BELFORT INSTRUMENT Co.

800-937-2353 www.Belfortinstrument.com

Belfort ®
Automated Weather Observing System AWOS

Maintenance Manual

Proprietary

Prepared in Response
to the
FAA, Automated Weather Observing System (AWOS)
Requirements

Aug. 2014

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1.0 Introduction

1.1 PURPOSE – This manual has been prepared to thoroughly describe the maintenance requirements to be followed by the owner and factory qualified technician to assure a long-term successful usage of a Belfort AWOS system.

1.2 SCOPE – This manual has been developed in accordance with the guidance and requirements described in FAA Advisory Circular, AC No: 150/5220-16D and other referenced documents. This manual is intended to provide the owner and maintenance technician with proper maintenance procedures applicable to all FAA approved Belfort AWOS configurations. Owners and maintenance technicians are encouraged to contact the Belfort product support group at 1-800-937-2353 regarding questions concerning the applicability of any specific maintenance procedure.

1.3 LEVEL OF MAINTENANCE – All levels of maintenance must be performed by a technician that meets the requirements indicated in section 4.0 of this manual. Site/user maintenance is characterized by routine preventive periodic maintenance, calibration adjustments and quick turnaround replacement of defective or unreliable Lowest Replaceable Unit (LRU) assemblies. Examples include completion of tri-annual performance, annual performance validation/maintenance checks and removal and replacement of a failed sensor component. This manual provides site maintenance personnel with instructions for completion and documentation of routine performance and maintenance checks and tasks, instructions for adjustment of out of tolerance sensors, troubleshooting procedures to identify defective components, and instructions for the removal and replacement of defective system components.

1.4 PERIODIC MAINTENANCE – Equipment/system components that require periodic maintenance and maintenance frequencies are identified in this manual. Forms to be used to document completion of maintenance tasks, system calibration and adjustments are provided in Appendix A of this manual. These forms can also be downloaded from the Belfort Instrument Co. website, http://www.belfortinstrument.com. In addition to providing documentation of maintenance actions completed, the Facility Performances and Adjustment Data Forms provided are intended to be used as checklists to assure that all required routine maintenance tasks are completed. Tri-annual preventive maintenance tasks must be completed in a timely manner to assure system accuracy, optimum performance and reliability of the system.

1.5 WARRANTY – The entire Belfort AWOS ™ system is provided with a one-year warranty. The warranty period starts with the date of delivery from the factory. The entire system has been manufactured and will perform in accordance with the requirements of the FAA AC 150/5220-16D. The dual-pressure sensor and visibility sensor will perform as a certified instruments in accordance with requirements of the FAA AC 150/5220-16D. Any defect in design, materials, or workmanship which may occur during proper and normal use during a period of 1 year from date of installation or a maximum of 2 years from date of shipment will be corrected by repair or replacement by the manufacturer FOB Belfort. An extended warranty or and service contract may have been purchased. Maintenance personnel should check with the system owner to determine if an extended warranty or service contract is applicable to the system installed at their site.

1.6 WARRANTY SUPPORT – For warranty support, contact Belfort Instrument Co. customer support at 1-800-937-2353. When calling, please have the Belfort AWOS ™ location and serial number available.

2.0 APPLICABLE DOCUMENTS & LIST OF ACRONYMS

2.1 APPLICABLE DOCUMENTS

This manual describes the periodic maintenance tasks to be performed on the Belfort Instrument Co. AWOS system to comply with applicable sections of the following documents:

FAA AC No: 150/5220-16D	Automated Weather Observing Systems (AWOS) For Non-Federal Applications
FAA Order 6700.20	Non-Federal Navigational Aids and Air Traffic Control Facilities
FAA Order 6560.13	Maintenance of Aviation Meteorological Systems and Miscellaneous Aids
FAA Form 6030-1	Facility Maintenance Log
Belfort AWOS (VDD)	Version located in Belfort AWOS site Maintenance Log binder.
Description Document	The VDD may also be located in the FRDF.

2.2 LIST OF ACRONYMS

AC	Alternating Current
AVG	Average
ALS	Ambient Light Sensor
AWOS	Automated Weather Observing System
BIT	Built-In-Test
CTAF	Common Traffic Advisory Frequency
DATU	Data Acquisition Terminal Unit
DC	Direct Current
DCP	Data Collection Processor
DDR	Digital Data Receiver
DMM	Digital Multi-meter
DSL	Digital Subscriber Line
DTMF	Dual-Tone Multi-Frequency
EEPROM	Electrically Erasable Programmable Read-Only Memory
FAA	Federal Aviation Administration
FBO	Facility Base Operator
FCC	Federal Communication Commission
FRDF	Facility Reference Data File
FRU	Field Replaceable Unit
FSDO	Flight Standards District Office
Hg	Mercury
HHDU	Hand Held Display Unit (Optional Maintenance Tool)
ICAO	International Civil Aviation Organization
ID	Identification
INOP	Inoperative
KT	Knots
LED	Light Emitting Diode

LRU	Lowest Replaceable Unit
MCIF	Microphone Click Interface
MHz	Megahertz (million Hertz)
MOU	Memorandum of Understanding
MSL	Mean Sea Level
NAVAID	Navigational Aid
NIST	National Institute of Standards and Technology
NOTAM	Notice To Airmen
OMM	Operations and Maintenance Manual
RAF	Regional Airway Facilities
REL HUM	Relative Humidity
RIF	Radio Interface
RPM	Revolutions Per Minute
T1	T-carrier 1 (digital transmission line, 1.544 Mbps, 24 voice channels)
UHF	Ultra High Frequency
UNICOM	Universal Integrated Communications (System)
VAC	Volts Alternating Current
VDC	Volts Direct Current
VDD	Version Description Document (Belfort AWOS Configuration Baseline Document)
VDU	Video Display Unit
VHF	Very High Frequency
VS	Visibility Sensor

3.0 MAINTENANCE PROGRAM OVERVIEW

Belfort AWOS maintenance consists of preventive and corrective maintenance activities. Preventive maintenance consists of tri-annual and annual maintenance tasks required to keep the Belfort AWOS system in peak operational condition. Corrective maintenance utilizes the Built-In Test (BIT) features of the Belfort AWOS software to identify system faults and minimize troubleshooting activities. For sensor troubleshooting, removal instructions and procedures refer to section 6.0 of this manual. Refer to the Belfort AWOS Installation and Checkout manual for installation instructions and checkout of replaced sensors and components.

A suite of system diagnostic self-tests is continuously running and automatically outputs system status to a history file every time sensor information is transmitted from the DCP. If the self-test detects a problem, the suspected sensor or function is identified in the system status log with an error flag.

When routine maintenance tasks and adjustments are not adequate to correct system errors or problems, defective components must be replaced. Site maintenance personnel must not attempt to repair defective system LRU components.

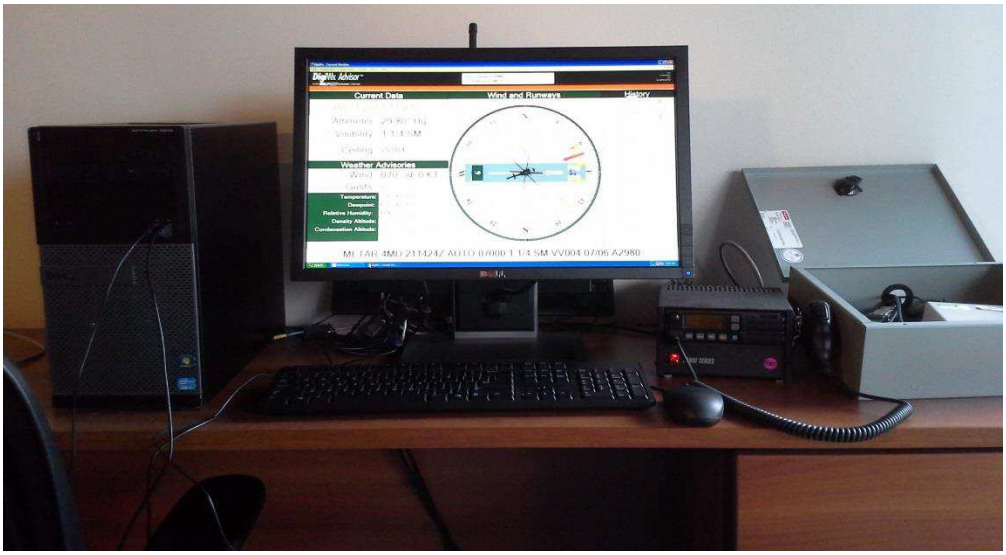

Figure 1
Typical Display Acquisition Terminal Unit setup

4.0 QUALIFICATION REQUIREMENTS FOR MAINTENANCE PERSONNEL – Installation and maintenance of the Belfort AWOS system must be performed by qualified personnel. FAA Order 6700.20A contains the qualification requirements for maintenance personnel who maintain Non-Federal facilities. Installation and maintenance personnel must meet the requirements of FAA Order 6700.20A and have the special knowledge and skills needed to install and maintain a Belfort AWOS facility. These skills can be obtained by completing the "Belfort AWOS Installation and Maintenance Training Program" course and successfully

passing the required FAA administered performance examination. The owner of the Belfort AWOS system is responsible for assuring that only qualified personnel perform system maintenance activities. Owners or maintenance technicians interested in scheduling this Belfort training should contact the Belfort AWOS program manager at 1-800-937-2353 to schedule this training.

5.0 PREVENTATIVE MAINTENANCE AND CALIBRATION PROCEDURES – Scheduled Belfort AWOS calibration/verifications are performed tri-annually and annually as detailed in Appendix B.

Any defects observed or detected during these maintenance and calibration procedures and tests must be described and recorded on the Facility Maintenance log, FAA Form 6030-1 and corrective actions initiated to resolve the issue as soon as possible.

As a standard practice, whenever maintenance personnel visit the outdoors Belfort AWOS site location, regardless whether the visit is scheduled or unscheduled, a general walk-around inspection of the Belfort AWOS tower and associated site grounds area must be performed. This walk-around inspection should include the following observations at a minimum:

1) Visual inspection of the tower for obvious defects such as chipped paint, evidence of corrosion on the tower or sensor enclosures or mounting structures, loose or broken hardware or electrical connections, and any other unsafe conditions that could affect the reliability of the system. Including an observation that the obstruction lighting is operational. Any defects observed must be described and recorded on the Facility Maintenance log, FAA Form 6030-1 and corrective actions initiated to resolve the issue as soon as possible.

2) A general inspection of the grounds area to assure that grounds maintenance is being adequately performed and the area is neat and orderly.

3) The certified instruments Visibility Sensor and Altimeter must be verified as detailed in Appendix B. The appropriate Belfort AWOS Maintenance Form from Appendix A must be completed for each Maintenance event.

4) The non-certified instruments Wind Speed and Direction, Temperature and Humidity/Dew-point Sensor must be verified as detailed in Appendix B. The appropriate Belfort AWOS Maintenance Form from Appendix A must be completed for each Maintenance event.

The following scheduled preventive maintenance procedures must be completed at a minimum for each of the LRU or system sensor assembly installed as identified in this section:

5.1 DATU – DATA ACQUISITION TERMINAL UNIT MAINTENANCE

Any defects observed or detected during these tests must be described and recorded on the Facility Maintenance log, FAA Form 6030-1.

5.1.1 DATU TRI-ANNUAL MAINTENANCE

1. Clean air filters with hand-held vacuum cleaner.
2. Clean cabinets with mild detergent and water (wring cloth dry).
3. Check the computer CPU Power Supply cooling fans to assure they are operating and listen for any unusual noise such as; grinding or squealing, that would indicate the fan is not functioning properly. The DATU computer is not a field repairable item. Therefore, if the fan is not operating or is making unusual noise, contact Belfort to arrange for computer replacement or factory repair.

3a. Check PC Clock for accurate time and Atomic Clock operation. If the time is not accurate, then perform the Atomic clock verification procedure in Appendix G. Then reset the Windows clock through the windows control panel to the correct time.

3b. Download and install any Windows Updates indicated by the Windows OS.

****The Belfort AWOS tower should be powered up with both AC and DC Circuit breakers on. Some of the sensors take up to 5 minutes for their averaged values to be reported to the DATU from the DCP.**

4. The Belfort AWOS Tower transmits telemetry, system status, sensor status and data quality status along with weather data. Advisor software captures the telemetry and displays it on the Advisor Main screen. See Figure 1a below.

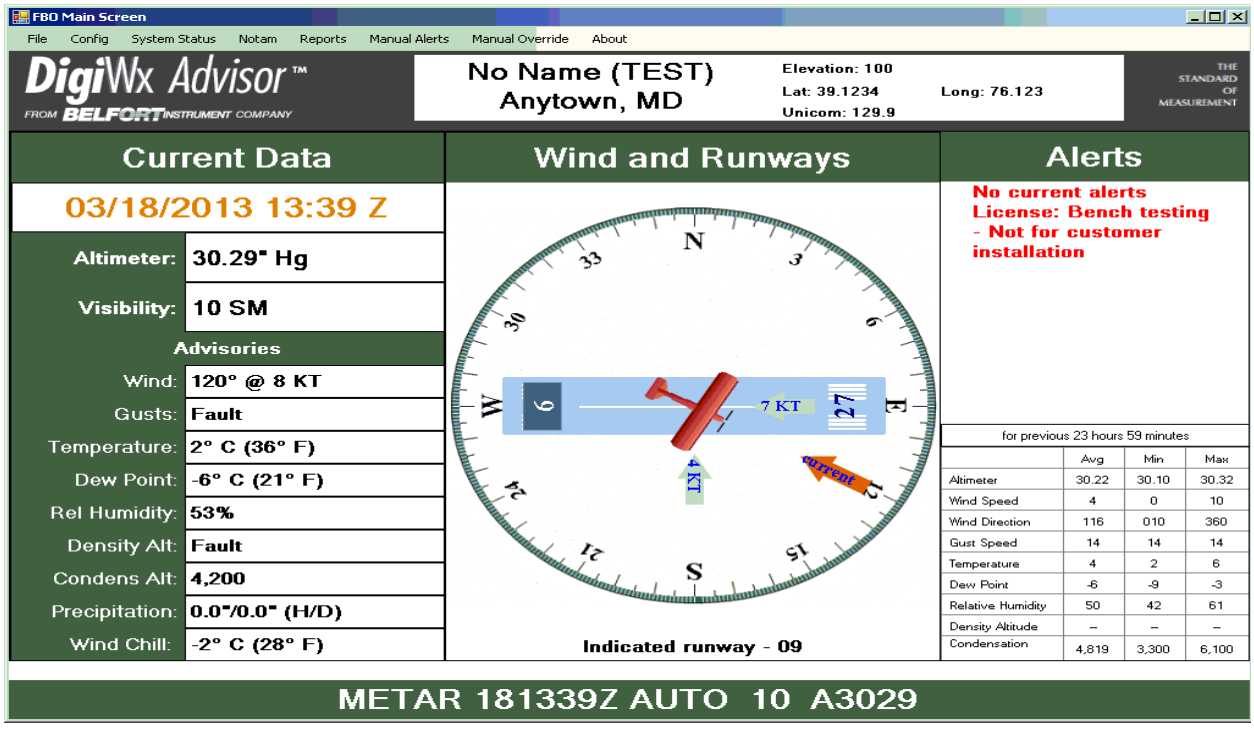

Figure 1a
Advisor Main Screen

Advisor software also captures this status and compares it to the last status received and if there is a difference in any of the data, writes all the data to the Advisor Status Log and to the Advisor Current Status Page. See Figure 1b below.

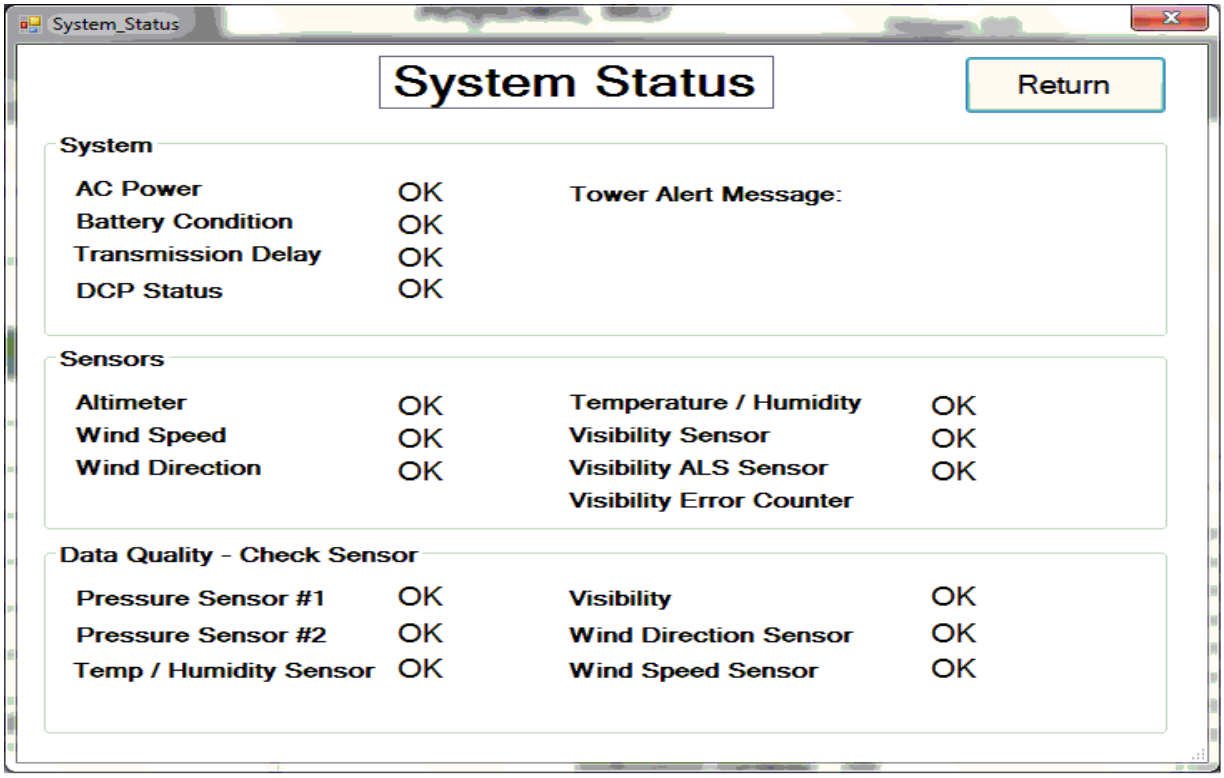

Figure 1b
System Status Page

The System Status Page is updated when the page is accessed. To reread the status, the technician must select the Return Button then access the System Status page again for updated status.

At any time the maintenance technician can view the most recently received Status Information displayed in a user-friendly format. The maintenance technician can also view the Status Change History for past or recurrent problems. View the Status Pages past history by selecting Status Pages from the History menu entry on the Advisor main menu. Refer to the Belfort AWOS "Operator Instruction Manual" for complete user instructions for operating the Advisor software.

5. Document any error flags on the Tri-annual or Annual "Facility Performance and Adjustment" data form.

6. Check the Advisor Status Log Page for any past or recurrent problems that have not been addressed as current.
7. If doing a Tri-Annual or Annual performance test, document any unexplained recurrent error flags on the Tri-annual or Annual "Facility Performance and Adjustment" data form. All actions taken to correct errors identified will need to be documented and addressed on the FAA Form 6030-1.

5.1.2 DATU ANNUAL MAINTENANCE – In addition to completing scheduled tri-annual maintenance tasks, DATU annual maintenance consists of verifying operation of the Atomic Clock and defragmenting the DATU computer hard drive and verification of the installed Belfort AWOS software configuration. It is not necessary to stop the Belfort AWOS application during disk defragment.

To verify the Belfort AWOS Atomic clock, follow the Verification Procedure in Appendix G.

Follow the steps below to defragment the computer hard drive:

1. Minimize the Advisor Window and any other running Belfort AWOS programs
2. Empty the Recycle bin.
3. Click on the "Start" button
4. Click on "My Computer"
5. Right click on "Local Disk, "C:"
6. Select "Properties"
7. Select the "Tools: tab
8. Select and click on the "Disk Cleanup" button to perform that function.
9. Click on the "Defragment Now" button
10. Note the "% Free Space"
    If "% Free Space is less than 15% or < 3G ," notify Belfort Instrument Company for support.
11. Click the "Defragment" button
12. Once the defragmenting process is complete you may exit all windows opened in the above listed steps.
13. Maximize the Advisor window and any other previously minimized Belfort AWOS programs

Follow the steps below to check the version status of the installed Belfort AWOS software:

1. Belfort AWOS Advisor:
    a) Select "Help" from the Advisor Menu.
    b) Select "About" from the submenu.
    c) The version number is located on the bottom of the window.
    d) Record the software version on the Annual Configuration Validation Performance and Maintenance Record.

2. Belfort AWOS Phone:
    a) Right click on the Belfort AWOS Phone icon located in the system tray.
    b) Select "Configure" from the popup menu.
    c) The version number is located on the top of the window.
    d) Record the software version on the Annual Configuration Validation Performance and Maintenance Record.

3. Belfort AWOS Voice:
   a) Select “Help” from the Belfort AWOS Voice main menu.
   b) Select “About Belfort AWOS Voice” from the submenu.
   c) The version number is located at the top of the window.
   d) Record the software version on the Annual Configuration Validation Performance and Maintenance Record.

4. Contact the Belfort Factory Customer Service for the current released versions information and the software if needed.

5. If the current installed versions of software are not the current released FAA approved versions of software, then the system should be updated with the newest released versions.

6. Add an entry in the Facility Maintenance Log on Form 6030-1 for each software version upgraded or any changes made to the PC.

5.2 DCP – Annual Barometric Pressure Maintenance & Calibration

SAFETY PRECAUTIONS

1. Do not perform outdoor Belfort AWOS maintenance tasks during a thunderstorm.
2. Use extreme caution when lowering the tilt-over tower whenever ice or snow has accumulated on the tower cross arm or the sensors. The extra weight may cause the tower to fall over rapidly.

PARTS AND TOOLS REQUIRED

1. Portable pressure standard with current NIST traceable calibration certification.
2. Notebook computer running ACBSTXCOM and RS232 cable
3. Belfort AWOS hand held display
4. Socket wrench and 13/16" socket
5. Eight (8) foot step ladder

INSTRUCTIONS

1. At the DATU display terminal, issue a NOTAM advisory, to alert users that the Belfort AWOS system is being serviced, prior to beginning this maintenance tasks. The NOTAM to be issued is **"Belfort AWOS system being serviced, do not use current weather data outputs."** Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Instructions for issuing and deleting NOTAMs are provided in the *"Belfort AWOS Operator Manual"*.
2. At the tower, toggle the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section (refer to figure 2.a) six (6) times (See Table 1).

