

BELFORT INSTRUMENT Co.

800-937-2353 www.DIGIWX.com

DigiWx[®]

Automated Weather
Observing System
AWOS

Maintenance Manual

Proprietary

Prepared in Response
to

FAA, Automated Weather Observing System (AWOS)
Requirements

July 2011

Table of Contents

Maintenance Manual

<u>Paragraph</u>	<u>Description</u>	<u>Page</u>
1.0	Introduction.....	1
1.1	Purpose.....	1
1.2	Scope.....	1
1.3	Level of Maintenance	1
1.4	Periodic Maintenance	1
1.5	Warranty	1
1.6	Warranty Support.....	1
2.0	Applicable Documents & List of Acronyms	2
2.1	Applicable Documents.....	2
2.2	List of Acronyms	2
3.0	Maintenance Program Overview	4
4.0	Qualification Requirements for Maintenance Personnel	5
5.0	Preventative Maintenance and Calibration Procedures	5
5.1	DATU Maintenance.....	5
5.1.1	DATU Tri-Annual Maintenance.....	5
5.1.2	DATU Annual Maintenance.....	7
5.2	DCP and Barometric Pressure Sensor Maintenance and Calibration	8
5.3	Temperature / Dew Point Maintenance and Verification	13
5.4	6000 Visibility Sensor Maintenance Verification and Calibration Procedures	14
5.5	Wind Speed Sensor Verification Procedure	18
5.6	Wind Direction Sensor Tri-annual Maintenance	19
5.7	Lightning Protection and Tower Maintenance	22
5.8	The 464 MHz UHF Transceiver and Annual Maintenance.....	23
5.9	The VHF Unicom Radio and Annual Maintenance.....	23
6.0	Troubleshooting the System	25
6.1	System Built-In Diagnostics and Troubleshooting	25
6.2	Interpreting Diagnostic Messages:.....	27
6.2.1	Interpreting System Status Messages:	27
6.2.2	Interpreting Sensor Status Messages:	30
6.2.3	Interpreting Data Quality Error Messages:.....	33
7.0	Tools and Test Equipment Required	38
8.0	Key System Parameters and Expected Outputs	39
9.0	Maintenance Data Recording and Forms.....	39
9.1	Facility Performances and Adjustment Data Form.....	39
9.2	Technical Performance Record.....	39
9.3	FAA Form 6030-1.....	39
10.0	Component Removal and Replacement Procedures	40
10.1	DCP Removal Procedures.....	40
10.2	Temperature, Humidity Dew Point Sensor Removal Procedures.....	42
10.3	6000 Visibility Sensor Removal Procedures	44

10.4	Wind Speed Sensor Removal Instructions.....	46
10.5	Wind Direction Sensor Removal Instructions	48
11.0	Recommended Spare Parts	50
12.0	Customer Product Support and Website Assistance.....	50

Tables

Table 1	DigiWx® Alert Messages.....	8
Table 2	Recommended Spare Components	50
Table 3	Recommended Spare Hardware	50

Figures & Illustrations

Figure 1	Typical Display Acquisition Terminal Unit Setup	4
Figure 1a	System Status Page	6
Figure 2	Typical DigiWx Tower Equipment Mounting Locations.....	9
Figure 2a	Securing the Tower for Maintenance.....	10
Figure 3a	Scatter Plate Attachment Detail.....	15
Figure 3b	Tower With Visibility Scatter Plate Attached	15
Figure 3c	Installation of Opaque Filters on Transmitter Hood.....	16
Figure 4	Wind Direction Vane Alignment.....	20
Figure 5	DCP Removal	41
Figure 6	Temperature/Humidity Sensor Removal	43
Figure 7	Visibility Sensor Removal.....	45
Figure 8	Wind Speed Sensor Removal.....	47
Figure 9	Wind Direction Sensor Removal	49

Appendix A	DigiWx® Maintenance Forms
Appendix B	DigiWx® Annual and Five-Year Maintenance Plan
Appendix C	464 MHz UHF Transceiver Specifications
Appendix D	Standard Unicom Radio-ICOM A100 VHF Radio Specifications
Appendix E	DigiWx Commissioning / Annual Inspection Procedure & Data Record
Appendix F	DCP Site Configuration Procedure

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 DigiWx® AWOS system.

1.2 SCOPE – This manual has been developed in accordance with the guidance and requirements described in FAA Advisory Circular, AC No: 150/5220-16C and other referenced documents. This manual is intended to provide the owner and maintenance technician with proper maintenance procedures applicable to all FAA approved DigiWx® 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 – 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 DigiWx®™ system is provided with a one-year warranty. The warranty period starts with the date of delivery from the factory. The dual-pressure sensor and visibility sensor have been manufactured and will perform in accordance with requirements of the FAA AC 150/5220-16. Any defect in design, materials, or workmanship which may occur during proper and normal use during a period of 1 year from date shipment will be corrected by repair or replacement by the manufacturer FOB Belfort.. An extended warranty may have been purchased. Maintenance personnel should check with the system owner to determine if an extended warranty 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 DigiWx®™ 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. DigiWx® AWOS system to comply with applicable sections of the following documents:

FAA AC No: 150/5220-16C	Automated Weather Observing Systems (AWOS) For Non-Federal Applications
FAA Order 6700.20A	Non-Federal Navigational Aids and Air Traffic Control Facilities
FAA Order 6560.13B	Maintenance of Aviation Meteorological Systems and Miscellaneous Aids
FAA Form 6030-1	Facility Maintenance Log

2.2 LIST OF ACRONYMS

AC	Alternating Current
AVG	Average
ALS	Ambient Light Semsor
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
ELDF	Endless Loop Dedicated 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
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 (DigiWx® Configuration Baseline Document)
VDU	Video Display Unit
VHF	Very High Frequency
VS	Visibility Sensor

3.0 MAINTENANCE PROGRAM OVERVIEW

DigiWx® maintenance consists of preventive and corrective maintenance activities. Preventive maintenance consists of tri-annual and annual maintenance tasks required to keep the DigiWx® system in peak operational condition. Corrective maintenance utilizes the Built-In Test (BIT) features of the DigiWx® software to identify system faults and minimize troubleshooting activities. For sensor removal instructions and procedures refer to section 7.0 of this manual. Refer to the DigiWx® 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 DigiWx® 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 have the special knowledge and skills needed to install and maintain a DigiWx® AWOS facility. These skills can be obtained by completing the Belfort Instrument “DigiWx® Installation and Maintenance Training Program” course and successfully passing the required performance examination. Technicians performing maintenance or adjustments on system radio communication equipment must also have a FCC general radio/telephone operator license. The owner of the DigiWx® 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 Instrument DigiWx® program manager at 1-800-937-2353 to schedule this training. In addition, the FAA will give a practical exam to any DigiWx technician to assure the technician is qualified to perform system maintenance.

5.0 PREVENTATIVE MAINTENANCE AND CALIBRATION PROCEDURES – Scheduled DigiWx® preventive maintenance tasks and sensor calibration/verifications are performed tri-annually and annually as detailed in Appendix B. As a standard practice, whenever maintenance personnel visit the outdoors DigiWx site location, regardless whether the visit is scheduled or unscheduled, a general walk-around inspection of the DigiWx 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. If the visit is made at night, verify that 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. 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.

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

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 repairable item. Therefore, if the fan is

not operating or is making unusual noise, contact Belfort to arrange for computer replacement or repair.

4. The DigiWx® Tower transmits system status, sensor status and data quality status along with weather data. DigiWx® Advisor software captures this data 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 DigiWx® Advisor Status Log and to the DigiWx® Advisor Current Status Page.

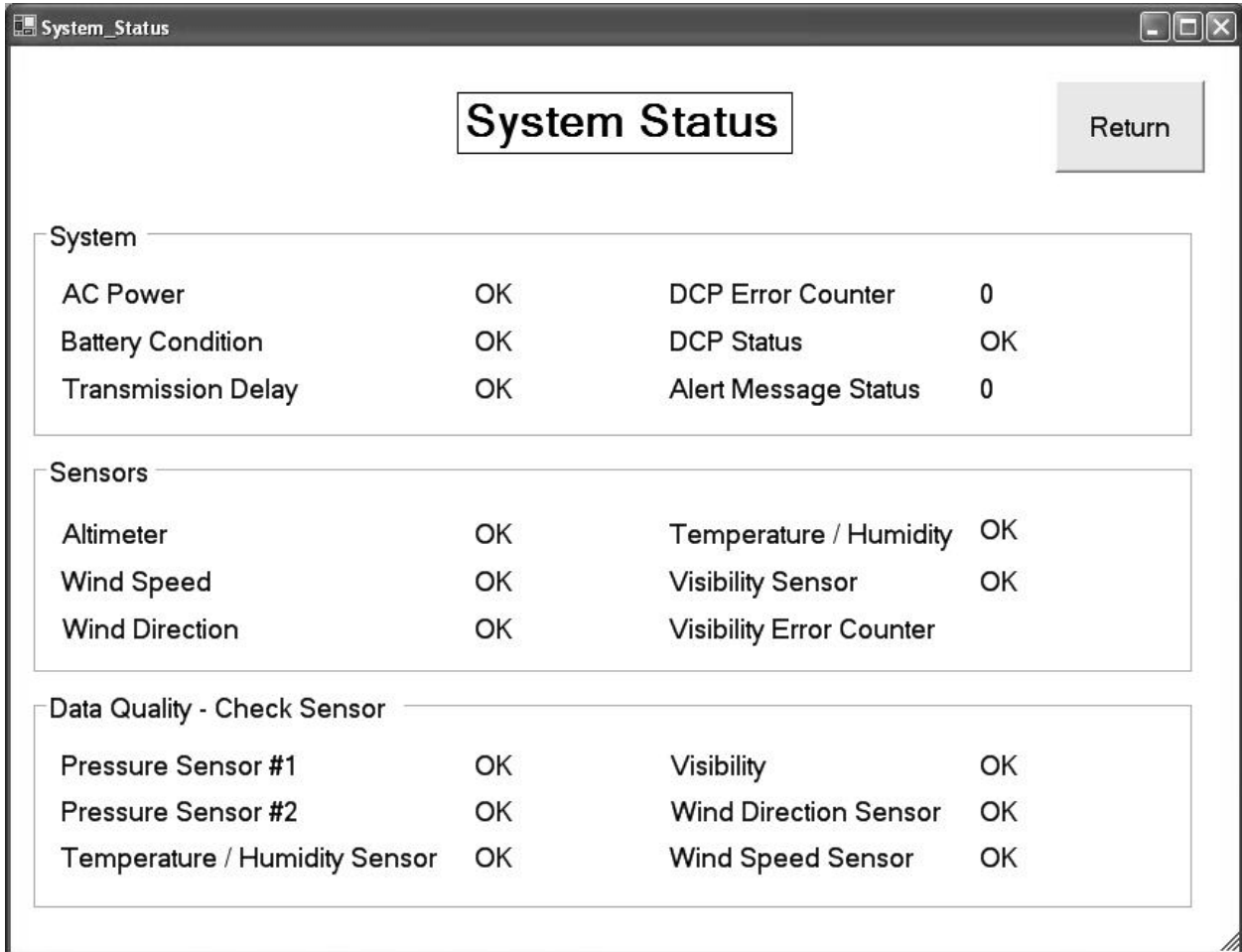


Figure 1a
System Status Page

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. View the Status Pages past history by selecting Status Pages from the History menu entry on the DigiWx® Advisor main menu. Refer to the DigiWx® "Operator Instruction Manual" for complete user instructions for operating the DigiWx® Advisor software.

