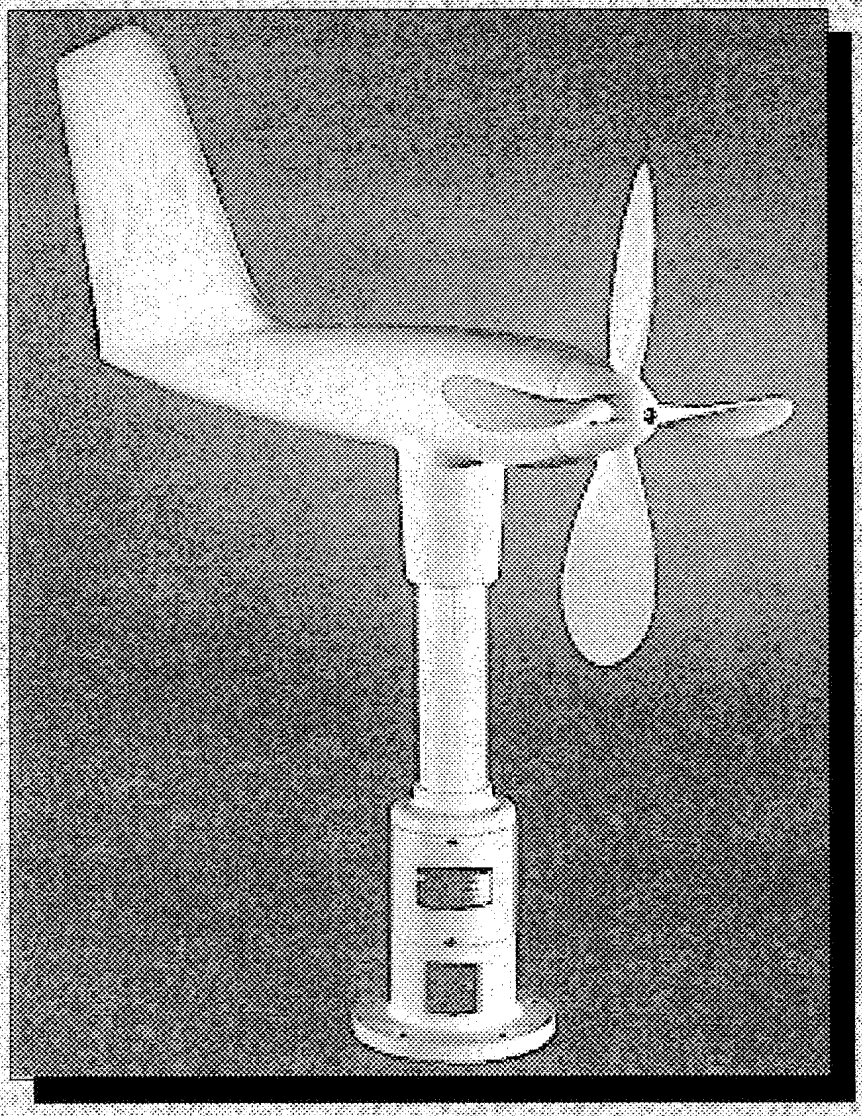
Skyvane Wind Sensor Model 2101



User's Manual

QUALIMETRICS, INC. • SACRAMENTO, CALIFORNIA • USA


QUALIMETRICS, INC.

REVISIONS				
REV	ECN#	DESCRIPTION	DATE	APPROVED
A	2239	INITIAL RELEASE	1/86	
B	3828	REVISE TRANSFER FUNCTIONS	10/90	
C	4052	UPDATE DRAWINGS	4/92	
D	4165	REVISE FOR NEW POTENTIOMETER	12/92	
E	4336	UPDATE BOM AND DRAWINGS	11/94	KAH

MODEL 2101
SKYVANE WIND SENSOR
USER'S MANUAL

CHECK		DT
ENGR		DT
MFG		DT
QA/SQA		DT
APPROVED		
BY	J. EWING	
DATE	11/4/94	

TITLE

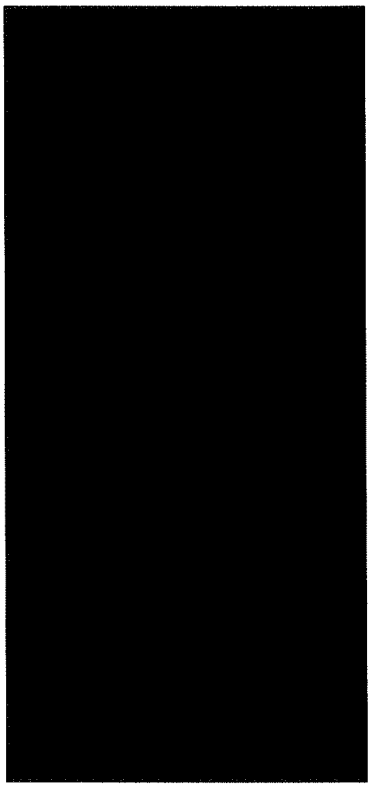
MODEL 2101
SKYVANE WIND SENSOR
USER'S MANUAL

QUALIMETRICS

DOCUMENT NUMBER **2101-001**

Skyvane Wind Sensor Model 2101

User's Manual



QUALIMETRICS, INC.

Qualimetrics, Inc.
1165 National Drive
Sacramento, CA 95834
Telephone: (916) 928-1000
Telefax: (916) 928-1165