Belfort AWOS Alert Messages
1. Contact FBO for an important message.
2. Wind speed sensor INOP.
3. Wind direction sensor INOP.
4. Temperature and/or humidity sensor INOP.
5. Barometric pressure sensor INOP.
6. Belfort AWOS being serviced. Do not use readings.
7. Belfort AWOS not maintained. Do not use readings.
8. Private Belfort AWOS weather station. Do not use.
9. Landing area warning
0. No Alerts

Table 1.
Belfort AWOS Alert Messages

3. Remove tower-securing bolts and lower the tower until the DCP is at a comfortable working height so that the portable pressure standard on an upper step of the ladder is at the same

height as the DCP. Secure the tower in that position by tying the rope to the base of the Belfort AWOS tower. Figure 2.a illustrates the height locations where the various Belfort AWOS sensors and other system components are located on the tower. Figure 2.b illustrates the tower as typically secured for maintenance.

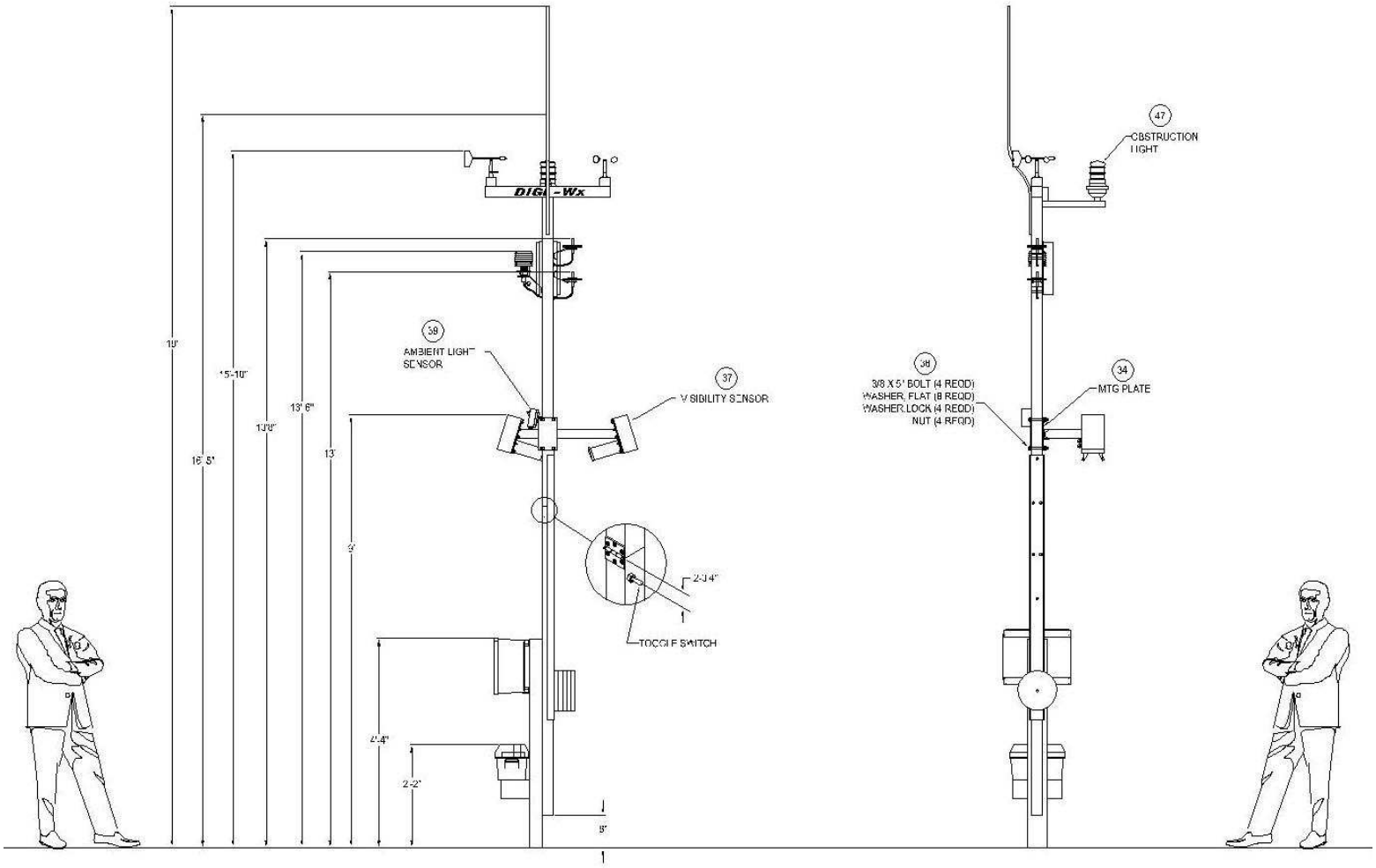

Figure 2.
Typical Belfort AWOS Tower Equipment Mounting Locations

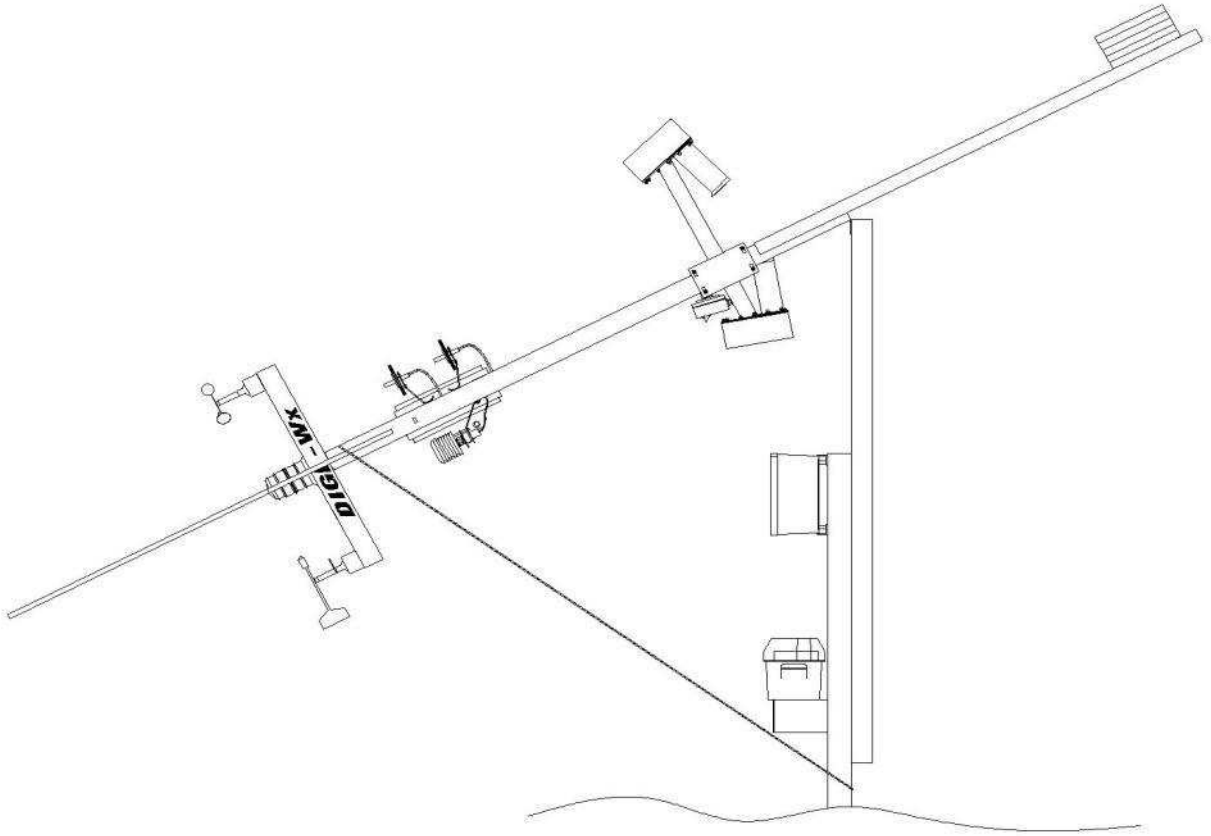

Figure 2a
Securing the Tower for Maintenance

4. Power on the Belfort AWOS HHDU. The word "ALERT" should be displayed across the HHDU runway display. Push the "PAGE" button and the message "Belfort AWOS being serviced" must appear. For the VHF output and the Phone output, the affected instrument will be reported as "inoperable". On the Advisor Screen, the indicated Alert will be reported on the front page of the display.
5. The Alert messages are programmed in the same order as they appear in Table 1. If an alert message other than message 6. is displayed, consult the list of alert messages in Table 1. You will need to toggle the tower switch an appropriate number of times until the "Belfort AWOS being serviced" alert message is displayed. For example, if the alert message number 2 is displayed, toggle the switch 4 times.
6. Check and clear the altimeter pressure ports of any blockage or insect infestation. If blockage is found, slide a wooden tongue depressor between the plates to clear the debris. Visually check the tubes from the pressure ports to the tower, look for any indications of crimping or degradation. Replace if necessary.
7. Verify accuracy of pressure sensor data - Place the portable pressure standard on the ladder at the same height (± 6 inches) as the DCP. Turn the standard on and allow it to stabilize for five (5) minutes. Check for low battery indication (a decimal point will appear between each digit of the displayed pressure when the battery is low).
8. If the system has a visibility sensor, there will be a serial RS232 cable from the visibility sensor connected to another RS232 cable which is connected to the back of the DCP. Disconnect these two RS232 cables. Connect the cable connected to the DCP to the test notebook computer RS232 serial communication port. If there is no visibility sensor installed, connect the portable notebook computer (with ACBSTXCOM installed) to the DCP through the serial communication cable that extends to the bottom of the tower.
9. If the system has a battery backup, turn off the DC circuit breaker so battery backup is disabled. Start the ACBSTXCOM program. After 10 seconds, turn the AC circuit breaker in the Belfort AWOS power box off and then on again to force a reset. Immediately type "m" <enter> to put the DCP in monitor mode. Enter the password.
10. Type "T10" <enter> to display the measured pressure from the 2 sensors. If the measured pressure of either of the sensors differs from the standard by more than 0.05 in Hg, it indicates that the sensor is not suitable for calibration. <u>The DCP must be replaced before continuing further with this procedure</u>. DO NOT ATTEMPT TO CALIBRATE A PRESSURE SENSOR THAT DIFFERS FROM THE STANDARD BY MORE THAN 0.05 in Hg. **Follow the Belfort AWOS System Component Failure Instructions in Section 5.10.**
11. If either sensor differs from the standard by more than .02 in Hg, or the sensors differ from each other by more than .02 in Hg, review the previous year's maintenance log for the Belfort AWOS Comprehensive Facility Performance and Adjustment Record and any Annual Configuration Validation Performance and Maintenance Records. If the Annual Drift value is greater than +-.02 in Hg then the sensors are suspected to be faulty and the DCP needs to be returned to Belfort for Factory Service. If the Annual Drift value is less than +- .02 inHg, the sensors can be adjusted. Document the Drift Value on the appropriate test record sheet.
12. To adjust the sensors, unbolt the DCP from the tower allowing access to the tube connectors on the back of the DCP. Remove the tubes from the back of the DCP and blow through tubes, checking for any obstructions. After assuring the tubes are clear and reconnecting them to the DCP (either tube to either connector is OK), start the pressure sensor calibration process by typing "U P ~" and press <enter>. The DCP will prompt you for a password.

Enter the site password (the password is case sensitive). Next, hold the CTRL key down and type "V" then enter the 5 digit target pressure from the portable pressure standard (Example 30.235) and press <enter>. The automatic calibration routine will make any required adjustments to the pressure sensor parameters and the DCP will report "calibration complete". At the end of the routine, press the "esc" key to return to the main configuration menu.

13. Verify that the pressure sensors are calibrated by repeating step 10. If the sensors still differ from each other or the standard by more than .02 in Hg. first, repeat step 12.
14. If the sensors cannot be adjusted to within spec, then the sensors are faulty and the DCP needs to be returned to Belfort for Factory service. **Follow the Belfort AWOS System Component Failure Instructions in Section 5.10.**
15. Type "c" and enter the new date of calibration, then type "CR".
16. Press the "Esc" key. This will cause the data to be saved in the EEPROM.
17. Exit ACBSTXCOM by typing "x" then press <enter>.
18. Reattach the DCP to the tower with the 4 screws removed in step 11 above.
19. Disconnect the RS232 cable from the notebook computer and reconnect the RS232 data communication cable to the visibility sensor (if present). Apply Dow Corning #4 liberally to the connection to protect against moisture. .
20. Remove and reapply power to the DCP to restore normal operation.
21. If additional maintenance tasks are to be performed, skip to next maintenance task. If maintenance tasks are complete, toggle the "ALERT MESSAGE" switch 4 times to return the unit to service.
22. Observe system output and verify that the system is reporting data as expected.
23. Switch the DC circuit breaker back on if battery backup is present.
24. Untie the rope and SLOWLY erect the tower to the vertical position and secure it by installing and tighten-up (DO NOT OVER TIGHTEN) the three (3) tower-securing bolts. NOTE: Be careful to avoid pinching the wires on the inside of the hinged Tower Section when raising the tower.
24. If all maintenance tasks are complete, issue another NOTAM advising users that "**maintenance activities were completed, system has been returned to normal operation**." The expiration date and time of this NOTAM should coincide with the same expiration date and time of the previous advisory NOTAM that was issued to put the system in the maintenance mode. Verify that this NOTAM advisory is correctly displayed on the operator screen. Refer to the *"Belfort AWOS Operator Manual"* for instructions on how to enter and delete NOTAMs**.**

5.3 TEMPERATURE, HUMIDITY AND DEW POINT- ANNUAL MAINTENANCE & VERIFICATION PROCEDURES

SAFETY PRECAUTIONS

1. Do not perform outdoor Belfort AWOS maintenance tasks during a thunderstorm.
2. Use extreme caution when lowering the tilt-over tower whenever ice or snow has accumulated on the tower cross-arm or the sensors. The extra weight may cause the tower to fall over rapidly.

PARTS AND TOOLS REQUIRED

1. Kestrel Model 3000 Wind Instrument or equivalent
2. Belfort AWOS hand held display

The Temperature and Dew Point Verification Test is a confidence test, which verifies that the Belfort AWOS air temperature and humidity readings compare reasonably with readings taken by a calibrated Kestrel Model 3000 Wind Instrument.

VERIFICATION INSTRUCTIONS

1. Turn on the HHDU. Stand near the base of the Belfort AWOS tower, facing into the wind. Observe the Belfort AWOS wind indicator vane to ascertain wind direction. Turn on the Kestrel Model 3000, select average mode, and hold the Kestrel Model 3000 at eye level, square to the wind and record the temperature and relative humidity. If the wind speed is below 2 mph, wave the Kestrel Model 3000 back and forth several times to assure air temperature is being measured and not case temperature. Press refresh on the HHDU to get the most recent Belfort AWOS data. The temperature and humidity readings should agree within 20%.
2. If either temperature or relative humidity does not agree within 20%, the sensor should be replaced. **Follow the Belfort AWOS System Component Failure Instructions in Section 5.10.**

5.4 6000 VISIBILITY SENSOR – TRI-ANNUAL MAINTENANCE, VERIFICATION & CALIBRATION PROCEDURES

SAFETY PRECAUTIONS

1. Do not perform outdoor Belfort AWOS maintenance tasks during a thunderstorm.
2. Use extreme caution when lowering the tilt-over tower whenever ice or snow has accumulated on the tower cross arm or the sensors. The extra weight may cause the tower to fall over rapidly.

PARTS AND TOOLS REQUIRED

1. Belfort Instrument Company 6000 Calibration Kit, Item 46, P/N 90001
2. Notebook computer running Hyper-terminal and male/female serial DB9 cable
3. Window cleaner and soft cloth
4. Tape Measure

PROCEDURE

1. At the DATU display terminal issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning this maintenance tasks. The NOTAM to be issued is **"Belfort AWOS system being serviced, do not use current weather data outputs."** Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
2. Before beginning verification, clean the visibility sensor glass windows and the scatter plate with a non-abrasive commercial window cleaner and a soft cloth.
3. Toggle the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times.
4. The Alert messages are programmed in the same order as they appear in Table 1. If an alert message other than message 6 is displayed, consult the list of alert messages in Table 1. You will need to toggle the tower switch an appropriate number of times until the "Belfort AWOS being serviced" alert message is displayed. For example, if the alert message number 2 is displayed, toggle the switch 4 times.
5. Mount the scatter plate to the sensor support bracket as shown in Figures 3.a and 3.b. Make sure the scatter plate is spaced an equal distance from the edge of each hood, within ±¼ inch (see figure 3.b).
6. If the battery backup option is installed, turn off the DC circuit breaker so battery backup is disabled.
7. At the bottom of the tower, the RS232 communication cable from the visibility sensor is connected to the RS232 cable from the DCP through a null modem adapter. Disconnect the RS232 visibility sensor cable from the null modem adapter and connect it to a notebook computer running Hyper terminal or Procomm, 9600 baud, N,8,1. It may be convenient to add a RS232 extension cable.

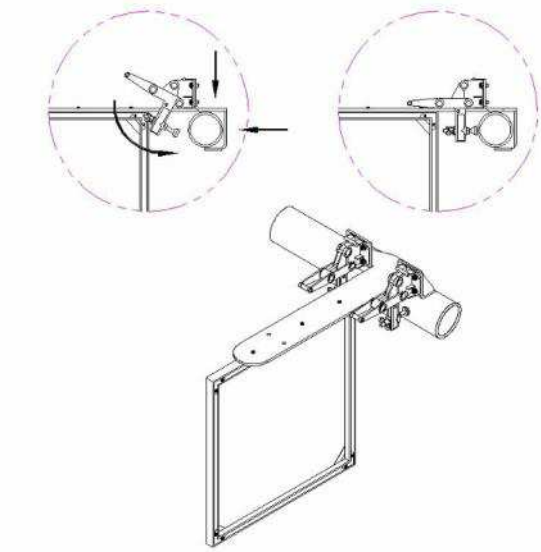

Figure 3a
Scatter Plate Attachment Detail

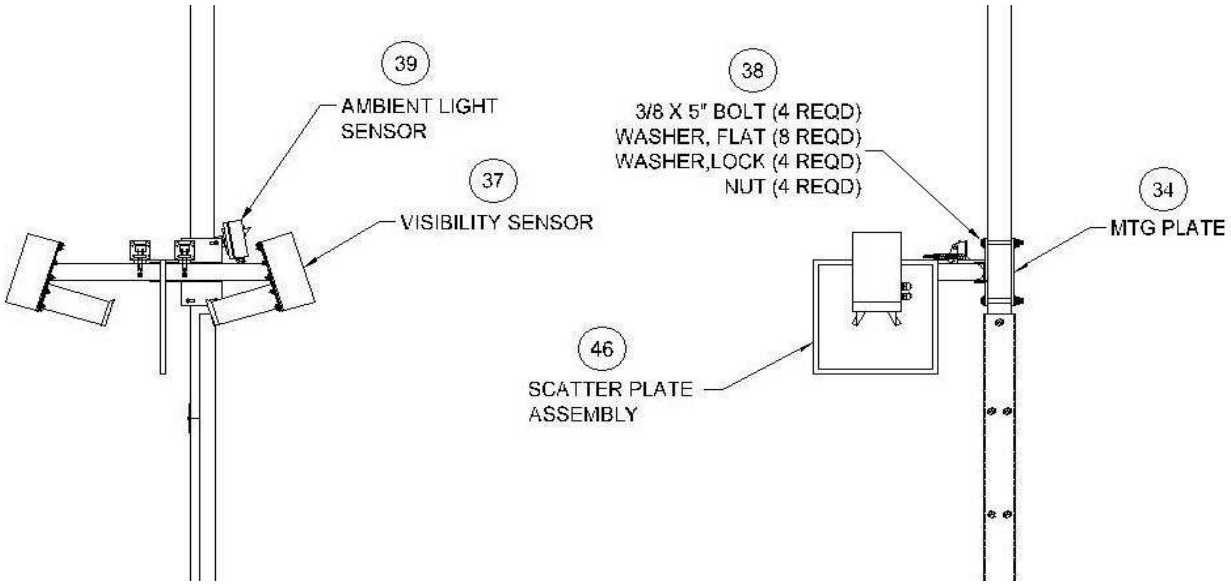

Figure 3b
Tower with Visibility Scatter Plate Attached

8. Remove power to the visibility sensor by turning off the AC circuit breaker in the power box. After waiting 10 seconds, turn it back on again to force a reset. The display should show the start message with model and version number. If not, disconnect and reconnect the RS232 cable and remove and reapply power to the DCP once again. If this does not result in the display showing the start message with model and version number, contact Belfort Instrument Co. customer support at 1-800-937-2353.

9. Hold down the "ctrl" key and type the letter "V" then type the word "foggy" in lower case letters when prompted for the password.
10. Type "FT" then press <enter> to run diagnostics, if the first 2 characters are FP, sensor is OK, FF indicates a failure and further diagnostics are necessary (see troubleshooting section of this manual). Type "FJ" to start streaming data.
11. Check the state of calibration first. Allow the measured visibility to settle for 5 minutes. If the ExtCo (the number in the last numerical column on the right) is within 5% of the value marked on the scatter plate, no recalibration is required. If recalibration is needed, proceed to the next step.
12. The zero-state calibration must be done first. Place the opaque filters (the triangle shaped pieces of rubber) on the receiver and transmitter hoods as close to the glass windows as possible. The filters are 5/8 thick rubber, triangular in shape, with ears that hook over the transmitter and receiver hoods to secure them in place. They may be attached easily near the mid-point of the hood and slid back to the window as shown in Figure 3c.

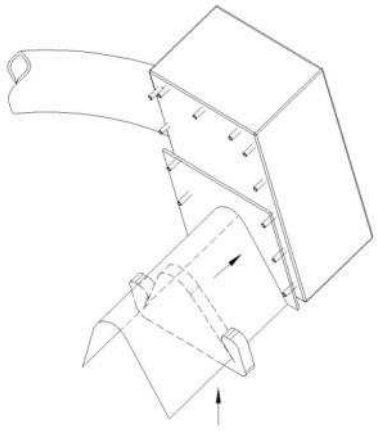

Figure 3c
Installation of Opaque Filters on
Transmitter and Receiver Hoods

13. Type "FZ" then press <enter> on the terminal. Answer "Y" when prompted "are you sure" question and wait approximately five (5) minutes for the routine to finish and prompt for acceptance. This acceptance prompt allows you to recover from an accidental invocation of the routine. Acceptable values for the zero offset are between –0.01 and +0.01. If the zero offset value displayed is acceptable, type "Y" and then press <enter>. The new value will be written to EEPROM, it will be discarded if you answer "N". Answer yes and press <enter> when prompted with the "OK to save TxPwrCal?" Question. If the zero offset value displayed is out of range, then confirm the proper installation of the opaque filters and rerun the "FZ". If the "FZ" is still out of range, then the instrument should be considered faulty and taken out of service. **Follow the Belfort AWOS System Component Failure Instructions in Section 5.10.**
14. Remove the opaque filters from the hoods.
15. The span-state calibration requires the use of the scatter plate installed as shown in figure 3.a
16. Install the scatter plate (See figure 3b) and record the Cal_ExtCo marked on the scatter plate.

