METEOROLOGICAL INSTRUMENTS

MODEL 05701
WIND MONITOR-RE

INSTRUCTION MANUAL

CE

YOUNG

JULY 1996

WARRANTY AND ASSISTANCE

R.M. YOUNG PRODUCTS are warranted by CAMPBELL SCIENTIFIC (CANADA) CORP. ("CSC") to be free from defects in materials and workmanship under normal use and service for **twelve (12) months** from date of shipment unless specified otherwise. CSC's obligation under this warranty is limited to repairing or replacing (at CSC's option) defective products. The customer shall assume all costs of removing, reinstalling, and shipping defective products to CSC. CSC will return such products by surface carrier prepaid. This warranty shall not apply to any CSC products which have been subjected to modification, misuse, neglect, accidents of nature, or shipping damage. This warranty is in lieu of all other warranties, expressed or implied, including warranties of merchantability or fitness for a particular purpose. CSC is not liable for special, indirect, incidental, or consequential damages.

Products may not be returned without prior authorization. To obtain a Return Merchandise Authorization (RMA), contact CAMPBELL SCIENTIFIC (CANADA) CORP., at (780) 454-2505. An RMA number will be issued in order to facilitate Repair Personnel in identifying an instrument upon arrival. Please write this number clearly on the outside of the shipping container. Include description of symptoms and all pertinent details.

CAMPBELL SCIENTIFIC (CANADA) CORP. does not accept collect calls.

Non-warranty products returned for repair should be accompanied by a purchase order to cover repair costs.

CAMPBELLSCIENTIFIC
CANADA CORP.
11564 - 149 street - edmonton - alberta - T5M 1W7
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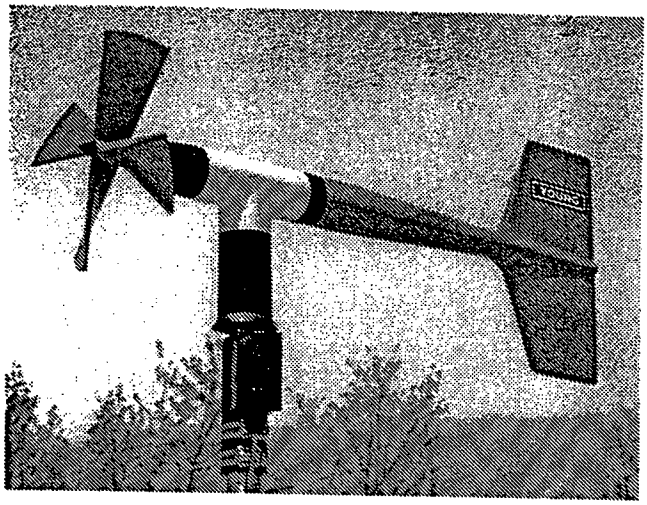
INSTRUCTIONS

MODEL 05701
WIND MONITOR-RE

R. M. YOUNG COMPANY
2801 Aero-Park Drive, Traverse City, MI 49684, U. S. A.
PHN 616-946-3980 FAX 616-946-4772 TWX 810-291-3366

MODEL 05701
WIND MONITOR - RE



WIND SPEED SPECIFICATION SUMMARY

Range	0 to 30 m/s (70 mph), gust survival 35 m/s (80 mph)
Sensor	22 cm diameter 4-blade helicoid propeller expanded polystyrene
Pitch	29.4 cm air passage per revolution
Distance Constant	1.0 m (3.2 ft.) for 63% recovery
Threshold Sensitivity	0.2 m/s (0.5 mph)
Transducer	Centrally mounted stationary coil, 2K ohm nominal DC resistance
Transducer Output	AC sine wave signal induced by rotating magnet on propeller shaft. 125 mV p-p at 100 rpm. 12.5 V p-p at 10,000 rpm.
Output Frequency	3 cycles per propeller revolution (0.10 m/s per Hz)

WIND DIRECTION (AZIMUTH) SPECIFICATION SUMMARY

Range	360° mechanical, 355° electrical (5° open)
Sensor	Balanced vane, 48 cm (19 in) turning radius.
Damping Ratio	0.65
Delay Distance	0.8 m (2.6 ft) for 50% recovery
Threshold Sensitivity	0.4 m/s (0.9 mph) at 10° displacement 0.6 m/s (1.4 mph) at 5° displacement
Damped Natural Wavelength	4.7 m (15.4 ft)
Undamped Natural Wavelength	3.6 m (11.8 ft)
Transducer	Precision conductive plastic potentiometer, 10K ohm resistance (±20%), 0.25% linearity, life expectancy 50 million revolutions, rated 1 watt at 40°C, 0 watts at 125°C
Transducer Excitation Requirement	Regulated DC voltage, 15 VDC max
Transducer Output	Analog DC voltage proportional to azimuth angle with regulated excitation voltage applied across potentiometer.

INTRODUCTION

The Wind Monitor-RE measures horizontal wind speed and direction. Developed for meteorological research applications, it is accurate, sensitive and corrosion resistant. The main housing, nose cone, and some internal parts are injection molded U.V. stabilized plastic. The tail and propeller is light weight expanded polystyrene. Both the propeller and vertical shafts use stainless steel precision grade ball bearings. Propeller shaft bearings have shields to help exclude contamination and moisture.

Propeller rotation produces an AC sine wave signal with frequency proportional to wind speed. This AC signal is induced in a stationary coil by a six pole magnet mounted on the propeller shaft. Three complete sine wave cycles are produced for each propeller revolution.

