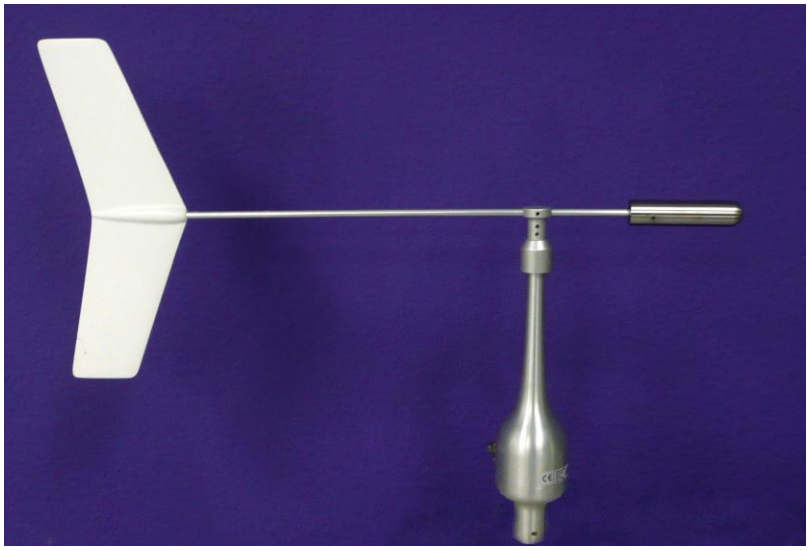
Micro Response Vane Model 2020



User's Manual

Rev. O

All Weather Inc. • 1165 National Drive • Sacramento, CA 95834 • USA • 800.824.5873 • www.allweatherinc.com

Disclaimer
The information and specifications described in this manual are subject to change without notice.

Latest Manual Version
For the latest version of this manual, see the *Product Manuals* page under *Reference* on our web site at www.allweatherinc.com/.

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Contact Customer Service

- **Phone** support is available from 8:00am - 4:30pm PST, Monday through Friday. Call 916-928-1000 and ask for "Service."
- **Online** support is available by filling out a request at www.allweatherinc.com/customer/support.html
- **E-mail** your support request to support@allweatherinc.com

Table of Contents

1 Introduction

The Model 2020 Micro Response Vane is a highly responsive analog-output wind vane. The vane body is precision-machined aluminum housing with a clear anodized finish. The structural plastic tail is protected with a durable aluminum-filled plastic coating. Stainless-steel shafts, bearings, and fittings are used throughout.

A precision potentiometer is coupled to the vane shaft to provide an analog output proportional to wind direction. A counterweight provides precision balancing of the tail assembly on the shaft. A quick-release waterproof connector is provided for cable terminations.

A mounting collar on the base of the sensor fits onto the Model 20231 Mast Adapter or the Model 2023 Crossarm. The 20231 Mast Adapter is used to install a single sensor, while the 2023 Crossarm allows the Model 2020 Vane to be installed in combination with an anemometer, such as the Model 2030. Both the Crossarm and Mounting Adapter fit onto a pipe stub or mast with a 1" outside diameter.

2 Installation

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.

The sensor is shipped complete with a tail assembly, counterweight, and mating electrical connector. The mating connector will be attached to the cable if cable was included with the order. The vane will mount directly onto the Model 2023 Crossarm Assembly. The accessory Model 20231 Mast Adapter may be ordered to allow the vane to be mounted onto a 1" outside diameter mast.

Assembly

With the exception of installing the tail and counterweight, the Model 2020 Micro Response Vane is ready for mounting. The counterweight is generally shipped unattached, and is packed in the 2020 housing's packing carton. The tail is packed inside a folded cardboard container taped to the side of the 2020 carton. Install the tail and counterweight as explained in the steps below.

1 Slide the vane tail shaft into the vane hub, entering the hub at the side opposite the scribe mark. Do not tighten the set screw on the hub yet.

2 Install the counterweight, making certain the vane tail shaft is fully engaged. Tighten the counterweight set screw with a 1/16" Allen wrench.

3 Hold the vane in a horizontal position and slide the tail shaft through the hub until the counterweight exactly balances the tail and the vane does not turn when held in a horizontal position. When balance is achieved, tighten the hub set screw with a 1/16" Allen wrench, making certain the tail is aligned with the axis of the vane. This procedure must be performed in an area free of drafts and air currents.

Site Selection

Location of the sensor is critical for accurate wind measurements. The standard exposure of an anemometer or vane over open, level terrain is 10 meters above the ground. Open, level terrain is defined as level ground with no obstruction within 300 meters. In locations where obstructions are not large, such as residential areas, and are distributed more or less evenly, the sensor may be placed at an effective height of $h + 10$ meters, where h is the approximate height (in meters) of the various obstacles. As an example, in a location where trees and buildings reach to about 5 meters, the sensors must be placed on a 15 meter mast to avoid erroneous results.

Table 1 — Determining Minimum Height of Anemometer

Distance to Obstruction	Minimum Height Above Ground Level of Anemometer
h	1.75h to 2.25h
5h	1.67h
10h	1.50h
20h	1.25h
25h	1.13h
30h	h

Handbook of Meteorological Instruments, 2nd Edition. Measurement of Surface Wind, Volume 4. London, HMSO: 1981.

In areas where large obstructions do exist within 300 meters of the sensor, the table on the preceding page can be used to calculate the proper height of the sensor (*h* is the height of the obstruction).