17. Type “FC” and press enter. Make sure the Extco number in the configuration information for Cal_ExtCo is the same extinction coefficient as on the calibration scatter plate. If not, enter the correct extco number from the calibration scatter plate into the configuration data. Press (ESC) key to save new value and get back to the terminal screen.
18. Type “FS” and type “Y” at the “are you sure” query. When the routine has finished, the terminal will display the new span calibration value and prompt for acceptance. Acceptable values range between 0.5 and 4.0.
19. If the span calibration value is out of range, repeat step 18. If out of range again, the instrument should be considered faulty and taken out of service. **Follow the Belfort AWOS System Component Failure Instructions in Section 5.10.**
20. Record the acceptable value displayed on the Tri-Annual maintenance data record form.
21. Type “Y” and the new span value will be written to EEPROM. Remove the scatter plate and store it for protection.
22. Type “FR” to reset the sensor and exit the diagnostic mode.
23. Disconnect the notebook computer and reconnect the sensor RS232 cable to the communication cable running up to the DCP at the bottom of the tower. Apply Dow Corning #4 liberally to the connection to protect against moisture.
24. If the battery backup option is installed, switch the DC circuit breaker back on if battery backup is present
25. If additional maintenance tasks are to be performed, skip to next maintenance task. If maintenance tasks are complete, toggle the “ALERT MESSAGE” switch 4 times to return the unit to service.
26. Verify the system begins outputting visibility information after a ten (10) minute algorithm delay.
27. If all maintenance tasks are complete, issue another NOTAM advising users that “**Belfort AWOS maintenance activities were completed, system has been returned to normal operation**.” The expiration date and time of this NOTAM should coincide with the same expiration date and time of the previous advisory NOTAM that was issued to put the system in the maintenance mode. Verify that this NOTAM advisory is correctly displayed on the operator screen. Refer to the *"Belfort AWOS Operator Manual"* for instructions on how to enter and delete NOTAMs**.**
28. If you need additional assistance or have questions concerning these maintenance or calibration tasks, contact Belfort Instrument Co. customer support at 1-800-937-2353.

5.5 WIND SPEED SENSOR – ANNUAL VERIFICATION PROCEDURE

The wind speed sensor verification procedure is a confidence test, which verifies that the Belfort AWOS wind speed readings compare reasonably with measurements taken from a reference Kestrel Model 3000 Wind Instrument.

SAFETY PRECAUTIONS

1. Before starting any power installation tasks, ensure that the A/C power circuit breaker is in the open position.
2. Do not perform outdoor Belfort AWOS installation tasks during a thunderstorm.
3. Use extreme caution when lowering the tilt-over tower whenever ice or snow has accumulated on the tower cross arm or the sensors. The extra weight may cause the tower to fall over rapidly.

PARTS AND TOOLS REQUIRED

1. Belfort AWOS Hand Held Display Unit (HHDU)
2. Kestrel Model 3000 Wind Instrument

VERIFICATION INSTRUCTIONS

1. Turn on the HHDU. Stand near the base of the Belfort AWOS tower, facing into the wind. Observe the Belfort AWOS wind indicator vane to ascertain wind direction. Turn on the Kestrel Model 3000, select average mode, and hold the Kestrel Model 3000 as high as possible, square to the wind for approximately one minute. Observe the average on the Kestrel and compare it to the wind speed measured by the Belfort AWOS and displayed on the HHDU. Press refresh to get the most recent HHDU data. The wind speed readings should agree within 20% for speeds above 5 knots.
2. If the readings do not agree within 20%, the wind speed sensor should be replaced. **Follow the Belfort AWOS System Component Failure Instructions in Section 5.10.**

5.6 WIND DIRECTION SENSOR - ANNUAL MAINTENANCE VERIFICATION

The wind direction sensor verification procedure is a confidence test, which verifies that the Belfort AWOS wind direction sensor has free rotation and balance and the sensor readings are properly aligned with the airport north marker.

SAFETY PRECAUTIONS

1. Do not perform outdoor Belfort AWOS maintenance tasks during a thunderstorm.
2. Use extreme caution when lowering the tilt-over tower whenever ice or snow has accumulated on the tower cross arm or the sensors. The extra weight may cause the tower to fall over rapidly.

PARTS AND TOOLS REQUIRED

1. Belfort AWOS Hand Held Display Unit (HHDU)
2. 3 mm Allen wrench
3. Socket wrench and 13/16" socket
4. Large rubber band

VERIFICATION INSTRUCTIONS

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning this maintenance tasks. The NOTAM to be issued is **"Belfort AWOS system being serviced, do not use current weather data outputs."** Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
2. Put the Belfort AWOS in "service mode" by toggling the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times (See Table 1). This will assure that pushing "REFRESH" on the HHDU will display instantaneous rather than averaged wind direction, and true rather than magnetic information..
3. Remove tower-securing bolts and tilt the tower until the cross arm is at a comfortable working height to access the wind direction sensor. Secure it in that position by tying the rope around the base of the Belfort AWOS tower (refer to figure 2.a).
4. Power on the Belfort AWOS HHDU. The word "ALERT" must now be displayed across the rectangular HHDU runway display. Push the "PAGE" button and the message "Belfort AWOS being serviced" must appear.
5. The Alert messages are programmed in the same order as they appear in Table 1. If an alert message other than message 6. is displayed, consult the list of alert messages in Table 1. Toggle the tower switch an appropriate number of times until the "Belfort AWOS being serviced" alert message is displayed. For example, if the alert message number 2 is displayed, toggle the switch 4 times.
6. Position the wind vane so that it is vertical and parallel to the red pointer installed on the sensor body. Secure the vane in that position by placing a rubber band around the tail of the direction vane and the transmitter antenna as shown in figure 4. Erect the tower into the vertical position. Confirm that the red pointer is aimed directly at the airport north marker. If the red pointer is not properly aligned toward the airport north marker, adjust it as follows:

Locate the True North Monument and lower the tower. Using a stepladder as necessary, sight along the folded tower section, to assure it points to the True North Monument. Loosen the set screw on the red pointer. Adjust its direction to point to the True North Monument. Tighten the set screw..

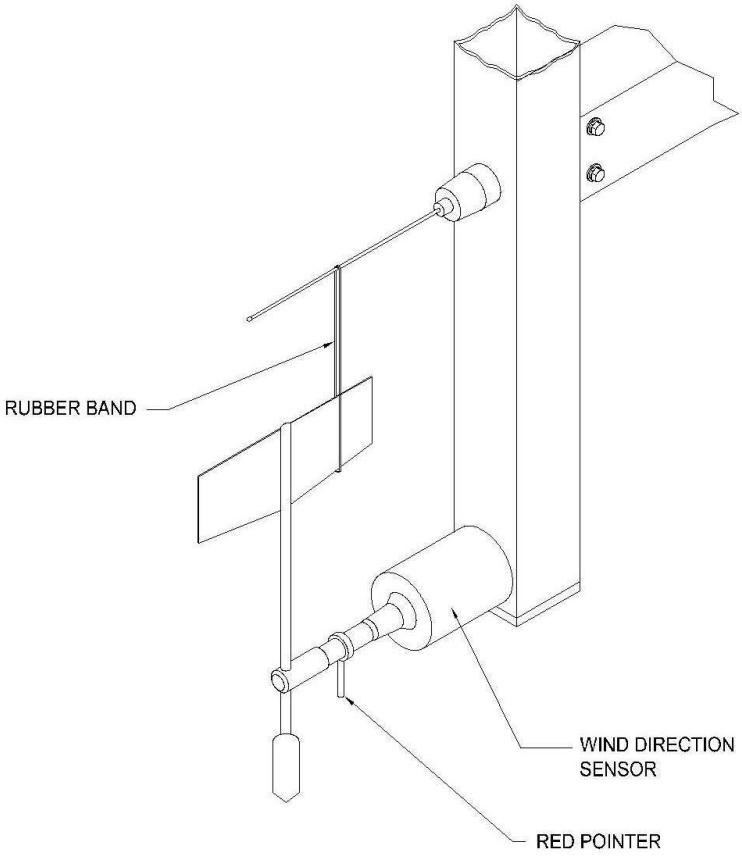

Figure 4
Wind Direction Vane Alignment

7. Press the "REFRESH" button on the Belfort AWOS HHDU and verify that the wind direction is 360°. If the direction does not read 360°, verify that the vane is aligned parallel with the red pointer and parallel to the long axis of the cross arm. If adjustments need to be made, proceed with Steps 8 thru 13 below, else go to step 14.
8. Remove the three (3) red plastic plugs and loosen the three (3) socket head screws holding the direction sensor to the cross arm.
9. Rotate the sensor bottle in the direction required to obtain a reading of 360°.
10. Wait for five (5) seconds, press the "REFRESH" button on the HHDU, and read the wind direction. Repeat this process until a reading of 360° is obtained.
11. Tighten the three (3) socket head screws securely using the supplied Allen wrench.
12. Press the "REFRESH" button again to verify that the wind direction still reads 360°.
13. Remove the rubber band from the vane and antenna.
14. Reinstall the three (3) red plastic plugs into the three (3) sensor mounting access-holes in the cross arm.

15. Locate the True North Monument. Using a stepladder, sight along the folded tower section to assure it points to the True North Monument. If not, then repeat steps 9 thru 13.
16. Rotate the direction vane around the full 360º's of rotation and verify it is free to turn with no rough spots in rotation. Noise or sudden rotational resistance indicates worn bearings and the unit must be replaced. **Follow the Belfort AWOS System Component Failure Instructions in Section 5.10.** Then from the 360º position, rotate the direction vane to cause the direction value to increment up from 0º's. Monitor the direction value on the HHDU as the vane is rotated slowly. Confirm that values increment from 0 and values are displayed within every 10º range 0 to 10, 10 to 20, 20 to 30, etc, up to 350 to 360º are displayed. If any groups of values are not displayed, then a direction segment is out. If a segment is out or the sensor is not reporting correct direction, **Follow the Belfort AWOS System Component Failure Instructions in Section 5.10.**
17. Untie the rope and SLOWLY erect the tower to the vertical position and secure it by installing and tighten-up (DO NOT OVER TIGHTEN) the three (3) tower-securing bolts. NOTE: Be careful to avoid pinching the wires on the inside of the hinged tower section when raising the tower.
18. Toggle the "ALERT MESSAGE" switch 4 times to return the unit to service. Push the "refresh" button on the HHDU to make sure the "ALERT MESSAGE" is gone and that the system begins reporting weather data as expected.
19. If all maintenance tasks are complete, issue another NOTAM advising users that "**Belfort AWOS maintenance activities were completed, system has been returned to normal operation**." The expiration date and time of this NOTAM should coincide with the same expiration date and time of the previous advisory NOTAM that was issued to put the system in the maintenance mode. Verify that this NOTAM advisory is correctly displayed on the operator screen. Refer to the *"Belfort AWOS Operator Manual"* for instructions on how to enter and delete NOTAMs**.**

5.7 LIGHTNING PROTECTION SYSTEM, BATTERY & TOWER TRI-ANNUAL MAINTENANCE

SAFETY PRECAUTIONS

1. Before starting any power installation/Maintenance tasks, ensure that the A/C mains power circuit breaker is in the open position.
2. Do not perform outdoor Belfort AWOS maintenance tasks during a thunderstorm.
3. Use extreme caution when lowering the tilt-over tower whenever ice or snow has accumulated on the tower cross arm or the sensors. The extra weight may cause the tower to fall over rapidly.

PARTS AND TOOLS REQUIRED

1. Two (2) adjustable wrenches 8" (Crescent or equivalent).
2. Battery Terminal cleaning brush (Sears P/N 00947697000 or equivalent.)

Figure 5
Typical Battery Terminal Brush

3. Commercial Multi-meter (Fluke 77 or equivalent).

TRI-ANNUAL INSPECTION/MAINTENANCE

1. While the tower is lowered, visually inspect the lightning rod and grounding cable for loose or corroded electrical connections and mounting hardware.
2. Clean and secure as required.
3. Locate the True North monument and verify that it is clearly marked and easily located. Replace or repaint as needed.
4. If a battery backup is installed, check the battery cable terminal connections for corrosion buildup. If corrosion is evident, disconnect the cables from the battery (disconnect the cable connected to the negative post of the battery first).
5. Clean battery posts and cable connectors using a battery terminal brush.
6. If a serviceable lead acid battery is in use, check fluid levels and top up with distilled water per battery manufacturer's instructions.
7. Check the battery voltage open circuit. An acceptable battery should have an open circuit voltage of 12.6VDC to 13.25VDC. If battery voltage checks low, replace the battery with a Group 27 deep discharge lead acid battery. Report the battery change in the Facility Maintenance log.
8. Reconnect and tighten the positive first and then the negative battery cable to their corresponding battery terminals.
9. Check the battery voltage under load. An acceptable battery should have a loaded voltage of 12.1VDC to 12.4VDC. If battery voltage checks low, replace the battery with a Group 27 deep discharge lead acid battery. Report the battery change in the Facility Maintenance log.

10. Open the power enclosure and assure that both function lamps on the surge protector are illuminated, if not, replace the surge protector.

5.8 THE UHF TRANSCEIVER ANNUAL MAINTENANCE

The UHF transceiver operates under License from the Federal Communications Commission. The FCC Registration number is 0011055407. The Emission Designator is 11K0F1D. The operating specifications for the UHF Transceiver are located in Appendix C.

The purpose of this testing is to verify that the UHF Transceiver is operating within specifications. Four operating specifications are checked: Frequency, Power, Deviation, and VSWR. The tolerance for each is located in Appendix C. If the UHF transceiver is found to not be operating within the tolerances, the DCP will need to be returned to the Belfort Instrument factory for repair. **Follow the Belfort AWOS System Component Failure Instructions in Section 5.10.**

***Per FAA Circular 150/5220-16D, section 2.9.a, all maintenance technicians must meet the qualifications defined in FAA Order 6700.20, Non-Federal Navigational Aids and Air Traffic Control Facilities, in order to perform the Belfort AWOS Commissioning / Annual Inspection Procedure.**

Perform the Belfort AWOS Commissioning / Annual Inspection Procedure provided in Appendix E. Complete the Belfort AWOS Commissioning / Annual Inspection Record Data Sheet during the test.

5.9 THE VHF UNICOM RADIO ANNUAL MAINTENANCE

The VHF Unicom operates under License from the Federal Communications Commission. The FCC License is specific for each Airport. The operating specifications for the VHF Unicom Radio are located in Appendix D.

The purpose of this testing is to verify that the VHF Unicom Radio operating within specifications. Four operating specifications are checked: Frequency, Power, Deviation, and VSWR. The tolerance for each is located in Appendix D.

***Per FAA Circular 150/5220-16D, section 2.9.a, all maintenance technicians must meet the qualifications defined in FAA Order 6700.20, Non-Federal Navigational Aids and Air Traffic Control Facilities, in order to perform the Belfort AWOS Commissioning / Annual Inspection Procedure.**

Perform the Belfort AWOS Commissioning / Annual Inspection Procedure provided in Appendix E. Complete the Belfort AWOS Commissioning / Annual Inspection Record Data Sheet during the test.

If the VHF Unicom Radio is found to not be operating within the tolerances and you have called Belfort Instrument Company for support, then **Follow the Belfort AWOS System Component Failure Instructions in Section 5.10.**

The following directions are provided if the radio is being replaced.

Directions to replace the Belfort AWOS VHF radio

1. Turn off radio
2. Unplug A/C power cable from back of radio
3. Remove antenna from back of radio. If an RF Attenuator is attached remove it also.
4. Disconnect the Mic Click Adapter RS-232 DB9 from the radio
5. Remove the radio and replace it with the working radio
6. Connect the Mic Click Adapter RS-232 DB9 to the radio
7. Screw the antenna into the antenna jack in the back of the radio. Install RF attenuator if previously installed
8. Plug in the A/C power cable
9. Turn on radio

New Radio Test

1. If Mic Clicks then test w/ a second radio
2. If Endless Loop then tune second radio and listen to broadcast.

5.10 Belfort AWOS System Component Failure Instructions:

If a Belfort AWOS system component fails a maintenance test, stops operating, or is suspect to be not operating correctly, perform the following notification steps:

1) Notify the proper airport authority of the Belfort AWOS system component failure. Follow the airport authority instructions for dealing with the AWOS component failure.

2) At the DATU display terminal if operational, issue a NOTAM advisory, to alert users that the Belfort AWOS system is being serviced, or that an instrument is not operational. Instructions for issuing and deleting NOTAMs are provided in the *"Belfort AWOS Operator Manual"*. Follow FAA requirements for the proper wording of the NOTAM. Verify that the entered NOTAM advisory is displayed on the Advisor operator screen.

3) After posting the NOTAM, and if the failure is an individual instrument component other than a barometric pressure sensor, and the balance of the system is still operating, the operator should at the tower, toggle the "ALERT MESSAGE" toggle switch (located on the lower half of the hinged tower section (refer to figure 2.a)) the appropriate number of clicks as designated by the Alert number in the list, to set the Alert condition to be reported. (See Table below).

Belfort AWOS Alert Messages
1. Contact FBO for an important message.
2. Wind speed sensor INOP.
3. Wind direction sensor INOP.
4. Temperature and/or humidity sensor INOP.
5. Barometric pressure sensor INOP.
6. Belfort AWOS being serviced. Do not use readings.
7. Belfort AWOS not maintained. Do not use readings.
8. Private Belfort AWOS weather station. Do not use.
9. Landing area warning
0. No Alerts

Figure 6
Belfort AWOS Alert Messages

4) Document the failure in the Facility Maintenance Log on the FAA Form 6030-1.
5) Follow any other rules or requirements required by the airport authority or the FAA.
6) Notify the Belfort Factory for any technical assistance, repair RMA or replacement parts.

6.0 TROUBLESHOOTING THE SYSTEM

If any corrective action is taken during any troubleshooting in this section, the work must be reported in the Facility Maintenance Log on FAA forms 6030-1.

6.1 SYSTEM BUILT–IN DIAGNOSTICS AND TROUBLESHOOTING

The Belfort AWOS Tower transmits system status, sensor status and data quality status along with weather data. Advisor software captures this data and compares it to the last status received. If there is a difference in any of the data, the software writes all the data to the Advisor Status Log and to the Advisor Current Status Page. At any time, the maintenance technician can view the most recently received Status Information displayed in a user-friendly format. The maintenance technician can also view the Status Change History for past or recurrent problems. Refer to the "Belfort AWOS Operator's Instruction Manual" for complete instructions for using the Advisor software.

If the Belfort AWOS DATU becomes inoperative or problems are evident with the computer or monitor, verify that all cable connections are secure and that system power is present. If these checks do not return the equipment to normal operation, contact Belfort Instrument Co. customer support to make arrangements to have the computer replaced. There are no other troubleshooting procedures for the DATU or Belfort AWOS software.

If the DATU has developed a fault, **Follow the Belfort AWOS System Component Failure Instructions in Section 5.10.**

A summary of the current condition indicators and status log indicators is shown below:

Status Pages are reached by selecting "Status Pages" on the Advisor main menu.

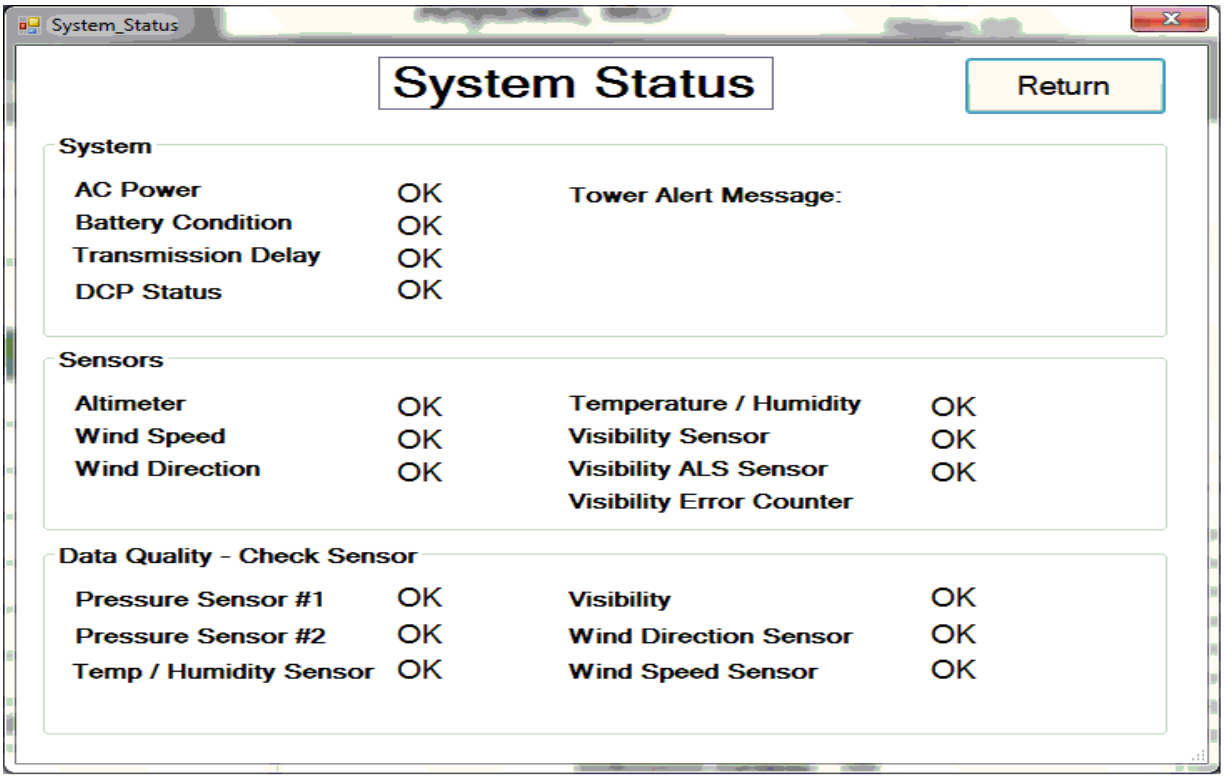

Figure 7
Advisor Current Status Page

System

AC Power	OK, Fault
Battery Condition	OK, Fault
Transmission Delay	OK, Fault
DCP Status	OK, Fault
Tower Alert Message	Blank, Alert Message selected

Sensors

Altimeter	OK, Fault
Wind Speed	OK, Fault
Wind Direction	OK, Fault
Temperature / Dew Point	OK, Fault
Visibility	OK, Fault
Visibility Polling Error Counter	OK, Fault

Data Quality

Check Pressure Sensor #1	OK, Fault
Check Pressure Sensor #2	OK, Fault
Check Temperature / Dew Point Sensor	OK, Fault

Check Visibility Sensor	OK, Fault
Check Wind Speed Sensor	OK, Fault
Check Wind Direction Sensor	OK, Fault

The Advisor Status History Log is available for review. The Advisor Status History Log Page is a chronological chart 18 columns wide representing the above 18 flags. It stores a time stamped record of all the fields every time any of the status fields change. Refer to the "Belfort AWOS Operator's Instruction Manual" for complete instructions for using the Advisor software and accessing the Belfort AWOS Status History..