Vane position is transmitted by a 10K ohm precision conductive plastic potentiometer which requires a regulated excitation voltage. With a constant voltage applied to the potentiometer, the output signal is an analog voltage directly proportional to azimuth angle.

The instrument mounts on standard one inch pipe, outside diameter 34 mm (1.34"). An orientation ring is provided so the instrument can be removed for maintenance and re-installed without loss of wind direction reference. Both mounting post assembly and orientation ring are secured to the mounting pipe by stainless steel band clamps. Electrical connections are made in a junction box at the base. A variety of devices are available for signal conditioning, display, and recording of wind speed and direction.

INITIAL CHECK-OUT

When the Wind Monitor-RE is unpacked it should be checked carefully for any signs of shipping damage. Remove the plastic nut on the propeller shaft. Install the propeller on the shaft so the letter markings on the propeller face forward (into the wind). The instrument is aligned, balanced and fully calibrated before shipment; however, it should be checked both mechanically and electrically before installation. The vane and propeller should easily rotate 360° without friction. Check vane balance by holding the instrument base so the vane surface is horizontal. It should have near neutral torque without any particular tendency to rotate. A slight imbalance will not degrade performance.

The potentiometer requires a stable DC excitation voltage. Do not exceed 15 volts. When the potentiometer wiper is in the 5° deadband region, the output signal is "floating" and may show varying or unpredictable values. To prevent false readings, signal conditioning electronics should clamp the signal to excitation or reference level when this occurs. **NOTE: Young signal conditioning devices clamp the signal to excitation level.** Avoid a short circuit between the azimuth signal line and either the excitation or reference lines. Although there is a 1K ohm current limiting resistor in series with the wiper for protection, damage to the potentiometer may occur if a short circuit condition exists.

Before installation, connect the instrument to an indicator as shown in the wiring diagram and check for proper wind speed and azimuth values. To check wind speed, temporarily remove the propeller and connect the shaft to a Model 18801 Anemometer Drive. Details appear in the CALIBRATION section of this manual.

INSTALLATION

Proper placement of the instrument is very important. Eddies from trees, buildings, or other structures can greatly influence wind speed and wind direction observations. To get meaningful data for most applications locate the instrument well above or upwind from obstructions. As a general rule, the air flow around a structure is disturbed to twice the height of the structure upwind, six times the height downwind, and up to twice the height of the structure above ground. For some applications it may not be practical or necessary to meet these requirements.

FAILURE TO PROPERLY GROUND THE WIND MONITOR-RE MAY RESULT IN ERRONEOUS SIGNALS OR TRANSDUCER DAMAGE.

Grounding the Wind Monitor-RE is vitally important. Without proper grounding static electrical charge can build up during certain atmospheric conditions and discharge through the transducers. This discharge can potentially cause erroneous signals or transducer failure. To direct the discharge away from the transducers, the mounting post assembly in which the transducers are mounted is made with a special anti-static plastic. Therefore it is very important that the mounting post be connected to a good earth ground. There are two ways this may be accomplished. First, the Wind Monitor-RE may be mounted on a metal pipe which is connected to earth ground. The mounting pipe should not be painted where the Wind Monitor is mounted. Towers or masts set in concrete should be connected to one or more grounding rods. If it is difficult to ground the mounting post in this manner an alternative method may be used. Inside the junction box the terminal labeled SPARE is internally connected to the anti-static mounting post. Use a wire to connect this terminal to a good earth ground as close to the instrument as possible.

Initial installation is most easily done with two people; one to adjust the instrument position and the other to observe the indicating device. After initial installation, the instrument can be removed and returned to its mounting without re-aligning the vane since the orientation ring preserves the wind direction reference. Install the Wind Monitor-RE following these steps:

1. MOUNT WIND MONITOR-RE
   a) Place orientation ring on mounting post. Do Not tighten band clamp yet.
   b) Place Wind Monitor-RE on mounting post. Do Not tighten band clamp yet.

2. CONNECT SENSOR CABLE
   a) Slide junction box cover up.
   b) Connect sensor cable to terminals. See wiring diagram.
   c) Route cable thru strain relief opening at bottom of junction box. Secure cable by tightening packing nut.
   d) Slide junction box cover down.

3. ALIGN VANE
   a) Connect instrument to an indicator.
   b) Choose a known wind direction reference point on the horizon.
   c) Sighting down instrument centerline, point nose cone at reference point on horizon.
   d) While holding vane in position, slowly turn base until indicator shows proper value.
   e) Tighten mounting post band clamp.
   f) Engage orientation ring indexing pin in notch at instrument base.
   g) Tighten orientation ring band clamp.

CALIBRATION

The Wind Monitor-RE is fully calibrated before shipment and should require no adjustments. Recalibration may be necessary after some maintenance operations. Periodic calibration checks are desirable and may be necessary where the instrument is used in programs which require auditing of sensor performance.

Accurate wind direction calibration requires a Model 18112 Vane Angle Bench Stand. Begin by connecting the instrument to a signal conditioning circuit which has some method of indicating azimuth value. This may be a display which shows azimuth values in angular degrees or simply a voltmeter monitoring the output. Orient the base with the junction box at 180°. Visually align the vane with the crossmarkings and observe the indicator output. If the vane position and indicator do not agree within 3°, adjust the potentiometer coupling inside the main housing. Details for making this adjustment appear in the MAINTENANCE, potentiometer replacement outline, step 7. It is important to note that while full scale azimuth on signal conditioning electronics may be 360°, full scale azimuth signal from the instrument is 355°. The signal conditioning electronics must be adjusted accordingly. For example, in a circuit where 0 to 1.000 VDC represents 0° to 360°, the output must be adjusted for 0.986 VDC when the instrument is at 355°. (355°/360° X 1.000 volts = 0.986 volts)

Wind speed calibration is determined by propeller pitch and the output characteristics of the transducer. Calibration formulas showing wind speed vs. propeller rpm and output frequency are included below. Standard accuracy is ± 0.2 m/s (0.4mph). For greater accuracy, the device must be individually calibrated in comparison with a wind speed standard. Contact the factory or your supplier to schedule a NIST (National Institute of Standards & Technology) traceable wind tunnel calibration in our facility.

