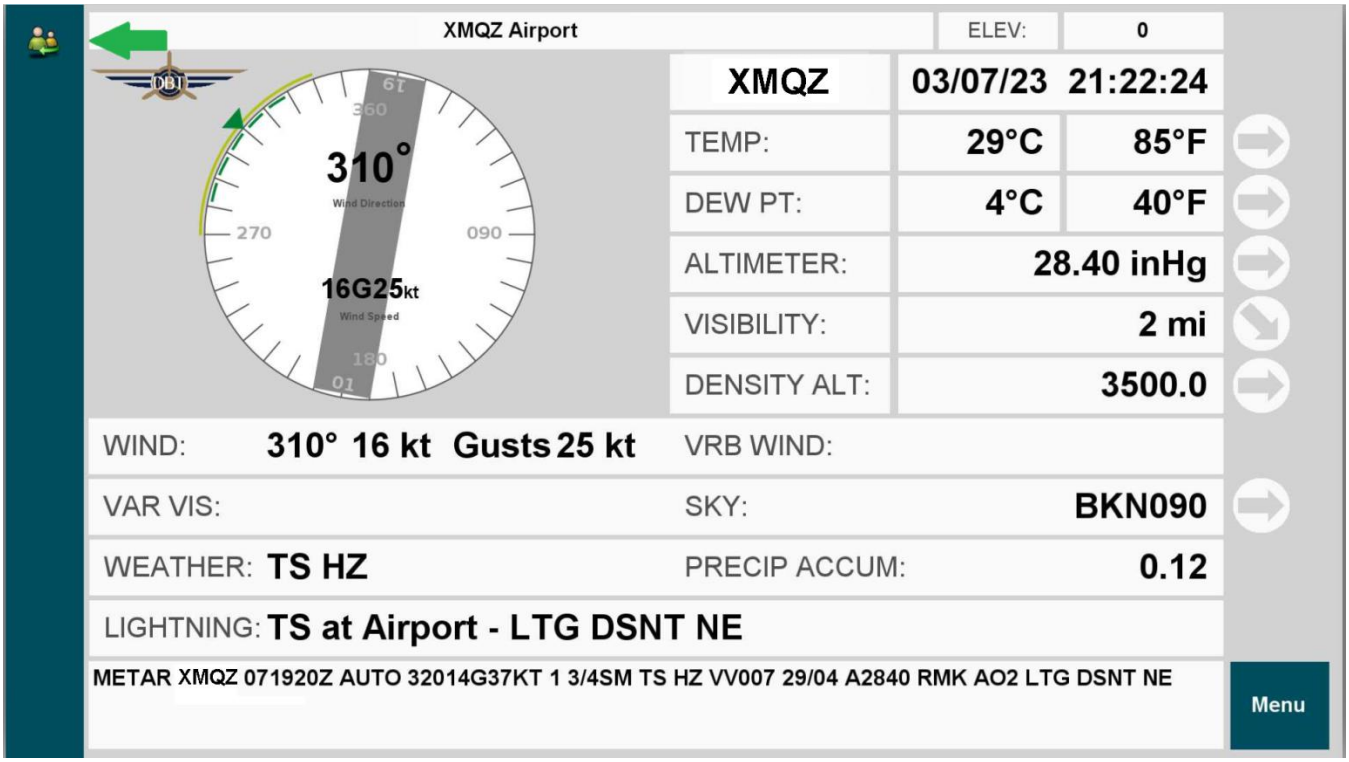


Figure 6. Click Logout Button to Log Out

If a dialog appears, click **OK** to confirm the logout.

Figure 7. Confirm Log Out

NOTE	Note that the logout confirmation popup only appears when logging out of the Observer or Technician position users.

It will then be possible to login to FlexClient as a different position user, or open FlexMon to log in with the required credentials.

3.2 WEATHER PRODUCTS

Some of the text boxes will not be populated when the FlexClient Weather View first opens. The FAA algorithms require moving averages to be applied to most sensor data. Before a data product is available, 80% of the full complement of data required for these moving averages is required to be present. As seen in Table 2, it takes a little while from the time an AWOS is turned on, or reset, before each meteorological data product becomes available. If a product is unavailable while a report is being published (such as in the audio to a pilot or a METAR on the NADIN port), the product will be published as "missing." In audio reports, the word, "missing" will be announced. In METARs the data product will be omitted and a remark in the message will indicate that information is not available.

Table 2. Delays in Report Generation due to Averaging

Data Product	Data Product Delay (minutes)
Sky Condition	28.5*
Visibility / Precipitation Identification	8
Temperature	4
Dew Point	4
Wind "Speed and direction"	1.5
Wind "Variable Winds"	1.5
Wind "Gust"	8
Altimeter Setting	1
Density Altitude	4
Lightning	No delay, this value is weather dependent. thunderstorms are reported as they occur and reported for 15 minutes from when the thunderstorm was detected.
Precipitation Accumulation	Processing and reporting the precipitation accumulation is started after the first hourly METAR observation, which appears at the bottom of the display page

* Sky condition requires 95% of its data to determine.

Text boxes will remain unpopulated if the corresponding sensor is not installed.

A yellow X will appear in the text box when the corresponding sensor is installed, but the data product has expired or is missing (Figure 8). A communication failure with the sensor or a determination that the data are invalid are typical reasons for this.

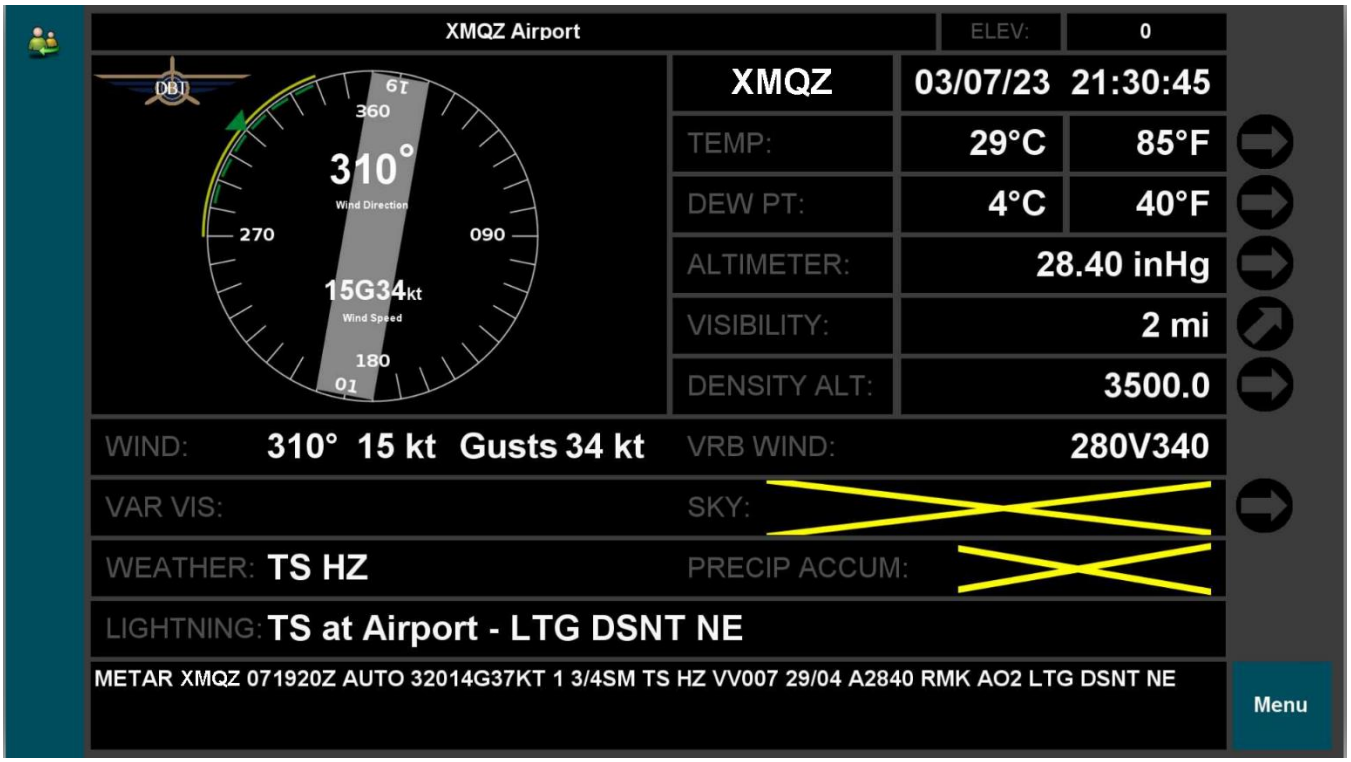


Figure 8. Weather View with Missing or Expired Data

Depending on the specific text box, a data product will expire when the data stream stops or gets interrupted for about 2–5 minutes.

A red X will appear in the text boxes when the data become corrupted or when the network connection between the DCP and the CDP is broken.

3.2.1 Wind

The wind panel (Figure 9) shows wind speed and wind direction are two-minute running averages calculated from sensor readings taken at one-second intervals. The wind direction is in degrees relative to magnetic North; wind speed values are in knots.

- The current wind direction is shown on a graphic dial that also shows the two-minute (green) and ten-minute (yellow) wind direction ranges along its rim.
- The wind direction is also shown numerically in the upper text box within the dial.
- The wind speed is shown in the lower text box within the dial. When present, wind gusts and variable winds are shown instead in the graphic dial.

The wind direction, speed, and gusts (if present) are also listed in a text box below the graphic dial.

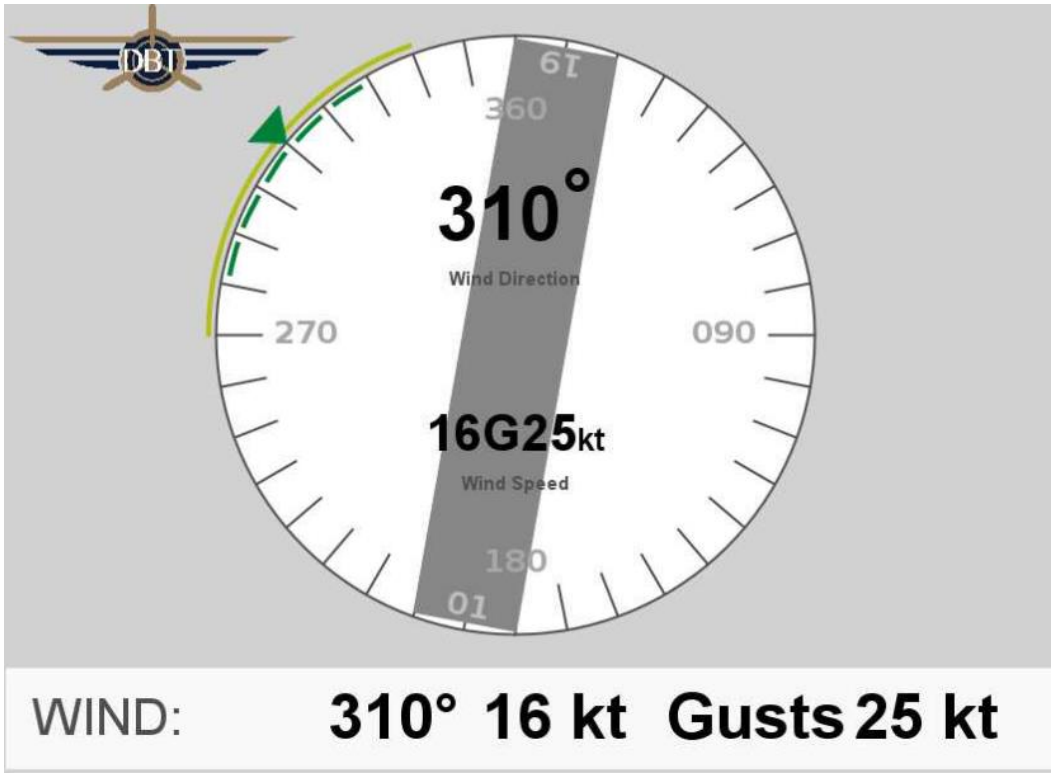


Figure 9. Wind Display

3.2.1.1 Wind Direction

The most recent wind direction value is shown on the graphic 360° dial and is displayed in the upper text box within the dial. The wind direction is a two-minute average calculated by the CDP and is updated every 5 seconds. Wind direction is reported in degrees.

3.2.1.2 Wind Direction Range

The outer rim of the wind dial shows the two-minute and ten-minute wind direction ranges. The two-minute range is shown in green bars, and the ten-minute range is shown as a solid yellow band. The

range increases or decreases in steps of 10°, with the outermost edges showing the wind direction extremes for the averaging period.

3.2.1.3 Wind Speed

The most recent instantaneous wind speed value is shown in the lower text field inside the dial, with values ranging from 0 knots to 120 knots. This wind speed is a two-minute average calculated by the CDP and is updated every 5 seconds. When the wind speed is less than three knots, the system indicates calm conditions.

3.2.1.4 Wind Gust

Wind gusts are reported when the difference between the maximum and minimum wind speeds measured over the past 10 minutes is 10 knots or greater. When present, wind gusts and variable winds are shown instead of the wind speed in the graphic dial and are also listed in a text box below the graphic dial.

3.2.1.5 Variable Wind Direction

Variable Wind Direction, when present, is shown in a text box to the right of the Wind text box.

Figure 10. Wind Test Boxes

Variable wind is reported when the wind direction varies around the two-minute average wind direction by 60 degrees or more, and the wind speed is more than 6 knots.

The displayed value shows the upper and lower ends of the direction variation, separated by a "V". As an example, a displayed value of ***040V130*** would mean the direction is varying between 40° and 130°.

The display will show simply ***VRB*** if:

- The wind speed is more than 6 knots and the direction is varying by more than 180°.

or

- The wind speed is 3–6 knots and the direction varies by 60 degrees or more.

3.2.2 Temperature and Dew Point

The Temperature fields display the most recent reportable values for Air Temperature and Dew Point (Figure 11).

TEMP:	29°C	85°F
DEW PT:	4°C	40°F

Figure 11. Temperature and Dew Point Display

3.2.2.1 Air Temperature

The Air Temperature is a five-minute average calculated by the CDP from readings taken by the Temperature/Relative Humidity sensor at one-second intervals. It is reported in both °C and °F and is *updated every 5 seconds.* The reportable range is -40 to +60°C.

3.2.2.2 Dew Point

The Dew Point temperature is a five-minute average calculated by the CDP from temperature and Relative Humidity sensor readings taken at one-second intervals. It is reported in both °C and °F and is *updated every 5 seconds*. The reportable range is -76 to +60°C.

3.2.3 Air Pressure

The Air Pressure fields (Figure 12) display the most recent reportable values for the Altimeter setting and, if applicable, Density Altitude (ft above mean sea level). These values are updated every 5 seconds.

Figure 12. Air Pressure Display

3.2.3.1 Altimeter Setting

The Altimeter setting is the pressure value to which the altimeter of an aircraft on the ground is set so that it will indicate the MSL (mean sea level) elevation of the airport. The two pressure sensors in the AWOS barometer must agree to within 0.04 inHg and the temperature inside the sensor housing must be >-40°C and <60°C for altimeter setting to be reported. The reporting units are inHg.

3.2.3.2 Density Altitude

Density Altitude is the altitude in the standard atmosphere where the air density is equivalent to that of the airport. This is used by pilots to determine aircraft performance. Density Altitude is not reported if it differs by less than 1000 ft from the field elevation. Density altitude is less likely to be reported at lower temperatures.

3.2.4 Visibility

The Visibility field (Figure 13) is a ten-minute average calculated each minute from sensor readings taken at ten-second intervals. It is reported in statute miles.

Figure 13. Visibility Display

3.2.5 Variable Visibility

Variable Visibility (Figure 14) is determined based on an algorithm that analyzes the one-minute average visibility values. Each one-minute average is compared to the previous one-minute average, and if the difference is greater than 0.5 miles, a positive or negative change is logged. The algorithm then evaluates the past ten minutes worth of this logged data, noting each recorded change. If three or more changes have been logged over the ten-minute period, along with two or more sign changes, variable visibility is reported. Otherwise, the field is left blank.

Figure 14. Variable Visibility Display

3.2.6 Sky Condition

The system reports sky condition (Figure 15) is based on cloud cover measurements taken by the laser ceilometer.

Figure 15. Sky Condition Display

When clouds are present, the Sky Condition field shows a cloud cover description followed by the height of the cloud base. The type of cloud cover is represented by the following codes.

- **CLR/SKC**—sky clear (no clouds below 12,500 ft); CLR is displayed when the data are generated automatically from the ceilometer
- **FEW**—few (≥6% to 24% sky cover)
- **SCT**—scattered (≥25% to 49% sky cover)
- **BKN**—broken (≥50% to 87% sky cover)
- **OVC**—overcast (>87% sky cover)
- **VV**—obscured (cloud bases at surface/fog)

Cloud height is shown in ***hundreds of feet*** (12,000 ft, for example, is represented by "120"). The Sky Condition is estimated based on conditions directly above the ceilometer over a 30-minute sliding window.

3.2.7 Weather

The Present Weather field (Figure 16) shows the calculated present weather value. Present weather is derived from data for several parameters, including air temperature, dew point temperature, visibility, lightning (when available), and precipitation type and rate data from the present weather sensor.

Present weather data in this window is averaged over a ten-minute period by the present weather sensor and updated every 5 seconds. Present weather is reported in codes. Table 3 lists the codes reportable by the AWOS.

Figure 16. Present Weather Display

Table 3. Present Weather Codes

Intensity		Descriptor		Phenomena			
-	light	*BC**	patches	*BR*	mist	*HZ*	haze
(blank)	moderate	*BL**	blowing	*DS**	dust storm	*IC**	ice crystals
+	heavy	*DR**	low drifting	*DU**	widespread dust	*PL**	ice pellets
VC	in vicinity	*FZ*	freezing	*DZ*	drizzle	*PO**	well-developed dust/sand whirls
		*PR**	partial	*FC**	funnel cloud, tornado, waterspout		
		*M**	shallow			*RA*	rain
		*SH**	shower			*SA**	sand
		TS	thunderstorm	*FG*	fog	*SG**	snow grains
				*FU**	smoke	*SN*	snow
				GR	hail	*SQ**	squalls
				*GS**	small hail/ snow pellets	*SS**	sandstorm
						*VA**	volcanic ash

* These conditions are not automatically reported, and will only appear if entered manually in the METAR.

Adapted from FMH-1 and FAA Order 7900.5B.

3.2.8 Precipitation Accumulation

The Precipitation Accumulation field (Figure 17) shows the amount of precipitation measured during the past hour, counting from the beginning of the hour. (A measurement reported at 2:15, for example, would show the amount of precipitation measured over the past 15 minutes.) Precipitation is reported in inches and updated every 5 seconds. The precipitation value is reset to 0 at the top of every hour.

Figure 17. Precipitation Accumulation Display

3.2.9 Lightning

The Lightning field (Figure 18) reports thunderstorm/lightning observations based on lighting strike measurements taken by the Thunderstorm/Lightning sensor. The report provides the direction of the thunderstorm and its proximity to the airport.

Figure 18. Lightning Display

- If strikes are detected within 0–5 nautical miles, the text display will show "TS at Airport". This will be voiced in the AWOS voice message as "Thunderstorm at the airport".
- If strikes are within 5–10 nautical miles, the text display will show "Thunderstorm in Vicinity". This will be voiced in the AWOS voice message as "Thunderstorm in the vicinity".
- If strikes are detected within 10–30 nautical miles, the text display will show "LTG DSNT" followed by the direction abbreviation. The AWOS voice message will report "Lightning" followed by the direction.
- If strikes are reported in 4 or more non-contiguous quadrants, the display will show "ALQDS". This will be voiced in the AWOS voice message as "Lightning all quadrants".
- If no strikes are detected, the text display will be blank, and no lightning data will be included in the AWOS voice message.

3.2.10 METAR

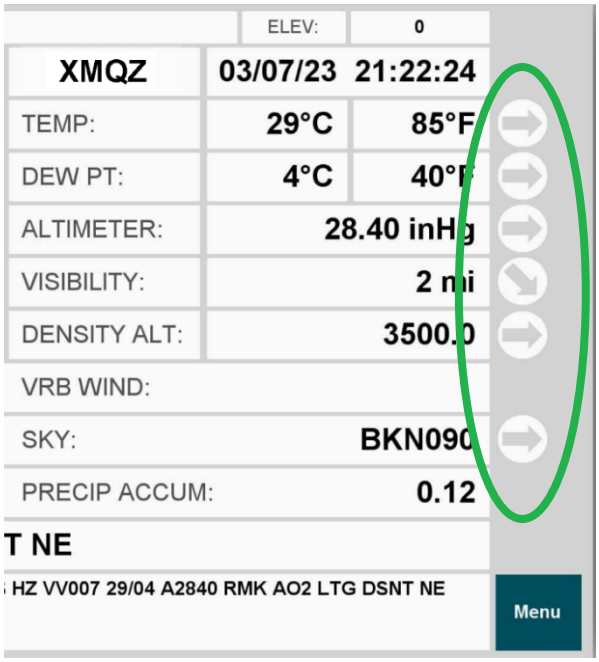
The METAR field (Figure 19) shows the most recently generated or transmitted METAR report.

Figure 19. METAR Display

METAR reports are generated automatically and can have a remark added or be edited manually as described in Section 5.2 and Section 5.3 by a user with the Observer position credentials.

3.3 TREND AND MENU ITEMS

The right column shows the trend and menu items (Figure 20).



Trend Indicator	Explanation
	Increasing Trend
	Stable
	Decreasing Trend

Figure 20. Weather View Showing Trend Indicators

The trend indicator shows whether the weather product in the text box next to the trend indicator is increasing, stable, or decreasing.

- For Temperature, Dew Point, Visibility, and Density Altitude, the trend is determined by subtracting the current 1-minute average from the 10-minute average of that data product. The trend is reported as
  decreasing if the difference is more than -0.5;
  stable if -0.5 ≤ difference ≤ 0.5; and
  increasing if the difference is more than 0.5.

- For Altimeter, the trend is determined by subtracting the current 1-minute average from the 10-minute average. The trend is reported as
  decreasing if the difference is more than -0.01;
  stable if -0.01 ≤ difference ≤ 0.01; and
  increasing if the difference is more than 0.01.

- For Sky Condition, the trend is determined by subtracting the current 1-minute average of the Layer 1 height from the 10-minute average of the Layer 1 height. The trend is reported as
  decreasing if the difference is less than 0;
  stable if the difference is 0; and
  increasing if the difference is greater than 0.

Use the **Menu** button to change between Light Mode and Dark Mode, as explained at the start of Chapter 3, and to access log files (Chapter 4) and other features (see Chapter 5).

4. LOG FILES

First, click the **Menu** button (Figure 21) to access further options.

These weather observation log files are available without logging in (Weather view) and are also available to the other user positions that hat login credentials.

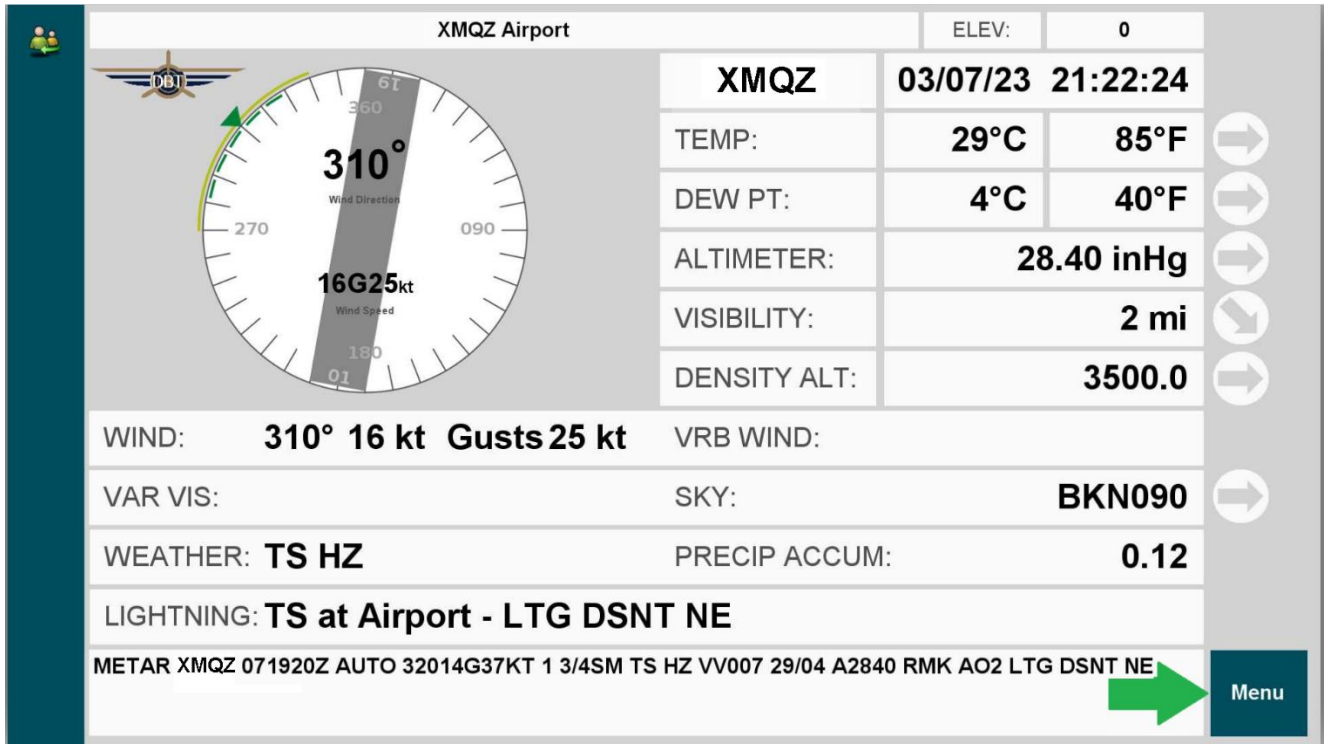


Figure 21. Click the Menu Button to Access Further Options

4.1 ONE MINUTE LOG

First, click the **One Minute Log** button (Figure 21) to access the one-minute weather logs to view or save.