6.2 INTERPRETING DIAGNOSTIC MESSAGES

The following are the factory recommended diagnostic procedures that should be followed whenever an error indicator is displayed on the current Advisor Status Page.

6.2.1 System Status Indicators:

The following are the factory recommended diagnostic procedures that should be followed whenever an error flag is displayed on the current Advisor Status Page as System Status Indicators.

The Advisor Status History is available for review. Refer to the "Belfort AWOS Operator Manual" for instructions on how to access Belfort AWOS Status History.

If any components are determined to be faulty or suspect, follow the Belfort AWOS System Component Failure Instructions in Section 5.10.

AC Power Status – Error flag is present when 14VDC from the AC to DC power supply is not present, not connected to the DCP, or the DCP AC status monitoring is faulty. The system would be running from the backup battery in this case.

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is **"Belfort AWOS system being serviced, do not use current weather data outputs."** Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
2. Using a voltmeter, check for 115VAC on power supply input. If 115VAC is present at the power supply input, use the DMM set to DC volts to check for +14VDC on the supply outputs. If no +14v DC output then turn off AC breaker and check for +14v line short. If no +14v short, then replace the defective power supply.
3. If 115VAC is not present on the power supply inputs, check for 115VAC at the input side of the circuit breaker. If the 115VAC is present at the input of the circuit breaker, then the circuit breaker may have tripped due to short on the lines to the input of the power supply. Use the DMM set to ohms, check for short on the AC input lines to the power supplies. If the input line is shorted, remove ac feed wires to the power supplies one supply at a time. If short goes away with removal of power supply feed lines, then replace suspect power

supply. If no AC short is found, then suspect the circuit breaker is faulty. Replace the circuit breaker.

4. Check inline fuses. If +14VDC is present and the inline fuse is OK, remove tower-securing bolts and tilt the tower until the cross arm is at a comfortable working height to access the wind Direction sensor. Secure the tower in that position by tying the attached tower hold down rope to the base of the Belfort AWOS tower as shown in Figure 2. Put the Belfort AWOS in "service mode" by toggling the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times.
5. Loosen the 4 screws securing the DCP to the tower and extend the DCP so the cable attachments can be checked on the back of the DCP. Make sure the 4 wire power cable is securely seated in the DCP. If this does not return the AC power status indicator to service and the DCP continues to run on battery backup, remove the 4 wire power cable from the DCP. Note that this removes all power from the DCP. Measure the DC voltages across the 4 pins of the power cable as follows:

   Pin 1 + to 2- should measure +14.00 vdc from DCP power supply (PS)
   Pin 4 + to 3- should measure +12 vdc from the battery

   If the voltages are both present, then suspect the DCP AC status circuit is faulty.
   When convenient, the DCP should be sent to the factory for repair or replaced.
   If the PS DC voltage output is missing, then suspect a DC power supply failure, or loss of AC input voltage to the power supply, or a DC voltage conductor in the tower power cable is broken or shorted.
   If the AC voltage in missing, then suspect an open circuit breaker, AC wiring short, AC Mains supply feed is off.

6. If the Voltage to the AC monitoring circuit is restored, re-attach the DCP to the tower with it screws.
7. Untie the rope and SLOWLY erect the tower to the vertical position and secure it by installing and tighten-up (DO NOT OVER TIGHTEN) the three (3) tower-securing bolts. NOTE: Be careful to avoid pinching the wires on the inside of the hinged Tower Section when raising the tower.
8. If additional maintenance tasks are to be performed, skip to next maintenance task. If maintenance tasks are complete, toggle the "ALERT MESSAGE" switch 4 times to return he unit to service.
9. If a system component has been determined to be faulty or suspect bad, go to Section 5.10 and follow those instructions. Else, at the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that "**Belfort AWOS maintenance activities were completed, system has been returned to normal operation**." The expiration date and time of this NOTAM should coincide with the same expiration date and time of the previous advisory NOTAM that was issued to put the system in the maintenance mode. Verify that this NOTAM advisory is correctly displayed on the operator screen. Refer to the *"Belfort AWOS Operator Manual"* for instructions on how to enter and delete NOTAMs**.**

Battery Condition – Error flag is present if AC power is off and backup battery is low.

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is **"Belfort AWOS system being serviced, do not use current weather data outputs."** Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
2. Remove battery terminal cable connections from the battery (disconnect the negative cable first) and clean with a terminal cleaning brush.
3. If a serviceable lead acid battery is in use, check fluid levels and top up with distilled water per battery manufacturer's instructions.
4. Check the battery voltage. A fully charged battery should have an open circuit voltage of 12.2VDC to 13.25VDC.
5. If battery voltage checks lower than 11.2v, replace the battery with a Group 27 deep discharge lead acid battery.
6. Reconnect the positive battery cable first to the positive terminal of the battery and then reconnect the negative cable.
7. Check the battery voltage with the tower load. A fully charged battery should have a loaded voltage of >12VDC. If the voltage is <11.8vdc, suspect the charging circuit in the DCP is faulty, the battery is bad or system has not run enough to charge the battery.
8. Allow the system to run for a minimum of 3 hours and then put the system in the service mode by toggling the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times.
9. Remove AC power from the system by turning off the AC circuit breaker in the power junction box.
10. At the DATU display terminal verify that the Battery condition error flag has not been set.
11. If the error flag is still set, contact Belfort Instrument Co. for additional troubleshooting suggestions to isolate the problem.
12. When the problem has been verified as corrected, return the system to service by toggling the "ALERT MESSAGE" switch on the tower 4 times to return the unit to service. Document corrective actions taken on the FAA Form 6030-1.
13. If a system component has been determined to be faulty or suspect bad, go to Section 5.10 and follow those instructions. Else, at the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that "**Belfort AWOS maintenance activities were completed, system has been returned to normal operation**." The expiration date and time of this NOTAM should coincide with the same expiration date and time of the previous advisory NOTAM that was issued to put the system in the maintenance mode. Verify that this NOTAM advisory is correctly displayed on the operator screen. Refer to the *"Belfort AWOS Operator Manual"* for instructions on how to enter and delete NOTAMs.

Transmission Delay – Error flag is set whenever the DCP is unable to transmit via the RF link, any information for 20 seconds or more. It will clear after the next transmission but will be reset and reported each time the delay condition occurs. This may be due to RF channel traffic or DCP transceiver problems. If the condition is recurrent but intermittent and the data transmission rate supports "current data" requirements (current data is always reported on the system), no action is necessary. If current data is not appearing on the system outputs, replace the DCP or return to the factory for diagnosis and repair.

DCP Status – Error flag is set whenever the DCP cannot process input from the sensors. This fault indicates the DCP has an internal fault and needs to be returned to the factory for repair or replacement. This fault cannot be resolved in the field.

Alert Message Status – Reports an Alert Message if a message is set at the Belfort AWOS tower.

1) If the operational condition requires an Alert condition to be set, the operator should at the tower, toggle the "ALERT MESSAGE" toggle switch (located on the lower half of the hinged tower section (refer to figure 2.a)) the appropriate number of clicks as designated by the Alert number in the list, to set the Alert condition to be reported. (See Table below).

Belfort AWOS Alert Messages
1. Contact FBO for an important message.
2. Wind speed sensor INOP.
3. Wind direction sensor INOP.
4. Temperature and/or humidity sensor INOP.
5. Barometric pressure sensor INOP.
6. Belfort AWOS being serviced. Do not use readings.
7. Belfort AWOS not maintained. Do not use readings.
8. Private Belfort AWOS weather station. Do not use.
9. Landing area warning
0. No Alerts

The selected Alert information will be provided in the Alert Message Status area of the System Alert window.

2) Only 1 alert at a time can be selected from the tower.
3) Multiple alerts can be selected and reported if entered via the Operators Terminal at the DATU. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete Alerts.

6.2.2 Interpreting Sensor Status and Data Quality Error Indicators:

The following are the factory recommended diagnostic procedures that should be followed whenever an error or fault flag is displayed on the current Advisor Status Page for Sensor or Data Quality Error Indicators.

If any components are determined to be faulty or suspect, follow the Belfort AWOS System Component Failure Instructions in Section 5.10.

Altimeter Sensor or Pressure Sensor #1 or #2 Indicators

1. If either of the Altimeter or Pressure Sensor Error indicators are present, there is a sensor problem with the pressure transducers. Either one or both of the pressure sensors are not reporting, a value of 99.99 is the reported altimeter setting or the individual pressure sensors values have deviated > .04 inhg from each other.
3. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**Belfort AWOS system being serviced, do not use current weather data outputs**." Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
4. Put the Belfort AWOS in "service mode" by toggling the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times.
5. Remove tower-securing bolts and tilt the tower until the cross arm is at a comfortable working height to access the wind Speed sensor. Secure the tower in that position by tying the attached tower hold down rope to the base of the Belfort AWOS tower as shown in Figure 2.
6. Perform the DCP – Annual Barometric Pressure Maintenance & Calibration procedure detailed in Section 5.2 of this manual. If this returns the sensor to service, then go to step 8.
7. If this does not return the unit to service, remove and return the DCP to the factory for service.
8. Untie the rope and SLOWLY erect the tower to the vertical position and secure it by installing and tighten-up (DO NOT OVER TIGHTEN) the three (3) tower-securing bolts. NOTE: Be careful to avoid pinching the wires on the inside of the hinged Tower Section when raising the tower.
9. If a system component has been determined to be faulty or suspect bad, go to Section 5.10 and follow those instructions.
10. At the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that "**Belfort AWOS maintenance activities were completed, system has been returned to normal operation.**" The expiration date and time of this NOTAM should coincide with the same expiration date and time of the previous advisory NOTAM that was issued to put the system in the maintenance mode. Verify that this NOTAM advisory is correctly displayed on the operator screen. Refer to the *"Belfort AWOS Operator Manual"* for instructions on how to enter and delete NOTAMs.

Temperature / Humidity Indicators

1. If either of the Temperature /Humidity Error indicators are present, there is a problem with the Temperature /Humidity Dew Point sensor. Either the sensor is not responding, or the sensor is reporting temperature value outside of the operating range of the sensor or humidity value outside of the operating range of the sensor.
2. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**Belfort AWOS system being serviced, do not use current weather data outputs**." Verify that this NOTAM advisory is displayed on the operator screen prior to

beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.

3. Put the Belfort AWOS in "service mode" by toggling the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times.
4. Remove tower-securing bolts and tilt the tower until the cross arm is at a comfortable working height to access the wind Speed sensor. Secure the tower in that position by tying the attached tower hold down rope to the base of the Belfort AWOS tower as shown in Figure 2.
5. Perform the Temperature, Humidity Sensor and Dew Point Annual Maintenance and Verification procedure detailed in Section 5.3 of this manual.
6. If this does not return the unit to service, power down the power enclosure, remove and replace the sensor. If no replacement sensor is immediately available, remove the faulty sensor from the system. The Temperature/Humidity/Dew Point will be reported by the system as 'Not Available" until the replacement sensor is installed.
7. Power up the Power Enclosure.
8. Untie the rope and SLOWLY erect the tower to the vertical position and secure it by installing and tighten-up (DO NOT OVER TIGHTEN) the three (3) tower-securing bolts. NOTE: Be careful to avoid pinching the wires on the inside of the hinged Tower Section when raising the tower.
9. If a system component has been determined to be faulty or suspect bad, go to Section 5.10 and follow those instructions.
10. At the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that "**Belfort AWOS maintenance activities were completed, system has been returned to normal operation**." The expiration date and time of this NOTAM should coincide with the same expiration date and time of the previous advisory NOTAM that was issued to put the system in the maintenance mode. Verify that this NOTAM advisory is correctly displayed on the operator screen. Refer to the *"Belfort AWOS Operator Manual"* for instructions on how to enter and delete NOTAMs.

Visibility Sensor, Sensor Error Counter Indicators

Note: The Ambient Light Sensor is an integrated part of the Visibility Sensor. If the Visibility sensor is bad, the Ambient Light Sensor (ALS) may also be reported as bad. If the Visibility Sensor is removed from service, the ALS must also be removed with it at the same time.

1. If either of the Visibility Sensor or Visibility Error Counter indicators are present, the Visibility Sensor is bad or not responding to the DCP information polling request.
2. The Visibility Polling Error Counter is an incidence counter of Visibility Sensor non-responses to polling requests from the DCP. It is used for factory remote diagnostic assistance. A factory technician may ask for the status or value of this indicator.
3. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is **"Belfort AWOS system being serviced, do not use current weather data outputs."** Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.

4. Put the Belfort AWOS in "service mode" by toggling the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times.
5. Remove tower-securing bolts and tilt the tower until the cross arm is at a comfortable working height to access the wind Speed sensor. Secure the tower in that position by tying the attached tower hold down rope to the base of the Belfort AWOS tower as shown in Figure 2.
6. Clean the glass windows on both sides of the visibility sensor with a clean soft cloth and commercial window cleaner.
7. Power down the power enclosure.
8. Remove the DCP from the tower and disconnect all cables at the back of the DCP.
9. Inspect DCP and cable connectors for damage, pushed in pins, broken contacts and evidence of corrosion. Repair or replace damaged or corroded cables as required.
10. Clean and lubricate DCP connectors and mating cable connectors with Dow Corning #4 to prevent corrosion. Reconnect cables to the back of the DCP and reinstall the DCP onto the tower.
11. Power up the power enclosure.
12. Using a DMM, check for 115VAC on the input terminals of the +12v Power supply. If the 115VAC is present, then go to step 10. If 115VAC is not present on the power supply inputs, check for 115VAC at the input side of the circuit breaker. If the 115VAC is present at the input of the circuit breaker, then the circuit breaker may have tripped due to short on the lines to the input of the power supply. Use the DMM set to ohms, check for short on the AC input lines to the power supplies. If the input line is shorted, remove ac feed wires to the power supplies one supply at a time. If short goes away with removal of power supply feed lines, then replace suspect power supply. If no AC short is found, then suspect the circuit breaker is faulty. Replace the circuit breaker.
13. Using a DMM, check the 12VDC output from the power supply. If the +12VDC output is not present, then replace the power supply.
14. If the sensor returns to service, perform the 6000 Visibility Sensor- Tri-Annual Maintenance…Instructions detailed in section 5.4 of this manual.
15. If the fault cannot be rectified, and 12VDC is available to the sensor, return the visibility sensor for repair or replacement and return the Belfort AWOS system into service without the visibility sensor.
16. The Visibility and ALS Sensor will be reported by the system as 'Not Available" until the replacement sensors is installed.
17. Untie the rope and SLOWLY erect the tower to the vertical position and secure it by installing and tighten-up (DO NOT OVER TIGHTEN) the three (3) tower-securing bolts. NOTE: Be careful to avoid pinching the wires on the inside of the hinged Tower Section when raising the tower.
18. If a system component has been determined to be faulty or suspect bad, go to Section 5.10 and follow those instructions.
19. At the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that "**Belfort AWOS maintenance activities were completed, system has been returned to normal operation.**" The expiration date and time of this NOTAM should coincide with the same expiration date and time of the previous advisory NOTAM that was issued to put the system in the maintenance mode. Verify that this NOTAM advisory is correctly displayed on the operator screen. Refer to the *"Belfort AWOS Operator Manual"* for instructions on how to enter and delete NOTAMs.

Visibility Ambient Light Sensor (ALS)

Note: The Ambient Light Sensor is an integrated part of the Visibility Sensor. If the Ambient Light sensor is bad, the Visibility Sensor may also be reported as bad. If the Visibility Sensor is removed from service, the ALS must also be removed with it at the same time.

1. If the Visibility ALS Sensor indicator is present, the Visibility ALS Sensor is bad or the Visibility Sensor is bad. A failure in the Visibility sensor can cause the ALS to be reported as bad.
2. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**Belfort AWOS system being serviced, do not use current weather data outputs**." Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
3. Put the Belfort AWOS in "service mode" by toggling the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times.
4. Remove tower-securing bolts and tilt the tower until the cross arm is at a comfortable working height to access the wind Speed sensor. Secure the tower in that position by tying the attached tower hold down rope to the base of the Belfort AWOS tower as shown in Figure 2.
5. Clean the glass window on the ALS sensor with a clean soft cloth and commercial window cleaner.
6. If the sensor returns to service, perform the 6000 Visibility Sensor- Tri-Annual Maintenance…Instructions detailed in section 5.4 of this manual.
7. If the fault cannot be rectified, power down the Power Enclosure.
8. Remove the Visibility Sensor power and signal cables from the Power Enclosure.
9. Return the visibility sensor with ALS for repair or replacement and return the Belfort AWOS system into service without the visibility sensor.
10. Power up the Power Enclosure.
11. The Visibility and ALS Sensor will be reported by the system as 'Not Available" until the replacement sensors is installed.
12. Untie the rope and SLOWLY erect the tower to the vertical position and secure it by installing and tighten-up (DO NOT OVER TIGHTEN) the three (3) tower-securing bolts. NOTE: Be careful to avoid pinching the wires on the inside of the hinged Tower Section when raising the tower.
13. If a system component has been determined to be faulty or suspect bad, go to Section 5.10 and follow those instructions.
14. At the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that "**Belfort AWOS maintenance activities were completed, system has been returned to normal operation.**" The expiration date and time of this NOTAM should coincide with the same expiration date and time of the previous advisory NOTAM that was issued to put the system in the maintenance mode. Verify that this NOTAM advisory is correctly displayed on the operator screen. Refer to the *"Belfort AWOS Operator Manual"* for instructions on how to enter and delete NOTAMs.

Wind Speed Indicators

1. If either of the wind speed indicators are set, this could mean that the speed sensor is not reporting to the DCP, the speed value has not changed for the specified duration of time or the DCP wind speed input has failed.
2. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**Belfort AWOS system being serviced, do not use current weather data outputs**." Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
3. Put the Belfort AWOS in "service mode" by toggling the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times.
4. Remove tower-securing bolts and tilt the tower until the cross arm is at a comfortable working height to access the wind speed sensor. Secure the tower in that position by tying the attached tower hold-down rope to the base of the Belfort AWOS tower as shown in Figure 2.
5. Power down the power enclosure.
6. Remove the DCP from the tower and disconnect all cables at the back of the DCP.
7. Inspect DCP and cable connectors for damage, pushed in pins, broken contacts or evidence of corrosion. Repair or replace damaged or corroded cables as required.
8. Clean and lubricate DCP connectors and mating cable connectors with Dow Corning #4 to prevent corrosion. Reconnect cables to the back of the DCP and reinstall the DCP onto the tower.
9. Remove the wind speed sensor from the tower cross arm and disconnect the sensor from the cable.
10. Inspect the sensor connector and mating cable connector for damage, pushed in pins, broken contacts or evidence of corrosion. Repair or replace the sensor cable if required.
11. Clean and lubricate the sensor connector and mating cable connectors with Dow Corning #4 to prevent corrosion and then reconnect the cable to the sensor.
12. Reinstall the wind speed sensor onto the tower cross arm.
13. Power up the power enclosure.
14. Spin the wind speed sensor and look on the HHDU, and check to see if the sensor has returned to service. If the sensor has returned to service, go to step 19.
15. If these actions have not returned the sensor to operation, return the sensor for replacement.
16. If no replacement sensor is immediately available, remove the faulty sensor from the system.
17. Put the Belfort AWOS Alert in "Wind speed Inoperable" mode by toggling the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section two (2) times.
18. The Wind Speed will be reported by the system as 'Not Available" until the replacement sensor is installed.
19. Untie the rope and SLOWLY erect the tower to the vertical position and secure it by installing and tighten-up (DO NOT OVER TIGHTEN) the three (3) tower-securing bolts. NOTE: Be careful to avoid pinching the wires on the inside of the hinged Tower Section when raising the tower.
20. If a system component has been determined to be faulty or suspect bad, go to Section 5.10 and follow those instructions.

21. After installation of a replacement sensor, perform the Annual Wind Speed Sensor Verification Procedure detailed in section 5.5 of this manual.
22. If the sensor is operational and maintenance tasks are complete, toggle the "ALERT MESSAGE" switch 4 times to return the unit to service.
23. At the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that "**Belfort AWOS maintenance activities were completed, system has been returned to normal operation**." The expiration date and time of this NOTAM should coincide with the same expiration date and time of the previous advisory NOTAM that was issued to put the system in the maintenance mode. Verify that this NOTAM advisory is correctly displayed on the operator screen. Refer to the *"Belfort AWOS Operator Manual"* for instructions on how to enter and delete NOTAMs**.**

Wind Direction Indicators

1. If either of the wind direction indicators are set, this could mean that the direction sensor is not reporting to the DCP, the direction value has not changed for the specified duration of time or the DCP direction input has failed.
2. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**Belfort AWOS system being serviced, do not use current weather data outputs**." Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
3. Put the Belfort AWOS in "service mode" by toggling the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times.
4. Remove tower-securing bolts and tilt the tower until the cross arm is at a comfortable working height to access the wind speed sensor. Secure the tower in that position by tying the attached tower hold-down rope to the base of the Belfort AWOS tower as shown in Figure 2.
5. Power down the power enclosure.
6. Remove the DCP from the tower and disconnect all cables at the back of the DCP.
7. Inspect DCP and cable connectors for damage, pushed in pins, broken contacts or evidence of corrosion. Repair or replace damaged or corroded cables as required.
8. Clean and lubricate DCP connectors and mating cable connectors with Dow Corning #4 to prevent corrosion. Reconnect cables to the back of the DCP and reinstall the DCP onto the tower.
9. Remove the wind direction sensor from the tower cross arm and disconnect the sensor from the cable.
10. Inspect the sensor connector and mating cable connector for damage, pushed in pins, broken contacts or evidence of corrosion. Repair or replace the sensor cable if required.
11. Clean and lubricate the sensor connector and mating cable connectors with Dow Corning #4 to prevent corrosion and then reconnect the cable to the sensor.
12. Reinstall the wind direction sensor onto the tower cross arm.
13. Power up the power enclosure.
14. Spin the wind direction sensor and look on the HHDU, and check to see if the direction value is changing and the sensor has returned to operation. If so, go to step 19.
15. If these actions have not returned the sensor to service, the sensor need to be replaced.

