STANDARD HORIZON

MD150

Digital Multi-Data Instrument

Owner's Manual

Marine Division of Vertex Standard

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 MD150 is a stand-alone, multidata instrument which displays depth, speed, temperature, log and time functions.

Included:

- Owners manual
- MD150 Digital instrument
- MD150 Panel Gasket
- MD150 Dust cover

1.2 Front panel

The front panel includes a a multi-function LCD and four-button keypad. The keypad uses both tactile and audible feedback to indicate when a key is pressed. All functions are controlled entirely by these four keys.

1.3 Rear panel

The rear panel contains a Fuji 4-pin connector for connection to the speed transducer and an RCA phono connector for connection to the depth transducer. It also contains red and black wires for connection to the power supply and a blue wire for NMEA output for interfacing with 150 series instruments, STANDARD HORIZON GPS Chartplotters or other NMEA listeners. A green wire is also provided for an external alarm.

2 Controls and connections

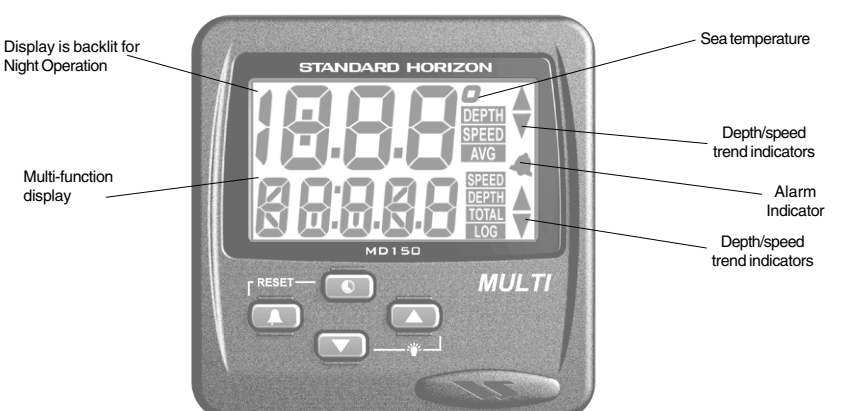


Figure 1. MD150 Front Panel

3 Accessories

3.1 Optional

SIA51 ..... Transom Mount Impeller with 30-foot cable
SIA53 ..... Thru-hull Speed Impeller
EX345 ..... 15-foot Impeller Extension Cable
EX345D ..... 15-foot Transducer Extension Cable
DST50 ..... 2 inch low profile Transducer
DST51 ..... Transom Mount Transducer
DST52 ..... Bronze Long Stem Thru-hull Transducer
DST53 ..... 2 inch Bronze low profile Transducer
DST55 ..... In-hull Depth Transducer
FB52 ..... Fairing block for DST52

3.2 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
Dummy Plug, SIA53	356002017A
Dust Cover	DC150
Flapper Valve, SIA53	596001019A
Paddlewheel Repair Kit, SIA51	602002022A
Paddlewheel Repair Kit, SIA53	602005009A
Thru-hull Fitting, SIA53	590170123A
Impeller Nut, SIA53	590170123A
Panel Gasket	108013023A
SIA53 / DST50 Mounting Nut	580001027A
DST51 Mounting Bracket	160001022A
SIA51 Mounting Bracket	16002022A

4 Installation

4.1 Location

The MD150 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 1.25" (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, do not over tighten so that the water sealing ability of the gasket is damaged.

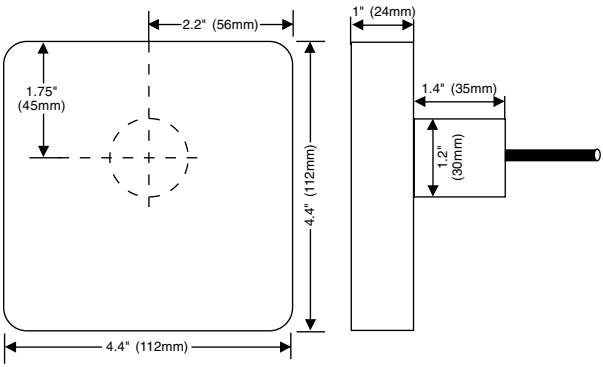


Figure 2. Instrument dimensions

4.3 Wiring Connection

Note: An external switch is necessary to turn the unit on and off.