Example: If there is a building 10 meters high and 50 meters away, the anemometer should be at least 16.7 meters above the ground. But, if the same building is 200 meters away, the sensor could be lowered to 12.5 meters.

When the sensor is mounted on a building, the building itself disturbs the wind flow and must be taken into account before installation. For large buildings, other than buildings such as lighthouses and skyscrapers, the sensor must be mounted as far away from the edge of the building as possible and at a height **at least 3/4 the height of the building**. Thus, with a building 28 meters high, a rooftop tower at least 21 meters high should be used..

Mounting

The Model 2020 Micro Response Vane mounts directly to the Model 2023 Crossarm without any additional accessories. The crossarm is generally used to mount a Model 2030 Anemometer in combination with the Model 2020 Vane to form a wind speed and direction measurement set. If the Model 2020 Vane is to be mounted separately, a Model 20231 Mast Adapter should be ordered as an accessory. Both the Model 2023 Crossarm and the Model 20231 Mast Adapter will mount to a mast with an outside diameter of 1” (25.4 mm) or 3/4" Schedule 40 pipe.

For AWOS installations, refer to the **2020/2030 AWOS Mounting** figure in the ***Drawings*** chapter of this manual..

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 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.

Orientation

The Model 2020 Micro Response Vane must be oriented correctly as to direction. The axis of the vane should be as close to vertical as possible. Orient the vane to direction (azimuth) as described in the steps below.

1 The crossarm and/or mast should be locked into the operating position. To aid in sensor orientation, the crossarm can be set in a North-South orientation using the mounting pins as targets.

2 Install the vane on the mast adapter with the dowel pin aligned with the mating hole in the vane housing. Once alignment is properly attained, the housing will slide onto the adapter. An identical dowel pin arrangement is found on the crossarm.

3 Tighten the clamp screw at the base of the vane. Align the scribe mark on the body with the scribe mark on the hub by rotating the hub and tail assembly. Hold the two marks in alignment. An easy way to accomplish this task is to use the Model 1249-A Wind Direction Calibrator.

4 Loosen the clamp set screw at the end of the crossarm to allow the vane and pin to turn as a unit. Loosen the mast set screws on the mast adapter.

5 Using a reference point with a transit or compass, rotate the vane body until the nose points to true North. Tighten the cap screw on the crossarm clamp or the set screws on the mast adapter. Remove the calibrator from the vane hub and body to allow free rotation of the tail.

When removing the vane assembly, do not disturb the position of the pin on the crossarm; when using a mast adapter, do not move the adapter. This will allow you to remove and reinstall the sensor without repeating the orientation procedure.

Connection

Install a three-wire 20 AWG cable in the mating connector using care in soldering and cable dressing. Replace the connector back shell to form a waterproof assembly. The connector is a quick release type and requires only a quarter turn of the nut to lock it in place. Do not tighten with a wrench. Connections are as shown in drawing 2020-004 at the back of this manual. If cable is ordered with the sensor, the connector will be attached at the factory. To order cable, specify part number T600503.

3 Theory of Operation

Definition

Wind direction is defined as the direction of the source of the wind flow measured in degrees from true North in a clockwise increasing angle. Example: A west wind (270°) originates in the West and moves in an eastward direction.

Theory of Operation

Changes in wind direction are sensed mechanically by a balanced vane assembly. The mechanical motion is transformed into an electrical signal through a shaft coupling the vane to a potentiometer. The potentiometer is a 5 kΩ conductive plastic resistive element with a long electrical angle.

Protective zener diodes are attached across the excitation lead and the wiper lead to the common lead to help quench transients induced by external sources.

The potentiometer is excited by a +5 V DC regulated source. A 2500 Ω resistor is placed in series with the +5 V DC source to protect the potentiometer element against a dead short in the +5 V DC power source. The voltage generated at the potentiometer wiper varies from 0–3.333 V DC as a direct function of wind direction variations.

4 Calibration

Refer to the appropriate signal conditioning manual for system calibration instructions. Check the Model 2020 Micro Response Vane for correct operation prior to making any adjustments to the system electronics.

Checking Sensor Operation

To check sensor operation, follow the steps below.

1 Measure the total resistance of the potentiometer by measuring the resistance between the white wire (+) and the black wire (–). The value should be 5000 Ω, ±5%.

2 Use a voltmeter to measure the voltage across the potentiometer. ***Use Caution—Observe the polarity of the test leads.*** Using the sensor cable supplied, place the (+) test probe onto the red wire and the (–) test probe onto the black wire. Rotate the vane in a clockwise direction (as viewed from the top). The voltage should increase as the vane is rotated.

Alignment

Align the potentiometer with the North alignment marks on the sensor housing by rotating the potentiometer body while monitoring the voltage output. Since the vane hub is not flush with the vane body, be sure to view the alignment marks from straight on to avoid parallax errors.

1 Loosen the two clamping screws on the potentiometer mounting plate.

2 Align the tail assembly to South. The two North marks will be 180° apart.

3 While holding the North alignment marks stationary, rotate the potentiometer body until the signal output reads 1.6665 V DC (one half the total voltage across the potentiometer).

4 Tighten the clamping screws and re-measure the output to check for changes during tightening of the screws. Repeat Step 3 if necessary.

Verify sensor operation prior to reinstalling the sensor. Always verify sensor operation after each re-alignment and especially after any service requiring disassembly of the housing is performed.

