



service information

ADVISORY
 BULLETIN

No. 2000-02

Circulate to: Sales Manager Accounting Service Manager Technician Parts Manager
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SmartCraft Gauge Trouble Shooting and Service Tips

Models Affected

MERCURY/MARINER

2000 Model Year, 115 thru 225 HP Digital Optimax

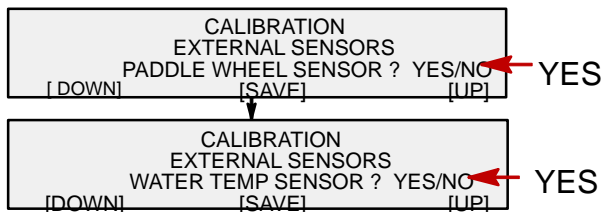
The new SmartCraft gauges introduced for the Digital Optimax engines for 2000 model year have performed well, but with all new products some questions and concerns have been raised. The chart below covers typical questions asked, warning displays, and conditions seen on the SmartCraft gauges. These may be due to normal sensor input, or installation and calibration errors.

FREQUENTLY ASKED QUESTIONS:

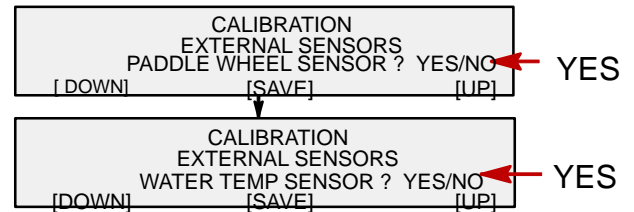
Question: Dual engine application – each engine is shipped with a paddle wheel speed/water temp sensor, should I install both paddle wheels.

Answer: One paddle wheel is all you need, but you can install both paddle wheels. Connect one paddle wheel harness to each engine wiring harness (see wiring diagram). Edit the external sensor calibration on both tachometers to show YES for paddle wheel and YES for Water temp sensor.

Tachometer Calibration for Port Engine

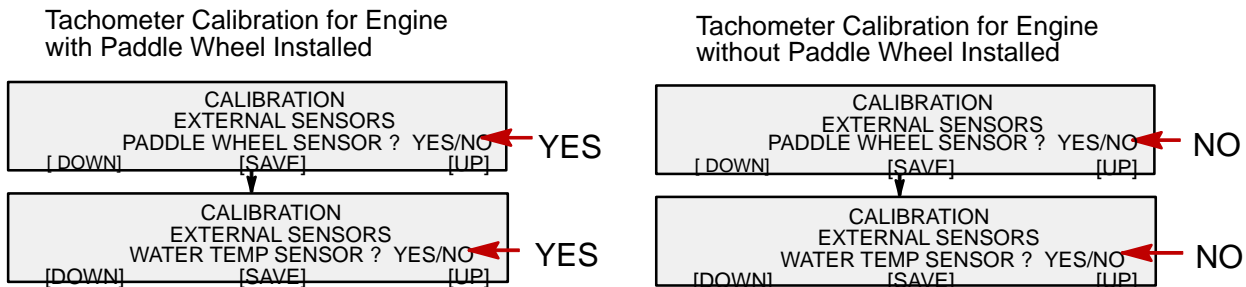


Tachometer Calibration for Starboard Engine



Question: Dual engine application – what’s required if I install only one paddle wheel/water temp sensor

Answer: Install the paddle wheel harness to either the port or starboard engine wiring harness Edit the external sensor calibration on the engine tachometer that has the paddle wheel connected to show YES for paddle wheel and YES for Water temp sensor. Edit the external sensor calibration on engine tachometer without the paddle wheel connected to show NO for paddle wheel and NO for Water temp sensor.



Question: My boat has two fuel tanks, can the smartCraft gauge wiring be connected to both fuel tanks at the same time.

Answer:

Single engine: The SmartCraft speedometer displays the fuel tank volume. The speedometer can be calibrated to only read the fuel level of one tank. However, if the boat has two fuel tanks that are identical (same size and shape), the SmartCraft could be wired to a electrical switching device that can be switched to read the fuel level of either tank.

Twin engines: SmartCraft can display the level of 2 fuel and oil tanks on one speed gauge. Wire one set of tanks to each engine and calibrate those tanks from that engine. The speed gauge will display the values from both engines. It will say “PORT” then “FUEL” and then say “STBD” then “FUEL” in an alternating pattern.