16. If no replacement sensor is immediately available, remove the faulty sensor from the system.
17. Put the Belfort AWOS Alert in "Wind Direction Inoperable" mode by toggling the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section three (3) times. Confirm the correct alert message is reported on the HHDU.
18. The Wind Direction will be reported by the system as 'Not Available" until the replacement sensor is installed.
19. If a system component has been determined to be faulty or suspect bad, go to Section 5.10 and follow those instructions.
20. After installation of a replacement sensor, perform the Annual Wind Direction Sensor Verification Procedure detailed in section 5.6 of this manual.
21. Untie the rope and SLOWLY erect the tower to the vertical position and secure it by installing and tighten-up (DO NOT OVER TIGHTEN) the three (3) tower-securing bolts. NOTE: Be careful to avoid pinching the wires on the inside of the hinged Tower Section when raising the tower.
22. If the sensor is operational and maintenance tasks are complete, toggle the "ALERT MESSAGE" switch 4 times to return the unit to service.
23. At the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that "**Belfort AWOS maintenance activities were completed, system has been returned to normal operation**." The expiration date and time of this NOTAM should coincide with the same expiration date and time of the previous advisory NOTAM that was issued to put the system in the maintenance mode. Verify that this NOTAM advisory is correctly displayed on the operator screen. Refer to the *"Belfort AWOS Operator Manual"* for instructions on how to enter and delete NOTAMs**.**

7.0 TOOLS AND TEST EQUIPMENT REQUIRED

1. Common hand tools (i.e., wrenches, screwdrivers, nut drivers)
2. Digital multi-meter (DMM) Fluke 77 or equivalent
3. Notebook computer with DB9 serial interface
4. PROCOMM software, PROCOMM Plus, Datastorm Tech or equivalent
5. Portable pressure standard Model 760-16B with Current NIST Traceable Calibration Certificate, (Paro-scientific, Inc or equivalent)
6. Visibility sensor calibration kit 32041, (Belfort Instrument Company)
7. Magnetic compass S&Y 183, Stocker and Yale or equivalent
8. Kestrel Model 3000 Wind Instrument with calibration kit
9. Scanner w/AC Adapter Radio Shack PRO 36/273-1455 or equivalent
10. Wire brush (Commercial)
11. Scraper, w/razor blade (Commercial)
12. Gloves, rubber (Commercial)
13. Techni-Tool TECH DUSTER inert dusting gas or equivalent
14. Battery Terminal cleaning brush (Sears P/N 00947697000 or equivalent)
15. Wooden tongue depressors (to be used to remove debris from DCP pressure ports)

8.0 KEY SYSTEM PERFORMANCE PARAMETERS AND EXPECTED SENSOR OUTPUTS – Refer to the appropriate sensor verification procedure as provided in section 5.0 of this manual.

9.0 MAINTENANCE DATA RECORDING AND FORMS - Three types of Data Recording Forms are used to record periodic maintenance activities both scheduled and unscheduled. Directions to find hard copies of the Belfort AWOS record forms are provided in Appendix A to this manual or they can be downloaded from the Belfort Instrument Co. website, http://www.belfortinstrument.com. Together, these documents provide a complete historical record of all maintenance actions accomplished on the Belfort AWOS system. It is imperative that all maintenance records are kept current, concise and accurate. All maintenance records are official documents and, as such, they may be needed as evidence in the investigation of an aircraft accident or other situations when the performance of a facility is in question. During FAA site visits, FAA inspectors will verify that maintenance tasks have been properly performed and documented.

9.1 BELFORT AWOS COMPREHENSIVE FACILITY PERFORMANCE AND ADJUSTMENT FORM – This form is used to record initial facility commissioning performance data and to record performance data after completion of major repair work. If the repair work includes DCP replacement, follow the DCP Site Configuration Procedure in Appendix F to enter the site-specific information for the airport location.

9.2 BELFORT AWOS TECHNICAL PERFORMANCE RECORD – These forms are used to record the results from Tri-Annual & Annual performance checks completed during periodic routine and non-routine maintenance activities and are intended to be used as checklists to assist in assuring that all scheduled tasks are completed.. These forms can also be used to log the results of tests conducted after an aviation accident.

9.3 FAA FORM 6030-1 - Facility Maintenance Log. The FAA will provide Form 6030-1. Information and instructions for the use of this form may be found in the site approved MOU/OMM or FAA Order 6700.20. Any change to the system, problem or damage identified during any maintenance activities, annual or periodic checks must be logged on FAA Form 6030-1. When a system component replacement or repair has been accomplished, the maintenance technician must make a performance verification statement on FAA Form 6030-1. In all cases, the technician completing maintenance or repair actions must be identified on the form.

10.0 COMPONENT REMOVAL AND REPLACEMENT PROCEDURES – Sensor removal procedures are described in this section. Refer to the Belfort AWOS Installation and Checkout manual for installation and checkout of replacement sensors and components.

Always assure that the safety precautions detailed in the Installation and Checkout manual are followed whenever performing any component removal or replacement operations. After replacement of components, always assure that applicable calibration and alignment procedures are to be performed as described in the Installation and Checkout manual. Documentation of replacement and checkout of system components must be recorded in the Facility Maintenance Log, FAA Form 6030-1.

10.1 DCP REMOVAL PROCEDURES:

SAFETY PRECAUTIONS

1. Do not perform outdoor Belfort AWOS maintenance tasks during a thunderstorm.
2. Use extreme caution when lowering the tilt-over tower whenever ice or snow has accumulated on the tower cross arm or the sensors. The extra weight may cause the tower to fall over rapidly.

PARTS AND TOOLS REQUIRED

1. Replacement DCP enclosure (if available).
2. Phillips head screwdriver

Removal Procedures: Refer to Figure 8.

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**Belfort AWOS system being serviced, do not use current weather data outputs.**" Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
2. Remove tower-securing bolts and tilt the tower until the cross arm is at a comfortable working height to access the DCP. Secure the tower in that position by tying the attached tower hold-down rope to the base of the Belfort AWOS tower as shown in Figure 2.
3. Power down the power enclosure by opening the AC and DC circuit breakers.
4. Remove the four (4) pan head screws, lock washers and flat washers that secure the DCP to the tower.
5. Remove the DCP from the tower and disconnect the antenna cable, power cable, 9-pin communication cable, sensor harness and two hoses that connect to the remote pressure ports from the rear of the DCP unit.
6. Note! Disconnect and remove the pressure port hoses by pulling them off of their barbed fittings located below the antenna connector on the back of the DCP.
7. Examine the cables, cable connectors and pressure port hoses for damage to connector pins or evidence of corrosion to connector assemblies. Examine the pressure port hoses for cracks or other damage. Remove and replace any damaged cables or hoses.

8. Contact Belfort Instrument Co. customer support to make arrangements for replacement of defective components.
9. Refer to the Belfort AWOS Installation and Checkout manual Section 9.0 for installation and checkout of the replacement parts.
10. Document sensor replacement on the FAA form 6030-1.

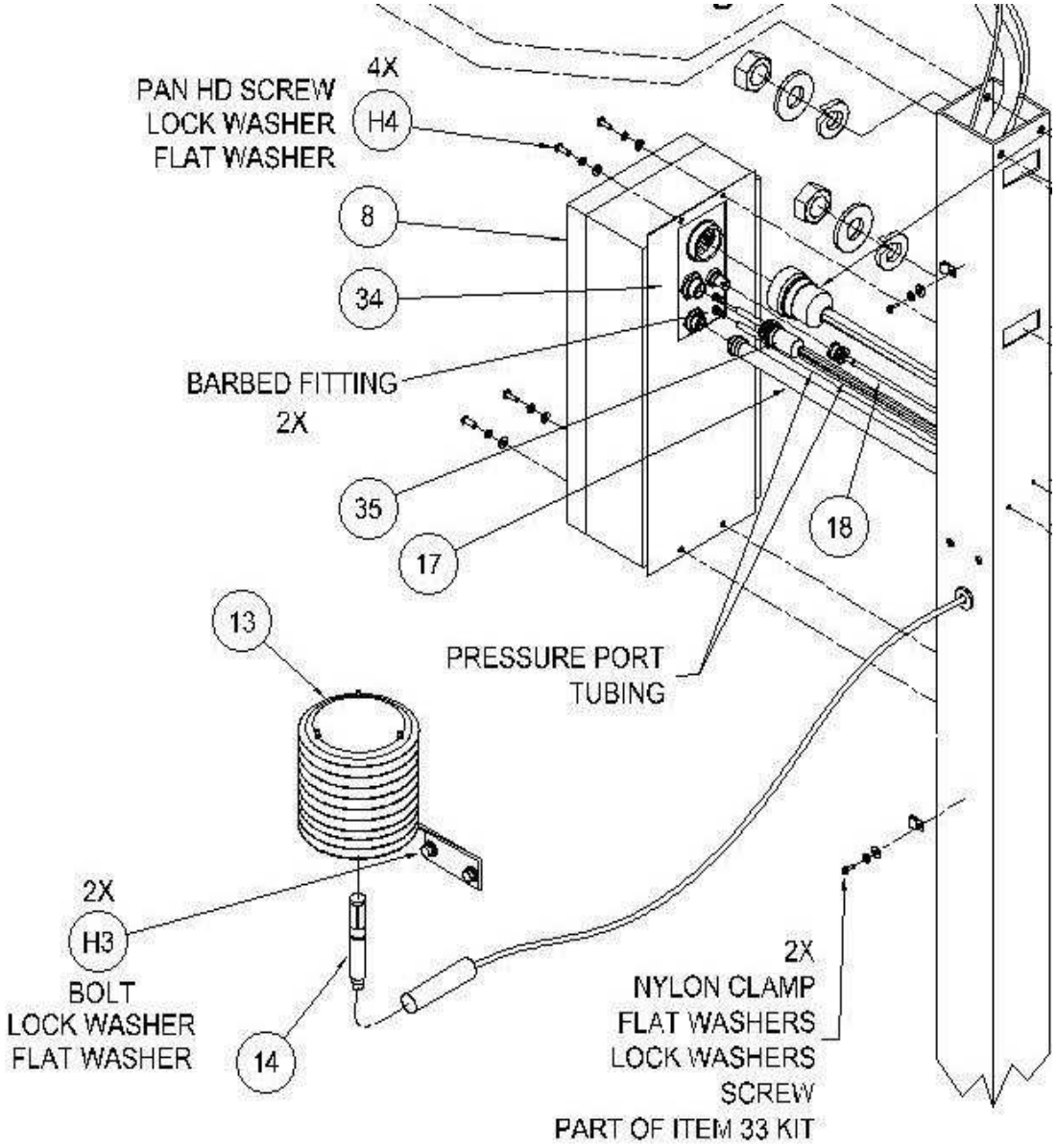

Figure 8
DCP Removal

10.2 TEMPERATURE, HUMIDITY/DEW POINT SENSOR REMOVAL PROCEDURES:

SAFETY PRECAUTIONS

1. Do not perform outdoor Belfort AWOS maintenance tasks during a thunderstorm.
2. Use extreme caution when lowering the tilt-over tower whenever ice or snow has accumulated on the tower cross arm or the sensors. The extra weight may cause the tower to fall over rapidly.

TOOLS REQUIRED

1. Phillips head screwdriver
2. Socket wrench and ¾" socket

Removal Procedures: Refer to Figure 6.

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**Belfort AWOS system being serviced, do not use current weather data outputs**." Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
2. Remove tower-securing bolts and tilt the tower until the cross arm is at a comfortable working height to access the Temperature/Humidity Sensor. Secure the tower in that position by tying the attached tower hold-down rope to the base of the Belfort AWOS tower as shown in Figure 2.
3. Power down the power enclosure by opening the AC and DC circuit breakers.
4. Loosen the jam nut on bottom of the plastic sensor adapter a few turns.
5. Remove the sensor and sensor connector assembly through the bottom of the plastic adapter.
6. Disconnect the sensor probe from the sensor cable connector.
7. Inspect the sensor cable connector for damage, corrosion or bent or broken pins. Replace as necessary.
8. Contact Belfort Instrument Co. customer support to make arrangements for replacement of defective components.
9. Refer to the Belfort AWOS Installation and Checkout manual Section 9.0 for installation and checkout of the replacement parts.
10. Document sensor replacement on the FAA form 6030-1

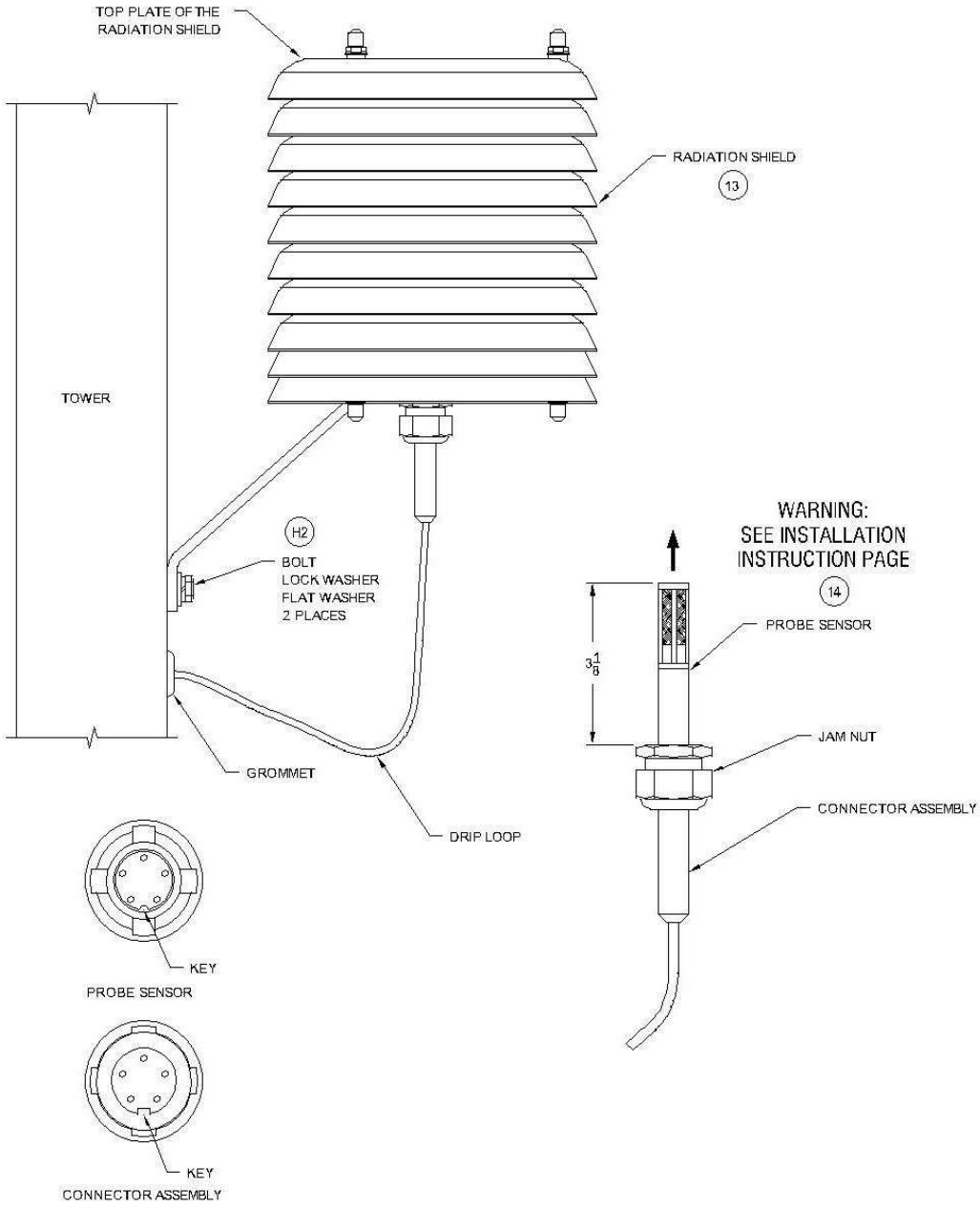

Figure 9.
Temperature/Humidity Sensor Removal

10.3 6000 VISIBILITY SENSOR REMOVAL PROCEDURES:

SAFETY PRECAUTIONS

2. Do not perform outdoor Belfort AWOS maintenance tasks during a thunderstorm.
3. Use extreme caution when lowering the tilt-over tower whenever ice or snow has accumulated on the tower cross arm or the sensors. The extra weight may cause the tower to fall over rapidly.

TOOLS REQUIRED

1. 8 foot step ladder.
2. Socket wrench with 9/16" socket.

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Removal Procedures: Refer to Figure 7.

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**Belfort AWOS system being serviced, do not use current weather data outputs**." Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
2. Remove tower-securing bolts and tilt the tower until the cross arm is at a comfortable working height to access the Temperature/Humidity Sensor. Secure the tower in that position by tying the attached tower hold-down rope to the base of the Belfort AWOS tower as shown in Figure 2.
3. Power down the power enclosure by opening the AC and DC circuit breakers.
4. Inside of the power enclosure, disconnect the red and black visibility power harness connections from the terminal block TB3.
5. Inside of the power enclosure, disconnect the visibility sensor RS232 serial cable that are connected to the terminal block TB4**.**
6. Remove the screws that hold the conduit clamps which secure the sensor wire bundle running down the hinge side of the tower. Save the screws and clamps.
7. Remove the mounting bolts that secure the visibility sensor and Ambient Light Sensor to the tower and carefully remove the sensors from the tower.
8. Inspect the sensor cables and connectors for damage, corrosion or bent or broken pins. Replace damaged cables as necessary.
9. Contact Belfort Instrument Co. customer support to make arrangements for replacement of defective components.
10. Refer to the Belfort AWOS Installation and Checkout manual Section 9.0 for installation and checkout of the replacement parts.
11. Document sensor replacement on the FAA form 6030-1.

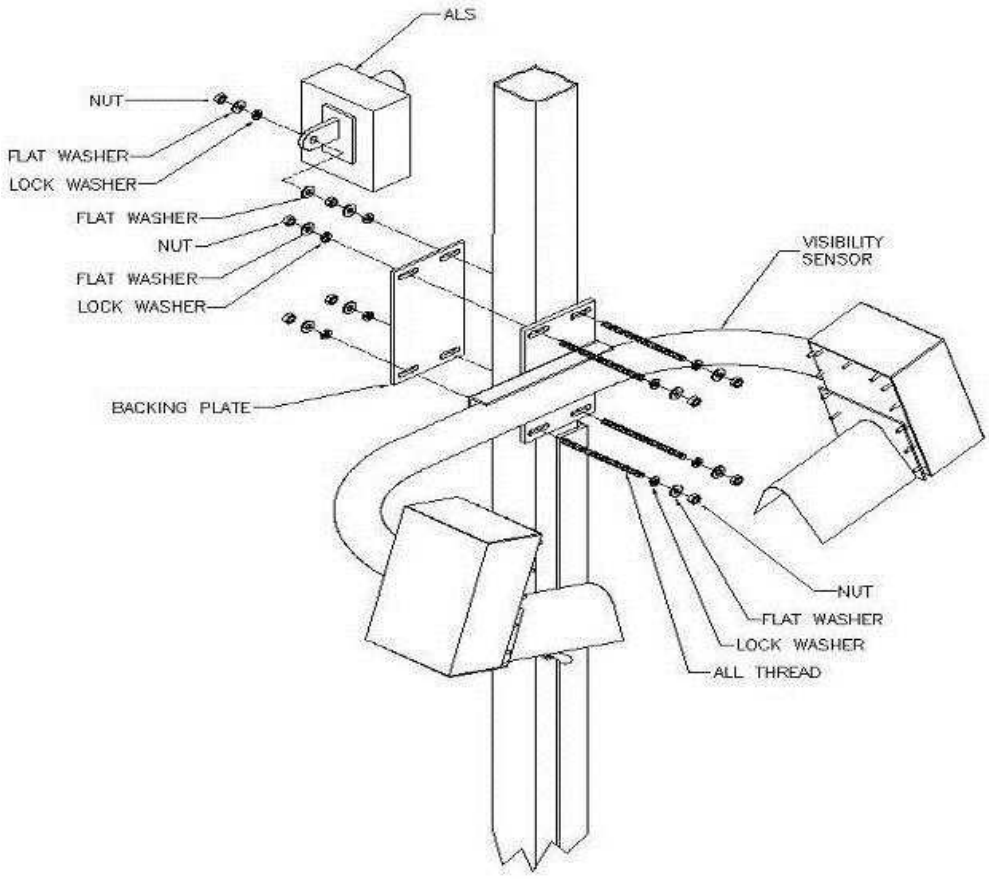


Figure 10-
Visibility Sensor Removal

10.4 WIND SPEED SENSOR AND WIND CUPS REMOVAL INSTRUCTIONS

SAFETY PRECAUTIONS

1. Do not perform outdoor Belfort AWOS maintenance tasks during a thunderstorm.
2. Use extreme caution when lowering the tilt-over tower whenever ice or snow has accumulated on the tower cross arm or the sensors. The extra weight may cause the tower to fall over rapidly.

TOOLS REQUIRED

1. Belfort AWOS Hand Held Display Unit (HHDU)
2. 3 mm Allen wrench
3. Socket wrench and 13/16" socket
4. Standard screw driver

Removal Procedures: Refer to figure 8.

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**Belfort AWOS system being serviced, do not use current weather data outputs**." Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
2. Remove tower-securing bolts and tilt the tower until the cross arm is at a comfortable working height to access the Wind Speed Sensor. Secure the tower in that position by tying the attached tower hold-down rope to the base of the Belfort AWOS tower as shown in Figure 2.
3. Power down the power enclosure by opening the AC and DC circuit breakers.
4. Remove the three (3) hole cap plugs in the bottom of the cross arm that cover the mounting screw access holes.
5. Remove and save the mounting screws.
6. Remove the wind speed sensor from the Cross Arm.
7. Loosen and disconnect the wind speed connector from the mating connector.
8. Inspect the sensor cable and connector for damage, corrosion or bent or broken pins. Replace damaged cable if needed.
9. Contact Belfort Instrument Co. customer support to make arrangements for replacement of defective components.
10. Refer to the Belfort AWOS Installation and Checkout manual Section 9.0 for installation and checkout of replacement parts.
11. Document component replacement on the FAA form 6030-1.

12. If required, the wind cups can be replaced with the sensor on or off the cross arm if the tower is lowered.
13. Use the screw driver to loosen the screw on the top of the tri-cup assembly.
14. Slide the old tri-cup assembly off of the end of the sensor.
15. Install the new tri-cup assembly onto the end of the sensor.

16. Reinstall the screw on the top of the tri-cup assembly.
17. Go to step 10 of this procedure and follow those directions.