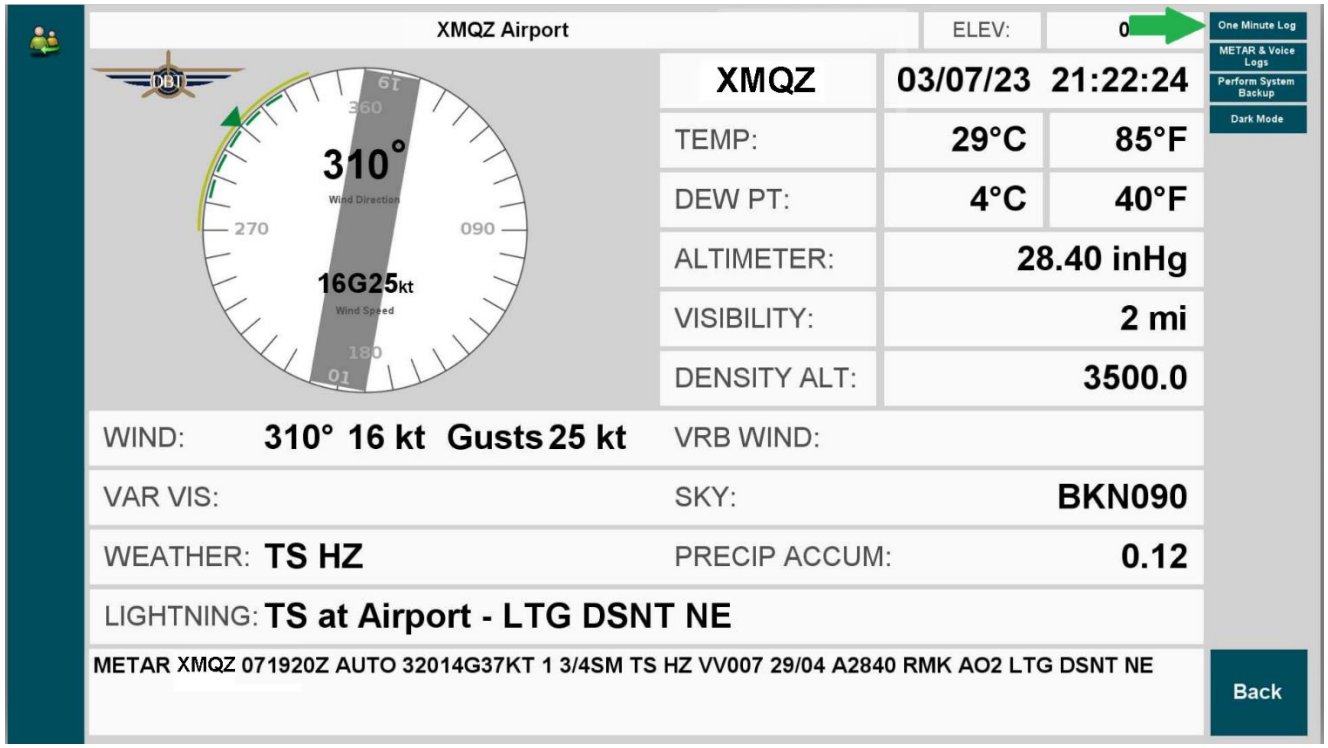


Figure 22. One Minute Button

A one-minute **Time Interval Summary** (Figure 23) will pop up. Either enter the start and end date/time ranges desired for then one-minute logs or use the built-in calendar to select the dates.

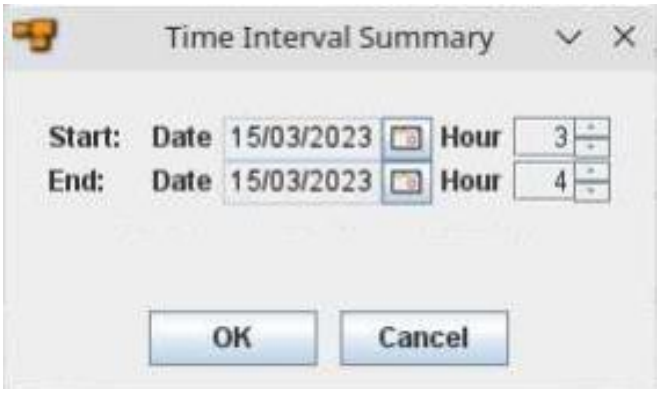


Figure 23. Select Time Interval for One Minute Logs

The log file (Figure 24) will then appear. As in the weather products shown in the FlexClient Weather View, unavailable data (sensor not installed, no data reported, or insufficient time elapsed to display that weather product) will have a blank, and missing data will be indicated by ////.

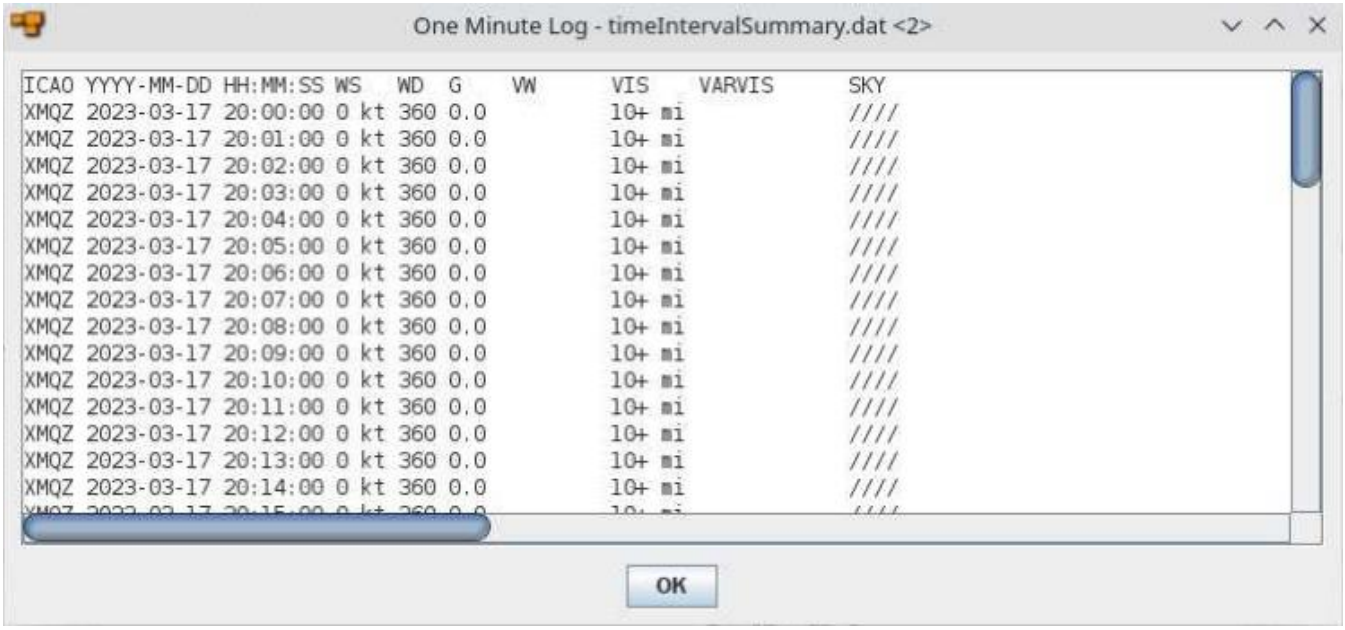


Figure 24. One-Minute Log Summary

The type of data contained in each field of data in a data log is indicated by an abbreviated heading at the top of the screen. Table 4 provide examples of the headings and what each headings means.

Table 4. One-Minute Log Headings

One-Minute Log	
Heading	**Parameter**
ICAO	Airport ICAO Identifier
YYYY-MM-DD	Date (Year/Month/Day)
HH:MM:SS	Time (hour:minute:second) at which log was generated
WS	Wind Speed (knots)
WD	Wind Direction
G	Wind Gust Speed, maximum recorded gust (knots)
VW	Variable Wind Speed Range (knots)
VIS	Visibility (stature miles)

Table 4. One-Minute Log Headings

One-Minute Log	
VARVIS	Variable Visibility (Istautute miles)
SKY	Sky Condition as reported
TMP	Temperature (°C)
DP	DewPoint (°C)
RH	Relative Humidity (%)
DA	Densility Altitude (ft above mean sea level)
ALT	Altimeter (inHg)
RAIN	Precipitation Accumulation from top of the hour (0.01")
D	Day/Night Sensor (D/N)
PW	Present Weather
LTX	Thunderstorm/Lightning Detector report
AO	AO2 notation means the station is automated and has a precipitation discriminator; AO1 means automated but no precipitation discriminator
RMK	Remark (added manually)

Click **OK** to end viewing the logs or click **Save** to save the log file.

A dialog window (Figure 25) will pop up when the **Save** option is selected. Select where the log file will be saved. The default */opt/FlexIDS* location shown in **ERROR! NOT A VALID BOOKMARK SELF-REFERENCE.** appears. If you are using a USB drive as the destination for the log file, use the */home/awi/media* directory and double-click the USB flash drive. Name the file and click **Save**. The file should be a text file (.txt).

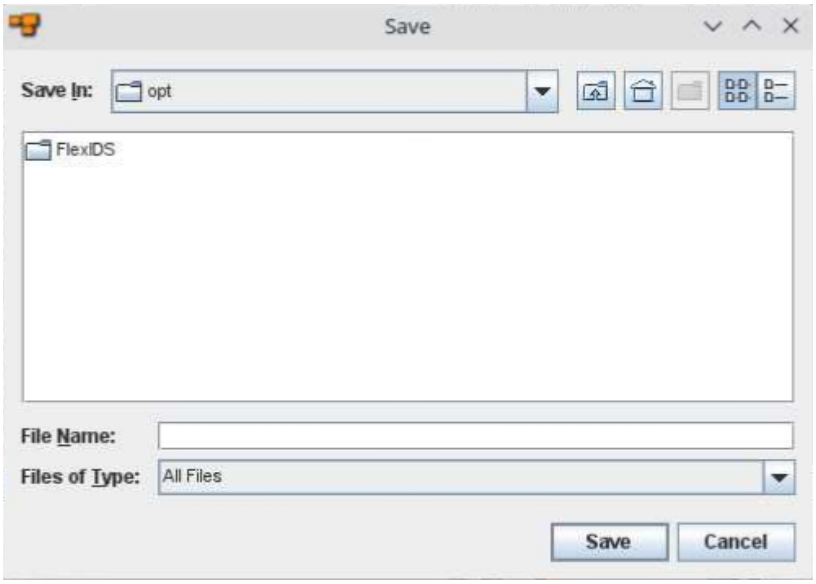


Figure 25. Select a Destination to Save the Log File

4.2 METAR AND VOICE LOGS

First, click the **METAR & Voice Logs** button (Figure 26) to access the METAR or Voice logs to view or save.

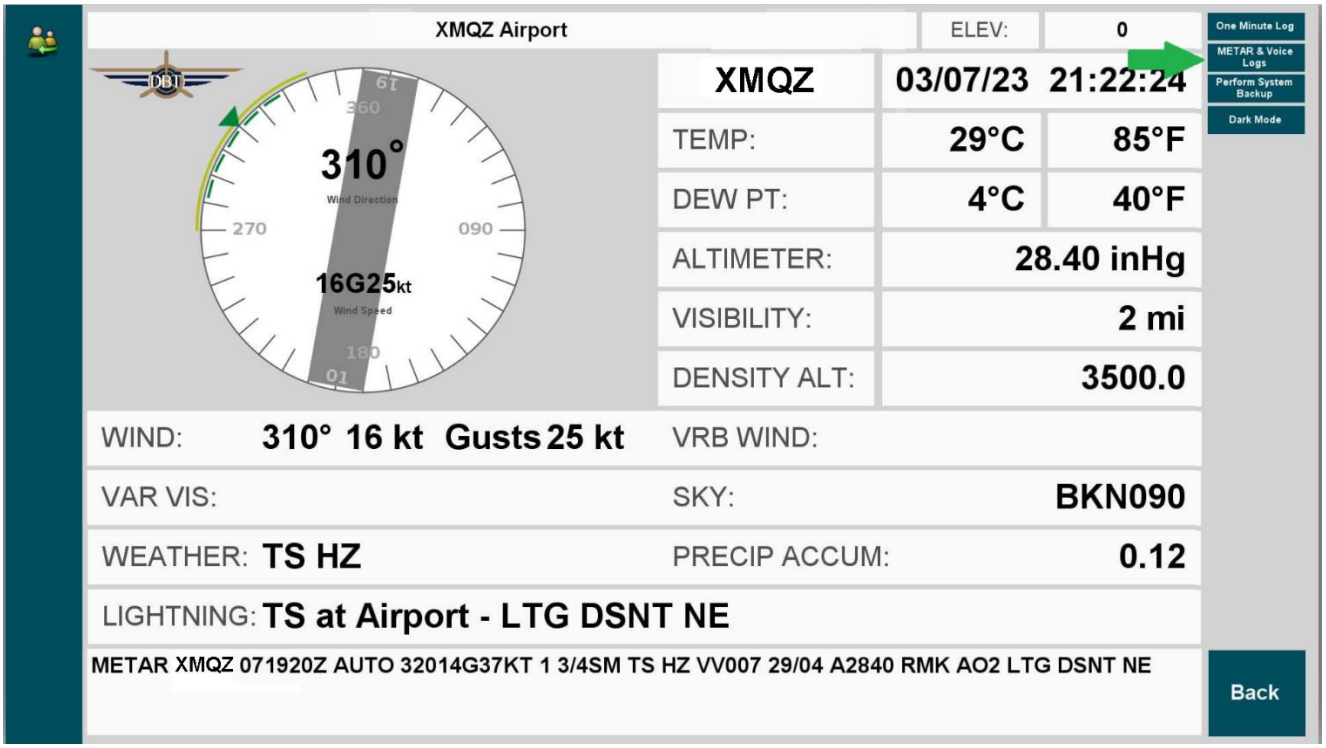


Figure 26. METAR & Voice Logs Button

A dialog box allowing you to select a **METAR Report** or an **AWOS Voice Report** (Figure 27) will pop up. Use the radio buttons to select which report. Either enter the start and end date/time ranges desired for the logs or use the built-in calendar to select the dates. Also select the corresponding hour desired for the start and end dates. Click **OK** when all the selections have been made.

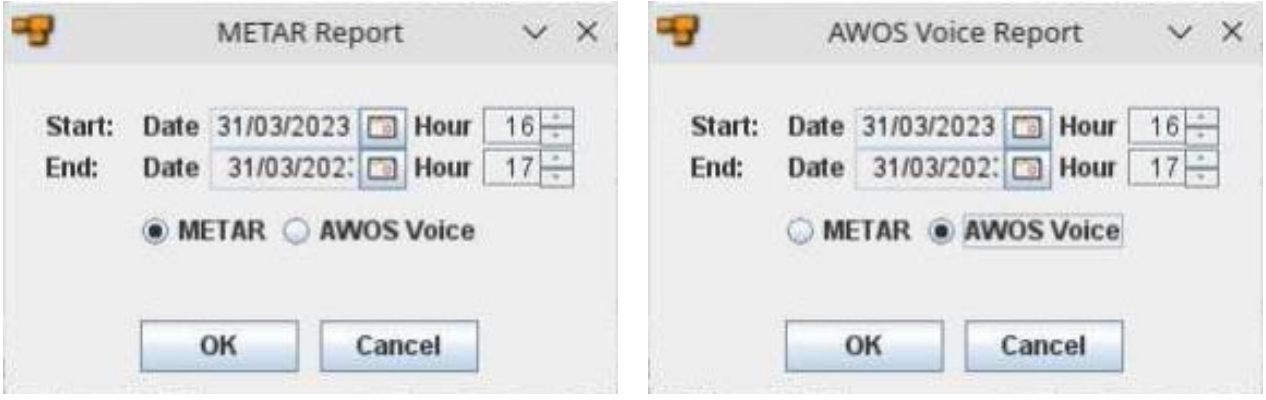


Figure 27. Select METAR or AWOS Voice Log and Start/End

Figure 28 and Figure 29 show samples of the METAR and AWOS Voice logs respectively that are produced.

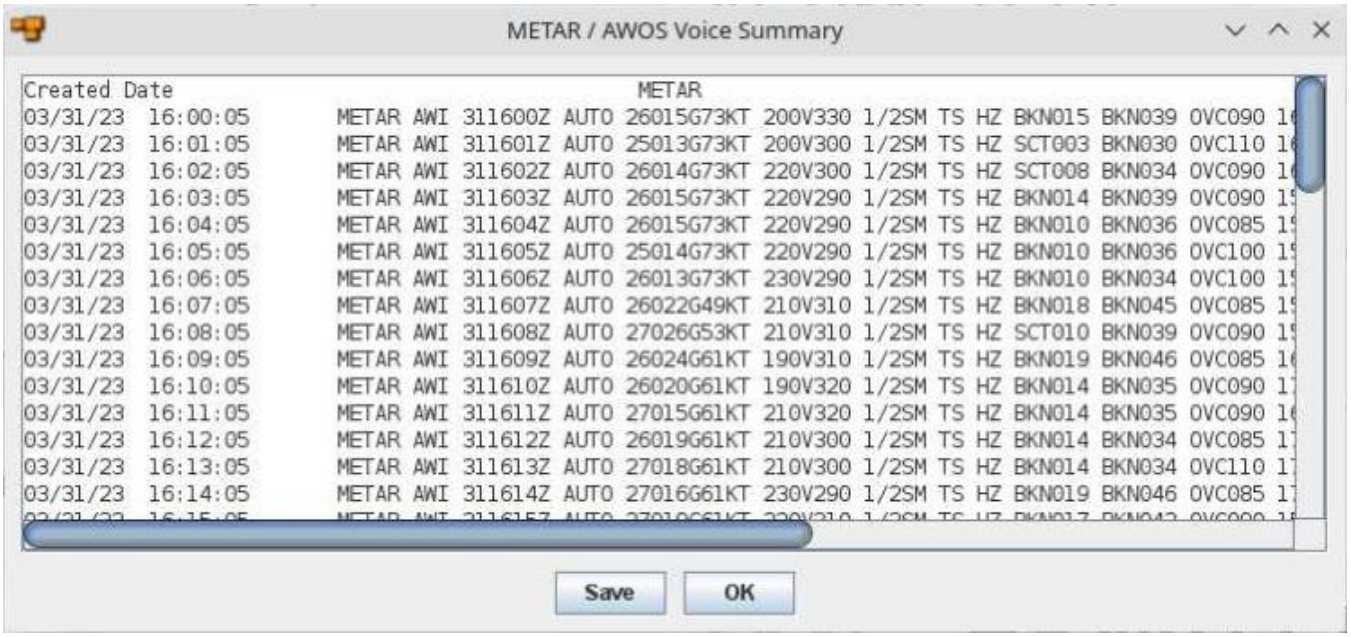


Figure 28. Sample METAR Logs

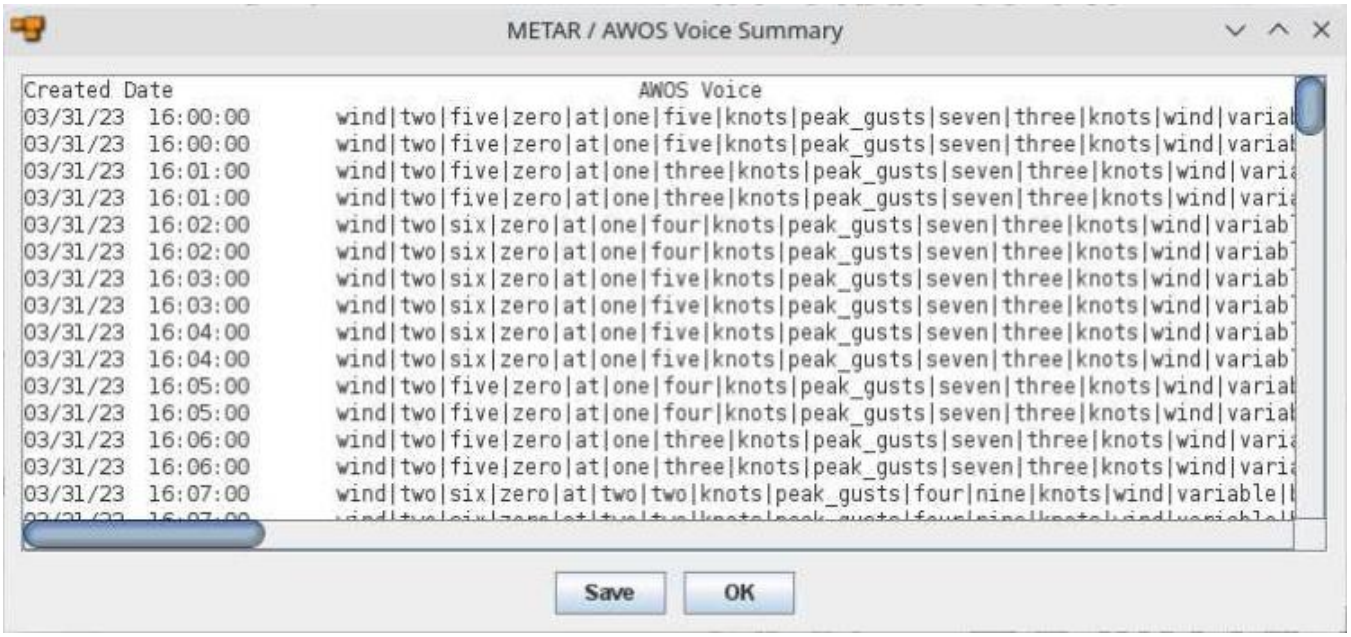


Figure 29. Sample AWOS Voice Logs

When a Voice Remark has been added (see Section 5.4), the AWOS Voice logs will include *phone_remark* after the text of the voiced output.

Click **Save** to save the log file or click **OK** when you have finished viewing them.

A dialog box will open to select a location to save the log file. Insert a USB drive into the OT computer. Use the */home/awi/media* directory and double-click the USB flash drive. Name the file and click **Save**.

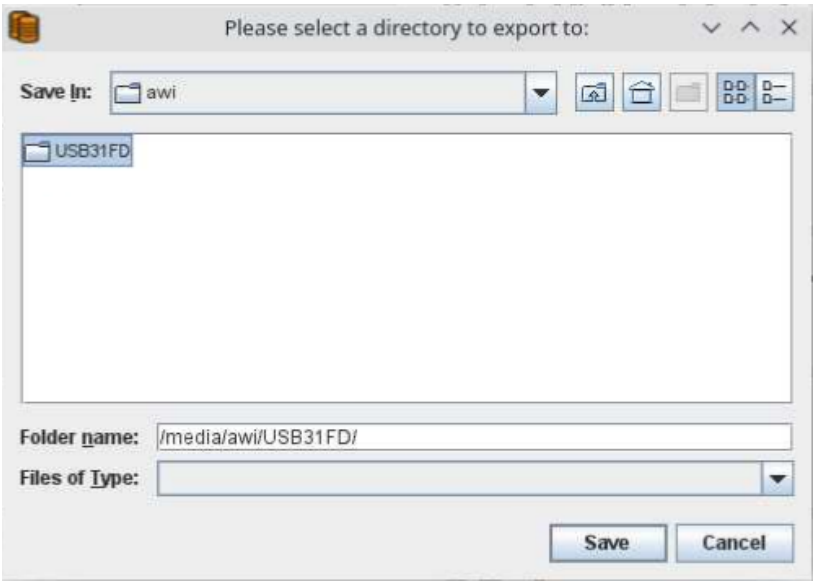


Figure 30. Select a Destination to Save the Log File

4.3 LOG RECOVERY

The log recovery zip file contains the weather data log files.

- One Minute logs
- METAR Report logs
- AWOS Voice Report logs

First, click the **Perform System Backup** button (Figure 31) to access to access the logs to recover.

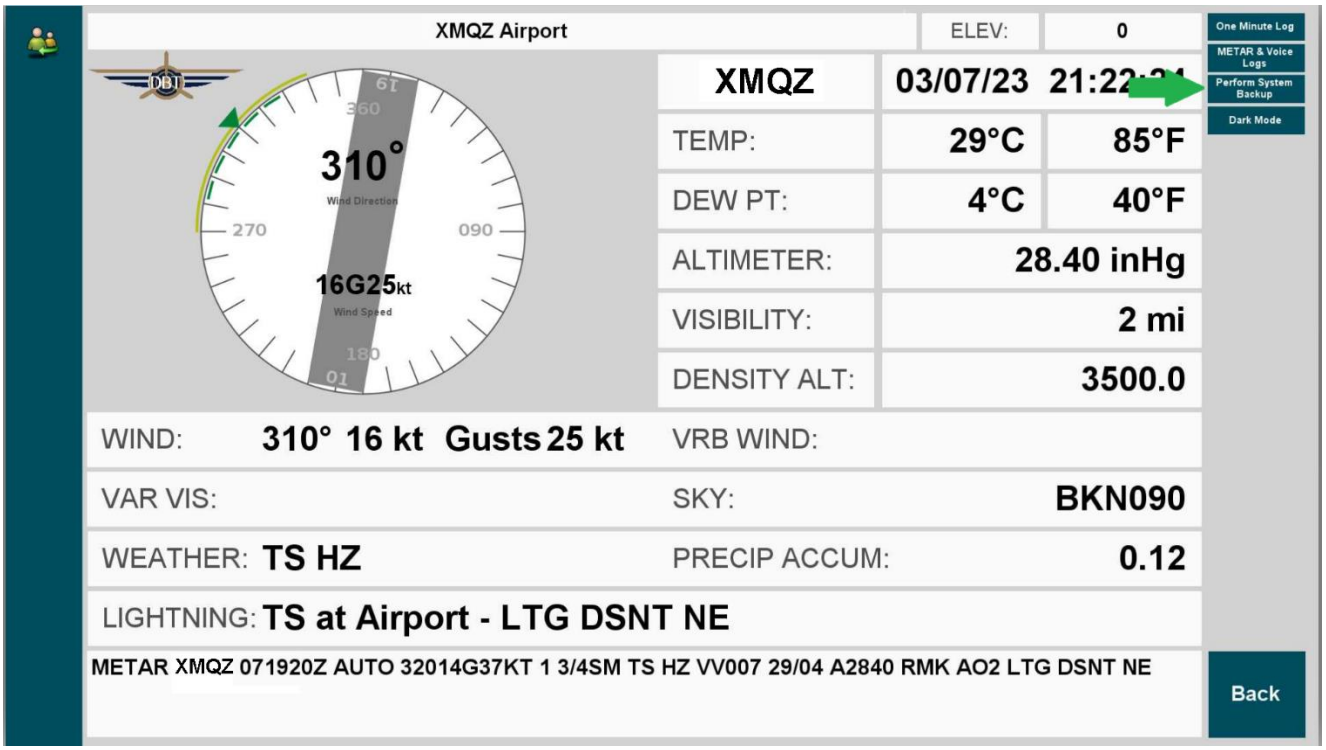


Figure 31. Perform System Backup Button

The logs files for the data retention period set at the factory will be saved in a zip file. The zip file will be named

Incident_datecode_filenanumber.zip

And will be located at this location.