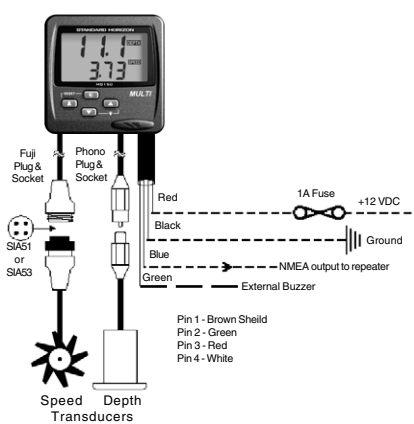


Figure 3. Wiring Connections

- 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.

- 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 100 series instruments.
- Connect the 4 pin Fuji connector to the speed and temperature transducer cable connector. Extension cables are available if the transducer cable is too short.
- If you are not using a repeater of you do not intend to provide NMEA data to another instrument then insulate the bare end of the blue wire.

4.4 Multiple Instruments

The MD150 may be used as an individual instrument or connected with a number of other 150 series instruments to the 150 series repeater, STANDARD HORIZON GPS Chartplotters or to other instruments accepting NMEA 0183 data.

4.5 Impeller/Transducer Installation

Note: It is wise to check the operation of the speed impeller before installation. To check; apply power to the instrument, plug in the impeller, spin the paddlewheel, and check the instrument for a speed/temperature reading.

Note: The depth transducer cable may be extended but depth performance may be affected. One EX345 Optional Extension Cable may be used for a maximum length of 45 feet.

4.5.1 Transom and thru-hull mount

Transom mount and thru-hull impellers and transducers can be used with the MD150. See section 3 for a list of available impellers and transducers. Specific installation instructions are supplied with each impeller or transducer.

4.5.2 In-Hull Installation

Transducer installation inside a solid fiberglass hull may degrade performance of depth sounder. Therefore, this type of installation is not preferred over thru-hull and transom installations.

Should the user desire to perform an in-hull installation, perform the following test to determine its suitability:

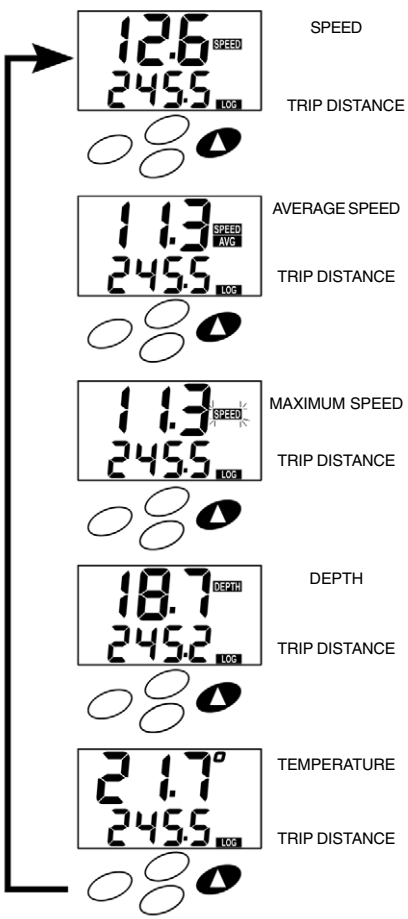
1. Fill a thin plastic bag with water and suspend the transducer in the water.
2. Hold the bag against the hull while the boat is moored and underway and check the reading on the instrument. The reading should be relatively constant.
3. The bag may have to be moved around the hull to find the best mounting location. The best location will be close to the center line, away from lifting strakes.
4. When a suitable location is found, clean the surface with a solvent/cleaner to remove any loose dirt or wax. Use a quality epoxy to attach the transducer to the inside of the hull. Make sure there are no air bubbles trapped in the epoxy.

5 Operation

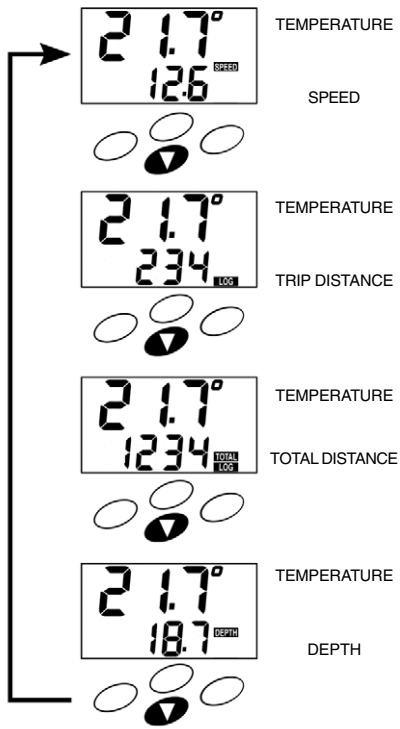
5.1 Changing Functions

The upper and lower display sections can be configured to display depth or speed readings. The remaining functions are available on either the upper or lower display only.