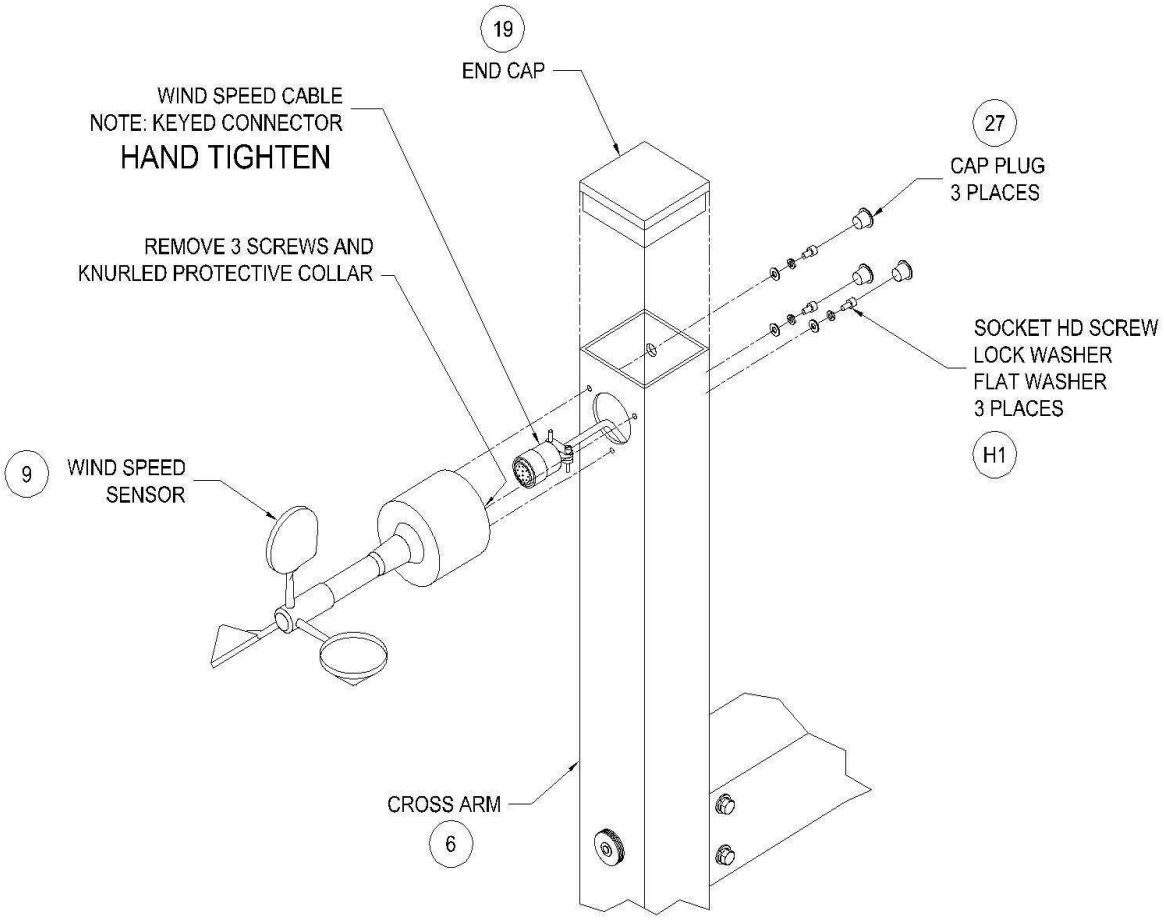


Figure 11.
Wind Speed Removal

10.5 WIND DIRECTION SENSOR AND VANE REMOVAL INSTRUCTIONS

SAFETY PRECAUTIONS

1. Do not perform outdoor Belfort AWOS maintenance tasks during a thunderstorm.
2. Use extreme caution when lowering the tilt-over tower whenever ice or snow has accumulated on the tower cross arm or the sensors. The extra weight may cause the tower to fall over rapidly.

TOOLS & PARTS REQUIRED

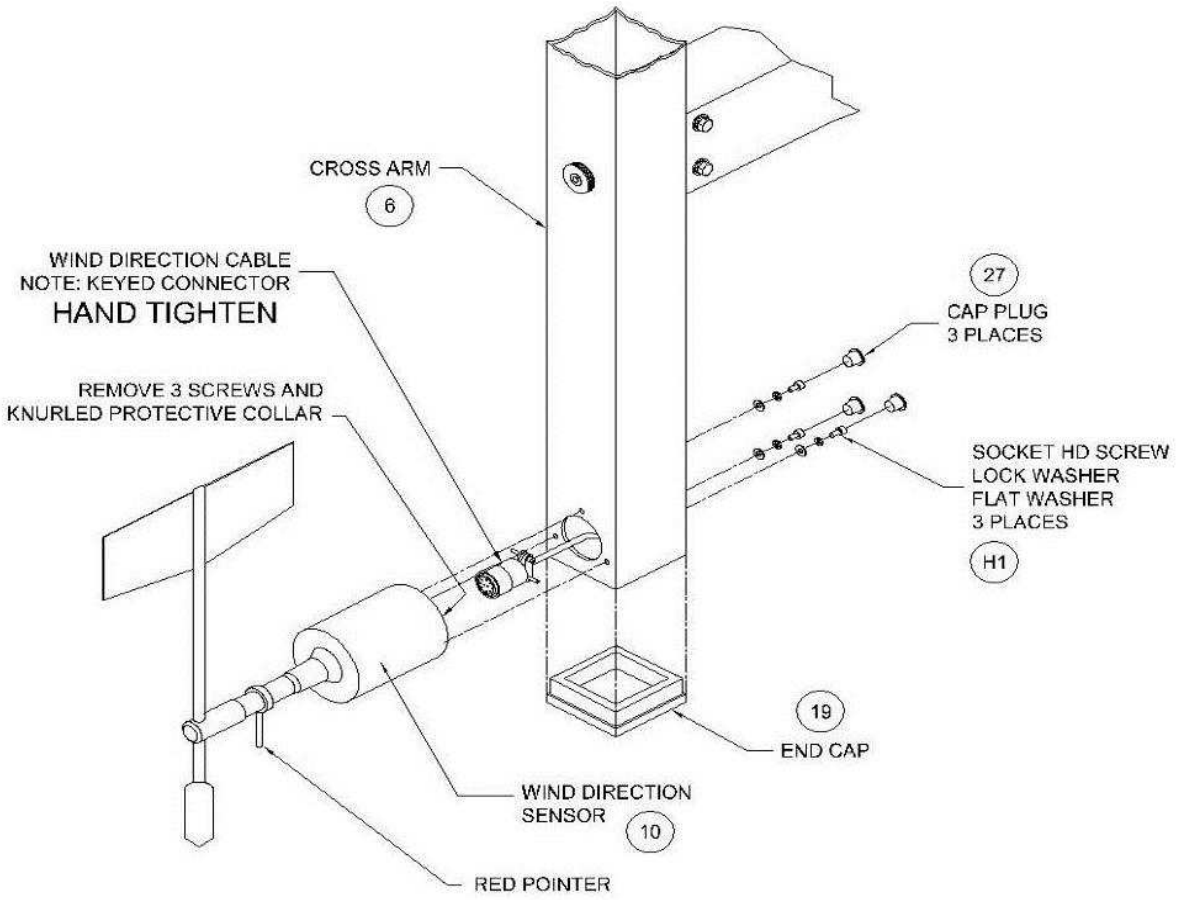
1. Three (3) M4 x 8, Socket head screws
2. 3 mm Allen wrench
3. Socket wrench and 3/16" socket
4. Small flat blade screw driver.

Removal Procedures: Refer to figure 9.

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**Belfort AWOS system being serviced, do not use current weather data outputs**." Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
2. Remove tower-securing bolts and tilt the tower until the cross arm is at a comfortable working height to access the Wind Direction Sensor. Secure the tower in that position by tying the attached tower hold-down rope to the base of the Belfort AWOS tower as shown in Figure 2.
3. Power down the power enclosure by opening the AC and DC circuit breakers.
4. If the wind direction vane only needs to be replaced go to step 13.
5. Remove the three (3) hole plugs in the bottom of the cross arm that cover the mounting screw access holes.
6. Remove the mounting screws.
7. Disconnect the wind direction sensor from the Cross Arm.
8. Loosen and disconnect the wind direction connector from the mating connector.
9. Inspect the sensor cable and connector for damage, corrosion or bent or broken pins. Replace damaged cable if needed.
10. Contact Belfort Instrument Co. customer support to make arrangements for replacement of defective components.
11. Refer to the Belfort AWOS Installation and Checkout Manual Section 9.0 for installation and checkout of the replacement parts.
12. Document sensor replacement on the FAA form 6030-1.

13. Care should be taken to not move the red direction pointer.
14. Position the direction vane with rubber band as shown in Figure 4. Follow Section 5.6 steps 6 thru 12 to verify and if necessary, correct the proper vane alignment with the red pointer.

15. When the pointer is properly aligned, use the small screw driver to loosen the set screws on the vane shaft. Remove the vane.
16. Position the new vane on the direction shaft and tighten the set screws.
17. Use the rubber band to secure the vane as shown in Figure 4.
18. Go to step 11 of this procedure and follow instructions.



NOTE: THE WIND DIRECTION VANE HAS BEEN ALIGNED AT THE FACTORY SUCH THAT IT WILL INDICATED A DIRECTION OF 360° WHEN IT IS ALIGNED WITH THE RED POINTER MOUNTED ON THE SENSOR BODY

DO NOT REMOVE
WIND DIRECTION VANE FROM THE SHAFT
OR THE RED POINTER FROM THE BODY

Figure 12
Wind Direction Sensor Removal

10.6 POWER SUPPLY REPLACEMENT INSTRUCTIONS

SAFETY PRECAUTIONS

1. Do not perform outdoor Belfort AWOS maintenance tasks during a thunderstorm.
2. Use extreme caution when lowering the tilt-over tower whenever ice or snow has accumulated on the tower cross arm or the sensors. The extra weight may cause the tower to fall over rapidly.

TOOLS & PARTS REQUIRED

Small slotted screw driver

Removal Procedur**es:** Refer to figure 13.

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**Belfort AWOS system being serviced, do not use current weather data outputs**." Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
2. Power down the power enclosure by opening the AC and DC circuit breakers.
3. Use a DMM set to AC volts, and measure the voltage on the AC input terminals of the power supply. The voltage read should be <1.0 vac.
4. In the power enclosure, locate the +12v dc or the +14v dc power supply to be replaced.
5. With the screw driver, loosen the screws to release the AC feed wires, L one black, N white and green.
6. With the screw driver, loosen the screws to release the DC output wires:
   +12v supply +V red wire, -V black wire;
   +14v supply +V red wire, +V white wire, -V black wire, -V green wire;
7. With the screw driver release the power supply catch mechanism that secures the supply to the din rail.
8. Examine the replacement power supply. If the replacement supply is the same model supply, then mount the supply onto the din rail in the same orientation as the original.
9. With the screw driver, insert the wires and tighten the screws to secure the AC feed wires, L one black, N white and GND green.
10. With the screw driver, insert the wires and tighten the screws to secure the DC output wires:
    +12v supply +V red wire, -V black wire;
    +14v supply +V red wire, +V white wire, -V black wire, -V green wire;
11. Check and confirm that the wires are connected as indicated above.
12. With the DMM set to resistance, measure across the AC wires and the DC wires. Confirm that there are no shorted wires. If any shorts exist, use the DMM to locate and resolve.
13. Power up the power enclosure by enabling the AC circuit breaker only.
14. With the DMM set to AC volts, measure across the AC input terminals L and N. Confirm that the AC voltage >110vac is present. If no Ac voltage, turn off the AC supply at the breaker and race the wire connections against the power enclosure wiring diagram. Fix any wiring errors.

15. With the DMM set to DC volts, measure across the DC output terminals +V and -V. Confirm that the DC voltage is of > or = +12v. If no DC voltage, turn off the AC supply at the breaker and trace the wire connections against the power enclosure wiring diagram. Fix any wiring errors.
16. Turn on the AC supply and re-measure the voltage. If > or = +12v then adjust the voltage as necessary for the supply that was replaced.
17. Document the supply replacement on the FAA form 6030-1.

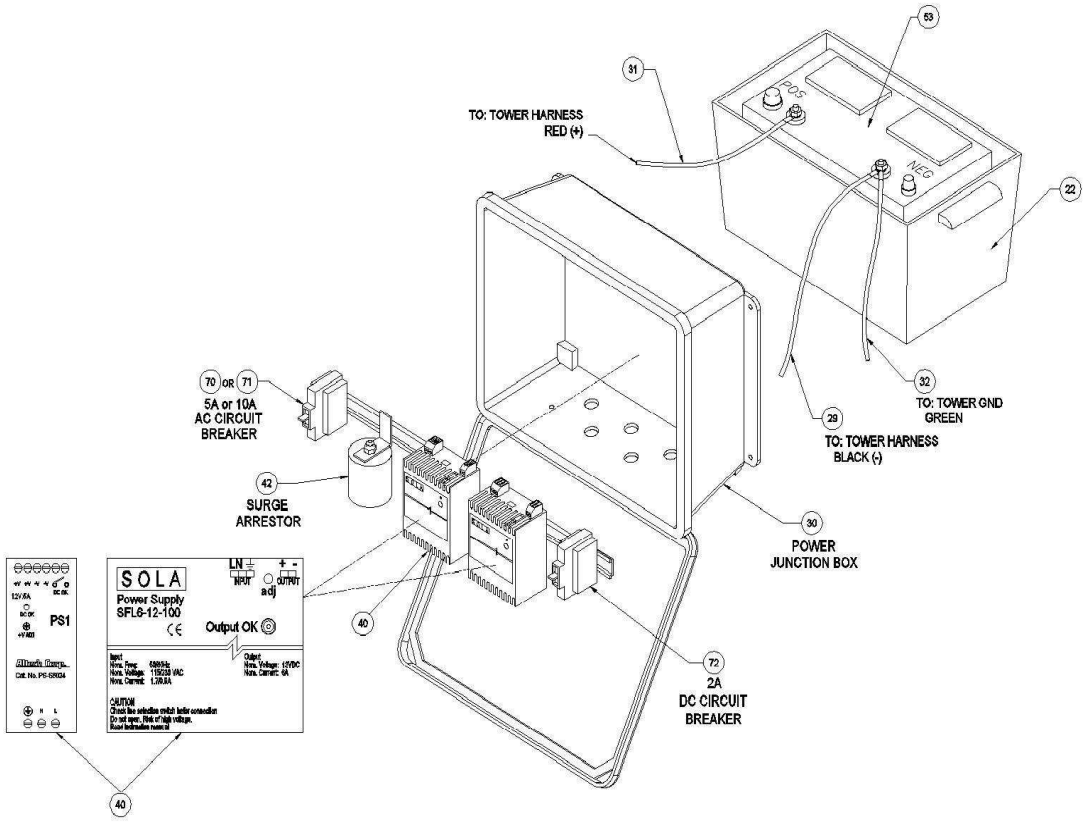


Figure 13

Power Supply and Surge Suppressor Mounting

(Note; The Altech power supply replaces the obsolete Sola Power Supply. Sola supplies are still in older systems in the field.)

10.7 SURGE SUPPRESSOR REPLACEMENT INSTRUCTIONS

SAFETY PRECAUTIONS

1. Do not perform outdoor Belfort AWOS maintenance tasks during a thunderstorm.
2. Use extreme caution when lowering the tilt-over tower whenever ice or snow has accumulated on the tower cross arm or the sensors. The extra weight may cause the tower to fall over rapidly.

TOOLS & PARTS REQUIRED

Slotted screw driver

Removal Procedur**es:** Refer to figure 13.

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the Belfort AWOS system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**Belfort AWOS system being serviced, do not use current weather data outputs**." Verify that this NOTAM advisory is displayed on the operator screen prior to beginning this maintenance tasks. Refer to the "Belfort AWOS Operator Manual" for instructions on how to enter and delete NOTAMs.
2. Open the power enclosure. Examine the Surge Suppressors for either of the following conditions:
    a. Either of the two neon indicators is out;
    b. The neon indicator is a color other than neon orange.
3. If either of the failure indicators above has occurred, perform the following instructions.
4. Power down the power enclosure by opening the AC and DC circuit breakers.
5. Use a DMM set to AC volts, and measure the voltage on the AC input terminals of the power supply. The voltage read should be <1.0 vac. This confirms that the AC voltage is turned off.
6. Cut the ty-wrap off of the wiring harness from the circuit breaker to the surge suppressor.
7. Examine the wiring harness and locate the wires that go to the suppressor. One black wire goes to the circuit breaker. One black wire go to the Black wire terminal on TB2. The white wire goes to the White wire terminal on TB2. The green wire goes to the green wire terminal on TB2.
8. Disconnect the suppressor wires from the terminal blocks by loosening the terminal block screws, while documenting what wire comes out of which screw terminal.
9. Unscrew the suppressor mounting bracket from the mounting plate.
10. Mount the new suppressor to the mounting plate using existing screws and mounting holes.
11. Add the suppressor wires to the harness and route them to the terminal block terminals as documented in step 8.
12. Connect the new suppressor wires to the same terminals as indicated in step 7. Either black wire can be connected to either black wire termination location.
13. Use ty-wraps to secure the wire harness.
14. Turn the AC circuit breaker on.
15. If the new suppressor is good, both neon orange indicators will be illuminated.
16. If both indicators are not on, then open the AC circuit breaker and examine the wiring using the wiring diagram provided in the Installation and Checkout manual.
17. If the wiring is correct turn the AC circuit breaker on and measure the voltage at the two black wires coming from the suppressor.
18. If both voltages are 110 to 120vAC, then contact the Belfort support for further instructions.

11.0 RECOMMENDED SPARE PARTS - Belfort Instrument Co. will make every effort to respond to replacement parts support issues in an expeditious and timely manner. However, system owners should consider purchasing and maintaining an inventory of the following recommended spare parts to assure minimum system down time should replacement parts be needed.

Recommended Spare Components		
Belfort Part Number	Description	Qty
80014	Wind Speed Bottle	1
80015	Wind Direction Bottle	1
80016	Wind Speed Cups	1
80017	Wind Direction Vane	1
R13HYCLIPS3	Temperature/Humidity Sensor	1
ZXPSS6012	Power Supply-Set to +14v +-.2v DC (DCP)	1
ZXPSS6012	Power Supply-Set to +14v +-.2v DC (Visibility)	1
LPC 10262-7	Surge Suppressor 120vac	1

Table 2.
Recommended Spare Components

-HARDWARE PACKAGE KIT -			PART NUMBER 80033			
				WASHERS		
ITEM	PART NBR	FASTENER	QTY	FLAT	LOCK	NUT
H1	80022	Socket Head Screw, M4 x 8	6	6	6	-
H2	80023	Hex Head Bolt, ¼-20 x ¾	7	7	7	-
H3	80025	Flat Head Screw, #8-32 x ½	2	-	-	-
H4	80026	Pan Head Screw, #8-32 x ½	4	4	4	-
H5	80027	Hex Head Bolt, 3/8-16 x 1	6	6	6	-
H6	80028	Hex Head Bolt, 3/8-16 x 4	1	3	2	2
H7	80030	Hex Head Bolt, ½-13 x 7	2	4	-	4

Table 3.
Recommended Spare Hardware
****Note: The full Bill of Material is available in the Installation and Checkout Manual as Appendix D.**

12.0 CUSTOMER PRODUCT SUPPORT AND WEBSITE ASSISTANCE - Maintenance personnel should check the Belfort Instrument Co. website, http://www.belfortinstrument.com, frequently to obtain the latest information regarding product technical support and to obtain answers to frequently asked questions. When replacement parts are needed, contact the Belfort Customer Support number, 800-937-2353, to make arrangements and assure all necessary authorizations are obtained for Warranty and other replacement parts to minimize delays in component replacement turn-around.

Appendix A

Belfort AWOS® Maintenance Forms

Belfort AWOS Tri-annual
Performance and Maintenance Record

Site Location: _____ Date: _____

1. DATU Maintenance (refer to Maintenance Manual Section 5.1.1 & 5.1.2)

	Completed
A. Clean computer air filters	☐
B. Clean cabinets with mild detergent and water	☐
C. Listen to CPU and Power Supply fans for function and noise	☐
D. Download and install any Windows OS updates	☐
E. Verify accuracy of the PC clock and adjust as necessary	☐
F. Verify that the computer hard disk available capacity is > 3 gb	☐
G. Display and review the Advisor current status and history log since last maintenance activity for error flags or unexplained recurrent system problems. Document system problems on the FAA Form 6030-1.	

Problems Identified? Yes ☐ No ☐

2. Record current weather system outputs

_____	_____	_____	_____
Location	Time	Wind speed	Wind Direction
_____	_____	_____	_____
Altimeter Setting	Temperature	Relative Humidity	Dew point
_____	_____	_____	_____
Density Altitude	Condensation Alt	Visibility	

Comments: _____
_____

3. Visibility Sensor (refer to Maintenance Manual section 5.4)

A. Clean visibility and ambient sensor windows Completed ☐

B. Perform sensor calibration if the ExtCo difference is > +-5%:

	Sensor ExtCo	Reference ExtCo	% Diff	Acceptable Tolerance: ± 5%	
Initial	_____	_____	_____	Pass ☐	Fail ☐
After Cal.	_____	_____	_____	Pass ☐	Fail ☐

4. Tower/DCP Mounting Assembly Visual Inspection (refer to Maintenance Manual section 5.7):

A. Check for obvious mechanical damage to system and repair or replace as needed ☐

B. Verify obstruction lighting is functional and repair or replace as needed ☐

C. Replace or repair parts as required. Damage Identified? Yes ☐ No ☐

D. If a battery backup is installed, check the battery cable connections for corrosion and clean as needed. ☐

E. Return the system to service and verify the system is reporting data as expected. ☐

5. Perform the Verification of the Belfort AWOS Atomic clock per the Verification Procedure in Maintenance Manual Appendix G.

Battery voltage within between 3.5v and 4.8v Pass ☐ Fail ☐

Clock is receiving WWVB Updates. Last update is with 5 days of current date.
Pass ☐ Fail ☐

PC Clock contains correct local date and time. Pass ☐ Fail ☐

Review the past years maintenance log and verify that no replacement of the Atomic Clock was made. If a replacement was made, verify that P/N and Revision installed is acceptable to current authorized VDD baseline. Yes ☐ No ☐

6. Record all corrective actions or adjustments made on FAA Form 6030-1 ☐

Tri-annual Maintenance completed by: _____ Date: _____

Belfort AWOS Annual Configuration Validation
Technical Performance and Maintenance Record

Site Location: _____ Date: _____

This Annual System Validation must be coordinated with the FAA Regional Flight Standards District Office representative assigned to this facility.

Belfort AWOS Version Description Document VDD is located in the site Belfort AWOS Maintenance Log binder.