/opt/FlexIDS/

5. ADDITIONAL FLEXCLIENT FUNCTIONS FOR POSITION USERS

Logging in with the Observer position credentials allows voice remarks and METAR remarks to be added to the METAR. Log out of the current screen by clicking the logout button shown in Figure 6. Then click **OK** to confirm the logout.

It will then be possible to log in to FlexClient as a position user. Enter *observer* or *technician* as the username, then enter the password and click **OK**.

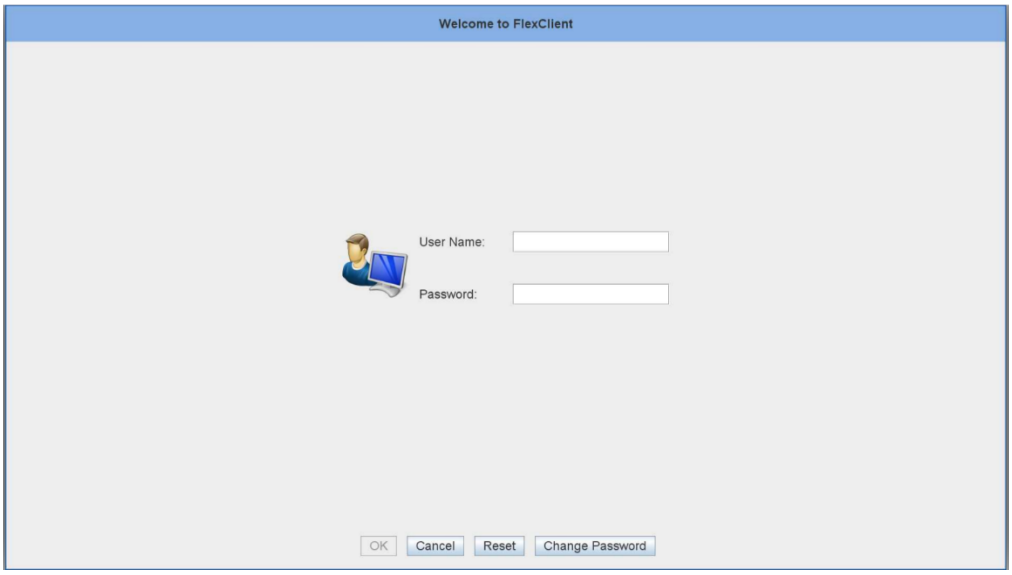


Figure 32. FlexClient Login Screen

5.1 ACCESS OTHER FUNCTIONS

Figure 33 shows the FlexClient view for either the Observer or the Technician position user. Click the **Menu** button to access additional functions.

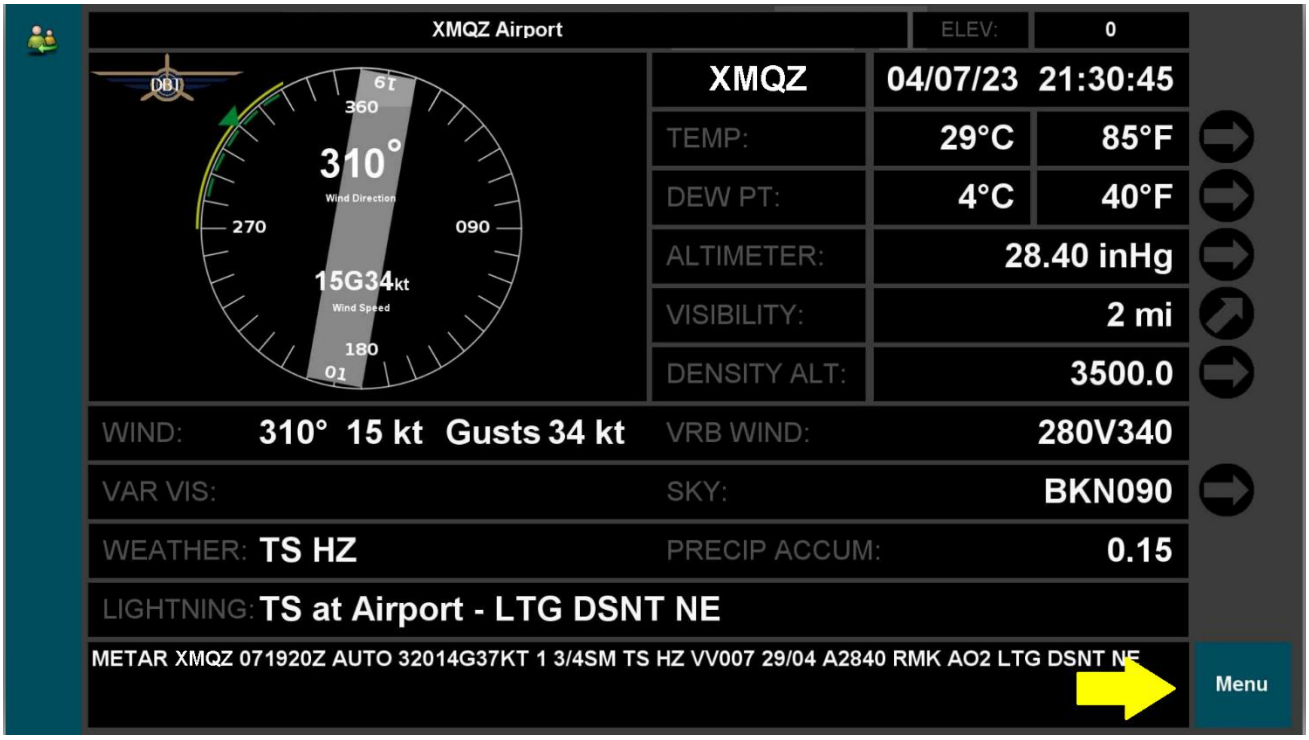


Figure 33. Click the Menu Button to Access Further Options

Figure 34 shows the FlexClient view for the Observer position users. Use the Dark Mode and Light Mode buttons to switch between the two views as explained in Chapter 3.

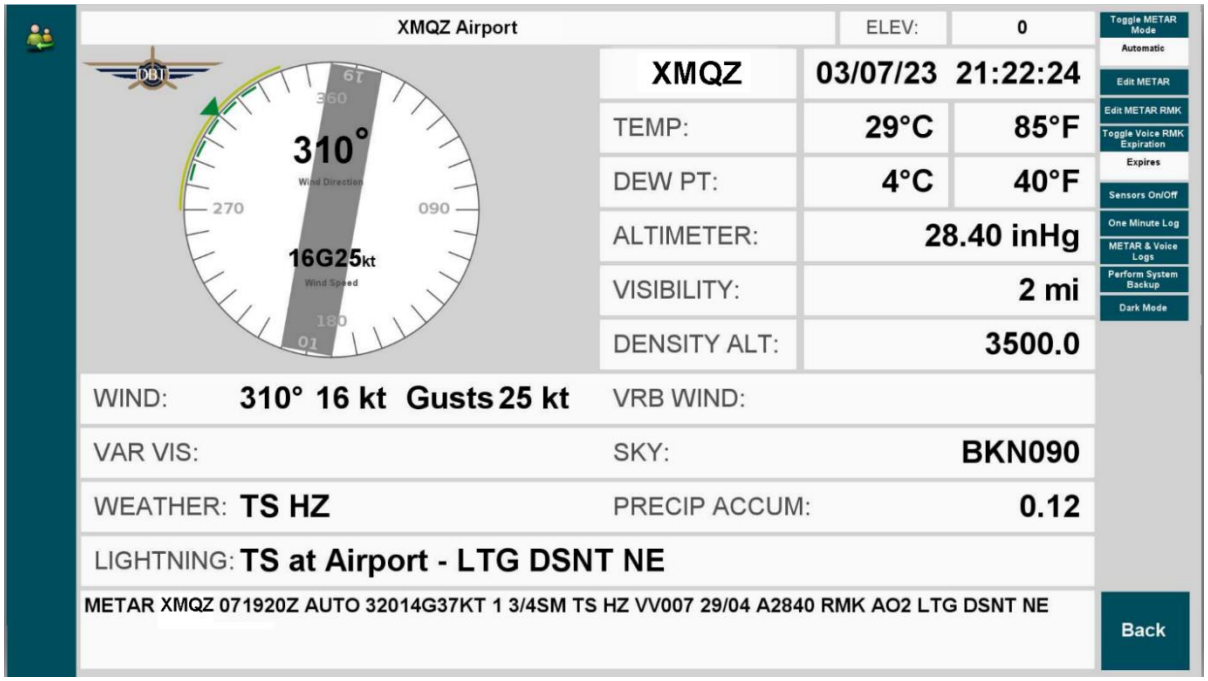


Figure 34. FlexClient View for Observer Position Users

Figure 35 shows the FlexClient view for the Technician position users. Use the Dark Mode and Light Mode buttons to switch between the two views as explained in Chapter 3. The FlexClient view for the Technician position is the same as the default weather view.

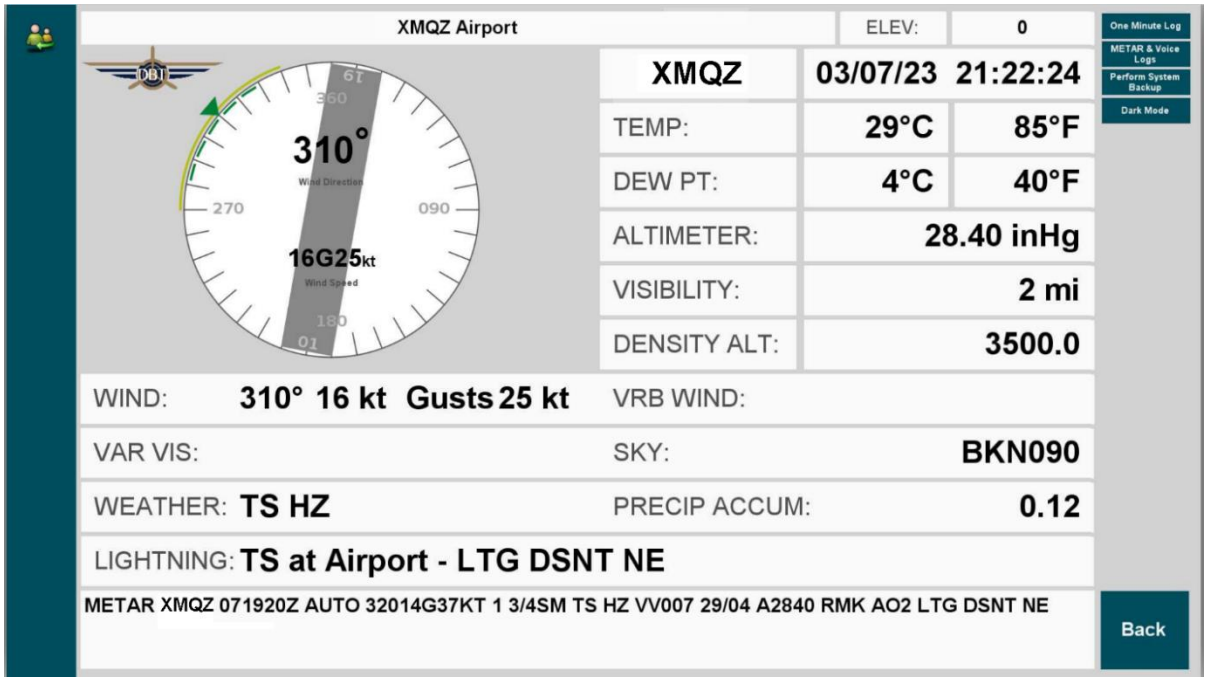


Figure 35. FlexClient View for Technician Position Users

5.2 AUGMENT A METAR

Augmenting a METAR is restricted to an Observer position user.

Refer to Section 5.3 for instructions on how to edit the entire METAR message including the remark.

The AWOS must be in the Automatic Mode for an observer to enter a weather-related remark that will be appended to automatically generated METAR.

First, click the **Menu** button (Figure 36) to access further options.

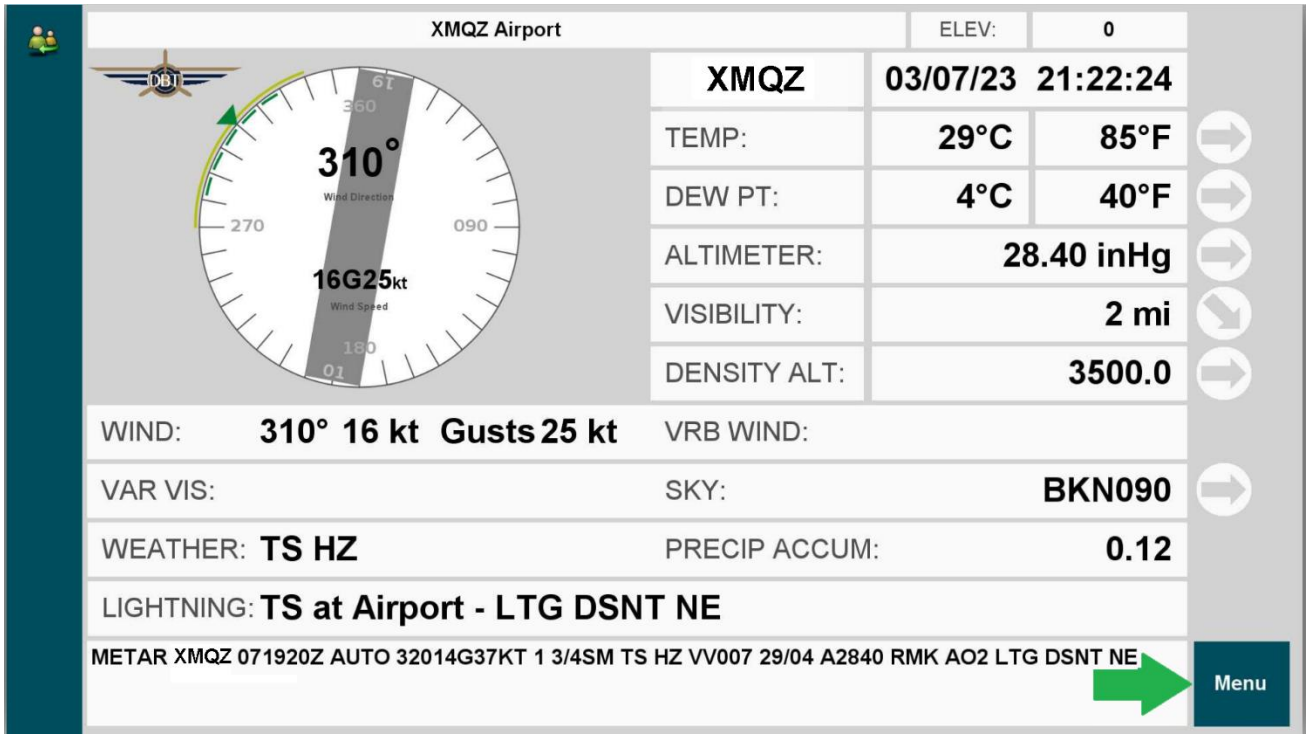


Figure 36. Click the Menu Button to Access Further Options

Click **Toggle METAR Mode** to select the **Automatic** mode (Figure 37). The current operation mode is shown in the box just below **Toggle METAR Mode**.

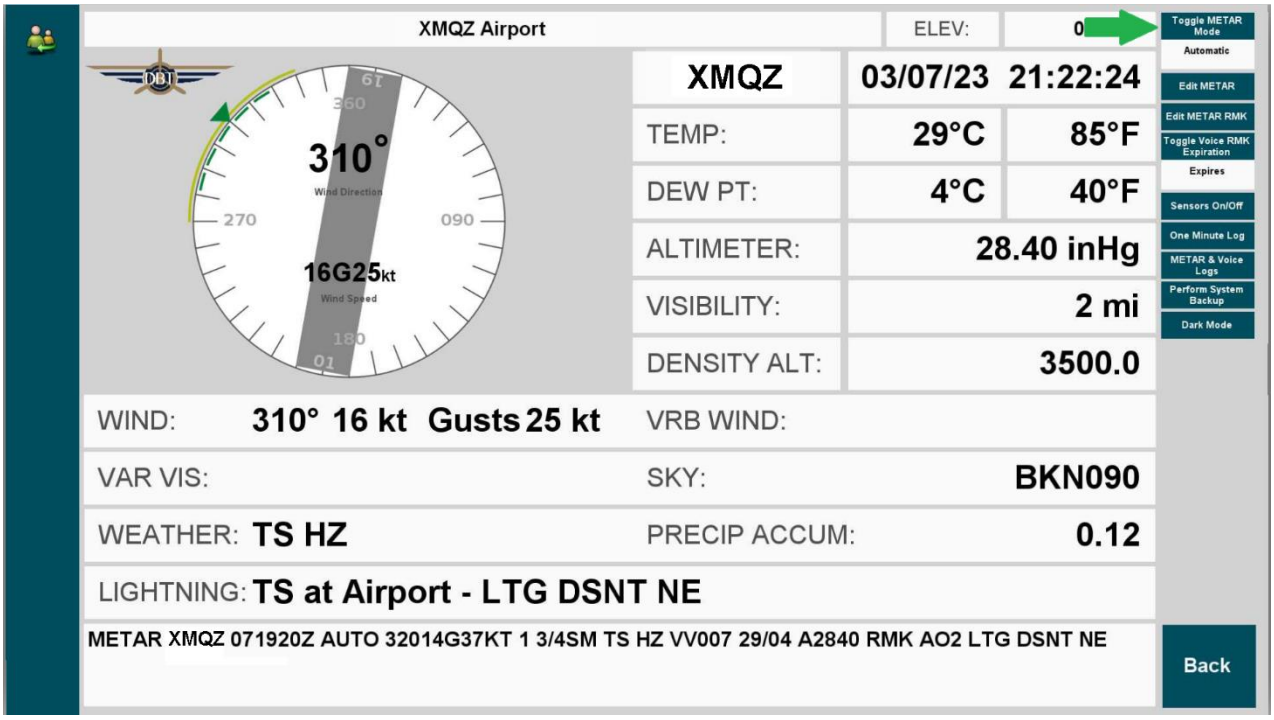


Figure 37. Click the Toggle METAR Mode Button to Select the Desired Mode

Click the **Edit METAR RMK** button (Figure 38) to append a METAR Remark to the METAR message.

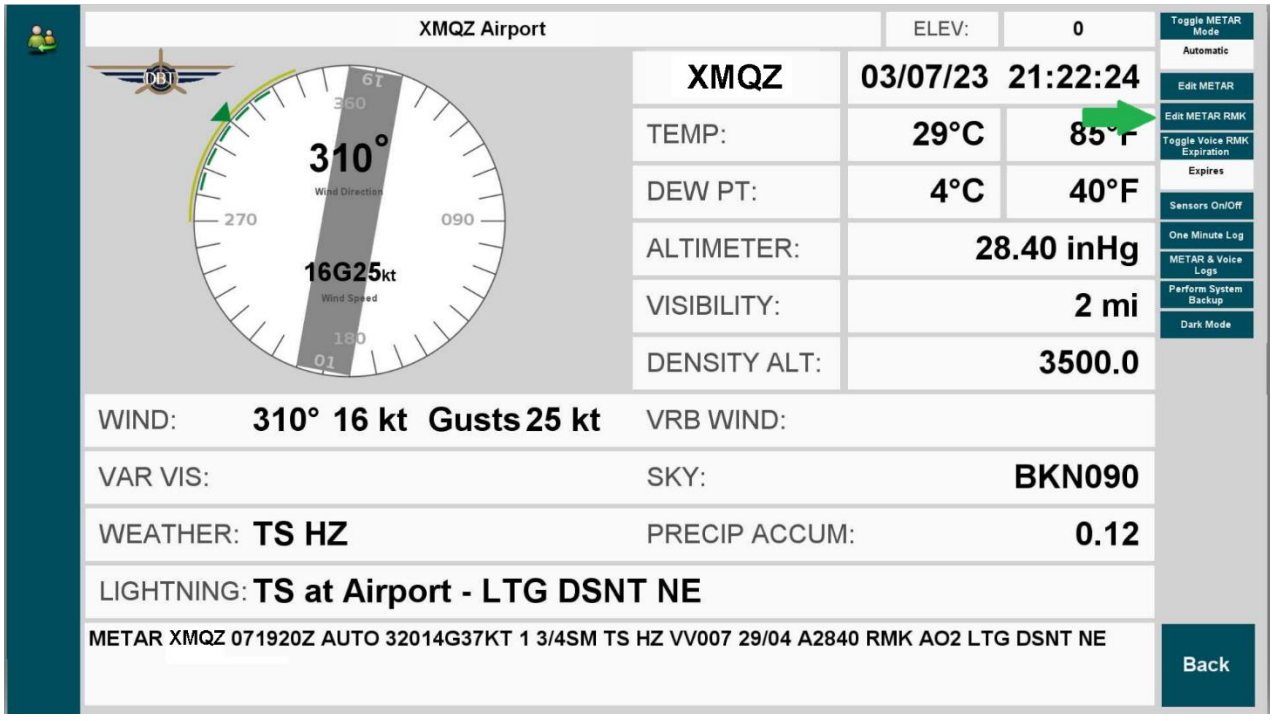


Figure 38. Select "Edit METAR RMK"

A dialog box will open, allowing a remark to be created (Figure 39).

Figure 39. Enter the Remark in the Dialog Box

Select "Persistent" or "Revalidated" (Figure 40).

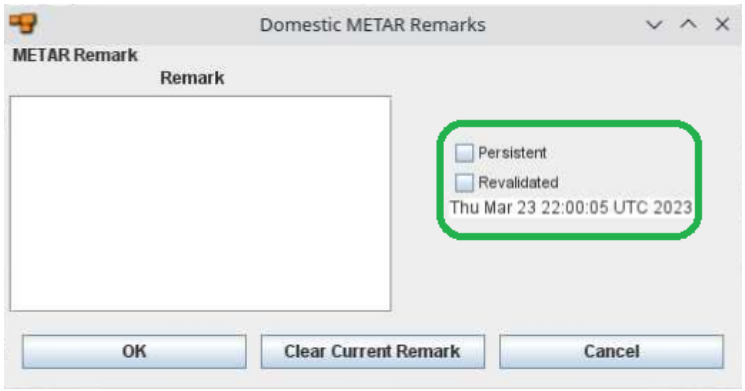


Figure 40. Select "Persistent" or "Revalidated" as Needed

- Unless Persistent or Revalidated is checked, the remark expires at the top of the hour.
- Check the Persistent checkbox to have the remark repeat in each METAR until the Persistent checkbox is unchecked.
- Check the Revalidated checkbox to have the remark remain in the METAR at the top of the hour instead of expiring. This may be repeated after the top of the hour.

Click **OK** once the desired METAR Remark and its occurrences have been entered.

Click the **Back** button when finished.

5.3 EDIT A METAR

Editing a METAR is restricted to an Observer position user.

Refer to Section 5.3 for instructions on how to enter a weather-related remark that will be appended to the automatically generated METAR.

The AWOS must be in the Manual Mode for an observer to edit the entire METAR message including the remark.

NOTE	Once the Manual Mode is selected, METAR logs will only populate after an edited METAR is sent as described in this section — the logs will *not* populate automatically every minute as they do in the Automatic Mode.

First, click the **Menu** button (Figure 41) to access further options.