To calibrate wind system electronics using a signal from the instrument, temporarily remove the propeller and connect a Model 18801 Anemometer Drive to the propeller shaft. Apply the appropriate calibration formula to the calibrating motor rpm and adjust the electronics for the proper value. For example, with the propeller shaft turning at 3600 rpm adjust an indicator to display 18.0 meters per second. (3600 rpm X 0.00500 m/s/rpm = 18.0 m/s).

CALIBRATION FORMULAS

Model 05701 Wind Monitor w/ 08274 Propeller

WIND SPEED vs PROPELLER RPM

m/s	=	0.00500 x rpm
knots	=	0.00971 x rpm
mph	=	0.01118 x rpm
km/h	=	0.01800 x rpm

WIND SPEED vs OUTPUT FREQUENCY

m/s	=	0.10000 x Hz
knots	=	0.19425 x Hz
mph	=	0.22369 x Hz
km/h	=	0.36000 x Hz

MAINTENANCE

Given proper care, the Wind Monitor-RE should provide years of service. Constructed entirely of non-corrosive materials and using components which are conservatively rated, the instrument requires little maintenance. The only components likely to need replacement due to normal wear are the precision ball bearings and the wind direction potentiometer. Only a qualified instrument technician should perform the replacement. If service facilities are not available, return the instrument to the company. Refer to the drawings to become familiar with part names and locations. The asterisk * which appears in the following outlines is a reminder that maximum torque on all set screws is 80 oz-in.

POTENTIOMETER REPLACEMENT

The potentiometer has a life expectancy of fifty million revolutions. As it becomes worn, the element may begin to produce noisy signals or become non-linear. When signal noise or non-linearity becomes unacceptable replace the potentiometer. Refer to exploded view drawing and proceed as follows:

1. REMOVE MAIN HOUSING
   a) Unscrew nose cone from main housing. Set o-ring aside for later use.
   b) Gently push main housing latch.
   c) While pushing latch, lift main housing up and remove it from vertical shaft bearing rotor.

2. UNSOLDER TRANSDUCER WIRE
   a) Slide junction box cover up, exposing circuit board.
   b) Remove screws holding circuit board.
   c) Unsolder three potentiometer wires (white, green, black), two wind speed coil wires (red, black), and earth ground wire (gray) from circuit board.

3. REMOVE POTENTIOMETER
   a) Loosen set screw on potentiometer coupling and remove it from potentiometer adjust thumbwheel.
   b) Loosen set screw on potentiometer adjust thumbwheel and remove it from potentiometer shaft extension.
   c) Loosen two set screws at base of transducer assembly and remove assembly from vertical shaft.
   d) Unscrew potentiometer housing from potentiometer mounting & coil assembly.
   e) Push potentiometer out of potentiometer mounting & coil assembly by applying firm but gentle pressure on potentiometer shaft extension. Set o-ring aside for later use.
   f) Loosen set screw on potentiometer shaft extension and remove it from potentiometer shaft.

4. INSTALL NEW POTENTIOMETER
   a) Place potentiometer shaft extension with o-ring on new potentiometer (Gap 0.040") and tighten set screw*. Re-grease o-ring if necessary.
   b) Push new potentiometer into potentiometer mounting & coil assembly.
   c) Feed potentiometer and coil wires through hole in bottom of potentiometer housing.
   d) Screw potentiometer mounting & coil assembly into potentiometer housing.
   e) Gently pull transducer wires through bottom of potentiometer housing to take up any slack. Apply a small amount of silicone sealant around hole.
   f) Install transducer assembly on vertical shaft allowing 0.5 mm (0.020") clearance from vertical bearing. Tighten set screws* at bottom of transducer assembly.
   g) Place potentiometer adjust thumbwheel on potentiometer shaft extension and tighten set screw*.

*Max set screw torque 80 oz-in

   h) Place potentiometer coupling on potentiometer adjust thumbwheel. Do Not tighten set screw yet.

5. RECONNECT TRANSDUCER WIRES
   a) Using needle-nose pliers or a paper clip bent to form a small hook, gently pull transducer wires through hole in junction box.
   b) Solder wires to circuit board according to wiring diagram. Observe color code.
   c) Secure circuit board in junction box using two screws removed in step 2b. Do not overtighten.

6. REPLACE MAIN HOUSING
   a) Place main housing over vertical shaft bearing rotor. Be careful to align indexing key and channel in these two assemblies.
   b) Place main housing over vertical shaft bearing rotor until potentiometer coupling is near top of main housing.
   c) Turn potentiometer adjust thumbwheel until potentiometer coupling is oriented to engage ridge in top of main housing. Set screw on potentiometer coupling should be facing the front opening.
   d) With potentiometer coupling properly oriented, continue pushing main housing onto vertical shaft bearing rotor until main housing latch locks into position with a "click".