The ^ key selects functions dedicated to the upper display. The selection remains in memory after power down.



The v key selects functions dedicated to the lower display. The selection remains in memory after power down.



5.2 Select Depth Units

When the top section of the display is indicating depth, press and hold the ^ key for three seconds. The new unit of measure will be displayed for three seconds.

Alternately, when the bottom section of the display is indicating depth, press and hold the v key for three seconds. The new unit of measure will be displayed for three seconds.

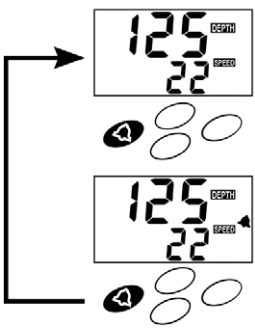
Depth units can be selected in the following order; meters, feet and fathoms.

5.3 The Depth Alarms

The shallow water alarm sounds when the depth falls below the selected value. The deep water alarm sounds when the depth exceeds the selected value. When the alarm is activated the beeper will sound continuously and the bell alarm symbol will flash.

5.3.1 Setting Alarms

Press the key to switch the alarm on or off.



5.3.2 Set Shallow Alarm

Press the and keys to enter shallow alarm mode.

Use the and keys to set alarm value.

Press the key to exit.

5.3.3 Set Deep Alarm

Press the and keys momentarily to enter deep alarm mode.

Use the and keys to set alarm value.

Press the key to exit.

Note: *When units are changed, the alarm values are automatically recalculated.*

5.4 Select Temperature Units

When the top section of the display is indicating temperature, press and hold the key for three seconds to change the units of measure between °C and °F.

5.5 Timer Functions

All timer functions are displayed on the lower section of the display.

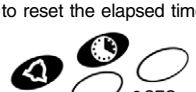
5.5.1 Elapsed Timer

The elapsed timer will record time from power up. Time is displayed in hours and minutes up to 99 hours and 59 minutes.

Press the key to show elapsed time.

ELAPSED TIME

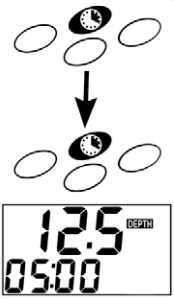
Press and hold the and keys for three seconds to reset the elapsed time to zero.



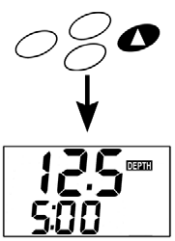
5.5.2 Count Down Timers

The countdown timer counts down from an entered value (minutes) giving audible beeps at 1 minute intervals from 4 minutes remaining to 1 minute remaining.

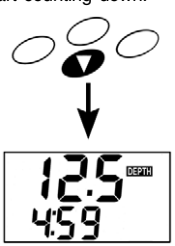
Press the key twice to show the countdown timer, the last value used is displayed.



To select a new value to count from, press the key to scroll through 1 to 10.



When the desired value is displayed press the key to start counting down.



To reset the count down timer, press and hold the and keys for three seconds while the countdown timer is displayed. The display will return to the timer selection.

5.3 Select Speed/Log Units

Speed and distance units can be selected in the following order; Knots (nautical miles), KPH (kilometers) and MPH (statute miles).

When the top section of the display is indicating speed, press and hold the key for three seconds. The new unit of measure will be displayed for three seconds.

Alternately, when the bottom section of the display is indicating speed, press and hold the key for three seconds. The new unit of measure will be displayed for three seconds.

Note: *When changing speed/distance units, the log totals are re-calculated to show the same distance in the new units.*

5.7 Reset Log

With the log displayed, press and hold the and keys for 3 seconds.

5.8 Reset Total Log

With the total log displayed, press and hold the and keys for 15 seconds.

Note: *When the total log is reset the trip log and average speed are reset also.*

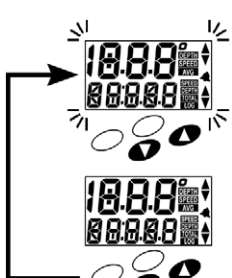
5.10 Reset Average Speed

With average speed displayed, press and hold the and keys for 3 seconds.