Question: I have a twin engine boat with only one fuel tank. Can I connect both engine fuel sensor wire to the same fuel tank?

Answer: No both engines connected to one fuel tank sensor will cause interference between the two tachometers. Connect only one engine to a single fuel tank. On the tachometer that does not have a fuel tank sensor connected set the tank capacity to “no tank installed” by reducing the capacity to zero.

Question: Can I install the 4 function gauge along with the SmartCraft gauges.

Answer: Yes you can, but all the alarm information is already on the tachometer and the tachometer includes a bar graph of the alarm condition and spells out what the digital value of the alarm condition is.

Question: Upon acceleration, the low oil message appears. The oil level is full in the remote oil tank.

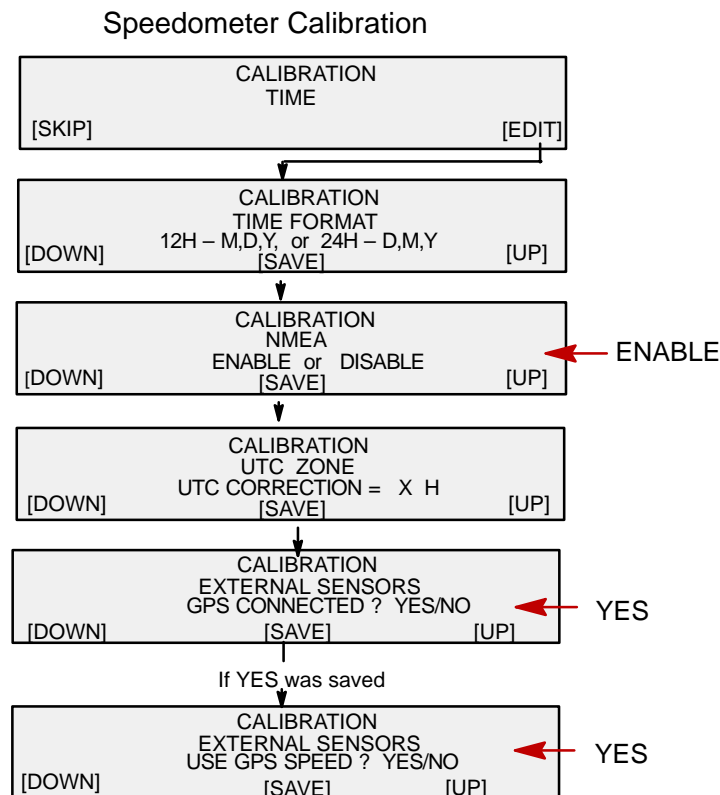
Answer: The calibration is not set correctly for the remote oil tank capacity. Recalibrate the oil tank capacity.

Question: How do I connect a GPS unit to the SmartCraft Gauges**Answer:**

1. First, look at the GPS wiring diagram and determine what two leads are the GPS output leads. GPS is transmitted on a data plus and data negative wire. However there are no standard on the colors of these wires. SmartCraft uses white as the data plus and blue as the data negative. Locate the White and Blue wires coming from the SmartCraft speedometer harness (see wiring diagram). Connect the GPS output leads to the white and blue wires from the speedometer harness. If no data is received, switch the wire connections around.

NOTE: Some GPS units only have a data positive wire, and in this case the GPS manufacturer recommends connecting the data negative from SmartCraft to the GPS ground lead. If no data is still received, refer the GPS owner's manual and see if the GPS has to be calibrated to turn on the output signal.

2. If you want the GPS to automatically set the time, edit the time calibration on the speedometer to enable NMEA.
3. Edit the external sensor calibration on the speedometer to show YES for GPS connected.



Question: Gauge needles do not return to 0 and clock loses calibration when ignition key is turned off.

Answer: Red wire from tachometer harness is not connected to a constant +12 volt source that is hot at all times. Connect red wire using a 5 amp in-line fuse to a 12V source that is hot at all time.

Question: Gauge needle works, but display cannot be read because screen color is black or white.

Answer: Gauge contrast setting is set full one way, reset contrast. You can use the calibration setting on a gauge that is readable to set the contrast level and then use the SET ALL INSTRUMENTS screen to save the new setting to all the gauges.

Question: Speedometer screen does not come up.