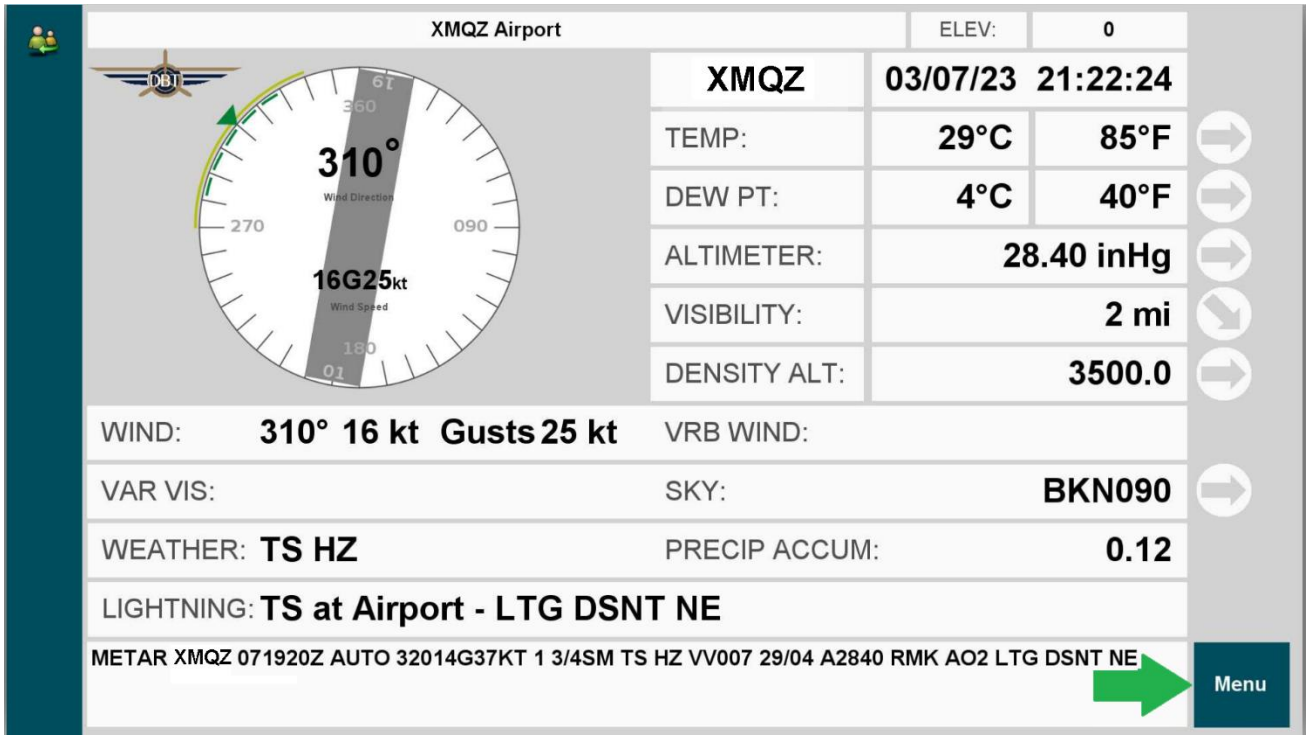


Figure 41. Click the Menu Button to Access Further Options

Click **Toggle METAR Mode** to select the **Manual** mode (Figure 42). The current operation mode is shown in the box just below **Toggle METAR Mode**.

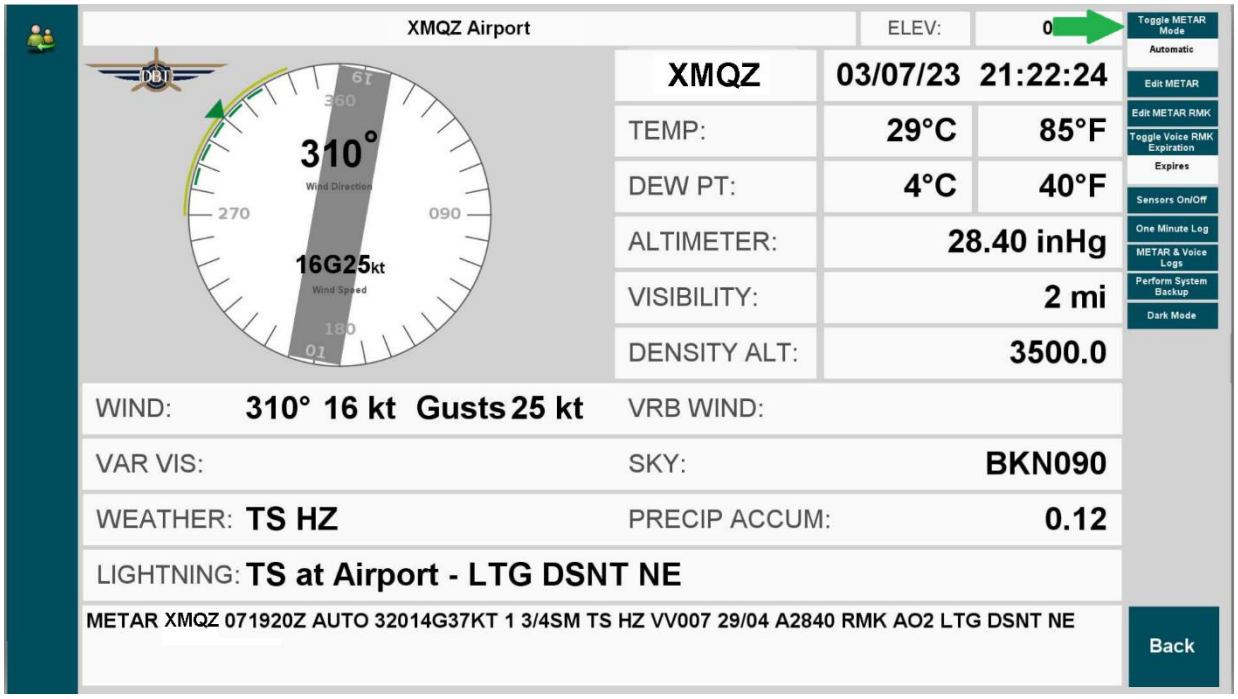


Figure 42. Click the Toggle METAR Mode Button to Select the Desired Mode

Click the **Edit METAR** button (Figure 43).

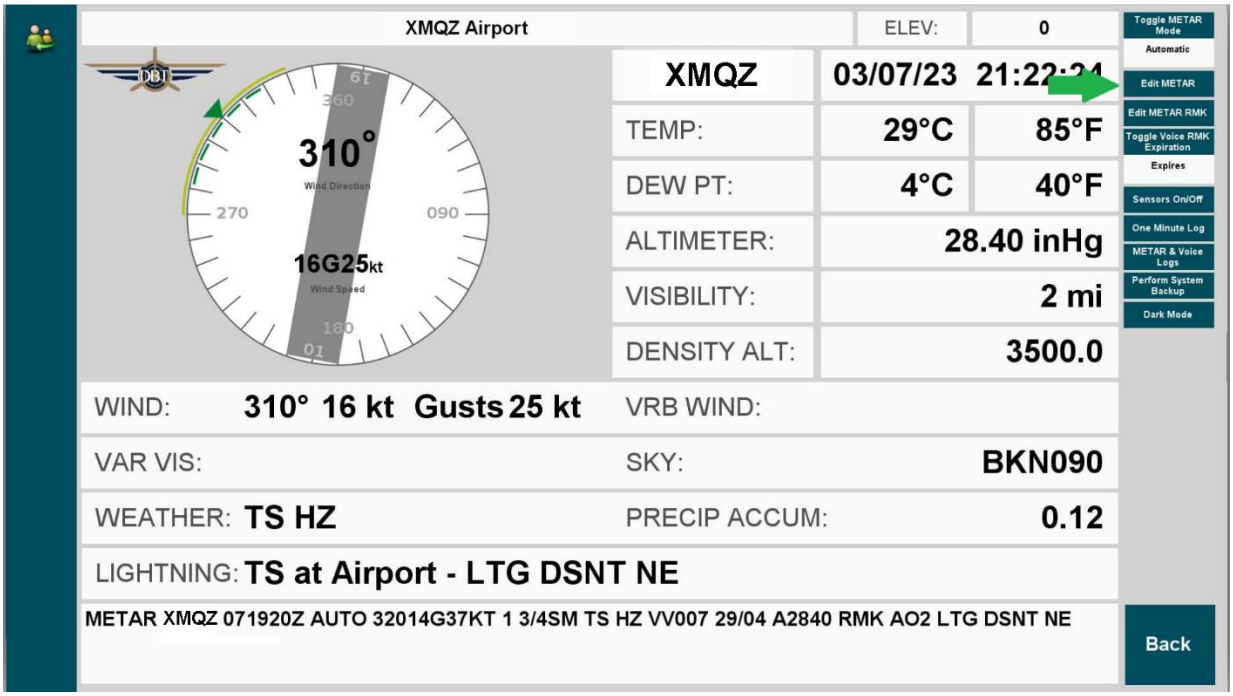


Figure 43. Select "Edit METAR"

A dialog box will open allowing a remark to be created (Figure 44). The dialog box will provide real-time feedback if an error is made.

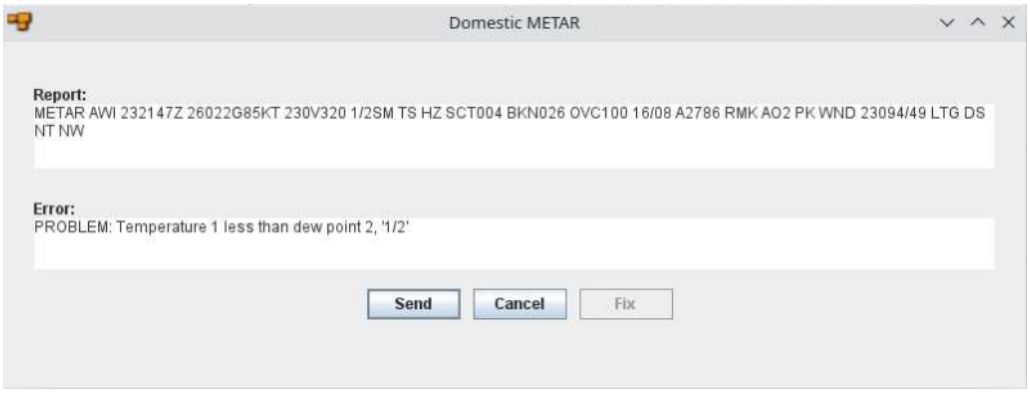


Figure 44. Use the Dialog to Enter a METAR

The **Fix** button can be used to resolve some basic issues as shown in the following examples. If the button is greyed out, you will have to rely on the information in the Error line.

- METAR AWI 272119Z BRFEW030 — add space between BR and FEW030
- METAR AWI 272119Z FEW030 BKN040 — remove repeated item FEW030
- METAR AWI 272119Z 22202KT — replace wind direction with the last clockwise multiple of 10 to get 22002KT

Once the METAR is error free, click **SEND** (Figure 45).

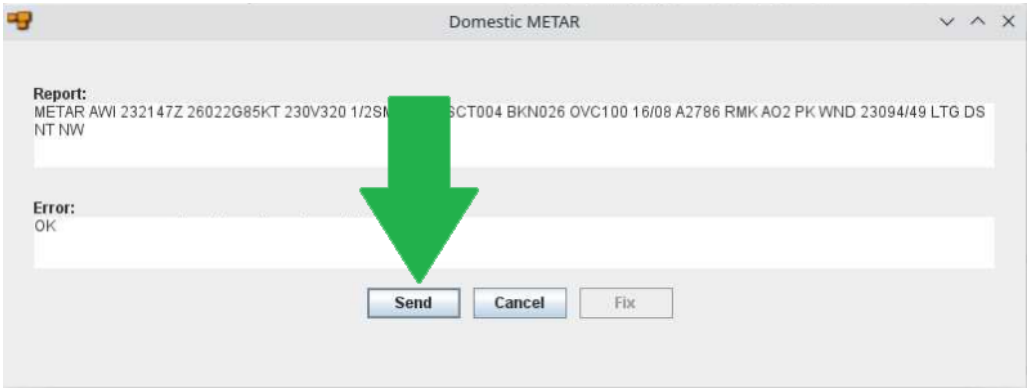


Figure 45. Once the METAR is Satisfactory, Click SEND

Click the **Back** button when finished.

The METAR will expire at the top of the hour; when it is sent within 5 minutes of the top of the next hour, it will expire at the top of the following hour. Once the METAR is expired, it will be shown as "missing" (yellow X) in the weather view until the next manual METAR is sent or the mode is toggled to the Automatic Mode.

5.4 VOICE REMARKS

Voice remarks are not entered from the FlexClient weather view. Voice remarks and/or a NOTAM can be recorded using the handset at the ACU or CIU, or remotely using a dial-up telephone (PTSN) or VoIP. Their expiration is managed from the FlexClient weather view as explained in Section 5.4.1.

A voice-appended remark and/or NOTAM can be entered by airport operators, weather observers and technicians to add additional airport or weather remark information. The recorded message does not appear in the METAR or on the FlexClient weather view. Recorded messages are appended to each voice report. If power is lost, when power is restored, the recorded remark is restored and will continue to play. A recording may be up to 90 seconds in length.

If a weather remark and a NOTAM are to be recorded, the NOTAM message should be prefixed with the word "NOTAM" to distinguish it from weather remarks.

NOTE FAA Advisory Circular 150/5220-16E 1.3: d (2) reads,

This NOTAM is limited to aviation related information specific to the airport in accordance with the latest edition of FAA Order 7930.2, Notice to Airmen (NOTAM), and ***must not include commercial announcements*** *such as fuel prices, lodging, etc.*

When using a handset or a dial-up telephone, pick up the handset or dial the number. While the current weather observation is being voiced, press 555 on the handset and follow the instructions.

When prompted for the password, key the 4-digit PIN followed by **#**.

The following options are presented.

1. Press **1** to listen to the current remark. If this option is selected, either the current remark will be played or *There is no remark recorded* will be played.

   If a remark is played, and it has not been activated, you will be invited to press **1** to activate the remark, press **2** to record a new remark, or press **4** to exit.

   If a remark is played, and it has been activated, you will be invited to press **1** to deactivate the remark, press **2** to record a new remark, press **3** to revalidate the remark, or press **4** to exit.

2. Press **2** to record a new remark after the beep. If this option is selected, voice the remark after the beep and press **#** when finished.

   The newly recorded remark will be played, and there will be a choice to press **1** to accept the remark, press **2** to record a new remark, or press **4** to exit.

   If you press **1** to accept the remark, you will be advised the remark is inactive and to press **1** to activate the remark.

The Voice Remark will become active after about 1–3 minutes, and will expire automatically at the top of the hour unless the Voice Remark expiration is changed.

Contact DBT Customer Service to change the password PIN.

5.4.1 Voice Remark Expiration

The activated Voice Remark expiration may be changed using the phone interface described above or by an Observer position user using the FlexClient weather view.

5.4.1.1 Via Phone Interface

To prevent the Voice Remark from expiring at the top of the hour, pick up the handset or dial the number and access the interactive menu as before.

- Then, while the activated Voice Remark is being played, press **3** to revalidate the remark.

The Voice Remark will now expire at the top of the *next* hour. This has to be repeated before the next expiration to keep the Voice Remark active. Alternatively, the Voice Remark can be toggled to not expire using the FlexClient weather view.

5.4.1.2 Via FlexClient Weather View

First, click the **Menu** button (Figure 46) to access further options.

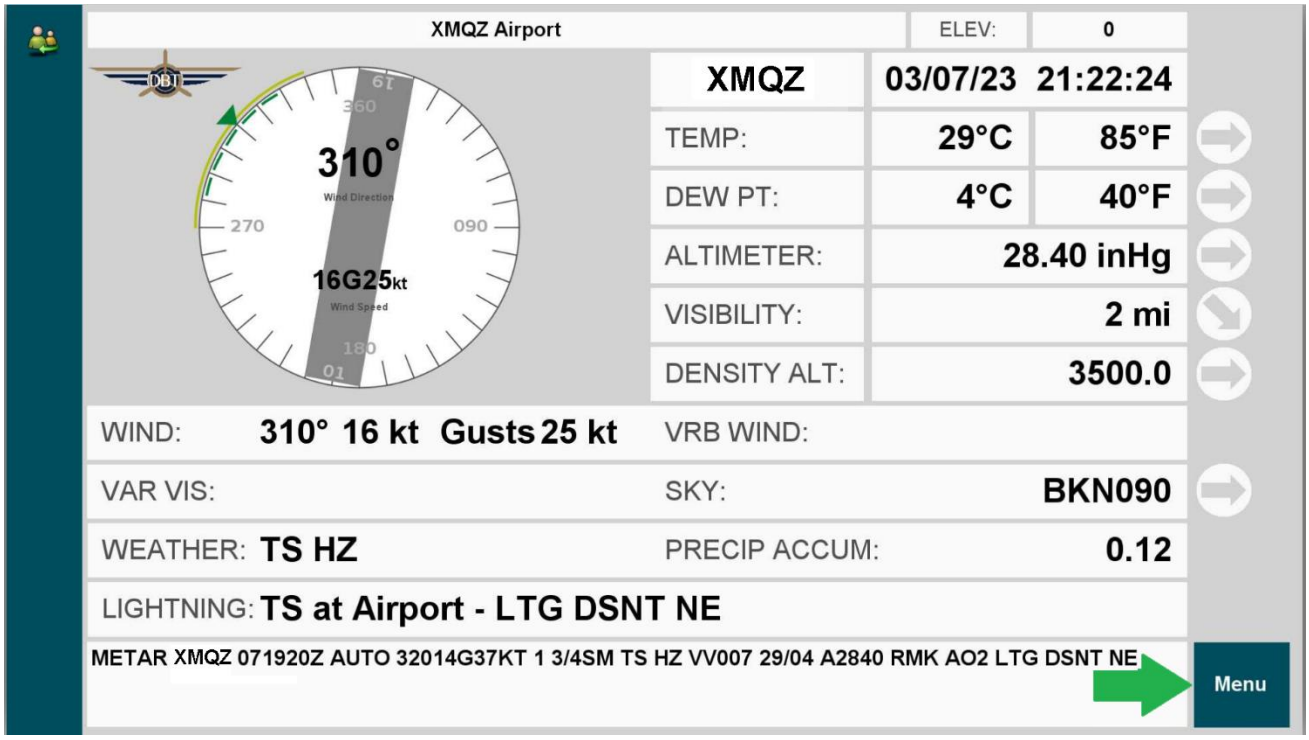


Figure 46. Click the Menu Button to Access Further Options

Click the **Toggle Voice RMK Expiration** button to toggle whether the recorded voice or NOTAM remark will expire (Figure 47). The **Expires** option will expire the remark at the top of the hour.

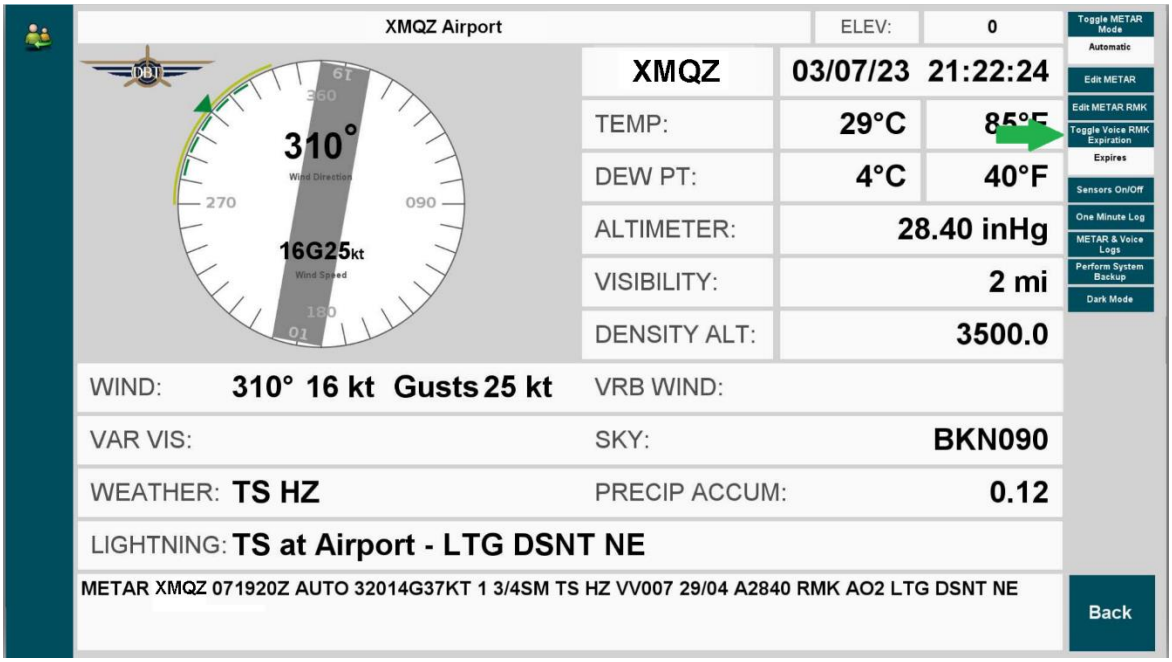


Figure 47. Click the Toggle Voice RMK Expiration Button to Select Whether Remark Expires

Click the **Back** button when finished.

5.5 TURN SENSORS ON/OFF

Turning sensors on/off is restricted to an Observer position user.

The *Sensor Enabled* dialog allows you to specify the sensor data to include on the display and in generated reports.

- When a sensor is turned ON, data for that sensor will be displayed and values will be included in logs and reports; its value will be included in calculations.
- When a sensor is turned OFF, the weather data associated with that sensor will appear as "missing" (yellow X) on the display and in reports; any calculated values that are dependent on it will be appear as "missing."

First, click the **Menu** button (Figure 48) to access further options.

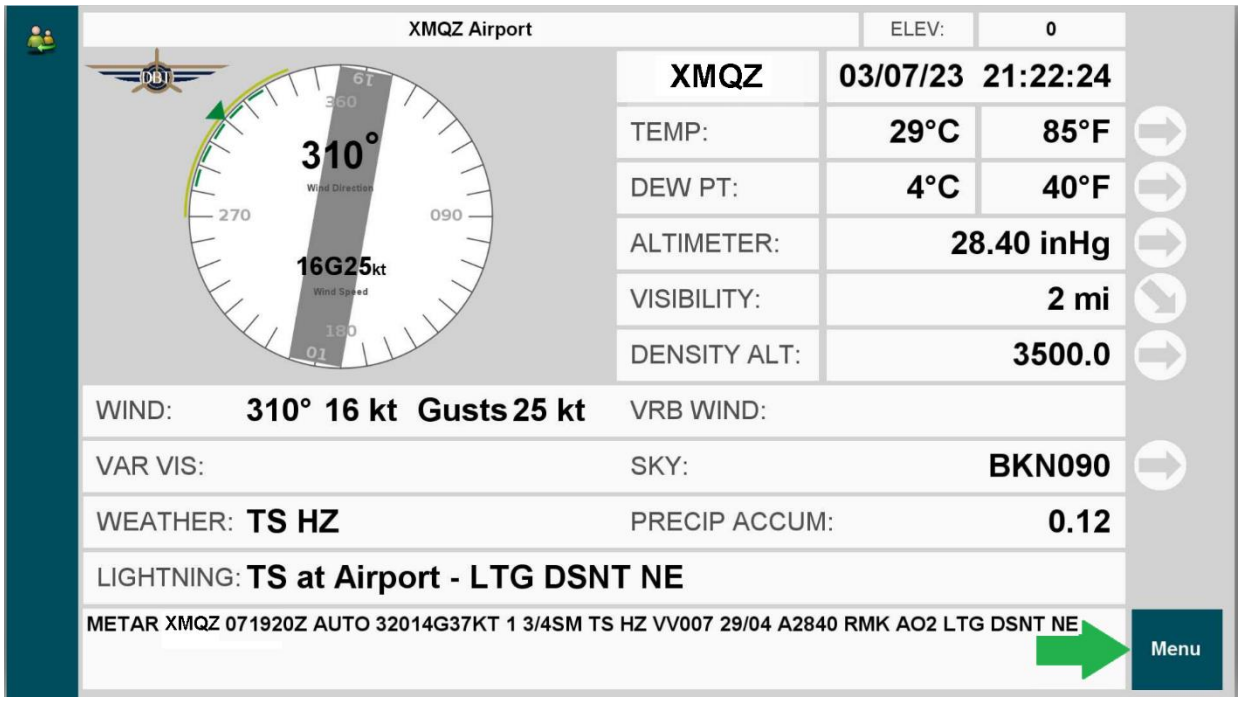


Figure 48. Click the Menu Button to Access Further Options

Click the **Sensors On/Off** button (Figure 49).

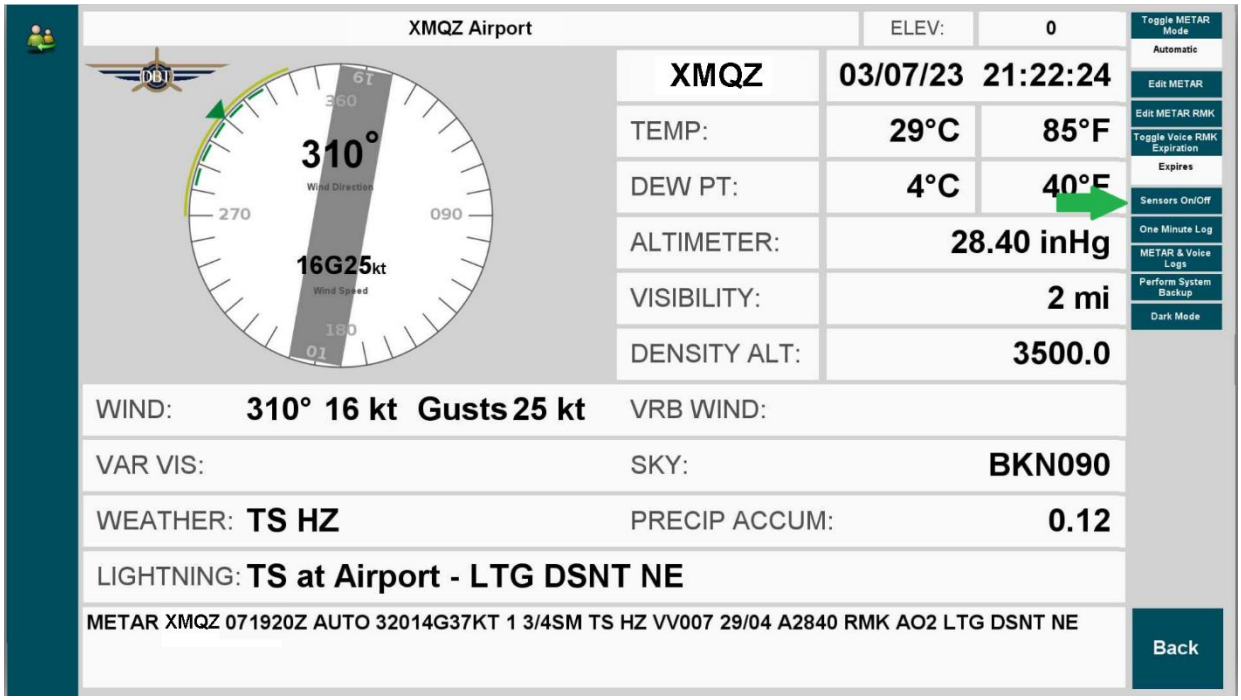


Figure 49. Click "Sensors On/Off"

Select the sensors to be turned ON or OFF individually by clicking **On** or **Off** beside the sensor name.

or

Turn all sensors ON by clicking the **Enable All** button at the bottom of the screen.

or

Turn all sensors OFF by clicking the **Disable All** button at the bottom of the screen.

