



SIGNETMARINEInc.
signetmarine.com

MK154 / SYSTEM 1500

WIND DIRECTION & WIND SPEED

Instruction Manual

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WINDPOINT/WINDSPEED SYSTEM

1500

INSTRUCTION MANUAL

1.0 INTRODUCTION

This manual contains description, specifications, and instructions for the installation and operation of your System 1500. PLEASE READ ALL OF THIS INSTRUCTION MANUAL; it will answer most of your questions. If you require further assistance, contact your Signet dealer, your nearest authorized warranty repair station (addresses furnished upon request), or Signet.

1.1 DESCRIPTION

The System 1500 features advanced microprocessor-based technology resulting in low power drain plus improved accuracy and reliability for the most demanding marine applications, both racing and cruising. The System 1500 is comprised of the MK 154 Indicator, MK 24.30-2 Masthead Sensor Assembly and Mounting Bracket, and standard 80-foot cable. The mast cable may be ordered in optional lengths of 90, 100, 110, 120, or 130 feet. The MK 154.4 is a slave indicator used with an existing System 1500 or may be ordered as a replacement master for use with an existing masthead sensor.

The System 1500 is compatible with a wide variety of other Signet marine instruments. They include the MK 23, MK 30, MK 169, MK 24, MK 181, MK 152, MK 140, and MK 144. If you already own one of these instruments, purchase an appropriate Signet Y-cable (see 5.1 Parts List) from you dealer in order to interface with the System 1500. Note that the MK 23 Closehauled Indicator, while compatible with the System 1500, cannot be interfaced with the system if any of the following instruments are also used: MK 181, MK 152, MK 140, and MK 144.

1.1 Description Continued

Due to all the complexities encountered when putting together a large system, it is recommended you contact Signet or your dealer when a system of more than three Signet instruments will be used per knotmeter, windspeed, or windpoint function.

The System 1500 indicates digital windspeed from 0 to 99 knots in 1-knot increments on a 0.75-inch high, 2-digit LCD (Liquid Crystal Display) display. This low-power display has high visibility, even in direct sunlight. The analog dial tracks apparent wind direction a full 360° relative to boat direction from 0° to 180° port and starboard in 5° increments. Night lights, separately powered from the indicator, provide dusk-to-dawn illumination of the indicator face. This indicator face is completely sealed to withstand weather, washdown, and salt-water corrosion. The case of the indicator is matte black to minimize reflective glare. A plastic cover is provided to help protect the indicator's face when it is not in use. The indicator may be installed in a bulkhead or instrument panel.

The tri-cup portion of the MK 24.30-2 Masthead Sensor generates its own transducer signal and rotates on low-friction, stainless steel bearings. The wind-vane portion of this sensor receives transmitter reference voltage from the indicator. The vane is aerodynamically designed for lightweight counterbalancing and is hydraulically damped for greater precision under all wind conditions.

The system's indicator and night lights are separately powered by 12 volts dc. The indicator contains reverse-polarity protection.

1.2 SPECIFICATIONS

Windpoint:

Range.....360° (0° to 180° port and
starboard)
Display.....analog dial
Scale Resolution.....5°
Accuracy.....less than \pm 3% of full scale
Input Characteristics.....0 to 6.8 volts, 3 phase

Windspeed:

Range.....0 to 99 knots
Display.....2-digit LCD, 0.75-inch high
Display Resolution.....1 knot
Accuracy..... \pm 1% of full scale
Averaging Period.....automatically controlled by
microprocessor with 8-second
time constant
Display Update.....every 2 seconds
Input Characteristics.....0.25 volt peak-to-peak/knot,
0.75 Hertz/knot
Power Requirements.....12 volts dc
Power Drain.....without lights: approx. 150
milliamps; with lights:
approx. 500 milliamps

2.0 INSTALLATION

2.1 UNPACKING AND INSPECTION

When unpacking your System 1500 package, be sure you have received everything (items 1-9 listed on page 4). Carefully check each item for damage incurred during shipment. If damage has occurred, promptly notify your dealer and the shipping carrier.

The following items are included in your System 1500 package:

2.1 Unpacking and Inspection Continued

1. MK 154 Indicator
2. Plastic screwdriver for calibration
3. M15112 protective plastic cover for indicator
4. Cutout template for mounting indicator
5. M15129 Mounting Kit
6. M15167 indicator mounting gasket
7. MK 24.30-2 Masthead Sensor Assembly and Mounting Bracket
8. MK 24-M080 80-foot Mast Cable
9. Instruction Manual and Warranty Card

When the MK 154 is ordered separately as a MK 154.4, your package includes items #1, 2, 3, 4, 5, 6, and 9.

Please fill out and return the Warranty Card as soon as possible.

2.2 INDICATOR INSTALLATION

The indicator may be installed in a bulkhead or instrument panel having a 5-3/16 inch square hole with sufficient clearance around it to accommodate the indicator's 5- $\frac{1}{2}$ inch square front bezel. There must be a minimum 4- $\frac{1}{2}$ inch rear clearance. Note that windpoint operation of the indicator may affect a closely-mounted compass. To eliminate any magnetic effects that may occur, the optional M15455 Magnetic Shield may be mounted over the indicator's case.

2.2.1 INSTALLATION EQUIPMENT

1. $\frac{1}{2}$ -inch Drill
2. Saber saw
3. Flat-blade screwdriver
4. Bedding Compound or Silicone Sealant

NOTE: DO NOT USE BOAT LIFE, 3M #3700, OR ANY POLY-SULFIDE BEDDING COMPOUND

2.2 Indicator Installation Continued

2.2.2 INSTALLATION PROCEDURES

1. Remove the paper backing from the cutout template. Position and apply the pressure-sensitive template to the surface of the panel that will hold the indicator.
2. Drill four $\frac{1}{2}$ -inch holes as indicated on the template.
3. Use the saber saw to cut out the remainder of the hole pattern along the INSIDE edge of the template's dotted line. Remove the remainder of the template from the mounting panel.
4. Assemble the clamp ring as shown in Figure 1.
5. Put the mounting gasket on the Indicator's case as shown in Figure 1. Work the mounting gasket into place flush with the rear lip of the bezel. Note that the inside edge of the gasket must fit in the channel of the lip in order to seal properly.
6. Apply bedding compound or sealant around the rear surface of the mounting gasket.
7. Loosen the clamp ring (see two "A" screws in Figure 1).
8. Insert the rear of the indicator through the front of the prepared hole in the panel.
9. Slip the clamp ring over the rear of the indicator. With the front bezel of the indicator held tightly against the front of the panel, position the clamp ring snugly against the rear of the panel.
10. Tighten the two "A" screws.
11. Seal the front bezel firmly against the panel by tightening the two "B" clamping screws (see Figure 1) hand tight. DO NOT OVERTIGHTEN THESE SCREWS. Overtightening will cause the clamp ring to slip.