5. Document any error flags on the Tri-annual or Annual "Facility Performance and Adjustment" data form.
6. Check the DigiWx® Advisor Status Log Page for any past or recurrent problems that have not been addressed as current.

7. 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 defragmenting the DATU computer hard drive and verification of the installed DigiWx® software configuration.

Follow the steps below to defragment the computer hard drive:

1. Click on the “Start” button
2. Click on “My Computer”
3. Right click on “Local Disk, “C:”
4. Select “Properties”
5. Select the “Tools: tab
6. Click on the “Defragment Now” button
7. Note the “% Free Space”
If “% Free Space is less than 15%,” notify Belfort Instrument Company
8. Click the “Defragment” button
9. Once the defragmenting process is complete you may exit all windows opened in the above listed steps.

Follow the steps below to check the version status of the installed DigiWx® software:

1. DigiWx® Advisor:
 - a) Select "Help" from the DigiWx® Advisor Menu
 - b) Select "About" from the submenu
 - c) The version number is located on the bottom of the window
2. DigiWx® Phone:
 - a) Right click on the DigiWx® 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
3. DigiWx® Voice:
 - a) Select "Help" from the DigiWx® Voice main menu
 - b) Select "About DigiWx® Voice" from the submenu
 - c) The version number is located at the top of the window

5.2 DCP – Annual Barometric Pressure Maintenance & Calibration

SAFETY PRECAUTIONS

1. Do not perform DigiWx® 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. Paro-scientific model 760-16 portable pressure standard with current NIST traceable certification.
2. Notebook computer running ASOSDCP102 and RS232 cable
3. DigiWx® 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 DigiWx system is being serviced, prior to beginning this maintenance tasks. The NOTAM to be issued is "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6.
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).

DigiWx® 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. DigiWx® AWOS being serviced. Do not use readings.
7. DigiWx® AWOS not maintained. Do not use readings.
8. Private DigiWx® AWOS weather station. Do not use.
9. Landing area warning
0. No Alerts

Table 1.

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 DigiWx® tower. Figure 2.a illustrates the height locations where the various DigiWx sensors and other system components are located on the tower. Figure 2.b illustrates the tower as typically secured for maintenance.