7. ALIGN VANE
   a) Connect excitation voltage and signal conditioning electronics to circuit board according to wiring diagram.
   b) With mounting post held in position so junction box is facing due south, orient vane to a known angular reference. Details appear in CALIBRATION section.
   c) Reach in through front of main housing and turn potentiometer adjust thumbwheel until signal conditioning system indicates proper value.
   d) Tighten set screw* on potentiometer coupling.

8. REPLACE NOSE CONE
   a) Screw nose cone into main housing until o-ring seal is seated. Be certain threads are properly engaged to avoid cross-threading.

FLANGE BEARING REPLACEMENT

If anemometer bearings become noisy or wind speed threshold increases above an acceptable level, bearings may need replacement. Check anemometer bearing condition using a Model 18310 Anemometer Bearing Torque Disk. If needed bearings are replaced as follows.

1. REMOVE OLD BEARINGS
   a) Unscrew nose cone. Do not lose o-ring seal.
   b) Loosen set screw on magnet shaft collar and remove magnet.
   c) Slide propeller shaft out of nose cone assembly.
   d) Remove front bearing cap which covers front bearing.
   e) Remove both front and rear bearings from nose cone assembly. Insert edge of a pocket knife under bearing flange and lift it out.

2. INSTALL NEW BEARINGS
   a) Insert new front and rear bearings into nose cone.
   b) Replace front bearing cap.
   c) Carefully slide propeller shaft thru bearings.
   d) Place magnet on propeller shaft allowing 0.5 mm (0.020") clearance from rear bearing.
   e) Tighten set screw* on magnet shaft collar.
   f) Screw nose cone into main housing until o-ring seal is seated. Be certain threads are properly engaged to avoid cross-threading.

VERTICAL SHAFT BEARING REPLACEMENT

Vertical shaft bearings are much larger than the anemometer bearings. Ordinarily, these bearings will not require replacement at the same interval as anemometer bearings. Check bearing condition using a Model 1833 Vane Torque Gauge.

Since this procedure is similar to POTENTIOMETER REPLACEMENT, only the major steps are listed here.

1. REMOVE MAIN HOUSING
2. UNSOLDER TRANSDUCER WIRES AND REMOVE TRANSDUCER ASSEMBLY
   Loosen set screws at base of transducer assembly and remove entire assembly from vertical shaft. Remove vertical shaft bearing rotor by sliding it upward off vertical shaft.
3. REMOVE VERTICAL SHAFT BEARING ROTOR by sliding it upward off vertical shaft.
4. REMOVE OLD VERTICAL BEARINGS AND INSTALL NEW BEARINGS. When inserting new bearings be careful not to apply pressure to bearing shields.
5 REPLACE VERTICAL SHAFT BEARING ROTOR
6. REPLACE TRANSDUCER & RECONNECT WIRES
7. REPLACE MAIN HOUSING
8. ALIGN VANE
9. REPLACE NOSE CONE

WARRANTY

This product is warranted to be free of defects in materials and construction for a period of 12 months from date of initial purchase. Liability is limited to repair or replacement of defective item. A copy of the warranty policy may be obtained from R. M. Young Company.

CE COMPLIANCE

This product has been tested and shown to comply with European CE requirements for the EMC Directive. Please note that shielded cable must be used.

Declaration of Conformity

Application of Council Directives:
89/336/EEC

Standards to which Conformity is Declared:
EN 50082-1 (IEC 801-2, 3, 4)

Manufacturer's Name and Address:
R. M. Young Company
Traverse City, MI, 49686, USA

Importer's Name and Address:
See Shipper or Invoice

Type of Equipment:
Meteorological Instruments

Model Number / Year of Manufacture:
05701/1996

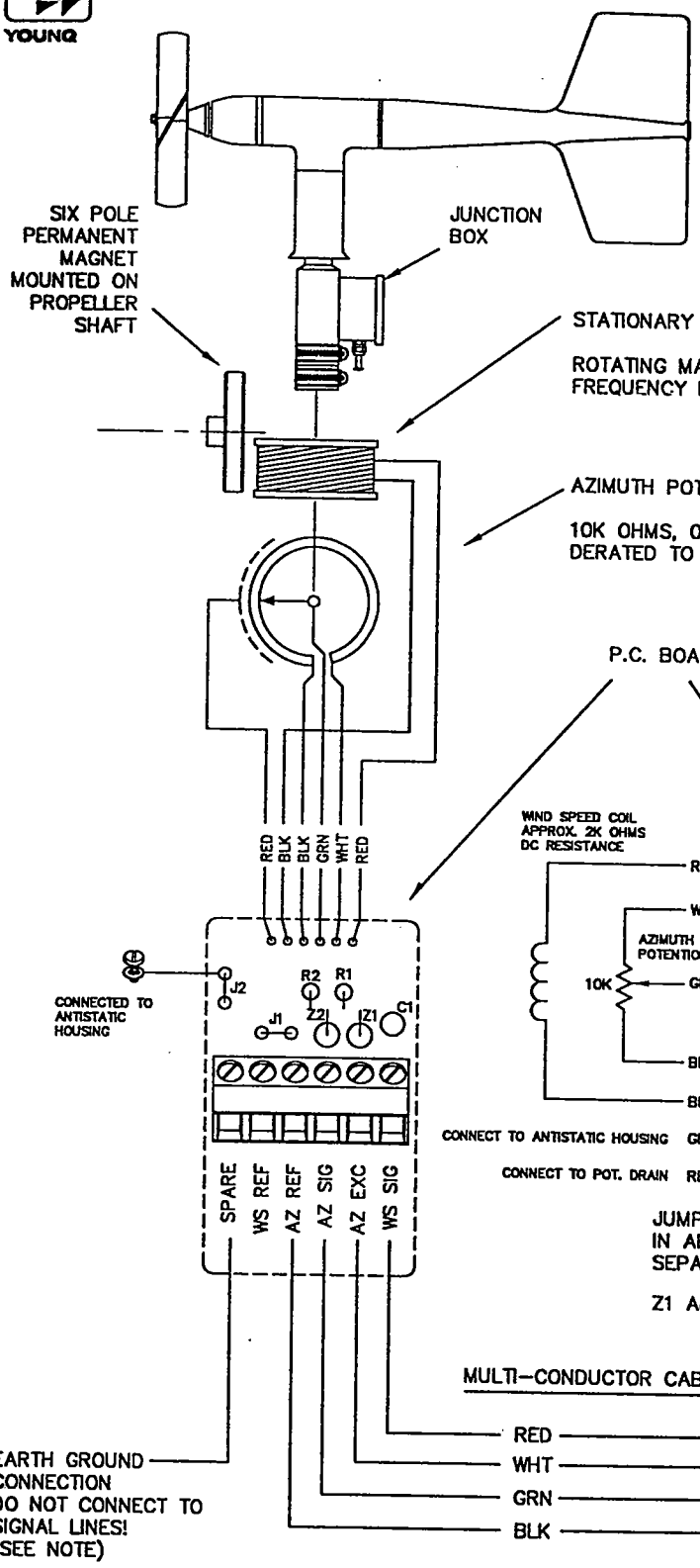
I, the undersigned, hereby declare that the equipment specified conforms to the above Directives and Standards.