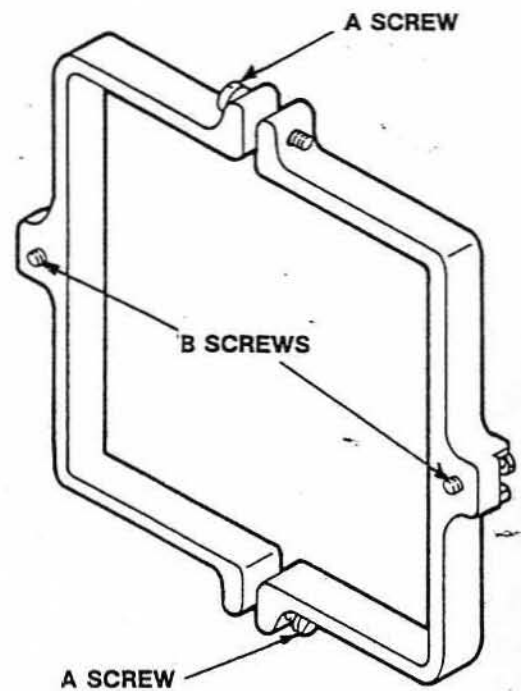
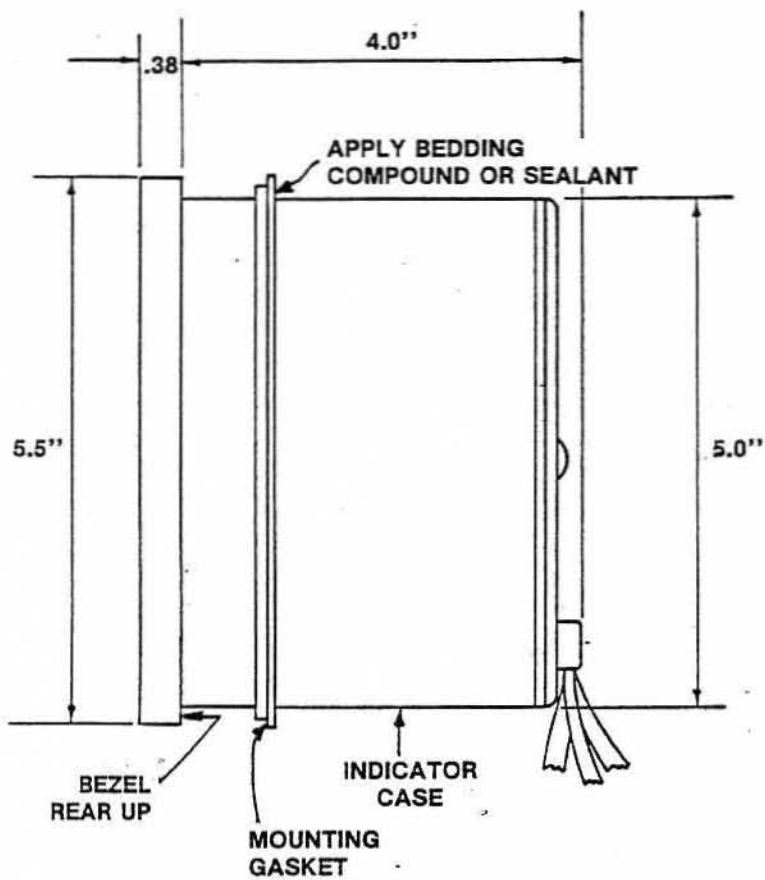


Figure 1. Detailed profile of MK 154 indicator (left) showing gasket installation and an isometric view of the clamp ring (right).

2.3 MASTHEAD SENSOR INSTALLATION

Reference Figure 2 throughout this section. Select a location on the top of the mast that will permit the sensor's staff to point aft. The sensor can be mounted, as an option, pointing to the bow. This is not recommended, however, since the sensor may not be visible from the helm and is more subject to sail damage.

The mast cable can connect the sensor to the indicator in either of two ways: (1) directly between the sensor and indicator without splices, or (2) indirectly through the optional MK 55.80 Mast-Base Junction Box. This second method is usually recommended in order to eliminate excess mast cable and avoid cable splicing. It also permits the cable to be easily separated and re-joined whenever the mast is removed. The MK 55.80, any other options, and any installation hardware may be purchased from your Signet dealer.

The masthead sensor should be installed in two steps: (1) before the mast is stepped, and (2) after the mast is stepped and rigged.

2.3.1 INSTALLATION EQUIPMENT

1. #7 drill
2. ¼-20 tap
3. 5/64-inch Allen wrench
4. Silicone sealant
5. 2 grommets (see 2.3.2)
6. 1 cable strain-relief clamp or strap (see 2.3.2)
7. Wire cutter
8. Box wrench set
9. Phillips-head and flat-blade screwdrivers

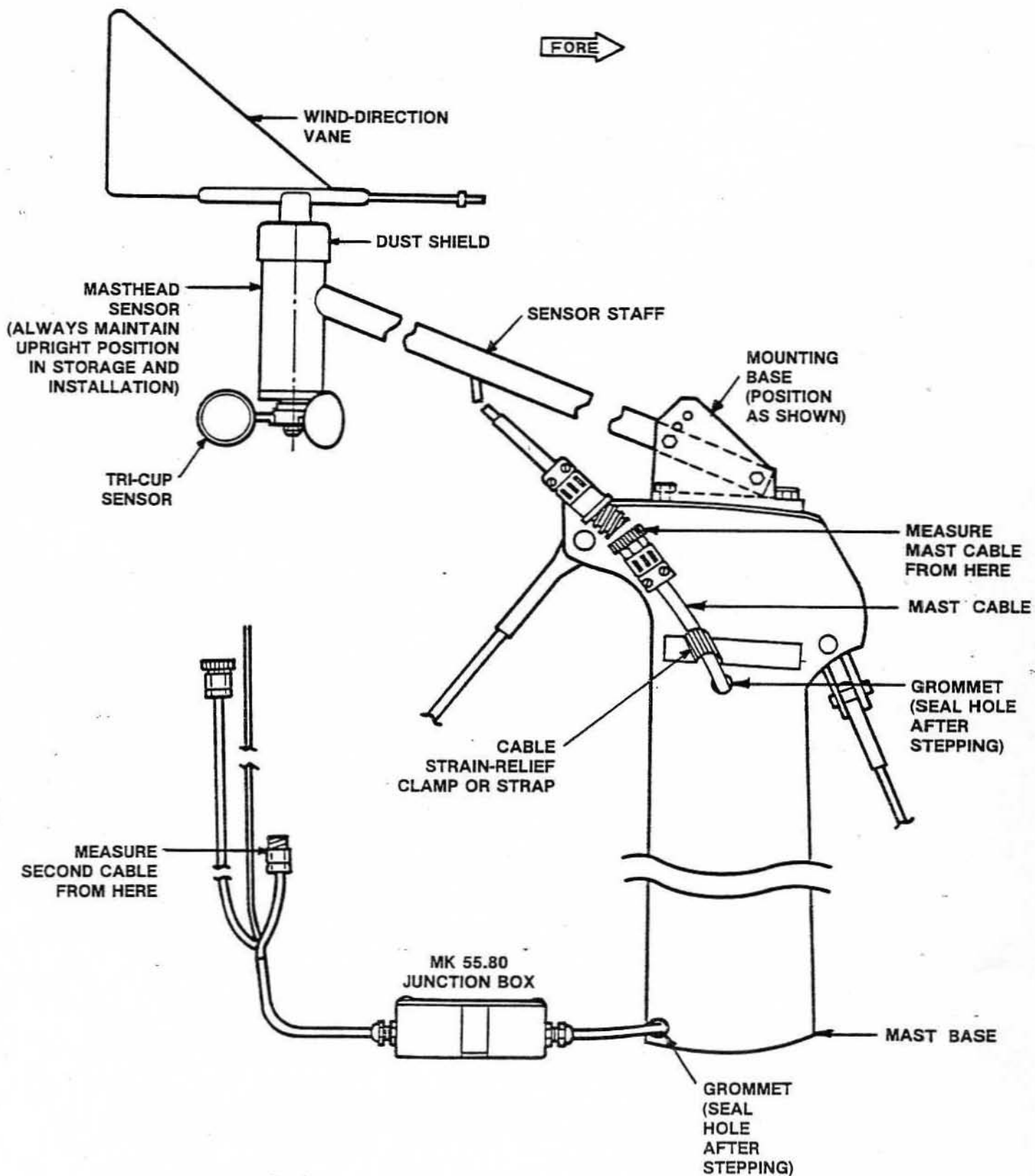


Figure 2. Installation of masthead sensor.