CALIBRATION CERTIFICATE

Instrument Micro Response Vane

Model Number 2020 Serial Number _____

Range	Calibration Points	Output (typical)	Output (actual)
1–360° Azimuth	180° AZ	1.665 V DC*	

* with excitation voltage of 3.333 V DC

Cable T600503 Length _____ Shield Yes ■ No ☐

☐ Refer to enclosed Calibration Sheet. Figure _____

☐ Must be used in conjunction with:

Instrument _____

Model Number _____ Serial Number _____

Technician _____ Date _____

5 Maintenance

Routine maintenance must be performed on the sensor to prevent severe corrosion build-up and to check the bearings and sensor operation.

For maintenance of a sensor as part of an AWOS system, refer to the AWOS Periodic Maintenance section below.

Checking the Bearings

The vane shaft coupled to the potentiometer should turn freely at all times. Rough motion indicates worn bearings either in the potentiometer or in the sensor body. Determine which bearings are faulty by de-coupling the potentiometer from the main shaft.

Replace the bearings as required. The potentiometer is not serviceable and must be replaced if the bearings are faulty or the resistive element is worn.

Precautions

Since corrosion is the main problem associated with wind sensors, apply a thick coating of silicon lubricant to the connector shell after the connector is attached and in place. Also, use a noncorrosive lubricant such as Loctite Silver Grade Anti-Seize Compound on all screws and fasteners whenever disassembly of the sensor is required. The use of these lubricants will make servicing of the sensor easier and will prevent seizure of the fastening hardware. It is also advisable to apply lubricant to the mounting adapter surfaces prior to final sensor installation. A commercial grade lubricant recommended for use is DOOR-EASE, available at hardware and automotive stores. In addition to these precautions, check that the drain hole in the base of the sensor is free of debris so that water drains away rather than collecting within the sensor.

Use great care in disassembly and reassembly of the sensor. Never use excessive force to make parts fit together. Overtightening of fasteners will either break the fastener or damage the machined threads of the sensor.

Any difficulties encountered during servicing that are not correctable by the user should be referred to the All Weather Inc. Customer Service Department.

Replacing the Sensor Bearing

Follow the steps below to replace the bearing in the field.

1 Remove the Allen-head set screw securing the sensor cap to the main shaft using a 1/16" Allen wrench, and lift off the vane and sensor cap as a unit.

2 Lift the upper bearing out by working a knife edge under the flanged outer race.

3 Clean all parts and install a new bearing. Press the bearing in place by applying pressure to the outer race only. The bearing could be damaged by pressing against the inner race.

4 Reassemble all parts in the reverse order of disassembly. Check for free and smooth rotation of the shaft before and after installing the vane assembly.

Disassembly and Potentiometer Replacement

The potentiometer must be unsoldered from the housing connector before it can be removed from the housing. Refer to Drawing 2020-003 for parts identification as needed while following the steps below.

1 Remove the Allen-head set screw securing the sensor cap to the main shaft, and lift off the vane and sensor cap as a unit.

2 Remove the three screws from the base of the housing and remove the base.

3 Remove the two screws and flat washers securing the potentiometer inside the housing and gently lower the potentiometer and shaft.

Maintenance Kit

A maintenance kit (P/N M488140) is available for the Model 2020 that provides the parts necessary for basic upkeep of the instrument. The kit includes those parts that are the most susceptible to wear, such as bearings and set screws. To order this kit, contact All Weather Inc. and specify Part Number M488140.

Periodic Maintenance

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

Tools and Equipment Required

- Compass or transit
- ½" wrench
- Silicon lubricant
- Noncorrosive lubricant (bee's wax)

Monthly Maintenance

Monthly maintenance of the Model 2020 consists of visually verifying that the vane is moving freely and that the displayed wind direction is reasonable compared to the orientation of the vane.

Quarterly Maintenance

Quarterly maintenance of the Model 2020 is identical to the monthly maintenance procedure: visually verify that the vane is moving freely and that the displayed wind direction is reasonable compared to the orientation of the vane.

Annual Maintenance

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

1 Remove the sensor from the mounting bracket by loosening the clamp screw located at the base of the unit. Leave the sensor cable and, if present, the heater cable connected. These cables will ensure that, if the sensor is dropped, the device will not fall.

2 Clean the drain hole on the bottom of the sensor to ensure that debris does not prevent water from draining out of the sensor.

3 Spread noncorrosive lubricant such as Loctite Silver Grade Anti-Seize Compound on the clamp screw and reinstall the sensor. The sensor mounting hole should be aligned with the pin on the base of the mounting bracket.

Verify Sensor Alignment

The Model 1249-A Wind Direction Calibrator is required for both the stationary or foldover tower types.

1 Locate the direction benchmark determined in the initial site survey. It should be approximately 100 to 150 feet from the tower in one of the four cardinal points referenced to true north. Align the sensor using the following steps for either a stationary or a foldover tower. When the sensor is installed on a foldover tower, it will be necessary to raise and lower the tower several times during alignment.

2 Separate the two halves of the Model 1249-A Wind Direction Calibrator by pulling the two discs apart.

3 Slip the bottom half of the calibrator (containing the knurled knob) onto the stationary portion of the vane's housing near the rotating cap. Loosen the knob, if necessary, to do this; then tighten the knob until the unit is secured.

4 Hold the vane's tail shaft and place the top half of the calibrator onto the shaft and sensor cap. Notice that the top half is recessed to accommodate the counterweight, and that there is a groove for the tail shaft and a cutout for the top of the vane cap.