FAA Representative will: Concurrently Witness ☐ Verify at Later Date ☐

1. Perform and document Tri-annual Maintenance Activities Completed ☐

2. Perform Annual DATU Maintenance (Refer to Maintenance Manual section 5.1.2) ☐

   Download and install any Windows OS updates ☐
   Record the version of all Belfort AWOS software installed;
   Advisor Version: _____
   Belfort AWOS Voice Version: _____
   Belfort AWOS Phone Version: _____
   Has any software been changed since initial or last Annual Validation? Yes ☐ No ☐
   If yes, do maintenance records reflect the change? Yes ☐ No ☐
   Is Current P/N and Revision acceptable to current authorized VDD baseline? Yes ☐ No ☐

3. Record DCP Serial Number and Revision and verify that it has not been changed since the last Annual or Initial System Installation data records. S N: _____ Rev: _____

   Has DCP been changed since initial or last Annual Validation? Yes ☐ No ☐
   If yes, do maintenance records reflect the change? Yes ☐ No ☐
   Is Current P/N and Revision acceptable to current authorized VDD baseline? Yes ☐ No ☐

4. Perform Annual Temperature/DEW Point sensor confidence validation (Refer to maintenance manual section 10.2) Pass ☐ Fail ☐
   Review the past years maintenance log and verify that no replacement of the Temperature/Dew Point sensor was made.
   If a replacement was made, verify that P/N and Revision installed is acceptable to current authorized VDD baseline. Yes ☐ No ☐
   Record any configuration difference(s) identified _____

5. Barometric Pressure Sensor (refer to Maintenance Manual section 5.2)

DCP S/N: _____	Reference Standard(A)	Belfort AWOS Reading (B)	Acceptable Tolerance	Adjustment Required?	Value After Adjustment
BP1	_____	_____	±0.02 in Hg	Y ___ N ___	_____
BP2	_____	_____	±0.02 in Hg	Y ___ N ___	_____

Review the past year maintenance log to see if the DCP (with pressure sensors) had been replaced. If it was replaced, indicate that fact here. DCP Replaced Yes ☐ No ☐

From the maintenance logs, review the previous measured pressure sensors values and document any change in the measured sensor values since the last altimeter check.

Sensor Drift BP1_____ BP2 _____ < +- .02 in Hg.

Record any configuration difference(s) identified _____

6. Visibility Sensor (refer to Maintenance Manual section 5.4)

Review the past years maintenance log and verify that no replacement of the Visibility sensor was made. If a replacement was made, verify that P/N and Revision installed is acceptable to current authorized VDD baseline. Yes ☐ No ☐

Record any configuration difference(s) identified _____

7. Perform the Annual Wind Speed Sensor confidence validation (refer to Maintenance Manual section 5.5) Pass ☐ Fail ☐

Review the past years maintenance log and verify that no replacement of the Wind Speed sensor was made. If a replacement was made, verify that P/N and Revision installed is acceptable to current authorized VDD baseline. Yes ☐ No ☐

Record any configuration difference identified _____

8. Perform the Annual Wind Direction Sensor confidence validation (refer to Maintenance Manual section 5.6)

Pass ☐ Fail ☐

Review the past years maintenance log and verify that no replacement of the Wind Direction sensor was made. If a replacement was made, verify that P/N and Revision installed is acceptable to current authorized VDD baseline. Yes ☐ No ☐

Record any configuration difference identified _____

9. Perform the Verification of the Belfort AWOS Atomic clock per the Verification Procedure in Maintenance Manual Appendix G.

Battery voltage within between 3.5v and 4.8v Pass ☐ Fail ☐

Clock is receiving WWVB Updates. Last update is with 5 days of current date.
Pass ☐ Fail ☐

PC Clock contains correct local date and time. Pass ☐ Fail ☐

Review the past years maintenance log and verify that no replacement of the Atomic Clock was made. If a replacement was made, verify that P/N and Revision installed is acceptable to current authorized VDD baseline. Yes ☐ No ☐

Record any configuration difference identified _____

10. Document and correct any configuration discrepancies identified.

Corrections Required? Yes ☐ No ☐

11. Return the system to service and verify the system is reporting data as expected. ☐

12. Record corrective actions taken on FAA Form 6030-1 ☐

Annual Maintenance and Configuration Validations completed by:

_____ Date: _____

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Belfort AWOS **COMPREHENSIVE**

Facility Performance and Adjustment Record

Version- Jan 2014

Site Location: _____ Date: _____

Belfort AWOS Version Description Document VDD is located in the site Belfort AWOS Maintenance Log binder.

1. DATU Maintenance (refer to Maintenance Manual Section 5.1)

	Completed
A. Clean computer air filters	☐
B. Clean cabinets with mild detergent and water	☐
C. Listen to CPU and Power Supply fans for function and noise	☐
D. Download and install any Windows OS updates	☐
E. Verify accuracy of PC Clock and adjust as necessary	☐
F. Verify that the compute hard disk available capacity is > 3 gb	☐

G. Belfort AWOS software installed, (record software version):
   Belfort AWOS Advisor Version: _____
   Belfort AWOS Voice (Mic Click) Version: _____
   Belfort AWOS Phone Version: _____

H. Display and review the Advisor current status and history log since last maintenance activity for error flags or unexplained recurrent system problems. Document system problems on the FAA Form 6030-1.

Problems Identified? Yes ☐ No ☐

Record current weather system outputs

_____	_____	_____	_____
Location	Time	Wind speed	Wind Direction
_____	_____	_____	_____
Altimeter Setting	Temperature	Relative Humidity	Dewpoint (Calculation)
_____	_____	_____	_____
Density Altitude	Condensation Alt	Visibility	

Comments: _____

_____

2. DCP Configuration (Refer to Appendix F DCP Site Configuration Procedure:

   Configuration Date: _____.
   Latitude: _____.
   Longitude: _____.
   Optional ID: _____.

Runways: _____.
Sensor Elevation: _____.
Field Elevation: _____.
Magnetic Variation: _____.
FBO Name: _____.
FBO/Unicom Frequency: _____.
Site Password: _____.
RF Transmit Power: _____.
Visibility Sensor Type: _____.
Visibility Sensor Baud Rate: _____.
Configuration Values saved in EEprom: Pass_____ Fail:_____.
Complete Air Nav Document attached to this sheet: Yes _____ No:_____.
DCP Enclosure cover screws fully tightened: Yes _____ **No:_____.**

3. Barometric Pressure Sensor (refer to Maintenance Manual section 5.2)

DCP S/N: _____ PN: _____	Reference Standard (A)	Belfort AWOS Reading (B)	Acceptable Tolerance	Adjustment Required?	Value After Adjustment
BP1	_____	_____	±0.02 in Hg	Y ___ N ___	_____
BP2	_____	_____	±0.02 in Hg	Y ___ N ___	_____

Review the past year maintenance log to see if the DCP (with pressure sensors) had been replaced. If it was replaced, indicate that fact here. DCP Replaced Yes ☐ No ☐

From the maintenance logs, review the previous measured pressure sensors values and document any change in the measured sensor values since the last altimeter check.

Sensor Drift BP1_____ BP2 _____ < +- .02 in Hg.

Record any configuration difference(s) identified _____

4. Visibility Sensor (refer to Maintenance Manual section 5.4)

Visibility Sensor PN: _____ Serial Number: _____

A. Clean visibility and ambient sensor windows Completed ☐

B. Perform sensor calibration if the ExtCo difference is > +-5%: Acceptable

	Sensor ExtCo	Reference ExtCo	% Diff	Tolerance: ± 5%	
Initial	_____	_____	_____	Pass ☐	Fail ☐
After Cal.	_____	_____	_____	Pass ☐	Fail ☐

5. Tower/DCP Mounting Assembly Visual Inspection:

A. Check for obvious mechanical damage to system and repair or replace as needed ☐

B. Verify obstruction lighting is functional and repair or replace as needed ☐
C. Check backup battery terminals for corrosion and clean as needed ☐
D. Replace or repair parts as required

Damage Identified? Yes ☐ No ☐

6. Perform Annual Temperature/Dew Point sensor confidence validation (Refer to maintenance manual section 5.3) Sensor P/N: _____ Serial No. _____ Pass ☐ Fail ☐

7. Perform the Annual Wind Speed Sensor confidence validation (refer to Maintenance Manual section 5.5) Sensor P/N: _____ Serial No. _____ Pass ☐ Fail ☐

8. Perform the Annual Wind Direction Sensor confidence validation (refer to Maintenance Manual section 5.6)

Sensor P/N: _____ Serial No. _____ Pass ☐ Fail ☐

9. Perform the Verification of the Belfort AWOS Atomic clock per the Verification Procedure in

Maintenance Manual Appendix G.

Battery voltage within between 3.5v and 4.8v Pass ☐ Fail ☐

Clock is receiving WWVB Updates. Last update is with 5 days of current date.
Pass ☐ Fail ☐

PC Clock contains correct local date and time. Pass ☐ Fail ☐

Review the past years maintenance log and verify that no replacement of the Atomic Clock was made. If a replacement was made, verify that P/N and Revision installed is acceptable to current authorized VDD baseline. Yes ☐ No ☐

11. Perform the DCP UHF Data Radio Accuracy Test Section IV of Appendix E Belfort AWOS Commissioning / Annual Inspection Procedure. Record the measured values:

Belfort AWOS UHF Data Radio Accuracy Checklist:

1. DCP Radio Serial Number:_____
2. DCP FCC Authorized Frequency: _____(467.850 MHZ)
3. DCP Freq. Deviation: _____ (2.2 KHZ2+-0.5 KHZ)
4. DCP RF Output Power: _____Watts (.75 to 1.25 watts)
5. DCP RF Modulation: _____% (78 to 82%)
6. DCP VSWR: _____ (< 3.0:1)
7. DCP FCC Authorized Frequency: _____(467.925 MHZ)
8. DCP Freq. Deviation: _____ (2.2 KHZ +-0.5 KHZ)
9. DCP RF Output Power: _____Watts (.75 to 1.25 watts)
10. DCP RF Modulation: _____% (78 to 82%)
11. DCP VSWR: _____ (< 3.0:1)

12. Perform the Belfort AWOS VHF Radio Accuracy Test Section V of Appendix E Belfort AWOS Commissioning / Annual Inspection Procedure. Record the measured values::

UNICOM VHF Radio Accuracy Checklist:

1. UNICOM Radio Serial Number:_____
2. Unicom FCC Authorized Frequency: _____MHZ
3. Unicom Freq. Deviation: _____ (+- 1 khz):
4. Unicom RF Output Power: _____Watts (2.5 watts +- ½ watt)
5. Unicom AM Demodulation: _____% (65 to 95%)
6. Unicom VSWR: _____ (< 3.0:1)

12. Record all corrective actions or adjustments made on FAA Form 6030-1 ☐

11. Return the system to service and verify the system is reporting data as expected. ☐

Completed by:

_____ Date: _____

Appendix B

Belfort AWOS® Tri-Annual, Annual & 5-Year Maintenance Plan

ANNUAL SYSTEM VALIDATION & 5 YEAR PERIODIC MAINTENANCE PLAN

Annual System Validations and Five Year Periodic Maintenance activities will be scheduled and completed in accordance with the following recurring frequencies:

Scheduled Maintenance Task/Activity	Minimum Frequency in days
Tri-annual Performance Verification and Maintenance Checks as detailed on the Belfort AWOS Tri-annual Performance and Maintenance Record Form	Once every 120 days ± 30 days
Annual Performance Maintenance Checks as detailed on the Belfort AWOS Annual Performance and Maintenance Record Form	On the anniversary date of facility commissioning ± 60 day
Annual Performance /Configuration Revalidation – To be coordinated with the assigned site FAA regional technical representative and recorded on the Belfort AWOS Annual Performance and Maintenance Record Form	On the anniversary date of facility commissioning ± 60 days

Tri-annual Performance Verification and Maintenance Checks will consist of:

1. Viewing the system data outputs on a HHDU and at the DATU display screen to check for missing data and/or error status reports and listening to the phone and Unicom voice outputs to verify the system data outputs are as expected for the specific Belfort AWOS configuration options installed at the site.
2. Cleaning the DATU computer and verifying that the computer power supply, processor fans and Atomic clock and PC clock are functioning properly.
3. Download and install any Windows OS Updates.
4. Cleaning and calibrating the visibility and ambient light sensors, if installed.
5. Visually inspecting the Tower assembly for obvious damage and inspecting the obstruction lighting to determine it is functioning properly.
6. Adjusting, correcting or replacing any defective LRU components identified during these tri-annual checks.

Annual Performance Maintenance Checks will consist of:

1. Completion of all Tri-annual Performance Verification and Maintenance Checks.
2. A confidence verification of the Temperature/Humidity sensor, and Wind Speed sensor outputs by comparing these outputs to the reported outputs of a calibrated Kestrel 3000 weather instrument.
3. A confidence verification of the Wind Direction sensor by verifying that True North is reported when the vane is aligned in a True Northerly direction.
4. Verifying the accuracy of the Dual Barometer pressure sensors by comparing the reported Belfort AWOS output to the output of a NIST traceable, calibrated pressure standard. Recalibrate the sensor if needed.

5. Belfort AWOS Annual Inspection Procedure (Appendix E) to verify UHF and VHF Radios are operating per specification.
6. DATU Annual Computer and Database Maintenance which will include:

    a) Verification that the DATU computer hard-drive still has a minimum of 3gb storage space available to continue to store system data for the next year.
    b) Defragment the computer hard-drive.
    c) Verification of all Belfort AWOS software version configuration status to assure that no unauthorized changes have been installed to the system software.

7. Adjusting, correcting or replacing any defective LRU components identified during these annual checks.

Annual Performance/Configuration Revalidation will consist of:

1. Coordinating a site visit with the assigned FAA regional technical representative to enable the FAA Representative to either concurrently witness performance of the Annual Performance Maintenance Checks or for the FAA Representative to verify specific or all of the system performance verifications.
2. This visit will also verify the configuration of the system sensor components to assure that no unauthorized configuration changes have been installed since the last completed Annual Performance /Configuration Revalidation.

Five - Year Maintenance Tasks: There are no specific five- year maintenance tasks to be completed for the Belfort AWOS system. All scheduled tri-annual and annual maintenance tasks shall continue to be performed at tri-annual and annual frequencies for as long as the Belfort AWOS weather system remains in service.

Appendix C

UHF Transceiver Specifications

Appendix C UHF Transceiver Specifications

The UHF transceiver operates under License from the Federal Communications Commission. The FCC Registration number is 0011055407. The Emission Designator is 11K0F1D.

The operating specifications for the UHF Transceiver are as follows:

Frequency:
467.850 MHZ Initial Tolerance: +- 2 KHz, Operating Tolerance: +/- 2 KHZ;
467.925 MHZ Initial Tolerance: +- 2 KHz, Operating Tolerance: +/- 2 KHZ;

Output Power: 1.0 W
Initial Tolerance: Upper: +.25 W, Lower: -.25 W;
Operating Tolerance: Upper: +.25 W, Lower -.25 W;

Frequency Deviation: 2.2 KHz
Initial Tolerance: +/- 0.5 KHz;
Operating Tolerance: +/- 0.5 KHz;

VSWR: 1.0:1
Initial Tolerance: 3.0:1 max;
Operating Tolerance: 3.0:1 max;

Appendix D

Standard Unicom Radio
ICOM A110 VHF Radio Specifications

Standard Unicom Radio-ICOM 110 VHF Radio Specifications

ICOM Radio Belfort Factory Configuration:

The ICOM radio drives a Bird Model 25-AMFN-06 (25 w 6 db) attenuator to the antenna. The radio output is adjusted down to 6 watts max output into the attenuator at the Belfort factory. After the attenuator, the maximum output RF power delivered to the antenna is 2.5 +-.25watts.

ICOM Radio Specification:

Frequency range	118.000 - 136.975 MHz
Channel spacing	8.33/25 kHz auto selection
(according to version)	or 25 kHz only
Mode	6K00A3E (AM)
No. of memory Ch.	20
Antenna connector	SO-239 (50Ω)
Power supply requirement	13.75 V DC or 27.5 V DC
(negative ground)	automatic selection
Current drain (at 13.75 V DC)	
Transmitting	5.0A max.
Receiving	4.0A (at AF max.)
	0.5A (at stand-by)
Operating temperature range	-30°C to +60°C;
	-22°F to +140°F
Frequency stability	±5 ppm (-30°C to +60°C)
Dimensions	150(W) × 50(H) × 180(D) mm
(projections not incl.)	$5^{29}/_{32}$(W) × $1^{31}/_{32}$(H) × $7^{3}/_{32}$(D) in
Weight (approx.)	1.5 kg; 3 lb 5 oz
	Transmitter
Output power	36 W typ. pep (9 W typ. for CW)
Modulation limiting	70 - 100% (IC-A110)
Modulation compression	Linear 85%
	Max. 95%
AF harmonic distortion	Less than 10% (at max. mod.)
Hum and Noise ratio	More than 40 dB
Spurious emissions	Less than -16 dBm
Microphone connector	8-pin modulator (600Ω)
	Receiver
Receiving system	Double conversion superheterodyne

Intermediate freq.	1st 38.85 MHz 2nd 450 kHz
Sensitivity (pd)	Less than 1 µV (at 6 dB S/N)
Squelch sensitivity (pd; at threshold)	Less than 0.3 µV
Selectivity	
25 kHz Ch. Spacing	More than ±8 kHz (at -6 dB) Less than ±17 kHz (at -40 dB) Less than ±25 kHz (at -60 dB)
8.33 kHz Ch. Spacing	More than ±2.778 kHz (at -6 dB) Less than ±7.37 kHz (at -60 dB)
Spurious response	More than 74 dBµ
Intermodulation rejection ratio*	More than 64 dB
BIocking/desensitisation*	More than 70 dB
Cross modulation rejection*	More than 70 dB
Audio output power	(at 13.75 V; 10% dist.; 60% mod.)
Internal speaker	1.5 W typical w/8Ω load
External Speaker	More than 10.0 W w/8Ω load
Headeset (side tone)	More than 0.1 W w/500Ω load
AF output impedance	
EXT SP	8Ω
Headset (side tone)	500Ω

Appendix E

Belfort AWOS Commissioning/ Annual Inspection Procedure & Data Record

Belfort AWOS Commissioning / Annual Inspection Procedure

This procedure is to be used to ensure that the Belfort AWOS AV 100 system meets the FAA requirements for both Commissioning and Annual Inspections.

***Per FAA Circular 150/5220-16D, section 2.9.a, all maintenance technicians must meet the qualifications defined in FAA Order 6700.20, Non-Federal Navigational Aids and Air Traffic Control Facilities, in order to perform the Belfort AWOS Commissioning / Annual Inspection Procedure.**

I. Required Equipment and Documentation:

1) HP 8920B Communications Test Set or equivalent
   with 50 ohm cable(male BNC connectors on both ends), N male to BNC female adapter
2) Bird Model 5000-EX or equivalent.
3) Bird Series 5010 Directional Power Sensor or Equivalent.
4) Bird DPM-50C 100-250 MHZ elements rated for 50 Watts and 5 Watts.
5) Voltmeter.
6) Belfort AWOS Commissioning/Annual Record Data Sheet Drawing # 80xxx.

II. Preparation:

1) On the Belfort AWOS Commissioning/Annual Record fill in the Date, Location, and Technician information.
2) Verify Serial Number and the valid Calibration Dates as required for all test equipment used. Complete the Calibration Date information on the Belfort AWOS Commissioning/Annual Record.
3) Connect the HP 8920B Communications Test Set to 120vac source and turn on. This instrument requires ½ hour warm up time before any measurement are taken. Plug the N male to BNC female adapter into the RF IN/OUT plug on the HP8920B. Plug one end of the 50-ohm cable into the adapter. Plug the other end of the 50-ohm cable onto the DCP antenna plug.
4) Configure the 8920B as follows:
   Press the TX button. The screen should read "TX Test" at the top. Change the fields using the round knob and set the fields to the following:

TX power Zero	Zero
TX power Meas	Peak
Input Port	RF in
IF Filter	15 kHz
Ex Tx Key	Off
AF Anl In	FM Demod

Filter 1	50 Hz HPF
Filter 2	15 KHz LPF
De-Emphass	750 MS
Detector	Peak + - Max
AFGen | Freq	1.0
AFGen | Lvl	50.0

5) Connect the Bird Digital Power meter as follows:
Connect the 9 pin male end of the D sub cable to the "Sensor" input on the Bird Digital Power Meter Model 5000EX. Connect the 9 pin female end of the D sub cable to the Bird Model 5010 Directional Power Sensor Module. Insure that the DPM-0.5E is installed in the "Reflected" socket of the Bird Model 5010 with the arrow pointing towards the other socket. Insure that the DPM-5E is installed in the "Forward" socket of the Bird Model 5010 with the arrow pointing towards the other socket.

6) Configure the Bird Digital Power meter as follows:
Press orange arrow key under "scale" on display.
Verify that the display is showing from the top " W 5 W"
If display does not show as described in 4a do the following:
Press orange arrow under "FWD Units" until display reads W
Press "5" on numeric keypad.
Press enter key
Press "esc" key.
Press orange arrow key under "FWD Units" until display reads "MW".
Press orange arrow key under "RF Units" until display reads "VSWR".

III. Tower Voltages Test:

1) Using the voltmeter, measure the following voltages and record the measurements:

a) AC Supply Voltage: Measure the AC Source Voltage on the AC Voltage connection terminals. The voltage should be between +112vac and +125vac. If the voltage is within range, record the voltage on the Commissioning / Annual Record Data Sheet and go to the next Test step. If the voltage is out of range, contact the facility representative and notify them of out of range AC power at the tower.

b) Visibility Sensor Power Supply voltage. Measure the Visibility Sensors Power Supply voltage on the Vis PS connection terminals. The voltage should be between +12 and +12.5vdc. If the voltage is within range, record the voltage on the Commissioning / Annual Record Data Sheet and go to the next Test step. If the voltage is out of range, use a screwdriver to adjust the voltage on the power supply adjustment mechanism. If the voltage will not adjust to within range, replace the power supply.

c) DCP/Obstruction Light Power Supply voltage. Measure the DCP/OBS Power Supply voltage on the DCP PS connection terminals. The voltage

should be between +13.5vdc and +14.0vdc. If the voltage is within range, record the voltage on the Commissioning / Annual Record Data Sheet and go to the next Test step. If the voltage is out of range, use a screwdriver to adjust the voltage on the power supply adjustment mechanism. If the voltage will not adjust to within range, replace the power supply.

d) Battery Supply voltage. Measure the Battery Supply voltage on the Battery connection terminals. The voltage should be between +12vdc and +13.8vdc. If the voltage is within range, record the voltage on the Commissioning / Annual Record Data Sheet and go to the next Test step.
If the voltage is below range, open the Battery Circuit Breaker. Measure the DCP Trickle Charge voltage level on the output side (not the input from the battery) of the circuit breaker. The voltage should be greater than >+12.2vdc. If voltage level is less than +12.2vdc then the trickle charger is faulty in the DCP, and will need to be replaced. If the voltage level is greater than +12.2vdc, then go to Test Step e.

e) Battery Fluid Levels. Verify the fluid levels in the 6 battery cells. If the fluid levels are correct, then record the information on the Commissioning / Annual Record Data Sheet and go to test Step f. If any of the levels are incorrect, add water to the cell to the required level. Record the information on the Commissioning / Annual Record Data Sheet and go to test Step f.

f) Close the Battery Circuit Breaker.

IV. Belfort AWOS DCP UHF Data Radio Accuracy Test:

1) Notify Regional OCC that system is being taken out of service if it is a commissioned system.

2) Lower the Tower. Remove the DCP cover. Record the serial number of the DCP Ritron Model DTX-454 RF Transceiver on the Commissioning / Annual Record Data Sheet.

3) Confirm that the HP8920B has been warming up for the minimum of ½ hour before use. Select the TX function and then FM Demodulation on the HP8920B front panel.