2.3 Masthead Sensor Installation Continued

2.3.2 INSTALLATION BEFORE STEPPING

Using the sensor's mounting base as a template, with the taller end of the base toward the stern, drill two 0.20-inch diameter holes in the end of the mast. Tap these holes with the $\frac{1}{4}$ -20 tap. Mount the base with the taller end aft and secure loosely with the bolts and lock-washers provided.

It is not recommended that the staff, vane, and tri-cup sensor be mounted before stepping in order to avoid damage to these components.

1. If the MK 55.80 Mast-Base Junction Box is used, the mast cable must be cut into two custom lengths. These lengths can best be determined by first positioning and mounting the Junction Box in a relatively dry area near the mast step. The box is secured by its two mounting ears using $\frac{1}{4}$ -inch hardware. Mounting ear centers can be measured at 5.600 inches or use the box's base as a template.
2. Measure the length from the top edge of the sensor's mounting base to the mast base and from the mast step to the terminal strip inside the junction box. Then add 6 inches for cable stripping. Cut the mast cable to this total length as measured from the single-connector end of the cable. This is the first cable required.
3. To make the second cable required, measure the length from the rear of the indicator's case to the terminal strip inside the junction box. Then add 6 inches for cable stripping. Cut the remaining piece of mast cable (from step 3) to this total length as measured from the dual-connector (plus ground wire) end of the cable.

NOTE: DO NOT CUT THE MAST CABLE AT THE MASTHEAD OR INSIDE THE MAST ITSELF.

2.3 Masthead Sensor Installation Continued

2.3.2 Installation Before Stepping Continued

4. Drill two 3/8-inch holes in the mast, one near the top and the other recommended near the mast base, to accommodate the mast cable. Insert a grommet in each hole; this grommet must accommodate a 3/8-inch hole and the thickness of the mast wall.
5. Run the mast cable with the single connector down the inside of the mast, starting at the masthead with the cut end, through the grommets. The connector-end must remain at the masthead. On a mast with internal halyards, protect the mast cable by first inserting a PVC (polyvinylchloride) tube down the length of the mast. Secure the tube away from the halyards. Then run the mast cable inside the tube.
6. Mount a cable strain-relief clamp or strap to the mast immediately above the grommeted cable entrance hole near the masthead. This clamp is to be placed around the mast cable to hold it secure. Once the mast is stepped, this clamp will virtually eliminate strain on the upper connectors.

2.3.3 INSTALLATION AFTER STEPPING AND RIGGING

Storage or shipment of the masthead sensor on its side or upside down may allow oil seepage from the vane's hydraulic damping assembly. This oil seepage is normal and will not affect operation of the sensor if it is cleaned off just prior to mounting. Pay special attention to cleaning the area between the staff and dust shield.

2.3 Masthead Sensor Installation Continued

2.3.3 Installation After Stepping and Rigging Continued

1. Before going up the mast and installing the sensor:
 - A. The wind vane's dust shield must be aligned. Turn the dust shield (see Figure 3A) until the FWD 0° notch matches the white alignment mark on the sensor's upper body.
 - B. Hold the dust shield in place. Then, if the staff will be installed pointing aft as recommended, mount the vane on top of the dust shield pointing over the staff (see Figure 3B). If the staff will point to the bow, the vane must point to the bow.
 - C. Remove the 10-32 lock-nut and washer from the bottom windspeed-end of the sensor's body. Install the tri-cup by fitting it over the remaining nut. The recessed area of the tri-cup must face upward. Replace the 10-32 lock-nut and washer and firmly tighten.
2. Take the completed masthead sensor assembly up the mast, place the staff in the mounting base, insert the mounting bolts, and proceed to adjust the staff angle until the sensor's body is perpendicular to the water. Three staff adjustment positions are provided on the sensor's mounting base. If more adjustment is required, use a shim under the mounting base.
3. With the mounting-base bolts loose, align the staff with the backstay so the sensor assembly is parallel with the fore-aft axis. Firmly tighten all mounting-base bolts.
4. Connect the masthead sensor cable connector to the mast cable connector. Dress the cable and tighten the cable strain-relief clamp or strap.

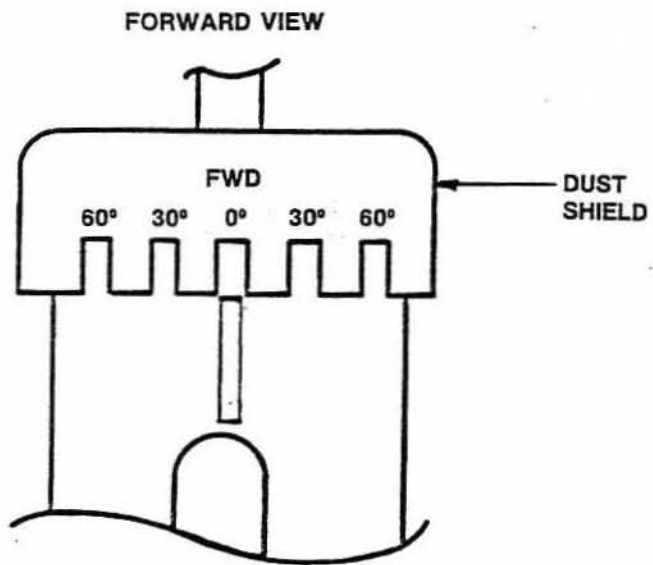


Figure 3A. Alignment of wind vane dust shield.

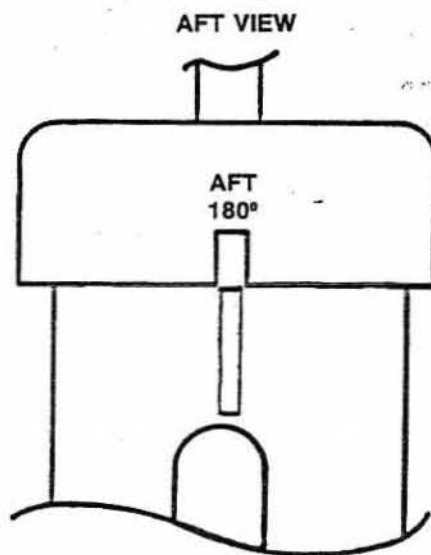


Figure 3B. Alignment of wind vane dust shield.