Table of Contents

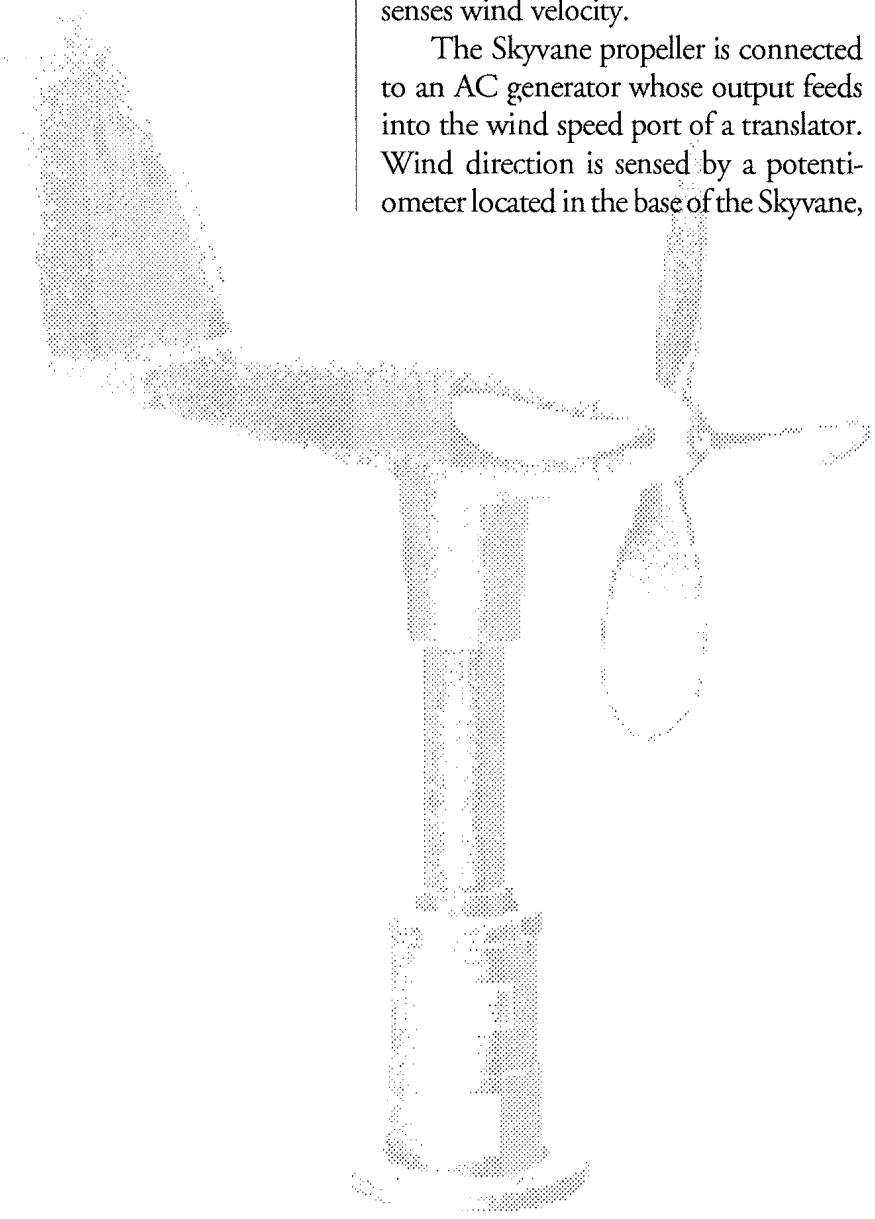
1 General Information

1.1 Introduction

The Model 2101 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 an AC generator 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" I.D. pipe (1 " O.D.). 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 Qualimetrics, 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 Re-install 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 Qualimetrics, 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 T600505 and the length must be specified in feet or meters.

2.5 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. 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.

2.6 Connection

After sensor alignment is complete, secure the base of the sensor to the mounting surface. 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 where appropriate. Do not put staples through the cable jacket. Avoid routing the cable near heavy-duty electrical equipment where unwanted inducted 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, Qualimetrics 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 an AC generator that produces an output voltage or frequency proportional to wind speed. This transducer is used in applications where power is not available for sensor excitation and cable runs are long or in noisy locations. The AC generator is a six-pole permanent magnet type. The output voltage is 18.00 VAC at 89.4 mph, and the output frequency is 90 Hz at 89.4 mph. Refer to Figure 4-1 for a list of output voltages and 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 voltage from the sensor can be measured directly using a voltmeter, or it can be measured at the monitoring or data logging equipment.

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 scribed lines on the sensor 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.

The potentiometer will read 4995 ohms or more before shorting to 0 ohms. Try to hold the sensor as close to the shorting point as possible.

CALIBRATION CERTIFICATE

Instrument Skyvane Wind Sensor

Model Number 2101 Serial Number _____

Range	Calibration Points	Sensor Output	Propeller Shaft Speed
Wind Speed			
0-200 MPH	0 MPH	0.00 VAC	0 rpm
	89.4 MPH	VAC	1800 rpm
Wind Direction			
0-360° Azimuth			
	180° Azimuth	1.665 VDC*	

Cable T600505 Length _____ Shield Yes ■ No ☐

☐ Refer to enclosed Calibration Sheet. Figure _____

☐ Must be used in conjunction with:

Instrument _____

Model Number _____ Serial Number _____

Technician _____ Date _____

* With excitation voltage of 3.33 VDC.

SKYVANE
MODEL 2101

MPH	OUTPUT, VAC	OUTPUT, Hz	SHAFT,RPM
10	1.87		
18.9	**3.66**	**18**	**360**
20	3.90		
30	5.93		
30.8	**6.10**	**30**	**600**
40	7.96		
46.0	**9.18**	**45**	**900**
50	9.99		
60	12.02		
70	14.06		
80	16.09		
89.4	**18.00**	**90**	**1800**
90	18.12		
100	20.15		
110	22.18		
120	24.21		
130	26.24		
140	28.27		
150	30.30		
160	32.33		
170	34.36		
180	36.39		
190	38.42		
200	40.45		

Y (MPH) = 4.925 x X (VAC) + 0.779
AC GENERATOR
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.

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:

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

❷ 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.

❸ 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.