It is possible to display average speed and a log value at the same time. In this situation the LAST function to be selected will be reset when the and keys are held down.

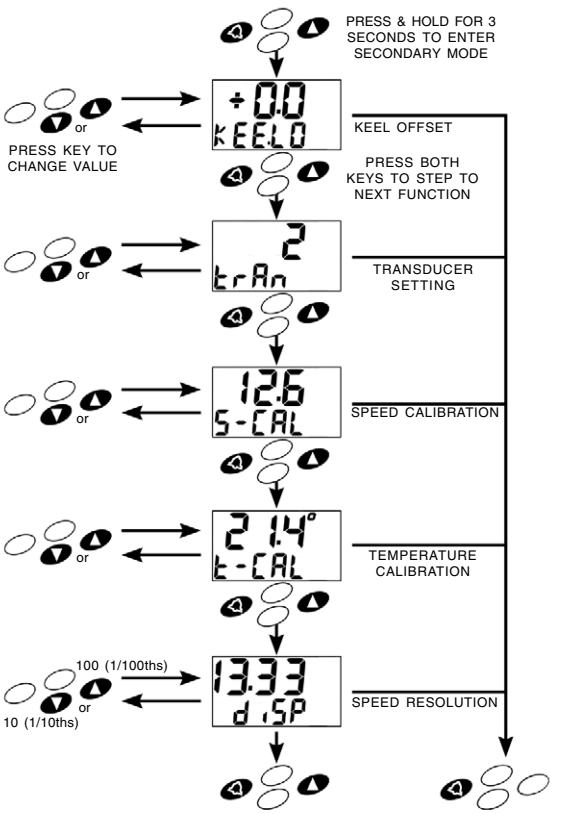
5.11 Backlighting On / Off

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



5.12 Secondary Functions

The secondary modes provide access to keel offset, transducer setting, calibration of boat speed, calibration of water temperature and speed display options of 1/10th or 1/100th units.



If no key is pressed for 10 seconds, the instrument will exit secondary mode and return the display to normal. Changes made to the secondary function being displayed at this time will not be saved.

5.13 Calibration Procedures

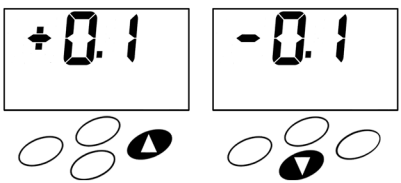
Note: *If the speed and depth readings flash, this indicates that the calibration values have been lost. To correct this, check the depth units, alarm values, keel offset, speed units and the speed calibration.*

5.13.1 Keel Offset

The MD150 will normally display the depth of water below the face of the transducer. You may introduce a keel offset to display the depth of water below the keel. A positive value may be entered to display the depth of water from the water surface to the bottom. This is often called waterline offset.

Follow the Secondary Functions chart to reach Keel Offset mode.

Use the ^ or v key to set the required value.



When required value is displayed press the ◁ key. The value will be stored in memory.

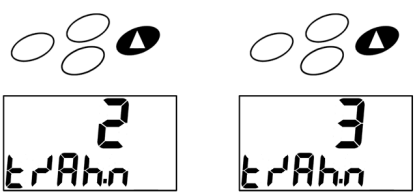
Note: When the depth units are changed the keel offset value will automatically be recalculated and displayed in the new units.

5.13.2 Transducer Setting

Three values of transducer setting can be selected (1 to 3). The lower numbers improve the shallow water performance and may produce reliable readings to below 3 feet. It is recommended to use the lowest number possible if shallow water performance is important. It must also be noted that in situations where the MD150 is tracking the bottom and displaying a constant depth but occasionally displaying "--" or erroneous depths of 3 to 4 feet, that this generally indicates the transducer setting is too low and should be increased.

Follow the Secondary Functions chart to reach Transducer Setting mode.

Use the ^ or v keys to set the required value.



To enter the transducer setting into memory and exit press the ◁ key.

5.13.3 Speed Calibration

Use the following sequence to adjust the speed displayed to match that of another craft or the speed displayed on a GPS receiver.

Follow the Secondary Functions chart to reach Speed Calibration mode.

To increase reading press the ^ key.

To decrease reading press the v key.

To enter the calibration setting into memory and exit press the ◁ key.

Note: When the speed calibration is adjusted, the trip log and the average speed will be reset.

5.13.4 Calibrate Temperature Display

To adjust the temperature displayed.

Follow the Secondary Functions chart to reach Temperature Calibration mode.

To increase reading press the ^ key.

