STANDARD HORIZON

WS150
Wind Speed/Point

Owner's Manual

STANDARD HORIZON

LIMITED WARRANTY

STANDARD HORIZON MARINE DIVISION OF VERTEX STANDARD warrants to the original purchaser that each new Marine Product manufactured and/or supplied by STANDARD HORIZON will be free from defects in materials and workmanship under conditions of normal use and service for a period of one (1) year from the date of delivery to the Purchaser. STANDARD HORIZON's liability under this warranty shall be limited to repair or replacement of the defective product, at STANDARD HORIZON's option, under no circumstances shall STANDARD HORIZON be liable for consequential, incidental, or other damages arising out of or in any way connected with a failure of the product to perform as set forth herein.

In the event of a defect, malfunction, or failure of the product to conform to specifications during the one-year warranty period, STANDARD HORIZON will repair or replace, at its option and without charge to the Purchaser, the product which upon examination by STANDARD HORIZON shall appear to be defective or not up to factory specifications. To obtain warranty service, the defective product must be returned to STANDARD HORIZON together with proof of the date of purchase. The Purchaser must pay any transportation expenses in returning the product to STANDARD HORIZON. STANDARD HORIZON will examine the product and respond to the Purchaser in approximately four (4) weeks from date of receipt of the product claimed to be defective.

This limited warranty does not extend to any product which has been subjected to misuse, neglect, accident, improper installation, or subject to use in violation of the maintenance or operating instructions, if any, furnished by STANDARD HORIZON, nor does this warranty extend to products on which the serial number has been removed, defaced, or changed. STANDARD HORIZON reserves the right to make changes or improvements to its products without notice during subsequent production without incurring the obligation to install such changes or improvements on previously manufactured or sold products.

To receive warranty service, the Purchaser must deliver the product, transportation and insurance prepaid, to **STANDARD HORIZON Marine Division of Vertex Standard, 115 North Wright Brothers Dr. Salt Lake City, Utah 84116-2838**. Include proof of purchase and date of purchase. STANDARD HORIZON will return the Product to the Purchaser freight prepaid.

Some states do not allow limitations on the duration of the warranty or exclusions or limitations of incidental or consequential damages so these limitations or exclusions may not apply to you. This warranty gives you specific legal rights, which may vary from state to state.

Lifetime Flat Rate Service Program: For the original Purchaser only, for the lifetime of the unit, STANDARD HORIZON will repair the unit to original specifications.

Note: The flat rate amount is payable by the Purchaser only if STANDARD HORIZON determines that a repair is needed. After the repair, a 90-day warranty will be in effect from the date of return of the unit to the Purchaser.

Owner's Records

Model	Serial number
Purchase date	Dealer

Contents

1 General Information

Note: Please familiarize yourself with the entire manual and transducer installation guide before attempting installation.

1.1 Introduction

The WS150 Wind Speed/Point is a high quality instrument that provides accurate information needed to set the proper sail trim. The instrument's advanced microprocessor computes and displays both apparent and true wind speed and direction (when provided with NMEA data from speed/log instrument such as the SL150). The maximum wind speed obtained since the last reset is also computed and displayed on command. The waterproof front panel is designed to withstand direct water spray without damage.

Included:

- Owners manual
- WS150 Wind instrument
- Masthead transducer
- Masthead cable
- Junction box for mast cable
- WS150 Panel Gasket
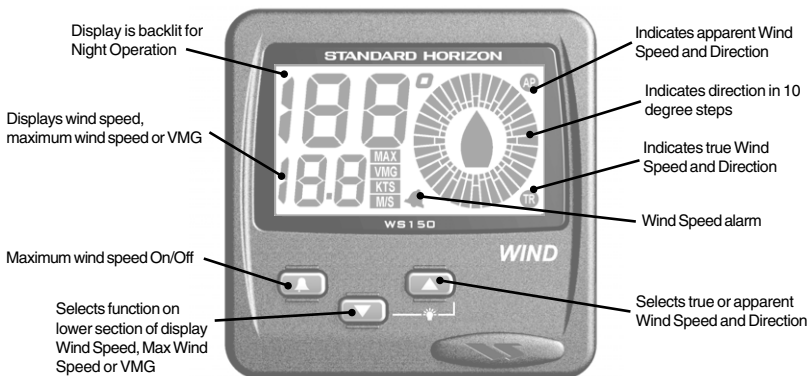- DC150 Dust cover

1.2 Front panel

The front panel includes a large LCD and three-button keypad. The keypad uses both tactile and audible feedback to indicate when a key is pressed. All functions are controlled entirely by these three keys. The front panel also includes separate icons which indicate that the instrument is displaying either true ("TRU") or apparent ("APT") wind speed/wind direction.