6 Warranty

Unless specified otherwise, Qualimetrics (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-AC	20.15 VAC Avg.
Propeller	4-blade; 13.77" dia. (350 mm)
Wind Direction	
Range	1-360°
Accuracy	±2°, ±5° at North
Sensor output-Potentiometer	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 Schematics and Parts List

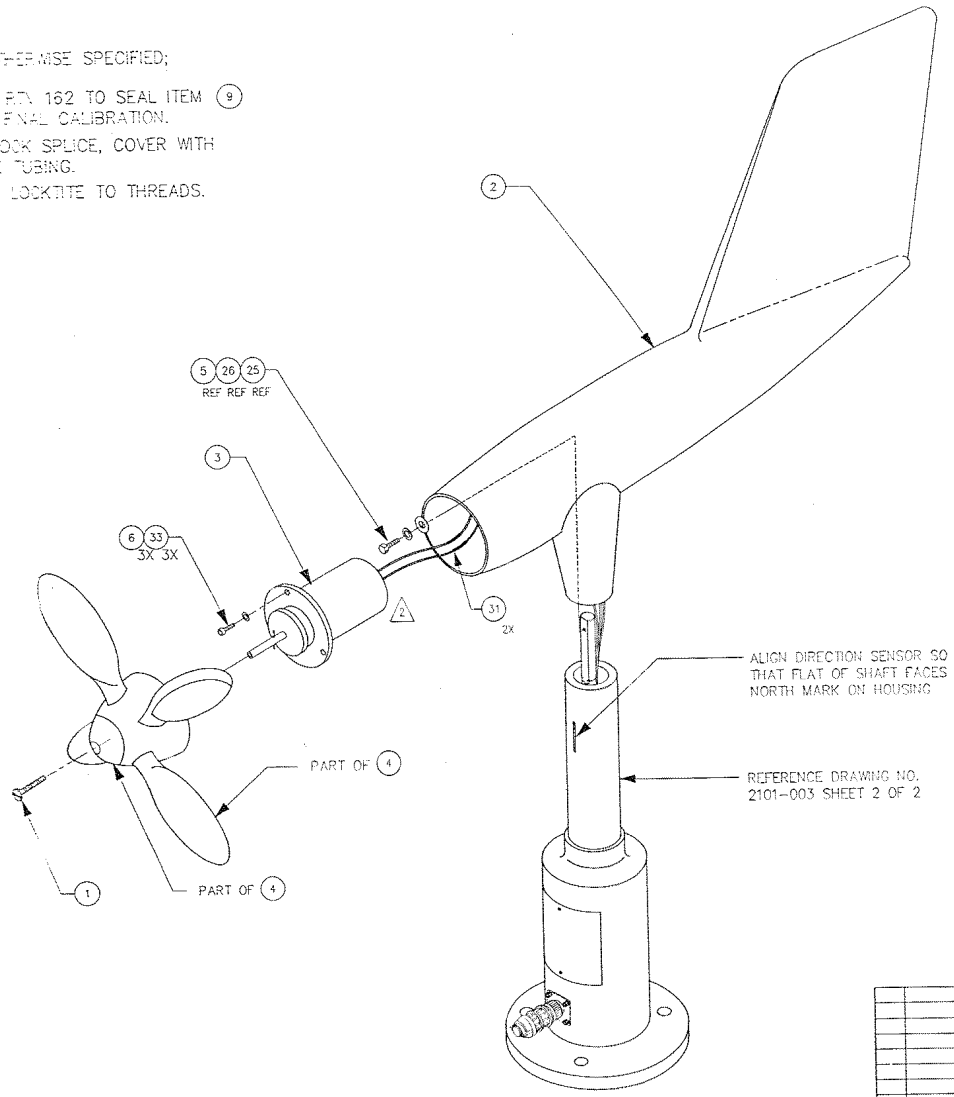
8.1 Contents

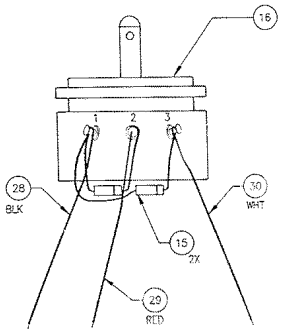
The following pages include schematics, assembly drawings, and parts lists for this instrument. Please note that the parts lists are arranged in assembly/subassembly form. Each subassembly is on its own page. Subassemblies and parts are listed in the smallest economical size available from Qualimetrics.

REVISIONS				DWG NO. 2101-003
REV	ECN	DESCRIPTION	DATE	APPROVED
A	2298	INITIAL RELEASE	5/88	
B	3227	CHG. PROP P/N, UPDATE DWG FORMAT	11-15-90	
C	4052	CHG P/N & VIEW OF AC GEN/& POT(CHT 2)	4/22/92	
D	4165	ADD ITEM #5 & CHANGE WIRING DIAGRAM	12/11/92	

NOTES: UNLESS OTHERWISE SPECIFIED;

1. APPLY PCN 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

MATL: SEE BILL OF MATERIALS

FINISH: AS ISSUED

TREATMENT:

NEXT ASSY	USED ON
APPLICATIONS	

	DRAWN BY:	DATE
	PRTE SANCHEZ	1DEC92
CHECKED BY:		12/3/92
DESIGN ENGINEER:		
PROJECT MANAGER:		12-11-92
PROGRAM MANAGER:		12/11/92
APPROVALS		DATE

QUALIMETRICS, Inc.