To decrease reading press the v key.

To enter the calibration setting into memory and exit press the ◁ key.

5.14 Simulation Mode

The MD150 has a simulation mode.

To enter this mode, hold down the ◁ key and then switch on the power. The instrument will remain in this mode even when power is switched off.

Repeat this procedure to exit simulation mode.

Note: Settings that are made while in simulation mode will remain in effect after returning to normal mode.

6 Maintenance

Your Digital Multi data 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:-

Standard Horizon
Factory Repair Facility
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, 90 mA nominal, 110 mA 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) gray background.

Illumination
- Red LED switchable from key pad.

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 (European EC specifications).

Depth
- 1 to 130 meters or 3 to 400ft.

Alarms
- Depth shallow and deep.

Display unit selection
- Feet, meters or fathoms, key pad selectable.

Alarm
- Shallow and deep, water. Audio and LCD flag.
- **Transducer**
  200 kHz, 600 ohm, 1500pF parallel capacitance.

Boat speed
- 0 to 50 knots, 0 to 90 kph, 0 to 60 Mph (depending on transducer type). User selectable to display in 0.1 or 0.01 increments.

Speed units and resolution
- 0.0 to 19.9 and then 20 to 50 in knots, MPH or KPH.

Average speed
- User selectable to 50 knots, resets to zero via key pad or at power down.

Maximum speed
- Records max. speed to 50 knots. Reset to zero via key pad or at power down.

Trip log
- 0 to 1999 units key pad resettable.

Total log
- 0 to 1999 units key pad resettable.

Keel Offset
- Keel or waterline, ±9.9 ft, ±1.6 fathoms or ±3.0 meters, user resettable. Allows for display of depth below keel or waterline.

Trend Indication
- Arrows indicate increasing or decreasing depth and speed trends.

Timers
- user configurable count down timers with audible alarms, 0 to 19:59 hours count up elapsed time.

Sea Temperature
- 32.0° to 99.9°F (0.0° to 37.7°C) 10 kOhm at 25°C. Tenths of a degree are displayed.

Sea Temperature Sensor Type
- 10 kOhm NTC at 77°F (25°C)

NMEA Output data
- VHW, VLW, MTW, DBT, DPT.

Transducer input cables
- Phono connector for depth, 4 pin Fuji for speed/temp transducer. 3 conductor cable for NMEA and power.

8 Troubleshooting

1. No display:

- Check DC power connections and DC polarity with voltmeter. Voltage must be between 10.7 and 16.6 volts.

2. No speed reading:

a. Under normal operation, the life of the paddle wheel is 2 years. Replace if worn. (See Section 3.2 for replacement part.)
b. Remove speed impeller from thru-hull fitting, spin paddlewheel manually and check for reading.
c. Check for fouling on paddle and thru-hull fitting.
d. Check for break in cable.

3. Low or high speed reading:

a. Check calibration.
b. Inspect for damage to paddlewheel or fouling of fitting or paddle.

4. Erratic speed reading:

a. Is there clear water flow over paddlewheel?
b. Is paddlewheel aligned fore and aft correctly?
c. Is paddlewheel clean and turning freely?
d. See section 3.2 for replacement parts.

5. Erratic readings when engine is running:

To isolate problem, unplug the impeller. If the problem goes away, reroute the cable away from the engine. If problem persists:

a. Add feed-through filter capacitor on the positive terminal of the ignition coil.
b. Add alternator whine filter to alternator.
c. Replace spark plug with resistive type.

6. No, or inaccurate temperature reading:

Remove, inspect and clean transducer if needed. Measure resistance between pins 1 and 4 on connector. Transducer is defective if shorted or open.

a. Check calibration.
b. Check for break in cable.

7. Speed cable is not long enough.

- Use EX345 optional cable. A maximum of two cable can be connected.

8. No depth reading (- -) at all depths:

a. Check transducer for growth or multiple coats of paint..
b. Check the transducer cable for cuts and sharp bends.
c. Substitute the transducer with a known good transducer hold it over the side of the boat into the water and see if the instrument functions. This isolates cause of problem (transducer or cable.

9. Erratic depth readings (while moored):

- Check transducer for growth or multiple coats of paint.

10. Erratic depth readings (while underway):

- Cavitation (air) under the face of the transducer. Review installation and reinstall if necessary.

11. When power is applied display digit counts up or down:

- See the section on Simulation Mode.

12. Simulation Mode:

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

STANDARD HORIZON
Marine Division of Vertex Standard

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