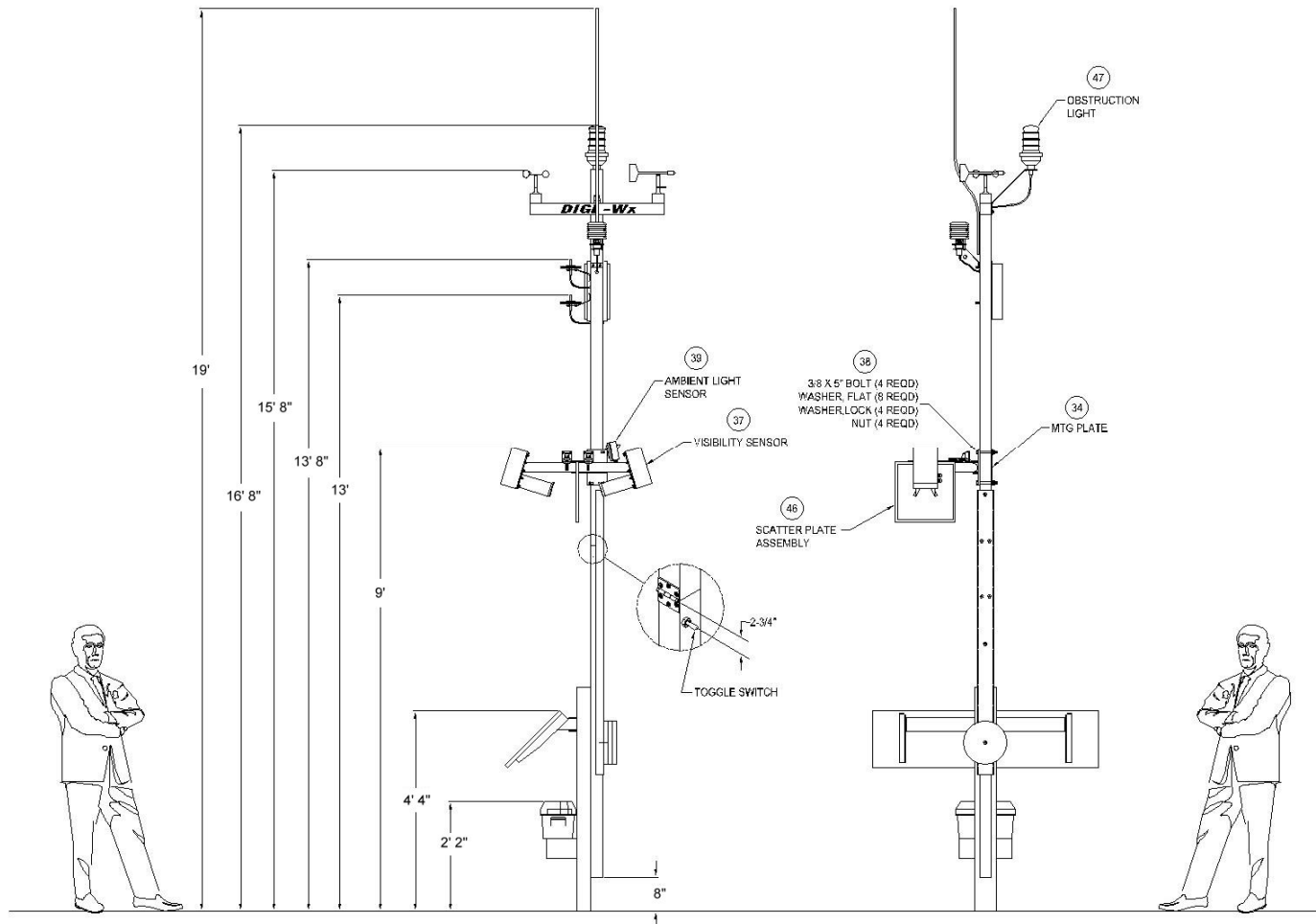


Figure 2.
 Typical DigiWx Tower Equipment Mounting Locations

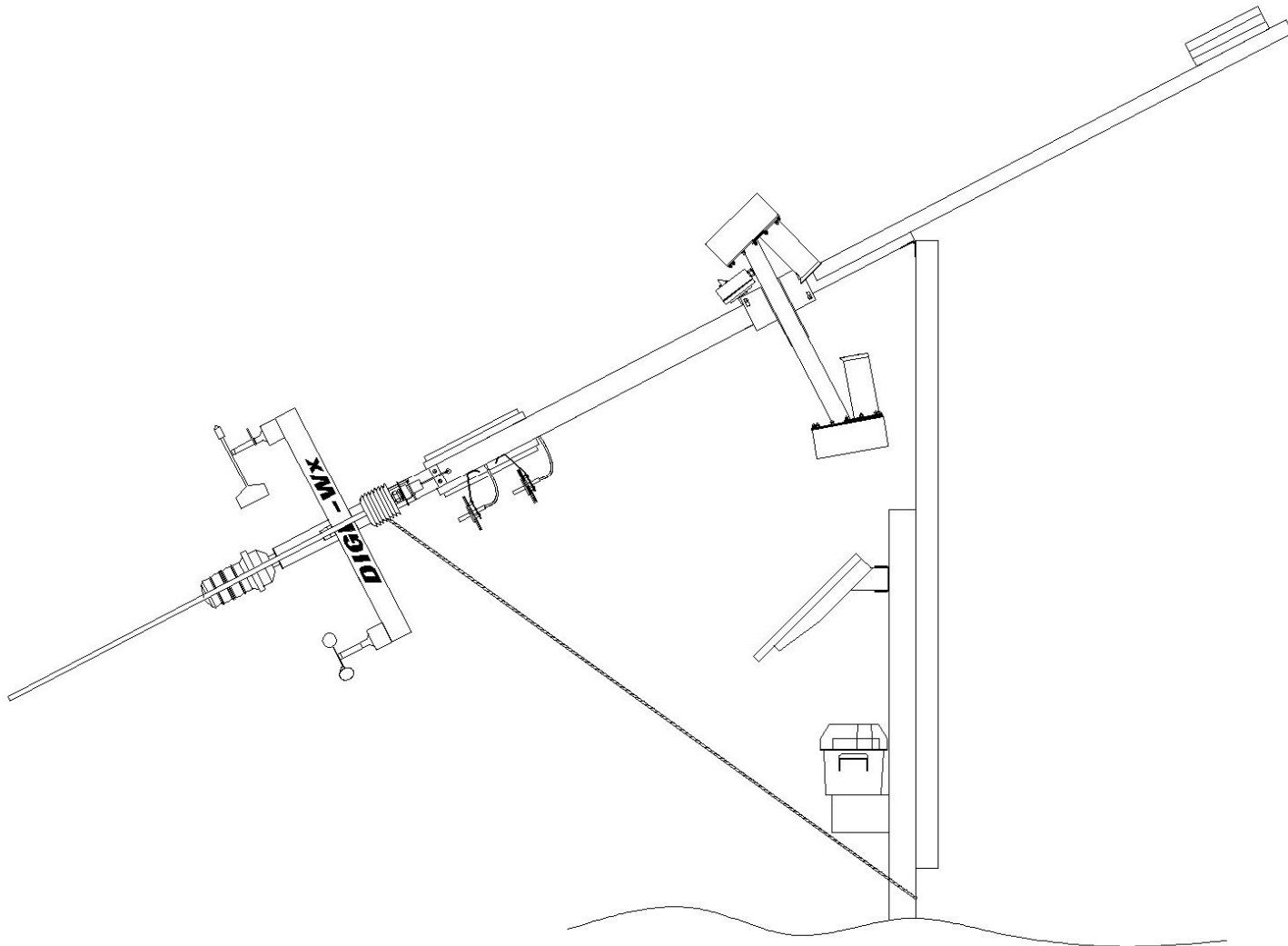


Figure 2.a Securing the Tower for Maintenance

4. Power on the DigiWx® AWOS hand held display. The word “ALERT” should be displayed across the HHDU runway display. Push the “PAGE” button and the message “DigiWx® 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. You will need to toggle the tower switch an appropriate number of times until the “DigiWx® 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 ASOSDCP102 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 ASOSDCP102 program. After 10 seconds, turn the AC circuit breaker in the DigiWx® power box off and then on again to force a reset. Immediately type “m” <enter> to put the DCP in monitor mode.
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 0.10 in Hg, it indicates that the sensor is not suitable for calibration. Replace the DCP before continuing further with this procedure. **DO NOT ATTEMPT TO CALIBRATE A PRESSURE SENSOR THAT DIFFERS FROM THE STANDARD BY MORE THAN 0.10 in Hg.**
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, 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” 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. At the end of the routine, press the “esc” key to return to the main configuration menu.
12. 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. repeat step 11.
13. Type “c” and enter the new date of calibration, then type “cr”.

14. Press the “Esc” key. This will cause the data to be saved in the EEPROM.
15. Exit ASOSDCP102 by typing “x” then press <enter>.
16. Reattach the DCP to the tower with the 4 screws removed in step 11 above.
17. 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. .
18. Remove and reapply power to the DCP to restore normal operation.
19. 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.
20. Observe system output and verify that the system is reporting data as expected.
21. Switch the DC circuit breaker back on if battery backup is present.
22. 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.
23. 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.

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

SAFETY PRECAUTIONS

1. Do not perform DigiWx® 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
2. DigiWx® AWOS hand held display

The Temperature and Dew Point Verification Test is a confidence test, which verifies that the DigiWx® 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 DigiWx® tower, facing into the wind. Observe the DigiWx® 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 DigiWx® 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.

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

SAFETY PRECAUTIONS

1. Do not perform DigiWx® 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 DigiWx system is being serviced prior to beginning this maintenance tasks. The NOTAM to be issued is "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 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 "DigiWx® 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 center of each hood, within $\pm\frac{1}{4}$ 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.

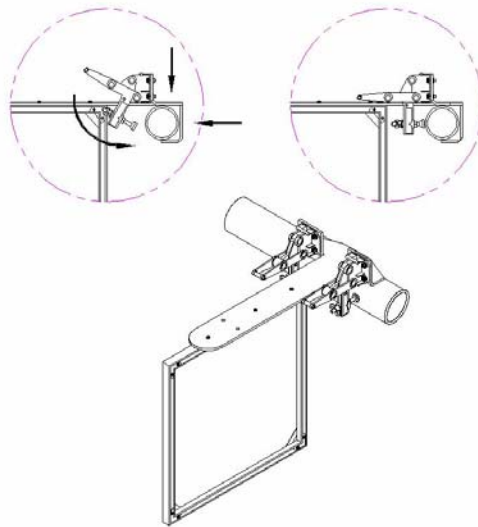


Figure 3.a
Scatter Plate Attachment Detail

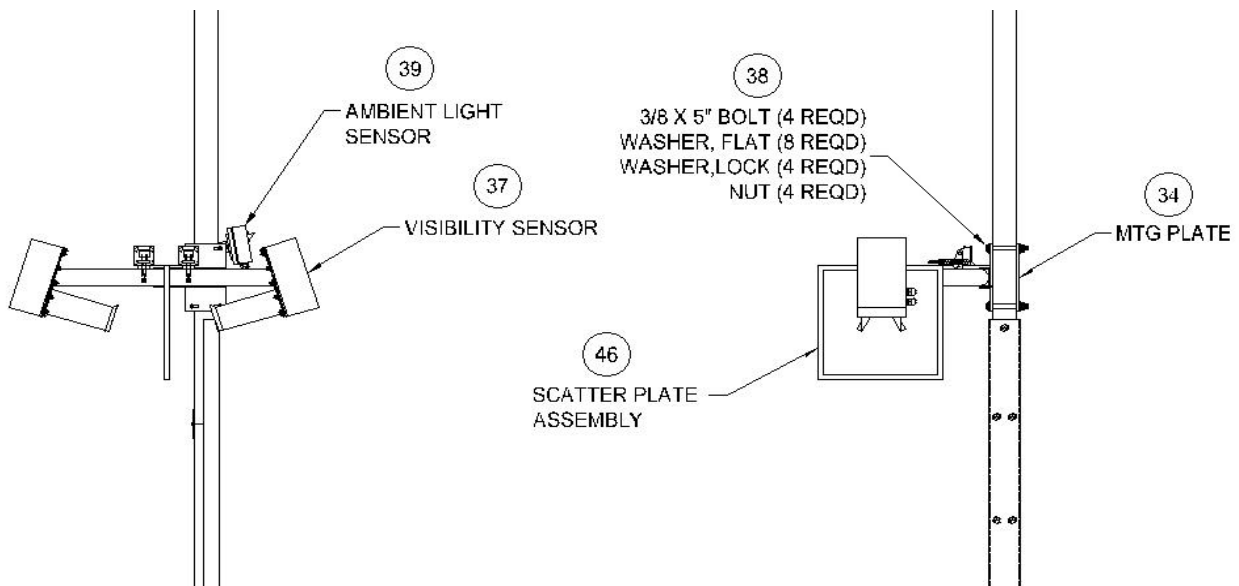


Figure 3.b
Tower With Visibility Scatter Plate Attached

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 3.c.

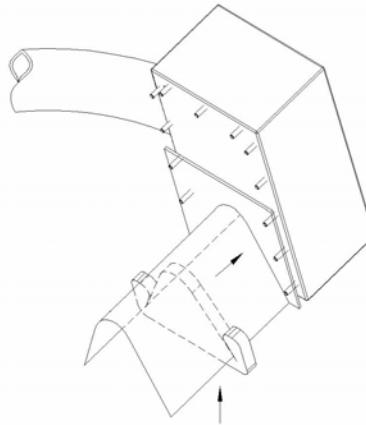


Figure 3.c
Installation of Opaque Filters on
Transmitter and Receiver Hoods

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.
14. Remove the opaque filters from the hoods.
14. The span-state calibration requires the use of the scatter plate installed as shown in figure 3.a
15. Install the scatter plate and record the Cal_ExtCo marked on the scatter plate.

16. Type "FC" and press enter. Make sure the number in the configuration information for Cal_ExtCo is the same extinction coefficient as on the calibration scatter plate. If not, enter the correct number in the configuration data. Press (ESC) key to get back to the terminal screen.
17. 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.
18. Record the acceptable value displayed on the Tri-Annual maintenance data record form.
19. Type "Y" and the new span value will be written to EEPROM . Remove the scatter plate and store it for protection.
20. Type "FR" to reset the sensor and exit the diagnostic mode.
21. 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.
22. If the battery backup option is installed, switch the DC circuit breaker back on if battery backup is present
23. 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.
24. Verify the system begins outputting visibility information after a ten (10) minute algorithm delay.
25. If all maintenance tasks are complete, issue another NOTAM advising users that "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.
26. 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 WIND SPEED SENSOR VERIFICATION PROCEDURE

The wind speed sensor verification procedure is a confidence test, which verifies that the DigiWx® 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 DigiWx® 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. DigiWx® 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 DigiWx® tower, facing into the wind. Observe the DigiWx® 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 DigiWx® 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.

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

SAFETY PRECAUTIONS

1. Before starting any power installation/Maintenance tasks, ensure that the A/C power circuit breaker is in the open position.
2. Do not perform DigiWx® 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. DigiWx® 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 DigiWx system is being serviced prior to beginning this maintenance tasks. The NOTAM to be issued is "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.
2. Put the DigiWx® 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 DigiWx® tower (refer to figure 2.a).
4. Power on the DigiWx® AWOS HHDU. The word "ALERT" must now be displayed across the rectangular HHDU runway display. Push the "PAGE" button and the message "DigiWx® 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 "DigiWx® 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 not properly aligned, realign the red pointer toward the airport north marker.

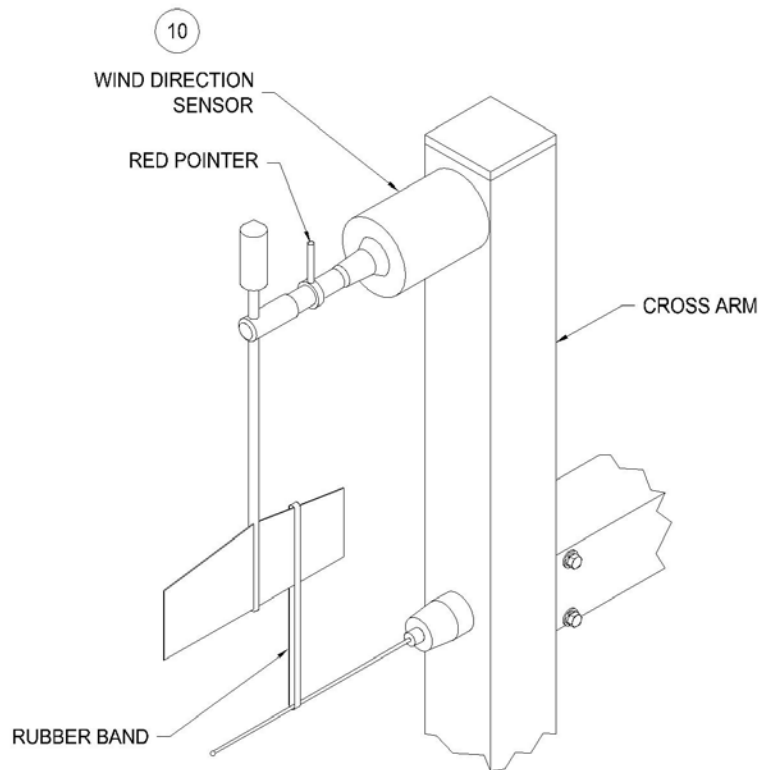


Figure 4
Wind Direction Vane Alignment

7. Press the “REFRESH” button on the DigiWx® 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 7 thru 14 below.
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.
16. Rotate the direction vane 360° 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. This is a digital sensor, if the true north direction is reported accurately, all other directions will also be reported accurately. If a segment of the sensor were out, the error log would have reported recurring problems.