2.3 Masthead Sensor Installation Continued

2.3.3 Installation After Stepping and Rigging Continued

5. Seal all holes, including the grommets cable hole, with silicone sealant.
6. At the mast base, gently pull any loose cabling through the grommets hole. Seal the hole with silicone sealant.
7. Disassemble the top of the junction box and loosen both waterproof cable feedthroughs (see Figure 4). Feed the cut end of the mast cable all the way through the nearest feedthrough. Firmly tighten the feedthrough.
8. Strip the outer jacket of the mast cable back about 3 to 4 inches. Then strip each individual wire back about $\frac{1}{2}$ -inch. Connect each wire to its nearest respective color-coded terminal (i.e., black wire to BLACK terminal, etc.). The shield of the mast cable is connected to the nearest SHIELD terminal.
9. Feed the cut end of the cable length with two connectors through the remaining junction box feedthrough. Firmly tighten the feedthrough.
10. Strip the outer jacket of this second cable back about 3 to 4 inches. Then strip each individual wire back about $\frac{1}{2}$ -inch. Connect each wire to its remaining respective color-coded terminal (i.e., black wire to BLACK terminal, etc.). The shield of this second cable is connected to the remaining SHIELD terminal.
11. Reassemble the top of the junction box.

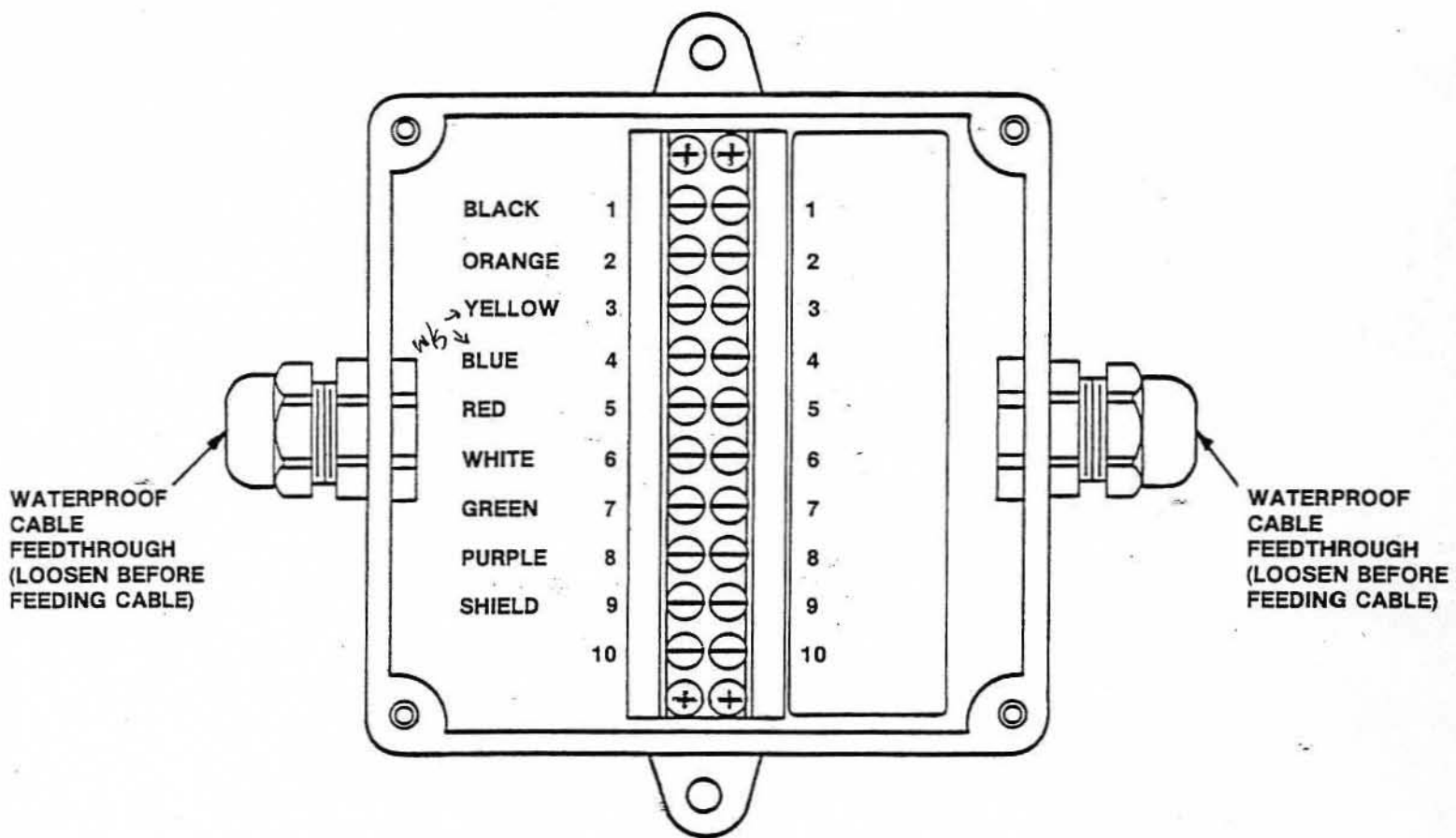


Figure 4: Junction box cable connections (top removed).

2.4 INDICATOR CONNECTIONS

2.4.1 TO THE MAST CABLE

Two of the cables from the rear of the indicator have connectors, one for windpoint (WP) and the other for windspeed (WS) (see Figure 5). Connect the windpoint connector (cable marked TO MAST CABLE) to its mating connector from the junction box. Connect the windspeed connector (cable marked TO TRANSDUCER) to its mating connector from the junction box.

2.4.2 FROM THE BATTERY

Connect the sensor's ground wire (shield) from the junction box to a through-hull fitting or anything common to the water.

Connect the red and black wires in the 12 VDC cable coming from the rear of the indicator (see Figure 5) to the boat's battery system through an external power switch, red to +12 volts dc and black to ground (THERE IS NOT POWER SWITCH ON THE INDICATOR). A 1-amp in-line fuse can be utilized in the indicator's external power circuit if desired.

2.4.3 NIGHT LIGHT POWER

Connect the white and green wires in the 12 VDC cable coming from the rear of the indicator to the boat battery system through an optional dimmer (see 5.1 Parts List) and a second power switch, white to +12 volts dc and green to ground.

2.5 REPEATER (SLAVE) INSTALLATIONS

The windpoint circuit of a Signet indicator, when used as a master unit, supplies transmitter reference voltage through the mast cable to the wind vane sensor circuit. If the indicator is to be used as a repeater (slave), this reference voltage is not required. If the indicator cannot be switched to a repeater (slave) function as with the MK 154, eliminate this voltage by removing pins #1 and 2 from the windpoint cable connector.