5 Rotate the top plate until the four pins are aligned with the holes in the bottom plate. The bottom half of the calibrator may require adjusting if it is too high or too low on the vane housing. Loosen the knurled knob and position the bottom half as needed.

Note that the next steps for aligning a sensor require two people when the sensor is on a stationary tower—one person on the ground to observe the DCP's LCD display, and the other on the tower.

6 While observing the LCD display inside the DCP, loosen the knurled knob slightly and rotate the entire calibration unit (along with the sensor tail) until the DCP indicates 180°. (If the benchmark is located to the East or West, rather than to the North or South, rotate the vane until the display reads 90 or 270.) Securely tighten the knurled knob to hold the vane in this position.

7 With the sensor locked in position, stand at the direction benchmark and verify that the tail of the vane is aligned with the vane body. If the vane is not aligned, loosen the mounting screw located at the bottom of the unistrut, align the sensor (and base) with the benchmark, and tighten the mounting bolt.

8 Lift the top half of the calibrator and rotate it and the vane tail 90° to the next position. Verify that the DCP display agrees with the new direction. Continue rotating the sensor to each of the remaining cardinal directions and verify that the vane position and DCP display agree.

9 Remove the calibrator.

10 Rotate the vane slowly through a full 360°, noting the reading on the LCD display (if the sensor is on a foldover tower, the tower can be in the lowered position during this procedure). As the vane 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, report the problem.

11 Verify that the vane's movement is free and smooth. If it is not, replace the bearings. The shaft should turn freely at all times.

12 Inspect all mounting hardware and cable assemblies for wear and damage. Replace as necessary.

13 Apply a thick coating of silicon lubricant to the connector shell after the connector is attached and in place. Use a noncorrosive lubricant such as bee's wax on all screws and fasteners whenever disassembly is required. The use of these lubricants will make future servicing easier.

14 If heaters are installed, verify that they are working by holding your hand close to the heater. The heater is always on, and should be warm.

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 Company's 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 Company's behalf, unless made in writing and signed by an authorized officer of the Company.

7 Specifications

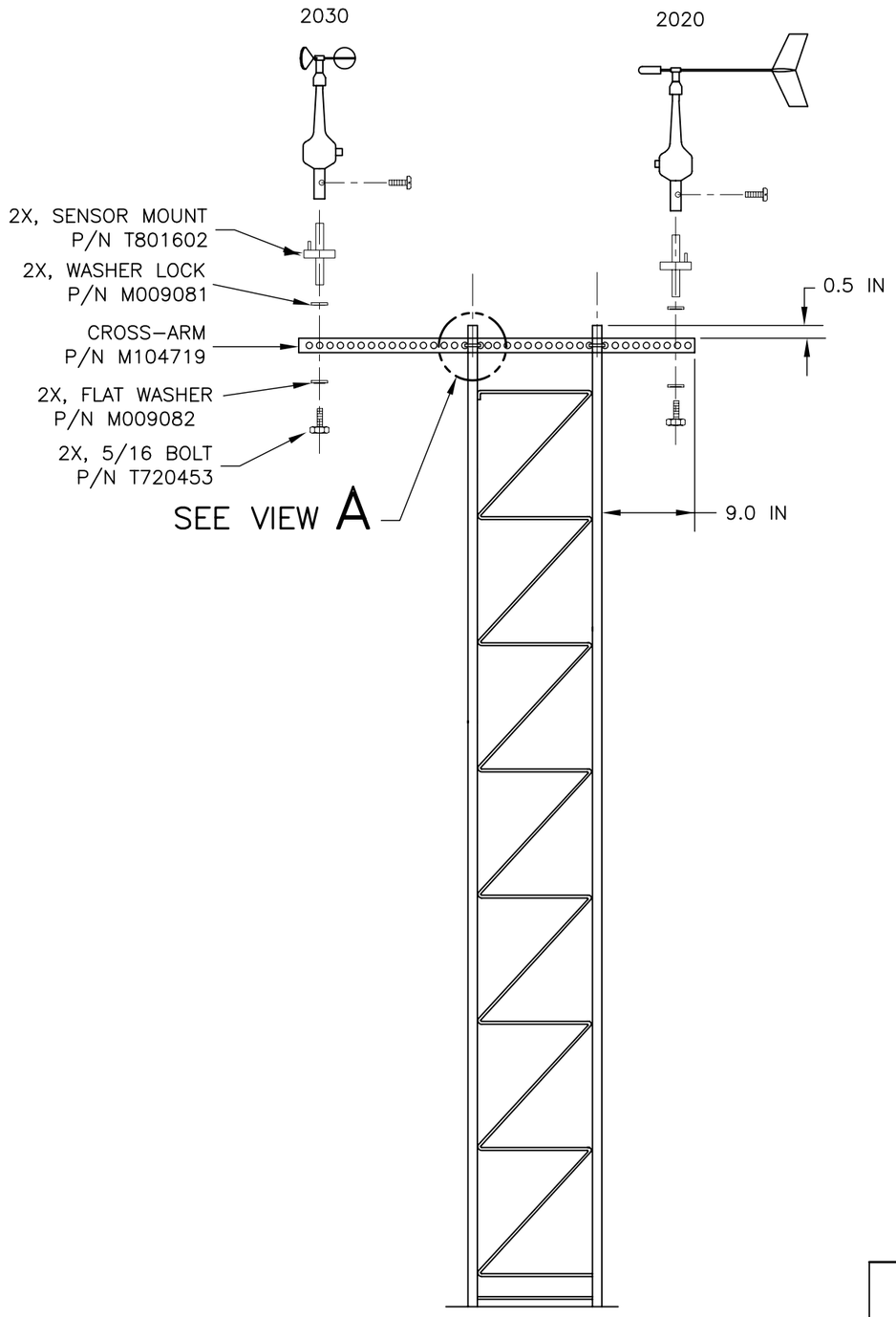
Sensor Type	Rotating vane
Transducer	Potentiometer, 5000 Ω, single wiper
Threshold	0.5 mph
Dead Band	5.0° at 0°
Resolution	Less than 1.0°
Distance Constant	3.5 feet (1.07 m)
Damping Ratio	0.4
Potentiometer Linearity	0.5%
Bearing	Sealed stainless steel with synthetic lubricant
Turning Radius	18" (457 mm)
Operating Temperature Range	-40 to +60°C
Body Size	12" H x 2 3/4" diameter (305 x 70 mm)
Weight/Shipping	2.5 lbs/7 lbs (1.13 kg/3.18 kg)
Mounting	Direct to crossarm or with adapter to 1" (25.4 mm) O.D. mast