Date / Place:
Traverse City, Michigan, USA February 19, 1996

David Poinsett
R & D Manager, R. M. Young Company

YOUNG

MODEL 05103-10A WIND MONITOR
MODEL 05305-10A WIND MONIOR-AQ
MODEL 05701-10A WIND MONITOR-RE



JUMPER J1 CONNECTS THE AZIMUTH AND WIND SPEED REFERENCES IN APPLICATIONS WHERE THE TWO REFERENCES NEED TO REMAIN SEPARATE, JUMPER J1 MUST BE OMITTED OR CUT.

Z1 AND Z2 ARE TRANSZORB TRANSIENT PROTECTION DEVICES.

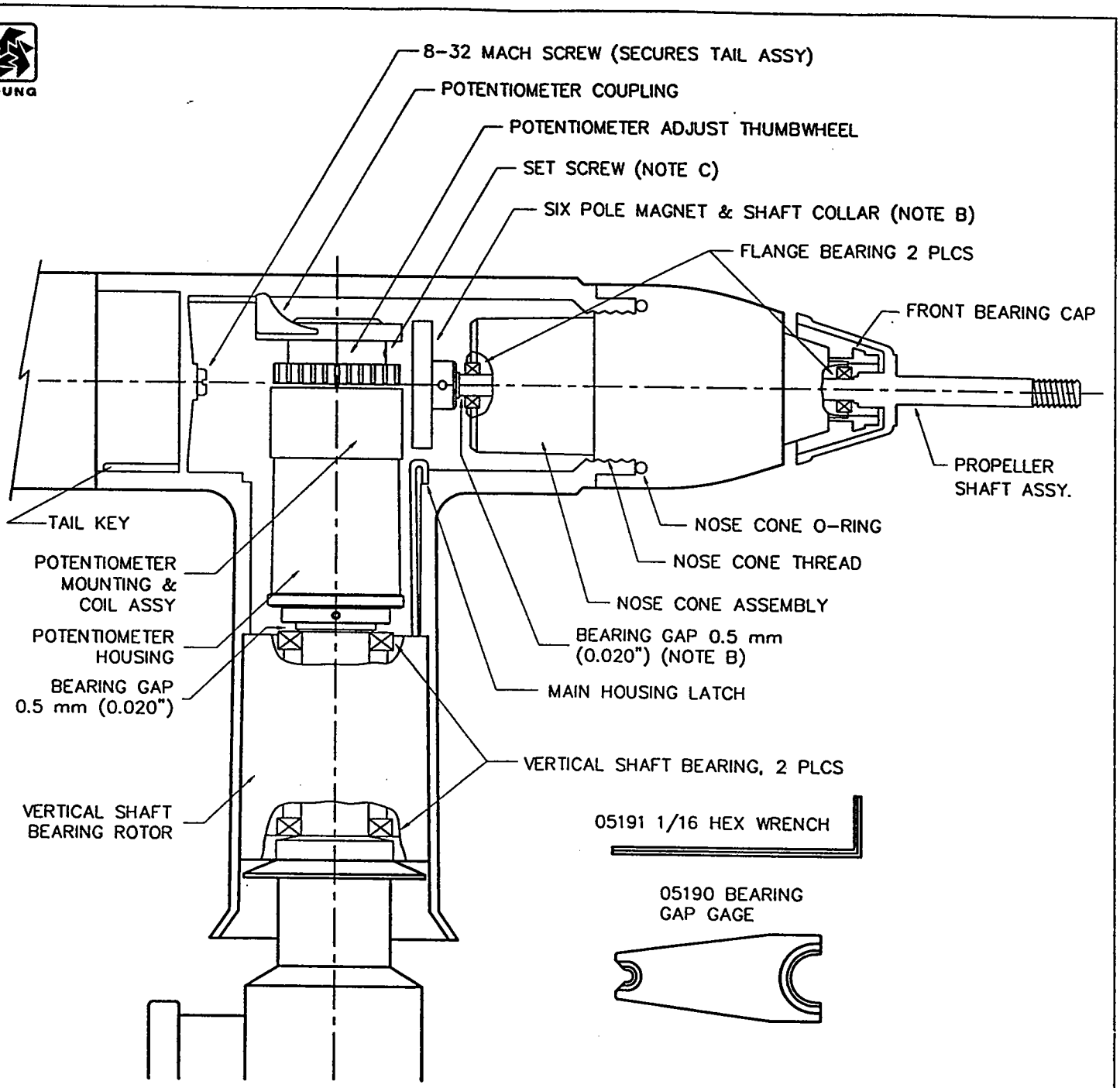
MULTI-CONDUCTOR CABLE

EARTH GROUND CONNECTION DO NOT CONNECT TO SIGNAL LINES! (SEE NOTE)	
RED	WIND SPEED SIGNAL
WHT	AZIMUTH EXCITATION VOLTAGE (15V MAX)
GRN	AZIMUTH SIGNAL
BLK	REFERENCE

NOTE:

THE EARTH GROUND TERMINAL MUST BE CONNECTED TO EARTH GROUND TO PROVIDE A STATIC DISCHARGE PATH. CONNECT THIS TERMINAL TO AN EARTH GROUND NEAR THE SENSOR.

MODELS 05103-10A/05305-10A/05701-10A	DWG A	PRD 02-94
WIND MONITOR/-AQ/-RE	DWN KL	DWG 02-94