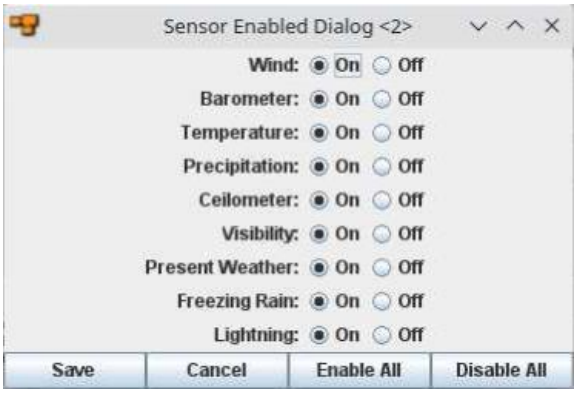


Figure 50. Select Which Sensors to Turn On/Off

When done, click **Save** to save the settings.

Click the **Back** button when finished.

6. NAVIGATING FLEXIDS SCREENS

The FlexClient weather view described in the preceding chapters is the most common screen that is used while running the F1 AWOS. The Technician position user may need to access FlexMon or FlexAdmin; this chapter explains how to do this or check the software version.

1. Hover the pointer near the bottom of the screen until the task bar appears.
2. The Quick Launch tray icon will appear (see Figure 51).

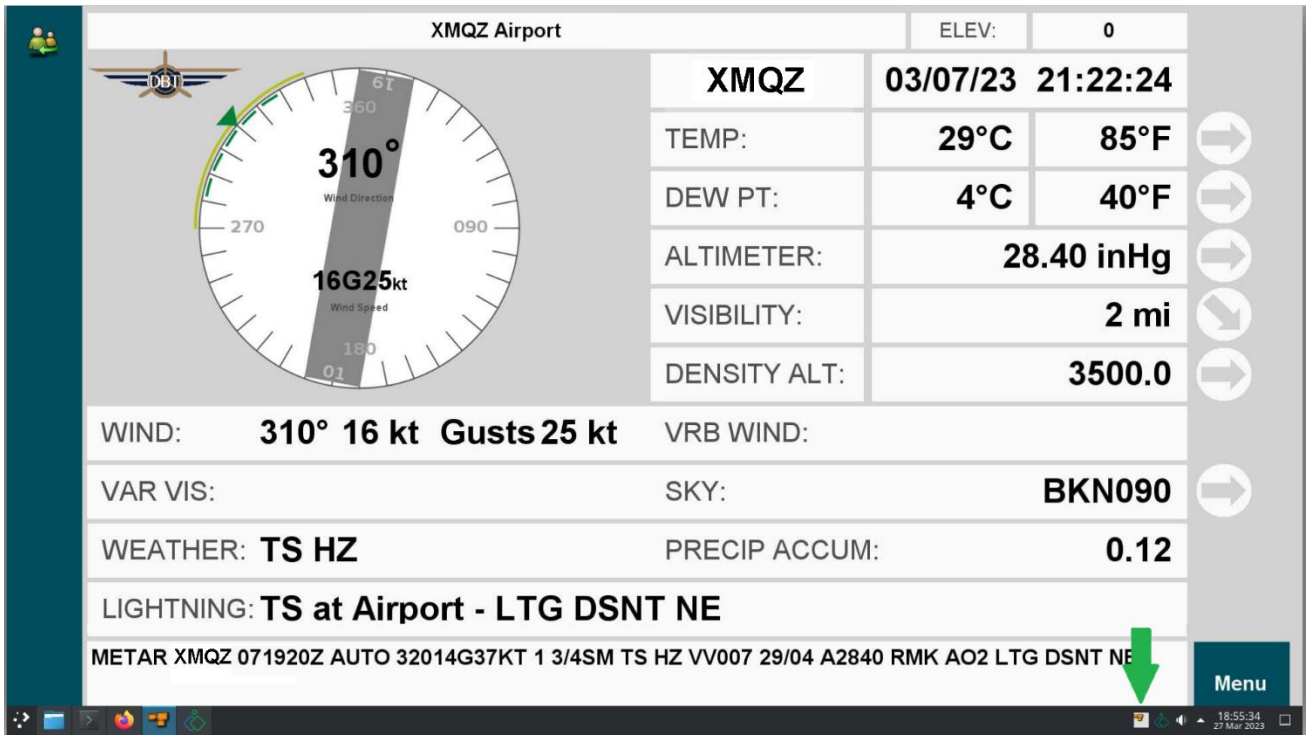


Figure 51. Quick Launch Tray Icon in Task Bar

3. Right-click the Quick Launch tray icon.
4. Select the desired function and click on it.

Figure 52. Select Quick Launch Option

6.1 ACCESS FLEXMON

Click **FlexMon** in the Quick Launch tray options (Figure 52) to access FlexMon.

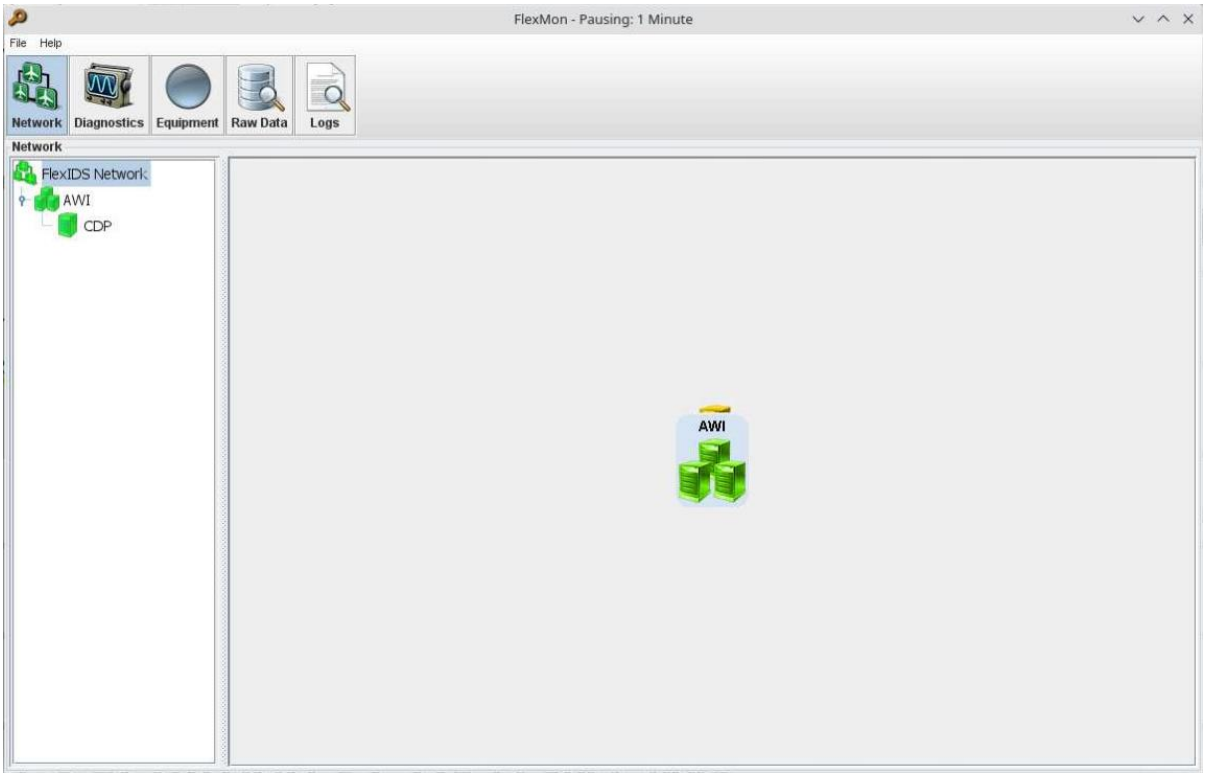


Figure 53. FlexMon Home Screen

Chapter 7 describes the FlexMon screens.

6.2 SOFTWARE VERSION

Click *Help* > *About* to display a popup with the software version(Figure 54).

Figure 54. Software Version

6.3 RUN BACKUP

NOTE	Note that because of the size of the backup, use the OT computer for the USB drive only if the CIU is connected to the ACU via a fiber modem or the cellular router. The slow data speed using RS-485 serial or a UHF data radio makes the OT computer impractical for these connections.

Run Backup will create a zip file that can be used to restore a site installation. Click **Run Backup** in the Quick Launch tray options (Figure 52) to back up the Flex database.

There will be a **Confirm Backup** prompt whether to select a different location than the default location. Click Yes to save to a USB drive.

Figure 55. Run Backup for Flex Database

Insert a USB drive into the OT computer. Use the */home/awi/media* directory and double-click the USB flash drive. Name the folder and click **Save**.

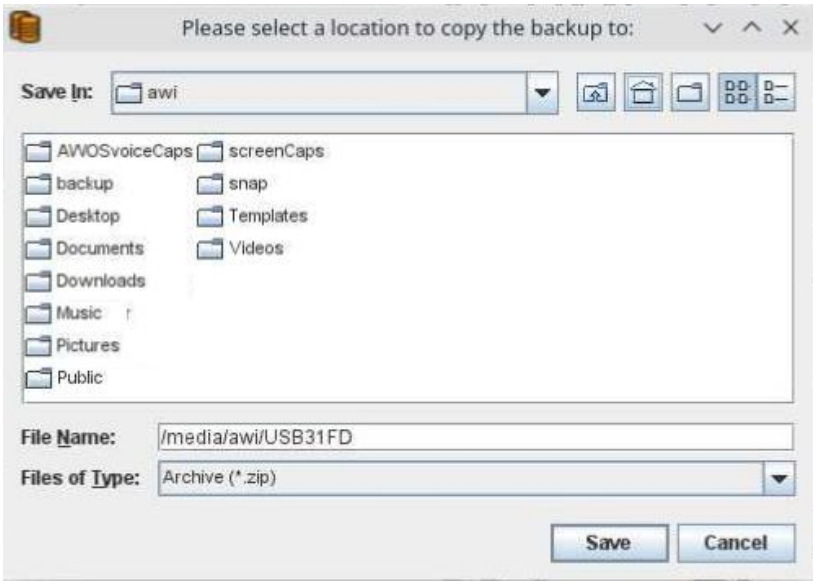


Figure 56. Select a Destination to Save the Backup

The backup will be confirmed.

Figure 57. FlexDB Backup Confirmation

7. FLEXMON SCREENS

FlexMon screens summarize the system monitoring for the F1 AWOS, and are accessed by the Technician position user as described in Section 6.1.

The FlexMon toolbar at the top of the FlexMon display provides buttons that provide access to the FlexMon tools. Click the tool to access its features.

Figure 58. FlexMon Toolbar

Click *File* > *Exit* at the top left of the FlexMon display when the activities have been completed.

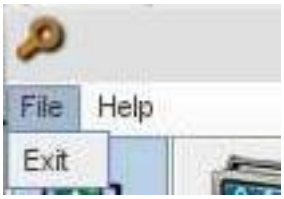


Figure 59. File > Exist When Done

7.1 NETWORK

The network tree in the left-hand pane shows the site and the hosts associated with the site and the network. There are icons that represent the CDP, OT, and other devices, if any, connected on the network.

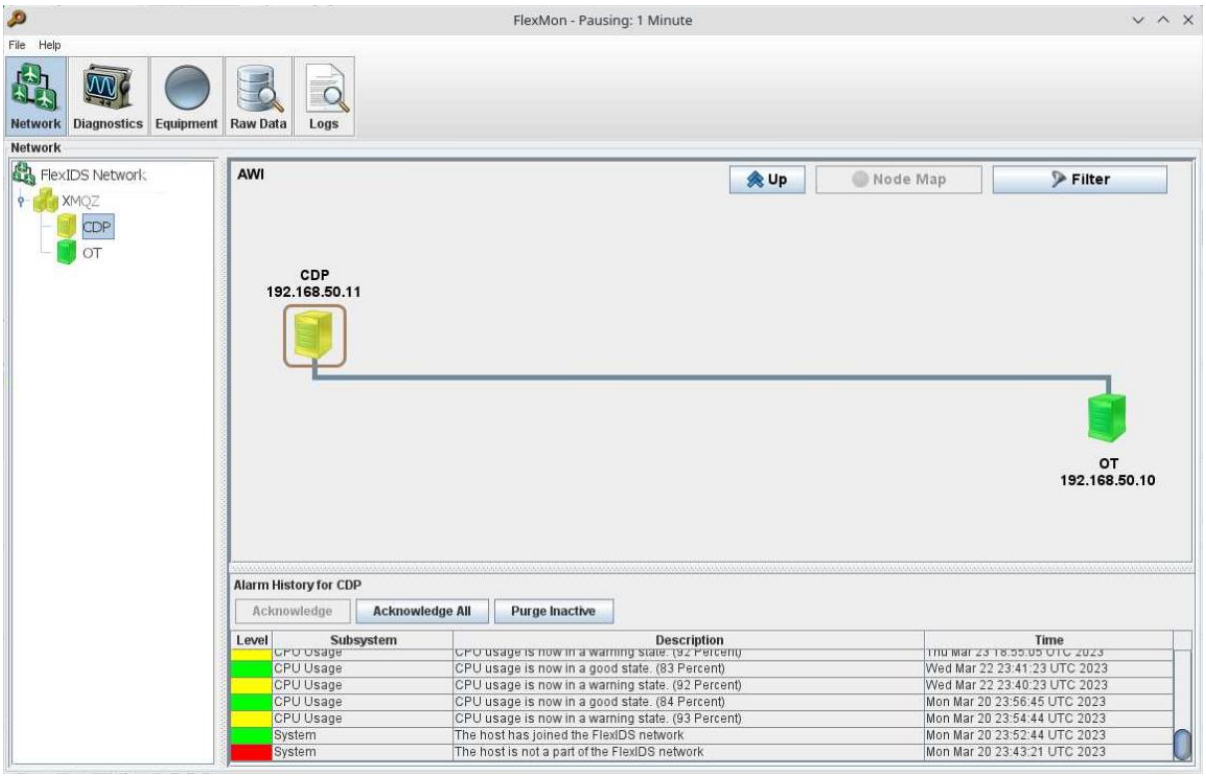


Figure 60. FlexMon Network

Click on a device in the network tree in the left-hand pane to view that individual device's alarm history. A description and time for each alarm is listed. This information can be used to determine how to troubleshoot the problem. It is also possible to click on the image in the main pane to proceed down to the next branch on the network tree. Click the **Up** button in the main pane to move back up the network tree.

Table 5 describes the alarm status states. A blinking alarm indicates that an alarm is present and has not been acknowledged. The host color will match the alarm color to make it easier to identify the host associated with the alarm.

Table 5. FlexMon Alarm Status States

Color	State	Indicates
Green	Blinking	There was an alarm that is no longer active
Yellow	Blinking	There is one or more active warning alarms
Red	Blinking	There is one or more active critical alarms
Grey	Solid	This host is not enabled to report alarms to FlexMon
Normal	Solid	No active alarms

There is also a **Node Map** and a **Filter** button on the main pane to allow the nodes to be shown and for the alarms to be filtered by device type. The **Node Map** is greyed out since there are no other nodes and there are no networked devices that can be selected by the **Filter** button.

Select a blinking alarm and click **Acknowledge**. The blinking will stop, and the color will remain steady. Click **Acknowledge All** to stop blinking for all the alarms. Click **Purge Inactive** to clear the alarm history. Note that the purge will not clear the alarm history for an alarm that is still active and needs to be addressed.

7.2 DIAGNOSTICS SCREENS

The Diagnostics screens provide access to the different types of diagnostic information collected since FlexMon started or since the latest reset. There are four types of diagnostic information.

- Interface Data Messages
- User Defined Data Messages
- DB Synch Messages
- Cache
- Host Status

7.2.1 Interface Data Messages

Click **Interface Data Messages** to get the diagnostic messages for the interfaces.

Figure 61 shows the METAR interface as an example. Click **METAR** to see the activity, which shows the time of the activity report and the IP address from which the data came. Select and click on an activity to view the product and product properties.

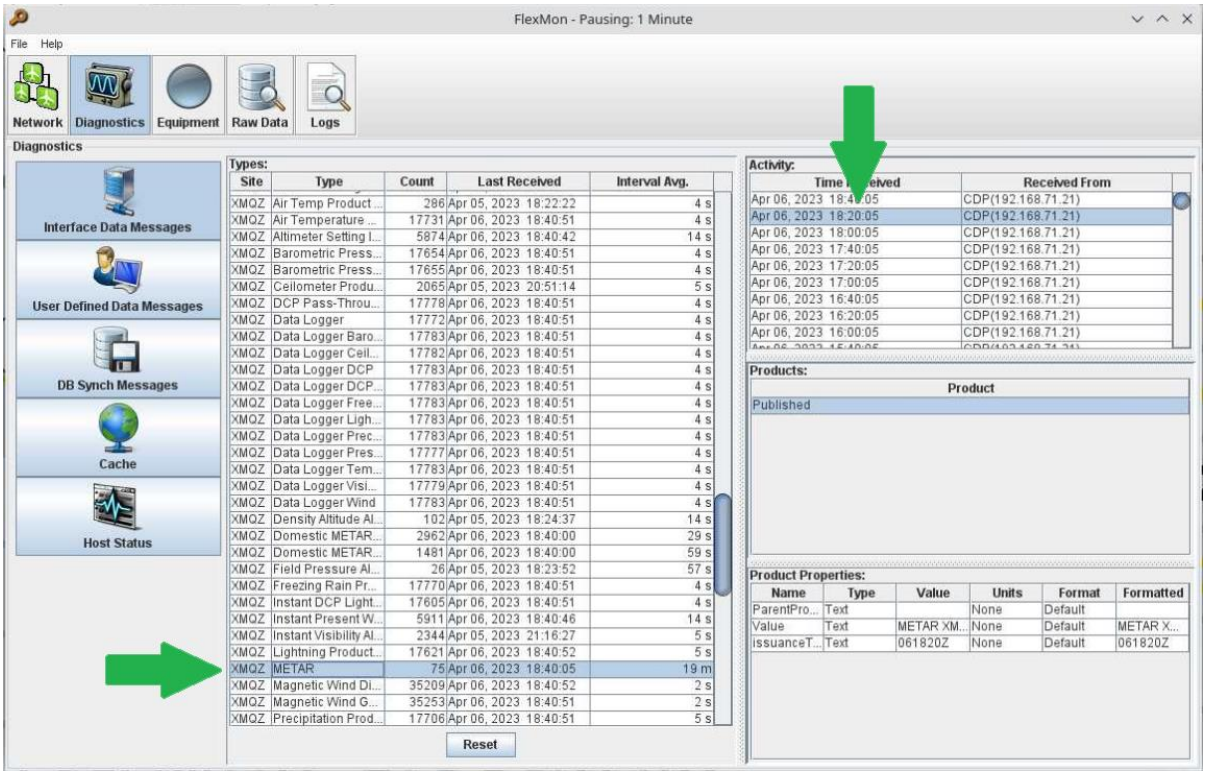


Figure 61. AWOS Voice Phone Interface Diagnostics Messages

Click **Reset** to reset the activity being monitored.

The diagnostic messages are similar for the remaining interfaces, AWOS Voice VHF, the site, and the local area.

- The site, identified by the airport code, consists of the entire AWOS at the site.
- LOCATION consists of the CDP or OT from which the interface data are being viewed.

7.2.2 User Defined Messages

There are no user-defined messages in the F1 STA.

7.2.3 DB Synch Messages

The DB Synch Messages screen allows access to the database synchronization messages.

The DB Synch Messages screen is divided into six areas.

1. Trans ID—a unique transaction ID assigned to a change.
2. Check Point—the checkpoint number assigned to a change.
3. Table Name—the name of the table where the data were stored or removed.
4. Modification—the type of modification made to the data.
   INSERT—data were inserted in the table.
   UPDATE—data were updated in the table.
   DELETE—data were removed from the table.
5. Received—shows the time and date stamp for the transaction.
6. Size—the size, in bits, of the data being added or modified.

Figure 62 shows an example of the DB Synch Messages screen.

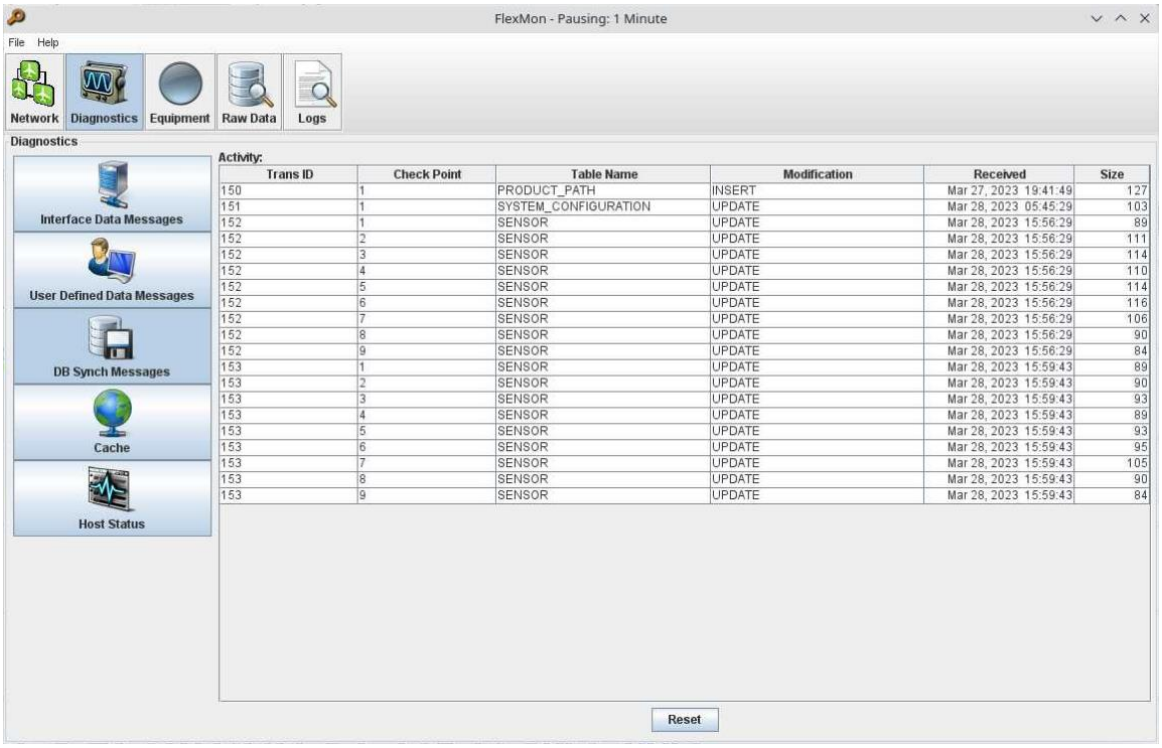


Figure 62. DB Synch Messages Screen

Click **Reset** to reset the activity being monitored.

7.2.4 Cache

The Cache screen provides access to the most recent activity, and access more specific information for a selected product. The screen provides information for Products and for Product Properties.

Click the row containing the desired product. The Product Properties section displays the properties of the selected product, access by the Technician position user in this example.

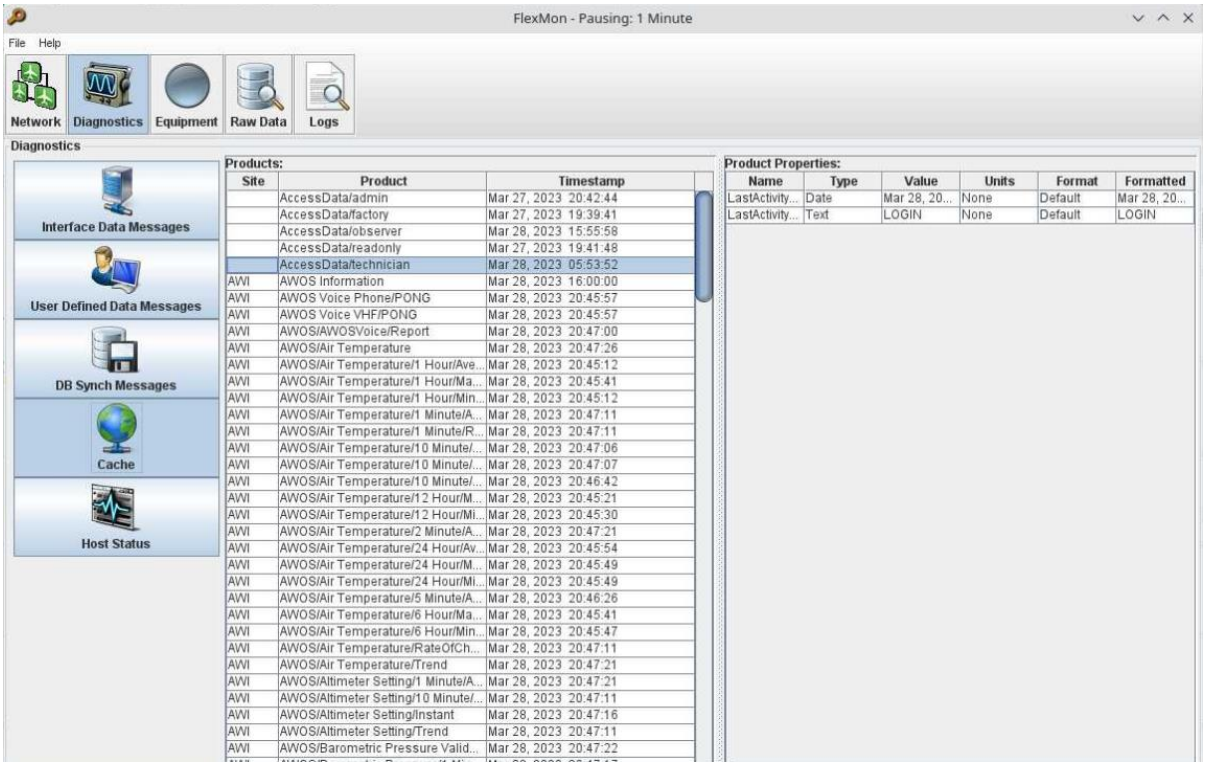


Figure 63. Diagnostics Cache

The Cache stores all products that have been used on the system. If a product was added to a system and then removed, the product will still be present in the Cache with the last active time stamp.