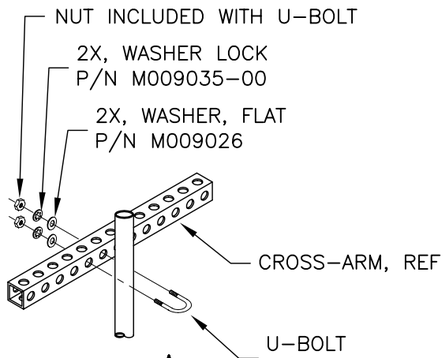
Optional heaters available

8 Drawings

The following pages include reference drawings to assist in installation and maintenance of this instrument.

REVISIONS			DWG NO. M403256-003	
REV	ECN	DESCRIPTION	DATE	APPROVED
A	4163	INITIAL RELEASE	9-8-93	SP
B	4805	CHANGE U-BOLTS	11/2/98	CSP
C	4981	ADD FOLDOVER TOWER VERSION SHT 2		
D	0626	CORRECTED P/NS SHEET 1	11-14-05	J.CONNER
E	1369	ADDED ICE RESISTANT HUB	3-10-09	J.CONNER





VIEW A
2 PLACES

2020/2030
AWOS MOUNTING
(STACKED TOWER)

C	E	REV	REV STATUS OF SHEETS
2	1	SHEET	

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

MATL: SEE PARTS LIST

FINISH: AS ISSUED

TREATMENT:

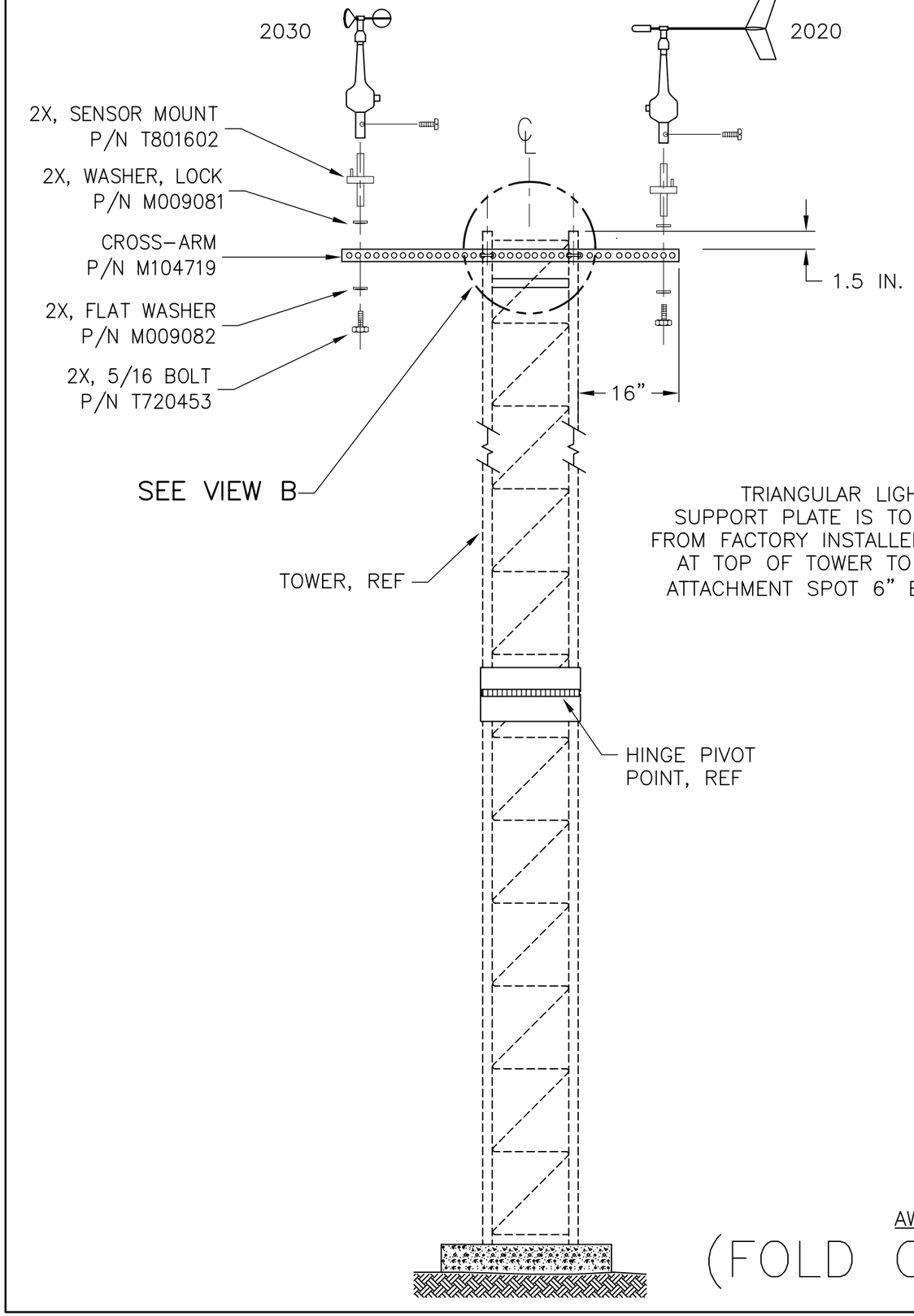
DRAWN BY: KOOYMAN	7SEP93	
REVISED BY: KOOYMAN	23SEPT03	
CHECKED BY:		
DESIGN ENGINEER:		
PROGRAM MANAGER: JM ANDERSON	8SEP93	
APPROVALS	DATE	