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 “**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.

5.7 LIGHTNING PROTECTION SYSTEM & TOWER TRI-ANNUAL MAINTENANCE

SAFETY PRECAUTIONS

1. Before starting any power installation/Maintenance tasks, ensure that the A/C power circuit breaker is in the open position.
2. Do not perform DigiWx® 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).



Typical Battery Terminal Brush

3. Commercial Multimeter (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. 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.
8. Reconnect and tighten the positive first and then the negative battery cable to their corresponding battery terminals.
9. 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 464 MHz UHF Transceiver and Annual Maintenance

The 464 MHz UHF transceiver operates under License from the Federal Communications Commission. The FCC Registration number is 0011055407. The Emission Designator is 11K0F2D. The operating specifications for the 464 MHz transceiver are located in Appendix C.

The purpose of this testing is to verify that the 464 MHz 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 464 MHz UHF transceiver is found to not be operating within the tolerances call Belfort Instrument Company for support.

***Per FAA Advisory Circular 150/5220-16C, section 13a, only an individual holding an FCC General Radiotelephone Operator License (GROL) may perform the DigiWx Commissioning / Annual Inspection Procedure.**

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

5.9 VHF Unicom Radio and 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 Advisory Circular 150/5220-16C, section 13a, only an individual holding an FCC General Radiotelephone Operator License (GROL) may perform the DigiWx Commissioning / Annual Inspection Procedure.**

Perform the DigiWx Commissioning / Annual Inspection Procedure provided in Appendix E. Complete the DigiWx 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, the following directions are provided if the radio is to be replaced.

Directions to replace the DigiWx 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.

6.0 TROUBLESHOOTING THE SYSTEM

6.1 SYSTEM BUILT-IN DIAGNOSTICS AND TROUBLESHOOTING

The DigiWx® Tower transmits system status, sensor status and data quality status along with weather data. DigiWx® 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 DigiWx® Advisor Status Log and to the DigiWx® 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 “DigiWx® Operator’s Instruction Manual” for complete instructions for using the DigiWx® Advisor software.

If the DigiWx® 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 DigiWx® software.

Status Pages are reached by selecting “Status Pages” from the History menu on the DigiWx® Advisor main menu.

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

DigiWx® Advisor Current Status Page

System

AC Power	0=OK, 1=Error
Battery Condition	0=OK, 1=Error
Transmission Delay	0=OK, 1=Error
DCP Status	0=OK, 1=Error
DCP Error Counter	0=OK, 1=Error
Alert Message Status	0=OK, 1=Error

Sensors

Altimeter	0=OK, 1=Error
Temperature / Dew Point	0=OK, 1=Error
Visibility	0=OK, 1=Error
Visibility Polling Error Counter	0=OK, 1=Error
Wind Speed	0=OK, 1=Error
Wind Direction	0=OK, 1=Error

Data Quality

Check Pressure Sensor #1	0=OK, 1=Error
Check Pressure Sensor #2	0=OK, 1=Error
Check Temperature / Dew Point Sensor	0=OK, 1=Error
Check Visibility Sensor	0=OK, 1=Error
Check Wind Speed Sensor	0=OK, 1=Error
Check Wind Direction Sensor	0=OK, 1=Error

The DigiWx® Advisor Status 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.

6.2 INTERPRETING DIAGNOSTIC MESSAGES

6.2.1 Interpreting System Status Messages:

The following are the factory recommended diagnostic procedures that should be followed whenever an error flag is displayed on the DigiWx® Advisor Status Log or the DigiWx® Advisor Current Status Page.

AC Power – Error flag is present when 12VDC from the AC power supply is not present. 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 DigiWx system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.
2. Using a voltmeter, check for 115VAC on power supply input. If 115VAC is not present, check for 115VAC at the input side of the circuit breaker. Either the circuit breaker is defective, there is a break in the 115VAC line or the facility power is off. With the circuit breaker in the on position, use a DMM to verify if 115VAC is present on both the input and output sides of the circuit breaker. If AC voltage is not present on the input side of the circuit breaker, the problem is in the facility power line. Contact the facility engineer to determine why the power is unavailable and initiate corrective action to restore incoming AC power. If 115VAC voltage is not present on the output side of the circuit breaker, the circuit breaker is defective and must be replaced.
3. If 115VAC is present at the power supply input, use the DMM to check for 12VDC on the supply output. Replace power supply if necessary.
4. Check inline fuses. If 12VDC 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 DigiWx® tower as shown in Figure 2. Put the DigiWx® 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 to service and the DCP continues to run on battery backup, replace the power cable.
6. 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.
7. 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.
8. At the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 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 DigiWx system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 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. Reconnect the positive battery cable first to the positive terminal of the battery and then reconnect the negative cable.
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 12.6VDC to 13.25VDC.
5. If battery voltage checks low, replace the battery with a Group 27 deep discharge lead acid battery.
6. 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.
7. Remove AC power from the system by turning off the AC circuit breaker in the power junction box.
8. At the DATU display terminal verify that the Battery condition error flag has not been set.
9. If the error flag is still set, contact Belfort Instrument Co. for additional troubleshooting procedures to isolate the problem.
10. 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.
11. At the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.

Transmission Delay – Error flag is set whenever the DCP is unable to transmit 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 channel traffic or DCP transceiver problem. 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.

DCP Status – Used for factory remote diagnostic assistance. A factory technician may ask for the status of this indicator.

DCP Error Counter - Used for factory remote diagnostic assistance. A factory technician may ask for the status of this indicator.

Alert Message Status – Reports an Alert Message if a message is set at the DigiWx® tower.

6.2.2 Interpreting Sensor Status Messages:

Altimeter – Error flag is present if there is a sensor problem with the pressure transducers (99.99 as the reported altimeter setting). Perform the DCP – Annual Barometric Pressure Maintenance & Calibration procedure detailed in section 5.2 of this manual. If this does not return the unit to service, remove and replace the DCP.

Temperature / Dew Point - Error flag is present if there is a problem with the Temperature /Dew Point sensor. Remove and Replace the sensor.

Visibility – Error flag is present if an installed Visibility Sensor is not responding to the DCP information polling request.

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the DigiWx system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.
2. Put the DigiWx® AWOS in “service mode” by toggling the “ALERT MESSAGE” toggle switch located on the lower half of the hinged tower section six (6) times.
3. Clean the glass windows on both sides of the sensor with a clean soft cloth and commercial window cleaner.
4. Remove the DCP from the tower and disconnect all cables at the back of the DCP.
5. 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.
6. At the bottom of the tower disconnect the two RS232 cables and inspect the mating connectors for damage, pushed in pins, broken contacts and evidence of corrosion. Repair or replace damaged or corroded cables as required.
7. 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.
8. Clean and lubricate the mating serial RS232 cable connectors with Dow Corning #4 to prevent corrosion. Reconnect these cables and store at the bottom of the bottom of the tower.
9. Using a DMM, check for 115VAC presence. Follow the verification steps detailed in step 1. of section 6.2.1.
10. Using a DMM, check the 12VDC output from the power supply. Replace the power supply if the 12VDC output is not present.
11. If the sensor returns to service, calibrate the sensor according to section 5.4 of this manual.
12. If the fault cannot be rectified, and 12VDC is available to the sensor, return the visibility sensor for repair or replacement and return the DigiWx® to service without the visibility sensor.
13. If maintenance tasks are complete, toggle the “ALERT MESSAGE” switch 4 times to return the unit to service.
14. At the DATU display operator’s terminal, when all maintenance actions are complete, issue another NOTAM advising users that “**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.

Visibility Polling Error Counter – This is an incidence counter of Visibility Sensor non-responses to polling requests. It is used for factory remote diagnostic assistance. A factory technician may ask for the status of this indicator.

Wind Speed – This flag is set if there is no data flow from the Wind Speed Sensor to the DCP.

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the DigiWx system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.
2. Toggle the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times. This will assure that pushing "REFRESH" on the HHDU will display instantaneous rather than averaged information.
3. 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 DigiWx® tower as shown in Figure 2.
4. Remove the DCP from the tower and disconnect all cables at the back of the DCP.
5. 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.
6. 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.
7. If these actions have not returned the sensor to service, return the sensor to Belfort for replacement.
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. Toggle the "ALERT MESSAGE" switch 4 times to return the unit to service.
10. Using the HHDU, verify the system begins outputting wind speed information.
11. At the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.

Wind Direction – This error flag is set if there is no data stream from the Wind Direction Sensor to the DCP.

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the DigiWx system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 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 DigiWx® tower as shown in Figure 2.
3. Toggle the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times. This will assure that pushing "REFRESH" on the HHDU will display instantaneous rather than averaged information.
4. Remove the DCP from the tower and disconnect all cables at the back of the DCP.
5. 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.
6. 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.
7. Disconnect the cable connectors at the wind speed sensor and inspect for damage, pushed in pins, broken contacts and evidence of corrosion. Repair or replace damaged or corroded cables as required. If the mating connectors of the sensor are damaged, the sensor must be replaced.
8. If these actions have not returned the sensor to service, return the sensor to Belfort for replacement or repair.
9. 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.
10. Toggle the "ALERT MESSAGE" switch 4 times to return the unit to service.
11. Verify that the system begins outputting wind direction information.
12. At the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.