These products are used by the F1 AWOS.

- Access by position users (default read-only, Observer, Technician, Factory, Admin)
- AWOS interfaces (AWOS Information, Voice Phone, Voice VHF)
- Weather products
  - Temperature
  - Altimeter Setting
  - Barometric Pressure
  - Density Altitude
  - Dew Point
  - Field Pressure
  - Lightning
  - METAR
  - Precipitation
  - Relative Humidity
  - Instant values from sensors
  - Sky Condition
  - Wind Direction
  - Wind Speed
  - Visibility

- DCP sensor data
- Data logging
- Site information
- System information

Table 6 explains the Cache fields.

Table 6. Cache Screen Information Fields

Field	Description
Products	**Site**: Identifies the airport from where the information is being sent. **Product**: Indicates the entity initiating the activity. **Timestamp**: The time the activity was completed, for example, the time a message from an interface was received.
Product Properties	**Name**: Identifies the property of the product selected in the Products section. **Type**: Indicates the property type, for example, Boolean. **Value**: Shows the value of the property, for example, if the property type was Boolean, the value would be either True or False. **Units**: Units. **Formatted**: Shows data formatted.

7.2.5 Host Status

Figure 64 shows the Host Status Diagnostics View which updates continuously to show the network availability of each FlexIDS host in the network.

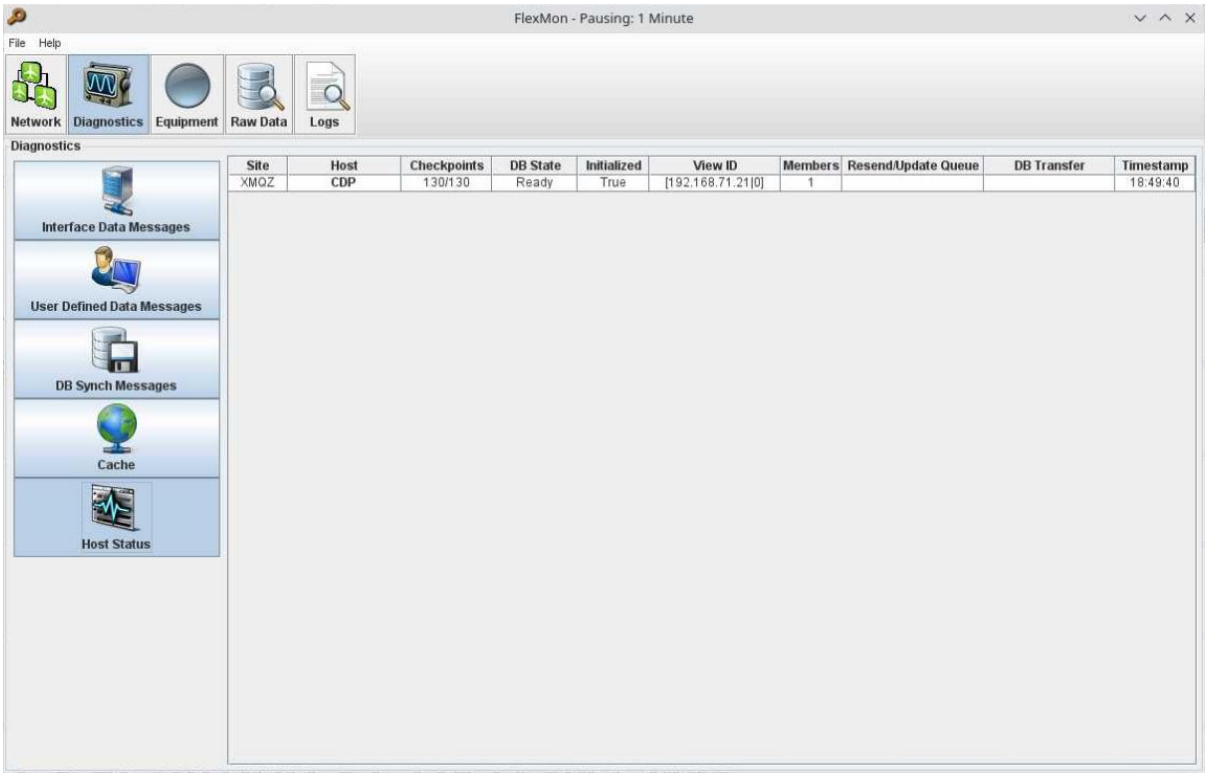


Figure 64. Host Status

7.3 EQUIPMENT DIAGNOSTICS SCREENS

The FlexMon Equipment diagnostics screens provides access to system and sensor level status information. The display is divided into two panes.

- The narrow pane on the left side is the navigation pane, which lists the components with status information available. To select a component, click its name in the navigation pane.
- The main pane shows the status information for the selected component.
- Within any screen, failures are shown in **RED** in the main pane and the sensor status; and warning conditions are shown in **YELLOW** in the sensor status only.

Sensors that are not installed will not appear in the navigation pane. No alarms will be triggered for uninstalled sensors.

7.3.1 Alarms

- If new alarms exist, a blinking red **ALARM** indicator is shown in the navigation pane beside the affected component.
- If a sensor or DCP warning is present, a yellow alarm indicator will be shown in the navigation pane beside the affected component.

7.3.2 DCP Diagnostics

Click the **DCP** heading in the list pane to call up the display shown in Figure 65. There are two tabs, **1192 DCP** and **DCPIII**.

- **1192 DCP** (Figure 65)

  The **Status** panel shows the current status of several DCP operating parameters.

  The **Recent Responses** panel shows a real-time record of incoming DCP poll responses in a scrolling list. The entries will scroll as new data is received, with the most recent response at the top of the list. The format of the DCP message is explained in the ***Model 1192 Data Collection Platform User's Manual***.

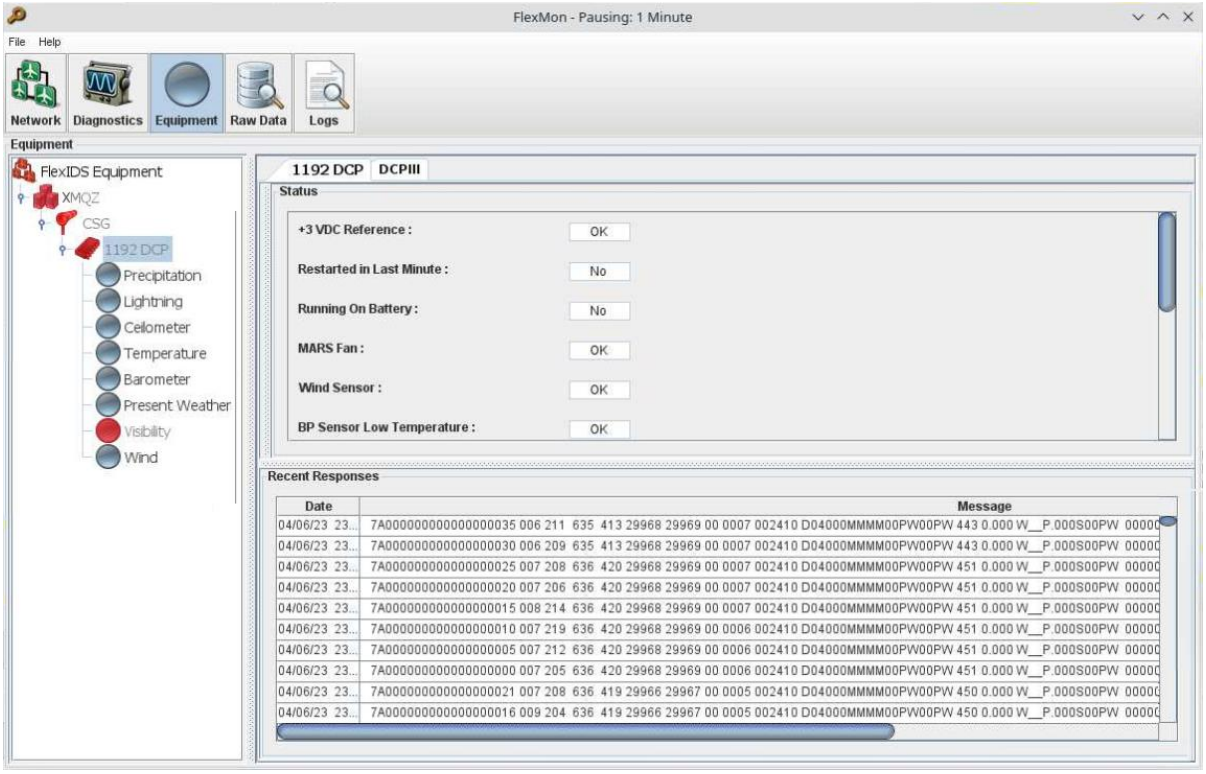


Figure 65. 1192 DCP Tab, DCP Diagnostics Screen

- **DCPIII** (Figure 66)

  The **DCPIII** tab allows the DCP LCD screen to be accessed via the OT. The LCD screen shows the current status of several DCP operating parameters. Click the ***** and **#** buttons to scroll through the screens.

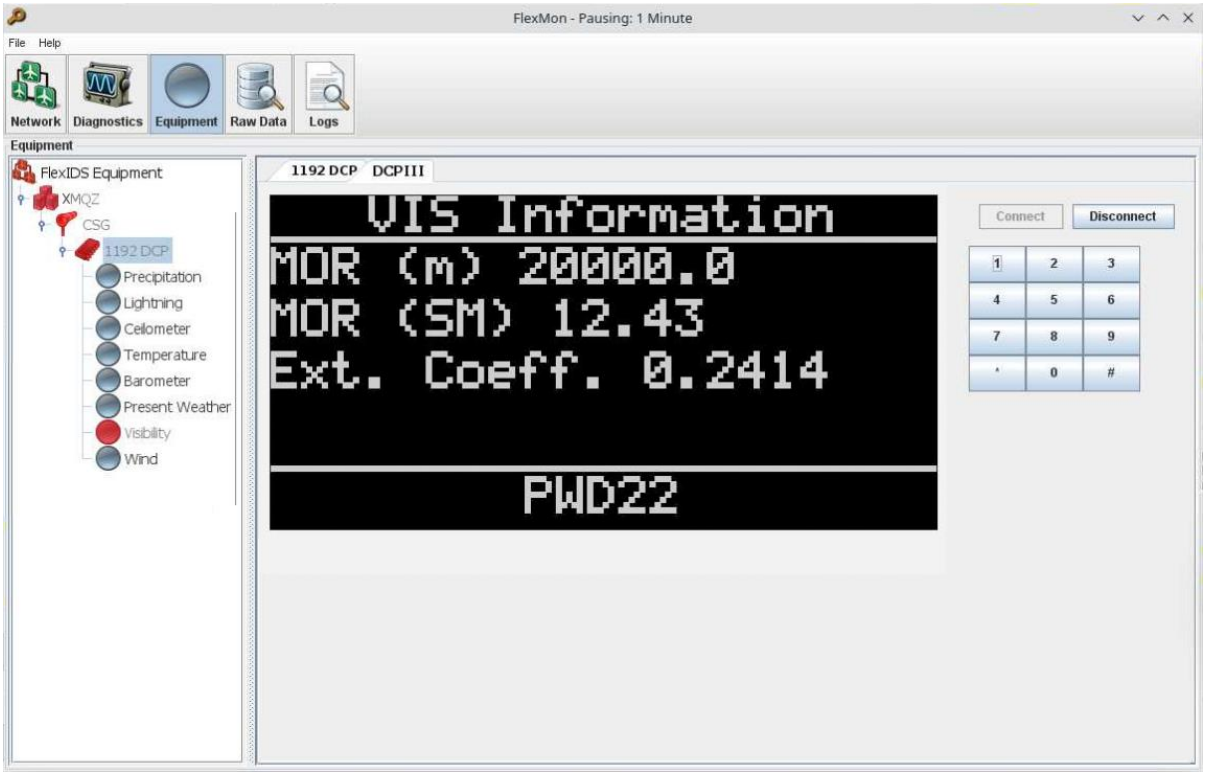


Figure 66. DCPIII Tab, DCP Diagnostics Screen

The **Status** panel shows the current status of a number of DCP components (Table 7). When a warning condition exists, the status will be shown in **YELLOW**. If a failure occurs, the status will be shown in **RED**.

Table 7. DCP Status Indications

Field	Indications	Description	Warning or Error
+3 VDC Reference	**OK** or **Failed**	Shows the current status of the DCP power supply's +5 V DC reference	Error
Restarted in Last Minute	**Yes** or **No**	Shows whether the DCP has been restarted in the past minute	Warning
Running on Battery	**Yes** or **No**	Indicates whether the DCP is running on battery or line power. **Yes** indicates the DCP is running on battery power; **No** indicates it is running on line (AC) power	Warning
MARS Fan	**OK** or **Failed**	Indicates **Failed** when the fan within the MARS unit is not working correctly. When the MARS fan fails, all temperature and RH values will be shown as missing.	Error
Wind Sensor	**OK** or **Failed**	Shows **Failed** if no data is received from the wind sensor	Error
BP Sensor Low Temperature	**OK** or **Failed**	Indicates **Failed** if the BP sensor's temperature drops below the minimum operational tolerance	Error
BP Sensor High Temperature	**OK** or **Failed**	Indicates **Failed** if the BP sensor's temperature rises above the maximum operational tolerance	Error
BP Sensor Communication	**OK** or **Failed**	Shows **Failed** if no data is received from the BP sensor	Error
Ceilometer Sensor Communication	**OK** or **Failed**	Shows **Failed** if no data is received from the ceilometer	Error
Freezing Rain Sensor Communication	**OK** or **Failed**	Shows **Failed** if no data is received from the freezing rain sensor	Error
Lightning Sensor Communication	**OK** or **Failed**	Shows **Failed** if no data is received from the lightning detector	Error
Precipitation Sensor Communication	**OK** or **Failed**	Shows **Failed** if no data is received from the present weather (precipitation ID & intensity) sensor	Error
Visibility Sensor Communication	**OK** or **Failed**	Shows **Failed** if no data is received from the visibility sensor	Error

7.3.3 Wind Sensor Diagnostics

Click the **Wind** heading in the list pane to call up the display shown in Figure 67.

- The **Sensor Data** panel shows the real-time sensor data and status.

Figure 67. Wind Sensor Diagnostics Screen

7.3.4 Temperature/RH Probe Diagnostics

Click the **Temperature** heading in the list pane to call up the display shown in Figure 69.

- The **Sensor Data** panel shows the real-time sensor data and status.

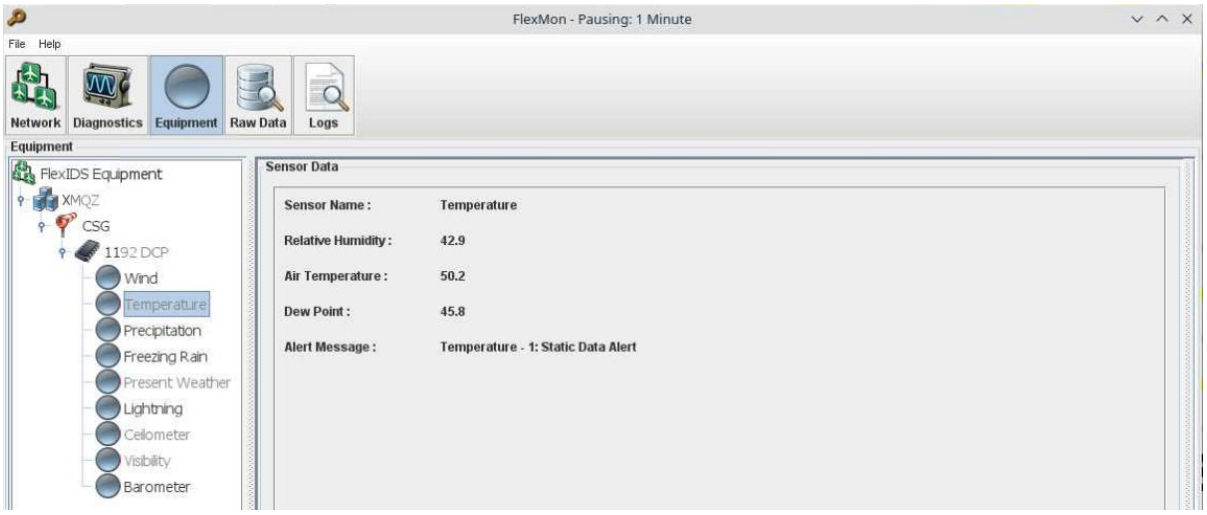


Figure 68. Temperature/RH Probe Diagnostics Screen

7.3.5 Rain Gauge Diagnostics

Click the **Precipitation** heading in the list pane to call up the display shown in Figure 69.

- The **Sensor Data** panel shows the real-time sensor data and status.

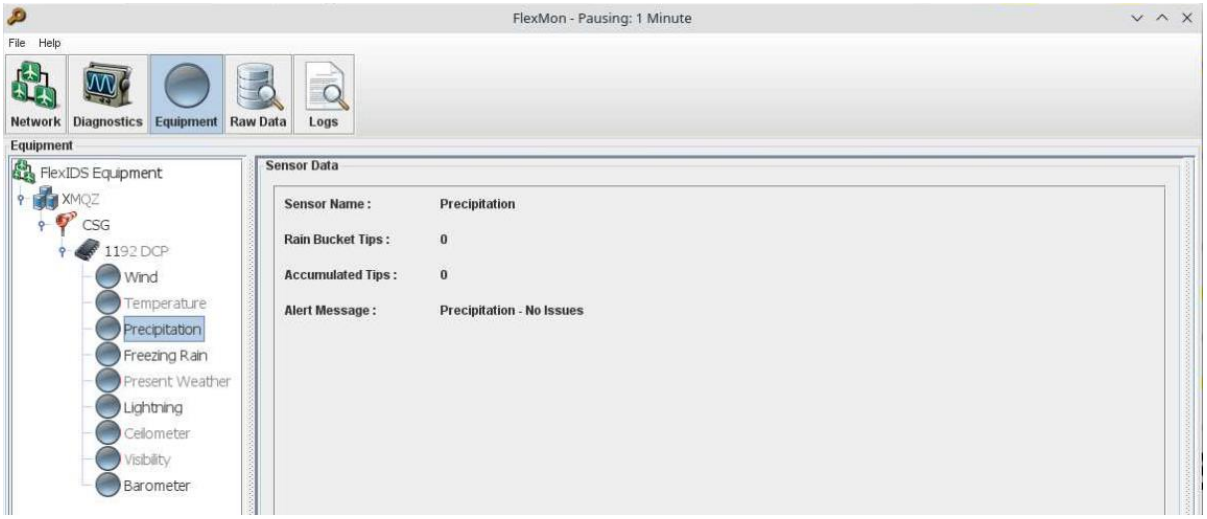


Figure 69. Rain Gauge Diagnostics Screen

7.3.6 Freezing Rain Sensor Diagnostics

Click the **Freezing Rain** heading in the list pane to call up the display shown in Figure 69.

- The **Sensor Data** panel shows the real-time sensor data and status.
- The **Sensor Status** panel shows the current status of several Freezing Rain Sensor operating parameters.

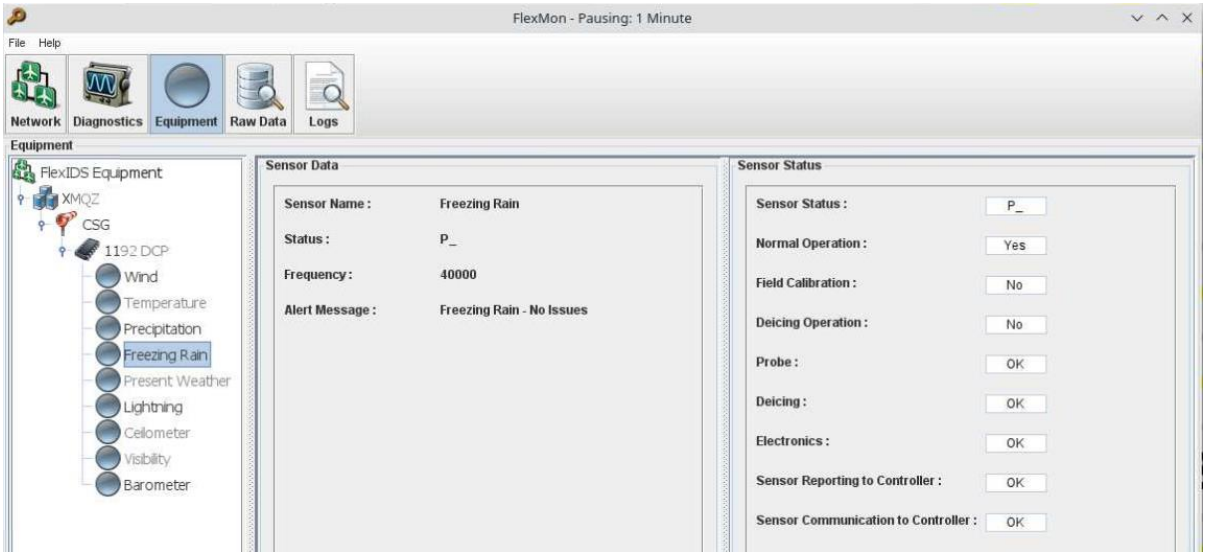


Figure 70. Freezing Rain Sensor Diagnostics Screen

The status panel provides a brief explanation of each of the status fields shown on the diagnostics display (Table 8). When a warning condition exists, the status will be shown in **YELLOW**. If a failure occurs, the status will be shown in **RED**.

Table 8. Definitions for the Freezing Rain Sensor Status

Field	Indications	Description	Warning or Error
Sensor Status	Code	Status code indicating sensor status followed by failure code: • P_Pass • F_Fail • D_Deice Failure code: • 1 Probe Failure • 2 Probe Deicing Heater Failure • 3 Electronics Failure	Error
Normal Operation	**Yes** or **No**	Indicates **Yes** if the sensor is functioning normally	Warning
Field Calibration	**Yes** or **No**	Indicates **Yes** if a field calibration is in progress	Warning

Field	Indications	Description	Warning or Error
Deicing Operation	**Yes** or **No**	Indicates **Yes** if a deicing cycle is in progress	Warning
Probe	**OK** or **Failed**	If **Failed**, the sensor probe is not functioning properly	Error
Deicing	**OK** or **Failed**	If **Failed**, a sensor deicing cycle was not completed successfully	Error
Electronics	**OK** or **Failed**	If **Failed**, the sensor's electronics have reported a fault	Error
Sensor Reporting to Controller	**OK** or **Failed**	If **Failed**, the sensor is not reporting data and status to the DCP	Error
Sensor Communication to Controller	**OK** or **Failed**	If **Failed**, the DCP is unable to communicate with the DCP	Error

7.3.7 Present Weather Sensor Diagnostics

Click the **PRESENT WEATHER** heading in the list pane to call up the display shown in Figure 71, Figure 72, or Figure 73.

- The **Sensor Data** panel shows the real-time sensor data and status.
- The **Sensor Status** panel shows the current status of several Present Weather Sensor status codes.

The diagnostic screen depends on the specific Present Weather Sensor.

7.3.7.1 6490 Present Weather Sensor Diagnostics

Figure 71. 6490 Present Weather Sensor Diagnostics Screen

Table 9 provides a brief explanation of each of the status fields shown on the diagnostics display. When a warning condition exists, the status will be shown in **YELLOW**. If a failure occurs, the status will be shown in **RED**.

