Skyvane Wind Sensor Model 2100

User's Manual

allweatherinc

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Table of Contents

1 General Information

1.1 Introduction

The Model 2100 Skyvane is a unique wind sensor that combines the durability of a heavy duty instrument with the response characteristics of a lightweight cup and vane. The aerodynamic shape of the sensor aligns the body with wind direction, while a four-bladed, low threshold propeller senses wind velocity.

The Skyvane propeller is connected to a high frequency (HF) tachometer whose output feeds into the wind speed port of a translator. Wind direction is sensed by a potentiometer located in the base of the Skyvane, providing a voltage output corresponding to sensor orientation.

The Skyvane is a heavy-duty combination wind sensor suited for installation in severe environments, including aboard ocean vessels. A flanged base provides a mounting surface for platforms and decks. A separate adapter, Model 21101, can be purchased to mount the sensor onto a $1^1/_4$" I.D. pipe ($1^1/_2$" O.D.) or to an AWOS tower top plate. The sensor provides outputs compatible with electronic signal conditioning modules and data logging equipment.

2 Installation

2.1 General

This instrument is thoroughly tested and fully calibrated at the factory and is ready for installation. Please refer to the return authorization card included in the packing box if damage has occurred. Also, notify All Weather Inc.

2.2 Siting

Site selection for wind sensors must be carefully planned to avoid errors introduced by their surroundings. Standard exposure for wind sensors is 33 feet (10 meters) above the ground over open, level terrain. Open terrain is defined as an area where the distance from the sensor to any obstruction is at least 10 times the height to which the obstruction protrudes above ground level at the sensor.

Major changes in wind direction are normally caused by the movement of large scale general circulation pressure patterns. When these large scale features are weak, local circulations such as sea breezes and night time cold air drainage predominate. Fluctuations in the mean wind direction over short periods are usually the result of mechanical or convective turbulence. Mechanical turbulence (eddies produced by the friction of air moving over rough surfaces) is seldom of interest in measuring wind. The siting of the sensor should normally attempt to minimize the effects of mechanical turbulence. Large obstacles such as trees, buildings, and hills create large mixing eddies that cause side fluctuations in wind direction and speed. It is generally advisable to avoid installing a wind sensor where it will be influenced by the wakes produced from large obstructions.

The tops of buildings are poor sites due to extreme mechanical turbulence. Wind sensors should never be located near exhaust vents, smokestacks, or ventilation systems. Sensors that must be roof-mounted should be at a height above the roof that is at least 1” times the height of the building for buildings less than 30 feet high. Avoid mounting sensors on the edge of a roof.

2.3 Precautions

When transporting, packing, and unpacking the sensor, always grasp the main support shaft with one hand and the tail assembly with the other. This prevents the sensor’s swinging freely and possibly being damaged. The propeller is vary fragile; do not drop or jar it.

2.4 Assembly

The sensor is shipped with the propeller detached. To attach the propeller:

1 Remove the retaining screw from the sensor shaft.

2 Slide the propeller onto the shaft and align the slot in the propeller hub to the key on the shaft.

3 Reinstall the retaining screw securely, but be careful not to overtighten it.

Attach the sensor cable to the sensor and to the indicating/recording electronics. Verify correct sensor operation prior to final installation. Refer to the appropriate instruction manuals for operating and calibration instructions. **Section 4** of this manual contains calibration information for this sensor. When cable is purchased from All Weather Inc., a 5-conductor, shielded, PVC jacketed, size 20 AWG cable is provided. The

cable will be attached to the sensor cable connector. The cable part number is T600507 and the length must be specified in feet or meters.

2.5 Wind Direction Benchmark (AWOS Installations)

For AWOS installations, a wind direction reference point must be established in one of the four cardinal directions. It is simplest to use True North as the reference, though at some installations this may not be feasible. The following instructions explain how to locate a North benchmark. Any of the other three directions can be determined once True North has been established.

True North uses the earth's geographic meridians, while Magnetic North is the North indicated by a magnetic compass. Depending on a site's location, Magnetic North is to either the East or West of True North (with the exception of sites along the "line of zero declination", where Magnetic and True North are the same). This difference, measured in degrees, between True North and Magnetic North is known as the **magnetic declination**. For sites west of the line of zero declination (which runs roughly from west of Hudson Bay, down along Lake Michigan to the Gulf Coast in western Florida), the magnetic declination is "Easterly". For sites east of the zero line, the declination is "Westerly". Magnetic declination for a particular site can be obtained from the site survey data form, airport directory, or from any USGS map.

Use the All Weather Inc. Model 8297 Surveying Compass with Telescope to determine True North at the installation site. This instrument allows you to determine True North to within 1° accuracy.

Once True North has been established, use the Model 8297 to determine the location at which the benchmark will be installed. The benchmark should be aligned with the Model 2020 vane, approximately 100 feet from the tower. Set the marker using a bag of quick-set concrete at the determined location, and note the location in the log book.

2.6 Mounting and Alignment

The sensor can be attached to the tip of a wooden pole or to a pipe support with a drilled top plate. In AWOS installations, the sensor mounts to the tower top plate using a Model 21101 Mast Adapter (see section 2.5.1).

Take care to mount the sensor exactly vertical, or a biased indication of direction will result.

The mounting hole on the opposite side of the base from the cable connector is used to orient the skyvane for wind direction measurement. When this hole faces South and the connector faces North, the direction measured by the sensor is true relative to this North-South orientation. Select a distant object that is directly North or South of the site and align the sensor to that point.

A transit located directly North of the instrument can be used to sight either the connector on the base or the scribe line on the sensor body. A second scribe line is located on the support shaft where it meets the sensor body. When the two scribe lines are aligned, the sensor points to North. After sensor alignment is complete, secure the base of the sensor to the mounting surface.

2.6.1 Mast Adapter Mounting

(Refer to **Figure 8-1** in the ***Drawings and Parts List*** chapter.)

Mount the mast adapter Model 21101 loosely to the mounting stub on the tower top plate. Rotate the mast adapter to make tightening of the two square head bolts easier. Notice that one of the five holes in the base of the skyvane is larger than the others; this is used for keying the sensor to the mast adapter. Before fastening the sensor to the mast adapter, insert one bolt from the underside of the mast adapter and secure it on top with a nut (keying nut). Set the skyvane on top of the mast adapter so that the keying nut slides into the oversize hole in the base of the skyvane. Do not install the skyvane propeller at this time. Rotate the skyvane and mast adapter until the signal connector approximately faces North. Insert the four remaining bolts, washers, and nuts as shown in **Figure 8-1** and secure the keying bolt with a second nut. Tighten the skyvane securely to the mast adapter. Align as described above, and install the propeller as shown in drawing 2100-003.

2.7 Connection

Connect the cable to the sensor connector and route the cable from the sensor to the indicator/recording equipment. The cable must be securely fastened to the mast or tower to prevent damage from wind whipping; use plastic cable ties every three feet, stopping seven feet from the ground. Do not put staples through the cable jacket. Avoid routing the cable near heavy-duty electrical equipment where unwanted induced noise might occur.