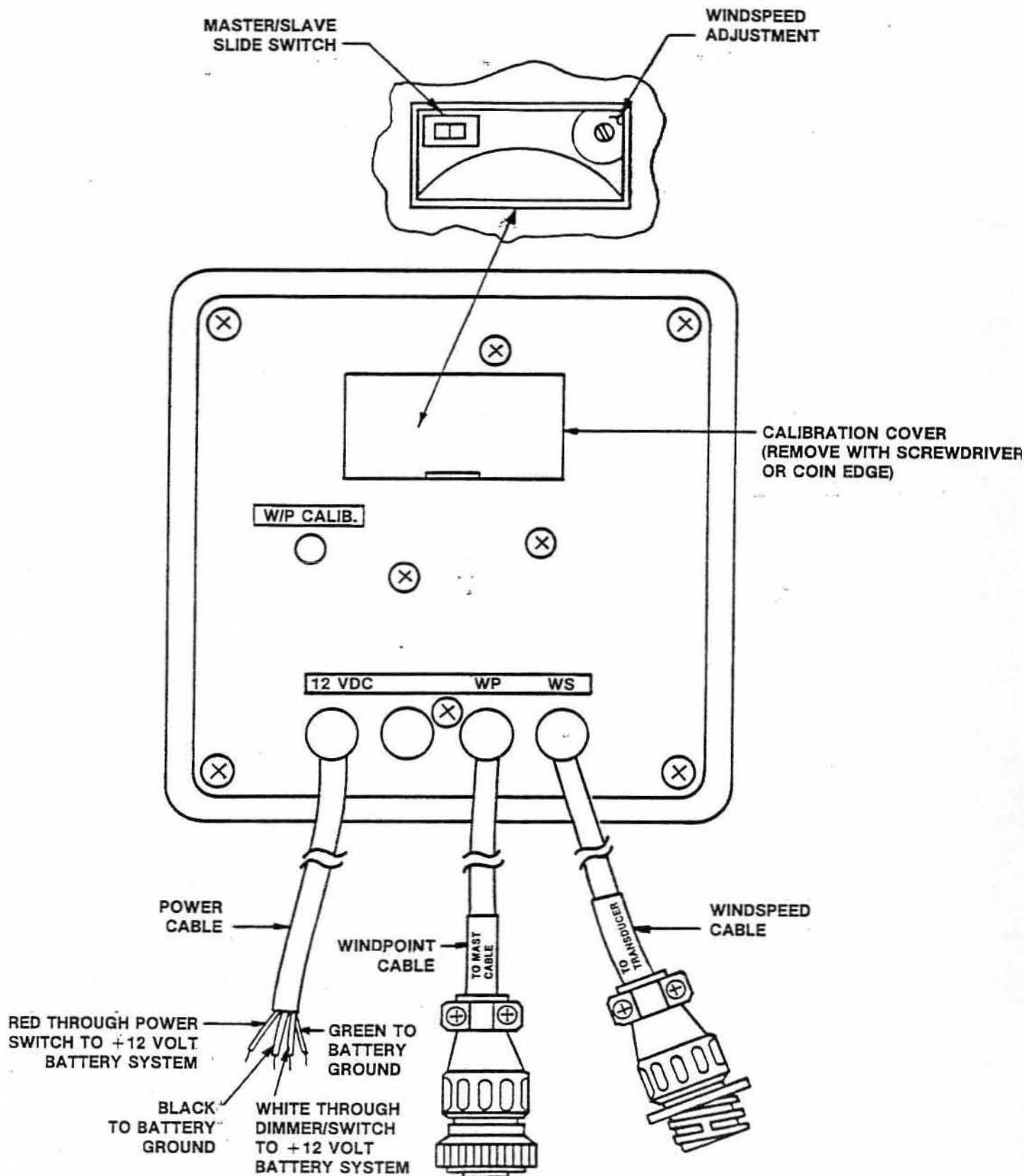


Figure 5. Rear panel of indicator.

2.5 Repeater (Slave) Installations Continued

Typical repeater (slave) installations are shown in Figure 6. Repeaters should be connected with optional Y-cables (see 5.1 Parts List) to the master indicator prior to calibration.

2.6 REAR PANEL CONTROLS

Reference Figure 5 throughout this section.

2.6.1 MASTER/SLAVE FUNCTION

The MK 154 used as a master unit provides transmitter reference to the sensor's wind vane. When used as a slave, it does not provide this reference voltage.

Determining Master m/Slave s, System #1- 152 m, 154 s;
System #2 - 152 m, 154 s, 24 s; System #3 - 154 m,
154 s; System #4 - 24 m, 154 s; System #5 - 181 m,
154 s, 24 s; System #6 - 24 m, 154 s, 23

A slide switch located under the calibration cover determines whether the MK 154 is a master or slave. The calibration cover is removed with a screwdriver or coin edge. The MASTER/SLAVE slide switch is positioned on the upper-left portion of the indicator's PC board as seen through the calibration hatch. A screwdriver blade can be used to slide the switch to the left for SLAVE or right for MASTER, as desired. Replace the calibration cover.

2.6.2 WINDPOINT CALIBRATION

Remove the hole plug marked W/P CALIB. on the rear of the indicator. Through the resulting hole can be seen the screwdriver slot of the windpoint calibration adjustment. With power applied to the indicator and wind vane held very steady pointing to the bow, adjust the W/P CALIB. adjustment until the analog dial on the indicator reads 0°. Replace the hole plug.

If you are using a windpoint repeater (see 2.5 Repeater Installations), also adjust the repeater's windpoint calibration control until its display reads 0°.