1.3 Rear panel

The rear panel contains a Fuji 5-pin connector for connection to the wind transducer. It also contains red and black wires for connection to the power supply, a blue wire for NMEA output, and a green wire for NMEA input.

2 Controls and connectors

Display is backlit for Night Operation

Displays wind speed, maximum wind speed or VMG

Maximum wind speed On/Off

Selects function on lower section of display Wind Speed, Max Wind Speed or VMG

STANDARD HORIZON

WS150

WIND

Indicates apparent Wind Speed and Direction

Indicates direction in 10 degree steps

Indicates true Wind Speed and Direction

Wind Speed alarm

Selects true or apparent Wind Speed and Direction

3 Accessories

3.1 Replacement Parts

The following parts may be ordered from the Standard Horizon Parts Department.

To order, call: 562-404-2700 Ext 351

Part	Part Number
Dust Cover	DC150
Extension Cable	HS50
Junction Box	M13349001A
Masthead assembly	M13349004A
Masthead Cable Assembly (100 feet long)	M13349005A
Panel Gasket	108013023A
Tricup Assembly	M13349002A
Wind Vane Assembly	M13349003A

4 Installation

4.1 Location

The WS150 is designed for above or below deck installation. Select a position that is:

- At least 12 inches (300mm) from a compass
- At least 20 inches (500mm) from any radio
- Easy to read by the helmsman and crew
- Protected from physical damage
- Accessible to electrical cable connections

4.2 Mounting

The mounting surface must be flat. Use the template to set the center of the fixing hole.

1 Drill a 1¼" (32mm) diameter mounting hole through the bulkhead.

2 Remove the nut. Peel the protective paper off the foam gasket and attach the gasket to the rear of the instrument.

3 Insert the instrument through the bulkhead. Hand tighten the nut and then finally tighten with a spanner. Do not over tighten so that the water sealing ability of the gasket is damaged.
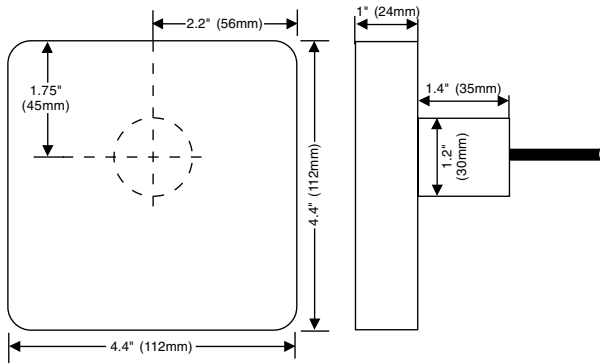
Figure 2. Instrument Dimensions

4.3 Wiring Connection

1 Keep electrical and transducer cables away from alternator or other noise generating electrical cables. Avoid connecting the instrument to power circuits that share loads with ignition, alternators, inverters and radio transmitters. Electrical power supply connections should always be as short as possible.

2 Connect the red wire to the positive supply via a 1 amp fuse or a 1 amp circuit breaker. Connect the black wire to the electrical ground. A 1 amp fuse will provide protection for up to five 150 series instruments.

3 Connect the 5 pin Fuji connector to the wind transducer cable connector. Do not cut or shorten the transducer cable. Extension cables are available if the transducer cable is too short.

4 If you are not interfacing to a SL150 speed instrument or RP150 repeater or you do not intend to provide NMEA data to another instrument then insulate the bare unused wires in the end of the five conductor cable.
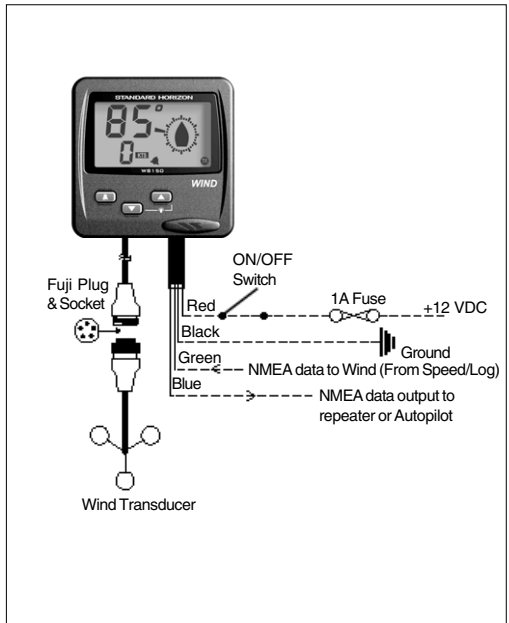
4.4 Multiple Instruments