TITLE
ASSEMBLY DRAWING,
CROSSARM,
2020, 2030, AWOS

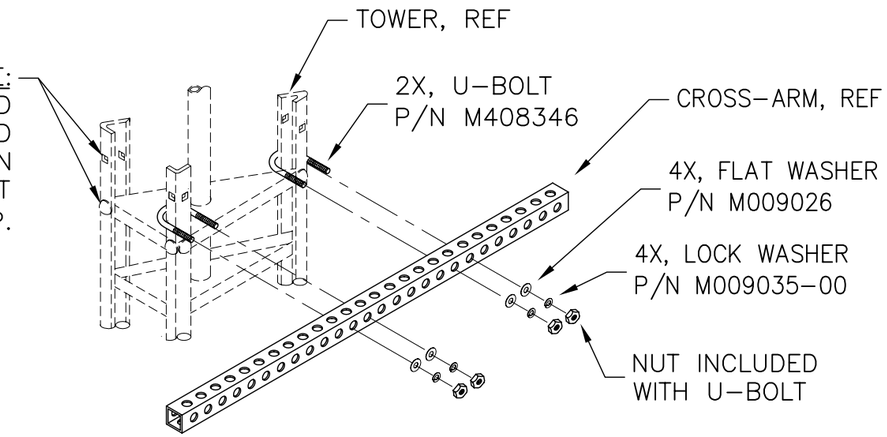
allweatherinc

SIZE C | DWG NO. M403256-003

SCALE NONE | RELEASE DATE 8SEP93 | SHEET 1 OF 2



*NOTE:
TRIANGULAR LIGHTNING ROD SUPPORT PLATE IS TO BE MOVED FROM FACTORY INSTALLED LOCATION AT TOP OF TOWER TO THIS NEXT ATTACHMENT SPOT 6” BELOW TOP.

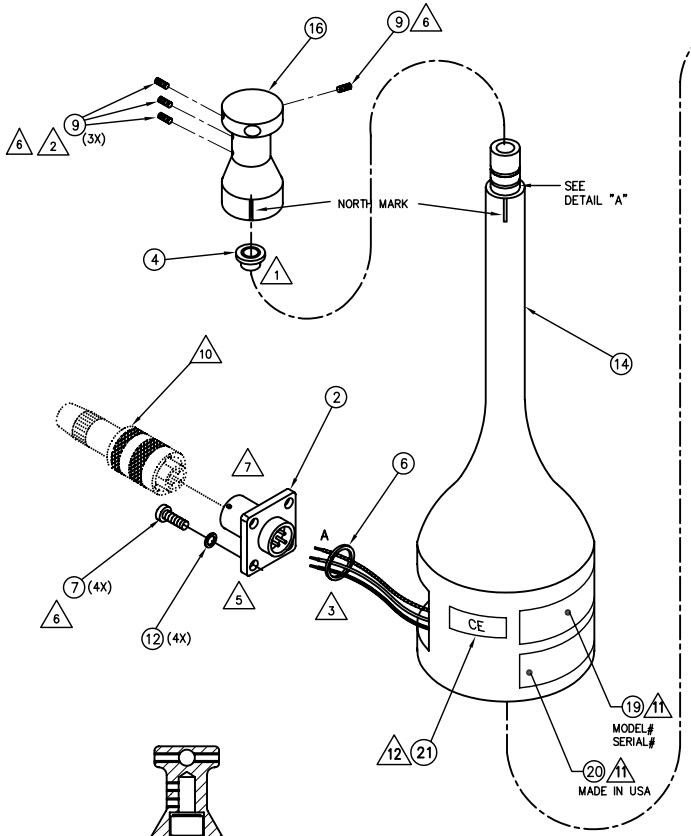


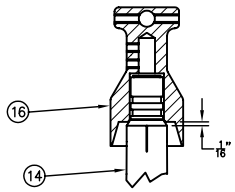
VIEW B

2020/2030 AWOS MOUNTING (FOLD OVER TOWER)