6.2.3 Interpreting Data Quality Error Messages: – The DigiWx® AWOS Data Quality error flags are set based upon built in algorithms that examine the data string and make a judgment as to the quality of the data. If any data stream wanders outside the limits expected under current conditions, the corresponding sensor Data Quality Error Flag will be present. This may indicate a problem if more than occasional. The following Quality Error Flags may be present:

- Check Pressure Sensor #1
- Check Pressure Sensor #2
- Check Temperature / Dew Point Sensor
- Check Visibility Sensor
- Check Wind Speed Sensor
- Check Wind Direction Sensor

Data Quality Messages:

Pressure Sensors #1 and #2 –

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the DigiWx system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.
2. Toggle the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times. This will assure that pushing "REFRESH" on the HHDU will display instantaneous rather than averaged sensor information.
3. Remove tower-securing bolts and tilt the tower until the DCP is at a comfortable working height. Secure the tower in that position by tying the attached tower hold down rope to the base of the DigiWx® tower as shown in Figure 2.
4. Perform the routine annual maintenance tasks described in section 5.2 of this manual, steps 1 through 9.
5. If the system returns to service, skip to step 9 of this procedure.
6. If the system still reports error messages, perform a calibration in accordance with steps 10 through step 19 of section 5.2.
7. If the pressure sensor returns to service with no error message, skip to step 13. If the system still does not return to service, the DCP will need to be replaced.
8. Return the system to service and toggle the alert switch 9 times to report the Barometric Pressure sensor inoperative.
9. 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.
10. Issue a NOTAM advising users the "Barometric pressure sensor is temporarily inoperative" and augment the automated weather data report to report the correct altimeter setting. Refer to the "DigiWx Operator Manual" sections 4.2.2.6 for instructions on manually overriding automated weather reports.
11. When the replacement DCP arrives remove the defective DCP in accordance with section 10.1 of this manual and install the replacement DCP in accordance with section 7.6 or 7.7 of the DigiWx Installation and checkout Manual as applicable.

12. All sensor outputs are processed and transmitted through the DCP. Any time it becomes necessary to replace the DCP, a complete system validation must be performed to assure that all system outputs are being reported accurately. Perform a comprehensive performance validation of all sensor outputs by completing and documenting the system validations identified in steps 1.F. thru 9. on the Comprehensive Facility Performance and Adjustment Record form (see appendix A to this manual). 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.
13. Toggle the “ALERT MESSAGE” switch 4 times to return the unit to service.
14. 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.

Temperature / Dew Point –

The Temperature/Dew point sensor cannot be calibrated and is not a repairable sensor. If the “Check Temperature / Dew Point Sensor” error flag is present, the sensor is most likely defective and should be replaced.

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the DigiWx system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is **"DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.
2. Remove and replace the sensor in accordance with section 10.2.
3. After installing the new sensor, perform the confidence test detailed in section 5.3 of this manual.
4. If the error message remains, contact Belfort Instrument Co. customer service, 1-800-937-2353 for assistance in further troubleshoot the cause of this problem.
5. If the system must be returned to service with the Temperature/Dew Point sensor inoperative, Issue another NOTAM advising users the “Temperature/Dew Point sensor is temporarily inoperative.” Refer to the "DigiWx Operator Manual" sections 4.2.2.6 for instructions on augmenting automated weather reports.
6. At the DATU display operator’s terminal, when all maintenance actions are complete, issue another NOTAM advising users that **“DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.

Visibility –

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the DigiWx system is being serviced prior to beginning investigation of this fault. The NOTAM to be

issued is "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.

2. Toggle the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times.
3. Clean the glass windows on both sides of the sensor with a clean soft cloth and commercial window cleaner.
4. Remove the DCP from the tower and disconnect all cables at the back of the DCP.
5. 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.
6. At the bottom of the tower disconnect the two RS232 cables and inspect the mating connectors for damage, pushed in pins, broken contacts and evidence of corrosion. Repair or replace damaged or corroded cables as required.
7. 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.
8. Clean and lubricate the mating serial RS232 cable connectors with Dow Corning #4 to prevent corrosion. Reconnect these cables and store at the bottom of the bottom of the tower.
9. Using a voltmeter, check for 115VAC on power supply input. If 115VAC is not present, check circuit breaker. If the circuit breaker is on, there is a break in the 115VAC line or the facility power is off. Contact the facility engineer or contact Belfort Instrument Co. customer support at 1-800-937-2353.
10. Using a voltmeter, check the 12VDC output from the power supply. Replace the power supply if the 12VDC output is not present.
11. If the sensor returns to service, calibrate the sensor according to section 5.4 of this manual.
12. If the fault cannot be rectified, and 12VDC is available to the sensor, the visibility sensor must be replaced. Return the DigiWx® to service without the visibility sensor.
13. If the system must be temporarily returned to service with the visibility sensor inoperative, issue another NOTAM advising users the "Visibility sensor is temporarily inoperative." Refer to the "DigiWx Operator Manual" sections 4.2.2.6 for instructions on augmenting automated weather reports.
14. When the replacement sensor arrives, remove the defective sensor in accordance with section 10.5 of this manual and install and checkout the replacement sensor in accordance with section 7.11 of the "DigiWx Installation and Checkout Manual."
15. After the system has been successfully returned to service, toggle the "ALERT MESSAGE" switch 4 times to return the unit to service.
16. At the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.

Wind Speed-

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the DigiWx system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 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 DigiWx® tower as shown in Figure 2.
3. Remove the DCP from the tower and disconnect all cables at the back of the DCP.
4. 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.
5. 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.
6. Remove the wind speed sensor from the tower cross arm and disconnect the sensor from the cable.
7. 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.
8. 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.
9. Reinstall the wind speed sensor onto the tower cross arm.
10. Turn on the HHDU and check to see if the sensor has returned to service.
11. If these actions have not returned the sensor to service, return the sensor for replacement.
12. After returning the sensor to service or installation of a replacement sensor, perform the wind speed confidence test detailed in section 5.5 of this manual.
13. 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.
14. If maintenance tasks are complete, toggle the "ALERT MESSAGE" switch 4 times to return the unit to service.
15. At the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 for instructions on how to enter and delete NOTAMs.

Wind Direction–

1. At the DATU display terminal, issue a NOTAM advisory to alert users that the DigiWx system is being serviced prior to beginning investigation of this fault. The NOTAM to be issued is "**DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 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 DigiWx® tower as shown in Figure 2.
3. Put the DigiWx® AWOS in "service mode" by toggling the "ALERT MESSAGE" toggle switch located on the lower half of the hinged tower section six (6) times. This will assure that pushing "REFRESH" on the HHDU will display instantaneous rather than averaged information.
4. Remove the DCP from the tower and disconnect all cables at the back of the DCP.
5. 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.
6. 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.
7. Remove the sensor from the cross arm and disconnect the sensor from the cable.
8. 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.
9. 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.
10. Reinstall the wind direction sensor onto the tower cross arm.
11. Turn on the HHDU and check to see if the sensor has returned to service.
12. If these actions have not returned the sensor to service, return the sensor for replacement.
13. After returning the sensor to service or installing a replacement sensor, perform the confidence verification checks and alignment detailed in section 5.6 of this manual.
14. 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.
15. If maintenance tasks are complete, toggle the "ALERT MESSAGE" switch 4 times to return the unit to service.
16. At the DATU display operator's terminal, when all maintenance actions are complete, issue another NOTAM advising users that **"DigiWx 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 "DigiWx Operator Manual" sections 4.2.2.5 and 4.2.2.6 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, (Paroscientific, Inc)
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. Hard copies of the DigiWx® record forms are provided in Appendix 1 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 DigiWx® 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 DIGIWx® 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 DIGIWx® 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 problem or damage identified during maintenance activities 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 DigiWx® 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 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. Before starting any power installation/Maintenance tasks, ensure that the A/C power circuit breaker is in the open position.
2. Do not perform DigiWx® 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. Replacement DCP enclosure
2. Phillips head screwdriver

Removal Procedures: Refer to Figure 5.

1. Put the system in the “Service Mode” by performing steps 1 – 4 of section 5.2 of this manual
2. Remove the four (4) pan head screws, lock washers and flat washers that secure the DCP to the tower.
3. 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. **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.
4. 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.
5. Contact Belfort Instrument Co. customer support to make arrangements for replacement of defective components.
6. Refer to the DigiWx® Installation and Checkout manual for installation and checkout of replacement parts.
7. Document sensor replacement on the FAA form 6030-1.