The model WS150 wind instrument can be connected to the model SL150 speed instrument to display true wind speed direction and speed VMG data on the WS150 display. The WS150 may also be connected to the RP150 system repeater or to any other instrument that will accept standard NMEA 0183 data. The NMEA sentences are: VWT, VWR, MWV and VPW.
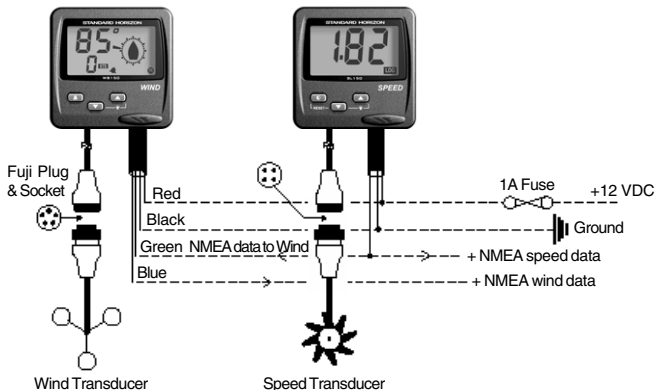
4.5 Masthead installation

Note: Perform linearization and calibration (see section 4.6.1 and 4.6.2) before installing the masthead on top of the mast by connecting the masthead transducer directly into the red connector on the WS150.

Proper planning for the location and installation of the wind instrument and its accompanying hardware provide maximum instrument accuracy. Refer to the figures in section 4.5.2 for additional clarity while performing the installation procedures.

Mount the Masthead Assembly pointing forward for the best performance. The Masthead Assembly may be pointed aft with some degradation in system performance. Regardless of the Masthead Assembly direction, the wind vane is pointed in the desired direction and held firmly in place during calibration.

4.5.1 Junction Box Installation

In most cases, it will be convenient to cut the Masthead Cable in order to run the cable through the mast and through the vessel. The Junction Box is used to connect the two cut ends of the masthead cable together.

1 Connect the Masthead Cable to the wind instrument and route the wire to the junction box. Cut the Masthead Cable to the wind instrument at the Junction Box adding 6 to 12

inches for cable stripping.

2 Remove the Junction Box cover and connect the cut cable wires to the terminal strip. Replace the cover.

Wire color and uses:

|	
Red	+/- 12VDC
Green	Wind Speed
Brown	Wind Direction
White	Wind direction
Shield	Ground

4.5.2 Masthead Cable Installation

Secure the mounting block of the Masthead Cable to the masthead plate of the spar. The mounting block should be aligned as close to the centerline of the vessel as possible to ensure proper performance. Final alignment of the wind direction pointer is accomplished by following the calibration procedure (see section 4.6), if not performed prior to the installation of the Masthead Assembly.

1 The mounting block should be used as a template to drill the two screw starter holes required. Attach the mounting block with the supplied self tapping screws.

2 To accommodate the Masthead Cable, dill two 5/16" to 3/8" holes in the mast, one near the top and one near the base. See Figure below. These holes will accommodate grommets (not provided) with 1/4" inner diameters. Insert a grommet in each hole to prevent cable chafe.
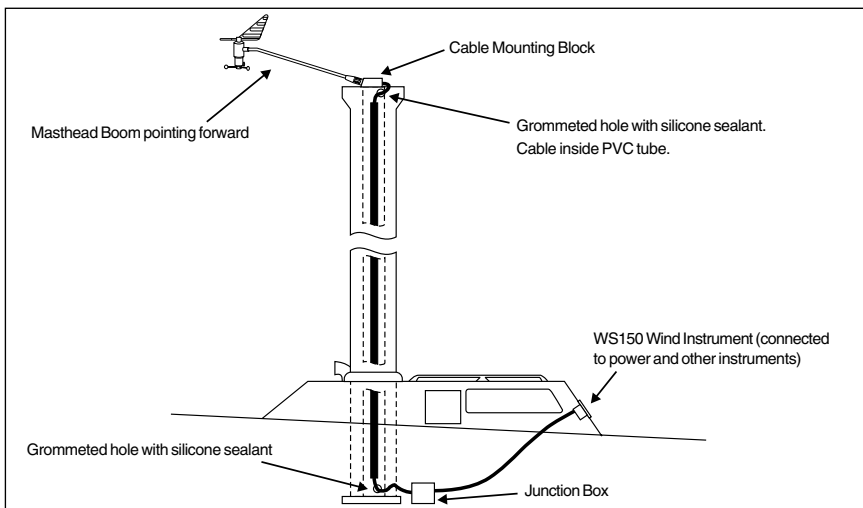
3 Mount a strap or cable strain-relief clamp to the mast immediately above the grommeted cable entrance hole near the masthead. (See figure on this page). The clamp is placed around the cable and secured to prevent strain on the cable connection at the Masthead Cable Mounting Block.