CAMPBELL SCIENTIFIC-CANADA	CHK	W0510310
R.M. YOUNG CO. TRAVERSE CITY, MI 49684 U.S.A. 616-946-3980		



NOTES:

A. TO REMOVE MAIN HOUSING – UNTHREAD NOSE CONE ASSEMBLY, PUSH MAIN HOUSING LATCH, LIFT UPWARD.

B. TO REPLACE ANEMOMETER FLANGE BEARINGS – UNTHREAD NOSE CONE, REMOVE SIX POLE MAGNET, SLIDE PROPELLER SHAFT AND HUB ASSEMBLY FORWARD, REMOVE FRONT BEARING CAP, AND FLANGE BEARINGS. AFTER BEARING REPLACEMENT, SET BEARING GAP TO 0.5mm (0.020")

C. TO ADJUST POTENTIOMETER OUTPUT SIGNAL – REMOVE NOSE CONE, LOOSEN SET SCREW IN POTENTIOMETER COUPLING, ADJUST OUTPUT SIGNAL BY MEANS OF POTENTIOMETER ADJUSTMENT THUMBWHEEL, RE-TIGHTEN SET SCREW.

WIND MONITOR SECTION VIEW	DWG A	PRD 02-90
MAIN HOUSING TRANSDUCER ASSY	DWN KL	DWG 07-96
	CHK gmy	M05103M
R.M. YOUNG CO. TRAVERSE CITY, MI 49686 U.S.A. 616-946-3980		

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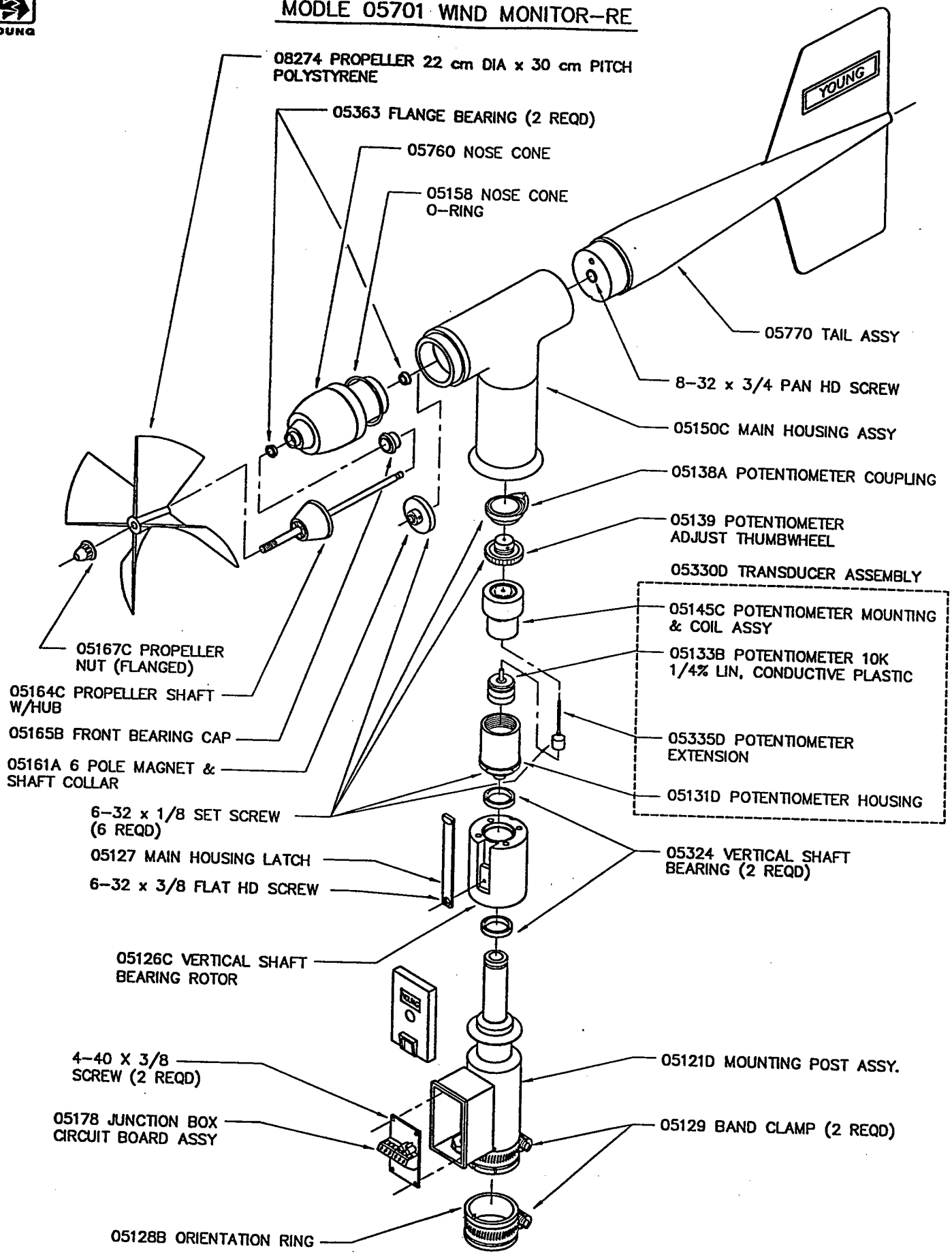
MODLE 05701 WIND MONITOR–RE