Table 9. 6490 Present Weather Sensor Status

Field	Indications	Description	Warning or Error
Sensor Status	Numeric	Status code indicating sensor status	—
Automatic Gain Control Card	**OK** or **Failed**	If **Failed**, the Automatic Gain Control PCB must be replaced before the sensor can be returned to normal operation (not field-replaceable)	Error
Electronics Power Supply	**OK** or **Failed**	If **Failed**, the Electronics Power Supply must be replaced before the sensor can be returned to normal operation	Error

Field	Indications	Description	Warning or Error
Heater Power Supply	**OK** or **Failed**	If **Failed**, the Heater Power Supply must be replaced before the sensor can be returned to normal operation	Error
Reset	**Yes** or **No**	Indicates Yes if the sensor has been reset in the past 5 minutes	Warning
Sensor Head Assembly	**OK** or **Failed**	If **Failed**, the sensor assembly must be replaced before the sensor can be returned to normal operation	Error
Signal Processor 1 Card	**OK** or **Failed**	If **Failed**, the Signal Processor 1 PCB must be replaced before the sensor can be returned to normal operation (not field-replaceable)	Error
Signal Processor 2 Card	**OK** or **Failed**	If **Failed**, the Signal Processor 2 PCB must be replaced before the sensor can be returned to normal operation (not field-replaceable)	Error
Transmit Modulator Card	**OK** or **Failed**	If **Failed**, the Transmit Modulator PCB must be replaced before the sensor can be returned to normal operation (not field-replaceable)	Error

7.3.7.2 6498-P/6498-PV/6498-DC-P/6498-DC-PV Present Weather Sensor Diagnostics

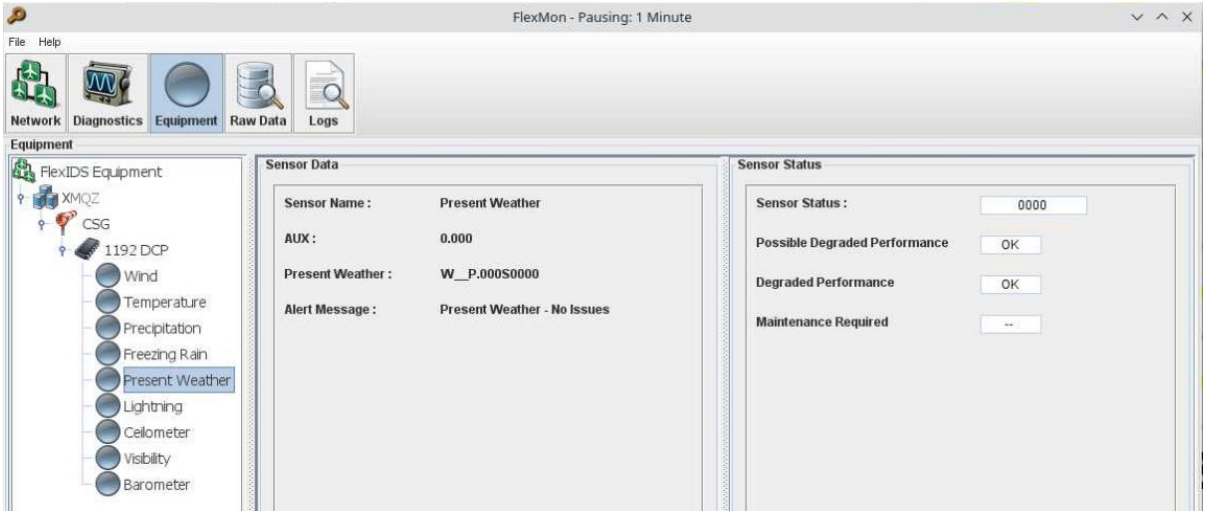


Figure 72. 6498-P/6498-PV/6498-DC-P/6498-DC-PV Present Weather Sensor Diagnostics Screen

The sensor outputs four codes.

- Sensor Status
  - 0000 — No faults
  - 0080 — Possible Degraded Performance
  - 4000 — Degraded Performance
  - 0C00 — Maintenance Required

The specific faults are then identified by **Failed** instead of **OK**.

If a failure occurs, the status will be shown in **RED**.

7.3.7.3 PWD22 Present Weather Sensor Diagnostics

Figure 73. PWD22 Present Weather Sensor Diagnostics Screen

Table 10 provides a brief explanation of each of the status fields shown on the diagnostics display. When a warning condition exists, the status will be shown in **YELLOW**. If a failure occurs, the status will be shown in **RED**.

Table 10. Definitions for the PWD22 Present Weather Sensor Status

Field	Indications	Description	Indicator
Sensor Status	Numeric	Status code indicating sensor status	—
Hardware Error	**OK** or **Failed**	If **Failed**, indicates that specific hardware error.	Error
Hardware Warning	**OK** or **Failed**	If **Failed**, indicates that specific hardware warning.	Warning
Backscatter Alarm	**OK** or **Failed**	If **Failed**, indicates that the contamination level is too high and cleaning must be done.	Alarm
Backscatter Warning	**OK or Failed**	If **Failed**, indicates that the contamination level has increased and cleaning must be performed in the near future.	Warning
Visibility Alarm 1	**OK** or **Failed**	If **Failed**, indicates limits of Relay Control 1 exceeded.	Alarm
Visibility Alarm 2	**OK** or **Failed**	If **Failed**, indicates limits of Relay Control 2 exceeded.	Alarm
Visibility Alarm 3	**OK** or **Failed**	If **Failed**, indicates limits of Relay Control 3 exceeded.	Alarm

7.3.8 Lightning Sensor Diagnostics

Click the **Lightning** heading in the list pane to call up the display shown in Figure 74.

- The **Sensor Data** panel shows the real-time sensor data and status.
- The **Sensor Status** panel shows the current status of several Lightning Sensor operating parameters.

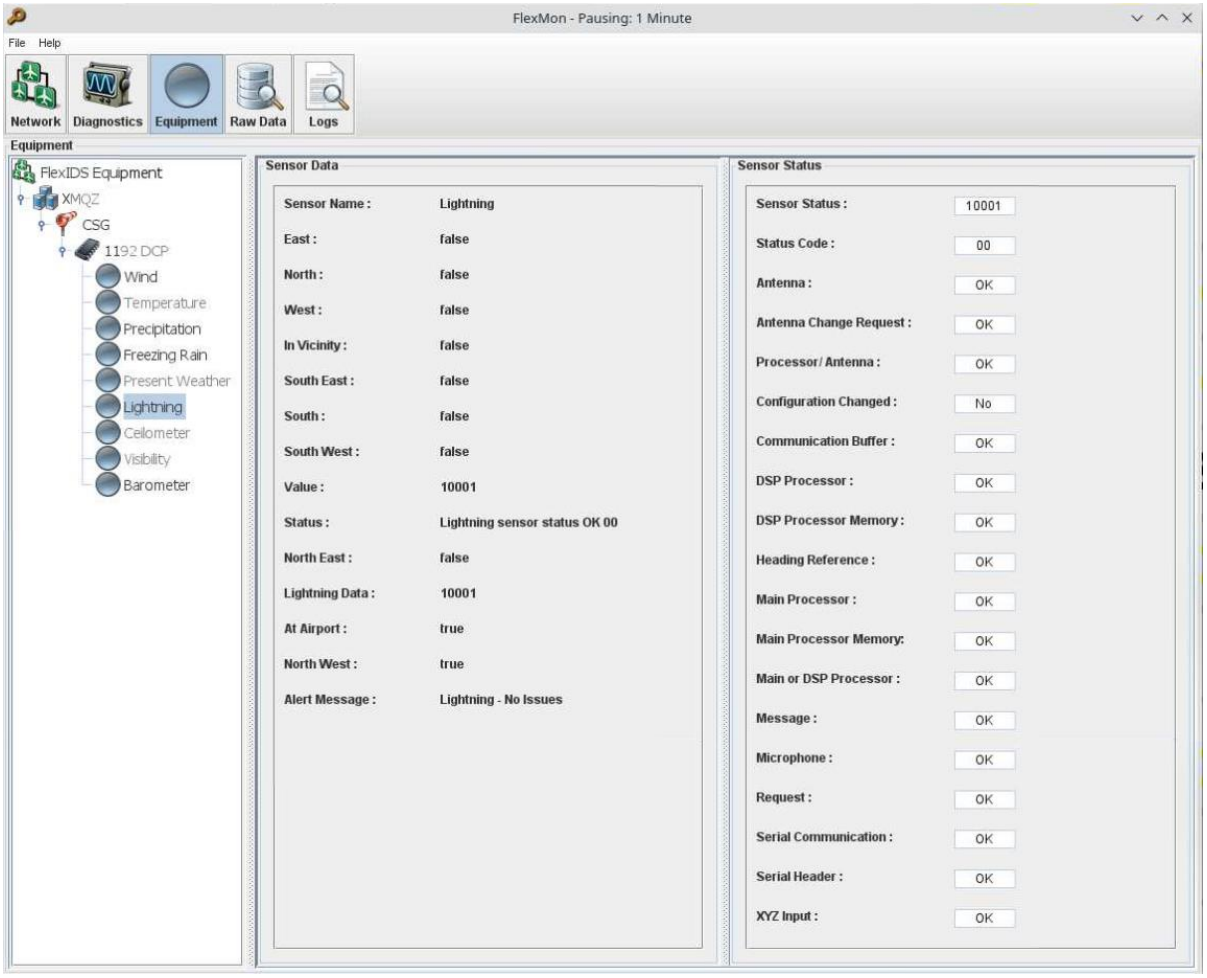


Figure 74. Lightning Sensor Diagnostics Screen

Table 11 provides a brief explanation of each of the status fields shown on the diagnostics display. When a warning condition exists, the status will be shown in **YELLOW**. If a failure occurs, the status will be shown in **RED**.

Table 11. Definitions for the Lightning Sensor Status

Field	Indications	Description	Warning or Error
Sensor Status	Numeric	Status code indicating sensor status	Warning or Error

Field	Indications	Description	Warning or Error
Status Code	Numeric	00 indicates normal operation; other values indicate an error, which will be denoted in one of the fields below	Error
Antenna	**OK** or **Failed**	Indicates **Failed** if there is an antenna or antenna wiring problem	Error
Antenna Change Request	**OK** or **Failed**	Indicates **Failed** if a request was received to change the antenna mount to a location that does not match the configuration jumpers	Error
Processor/Antenna	**OK** or **Failed**	Indicates **Failed** if there have been invalid or missing internally generated test strikes; possible causes are a noisy antenna location or antenna wiring problem	Error
Configuration Changed	**Yes** or **No**	Indicates **Yes** if the antenna location (determined by processor jumpers) has changed since the system was last powered up	Error
Communication Buffer	**OK** or **Overload**	Indicates **Overload** if the communication buffer has become full; some data loss is likely	Warning
DSP Processor	**OK** or **Failed**	Indicates **Failed** if there is an error in the DSP processor	Error
DSP Processor Memory	**OK** or **Failed**	Shows **Failed** if there is an error in the DSP processor's memory	Error
Heading Reference	**OK** or **Failed**	If **Failed**, contact DBT Customer Service	Error
Main Processor	**OK** or **Failed**	Indicates **Failed** if there is an error in the main processor	Error
Main Processor Memory	**OK** or **Failed**	Shows **Failed** if there is an error in the main processor's memory	Error
Main or DSP Processor	**OK** or **Failed**	Shows **Failed** if an error has occurred in either the main or DSP processor	Error
Message	**OK** or Invalid	Shows **Invalid** if the sensor message is corrupted	Warning
Microphone	**OK** or **Stuck**	Shows **Stuck** if the microphone key has been asserted for 60 seconds or more	Error
Request	**OK** or **Invalid**	Shows **Invalid** if a poll command was not received properly	Warning
Serial Communication	**OK** or **Failed**	Shows **Failed** for communication errors, such as no data, wrong baud rate, excessive noise, etc.	Error
Serial Header	**OK** or **Failed**	Shows **Failed** if an error is detected in the message header	Error
XYZ Input	**OK** or **Failed**	If **Failed**, contact DBT Customer Service	Error

7.3.9 Ceilometer Diagnostics

Click the **Ceilometer** heading in the list pane to call up the display shown in Figure 75 or Figure 76.

- The **Sensor Data** panel shows the real-time sensor data and status.
- The **Sensor Status** panel shows the current status of several Ceilometer operating parameters.

7.3.9.1 8339-FAA Ceilometer

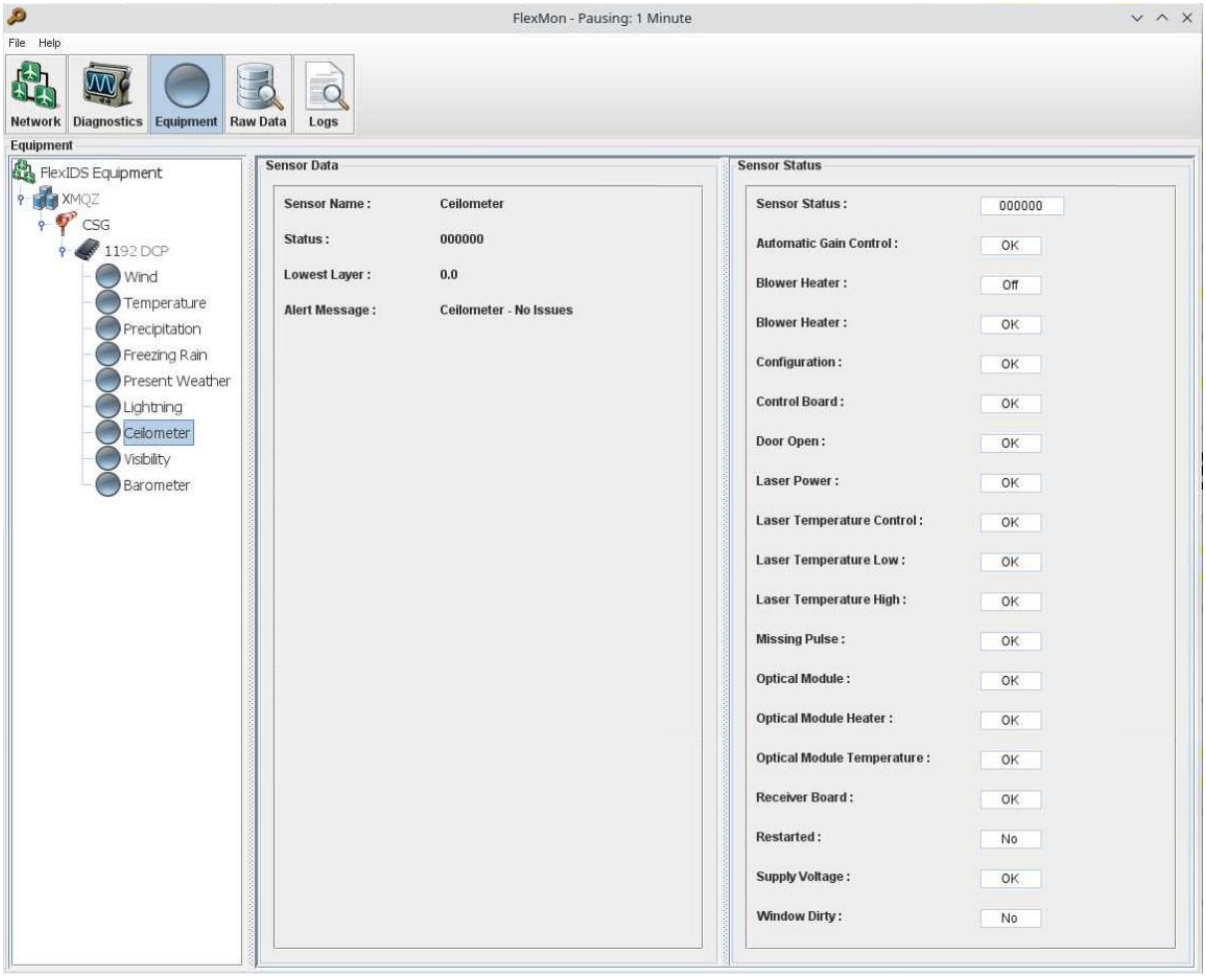


Figure 75. 8339-FAA Ceilometer Diagnostics Screen

Table 12 provides a brief explanation of each of the status fields for the 8339-FAA Ceilometer shown on the diagnostics display. When a warning condition exists, the status will be shown in **YELLOW**. If a failure occurs, the status will be shown in **RED**.

Since the ceilometer is capable of discerning levels of error, any of the ceilometer status fields can indicate *either* a warning or a failure, depending on the severity of the condition. If a warning condition exists and is not addressed, it will progress to failure status. The status field will then change from **YELLOW** to **RED**.

Table 12. Definitions for the 8339-FAA Ceilometer Status

Field	Indications	Description	Warning or Error
Sensor Status	Numeric	Status code indicating sensor status	Either, depending on severity
Automatic Gain Control	**OK** or **Failed**	If **Failed**, indicates an error in the Automatic Gain Control software.	
Blower Heater	**On** or **Off**	Indicates whether the Blower/Heater is currently powered on.	Either, depending on severity
Blower Heater	**OK** or **Failed**	Indicates the status of the Blower/Heater	
Configuration	**OK** or **Failed**	If **Failed**, indicates the configuration information has not been loaded or the firmware is corrupted	
Control Board	**OK** or **Failed**	If **Failed**, the Control Board must be replaced before the ceilometer can be returned to normal operation	
Door Open	**OK** or **Failed**	Indicates whether the ceilometer enclosure door is open (**Failed**) or closed (**OK**); triggered by the door's interlock switch. When the interlock switch has been placed in the bypass mode, the Door Open field would indicate the door is closed (**OK**).	
Laser Power	**OK** or **Failed**	Indicates **Failed** if laser power drops below the acceptable level.	
Laser Temperature Control	**OK** or **Failed**	Indicates the status of the Ceilometer's Peltier device	
Laser Temperature Low	**OK** or **Failed**	Indicates **Failed** if the laser temperature drops below the minimum operational tolerance	
Laser Temperature High	**OK** or **Failed**	Indicates **Failed** if the laser temperature rises above the maximum operational tolerance	
Missing Pulse	**OK** or **Failed**	Indicates **Failed** if an expected return laser pulse was not detected. Could be due to a number of causes; use in combination with other status conditions to determine cause	
Optical Module	**OK** or **Failed**	If **Failed**, the Optical Module must be replaced before the ceilometer can be returned to normal operation	
Optical Module Heater	**OK** or **Failed**	Indicates the status of the Optical Module's heater	
Optical Module Temperature	**OK** or **Failed**	If **Failed**, indicates the Optical Module's temperature is out of tolerance	
Receiver Board	**OK** or **Failed**	If **Failed**, the Receiver Board must be replaced before the ceilometer can be returned to normal operation	
Supply Voltage	**OK** or **Failed**	If **Failed**, indicates the main voltage supply has been lost	
Window Dirty	**OK** or **Failed**	If **Yes**, indicates the ceilometer lenses need cleaning	

7.3.9.2 CL31 Ceilometer

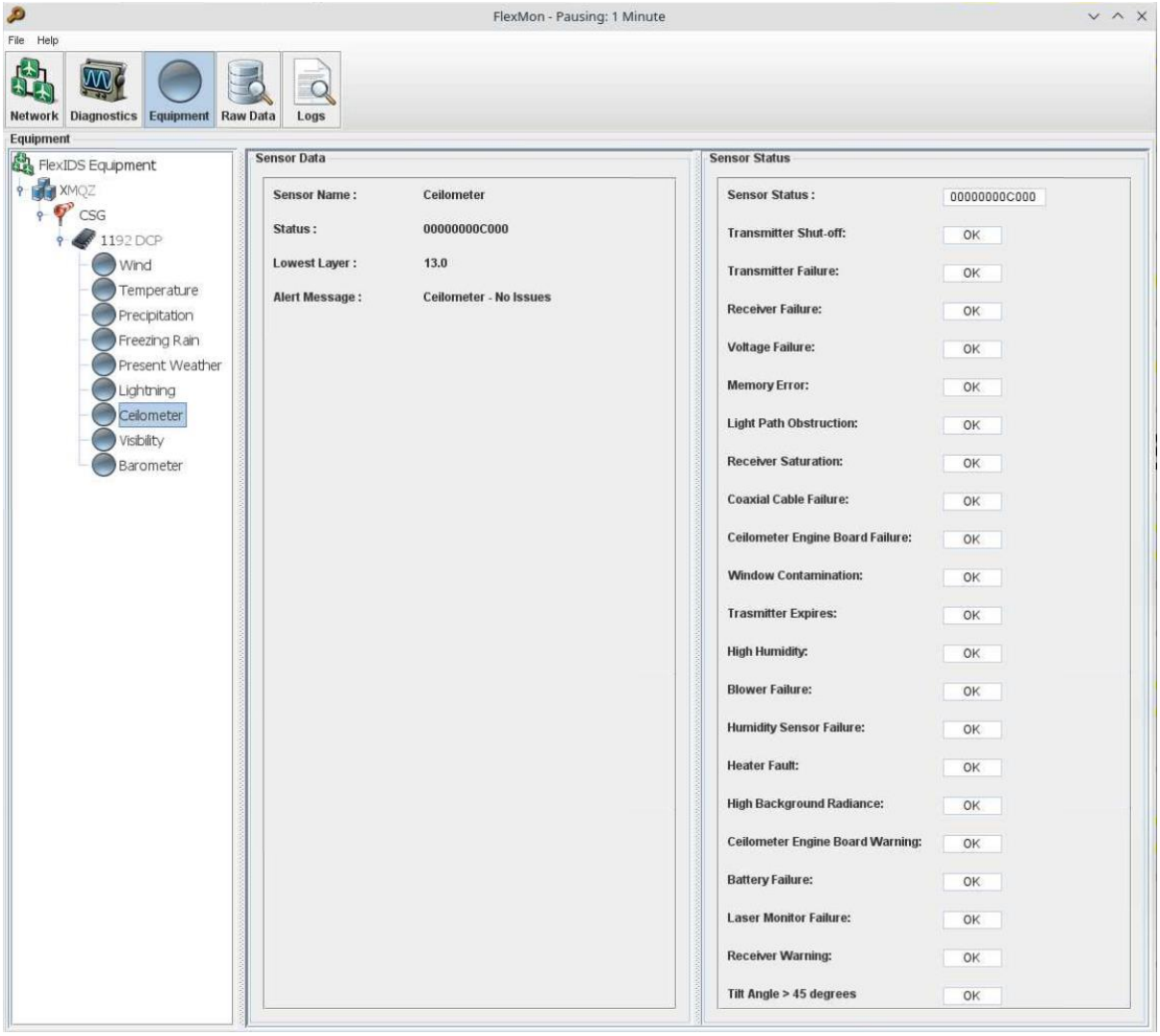


Figure 76. CL31 Ceilometer Diagnostics Screen

Table 13 provides a brief explanation of each of the status fields for the CL31 Ceilometer shown on the diagnostics display. When a warning condition exists, the status will be shown in **YELLOW**. If a failure occurs, the status will be shown in **RED**.

Table 13. Definitions for the CL31 Ceilometer Status

Field	Indications	Description	Indication
Sensor Status	Numeric	Status code indicating sensor status	—
Transmitter Shut-off	**OK** or **Failed**	If **Failed**, indicates laser temperature high.	Alarm
Transmitter Failure	**OK** or **Failed**	If **Failed**, indicates laser temperature high.	Alarm
Receiver Failure	**OK** or **Failed**	If **Failed**, indicates receiver damaged or loose cable connection.	Alarm
Voltage Failure	**OK** or **Failed**	If **Failed**, indicates CLE321 is damaged.	Alarm
Memory Error	**OK** or **Failed**	If **Failed**, indicates the CLE321 memory failure.	Alarm
Light Path Obstruction	**OK** or **Failed**	If **Failed**, indicates Window is badly contaminated or other light path obstruction .	Alarm
Receiver Saturation	**OK** or **Failed**	If **Failed**, indicates direct sunlight or something is blocking the laser beam.	Alarm
Coaxial Cable Failure	**OK** or **Failed**	If **Failed**, indicates coaxial cable failure.	Alarm
Ceilometer Engine Board Failure	**OK** or **Failed**	If **Failed**, indicates fault in Ceilometer Engine Board CLE321.	Warning
Window Contamination	**OK** or **Failed**	If **Failed**, indicates window contamination (bird droppings or condensation).	Warning
Transmitter Expires	**OK** or **Failed**	If **Failed**, indicates laser power low, old LED.	Warning
High Humidity	**OK** or **Failed**	If **Failed**, indicates water condensation inside Ceilometer.	Warning
Blower Failure	**OK** or **Failed**	If **Failed**, indicates whether the Blower is currently off, cable, power, or physically damaged.	Warning
Humidity Sensor Failure	**OK** or **Failed**	If **Failed**, the humidity sensor is not connected or is damaged.	Warning
Heater Fault	**OK** or **Failed**	If **Failed**, indicates blower circuit breaker, cable, or heater is damaged.	Warning
High Background Radiance	**OK** or **Failed**	Direct sunlight, measurements are OK unless there are alarms.	Warning
Ceilometer Engine Board Warning	**OK** or **Failed**	If **Failed**, indicates noncritical fault in Ceilometer Engine Board CLE321.	Warning
Battery Failure	**OK** or **Failed**	If **Failed**, indicates battery is dead.	Warning
Laser Monitor Failure	**OK** or **Failed**	If **Failed**, indicates laser power monitor board CLM311 or laser power measurement on Engine Board has failed.	Warning
Receiver Warning	**OK** or **Failed**	If **Failed**, indicates noncritical CLR321 Receiver failure..	Warning

Field	Indications	Description	Indication
Tilt Angle > 45 degrees	**OK** or **Failed**	If **Failed**, indicates unit is not correctly installed or the tilt angle is larger than 45°.	Warning
Blower	**OK** or **Failed**	If **Failed**, indicates whether the Blower is currently off, cable, power, or physically damaged.	Warning
Blower Heater	**On** or **Off**	Indicates whether the Blower/Heater is currently powered on.	Status
Internal Heater	**On** or **Off**	Indicates whether the internal heater is currently powered on.	Status
Working From Battery	**Yes** or **No**	Indicates whether the Ceilometer is operating from the battery.	Status
Standby Mode	**On** or **Off**	Indicates whether standby mode is on.	Status
Self Test In Progress	**Yes** or **No**	Indicates whether self-test is in progress.	Status
Manual Settings are Effective	**On** or **Off**	Always on.	Status
Units	**meters** or **ft**	—	—
Manual Blower Control	**On** or **Off**	Indicates whether manual blower control is on.	Status
Polling Mode	**On** or **Off**	Indicates whether polling mode is on.	Status

7.3.10 Visibility Sensor Diagnostics

Click the **Visibility** heading in the list pane to call up the display shown in Figure 77 and Figure 78.

- The **Sensor Data** panel shows the real-time sensor data and status.
- The **Sensor Status** panel shows the current status of several Visibility Sensor operating parameters.