Shielded cable is used whenever possible and may be ordered with the sensor. Connect the shield wire to chassis or earth ground only at the indicator/recorder end of the cable. When cable is purchased with the sensor, All Weather Inc. will ship the cable with the connector attached.

3 Theory of Operation

3.1 Construction

The Skyvane Wind Sensor makes two independent measurements: wind speed and wind direction. The components used are selected for durability and will withstand winds in excess of 200 mph.

The sensor is constructed of fiberglass and aluminum and uses stainless steel or brass components for all moving parts.

3.2 Wind Speed

The wind speed transducer is a high frequency (HF) tachometer that produces a +12 VDC square wave output with a frequency proportional to wind speed. A slotted disc rotates through the transducer interrupting the signal between an oscillator module and a receiver module. The output signal varies from 0-925 Hz for a wind speed range of 0-200 miles per hour. Refer to Figure 4-1 for a list of output frequencies for various wind speeds.

The signal from the wind speed transducer is carried by wires through the main shaft to a slip ring assembly. The brushes of the slip ring assembly in turn are connected to a 10-pin weatherproof connector. (Refer to the schematic at the end of this manual for wiring details.) Both the propeller shaft and main body shaft are supported on lubricated stainless steel ball hearings. Labyrinths are provided to prevent the entry of moisture.

3.3 Wind Direction

The wind direction transducer is a single-wiper 5k ohm potentiometer excited with a constant voltage. The linear output of the wiper is a voltage proportional to 0-360° of wind direction. The gap of the potentiometer is oriented directly to North.

As the wind rotates the body of the sensor, a shaft leading from the body rotates the potentiometer shaft. With +5 VDC applied to the potentiometer, the motion of the sensor causes the voltage at the potentiometer wiper to vary from 0 to 3.33 VDC. This linear voltage corresponds to degrees azimuth from 0 to 360. The output of the potentiometer is used to drive analog recorders, dials, data loggers, and signal conditioning modules.

In order to protect both the sensor and the +5 VDC excitation voltage source, a series resistor of 2.49K ohms, 1%, is wired in series with the +5 VDC lines.

4 Calibration

4.1 General

Each sensor has been factory calibrated before shipment and is ready for installation. The following steps describe how to calibrate the Skyvane.

4.2 Wind Speed Calibration

Wind speed calibration is accomplished by removing the propeller assembly and driving the shaft counterclockwise at a known RPM by means of a synchronous motor calibration unit. This calibration is accomplished in the laboratory prior to field installation.

The wind speed transducer output wires should be connected to a wind speed module, such as All Weather Inc. Model 1275. Otherwise, a +12 VDC regulated supply must be attached to the sensor and the output monitored with a frequency counter or oscilloscope. Refer to Figure 4-1 for calibration data.

4.3 Wind Direction Calibration

The wind direction transducer can be aligned using the following procedure.

1 Remove the side cover from the sensor.

2 Loosen the set screw that holds the coupling to the main shaft (not the transducer shaft).

3 Align the tail assembly to south. The two scirbed liens will be 180° apart.

4 Rotate the coupling and transducer shaft assembly until the indicator aligns with south or the voltage at the wiper is one half the total voltage applied to the potentiometer.

5 Tighten the set screw at the top of the coupling.

6 Replace the side cover.

CALIBRATION CERTIFICATE

Instrument Skyvane Wind Sensor

Model Number 2100 Serial Number

Range	Calibration Points	Sensor Output	Propeller Shaft Speed
Wind Speed			
0-200 MPH	91.08 MPH	420.0 Hz	1800 rpm
Wind Direction			
0-360° Azimuth	180° AZ	1.665 VDC*	
* with excitation voltage of 3.33 VDC			

Cable T600507 Length Shield Yes ■ No ☐

☐ Refer to enclosed Calibration Sheet. Figure

☐ Must be used in conjunction with:

Instrument

Model Number Serial Number

Technician Date

SKYVANE
MODEL 2100

MPH	OUTPUT, Hz	SHAFT, RPM
10	44.29	
18.57	**84.00**	**360**
20	90.63	
30	136.97	
30.65	**140.00**	**600**
40	183.31	
45.76	**210.00**	**900**
50	229.65	
60	275.99	
70	322.33	
80	368.67	
90	415.00	
91.08	**420.00**	**1800**
100	461.34	
110	507.68	
120	554.02	
130	600.36	
140	646.70	
150	693.04	
160	739.38	
170	785.72	
180	832.06	
190	878.40	
200	924.74	

Y (MPH) = 0.2158 x X (Hz) + 0.442
HIGH FREQUENCY TACHOMETER
OUTPUT SIGNAL vs. MPH
Figure 4-1

MPH x	1.60934	0.44704	0.86898	1.46660
MPH	Km/Hr	m/s	Knots	Ft./s
0	0	0	0	0
5	8.05	2.24	4.34	7.33
10	16.09	4.47	8.69	14.67
15	24.14	6.71	13.03	22.00
20	32.19	8.94	17.38	29.33
25	40.23	11.18	21.72	36.67
30	48.28	13.41	26.07	44.00
35	56.33	15.65	30.41	51.33
40	64.37	17.88	34.76	58.67
45	72.42	20.12	39.00	66.00
50	80.47	22.35	43.45	73.33
55	88.51	24.59	47.79	80.67
60	96.56	26.82	52.14	88.00
65	104.61	29.06	56.48	95.33
70	112.65	31.29	60.83	102.67
75	120.70	33.53	65.17	110.00
80	128.75	35.76	69.52	117.33
85	136.79	38.00	73.86	124.67
90	144.84	40.23	78.21	132.00
95	152.89	42.47	82.55	139.33
100	160.93	44.70	86.90	146.67

Units of Measure Conversion
Figure 4-2

5 Maintenance

5.1 Periodic Maintenance

This instrument should operate for an extended period of time with a minimum of care and maintenance. The only periodic maintenance that may be required is the application of oil to the felt washer behind the propeller. How often this needs to be done depends on the environmental conditions to which the instrument is subjected, but it should not be required more than once a year. If trouble should occur, refer to the drawings supplied with the instrument to isolate the problem. If parts or maintenance are required, contact the factory.

For sensors installed as part of an AWOS system, refer to section 5.5.

5.2 Disassembly

Inspection or repair of the skyvane may require some disassembly and re-assembly of the unit. This can be accomplished quickly and easily using the instructions in the following paragraphs.

Removal of propeller:

1 Remove the propeller retainer screw (M010028).

2 Slide the propeller forward off the wind speed transducer shaft (M100117, M100120, or M100122).

Removal of Wind Speed Transducer:

1 With the propeller removed as described above, the transducer mounting screws will be exposed. Remove the transducer mounting screws and pull the transducer slowly from the upper housing (M100113).

2 When the transducer is free of the housing, it is necessary to unsolder the wiring connections behind the transducer before it can be completely removed.

Removal of Wind Direction Transducer:

1 Remove the 3 screws (M004027) from the bottom cover (101888), and remove the bottom cover from the lower housing (M101884).

2 Remove the two front cover retaining screws (M006047) and remove the front cover.

3 Loosen the upper set screws from the coupling (M025537) . Remove the 3 transducer mounting screws (M004025), and slowly remove the transducer from the lower housing.