4 Starting at the masthead grommet, run the cable through the inside of the mast. On a mast with an internal PVC tube down the length of the mast, run the cable through the inside of the PVC tube to prevent the Masthead Cable from crossing a halyard.

5 At the base of the mast, pull the cable through the grommet. Seal the grommeted holes with silicone sealant.

6 Step and rig the mast.

7 Route the cable from the exit of the mast to the Junction Box, matching the wire colors of the cut cable ends.

9 Take the Masthead Assembly up the mast. Connect the Masthead Assembly electrical connector to the electrical connector on the mounting block. While supporting the weight of the masthead Assembly, tighten its threaded support sleeve to the threaded support on the Mounting Block.

10 Apply power and perform Calibration procedure (see section 4.6) if necessary.

11 Make sure the set screw on the masthead tricup is properly tightened.
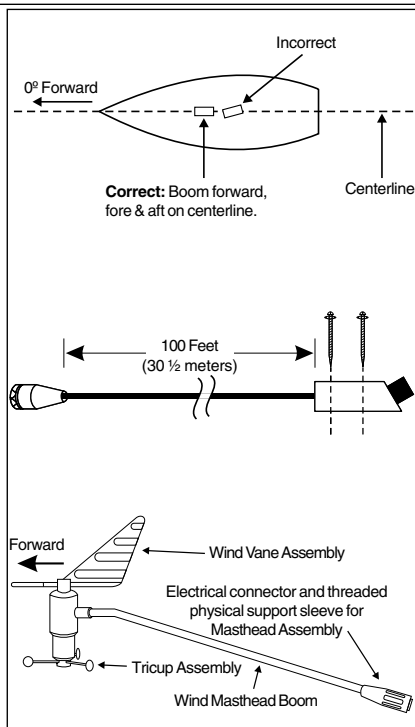
4.6 Calibration

Note: Install the masthead transducer after the following have been performed. When first installing the WS150, Linearization should be performed first, followed by Wind Direction Calibration, then Wind Speed Calibration (if necessary).

Calibration chart:
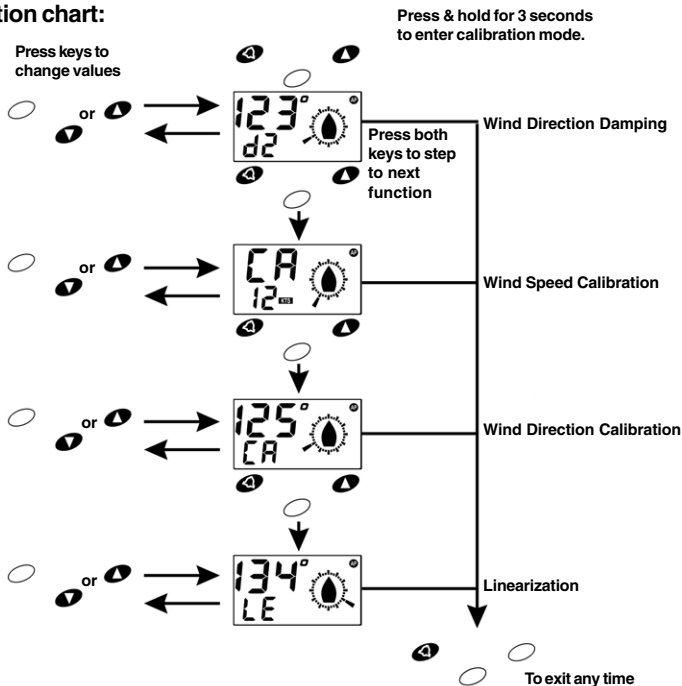
4.6.1 Linearization of the Wind Sensor and Instrument

Each wind direction sensor has slightly different electrical characteristics. To provide a highly accurate display of wind direction data these characteristics must be entered into the wind display. This process is called linearization.