SIZE	DWG NO.	
C	M403256–003	
SCALE NONE	REV LTR C	SHEET 2 OF 2

REVISIONS			DWG NO. 2020-003	
REV	ECN	DESCRIPTION	DATE	APPROVED
A	4153	INITIAL RELEASE	12-21-92	
B	4225	NEW DESIGN OF IT-17, DELETE IT-19	5-17-93	PS
C	4538	DELETE ITEM 3, ADDED NOTE 10 & 11 ADD IT-19 & 20, DELETE NOTE 8	21NOV95	KAH
D	4738	ADD CE LABEL IT-21 & NOTE 12		
E	5016	DEL IT-13 & SHOW AS P/O IT-15, DEL NOTE 4	4/03	PK
F	5095	REVISED NOTE 6, ADD NOTE 6 TO ITEM 9 (3X)	9-13-04	J.CONNER
G	5152	ADD NOTE 13	12-13-04	J.CONNER
H	1369	REVISED ITEM 16	12-18-07	J.CONNER

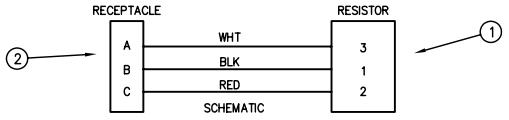




DETAIL "A"

NOTES: UNLESS OTHERWISE SPECIFIED

1. SECURE BEARING (ITEM 4) TO UPPER BODY (ITEM 14) WITH "LOCKTITE" 222. DO NOT ALLOW "LOCKTITE" TO CONTAMINATE WORKING SURFACES OF BEARING.
2. WHEN INSTALLING HUB, (ITEM 16) INSURE THAT SCREWS (ITEM 9), ALIGN WITH FLAT AREA OF SHAFT (PART OF ITEM 1).
3. APPLY SILICONE GREASE TO O-RING.
4. DELETED
5. SOLDER WIRES FROM POT/SHAFT ASSY (ITEM 1) TO RECEPTACLE (ITEM 2). APPLY LIQUID "HUMISEAL" OR EQUIV. TO SOLDER CONNECTIONS.
6. COAT SCREW THREADS WITH ANTI-SEIZE COMPOUND, LOCTITE SILVER GRADE, ANTI-SEIZE, OR EQUIV.
7. INSTALL RECEPTACLE (ITEM 2) TO UPPER BODY (ITEM 14) WITH LARGE KEY WAY OF RECEPTACLE TOWARD TOP OF ASSEMBLY.
8. DELETED
9. SEE 2020-001 FOR VANE AND COUNTER WEIGHT ASSEMBLY (SECTIONS 3.3 THRU 3.7) NOT FACTORY INSTALLED.
10. MATING CONNECTOR, T210001, NOT INCLUDED IN THIS ASSEMBLY.
11. INSTALL LABELS OPPOSITE RECEPTACLE. IDENTIFY AS MODEL 2020 AND SERIALIZE.
12. AFFIX 1/2" SQUARE BLACK-ON-SILVER CE LABEL (ITEM 21) AS SHOWN.
13. AFTER ASSEMBLY IS COMPLETE, BOX THE SENSOR BODY IN A 15 3/4 X 3 1/4 X 3 1/4 BI-PANEL FOLDED CARDBOARD BOX. OBTAIN BOXES FROM SHIPPING.