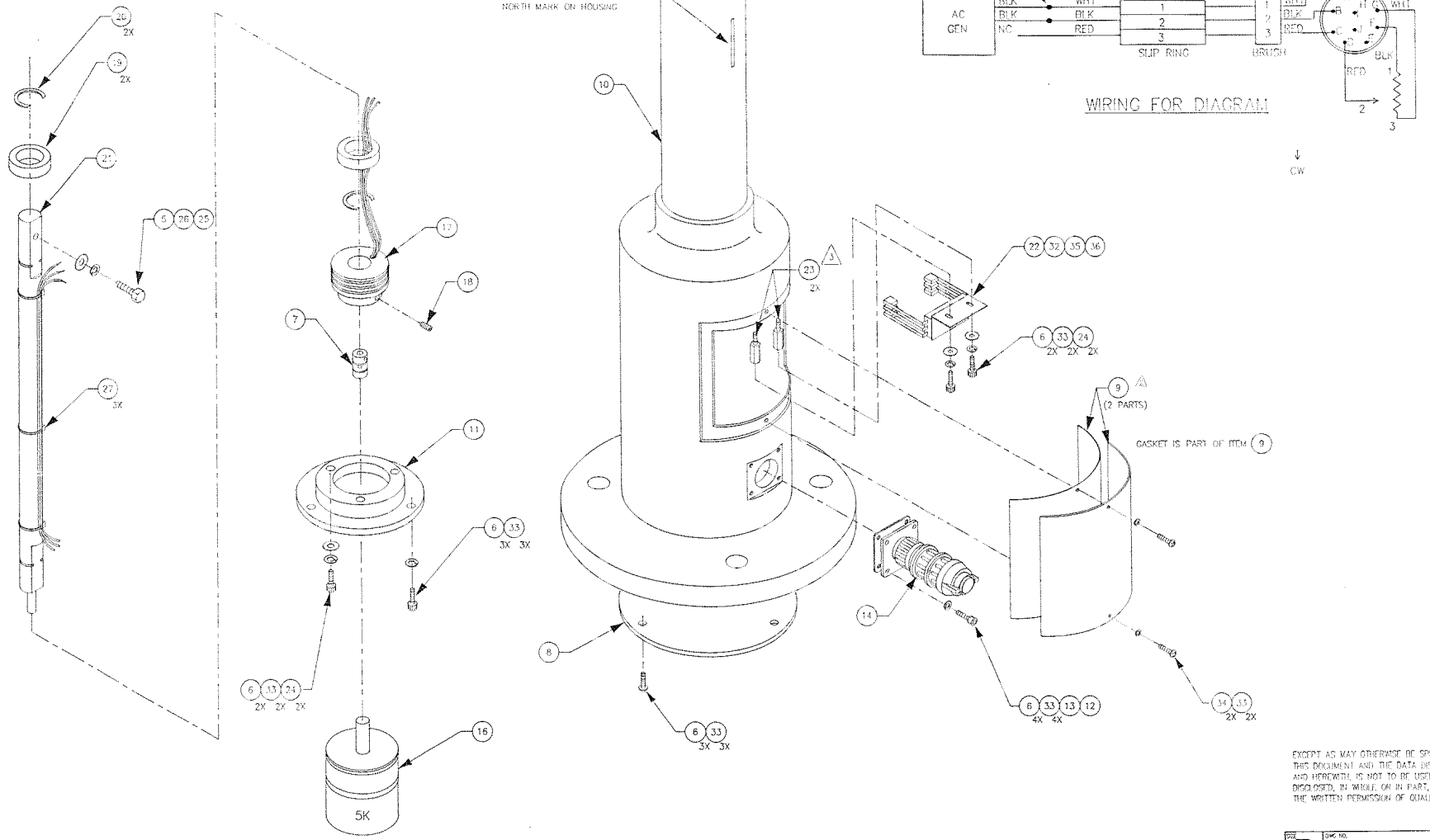
TITLE: ASSEMBLY DRAWING, WND SPD AND WND DIR XMTR

SIZE: D DWG NO. 2101-003

SCALE: NONE RELEASE DATE: 5/88 SHEET 1 OF 2

NOTES: UNLESS OTHERWISE SPECIFIED;

1. THIS ASSSEMBLY IS PART NUMBER M103215.



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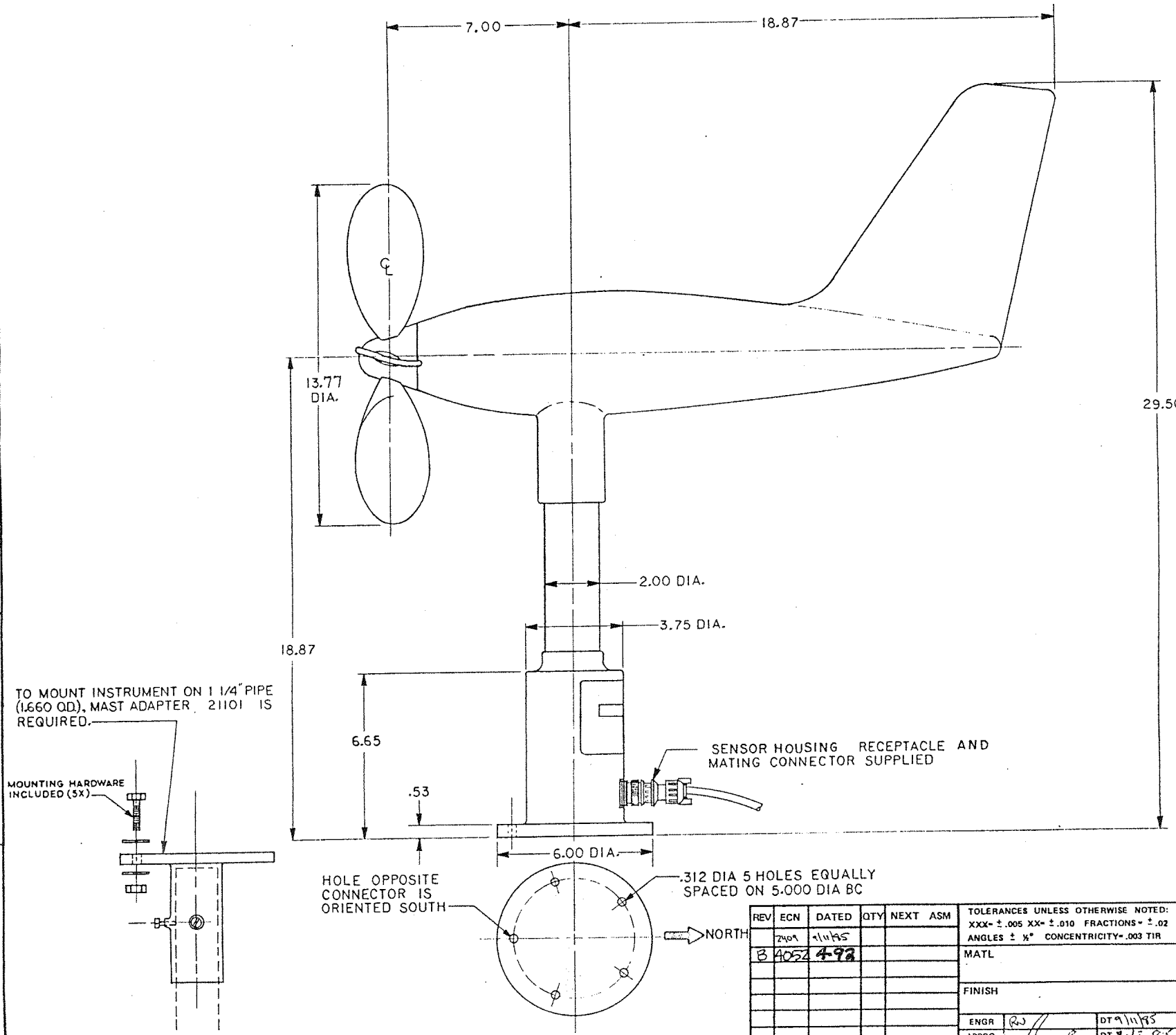