1 Connect the masthead directly to the red 5-pin connector on the WS150.

2 Follow the Calibration Chart until you reach the Linearization mode. The display will flash for 6 seconds before displaying LE.

3 To perform the linearization process rotate the wind vane as many times as necessary for the wind direction indicator to make a complete 360 degree circle without the indicator stopping

or reversing. It may take 8 to 10 revolutions of the wind vane for best results. The wind vane can be rotated in either direction.

4 To exit, press the ◁ key.

4.6.2 Wind Direction Calibration

It is very difficult to align the mast head transducer in an exact fore and aft position during installation on the mast. The WS150 allows the user to carry out adjustments to the displayed wind direction before the transducer is installed by connecting the masthead to the red connector on the WS150.

1 Follow the Calibration Chart until you reach the Wind Direction Calibration mode.

2 Press the ⋀ or ⋁ keys to change the displayed wind direction.

3 To exit, press the ◁ key.

4.6.3 Wind Speed Calibration

The WS150 wind speed transducer is factory calibrated to read the correct wind speed under normal conditions. If necessary the user is able to make adjustments to the wind speed reading.
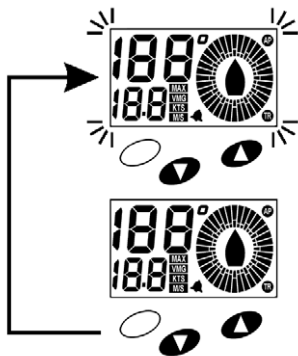
1 Follow the Calibration Chart until you reach the Wind Speed Calibration mode.

2 To increase reading press the ⋀ key.

3 To decrease reading press the ⋁ key.

4 Each key press results in a 5% change. It may take 2 or 3 key presses before a change to the speed can be observed.

5 To exit press the ◁ key.

Note: If there is any doubt about the accuracy of the display wind direction, repeat the linearization & alignment calibration procedures.

4.6.4 Wind Direction Damping

This setting controls the rate the displayed wind angle changes. There are four levels of damping: d0, d1, d2 and d3. The most heavily-dampened setting is d3 and d0 for no damping. The WS150 is factory-set for a damping of d2.

To change the damping setting, perform the following:

1 Follow the Calibration chart to enter the Wind Direction Damping mode.

2 To increase reading press the ⋀ key.

3 To decrease reading press the ⋁ key.

4 To exit press the ◁ key.

4.7 Microprocessor Reset.

When the instrument is not functioning properly, the microprocessor can be reset as follows:

1 Turn off the instrument power.

2 Press the ◁ and ⋀ keys and turn the power back on. Continue to press and hold the keys for 7 seconds after the power is turned back on.

3 All Calibration settings will be reset to factory-
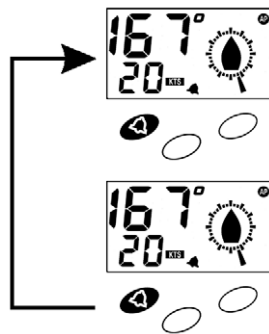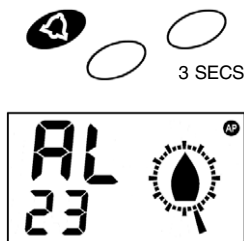
5 Operation

5.1 Backlighting On / Off

Simultaneously press the ⋀ and ⋁ keys to turn the backlight on. Repeat this procedure to turn the lighting off.

5.2 Wind Speed Alarm On/Off

Press the ◁ key to switch the alarm on and off.

5.3 Set Wind Speed Alarm

Press and hold the ◁ key for 3 seconds.
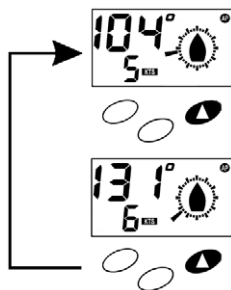

3 SECS

Use the ∧ or ∨ keys to set alarm value.

Press the ◁ key to exit.

5.4 True or Apparent Wind Display

*Note the direction of the wind is referenced to the vessel's Port and Starboard sides.*

Press the ∧ key to switch between True or Apparent wind speed.

Note: To obtain true wind data the WS150 must be provided with NMEA (VHW) data from a speed/log instrument, such as the SL150.

5.5 Select Speed Function

Press the ∨ key to switch between Wind Speed, Maximum Wind Speed and VMG.