7.3.10.1 6498-V/6498-PV/6498-DC-V/6498-DC-PV Visibility Sensor Diagnostics

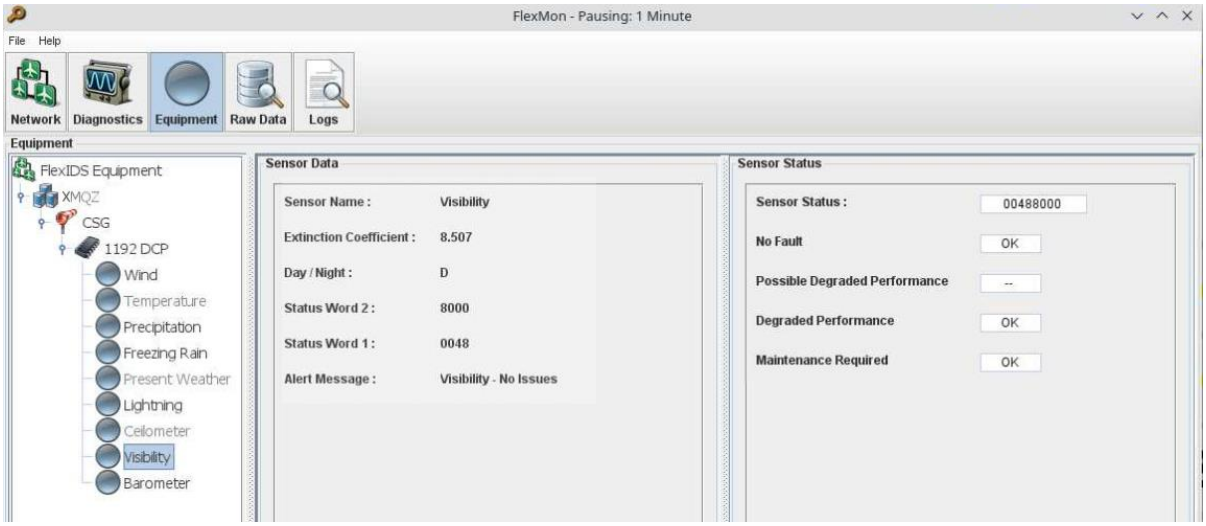


Figure 77. 6498-V/6498-PV/6498-DC-V/6498-DC-PV Visibility Sensor Diagnostics Screen

The sensor outputs four codes based on two status words.

- Sensor Status
  - 0000 — No faults
  - 0080 — Possible Degraded Performance
  - 4000 — Degraded Performance
  - 0C00 — Maintenance Required

The specific faults are then identified by **Failed** instead of **OK**.

If a failure occurs, the status will be shown in **RED**.

7.3.10.2 PWD22 Visibility Sensor Diagnostics

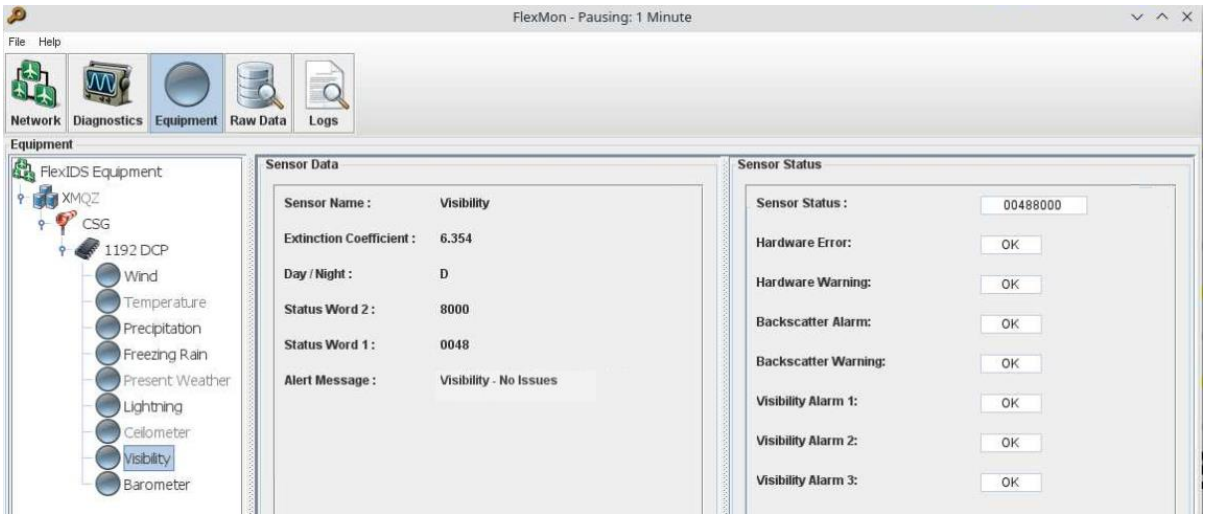


Figure 78. PWD22 Visibility Sensor Diagnostics Screen

Table 14 provides a brief explanation of each of the status fields shown on the diagnostics display. When a warning condition exists, the status will be shown in **YELLOW**. If a failure occurs, the status will be shown in **RED**.

Table 14. Definitions for the PWD22 Visibility Sensor Status

Field	Indications	Description	Indicator
Sensor Status	Numeric	Status code indicating sensor status	—
Hardware Error	**OK** or **Failed**	If **Failed**, indicates that specific hardware error.	Error
Hardware Warning	**OK** or **Failed**	If **Failed**, indicates that specific hardware warning.	Warning
Backscatter Alarm	**OK** or **Failed**	If **Failed**, indicates that the contamination level is too high and cleaning must be done.	Alarm
Backscatter Warning	**OK or Failed**	If **Failed**, indicates that the contamination level has increased and cleaning must be performed in the near future.	Warning
Visibility Alarm 1	**OK** or **Failed**	If **Failed**, indicates limits of Relay Control 1 exceeded.	Alarm
Visibility Alarm 2	**OK** or **Failed**	If **Failed**, indicates limits of Relay Control 2 exceeded.	Alarm
Visibility Alarm 3	**OK** or **Failed**	If **Failed**, indicates limits of Relay Control 3 exceeded.	Alarm

7.3.10.3 8364-E Visibility Sensor

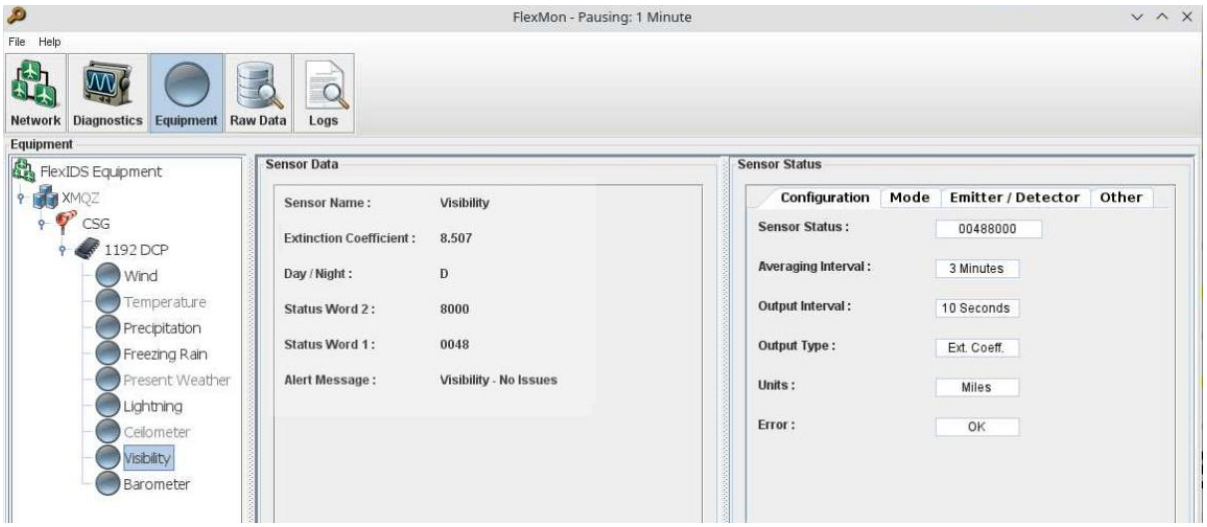


Figure 79. 8364-E Visibility Sensor Diagnostics Screen

The 8364-E Visibility Sensor diagnostics screen (Figure 79) has four tabs.

Configuration	The **Configuration** tab shows the current configuration of the sensor.
Mode	The **Mode** tab shows **OK** or **FAILED** status for the sensor's four operating modes.
Emitter/Detector	The **Emitter/Detector** tab shows the status of each of the four sensor heads and their associated heaters.
Other	The **Other** tab contains miscellaneous status data to aid in troubleshooting problems and gauging the overall operation of the sensor.

When a warning condition exists, the status will be shown in **YELLOW**. If a failure occurs, the status will be shown in **RED**.

7.3.10.3.1 Configuration

The 8364-E Visibility sensor has several configuration options (Table 15) that are set via the visibility controller. The **Configuration** tab shows the current configurations settings. Note that the settings cannot be changed through this screen; any changes must be made at the visibility controller.

Table 15. Definitions for the 8364-E Visibility Sensor Configuration Tab

Field	Description
Averaging Interval	The visibility calculates average values of collected data internally, then outputs the average to the DCP. This field shows the averaging interval currently in effect. Possible settings are: 3 minutes, 5 minutes, or 10 minutes.
Output Interval	This field shows the frequency with which data is output to the DCP. Possible settings are: 10 seconds, 1 minute, 5 minutes, or 10 minutes
Output Type	This field shows the type of data being output by the sensor. Data can be output either as visibility values or as extinction coefficient.
Units	This field indicates the units of measure for output data, and can be either miles or kilometers.
Error	This field shows any errors detected by the sensor's internal diagnostics.

7.3.10.3.2 Mode

The **Mode** tab (Table 16) shows **OK** or **Failed** for the 8364-E Visibility sensor's four operating modes.

During normal operation, the sensor alternates between Mode 0 and Mode 1 operation with a period of 15 seconds. Each half cycle, a new pair of detector measurements is acquired (one direct and one indirect). The measurement cycle period is 1 minute long, with 30 seconds spent in each mode.

A **Failed** status indicates problems with one of the four heads. The source of these errors can be further narrowed down by checking status for the individual heads in the **Emitter/Detector** tab. If only one head has failed, the field will show a warning (**YELLOW**). If more than one head fails, an error (**RED**) will be indicated.

Table 16. Definitions for the 8364-E Visibility Sensor Mode Tab

Field	Description	Indications
Mode 0, Direct	Direct measurement between Emitter 0 and Detector 1	**OK** or **Failed**
Mode 0, Indirect	Scatter measurement between Emitter 0 and Detector 0	**OK** or **Failed**
Mode 1, Direct	Direct measurement between Emitter 1 and Detector 0	**OK** or **Failed**
Mode 1, Indirect	Scatter measurement between Emitter 1 and Detector 1	**OK** or **Failed**

7.3.10.3.3 Emitter/Detector

The **Emitter/Detector** tab (Table 17) shows **OK** or **Failed** for the 8364-E Visibility sensor's four heads and four heaters (one in each head). A **Failed** status indicates a failure of the head, or dirt or contaminants on the sensor window. If only one head has failed, the field will show a warning (**YELLOW**). If more than one head fails, an error (**RED**) will be indicated.

Table 17. Definitions for the Emitter/Detector Tab

Field	Indications
Emitter 0	**OK** or **Failed**
Emitter 1	**OK** or **Failed**
Detector 0	**OK** or **Failed**
Detector 1	**OK** or **Failed**
Emitter 0 Heater	**OK** or **Failed**
Emitter 1 Heater	**OK** or **Failed**
Detector 0 Heater	**OK** or **Failed**
Detector 1 Heater	**OK** or **Failed**

7.3.10.3.4 Other

The **Other** tab (Table 18) shows status information for several parameters that can be used in the troubleshooting of sensor problems.

Table 18. Definitions for the Visibility Sensor "Other" Tab

Field	Indications	Description	Warning or Error
Power Supply	**AC** or **Battery**	Indicates whether the sensor is operating from battery or AC power	Warning
Complete Data	**Yes** or **No**	**Yes** indicates complete data is being received from all heads	Warning
Missing Data	**Yes** or **No**	**Yes** indicates incomplete data is being received from at least one head	Error
Window Dirty	**OK** or **Failed**	**Failed** indicates that contaminants (dust, etc) have accumulated on the emitter or detector windows. Cleaning the windows should clear this error	Warning

Field	Indications	Description	Warning or Error
Operating Heads	**4** or **3**	Indicates whether the sensor is operating in 4 head (normal) mode or 3 head mode. Three-headed operation is initiated automatically when the software determines that one of the sensor heads is not functioning properly. In this mode, special algorithms are used to determine visibility based on the outputs of the three operational heads	Warning
Cross Check	**OK** or **Failed**	**Failed** indicates one of the sensor heads has failed	Warning
ALS or Day/Night Heater	**OK** or **Failed**	**Failed** indicates the heater has failed on the Ambient Light Sensor or Day/Night Sensor, whichever is installed.	Error

7.3.11 Barometric Pressure Sensor Diagnostics

Click the **Barometer** heading in the list pane to call up the display shown in Figure 77.

- The **Sensor Data** panel shows the real-time sensor data and status.

Figure 80. Barometric Pressure Sensor Diagnostics Screen

7.4 RAW DATA

The **Raw Data** button allows access to the METARs in the Aviation Reports that are being processed by the Interface Host. The CDP transmits this data by multicasting to the entire network. The **Raw Data** button is greyed out when FlexMon is accessed on the OT since the OT is not an Interface Host, so raw data can only be accessed via a remote session with the CDP.

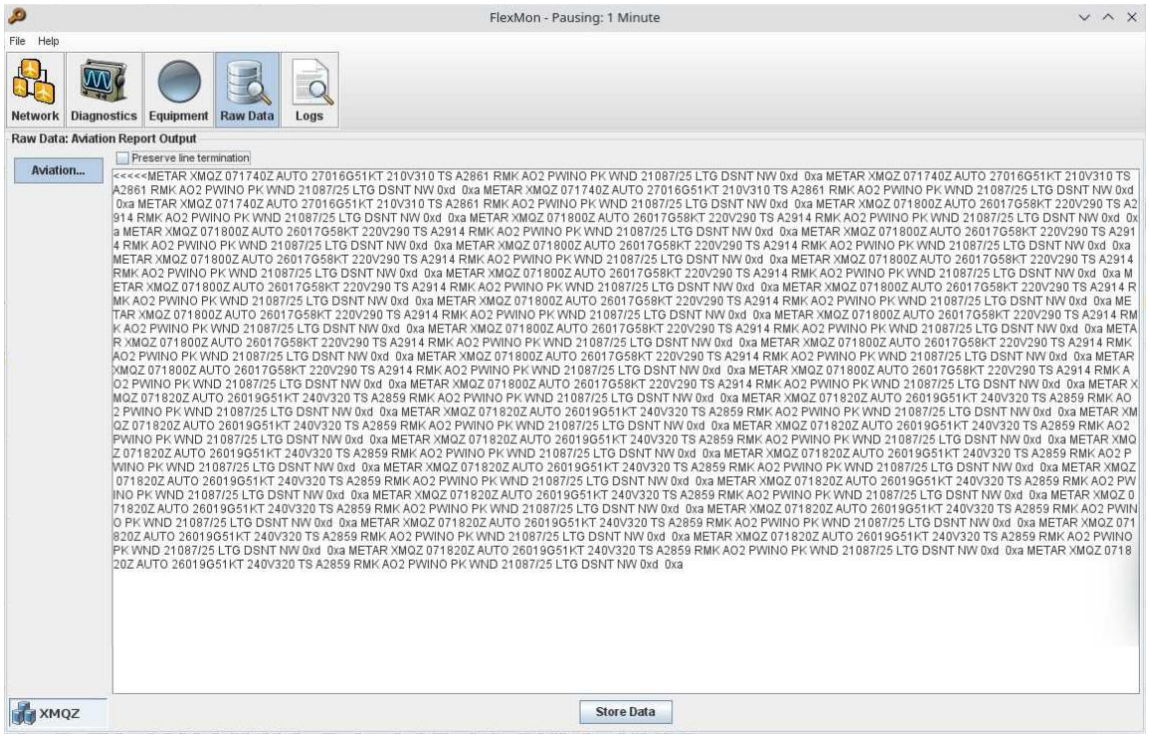


Figure 81. Raw Data

Once you are viewing the raw data via a remote session, click **Store Data** to save the data. Use the */home/awi* directory, name the file, and click **Save**. The data file can then be copied to another location via the remote session.

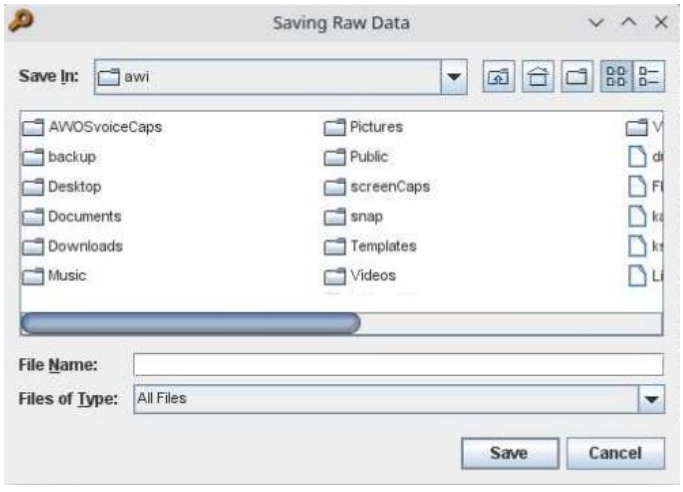


Figure 82. Select a Destination to Save the Backup

7.5 LOGS

The Logs data screen provides access to the telemetry logs.

- System—detailed system logs
- Error—detailed error logs
- Database—detailed database activity logs
- Actions—detailed history identifying the click and user ID of all actions performed
- AWOS algorithm—detailed AWOS algorithm activity logs
- MetDB—detailed meteorological report and product logs in the Met database
- AWOS Voice Phone—detailed AWOS Voice Phone queueing logs,
- Aviation Report Output—detailed Aviation Report Output activity logs
- AWOS Voice VHF—detailed AWOS Voice VHF queueing logs
- Data Logger—detailed data logger and checksum logs

Select the log type on the left and the log content will be displayed on the right. The logs will scroll down the screen and can be paused or unpaused by clicking the **Pause** button at the lower right of the screen.

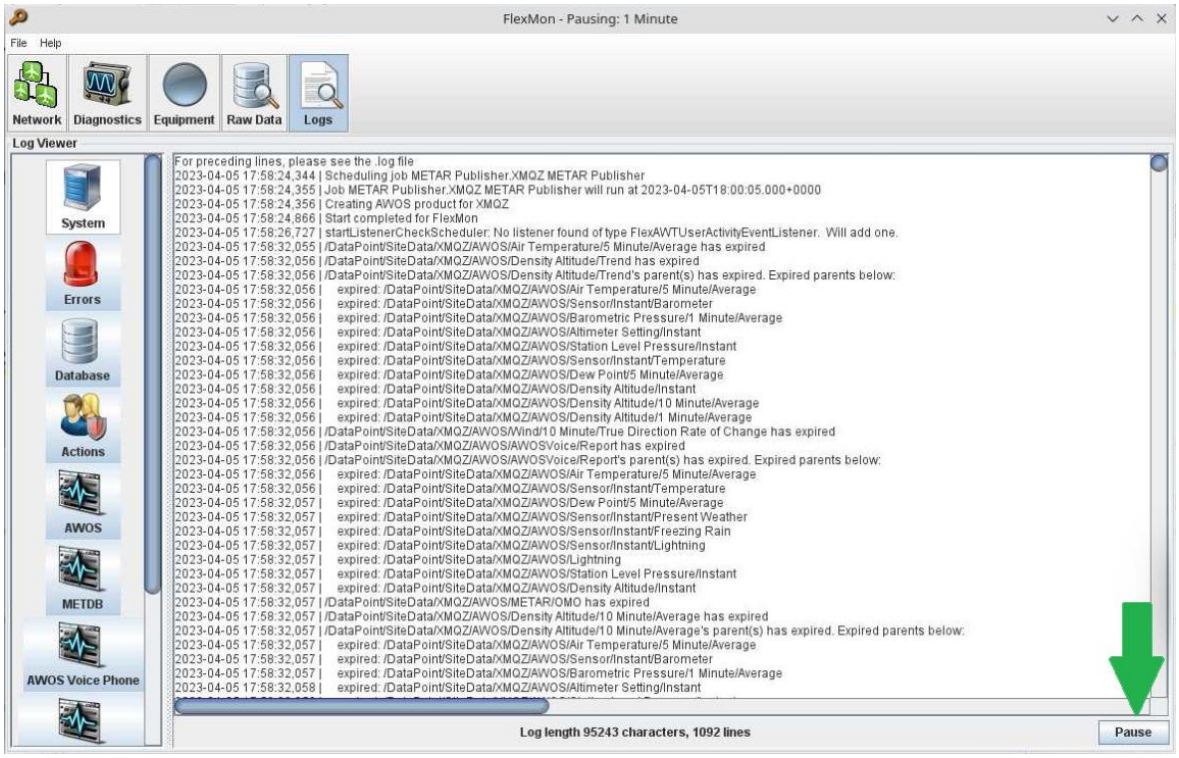


Figure 83. F1 AWOS System Logs

The log files that store all of the data shown in FlexMon while viewing the logs are stored on the local drive of the CDP and OT. The files are located in following location.

/opt/FlexIDS/artifacts/logs/

The files may be viewed using a simple text editor. The log files names and size vary depending on the operator usage. The technician may copy all the log files to a USB drive to export the files from the FlexIDS network for further analysis.

8. MONTHLY MAINTENANCE

AWOS monthly maintenance consists of a general system check and cleaning of sensor optics. Follow the procedures below and take any required corrective action. A form is provided at the end of this chapter to document the maintenance performed.

The person performing the monthly maintenance procedures is not required to have any FAA certification. Training is provided by the DBT technician at the time of installation or when upgrades are added. This training will familiarize the operator with the orientation needed to perform routine monthly maintenance.

8.1 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.

8.2 GENERAL MAINTENANCE

1. Check the operation of the obstruction lights on the tower. 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.

2. Inspect all mounting hardware and external surfaces and cable assemblies.

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

4. 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.

8.3 SPECIFIC MAINTENANCE

8.3.1 Acquisition Control Unit (ACU)

Verify that all cables and conduits are connected and in good condition. Check for damage caused by animals.

8.3.2 BP Sensor

Visually check the pressure port at the bottom of the ACU enclosure and clear any debris from within the plate area.

8.3.3 Mechanical Wind Direction Sensor

1. Visually verify that the vane is moving freely.
2. Verify that the values on the DCP display 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 wind vane and vane body are clear of large debris, such as bird nests.

8.3.4 Mechanical Wind Speed Sensor

1. Visually verify that the cups are moving freely.
2. Verify that the values on the DCP display 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.

8.3.5 Ultrasonic Wind Sensor

1. Verify that the values on the DCP display 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.

8.3.6 Temperature/Relative Humidity Probe

No additional procedures.

8.3.7 MARS

1. Maintenance of the MARS is generally limited to periodic cleaning and occasional repainting of exterior surfaces.
2. Check the air inlet (the narrow end of the MARS) for obstructions and debris.
3. Remove obstructions and debris as necessary.
4. Check the MARS for insect activity (cobwebs, hornet's nests, etc.), as well as birds' nests, and clean out any debris.
5. 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 sandpaper to clean them and encourage better paint adhesion.
6. 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.
7. 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.
8. 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.
9. Check the fan for noise that could be a sign of worn bearings.
10. If the MARS fan is in need of repair, report the problem.
11. 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.
12. If the MARS fan is in need of repair, contact DBT Customer Service (see Section 1.1).

8.3.8 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, contact DBT Customer Service (see Section 1.1).

8.3.9 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.

8.3.10 Present Weather and Visibility Sensors

1. Clean the sensor windows using a soft cloth and water.
2. Clean the Day/Night sensor optics (either in the vicinity of the enclosure or nearby on the H frame for the PWD22 sensor).

8.3.11 Ceilometer

WARNING	**The 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 the blower operation by covering the window (only the receiver window for the 8339-FAA Ceilometer, shown in Figure 84 — the CL31 Ceilometer does not have a separate receiver window), 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 84. 8339-FAA Receiver Window

8.3.12 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.

8.3.13 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.

8.3.14 Communication Interface Unit and Operator Terminal

1. Check OT display operation.
2. Check OT keyboard operation.
3. Verify printer is printing a line every minute.
4. Check the printer ribbon and replace as necessary.
5. Check the printer paper and replace as necessary.
6. Check dial-up telephone operation by dialing from an outside line.
7. Verify VHF radio operation by listening to the AWOS voice output over a remote receiver.
8. Check the system clock against a known standard. If the difference is greater than 15 seconds, report the problem.
9. Check the cables connecting to the CIU.

MONTHLY MAINTENANCE FORM

The following page provides a form to record monthly maintenance activities. The form should be copied and sufficient copies stored at a convenient location in each site's Facility Reference Data File (FRDF).

AWOS Monthly Technical Performance Record

Site Name and Location _____ Date _____

General	**Completed**
Notify local users AWOS may be missing or unreliable during inspection	_____
ACU/Tower/H Frame	**Pass (Y/N)**
Remove debris from all sensors	_____
Check for mechanical damage	_____
Check for movement of mechanical wind speed and direction sensors	_____
Check operation of MARS fan	_____
Check obstruction lights	_____
Check dial-up by dialing in from an outside line	_____
Check VHF by listening to AWOS voice output from a remote receiver	_____
Sensors	**Pass (Y/N)**
Check all sensor hardware and cables	_____
Clean Rain Gauge funnel	_____
Check Rain Gauge heaters	_____
Clean Present Weather/Visibility Sensor optics (PWD22, 6498 series, 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	_____
CIU/OT	**Pass (Y/N)**
Check display operation	_____
Check keyboard and mouse operation	_____
Check printer operation, replace ribbon and paper as necessary	_____
Check system clock	_____
Record AWOS Observations	**Data**
Time and Date	_____
Wind Direction	_____
Wind Speed	_____
Temperature	_____
Dew Point	_____
Altimeter Setting	_____
Visibility	_____
Density Altitude	_____
Variable Visibility	_____
Sky Condition (Clouds)	_____
Present Weather	_____
Precipitation Accumulation	_____
Lightning	_____

Note any missing (yellow X) parameter or any other obvious failures:

_____

_____

System Checked By: _____ Date/Time: _____

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