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	2409	4/11/85		
B	4052	4-92		

TOLERANCES UNLESS OTHERWISE NOTED:
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ANGLES ± ½° CONCENTRICITY= .003 TIR

MATL

FINISH

ENGR	RJ	DT 9/11/85
APPRO		DT 9-12-83

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

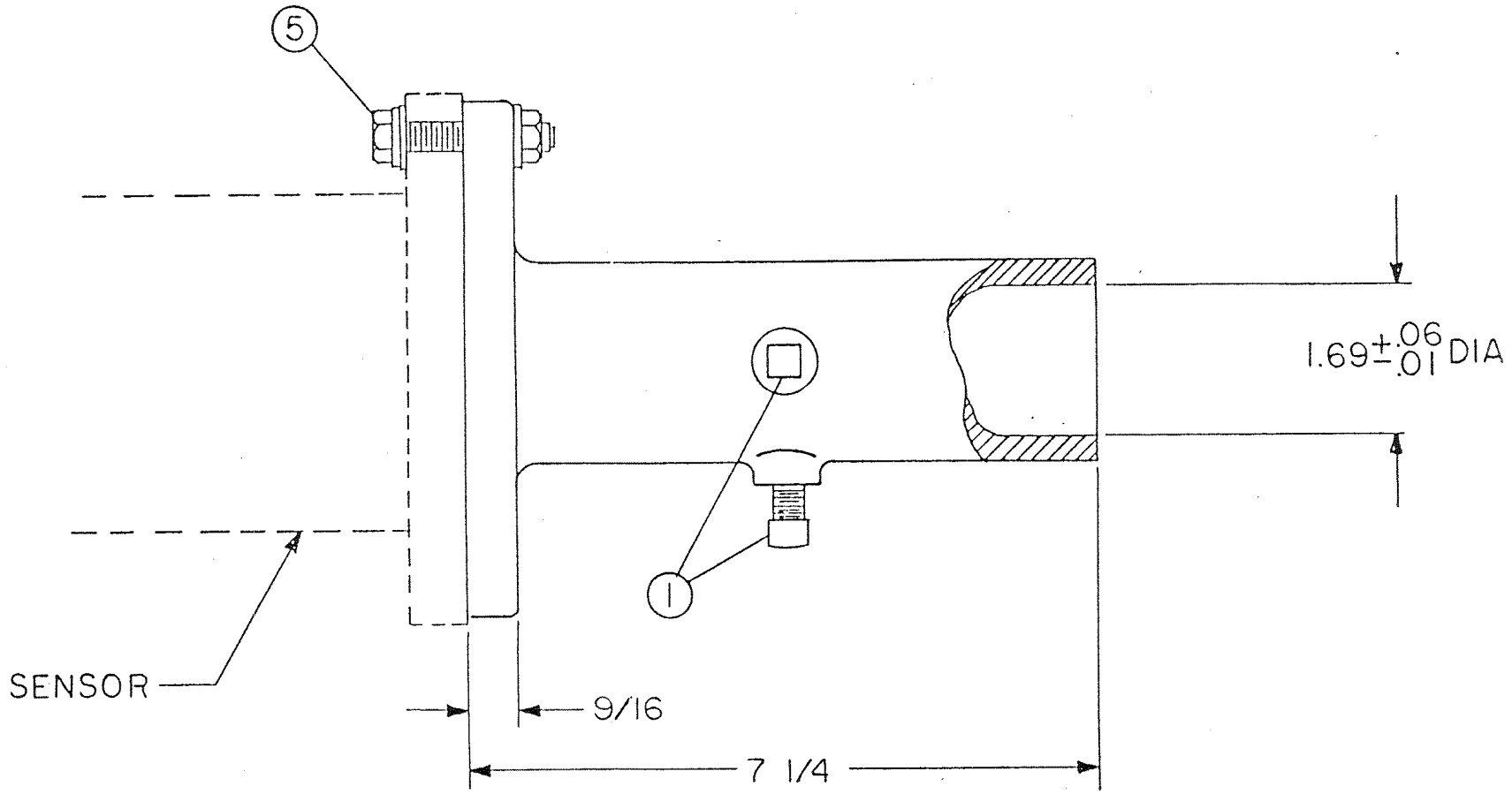
NOMENCLATURE OUTLINE DRAWING
SKYVANE WIND SENSOR

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	gma	DT 4-92

QUALIMETRICS, Inc.