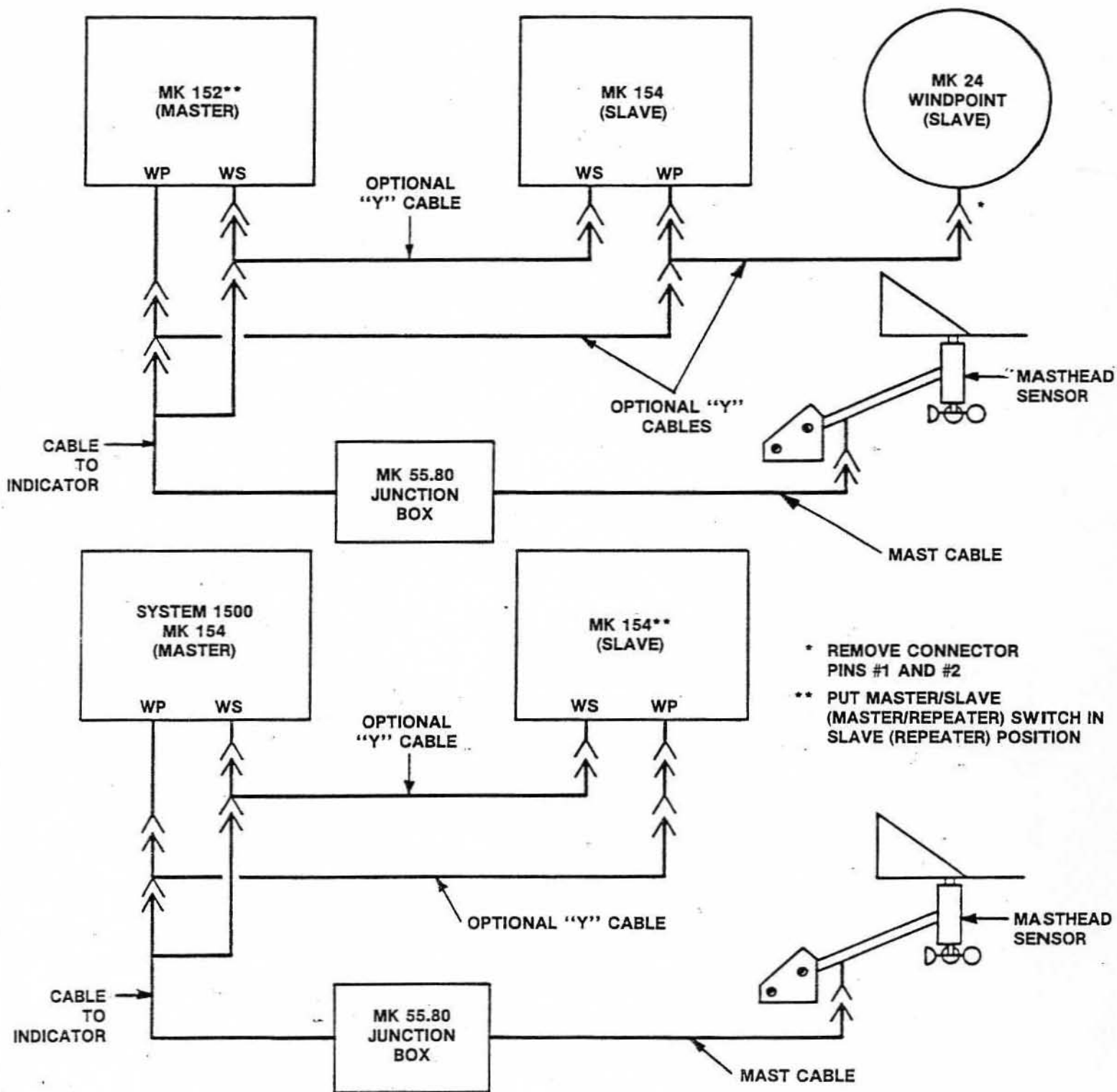


Figure 6. Some typical repeater (slave) installations.

2.6 Rear Panel Controls Continued

2.6.2 Windpoint Calibration Continued

This calibration may be performed again at any time and should be checked at regular intervals. To check windpoint calibration, rotate the wind vane to various positions and note the response of the indicator's analog dial. Indicator positions should be the same as the vane positions.

Immediately after initial calibration, operation of the indicator's windpoint function should be verified for future reference. Disconnect the indicator's windpoint connector (cable marked TO MAST CABLE) from its mate. The indicator's built-in transmitter reference signal will force a reading on the analog dial of between 10° port and 40° starboard. Record the specific reading. This operational verification may be performed again at any time. The reading obtained on future checks should match the initial reading. Reconnect the windpoint connector to its mate.

2.6.3 WINDSPEED CALIBRATION

The windspeed function of the indicator is calibrated at the factory in an open wind tunnel and should not require further calibration after installation. Before attempting any adjustment, first be sure that the windspeed tri-cup is spinning freely in the wind.

Windspeed calibration can be checked anytime by comparing the windspeed displayed on the indicator with the reading at an accurate, stationary windmeter, such as a Coast Guard Station. For a more precise calibration check, while motoring on a morning with no breeze, compare the indicator's displayed windspeed with the boat's knotmeter reading. If the indicator does not match, adjust the windspeed adjustment, located under the calibration cover in the upper-right corner, until the LCD display of the indicator matches the stationary windmeter or the boat's knotmeter.

3.0 THEORY OF OPERATION

Reference Figure 7 throughout this section.

The windpoint section of the indicator is a dc servo system. The wind-vane position determines the masthead sensor's potentiometer slider position. Three taps on the potentiometer provide three voltages with a direct relation to vane position. These three voltages are current-amplified in the indicator (there is no voltage amplification) and used to drive the 3-coil servo meter assembly in the indicator.

The windspeed tri-cup is a transducer with an ac output signal. This signal is measured and displayed by the indicator. The indicator's windspeed circuitry utilizes a microprocessor to do the processing and conversion of the windspeed data to drive the LCD display.

The indicator uses a single-component 8-bit microcomputer. Among other state-of-the-art features are two A/D converters. The frequency information from the windspeed sensor is first shaped and then applied to one of the A/D converters, while the calibration potentiometer is connected to the second A/D converter. The entire processing program is contained in the on-board ROM.

New data is supplied every 2 seconds to the output ports which drive appropriate segments of the 2-digit LCD. The program provides averaging with about an 8-second time constant to minimize flickering of the display.

The indicator operates on a nominal 12-volt dc power source and is not damaged by steady-state voltages as high as 16 volts dc or transients as large as 25 volts peak. Internally, this supply voltage is regulated to supply several different values for different circuits.

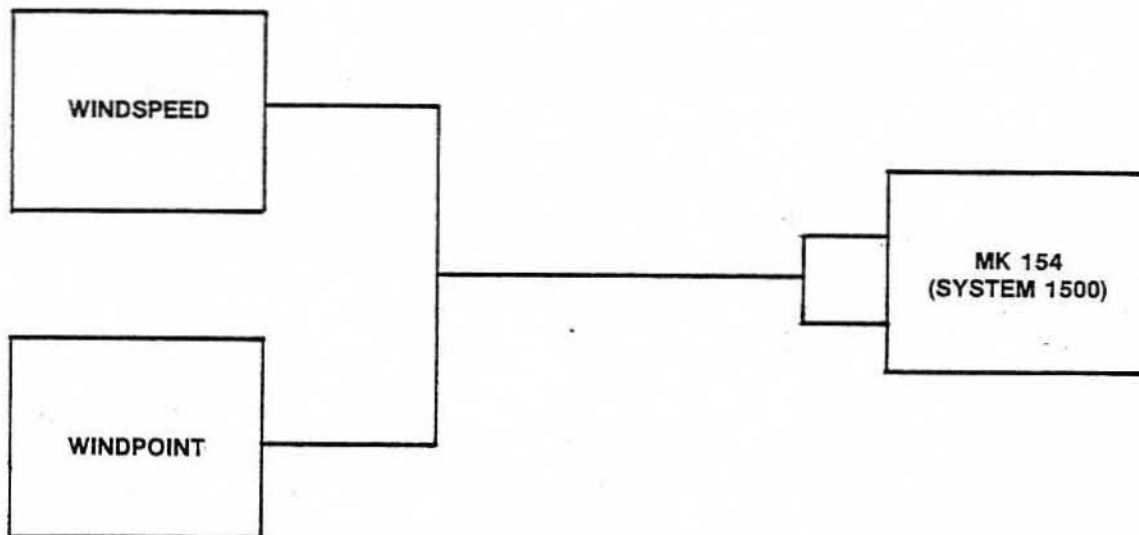


Figure 7. MK 154 Block Diagram

3.0 Theory of Operation Continued

The drivers for the servo motor are supplied by a circuit consisting of a 14-volt zener diode; thus, normally this operating voltage becomes one diode drop below the supply voltage.

The windpoint transmitter is powered from a 6.8-volt zener, biased up halfway between the supply voltage and ground. These voltages are usually referred to as "+9" and "+2".

The entire windspeed system, including the microprocessor, operates on +5 volts, supplied by an IC voltage regulator.

4.0 TROUBLESHOOTING

The System 1500 is a complex electronic device which should normally be serviced only by a qualified technician with proper equipment. The indicator contains no user-replaceable parts. The masthead sensor assembly does contain replaceable parts (see 5.1 Parts List and Figure 8).