4 Remove the 4 electrical connector mounting screws from around the bulkhead receptacle, and remove this receptacle from the lower housing.

5 Unsolder the wind direction transducer wires from this connector.

6 The wind direction transducer may now be completely removed as the wires are withdrawn through the lower housing.

Removal of Slip Ring Brushes:

1 After the above procedure has been performed, remove the two brush assembly mounting screws (M004002).

2 The wires from the assembly must be unsoldered before it can be completely removed. This can be done at the electrical connector or at the terminals on the brush assembly.

3 Withdraw the brush assembly (M409012).

5.3 Items Requiring Factory Disassembly

Removal and replacement of the slip rings (M100126) must be done at the factory, since this requires removing the upper housing to reroute the wires from the slip rings to the wind speed transducer. The special bearing seating procedures required when replacing the upper housing dictate that it be done at the factory.

5.4 Re-assembly

Re-assembly can be accomplished by following the above procedures in reverse order.

5.5 AWOS Periodic Maintenance

Periodic maintenance of AWOS sensors is divided into three categories: monthly maintenance, quarterly maintenance, and annual maintenance. The listed maintenance routines are performed according to that schedule.

5.5.1 Tools and Equipment Required

The following tools and equipment are required for periodic AWOS maintenance.

- Assorted hand tools, including #/8" wrench
- Model 1231 run-up motor

5.5.2 AWOS Monthly Maintenance

Visually check that both the wind speed propeller and the wind direction tail are moving freely. This may require careful observation in calm wind conditions. NOTE: Visual inspection is accomplished from ground level.

5.5.3 AWOS Quarterly Maintenance

Visually check that both the wind speed propeller and the wind direction tail are moving freely. This may require careful observation in calm wind conditions. NOTE: Visual inspection is accomplished from ground level.

5.5.4 AWOS Annual Maintenance

During annual maintenance, perform the following procedures in addition to those outlined for monthly and quarterly maintenance.

1 Locate the direction benchmark determined in the initial site survey. It is approximately 100 to 150 feet from the sensor in one of the four cardinal points as referenced to true north.

2 Set the vane alignment of the sensor to the direction of the benchmark. With the sensor in this position, check the LCD display inside the DCP to determine if the vane is oriented properly toward the benchmark. If it is not, rotate the sensor and mast adapter until the sensor orientation and display agree. Tighten the mast adapter set bolts when aligned.

3 In turn, rotate the sensor slowly through a full 360°, noting the reading on the LCD display. When the LCD display reads 90°, hold the skyvane still and visually verify that it is pointing approximately East. Continue rotating the sensor, pausing at each of the remaining cardinal directions (180°, 270°, and

360°) and visually verifying that the sensor is pointing in the appropriate direction. As the skyvane is turned, the displayed values should change smoothly, with no sudden jumps or dropouts. Note, however, that there is a 10° dead band at North where suspicious readings are likely to be seen. This behavior is normal near North, but in any other direction indicates a potentiometer failure. If the sensor fails any part of this test, replace the potentiometer.

4 Verify that the skyvane's movement is free and smooth.

5 Set the DCP's LCD display to display wind speed.

6 Remove the screw from the front of the propeller and slide the propeller off the shaft.

7 Connect a Model 1231 run-up motor to the propeller shaft and power the motor on. The DCP's LCD display should read between 78 and 80 knots.

8 Replace the propeller.

9 Inspect the propeller for damage.

10 Rotate the propeller to confirm that it rotates easily without binding. If it does not, oil the felt washer behind the propeller. The felt washer may need to be oiled more frequently in areas where the skyvane is exposed to large amounts of dust or other contaminants.

11 (*The following test should be performed in windless conditions. If one person is performing the test alone, the anemometer will need to be removed from the tower and connected to a test cable within sight of the DCP display*.)

With the propeller in place, spin the cups by hand until the DCP display reads greater than 5 knots. After releasing the cups, they will slow and the displayed speed will gradually decrease. If the display reads 2 knots or less while the cups are still turning, the bearings are good. If the cups stop before slowing to a speed of 2 knots or less, replace the bearings.

6 Warranty

Unless specified otherwise, All Weather Inc. (the Company) warrants its products to be free from defects in material and workmanship under normal use and service for one year from date of shipment, subject to the following conditions:

a. The obligation of the Company under this warranty is limited to repairing or replacing items or parts which have been returned to the Company and which upon examination are disclosed, to the Company's satisfaction, to have been defective in material or workmanship at time of manufacture.

b. The claimant shall pay the cost of shipping any part or instrument to the Company. If the Company determines the part to be defective in material or workmanship, the Company shall prepay the cost of shipping the repaired instrument to the claimant. Under no circumstances will the Company reimburse claimant for cost incurred in removing and/or reinstalling replacement parts.

c. This warranty shall not apply to any Company products which have been subjected to misuse, negligence, or accident.

d. This warranty and the Companys obligation thereunder is in lieu of all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose, consequential damages, and all other obligations or liabilities.

No other person or organization is authorized to give any other warranty or to assume any additional obligation on the Companys behalf, unless made in writing and signed by an authorized officer of the Company.

7 Specifications

Wind Speed	
Range	0-200 mph (0-90 m/s)
Starting threshold	2 mph (0.9 m/s)
Complete tracking	3 MPH (1.3 m/s)
Distance constant	6.2 ft. (1.9 m)
Accuracy	±1 mph <30 mph; ±3% >30 mph
Sensor output, 100 MPH-HF	461.3 Hz
Propeller	4-blade; 13.77" dia. (350 mm)
Wind Direction	
Range	1-360°
Accuracy	±2°; ±5° at North
Sensor output-POT	0-5000 ohms
Potentiometer type	Co-molded plastic, single wiper
General	
Size	29.75"L x 30"H (760 x 762 mm)
Weight/Shipping	12 lbs/25 lbs (5.4 kg/11.3 kg)

8 Drawings and Parts List

8.1 Contents

The following pages include drawings and parts lists for this instrument. Please note that the parts lists are arranged in assembly/subassembly form. Each subassembly is on its own page. Subassemblies and parts are listed in the smallest economical size available from All Weather Inc.