MODEL 05701 WIND MONITOR–RE	DWG A	PRD 03–90
GENERAL ASSEMBLY & REPLACEMENT PARTS	DWN KL	DWG 10–94
	CHK	E05701
R.M. YOUNG CO. TRAVERSE CITY, MI 49686 U.S.A. 616–946–3980		

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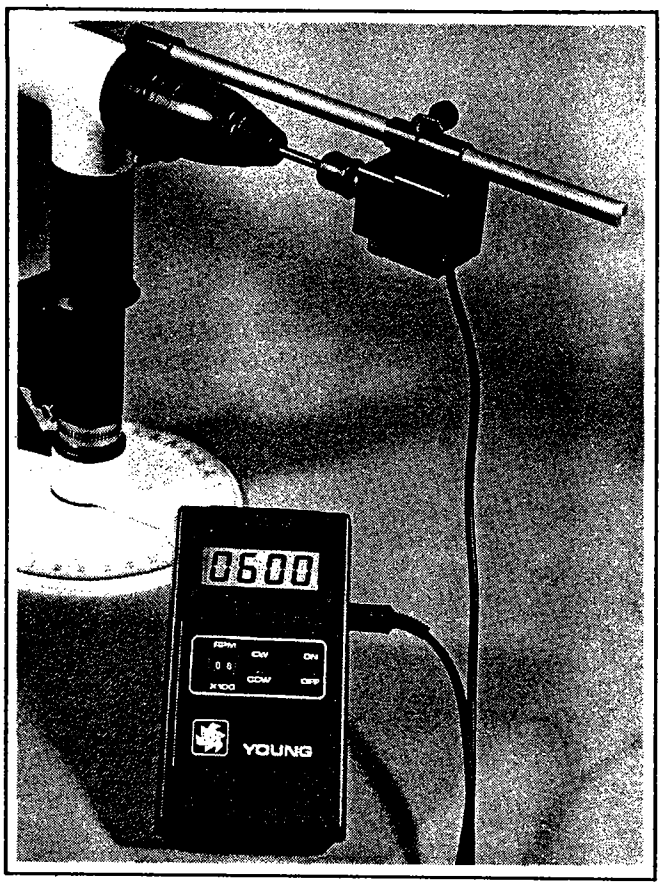
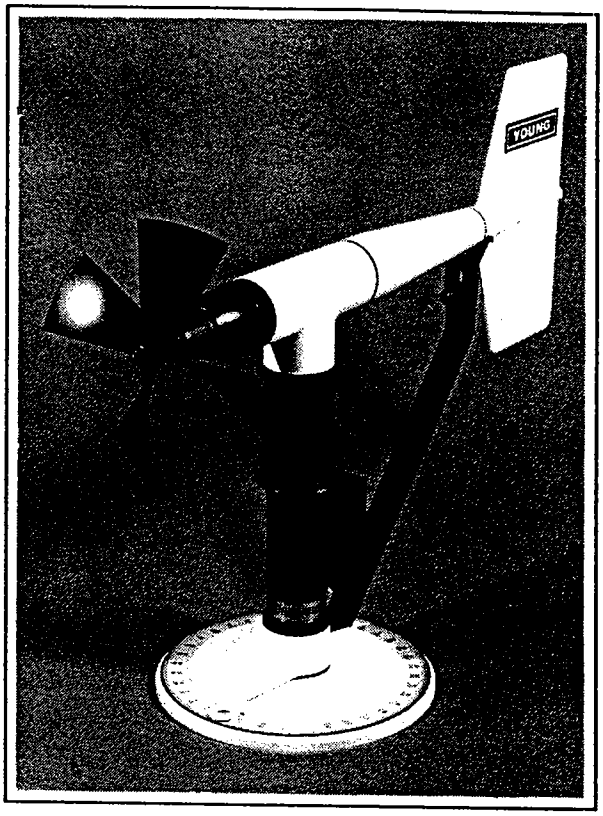
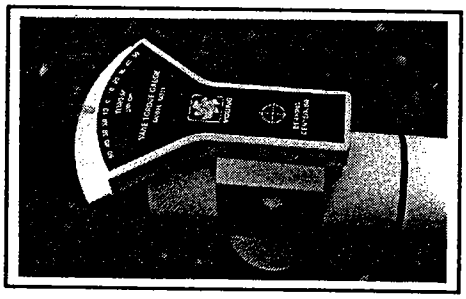
CALIBRATION ACCESSORIES