4.1 TROUBLESHOOTING THE INDICATOR AND SENSOR

Operational verification of the indicator's windpoint function will determine if the indicator is faulty. Disconnect the indicator's windpoint connector (cable marked TO MAST CABLE) from its mate. Record the analog dial reading. It should match the initial reading obtained in 2.6.2 Windpoint Calibration. If not, the indicator must be serviced by Signet or an authorized service facility (addresses of worldwide locations furnished upon request).

Following procedures in the troubleshooting guides of Tables 1 and 2 will help isolate problems in the indicator and/or masthead sensor.

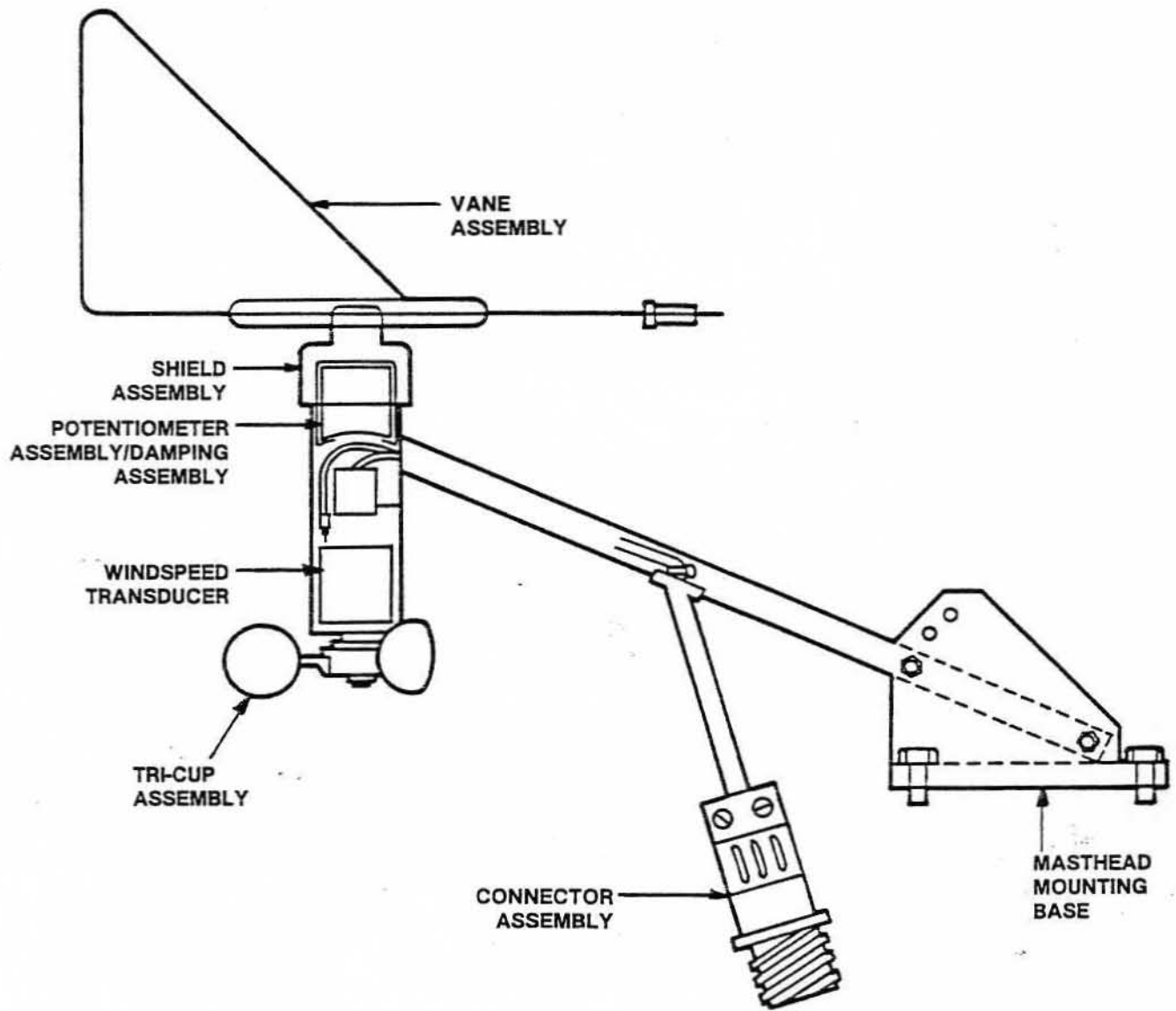


Figure 8. Masthead sensor assembly replaceable parts (see 5.1 Parts List).

4.2

SPECIAL TROUBLESHOOTING TIPS

1. The wind-vane's potentiometer may be checked for correct electrical parameters:
 - A. Turn off the power to the indicator. Disconnect the mast cable connector from the masthead sensor cable connector. Check the connectors for damage or loose wires.
 - B. Check the potentiometer of the wind vane, measure its resistance between pins #1 and 2 of the masthead sensor connector. This reading should be 1250 ohms. Then check resistance between pins #5, 6, and 7 (any combination). This reading should be 1110 ohms. If any of these readings are incorrect, the potentiometer requires replacement.
 - C. To zero the potentiometer, measure resistance between pins #1 and 5 and turn the wind vane until obtaining a resistance reading of 0 ohms.
2. The tri-cup transducer may be checked for output. Measure ac voltage between pins #3 and 4 of the masthead sensor cable connector. With the tri-cup turning, an ac voltage should be produced. Then measure resistance across the same pins with the tri-cup stationary. This reading should be 4,000 ohms \pm 10%.
3. The windpoint and windspeed mast cable may be checked next between the masthead and junction box. Reconnect the masthead sensor cable connector to the mast cable connector. Disconnect the wires on the junction box terminal strip going to the indicator. Repeat steps 1, 2, and 3 measuring across the color-coded terminals in the junction box per the following pin number/wire color coordination:

TABLE 1 WINDPOINT TROUBLESHOOTING GUIDE

<u>PROBLEM</u>	<u>PROBABLE CAUSES</u>	<u>CURES</u>
Analog dial does not move.	<ol style="list-style-type: none"> 1. 12 volts not connected to indicator. 2. Polarity reversed on battery power leads. 3. Mast cable disconnected from indicator's windpoint cable. 4. Wire broken or shorted in cable or junction box. 5. Cable broken or cut. 6. Mast cable disconnected from masthead sensor cable. 7. Lightning damage to indicator or masthead sensor. 8. MASTER/SLAVE switch in wrong position. 	<ol style="list-style-type: none"> 1. Connect battery source to indicator. 2. Reverse battery connections to indicator. 3. Connect mast cable to indicator's windpoint cable. 4. Restrip and reconnect wire; insufficient length may require new mast cable. 5. Replace cable; repairs should be only temporary. 6. Reconnect cables. 7. Return system for service. 8. See 2.6.1 for switch location.
Analog dial reads only in one portion of dial.	<ol style="list-style-type: none"> 1. Faulty wind vane sensing circuit. 2. Broken wire in cable to sensor. 3. Faulty windpoint circuit in indicator. 4. Repeater power is off. 	<ol style="list-style-type: none"> 1. Return masthead sensor for service. 2. Inspect and repair cable. 3. Return indicator for service. 4. Turn on the repeater.
Analog dial read 180° out of phase.	<ol style="list-style-type: none"> 1. Vane on backward. 	<ol style="list-style-type: none"> 1. Reverse vane direction.
Analog dial will not stay in adjustment, drifts, or will not stay in adjustment with vane.	<ol style="list-style-type: none"> 1. Faulty windpoint circuitry in indicator. 2. Set screws holding vane and/or hub and dust shield are loose. 	<ol style="list-style-type: none"> 1. Return indicator for service. 2. Tighten set screws; check dust shield for proper positioning (see 2.3.3).
Constant error in relation to wind vane.	<ol style="list-style-type: none"> 1. Indicator requires calibration. 	<ol style="list-style-type: none"> 1. Recalibrate indicator (see 2.6.2).
Analog dial is erratic only when engines are running.	<ol style="list-style-type: none"> 1. Engine noise is being picked up by windpoint electronics through the mast cable. 	<ol style="list-style-type: none"> 1. Put noise suppression equipment on engines. 2. Re-route mast cable away from engine.
Analog dial reads port and vane reads starboard.	<ol style="list-style-type: none"> 1. Mast cable connector pin #6 (white wire) and pin #7 (green wire) are reversed. 	<ol style="list-style-type: none"> 1. Reverse white and green wires in junction box.