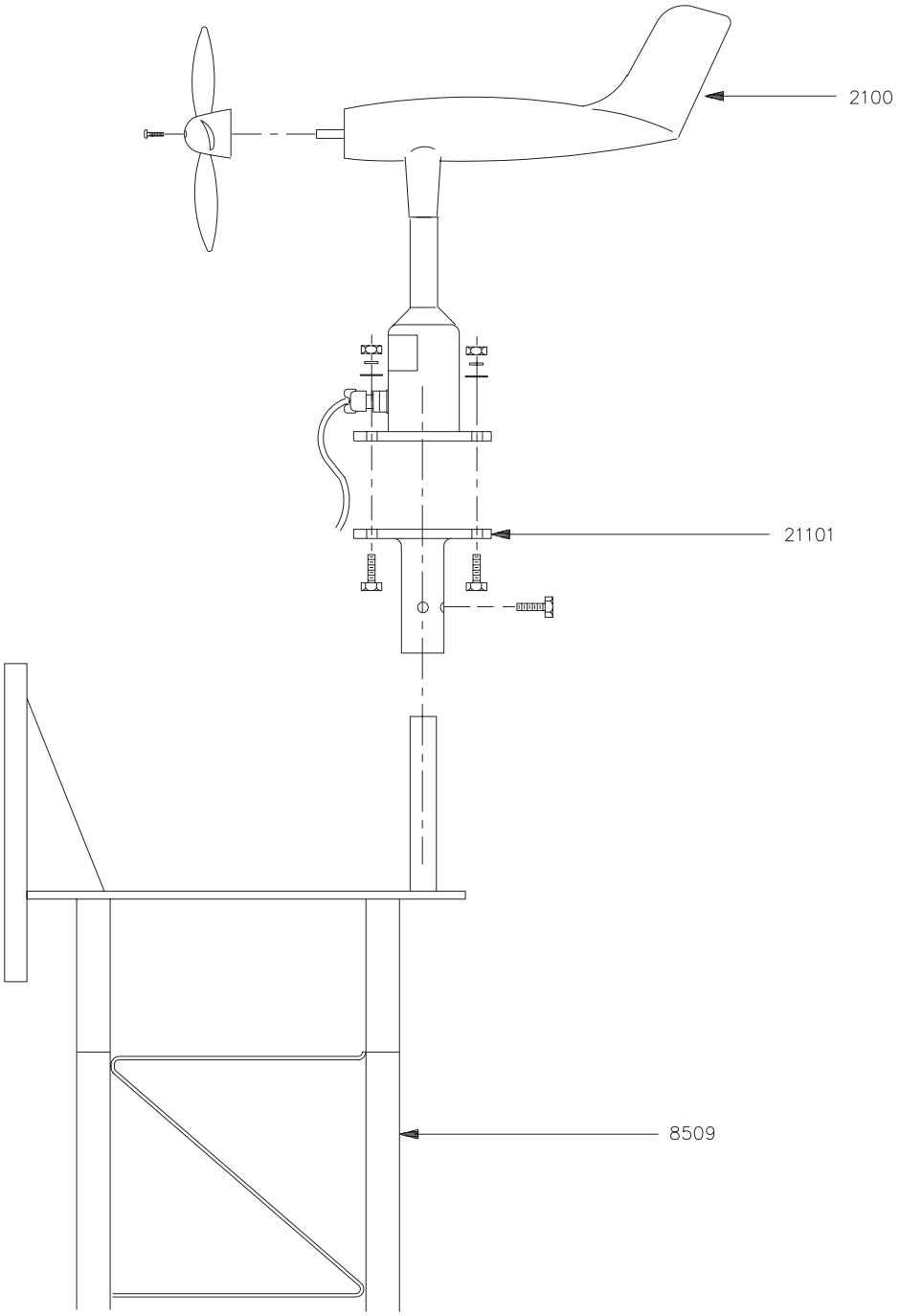
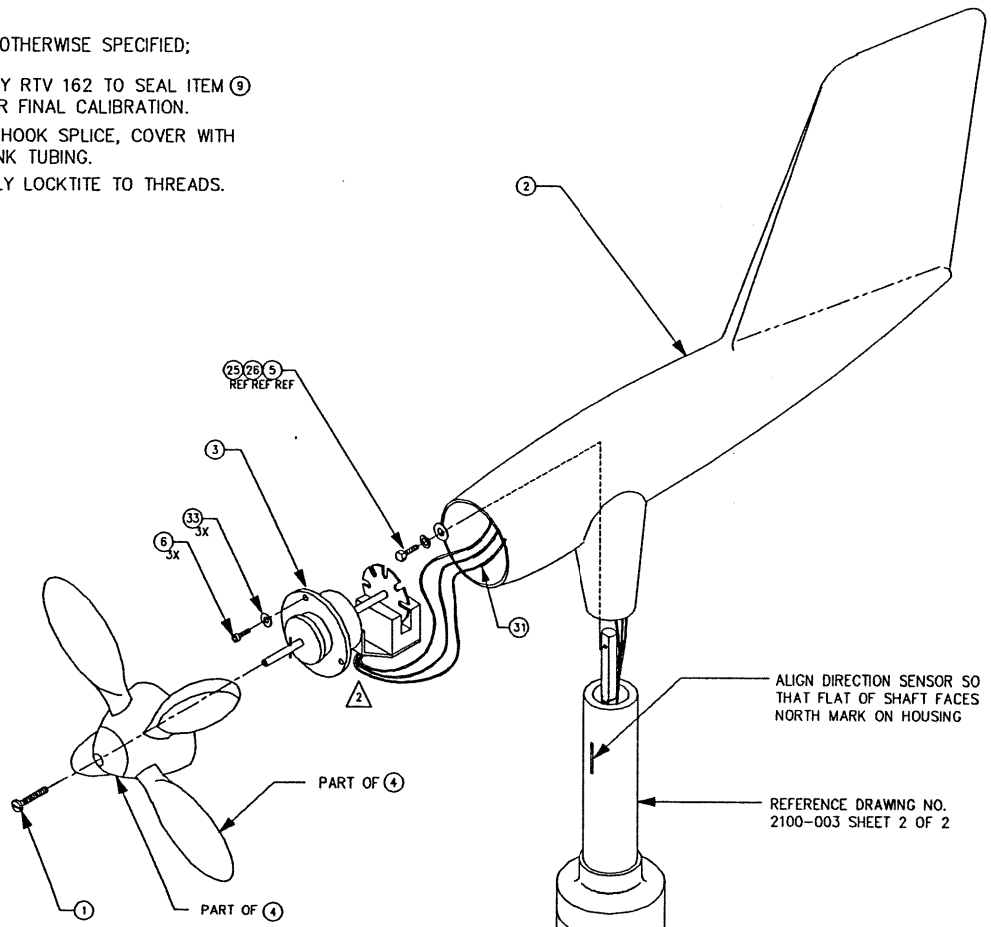


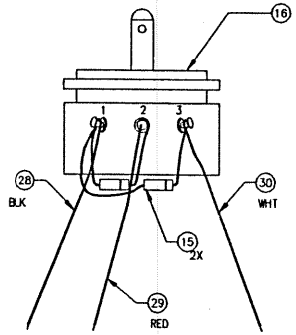
Figure 8-1
AWOS Tower Installation

REVISIONS			DWG NO 2100-003	
REV	ECN	DESCRIPTION	DATE	APPROVED
A	2798	SEE ECN FOR HISTORY	5/88	
B	3718	SEE ECN FOR HISTORY	11/15/90	
C	4052	SEE ECN FOR HISTORY	4/22/92	
D	4150	ADD ITEM #S & ADD WIRING DETAIL & NOTES		

NOTES: UNLESS OTHERWISE SPECIFIED;

1. APPLY RTV 162 TO SEAL ITEM (9) AFTER FINAL CALIBRATION.
2. USE HOOK SPLICE, COVER WITH SHRINK TUBING.
3. APPLY LOCKTITE TO THREADS.