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

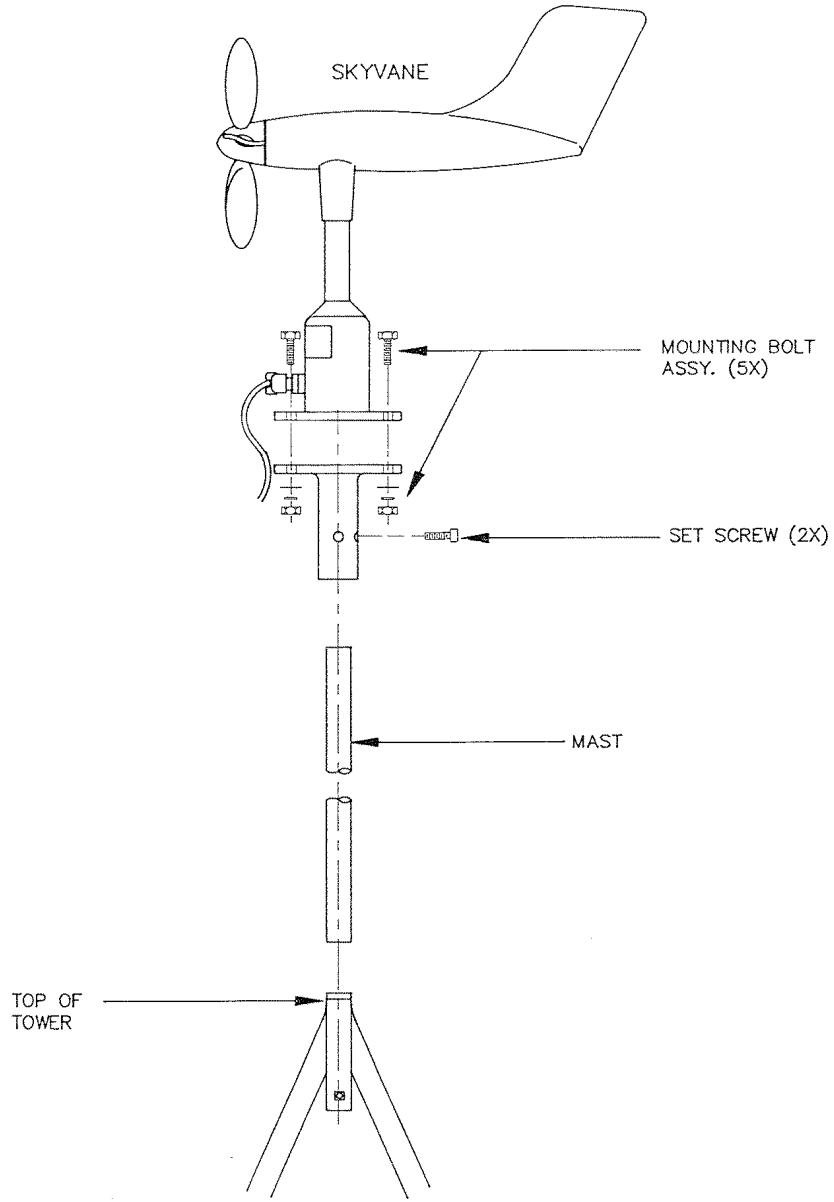
NOMENCLATURE

MAST ADAPTER

MOD. USAGE 2111-A, 2100

SHEET 1 OF 1

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



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A	3043	4/5/89		

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ANGLES ±1/2° CONCENTRICITY=.003 TIR

MATL

FINISH

ENGR RW DT 4/6/89

APPROVED DT 4/6/89

QUALIMETRICS, Inc.