3 SECS

3 SECS
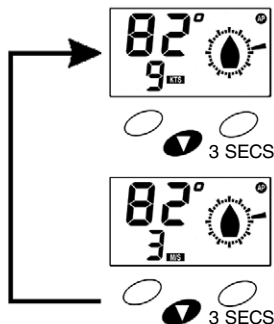
Note: VMG units of measure are the same as the speed instrument (Knots, MPH, KPH) providing the boat speed data.
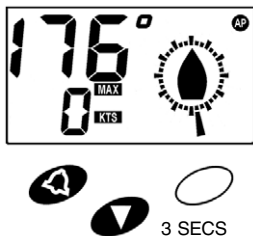
5.6 Select Speed Units

Press the ∧ or ∨ key for 3 seconds to switch between Knots or Meters/Second.

5.7 Reset Maximum Wind Speed

While Maximum Wind Speed is displayed, press and hold the ◁ and ∨ keys for 3 seconds to reset the maximum wind speed to zero.

Note: All calibration settings will be reset to the factory defaults.

3 SECS

6 Maintenance

Your wind speed/point instrument is designed for years of trouble free operation assuming proper installation and care are provided. Following the operation and installation guidelines in this manual should ensure optimum performance of the instrument. In the unlikely event that the instrument shall fail to perform or shall need servicing, contact:

Factory Repair Facility
Standard Horizon
115 North Wright Brothers Drive
Salt Lake City, UT 84116

Telephone number (800) 366-4566
Fax number (801) 359-4122

7 Specifications

Power Supply
- 10.7 to 16.6 VDC, 30mA nominal, 40mA with backlight on.

Operating temperature
- 32° to 113°F (0° to 45°C)

Size of display
- 4.4 x 4.4 x 1" (112 x 112 x 24mm), overall depth 1.4" (35mm) behind panel.

Display type
- Twisted Nematic (TN) grey background, 32° to +158°F (0° to +70°C).

Illumination
- Red LED.

RF interference
- Less than 6 dB maximum quieting on any marine radio channel with 3 dB gain antenna within 1 meter of instrument display head.

Wind Direction
- Apparent and true 180 degrees to port and starboard.

Wind speed
- 0 to 99 knots, or 0 to 50 m/sec with maximum wind speed recording.

Alarm
- Wind speed alarm user settable value.

VMG display
- Displayed in 0.1 steps to 19.9 knots and 1.0 steps above 20 knots.

NMEA input (for VMG and True Wind Data calculation)
- Accepts VHW sentence from SL150 speed log or other instrument with NMEA output.

NMEA output
- NMEA 0183 format VWT, VWR, MWV, VPW for RP150 system repeater or other NMEA compatible instrument. Short circuit protected. Drive capability for up to four NMEA receivers.

Transducer cables.
- 5 pin Fuji connector for wind mast head transducer, 5 conductor cable for NMEA input, output and power connections.

Transducer
- Lightweight weatherproof type with 30 meters of cable. Electronic sine cosine output.

8 Troubleshooting

Note: to isolate a problem, the masthead may be connected to the red connector on the WS150.

1 No display:
- Check DC power connections and DC polarity with voltmeter. Voltage must be between 10.7 and 16.6 volts.

2 Faulty wind speed or wind direction indication:
- 1. Possible defective Masthead Cable
  2. Possible defective Masthead Assembly
  3. Possible defective instrument
- Remove the Masthead Assembly from the masthead and connect it directly to the instrument red moulded cable. If the indication is normal, the Masthead Cable is defective. If the problem persists, contact your supplier for service.
  NOTE: The instrument and Masthead Assembly may be connected directly for linearization of the repaired or new equipment prior to installation.

3 Simulation Mode
- At power up, if all the segments display for 5 seconds then the instrument is in simulation mode.

4 Masthead cable is not long enough:
- Use the optional HS50 cable. Maximum of two cables can be connected.

5 Wind speed:

5a Erratic or no wind speed
- Check green wire in junction box or other splice in masthead cable.
- Check power supply.

5b Tricup seems to spin slower
- Remove head and clean tricup

5c Slow wind speed (Tricup spins freely)
- See wind speed calibration section 4.6.3

6 Wind Direction:

6a Erratic or no wind direction, does not point in all directions (port/starboard)
- Check white and green wires
- Check power supply.

6b Reacts slow to wind changes
- See Wind Direction Damping section 4.6.4

6c Mast Cable wires and their descriptions
- Shield: Battery Ground
  Red: + 12VDC
  Green: Wind Speed
  Brown: Wind Direction
  White: Wind Direction

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