WIRING DIAGRAM

D	D	REV	REV STATUS
2	1	SHEET	OF SHEETS

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES
TOLERANCES
XX=±.010 ANGLES ±1/2°
XXX=±.005 FRACTIONS=±.02
DO NOT SCALE DRAWING

MAT'L: SEE BILL OF MATERIALS
FINISH: AS ISSUED
TREATMENT:

NEXT	NEXT ASSY	USED ON
QTY REQD	APPLICATIONS	

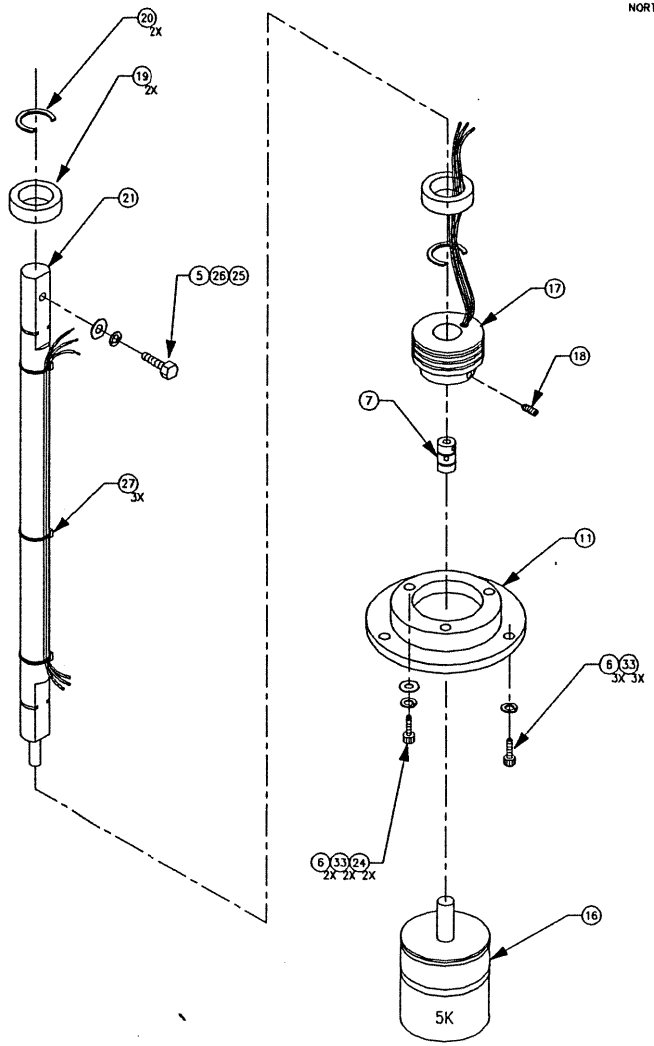
DRAWN BY: PETE SANCHEZ 14JAN93
CHECKED BY:
DESIGN ENGINEER:
PROJECT MANAGER:
PROGRAM MANAGER:
APPROVALS DATE

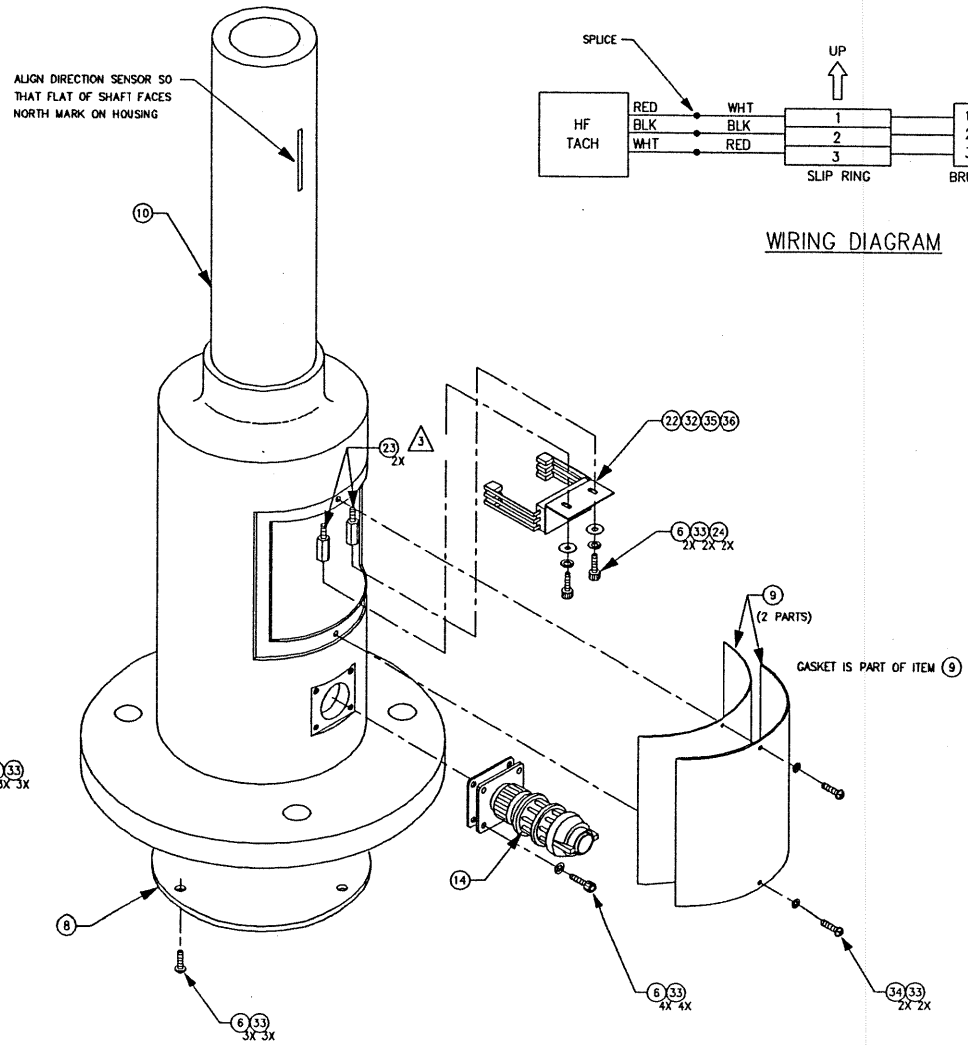
QUALIMETRICS, Inc.