4) Connect the DCP to the PC console and open a DOS window. On the PC start the appropriate version of ACBSTXCOM program provided on the site notebook PC as follows: enter the DOS command "ACBSTXCOM comx" into the console starts the ACBSTXCOM program. (Comx is the number of the communications port that you use for serial communications.) Enter the "M" command at the "-" prompt. The "Enter Password" message will be displayed. Enter the "Password". Access will be granted to the built in hardware tests. This stops all RF transmission via the DCP RF transceiver.

5) Disconnect the DCP RF transceiver antenna coax cable at the transceiver. Connect the HP8920D RF input connector to the DCP RF transceiver with the 50 ohm coax cable.

6) Enter the command “B” space, “2” space, “1” space and return to tell the DCP to select RF frequency 467.850MHZ at 1W.

7) Enter a “K” command to start the DCP to transmitting a 1 Khz tone.

8) On the HP8920D, note the TX Frequency value and record it on the Commissioning / Annual Record Data Sheet as the DCP FCC Authorized Frequency value. Frequency will be 467.850 MHZ +-2 K hz. If the Frequency is out of range, then the Ritron RF Transceiver should be replaced.

9) On the HP8920D, note the TX Frequency Deviation value and record it on the Commissioning / Annual Record Data Sheet as the DCP Frequency Deviation value. Frequency Deviation should be 2.2 Khz +- .5 Khz. If the Frequency Deviation is out of range, then the Ritron RF Transceiver should be replaced.

10) On the HP8920D, note the measured RF power value. The RF power should be between .75 and 1.25w. If the value is in range, then record the value on the Commissioning / Annual Record Data Sheet. If the RF power is out of range, then the Ritron RF Transceiver should be replaced.

11) On the HP8920D, note the measured RF modulation value. The modulation value should be between 78 and 85 %. If the RF modulation is in range, then record the value on the Commissioning / Annual Record Data Sheet. If the RF modulation is out of range, then the Ritron RF Transceiver should be replaced.

12) Press any key on the PC keyboard to stop the “K” 1 Khz tone output.

13) Disconnect the HP8920D from the 50 ohm coax cable. Connect the coax cable to the Input connector of the Bird Model 5010 Directional Power Sensor. Connect the coax cable from the antenna to the Output connector on the Bird Model 5010. Connect the Bird Model 5010 Interface cable to the Bird Model 5000-EX. Power on the Bird Power Meter.

14) On the Bird Power Meter panel, select VSWR measurement.

15) On the PC, enter a “K” command to start the DCP to transmitting a 1 Khz tone.

16) On the Bird Power Meter, note the measured VSWR value. The VSWR should be <3.0:1. The optimal value is 1.0:1. If the VSWR is in range, then record the value on the Commissioning / Annual Record Data Sheet. If the VSWR is out of range, then the antenna cable should be inspected for damage or kinks, or the Ritron RF Transceiver should be replaced.

17) Press any key on the PC keyboard to stop the “K” 1 Khz tone output.

18) Enter the command “B” space, “3” space, “1” space and return to tell the DCP to select RF frequency 467.925 MHZ at 1W.

19) Enter a “K” command to start the DCP to transmitting a 1 Khz tone.

20) On the HP8920D, note the TX Frequency value and record it on the Commissioning / Annual Record Data Sheet as the DCP FCC Authorized Frequency value. Frequency will be 467.925 MHZ +-2 K hz. If the Frequency is out of range, then the Ritron RF Transceiver should be replaced.

21) On the HP8920D, note the TX Frequency Deviation value and record it on the Commissioning / Annual Record Data Sheet as the DCP Frequency Deviation value. Frequency Deviation should be 2.2 Khz +- .5 Khz. If the Frequency Deviation is out of range, then the Ritron RF Transceiver should be replaced.

22) On the HP8920D, note the measured RF power value. The RF power should be between .75 and 1w. If the value is in range, then record the value on the Commissioning / Annual Record Data Sheet. If the RF power is out of range, then the Ritron RF Transceiver should be replaced.

23) On the HP8920D, note the measured RF modulation value. The modulation value should be between 78 and 85 %. If the RF modulation is in range, then record the value on the Commissioning / Annual Record Data Sheet. If the RF modulation is out of range, then the Ritron RF Transceiver should be replaced.

24) Press any key on the PC keyboard to stop the “K” 1 Khz tone output.

25) Disconnect the HP8920D from the 50 ohm coax cable. Connect the coax cable to the Input connector of the Bird Model 5010 Directional Power Sensor. Connect the coax cable from the antenna to the Output connector on the Bird Model 5010. Connect the Bird Model 5010 Interface cable to the Bird Model 5000-EX. Power on the Bird Power Meter.

26) On the Bird Power Meter panel, select VSWR measurement.

27) On the PC, enter a “K” command to start the DCP to transmitting a 1 Khz tone.

28) On the Bird Power Meter, note the measured VSWR value. The VSWR should be <3.0:1. The optimal value is 1.0:1. If the VSWR is in range, then record the value on the Commissioning / Annual Record Data Sheet. If the VSWR is out of range, then the antenna cable should be inspected for damage or kinks, or the Ritron RF Transceiver should be replaced.

29) Press any key on the PC keyboard to stop the “K” 1 Khz tone output.

30) Disconnect the Bird Model 5010 Directional Power Sensor from the antenna and DCP coax cables. Reconnect the DCP antenna cable back to the Ritron Transceiver. Replace the cover on the DCP enclosure.

31) Raise the tower. In the power enclosure, momentary turn off the AC and battery breakers at the same time. Wait 5 seconds and then turn both breakers back on. This resets the DCP electronics back to normal operational state.

V. Belfort AWOS VHF Radio Accuracy Test:

1) Notify Regional OCC that the system is being taken out of service if it is a commissioned system.

2) Power off the VHF Unicom radio to be verified. Record the serial number of the Unicom radio on the Commissioning / Annual Record Data Sheet.

3) Confirm that the HP8920B has been warming up for the minimum of ½ hour before use. Select the TX function and then AM Demodulation on the HP8920B front panel.

4) Disconnect the antenna coax cable from the inline RF attenuator if present. Connect the HP8920D RF input connector to the inline RF attenuator with the 50 ohm coax cable or to the radio output connector if no attenuator is present.

5) Connect a mic to the radio if one is not normally connected. Power up the Unicom radio.

6) Press the mic talk button on the handset of the radio.

7) On the HP8920D, note the TX Frequency value and record it on the Commissioning / Annual Record Data Sheet as the Unicom FCC Authorized Frequency value. If the Frequency is not the authorized frequency, change the frequency to the authorized value and make note of the change. Then contact the facility representative and notify them of the correction made to the Unicom authorized frequency.

8) On the HP8920D, note the TX Frequency Deviation value and record it on the Commissioning / Annual Record Data Sheet as the Unicom Frequency Deviation value. Frequency Deviation should be +-1 Khz. If the Frequency Deviation is out of range, then the Unicom radio should be replaced.

9) With the mic talk button pressed, on the HP8920D note the TX RF Power value. The Value should be 2.5 watts +- .25 w. If the measured value is within range, record it on the Commissioning / Annual Record Data Sheet as the Unicom RF Output Power value. If the Unicom RF power is out of range, then first verify the 25w 6db attenuator is properly installed on the Unicom radio RF output connector. Else the radio is suspect bad and should be replaced.

10) On the FBO PC connected to the radio, initiate the 1 khz tone output on the audio output lines as follows:

a) On PC navigate to: c:\Belfort AWOS folder;
b) Double click on: "1khz.wav";

c) The 1 KHz tone will start to play.

11) On the HP8920D, note the measured RF demodulation value. The value should be between 65 and 95%. If the RF demodulation value is in range, then record the value on the Commissioning / Annual Record Data Sheet. If the RF demodulation is out of range, then the Unicom Radio should be replaced.

12) Stop the "K" 1 Khz tone output to the Unicom radio by clicking the red X in upper right corner of window.

13) Disconnect the HP8920D from the 50 ohm coax cable. Connect the coax cable to the Input connector of the Bird Model 5010 Directional Power Sensor. Connect the coax cable from the antenna to the Output connector on the Bird Model 5010. Connect the Bird Model 5010 Interface cable to the Bird Model 5000-EX. Power on the Bird Power Meter.

14) On the Bird Power Meter panel, select VSWR measurement.

15) On the FBO PC connected to the radio, initiate the 1 khz tone output on the audio output lines as follows:

a) On PC navigate to: c:\Belfort AWOS folder;
b) Double click on: "1khz.wav";
c) The 1 KHz tone will start to play.

16) On the Bird Power Meter, note the measured VSWR value. The VSWR should be <3.0:1. The optimal value is 1.0:1. If the VSWR is in range, then record the value on the Commissioning / Annual Record Data Sheet. If the VSWR is out of range, then the antenna cable should be inspected for damage or kinks, the 25w 6db attenuator should be checked that it is properly installed on the Unicom radio RF output connector or the Unicom Radio should be replaced.

17) Stop the "K" 1 Khz tone output to the Unicom radio by clicking the red X in upper right corner of window.

18) Power off the Unicom radio.

19) Disconnect the Bird Model 5010 Directional Power Sensor from the antenna and Unicom radio's attenuator. Reconnect the antenna cable back to the attenuator connected to the Unicom Radio.

20) Power on the Unicom radio.

Belfort AWOS Commissioning / Annual Inspection Record Data Sheet

Version- Feb 2014

Date: ____/____/_____

Location: _____

Technician: _____

Pressure Standard SN_____ Cal Date_____

HP 8920B Comm. Test Set Cal Data _____

Bird DPM-50C 400 – 960 MHZ Elements Cal Date_____

Bird DPM-50C 100 – 250 MHZ Elements Cal Date_____

Tower Power Checks:

1. **AC Power voltage: _____Vac (+112 to 120vac)**
2. **Visibility Sensor Power Supply voltage: _____Vdc (+12 to +12.5vdc)**
3. **DCP/OBS Power Supply voltage: _____Vdc (+14v + -.2 vdc)**
4. **Battery voltage: _____Vdc (+12 to 13.8 vdc)**
5. **Check 6 battery cells water levels: _____**

Barometer Checks:

1. **Portable Pressure Standard:_____**
2. **Pressure Sensor #1:_____**
3. **Pressure Sensor #2:_____**

Visibility Sensor:

1. **Calibration Scatter Plate Ext_Co:_____**
2. **Sensor Min:_____**
3. **Sensor Ext_Co:_____**
4. **Sensor Max:_____**

Belfort AWOS UHF Data Radio Accuracy Checklist:

1. **DCP Radio Serial Number:_____**
2. **DCP FCC Authorized Frequency: _____(467.850 MHZ)**
3. **DCP Freq. Deviation: _____ (2.2 KHZ2+-0.5 KHZ)**
4. **DCP RF Output Power: _____Watts (.75 to 1.25 watts)**
5. **DCP RF Modulation: _____% (78 to 82%)**
6. **DCP VSWR: _____ (< 3.0:1)**

7. **DCP FCC Authorized Frequency: _____(467.925 MHZ)**
8. **DCP Freq. Deviation: _____ (2.2 KHZ +-0.5 KHZ)**
9. **DCP RF Output Power: _____Watts (.75 to 1.25 watts)**
10. **DCP RF Modulation: _____% (78 to 82%)**
11. **DCP VSWR: _____ (< 3.0:1)**

UNICOM VHF Radio Accuracy Checklist:

1. **UNICOM Radio Serial Number:_____**
2. **Unicom FCC Authorized Frequency: _____MHZ**
3. **Unicom Freq. Deviation: _____ (+- 1 khz):**
4. **Unicom RF Output Power: _____Watts (2.5 watts +- ½ watt)**
5. **Unicom AM Demodulation: _____% (65 to 95%)**
6. **Unicom VSWR: _____ (< 3.0:1)**

Appendix F

DCP Site Configuration Procedure

DCP Site Configuration Procedure:

The DCP must be configured with the specific information for the destination airport. Access the WEB site WWW.airnav.com and enter the specific airport designator for the destination airport. Print the complete package of information for the airport. When the configuration is completed, staple the complete Air Nav Document to the Comprehensive Facility Performance and Adjustment Form.

1. In the DCP Power Enclosure, turn off AC power by turning off circuit breaker 1.

2. In the DCP Power Enclosure, turn off DC power by turning off circuit breaker 2.

3. Lower the tower to gain access to the bad DCP.

4. Remove the four mounting screws holding the Bad DCP to the tower.

5. Disconnect all cable connectors from the unit. Note the locations of the cable connectors when connected to the DCP.

6. Connect the cables to the new DCP.

7. Re-install the four mounting screws to hold the new DCP to the tower.

8. Connect the PC to the DCP cable dongle in the DCP Power Enclosure.

9. On the PC, open a DOS window and browse to the TXCOM program for the version of DCP program in the UUT. Start the TXCOM program as follows:

   Enter "acbstxcom108A comx"<cr>.

   Acbstxcom108A is the revision for DCP's with firmware code version 1.05D, and comx (com1-com8) is the serial port as configured on the PC to be used for testing.

10. The TXCOM program will respond with a hyphen ("-") prompt.

11. In the DCP Power Enclosure, turn ON AC power by turning on circuit breaker 1.

12. Immediately enter on the PC, the monitor command by entering "m" <cr>.

13. If the unit responds with an "Enter Password" message, enter the default password "XXXXXXXXX", <cr>.

14. The program will respond with the name and version of the main board program loaded in the U.U.T. The format for the firmware revision is "Belfort AWOS ACBS 1.05D (02/11/08). The "1.05D" is the code revision and the "02/11/08" is the firmware creation date. Verify that the code version is the correct version for the UUT by comparing the version number with the version in the products Software Firmware Archive Released folder. If firmware is not correct, return the unit to the Belfort Factory for code upgrade.

15. Enter a "v" command followed by a <cr>. The program will respond with the name and version of the sensor board program loaded in the DCP. The format for the firmware revision is "Belfort AWOS CBS 1.01 (02/11/08). The "1.01" is the code revision and the "02/11/08" is the firmware creation date. Verify that the code version is the correct version for the UUT.

16. To configure the DCP, enter the command "c" <cr>.

17. To enter the "Configuration Data", press the backspace key until the field is blank. Enter the date the DCP was configured as follows: Year, month, and day in the following format "xxxx-xx-xx". Press <cr>. Enter a Configuration Date on the Comprehensive Facility Performance and Adjustment Form.

18. To enter the "Latitude" information, press the backspace key until the field is blank. Enter the Latitude information from the AIRNAV and Customer Site Survey documentation. Press <cr>. Enter the Latitude on the Comprehensive Facility Performance and Adjustment Form.

19. To enter the "Longitude" information, press the backspace key until the field is blank. Enter the Longitude information from the AIRNAV and Customer Site Survey documentation. Press <cr>. Enter the Longitude on the Comprehensive Facility Performance and Adjustment Form.

20. To enter the "Optional ID", press the backspace key until the field is blank. Enter the maximum 4 character desired airport designator followed by <cr>. This may be defined by the customer. Enter the Optional ID the Comprehensive Facility Performance and Adjustment Form.

21. To enter the "Runways", press the backspace key until the field is blank. Enter the desired airport runways separated by a space character, from the AirNav document. Press <cr>. Enter the Runways on the Comprehensive Facility Performance and Adjustment Form.

22. To enter the "Sensor Elevation", press the backspace key until the field is blank. Enter the elevation value. This value will need to be supplied by the customer from their Site Survey document and add the additional height of the sensors on the tower supplied with the system. Press <cr>. Enter the Sensor Elevation on the Comprehensive Facility Performance and Adjustment Form.

23. To enter the "Field Elevation", press the backspace key until the field is blank. Enter the elevation value. This value may need to be supplied by the customer or use the AirNav

and Customer Site Survey document. Press <cr>. Enter the Field Elevation on the Comprehensive Facility Performance and Adjustment Form.

24. To enter the "Magnetic Variation", press the backspace key until the field is blank. Enter the Magnetic Variation. This value may need to be supplied by the customer or use the AirNav document. Press <cr>. Enter the Magnetic Variation on the Comprehensive Facility Performance and Adjustment Form.

25. To enter the "FBO Name", press the backspace key until the field is blank. Enter the FBO name. This value may need to be supplied by the customer or use the AirNav document. Press <cr>. Enter the FBO Name on the Comprehensive Facility Performance and Adjustment Form.

26. To enter the "FBO/Unicom Frequency", press the backspace key until the field is blank. Enter the Frequency value. This value may need to be supplied by the customer or use the AirNav document. Press <cr>. Enter the FBO/Unicom Frequency on the Comprehensive Facility Performance and Adjustment Form.

27. To enter the "Site Password", press the backspace key until the field is blank. Enter the Password value. Press <cr>. Enter the Site Password on the Comprehensive Facility Performance and Adjustment Form.

28. Press "enter" and verify the Transmitter Data information is displayed as follows:

    Transmitter Data:

    UHF PriTx Frequency : Frequency is not changeable.
    UHF SecTx Frequency : Frequency is not changeable
    TX Power: H

29. To enter the "TX Power", press the backspace key until the field is blank. The standard TX Power value is "H". Press <cr>. Enter the TX Power on the Comprehensive Facility Performance and Adjustment Form.

30. Press "enter" until the Visibility Sensor Data field is displayed as follows:

    VIS Sensor Data:
    Vis Sensor Type = 6000

31. To enter the "Visibility Sensor Type", press the backspace key until the field is blank. Enter the model number supplied with the system or the word "none" if no Visibility Sensor supplied. The standard Visibility Sensor Model number is "6000". Press <cr>. Enter the Visibility Sensor Type on the Comprehensive Facility Performance and Adjustment Form.

32. To enter the "Visibility Sensor Baud Rate", press the backspace key until the field is blank. For the standard Visibility Sensor Model "6000", the standard Baud Rate is "9600". Enter the Baud Rate value. Press <cr>. Enter the Visibility Sensor Baud Rate on the Comprehensive Facility Performance and Adjustment Form.

33. If prompted, enter default password "XXXXXXXX" to save new values to EEprom. Enter a Pass or Fail result on the Comprehensive Facility Performance and Adjustment Form.

34. When the configuration is completed, staple the complete AirNav Document and a copy of the customer airport site survey to the Comprehensive Facility Performance and Adjustment Record.

35. Confirm that the six DCP enclosure cover screws are fully tight.

36. On the Belfort AWOS Handheld Receiver or the Belfort AWOS FBO DATU unit, monitor telemetry from the tower and verify all expected telemetry is present. If any telemetry value does not appear on the Handheld or the FBO PC, then trouble shoot the system and repair as required.

37. Raise the tower to its upright position.

38. In the DCP Power Enclosure, turn ON Battery DC power by turning on circuit breaker 2.

39. If the installation has a VHF radio option, use an airport supplied VHF radio or a hand held VHF radio, click the mick the set number of times to initiate the VHF broadcast. Listen to the full message and confirm that the telemetry matches the data on the HHDU or on the Advisor screen on the DATU.

    If the system if an endless loop broadcast system, use the airport supplied VHF radio or a hand held VHF radio, set to the broadcast discrete frequency. Listen to the full message and confirm that the telemetry matches the data on the HHDU or on the Advisor screen on the DATU.

    If telemetry broadcasted does not match the data on the HHDU or on the Advisor screen, then trouble shoot the system and repair as required.

40. If the installation has a Phone option, using an airport public phone or a cell phone, call the system on the user supplied telephone number. Listen to the full message and confirm that the telemetry matches the data on the HHDU or on the Advisor screen on the DATU.

    If telemetry broadcasted does not match the data on the HHDU or on the Advisor screen, then trouble shoot the system and repair as required.

Appendix G

Belfort AWOS Atomic Clock

Verification Procedure

Belfort AWOS Atomic Clock Verification Procedure

06/01/2014

The Belfort AWOS Atomic Clock can be tested, configured and verified using the following procedure.

Units are typically not shipped with batteries installed. The unit uses 3 AAA batteries. Do not use rechargeable batteries is this unit.

The unit can be connected to the PC using a USB cable. When connected with the PC, a 7vdc wall pack is also required and supplied.

1. The cable to the PC and the optional wall pack power supply disconnected, remove the top 4 cover screws. Open the cover.

2. If the batteries are not installed, install 3 AAA batteries. Verify the correct battery polarity during their installation.

3. Re-install the cover with 4 cover screws.

4. Connect the USB cable from the PC to the Unit Under Test (UUT).

5. Connect the unit to the PC with its USB cable and wall pack power supply.

6. On the PC, start Hyper-terminal (HT) at 9600, 8, N, 1, no handshaking. In HT select the PC USB Com port that the Atomic Clock is connected to.

7. In HT, enter the command RN followed by the enter key.

8. The unit should respond with the unit serial number in the following message format. Verify that the serial number is correct. If not correct, contact the Belfort Service Tech or Belfort Factory for directions. If the serial number is received, this means that communications with the unit is good and the unit is working.

    1. N 102

9. In HT, enter the command RB followed by the enter key. The unit should respond with the battery voltage in the following message format:

    1. B 4.84

10. The battery voltage can range from 3.5 Vdc to 4.8 Vdc. If the battery voltage is at or below 3.5v, disconnect the unit from the PC and replace the 3 AAA batteries with others of the same type. Reconnect the unit to the PC with power and repeat the RB command.

11. In HT, enter the command RT followed by the enter key. The unit should respond with the local time in the following message format:

    i. T 01/29/2013-13:41:59

    b. ***If the UUT has never been connected to the Belfort AWOS Application, the local time will not be correct. The Belfort AWOS Application will automatically load locate time into the unit.

12. If desired, the correct local time can be entered by using the following command format followed by the enter key.

    i. WTMM:DD:YYYY:hh:mm:ss

    ii. WT = write time command;
    iii. MM = 2 digit month, DD = 2 digit day of month, YYYY = 4 digit year;
    iv. hh = hour of the day, mm = minutes past the hour, ss = seconds;

    b. The unit will respond 'OK' if values are stored in clock.
    c. If a date and time is with out of range values, the unit will report FAIL.
    d. If the unit responds with 'FAIL', repeat the command entry. If still reporting FAIL, contact the Belfort Service Tech or factory for instructions.

13. In HT, enter the command RT followed by the enter key. The unit should now respond with the correct local time in the following message format.

    i. T 01/29/2013-13:41:59

14. If the unit still reports the wrong local time, contact the Belfort Service Tech or factory for instructions.

15. If the unit has been powered and previously connected to the PC with the Belfort AWOS Application operational for a test period, enter the command RS followed by the enter key. The unit should now respond with the time of the last synchronization message received from WWVB Time Source.

    i. S 01/29/2013-12:51:59

16. If the unit has passed all of the above test samples, the unit is function as required. If any test results differ from the above examples, contact the Belfort Service Tech or the Belfort Factory for instructions.

17. Verify that the PC clock has the correct local date and time.

18. If performing the Annual Maintenance Procedure, update the Annual Configuration Validation Technical Performance and Maintenance Record with the results of the verification test.