C

TITLE
INSTALLATION DRAWING,
MAST ADAPTER

MOD. USAGE 2100

SHEET 1 OF 1

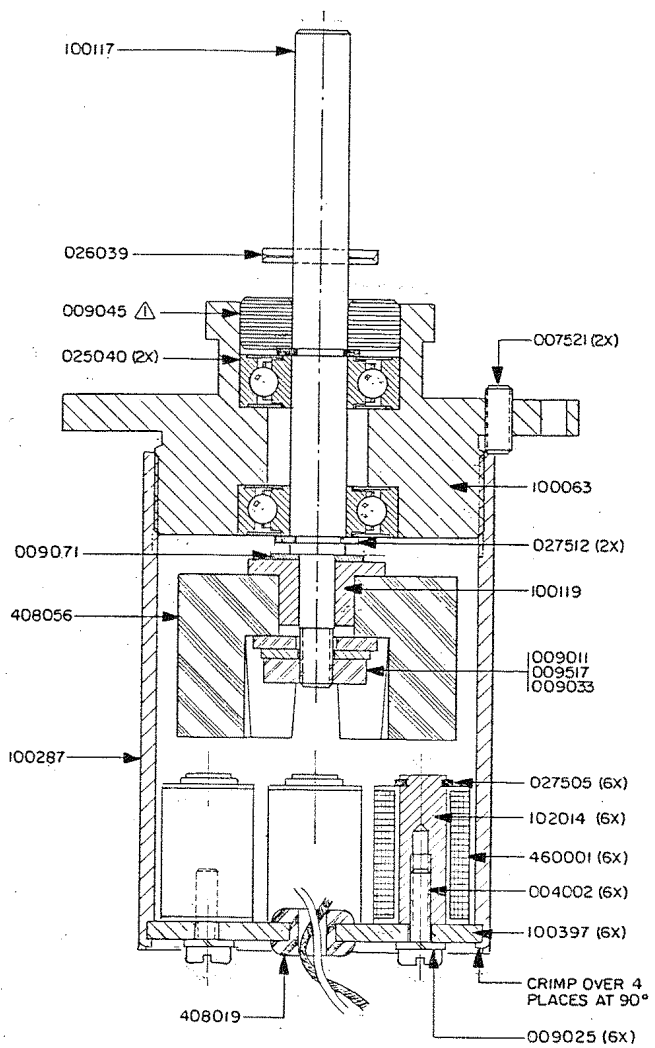
BY K. Weller

DATE 4-5-89

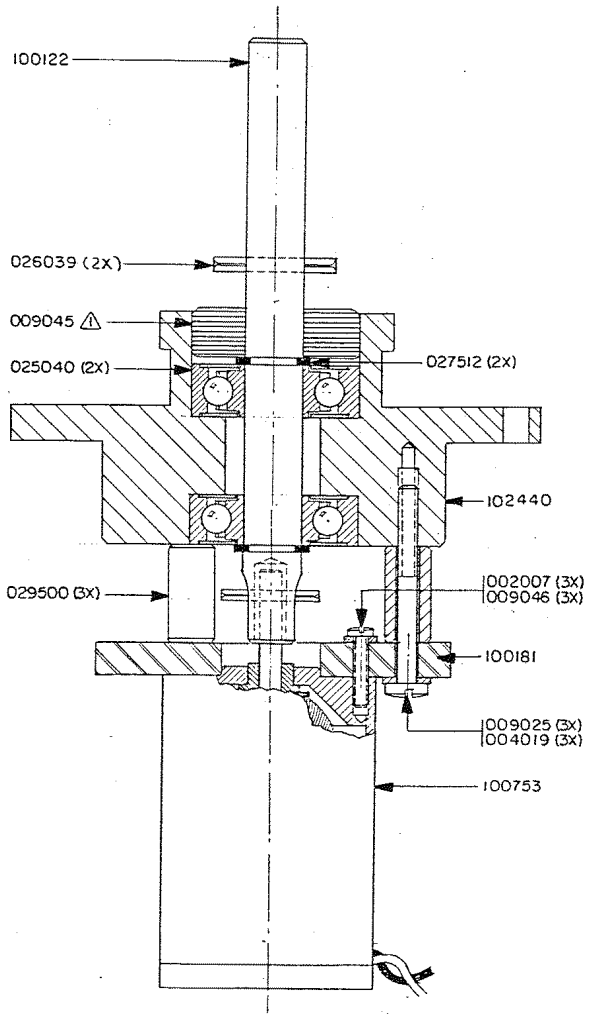
SCALE NONE

DWG. NO. 21101-007

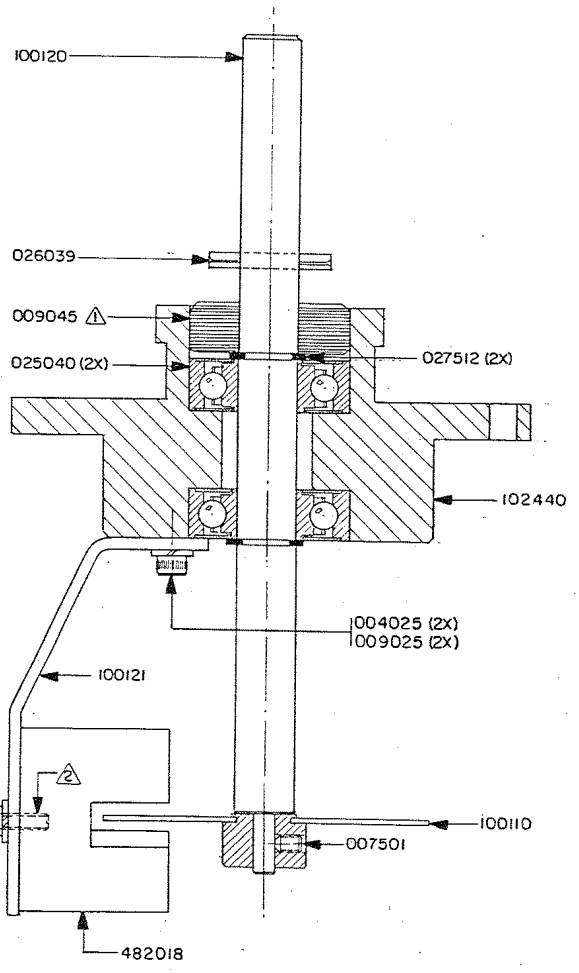
DWG. NO. MI00225



MI00225 A.C. GENERATOR



MI00226 D.C. GENERATOR



MI00227 HIGH FREQ TACHOMETER

⚠1 IMPREGNATE FELT WASHER WITH SAE 20 WT OIL (029041)

⚠2 METRIC SCREWS AND WASHERS SUPPLIED WITH 482018

DEVIATION NUMBER			DWG. NO.	QTY	ITEM	PART NO.	DESCRIPTION
REV.	ENGINEERING ORDER NO.			REQ.	NEXT ASSY		
A	4-17-80	1581		~~225~~	~~600153~~	TOLERANCES ANGLES ±30′ CONCENTRICITY .003 TIR FRACT ±.015 XX±.01 XXX±.005 UNLESS OTHERWISE NOTED	WEATHERMEASURE CORPORATION A Subsidiary of Systron-Donner Corp. SACRAMENTO, CALIFORNIA
B	2-25-81	1790		225	600154	MATERIAL NOTED	NAME GENERATOR ASSEM
C	3-2-91	3831		226	600155		
				~~226~~	~~600168~~	HEAT TREAT	DTD. 10-1-79 DWN. GEARHEART
				~~227~~	~~600156~~	FINISH	SCALE DWG NO. MI00225 TAB
				227	600157		

BRUNING 40-21.38133

LINE NO	RUN/ SET UP	COMPONENT	QTY EACH	UOM
10		ASM ASSEMBLY DRAWING 2101-003	1.0000	EA
30		2101-001 MANUAL USERS 2101	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		M100225 W102P AC GEN INSTL ASSY. IT-43	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

LINE NO	RUN/ SET UP	COMPONENT	QTY EACH	UOM
10		M004002 SCR 4-40 X .375 PAN SS PHIL	6.0000	EA
20		M007521 SCR SET 6-32 X.500 SS CUP	2.0000	EA
30		M009011 WASHER LOCK #10 SS SPLIT	1.0000	EA
40		M009025 WASHER LOCK #4 SS SPLIT	6.0000	EA
50		M009033 WASHER FLAT #10 SS .44OD .03T	1.0000	EA
60		M009045 WASHER FELT OIL IMPR	1.0000	EA
70		M009071 WASHER FLAT #10 SS .50OD .01T	1.0000	EA
80		M009517 NUT HEX 10-32 SS .37HX .12TK	1.0000	EA
90		M025040 BEARING BAL .8861 X.315 X.2756 ADDITIONAL SOURCE, SS SERIES FROM NHBB (DOMESTIC USA MFG'D)	2.0000	EA
100		M026039 PIN SPRING .063 X.750 SS	1.0000	EA
110		M027505 RING RTNG .250 EXT C SS	6.0000	EA
120		M027512 RING RTNG .312 EXT C	2.0000	EA
130		M029041 OIL 20W NON DETERGENT-QT	.0000	QT
140		M100063 W102P MOUNTING PLATE	1.0000	EA
150		M100117 W102P SHAFT-AC GEN	1.0000	EA
160		M100119 W102P BUSHING MAGNET	1.0000	EA