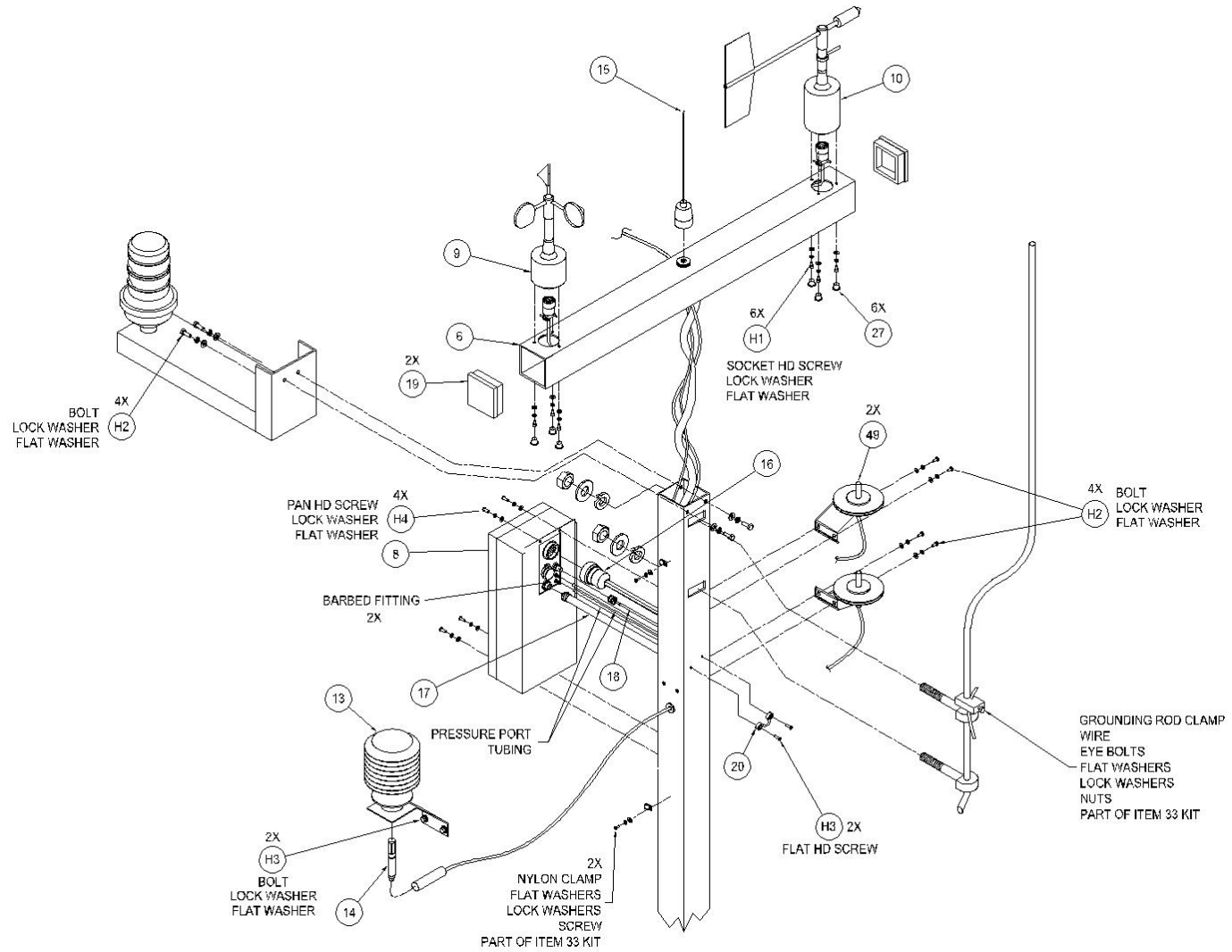


Figure 5
Removal of DCP

10.2 TEMPERATURE, HUMIDITY/DEW POINT SENSOR REMOVAL PROCEDURES:

SAFETY PRECAUTIONS

1. Before starting any power installation/Maintenance tasks, ensure that the A/C power circuit breaker is in the open position.
2. Do not perform DigiWx® 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. Phillips head screwdriver
2. Socket wrench and ¾" socket

Removal Procedures: Refer to Figure 6.

1. Put the DigiWx® in “Service Mode” by performing steps 1-4 of section 5.2 of this manual.
2. Loosen the jam nut on top of the plastic sensor adapter a few turns.
3. Remove the sensor and sensor connector assembly through the bottom of the plastic adapter.
4. Disconnect the sensor probe from the sensor cable connector.
5. Inspect the sensor cable connector for damage, corrosion or bent or broken pins. Replace as necessary.
6. Contact Belfort Instrument Co. customer support to make arrangements for replacement of defective components.
7. Refer to the DigiWx® Installation and Checkout manual for installation and checkout of replacement parts.
8. Document sensor replacement on the FAA form 6030-1.

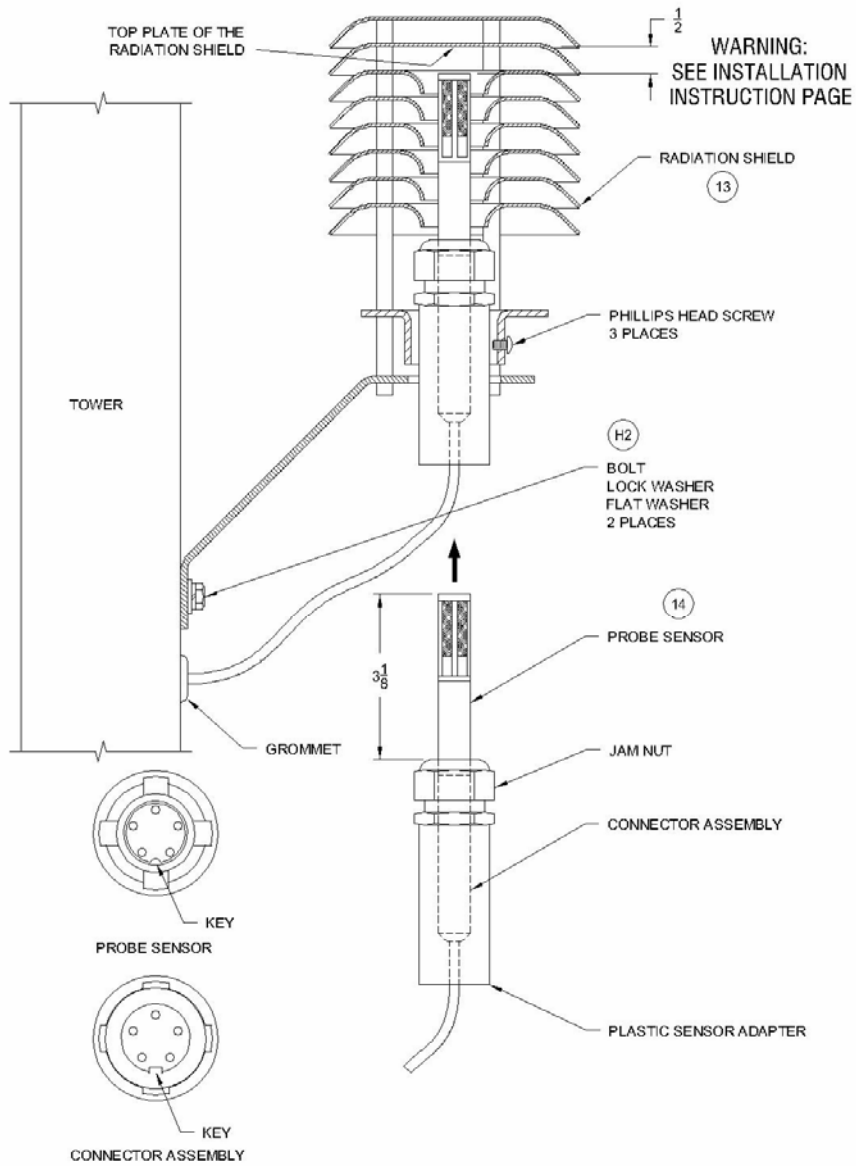


Figure 6.
Temperature/Humidity Sensor Removal

10.3 6000 VISIBILITY SENSOR REMOVAL PROCEDURES:

SAFETY PRECAUTIONS

1. Before starting any power installation/Maintenance tasks, ensure that the A/C power circuit breaker is in the open position.
2. Do not perform DigiWx® 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.

Removal Procedures: Refer to Figure 7.

1. Put the DigiWx® system in the “Service Mode” by performing steps 1-4 of section 4.2.2 of this manual.
2. At the base of the tower, disconnect the red and black visibility power harness connections to the positive and negative outputs of the visibility sensor 12VDC power supply.
3. Disconnect the RS232 serial cable that is connected to the sensor from the DB9 null modem adapter connector that is attached to the RS232 cable coming down inside the tower.
4. 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.
5. Remove the mounting bolts that secure the visibility sensor to the tower and carefully remove the sensor from the tower.
6. Inspect the sensor cables and connectors for damage, corrosion or bent or broken pins. Replace damaged cables as necessary.
7. Contact Belfort Instrument Co. customer support to make arrangements for replacement of defective components.
8. Refer to the DigiWx® Installation and Checkout manual for installation and checkout of replacement parts.
9. Document sensor replacement on the FAA form 6030-1.