D	H	REV	REV STATUS OF SHEETS
2	1	SHEET	

APPEND THE FOLLOWING DOCUMENTS WHEN CHANGING THIS DOCUMENT:	
2020-001	

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

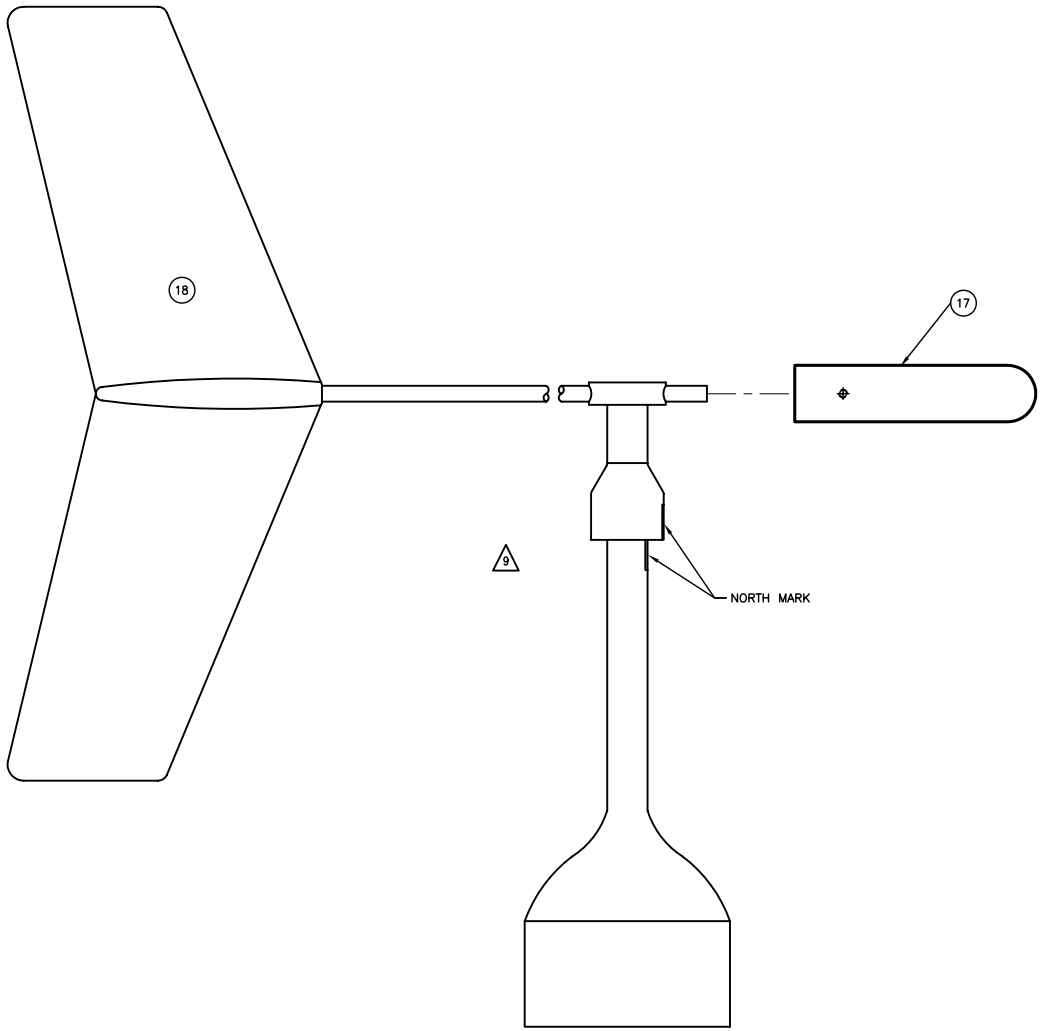
DRAWN BY: PETE SANCHEZ	15DEC92	
REVISED BY: P KOOYMAN	29mar04	
CHECKED BY: DON TEETER	16DEC92	
DESIGN ENGINEER: ALEX TACKETT	16DEC92	
PROJECT MANAGER: JM ANDERSON	16DEC92	
APPROVALS	DATE	

TITLE: ASSEMBLY DRAWING, MICRO RESPONSE VANE SENSOR BODY

allweatherinc

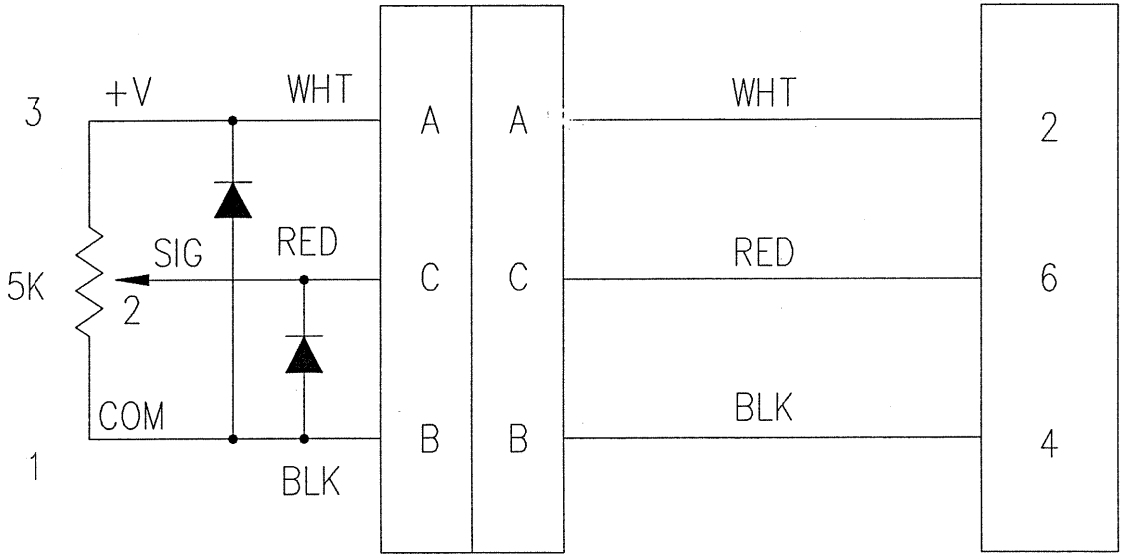
SIZE D | DWG NO. 2020-003

SCALE NONE | RELEASE DATE 12-21-92 | SHEET 1 OF 2



SIZE	DWG NO.	
D	2020-003	
SCALE NONE	REV LTR D	SHEET 2 OF 2

REVISIONS			2020-004	
REV	ECN	DESCRIPTION	DATE	APPROVED
A	2468	SEE ECN HISTORY	3JAN86	
B	4101	INCREMENT REV. TO TRACK	14DEC92	
C	4153	ADD 1,2,3 & ADD WHT, RED, BLK	12-2-92	
D	4538	UPDATED ECN 4538 ONLY		



APPEND THE FOLLOWING DOCUMENTS WHEN CHANGING THIS DOCUMENT:	
2020-001	

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

DRAWN BY:	*PETE SANCHEZ*	*25JUNE92*
REVISED BY:	*J CONNER*	*12SEP95*
CHECKED BY:		
DESIGN ENGINEER:		
PROJECT MANAGER:		
APPROVALS		DATE

TITLE
SCHEMATIC MICRORESPONSE VANE

QUALIMETRICS

SIZE A | DWG NO. 2020-004

SCALE NONE | RELEASE DATE | SHEET 1 OF 1

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www.allweatherinc.com

2020-001
May, 2010
Revision O