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

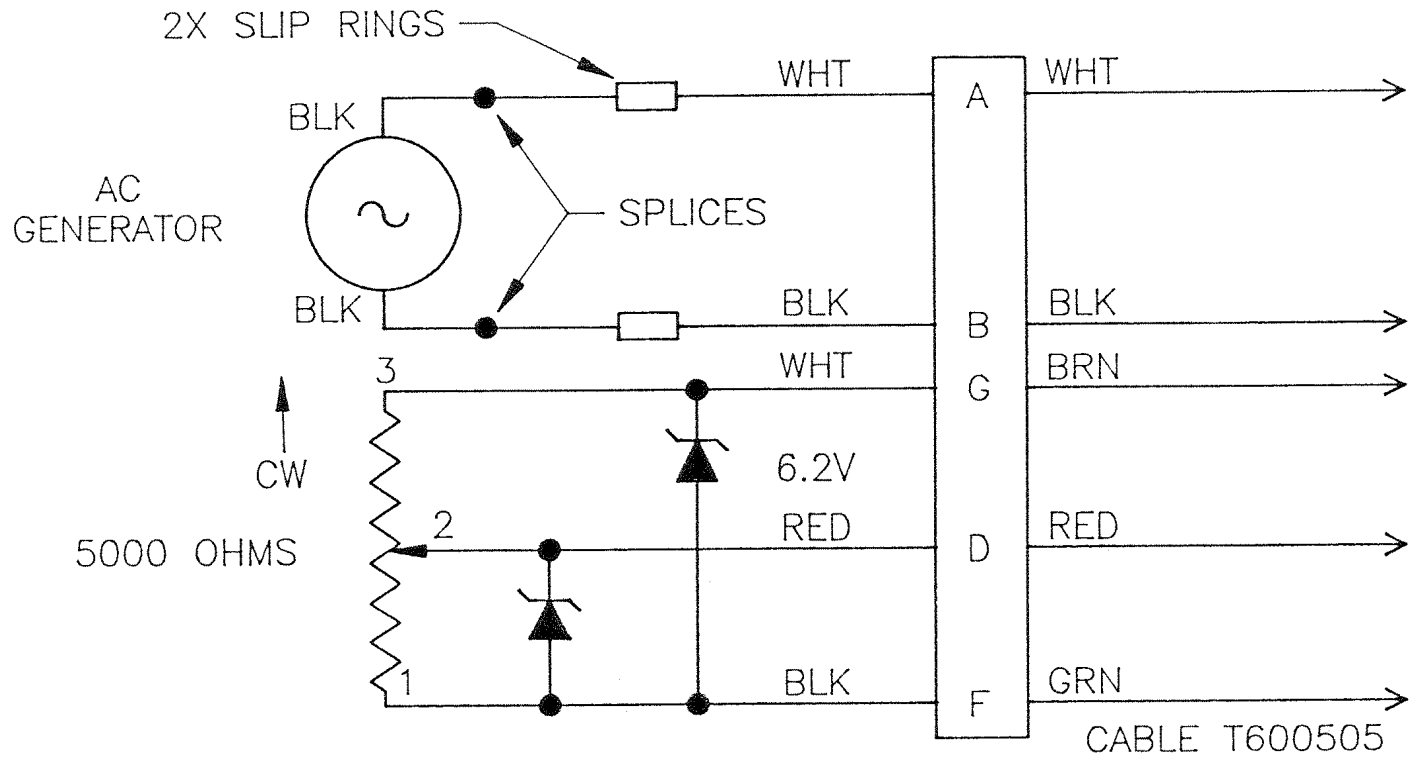
LINE NO	RUN/ SET UP	COMPONENT	QTY EACH	UOM
170		M100287 W101P HOUSING-AC GEN MACHINED	1.0000	EA
180		M100397 W101P MOUNTING PLATE COIL	1.0000	EA
190		M102014 COIL SUPPORT W102 AC GEN.	6.0000	EA
200		M408019 GROMET 1/8 HOLE 7030-C HHS9	1.0000	EA
210		M408056 MAGNET 6 POLE 5H178 W101-P	1.0000	EA
220		M460001 COIL W101P 2-470	6.0000	EA
230		ECN ENGR CHANGE NUMBER 3831	.0000	EA
9020	.8000 .1000	 ELECTRONICS	10.0000	EA

LINE NO	RUN/ SET UP	COMPONENT	QTY EACH	UOM
10		ASM ASSEMBLY DRAWING M102439-003, M103215-003	.0000	EA
20		ECN ENGR CHANGE NUMBER 2409	.0000	EA
30		M004027 SCR 4-40 X .250 PAN SS PHIL 3	2.0000	EA
40		M004059 SCR 4-40 X .250 HEX/WSHR SS 4	2.0000	EA
50		M007507 SCR SET 10-32 X.250 SS LOCK 12	1.0000	EA
60		M009034 WASHER FLAT #4 SS .32OD .03T 13	2.0000	EA
70		M025007 BEARING, NDP77R10AV2 77R10AV2 14	2.0000	EA
80		M027514 RING RTNG .625 EXT "C" SS 15	2.0000	EA
90		M101884 W102 LOWER HOUSING ASSEMBLY 10	1.0000	EA
100		M101885 W102 MAIN SHAFT 16	1.0000	EA
120		M102730 SLIP RING ASSY,COMPLETE 17	1.0000	EA
130		M102735 BRUSH ASSY. COMPLETE 18	1.0000	EA

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

LINE NO	RUN/ SET UP	COMPONENT	QTY EACH	UOM
140		M408144 STANDOFF M-F 4-40 X .500 19	2.0000	EA
150		M434004 CABLE TIE 4.8"X.19" (1.00 DIA) 20	3.0000	EA

REVISIONS			2101-004	
REV	ECN	DESCRIPTION	DATE	APPROVED
A		SEE ECN FOR HISTORY	11/84	
B	3827	SEE ECN FOR HISTORY	11/15/90	
C	4052	SEE ECN FOR HISTORY	4/92	
D	4165	REDRAWN, UPDATE TO CURRENT FORMAT & ADD SLIP RINGS & SPLICES	12/2/92	P.S.



XT	NEXT ASSY	USED ON
TY QD	APPLICATIONS	

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

MATL

FINISH

TREATMENT

DRAWN BY: PETE SANCHEZ	1DEC92	
CHECKED BY:	12/2/92	
DESIGN ENGINEER:	12-1-92	
PROJECT MANAGER:		
PROGRAM MANAGER:	12/11/92	
APPROVALS	DATE	

QUALIMETRICS, Inc.

TITLE
SCHEMATIC
SKYVANE MODEL 2101

SIZE	DWG NO.	
A	2101-004	
SCALE NONE	RELEASE DATE 11/84	SHEET 1 OF 1