TITLE: ASSEMBLY DRAWING, WND SPD AND WND DIR XMTR

SIZE D DWG NO 2100-003

SCALE NONE RELEASE DATE SHEET 1 OF 2

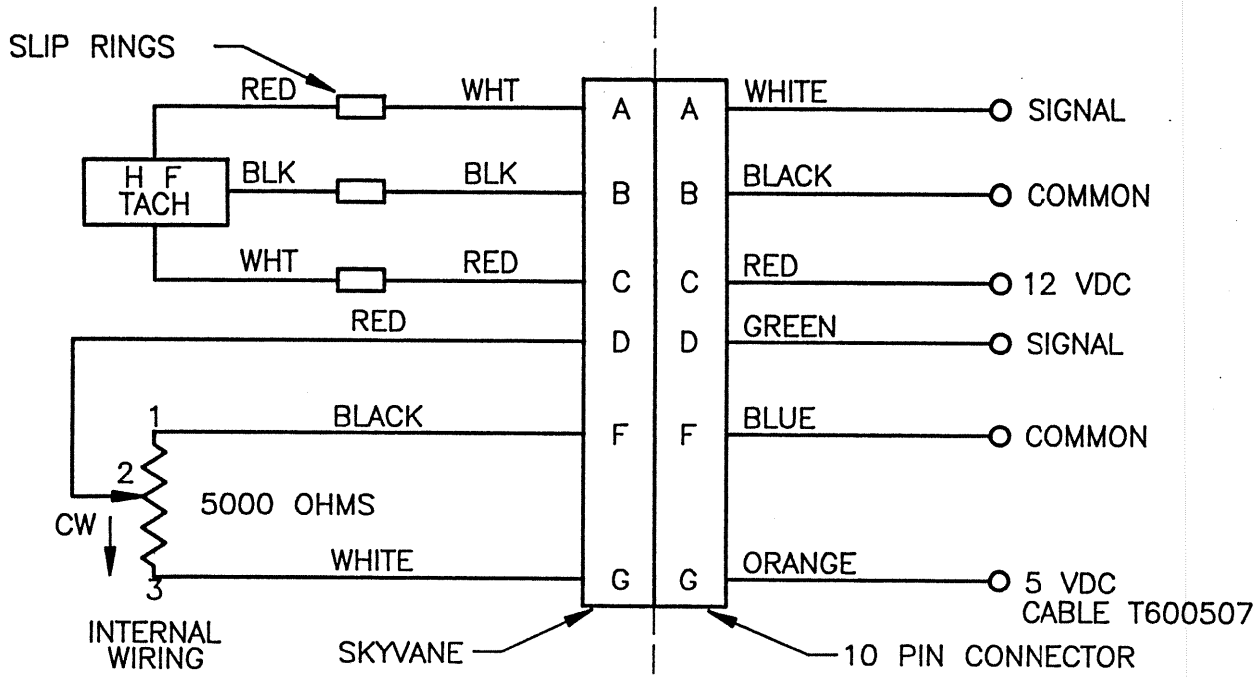




WIRING DIAGRAM

SIZE	DWG NO.
D	2100-003
SCALE NONE	REV LTR D SHEET 2 OF 2

REVISIONS			2100-004	
REV	ECN	DESCRIPTION	DATE	APPROVED
A	2239	SEE ECN FOR HISTORY	12/84	
B	3718	SEE ECN FOR HISTORY	10/1/90	
C	4052	SEE ECN FOR HISTORY	4/92	
D	4150	REDRAWN, UPDATE TO CURRENT FORMAT & ADD SLIP RINGS	1/20/93	
E	4336	ADD SKYVANE CONNECTOR & MOVE CW DES.	03NOV94	KHH



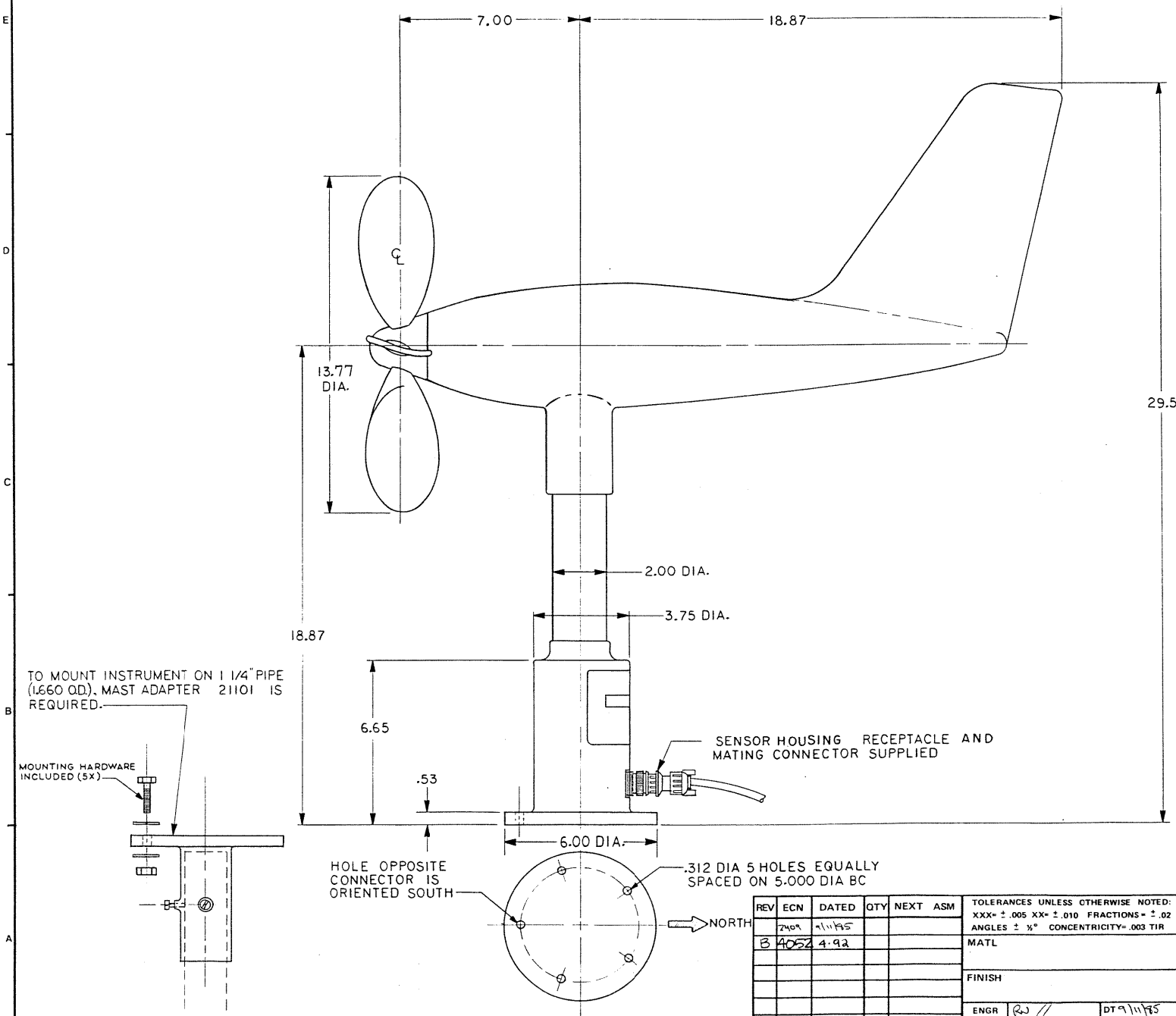
			UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES XX=±.010 ANGLES ±1/2° XXX=±.005 FRACTIONS=±.02 DO NOT SCALE DRAWING	DRAWN BY: PETE SANCHEZ	15JAN93
				CHECKED BY: Keely Hook	03NOV94
			MATL	DESIGN ENGINEER:	
			FINISH	PROJECT MANAGER:	
NEXT	NEXT ASSY	USED ON	TREATMENT	PROGRAM MANAGER:	
QTY REQD	APPLICATIONS			APPROVALS	DATE

QUALIMETRICS, Inc.