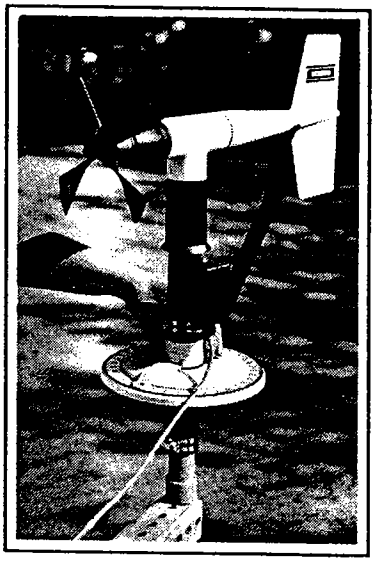
MODEL 18801/18810 ANEMOMETER DRIVE



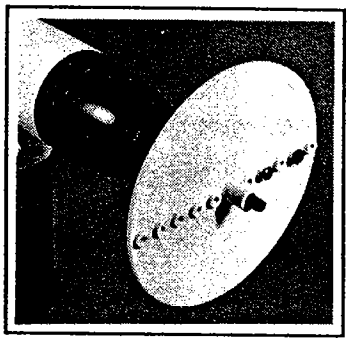
MODEL 18112 VANE ANGLE BENCH STAND



MODEL 18331 VANE TORQUE GAUGE



MODEL 18212
VANE ANGLE FIXTURE
(TOWER MOUNT)



MODEL 18310 PROPELLER
TORQUE DISC

MODEL 18301
VANE ALIGNMENT ROD

CALIBRATION ACCESSORIES

SPECIFICATIONS

MODEL 18801
ANEMOMETER DRIVE

Range: 100 to 10,000 in 100 RPM increments
Rotation: Clockwise or counter-clockwise
Display Resolution: 1 RPM
Quartz Timebase Reference: 0.1 RPM
External Output:
32 pulses per rotation, $12V_{p-p}$
Power Requirement:
6 to 24 VDC, 3 W. 115VAC wall adapter included. Unit may also run on internal power- 4 x AA 1.5V alkaline batteries which are included.

MODEL 18810
ANEMOMETER DRIVE

Range: 10 to 1000 RPM in 10 RPM increments
Display Resolution: 0.1 RPM

MODEL 18112 and 18212
VANE ANGLE CALIBRATION DEVICES

Range: 0 to 360°
Resolution: 0.5 degree

MODEL 18310 and 18312
TORQUE DISC DEVICES

Range: 0 to 5.4 gm-cm
Resolution: 0.1 gm-cm

MODEL 18331
VANE TORQUE GAUGE

Range: 0 to 50 gm-cm
Resolution:
At 10 cm distance, each division represents 5 gm-cm. Used for pass/fail test of vane bearings.

Model 18801 Anemometer Drive provides a convenient and accurate way to rotate an anemometer shaft at a known rate. The motor may be set to rotate clockwise or counter-clockwise at any rate between 100 and 10,000 RPM in 100 RPM increments. The large LCD display shows actual rotation rate with 1 RPM resolution. Rotation rate and display are referenced to an accurate and stable quartz timebase. For completely portable operation, the unit runs on 4 internal "AA" alkaline batteries. For extended operation, an AC wall adapter is included.

Model 18810 Anemometer Drive is identical to Model 18801 except the drive motor incorporates a 10:1 gear reducer for 10 to 1000 RPM coverage in 10 RPM increments. The lower range is recommended for cup anemometer calibration.

Model 18112 Vane Angle Bench Stand is used to check and set wind direction calibration on the Wind Monitor family of sensors. The mounting post engages the direction orientation notch on the Wind Monitor. An easy to read pointer covers 0 to 360° with ½° resolution.

Model 18212 Vane Angle Fixture - Tower Mount is identical to the Model 18112 except it is used on location where the sensor is mounted rather than on a lab bench. Temporarily placed between the Wind Monitor and its orientation ring, index keys and notches are stacked to preserve direction reference.

Model 18310 Propeller Torque Disc checks anemometer bearing torque with 0.1 gm/cm resolution. The disc temporarily replaces the propeller for torque measurement or simple yet accurate pass/fail checks. Charts included with the unit relate torque to propeller threshold with limits for acceptable bearing performance.

Model 18312 Cup-Wheel Torque Disc checks cup anemometer bearing torque.

Model 18331 Vane Torque Gauge checks vane bearing torque of Wind Monitor family sensors. Slip the fixture over the main housing and make simple yet accurate vane torque measurements. Charts relating vane torque to vane threshold provide limits for acceptable bearing performance.

Model 18301 Vane Alignment Rod helps align the vane of a wind sensor to a known direction reference during installation. The base of the device has an index key that engages the direction orientation notch in the sensor allowing the sensor to be removed without losing wind direction reference.

Ordering Information:

Description	Model
Anemometer Drive - 100 to 10,000 RPM	18801
Anemometer Drive - 10 to 1000 RPM	18810
230V / 50-60 Hz Input Power	add suffix "H"
Vane Angle Bench Stand	18112
Vane Angle Fixture - Tower Mount	18212
Propeller Torque Disc	18310
Cup-Wheel Torque Disc	18312
Vane Torque Gauge	18331
Vane Alignment Rod	18301

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