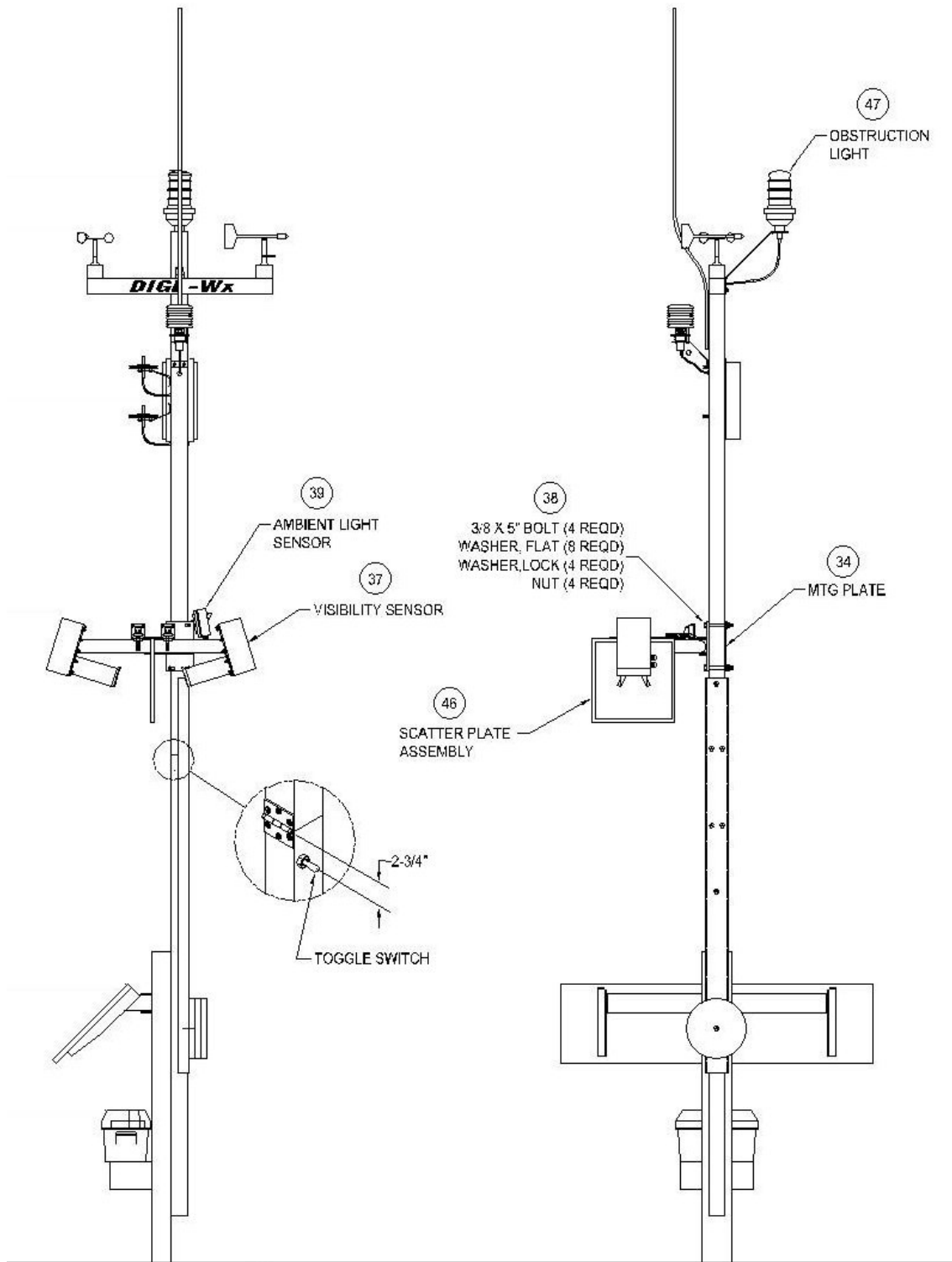


Figure 7, Visibility Sensor Removal

10.4 WIND SPEED SENSOR REMOVAL INSTRUCTIONS

SAFETY PRECAUTIONS

1. Before starting any power installation/Maintenance tasks, ensure that the A/C power circuit breaker is in the open position.
2. Do not perform DigiWx® 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. DigiWx® AWOS hand held display unit (HHDU)
2. 3 mm Allen wrench
3. Socket wrench and 13/16" socket
4. Small flat head screw driver

Removal Procedures: Refer to figure 8.

1. Lower the tower and put the DigiWx® system in the “Service Mode” by completing steps 1 - 4 of section 5.2.
2. Remove the three (3) hole cap plugs in the bottom of the cross arm that cover the mounting screw access holes.
3. Remove and save the mounting screws.
4. Remove the sensor from the Cross Arm.
5. Loosen and disconnect the wind speed connector from the mating connector.
6. Inspect the sensor cable and connector for damage, corrosion or bent or broken pins. Replace damaged cable if needed.
7. Contact Belfort Instrument Co. customer support to make arrangements for replacement of defective components.
8. Refer to the DigiWx® Installation and Checkout manual for installation and checkout of replacement parts.
9. Document sensor replacement on the FAA form 6030-1.

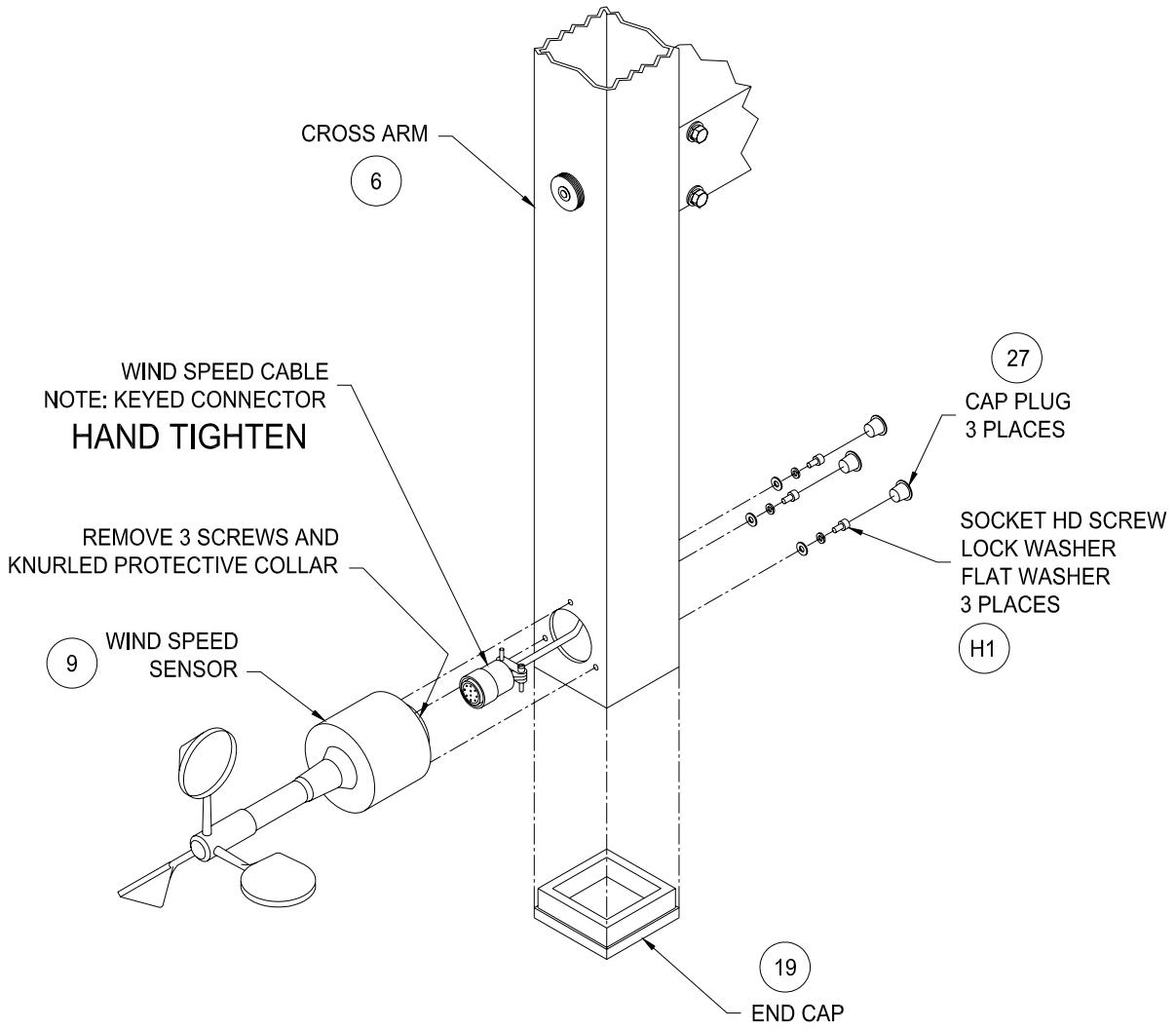


Figure 8.
Wind Speed Removal

10.5 WIND DIRECTION SENSOR REMOVAL INSTRUCTIONS

SAFETY PRECAUTIONS

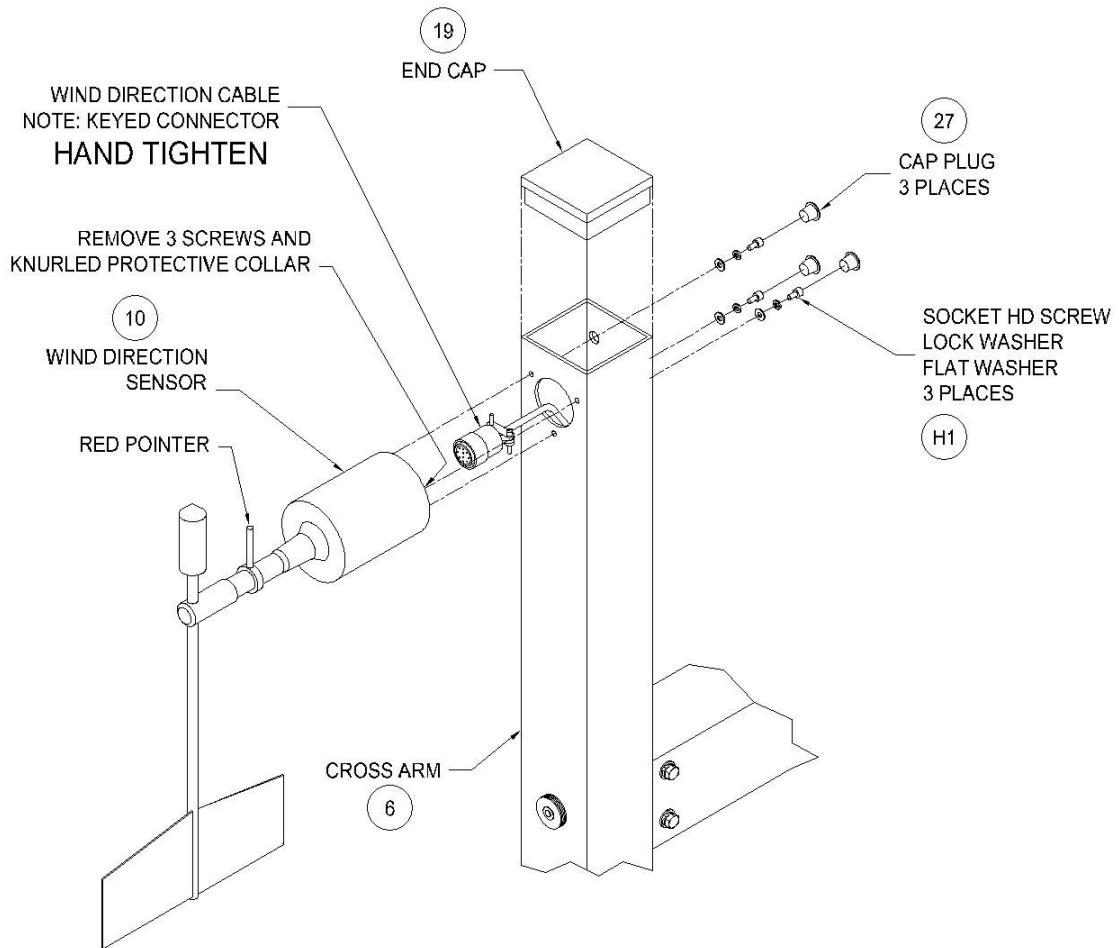
1. Before starting any power installation/Maintenance tasks, ensure that the A/C power circuit breaker is in the open position.
2. Do not perform DigiWx® AWOS maintenance tasks during a thunderstorm.
3. Use extreme caution when lowering the tilt-over tower whenever ice or snow has accumulated on the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

TOOLS & PARTS REQUIRED

1. Three (3) M4 x 8, Socket head screws
2. 3 mm Allen wrench
3. Socket wrench and 3/16" socket

Removal Procedures: Refer to figure 9.