TITLE: SCHEMATIC
SKYVANE MODEL 2100

SIZE	DWG NO.	
A	2100-004	
SCALE NONE	RELEASE DATE 12/84	SHEET 1 OF 1

DWG. NO. 2100-005



REV	ECN	DATED	QTY	NEXT ASM
	2409	9/11/85		
B	4052	4-92		

TOLERANCES UNLESS OTHERWISE NOTED:
XXX= ± .005 XX= ± .010 FRACTIONS = ± .02
ANGLES ± ½° CONCENTRICITY= .003 TIR

MATL

FINISH

ENGR	RJ	DT 9/11/85
APPRO		DT 9-12-85

QUALIMETRICS, Inc.
WEATHERMEASURE / WEATHERTRONICS
Instruments and Systems Division
3213 Orange Grove Avenue
Sacramento, California 95660 U.S.A.

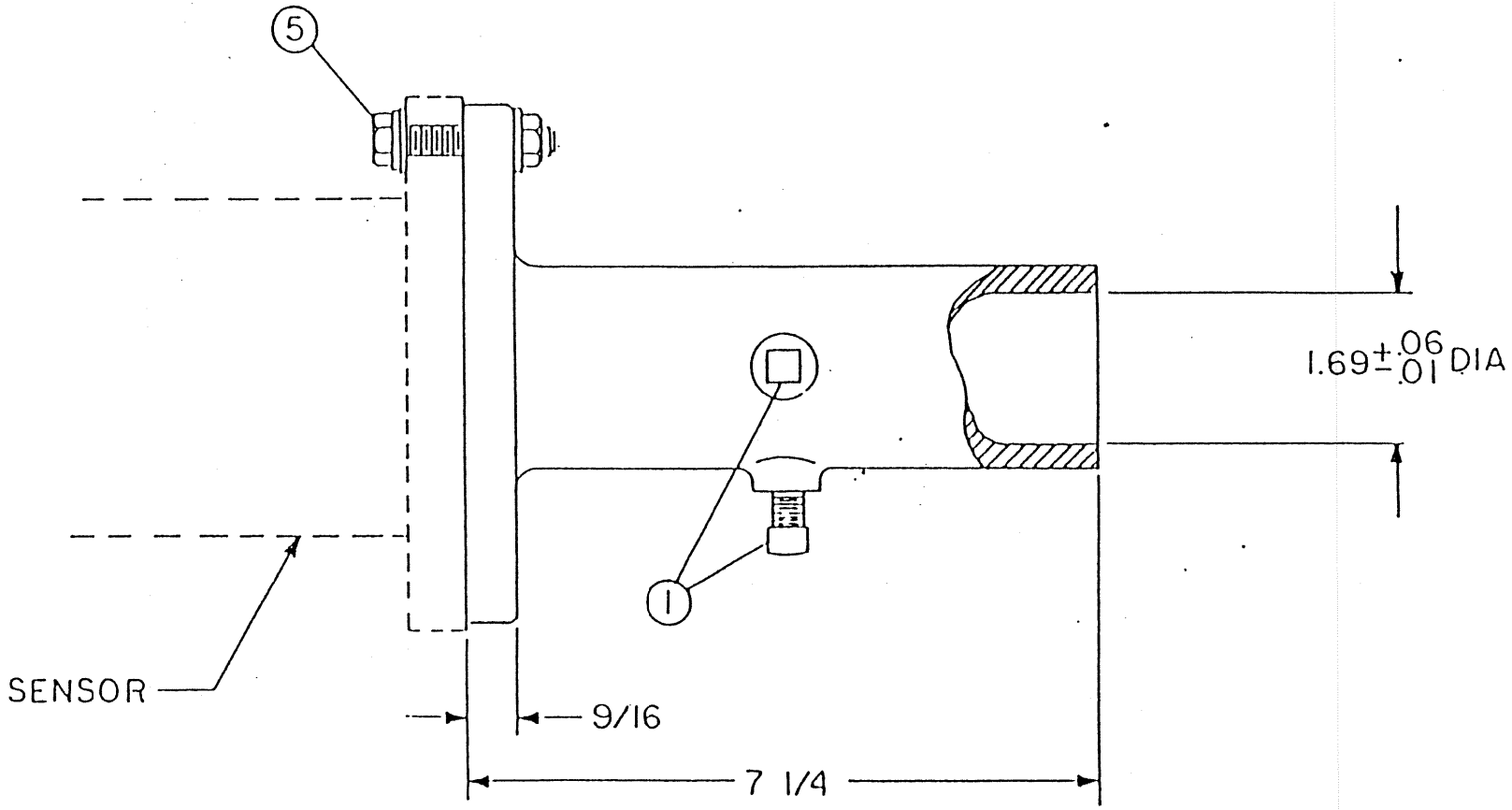
NOMENCLATURE OUTLINE DRAWING
SKYVANE WIND SENSOR

MOD. USAGE 2100-2107 | SHEET 1 OF 1

BY K. WEBER | SCALE NONE | DWG NO. 2100-005 | C

DT 9/11/85

DWG. NO. 21101-05



REV	ECN	DATED	QTY	NEXT ASM
A		2-83		

TOLERANCES UNLESS OTHERWISE NOTED:
XXX= ± .005 XX= ± .010 FRACTIONS = ± .02
ANGLES ± ½° CONCENTRICITY= .003 TIR

MATL

FINISH

ENGR		DT
APPRO		DT 2-83

QUALIMETRICS, Inc.

WEATHERMEASURE · WEATHERTRONICS
Instruments and Systems Designed
3213 Kingston Avenue
Sacramento, California 95660 U.S.A.