TABLE 2 WINDSPEED TROUBLESHOOTING GUIDE

<u>PROBLEM</u>	<u>PROBABLE CAUSES</u>	<u>CURES</u>
Display reads only zero.	<ol style="list-style-type: none"> 1. Tri-cup is not turning. 2. Cable is damaged or broken. 	<ol style="list-style-type: none"> 1. Repair tri-cup assembly; have bearings replaced. 2. Repair damaged cable; should be only temporary.
Display is erratic or reads low all the time.	<ol style="list-style-type: none"> 1. Tri-cup is damaged. 2. System out of calibration. 3. Cables/connectors damaged. 4. System loaded down by another faulty windspeed indicator. 	<ol style="list-style-type: none"> 1. Replace tri-cup. 2. Recalibrate (see 2.6.3). 3. Check and replace damaged items. 4. Repair faulty windspeed indicator.
Display is erratic only when engines are running.	<ol style="list-style-type: none"> 1. Engine noise is being picked up by windspeed electronics through mast cable. 	<ol style="list-style-type: none"> 1. Put noise suppression equipment on engines. 2. Re-route mast cables away from engines.
Display is completely blank.	<ol style="list-style-type: none"> 1. Power off or disconnected. 2. LCD display is non-functional or damaged. 3. LCD driver circuit is not operating. 	<ol style="list-style-type: none"> 1. Reconnect and/or turn on power. 2. Replace LCD display. 3. Repair LCD driver circuit.

4.2 Special Troubleshooting Tips Continued

3. Continued

Pin #1 - Black	Pin #5 - Red
#2 - Orange	#6 - White
#3 - Yellow	#7 - Green
#4 - Blue	#8 - Purple (NOT USED)

4. The remaining piece of cable between the junction box and indicator may be checked for continuity with an ohmmeter. Disconnect both connectors at the indicator. Measure resistance across each bare-wire tip and its respective connector pin. An open wire will show up as a high resistance, greater than 15,000 ohms. None of the previously-mentioned wires should have continuity to the cable shield.

5.0 APPENDICES

5.1 PARTS LIST

1. Masthead Sensor (Reference figure 8):
- | | |
|--|------------|
| Masthead Sensor Assembly & Mounting Bracket..... | MK 24.30-2 |
| Vane Assembly..... | MK 20.32 |
| Shield Assembly..... | MK 20.59 |
| Potentiometer Assembly/Damping Assembly..... | MK 20.53 |
| Windspeed Transducer..... | MK 19.29 |
| Tri-Cup Assembly..... | MK 19.32 |
| Connector Assembly, Male..... | MK 20.57 |
| Connector Assembly, Female..... | MK 20.58 |
| Masthead Mounting Base..... | MK 20.39 |
2. Indicator:
- | | |
|---|-----------|
| Front Case with glass..... | MK 154.49 |
| Gasket..... | M15167 |
| Mounting Kit..... | M15129 |
| Protective Plastic Cover for faceplate..... | M15112 |

5.1 Parts List Continued

3. Cables:

80-foot Mast Cable.....	MK 24-M080
90-foot Mast Cable.....	MK 24-M090
100-foot Mast Cable.....	MK 24-M100
110-foot Mast Cable.....	MK 24-M110
120-foot Mast Cable.....	MK 24-M120
130-foot Mast Cable.....	MK 24-M130
Y-Cable, Windpoint.....	MK 24-Y0125
Y-Cable, Windspeed.....	MK 15-Y0120

4. Miscellaneous:

Mast-Base Junction Box.....	MK 55.80
Magnetic Shield: assembly fits over indicator case.....	M15455
Instrument Guard: T-shaped black-anodized aluminum guard mounted over the indicator's face and to the bulkhead.....	M00213
Light Dimmer Control: potentiometer only (no power switch).....	MK 38

5.2 WARRANTY

SIGNET SCIENTIFIC COMPANY LIMITED TWO-YEAR WARRANTY

Signet Scientific Company warrants its instruments to be free from defects in material and workmanship under normal use for a period of two years from date of purchase by the initial owner, or three years from date of manufacture, whichever comes first, as described in the following paragraphs.

This warranty does not cover defects caused by abuse or electrical damage. Signet will not cover under warranty any instruments damaged during shipment to the factory less case or improperly packed. Repair attempts by anyone other than authorized service personnel will void the warranty. Proof of date of purchase will be required before warranty repairs can begin.

5.2 Warranty Continued

Parts which prove to be defective in the first year will be repaired or replaced free of charge including labor, shipped F.O.B. our factory or a designated service center (addresses furnished upon request).

Only non-moving parts, such as electrical components, which prove defective during the second year are warranted. Meter movements will not be covered. All units qualifying for warranty service after one year are subject to a maximum service charge of \$15.00 for replacement of non-moving parts.

Items returned for warranty repairs must be shipped prepaid and insured. Warranty claims are processed on the condition that prompt notification of a defect is given to Signet within the warranty period. Signet shall have the right to determine whether in fact a warranty situation exists.

The Signet warranty does not cover travel time, mileage expenses, removal, reinstallation, or calibration.

Signet is continually making design changes and improvements that adapt to original circuit configuration. These will be incorporated as required in older units on a minimal-charge basis while under warranty.

CONSEQUENTIAL DAMAGES

Signet Scientific Company shall not be liable for special consequential damages of any nature with respect to merchandise sold, rendered, or delivered.

This warranty gives you specific legal rights and you may also have other rights which vary from state to state.

6.0 MANUAL CHANGE INFORMATION

Signet continually strives to keep up with the latest electronic and design developments by adding circuit, component, and design improvements to its instruments as soon as they are developed and tested. Sometimes, due to printing and shipping requirements, we cannot immediately get these changes into printed manuals. Therefore, your manual may contain new change information on the following pages. A single change may affect several sections. Be sure to make all changes within the appropriate sections of this manual.

7.0 INDICATOR SCHEMATIC

Unauthorized repair of any portion of your System 1500 can void your limited warranty.