1. Lower the tower and put the DigiWx® system in the "Service Mode" by completing steps 1-2 of section 5.6 of this manual.
2. Remove the three (3) hole plugs in the bottom of the cross arm that cover the mounting screw access holes.
3. Remove the mounting screws.
4. Disconnect the sensor from the Cross Arm.
5. Loosen and disconnect the wind speed connector from the mating connector.
6. Inspect the sensor cable and connector for damage, corrosion or bent or broken pins. Replace damaged cable if needed.
7. Contact Belfort Instrument Co. customer support to make arrangements for replacement of defective components.
8. Refer to the DigiWx® Installation and Checkout manual for installation and checkout of replacement parts.
9. Document sensor replacement on the FAA form 6030-1.



NOTE: THE WIND DIRECTION VANE HAS BEEN ALIGNED AT THE FACTORY
SUCH THAT IT WILL INDICATE 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 9.
Wind Direction Sensor Removal**

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
SCP30S15DN	Power Supply	1
80083	Visibility Power Supply 12VDC	1
LPC 10262-7	Surge Suppressor	1

Table 2.
Recommended Spare Components

-HARDWARE PACKAGE KIT -			PART NUMBER 80033			
ITEM	PART NBR	FASTENER	QTY	WASHERS		
				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

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

DigiWx® Maintenance Forms

DigiWx[®] Tri-annual Performance and Maintenance Record

Site Location: _____ Date: _____

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

- | | <u>Completed</u> |
|--|--------------------------|
| A. Clean computer air filters | <input type="checkbox"/> |
| B. Clean cabinets with mild detergent and water | <input type="checkbox"/> |
| C. Listen to CPU and Power Supply fans for function and noise | <input type="checkbox"/> |
| D. Verify accuracy of computer clock and adjust as necessary | <input type="checkbox"/> |
| E. Verify that the compute hard disk available capacity is > 3 gb | <input type="checkbox"/> |
| F. Display and review the DigiWx 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%:

	<u>Sensor</u>	<u>Reference</u>	<u>% Diff</u>	
	<u>ExtCo</u>	<u>ExtCo</u>		<u>Acceptable</u> Tolerance: ± 5%
<u>Initial</u>				Pass <input type="checkbox"/> Fail <input type="checkbox"/>
<u>After Cal.</u>				Pass <input type="checkbox"/> Fail <input type="checkbox"/>

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

Tri-annual Maintenance completed by: _____ Date: _____

DigiWx[®] Annual Configuration Validation 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.

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)

Record the version of all DigiWx[®] software installed;

DigiWx[®] Advisor Version: _____

DigiWx[®] Voice Version: _____

DigiWx[®] 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. Review the past years maintenance log and verify that no replacements for the Temperature Dew Point sensor have been 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 _____

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

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

Review the past years maintenance log and verify that no replacements for the Pressure Sensors have been 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. 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 _____

8. 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 _____

9. 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 _____

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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DigiWx[®] COMPREHENSIVE

Facility Performance and Adjustment Record

Site Location: _____ Date: _____

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

- | | <u>Completed</u> |
|---|--------------------------|
| A. Clean computer air filters | <input type="checkbox"/> |
| B. Clean cabinets with mild detergent and water | <input type="checkbox"/> |
| C. Listen to CPU and Power Supply fans for function and noise | <input type="checkbox"/> |
| D. Verify accuracy of computer clock and adjust as necessary | <input type="checkbox"/> |
| E. Verify that the compute hard disk available capacity is > 3 gb | <input type="checkbox"/> |
| F. DigiWx [®] software installed, (record software version): | |
| DigiWx [®] Advisor Version: _____ | |
| DigiWx [®] Voice Version: _____ | |
| DigiWx [®] Phone Version: _____ | |
| G. Display and review the DigiWx [®] 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
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 AirNav 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: _____	Reference Standard(A)	DigiWx Reading (B)	Acceptable Tolerance	Adjustment Required?	Value After Adjustment
PN: _____					
BP1	_____	_____	±0.02 in Hg	Y ___ N ___	_____
BP2	_____	_____	±0.02 in Hg	Y ___ N ___	_____

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

	<u>Sensor</u> <u>ExtCo</u>	<u>Reference</u> <u>ExtCo</u>	<u>% Diff</u>	<u>Tolerance: ± 5%</u>
<u>Initial</u>	_____	_____	_____	Pass <input type="checkbox"/> Fail <input type="checkbox"/>
<u>After Cal.</u>	_____	_____	_____	Pass <input type="checkbox"/> Fail <input type="checkbox"/>

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. Record all corrective actions or adjustments made on FAA Form 6030-1
- 10. Return the system to service and verify the system is reporting data as expected.

Completed by:

_____ **Date:** _____

Appendix B

DigiWx® 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 DigiWx® Tri-annual Performance and Maintenance Record Form	Once every 120 days ± 30 days
Annual Performance Maintenance Checks as detailed on the DigiWx® 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 DigiWx® 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 DigiWx® configuration options installed at the site.
2. Cleaning the DATU computer and verifying that the computer power supply and processor fans are functioning properly.
3. Cleaning and calibrating the visibility and ambient light sensors, if installed.
4. Visually inspecting the Tower assembly for obvious damage and inspecting the obstruction lighting to determine it is functioning properly.
5. 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, Dew Point 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 DigiWx® output to the output of a NIST traceable, calibrated pressure standard. Recalibrate the sensor if needed.
5. 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) Database maintenance and archival of oldest system data as required.
 - d) Verification of all DigiWx® software version configuration status to assure that no unauthorized changes have been installed to the system software.
5. 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 DigiWx® 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 DigiWx® weather system remains in service.

Appendix C 464MHz UHF Transceiver Specifications

The 464 MHz UHF transceiver operates under License from the Federal Communications Commission. The FCC Registration number is 0011055407. The Emission Designator is 11K0F2D.

The operating specifications for the 464 MHz transceiver are as follows:

Frequency:

464.600 MHZ Initial Tolerance: ± 0.7 KHz, Operating Tolerance: ± 0.7 KHz;

464.750 MHZ Initial Tolerance: ± 0.7 KHz, Operating Tolerance: ± 0.7 KHz;

Output Power: 2.0 W

Internal Tolerance: Upper: 2.25 W, Lower: 1.75 W;

Operating Tolerance: Upper: 2.25 W, Lower 1.2 W;

Frequency Deviation: 1.5KHz

Internal Tolerance: ± 0.5 KHz;

Operating Tolerance: ± 0.5 KHz;

VSWR: 1.0:1

Internal Tolerance: 2.0:1 max;

Operating Tolerance: 3.0:1 max;

Appendix D 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 watts.

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
Blocking/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
Headset (side tone)	More than 0.1 W w/500Ω load
AF output impedance	
EXT SP	8Ω
Headset (side tone)	500Ω

Appendix E

DigiWx Commissioning/ Annual Test Procedure & Data Record



DigiWx Commissioning / Annual Inspection Procedure

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

***Per FAA Advisory Circular 150/5220-16C, section 13a, only an individual holding an FCC General Radiotelephone Operator License (GROL) may perform this Test 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) DigiWx Commissioning/Annual Record Data Sheet Drawing # 80xxx.

II. Preparation:

- 1) On the DigiWx Commissioning/Annual Record fill in the Date, Location, and Technician information.
- 2) Verify the valid Calibration Dates for all test equipment used. Complete the Calibration Date information on the DigiWx 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 +14.5vdc. 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.
- 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. DigiWX 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 464.600MHZ at <2W.
- 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 464.600 MHZ +-1.5 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 1.500 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 1.2 and 2w. 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 1.1:1. 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 464.7500MHZ at <2W.
- 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 464.7500 MHZ +-1.5 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 1.500 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 1.2 and 2w. 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 1.1:1. 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. DigiWX 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 DCP Frequency Deviation value. Frequency Deviation should be +-25 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 between 2 watts \pm ½ 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:\DigiWx 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 80 and 90%. 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:\DigiWx 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 1.1:1. 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.



DigiWx Commissioning / Annual Inspection Record Data Sheet

Date: ___/___/___

Location: _____ HP 8920B Comm. Test Set Cal Data _____
Bird DPM-50C 400 – 960 MHZ Elements Cal Date _____
Technician: _____ 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 (+13.5 to +14.5 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: _____
Sensor Ext_Co: _____
Sensor Max: _____

DigiWX UHF Data Radio Accuracy Checklist:

1. DCP Radio Serial Number: _____
2. DCP FCC Authorized Frequency: _____ (464.6000 MHZ)
3. DCP Freq. Deviation: _____ (1.5 KHZ +-0.5 KHZ)
4. DCP RF Output Power: _____ Watts (1.2 to 2 watts)
5. DCP RF Modulation: _____ % (78 to 82%)
6. DCP VSWR: _____ (< 3.0:1)

7. DCP FCC Authorized Frequency: _____ (464.7500 MHZ)
8. DCP Freq. Deviation: _____ (1.5 KHZ +-0.5 KHZ)
9. DCP RF Output Power: _____ Watts (1.2 to 2 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: _____ (+- 25 khz):
4. Unicom RF Output Power: _____ Watts (2 watts +- ½ watt)
5. Unicom AM Demodulation: _____ % (80 to 90%)
6. Unicom VSWR: _____ (< 3.0:1)

Appendix F

DigiWx 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 AirNav 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 "acbstxcom108 comx"<cr>.

Acbstxcom108 is the revision for DCP's with firmware code version 1.05C, 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 "StormyWx", <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 “DigiWx 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 “DigiWx 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 as follows: Year, month, 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 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 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 may need to be supplied by the customer or use the AirNav 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

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:

PriTx Frequency : 464.60 Frequency is not changeable.
SecTx Frequency : 464.75 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 “StormyWx” 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 to the Comprehensive Facility Performance and Adjustment Record.
35. Confirm that the six DCP enclosure cover screws are fully tight.
36. On the DigiWX Handheld Receiver or the DigiWX 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 up right position.
38. In the DCP Power Enclosure, turn ON Battery DC power by turning on circuit breaker 2.