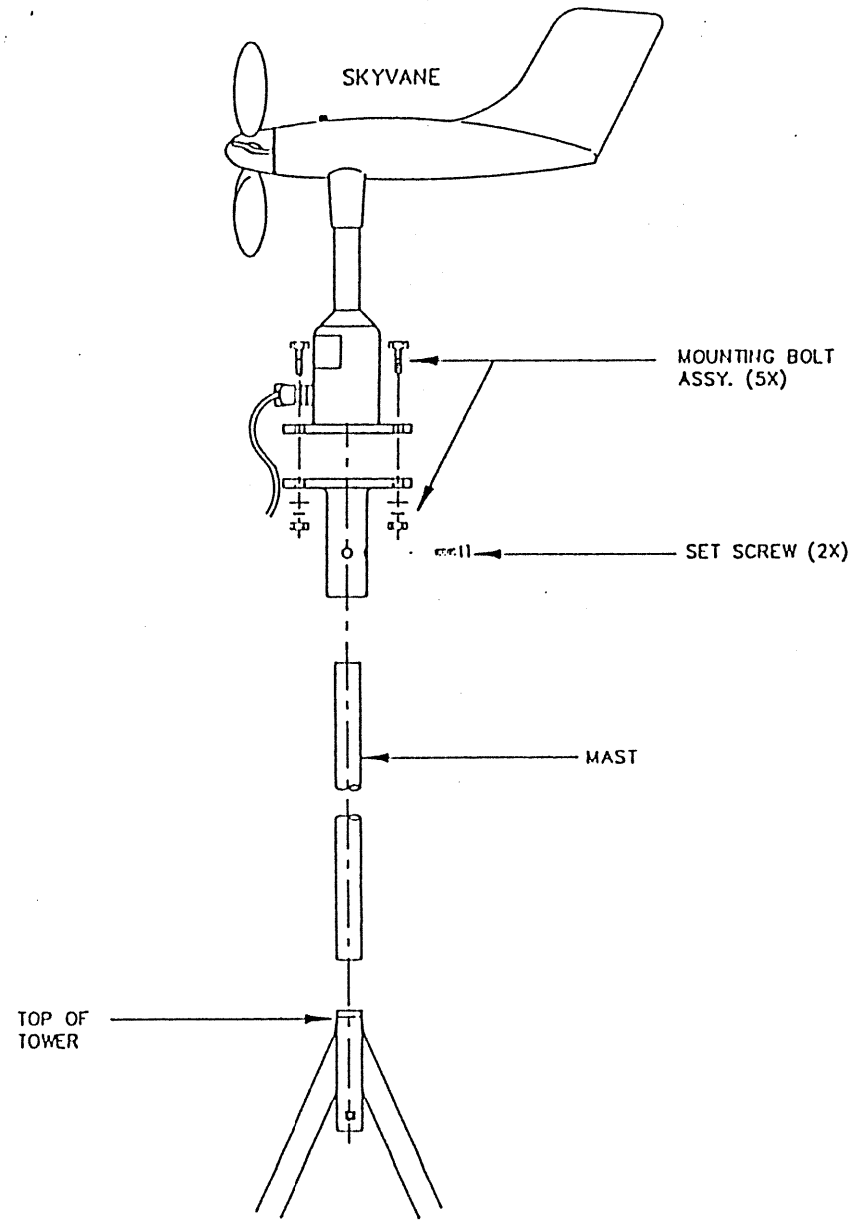
NOMENCLATURE

MAST ADAPTER

MOD. USAGE 2111-A; 2100

SHEET 1 OF 1

BY	SCALE	DWG NO.	
GT	0	21101-05	A
DT 2-24-83			



REV	ECN	DATED	QTY	NEXT ASSY
A	3043	4/5/89		

TOLERANCES UNLESS OTHERWISE NOTED
XXX=±.005 XX=±.010 FRACTIONS=±.02
ANGLES ±1/2° CONCENTRICITY=.003 TIR

MATL

FINISH

ENGR RJ DT 4/6/89

APPROVED DT

QUALIMETRICS, Inc.

C

TITLE
INSTALLATION DRAWING,
MAST ADAPTER

MOD. USAGE 2100

SHEET 1 OF 1

BY K. Wolen

DATE 4-5-89

SCALE NONE

DWG NO. 21101-007

LINE NO	RUN/ SET UP	COMPONENT	QTY EACH	UOM
10		ASM ASSEMBLY DRAWING 2100-003	1.0000	EA
30		2100-001 MANUAL USERS 2100	1.0000	EA
40		M010031 SCR 10-32 X .750 BND SS LOCK IT-1	1.0000	EA
50		M100113 ASSY BODY UPPER HOUSING W102 IT-2	1.0000	EA
60		M100227 XDUCER H.F. TACK ASM W102 IT-3	1.0000	EA
70		M104500 PROPELLER ASSY SKYVANE IT-4	1.0000	EA
100		T430043 SERIAL TAG 0.5X1.7 QUALIMETRI IT-39	1.0000	EA
110		ECN ENGR CHANGE NUMBER ECN 4336, 3-30-94	.0000	EA
120		M012035 SCR .250-28 X1.500 HEX SS IT-5	1.0000	EA
130		M004024 SCR 4-40 X .375 SOC SS IT-6	18.0000	EA
140		M025539 COUPLING 1/4 X 1/8 T301-35A IT-7	1.0000	EA
150		M101888 PLATE BOTTOM W102 IT-8	1.0000	EA
160		M101913 ASSY ACCESS COVER IT-9	1.0000	EA

(PART NO)=A4$ OR A4$(1,3)="ALL"

LINE NO	RUN/ SET UP	COMPONENT	QTY EACH	UOM
170		M101884 W102 LOWER HOUSING ASSEMBLY IT-10	1.0000	EA
180		M103216 ADAPTER PLATE 5K POT TO SKYVAN IT-11	1.0000	EA
190		M408030 GASKET JACK MTG SIZE 18 IT-12	1.0000	EA
200		M425037 JACK 10 PIN MS310EA-181 PRE IT-13	1.0000	EA
210		M426025 PLUG STRT 10 PIN IT-14	1.0000	EA
220		M463072 DIODE ZEN. IN4735A 6.2V 1 W IT-15	2.0000	EA
230		M480114 POTENTIOMETER 5K IT-16	1.0000	EA
240		M102730 SLIP RING ASSY COMPLETE IT-17	1.0000	EA
250		M007520 SCR SET 4-40 X.375 SS CUP IT-18	1.0000	EA
260		M025007 BEARING, NDP77R10AV2 77R10AV2 IT-19	2.0000	EA
270		M027514 RING RTNG .625 EXT C SS IT-20	2.0000	EA
280		M101885 W102 MAIN SHAFT IT-21	1.0000	EA
290		M102735 BRUSH ASSY. COMPLETE IT-22	1.0000	EA

LINE NO	RUN/ SET UP	COMPONENT	QTY EACH	UOM
300		M408144 STANDOFF M-F 4-40 X .500 IT-23	2.0000	EA
310		M009034 WASHER FLAT #4 SS .32OD .03T IT-24	5.0000	EA
320		M009041 WASHER FLAT .250 SS .63OD .04T IT-25	1.0000	EA
330		M009042 WASHER LOCK .250 SS SPLIT IT-26	1.0000	EA
340		M434001 CABLE TIE 3.9X.09 (0.87 DIA) IT-27	3.0000	EA
350		M492010 WIRE HOOKUP 26 GA STRND IT-28	6.0000	IN
360		M492002 WIRE HOOKUP 26 GA STRND IT-29	6.0000	IN
370		M492009 WIRE HOOKUP 26 GA STRND IT-30	6.0000	IN
380		M432003 TUBE SHRNK 1/8 BLK IT-31	3.0000	IN
390		M492084 W HKP 22GA STRD BLK IT-32	8.0000	IN
400		M009025 WASHER LOCK #4 SS SPLIT IT-33	20.0000	EA
410		M004008 SCR 4-40 X .312 PAN SS PHIL IT-34	2.0000	EA
420		M492093 W HKP 22GA STRD WHT IT-35	8.0000	IN

(PART NO)=A4$ OR A4$(1,3)="ALL"

LINE NO	RUN/ SET UP	COMPONENT	QTY EACH	UOM
430		M492086 W HKP 22GA STRD RED IT-36	8.0000	IN
9020	2.4000 .2000	MECHANICAL ASSEMBLY	4.0000	EA

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