Answer: Turn the ignition key on and off. If that does not work, unplug the gauge wiring connection and reconnect.

Question: Can you set TROLL speed on the speedometer if the speedometer is calibrated to read GPS speed.

Answer: TROLL cannot be set on the speedometer without a paddle wheel input because the GPS information is not accurate enough at low speed. Troll can be set on the tachometer.

Question: Can you set TROLL speed when paddle wheel is not installed

Answer: TROLL can be set with the tachometer. However, paddle wheel must be installed to set TROLL with the speedometer.

Question: How is fuel usage determined

Answer: Usage is determined from the engines ECM–fuel map.

Question: The remote oil tank level is displayed on the speedometer, if I have twin engines how is both oil tank levels viewed?

Answer: When viewing remote oil tank level the speedometer will show oil level of one engine for several second then switch over to the opposite engine and back again.

Trouble Shooting Chart:

PROBLEM	TACHOMETER DISPLAY	SPEEDOMETER DISPLAY	ENGINE GUARDIAN SYSTEM ACTIVATED
BATTERY	●		●
ENGINE DATA BUS	●		
FAULT – HORN	●		
FAULT – IGNITION	●		
FAULT – INJECTOR	●		
FAULT – OIL PUMP	●		●
FAULT – SENSOR	●		●*
FAULT – SPEEDO	●		
FAULT – WATER TEMP	●		
LOW FUEL		●	
LOW OIL		●	
OVERHEAT	●		●
OVER SPEED	●		
PRESSURE	●		●
RESERVE OIL	●		●
UNIT MISMATCH (MULTI ENGINE)	●		
WATER IN FUEL	●		

* Throttle and manifold pressure sensors only

WARNING DISPLAYS:

Problem	Corrective Action
<p>Battery Message</p> <ol style="list-style-type: none"> Battery charge is low Electrical system is not charging 	<ol style="list-style-type: none"> <ol style="list-style-type: none"> Check condition of battery. If the message appears immediately after starting, it is possible that the engine alternator can recharge the battery after operating awhile. To help the alternator recharge the battery quickly, you can reduce the load on the electrical system by turning off any unneeded accessories. If message appears while driving or comes on after starting and continued to be displayed, the electrical system must be checked to determine the cause of the problem.
<p>Engine Data Bus Message</p> <ol style="list-style-type: none"> Data communication link between the tachometer and engine is not connected. 	<ol style="list-style-type: none"> Check for disconnected wires. Make sure the gray and brown/white wires are connected to the diagnostic port plug on the engine. See SmartCraft Gauge Wiring.
<p>Unit Mismatch Message</p> <ol style="list-style-type: none"> (Multi Engines) This message tells you that the tachometers are not calibrated alike. (For example, this could happen if one tachometer readings are in English and the another is in Metric. 	<ol style="list-style-type: none"> Re-calibrate the tachometers. <i>NOTE: When calibrating multi tachometers, have all the tachometers powered up at the same time while calibrating.</i>
<p>Low Fuel Level Message</p> <ol style="list-style-type: none"> Fuel level in the fuel tank is low. Fuel level in fuel tank is not low. 	<ol style="list-style-type: none"> Refill the tank Re-calibrate the fuel tank capacity
<p>Low Oil Level Message</p> <ol style="list-style-type: none"> Oil level in the remote oil tank is low. Oil level in remote oil tank is not low. 	<ol style="list-style-type: none"> Refill the tank Re-calibrate the oil tank capacity
<p>Overspeed Message</p> <p>Warning horn will sound continuously</p> <ol style="list-style-type: none"> Engine speed exceeded the maximum allowable RPM. The system will automatically reduce the engine speed to within the allowable limit. 	<ol style="list-style-type: none"> propeller is ventilating. Incorrect propeller is being used. Propeller is faulty.

Problem	Corrective Action
<p>Reserve Oil Low Message</p> <p>This message is displayed and the warning horn begins sounding a series of four beeps every two minutes to inform the driver that the oil level is critically low in the engine mounted oil reservoir tank. When the oil level gets close to empty, the horn begins sounding continuously and the Engine Guardian System will start limiting engine power. The display shows percent of reserve oil that's remaining.</p> <ol style="list-style-type: none"> 1. Low oil level in engine mounted oil reservoir tank and also remote tank. 2. Oil level in engine mounted oil reservoir is low but not low in remote oil tank. 3. Oil level in engine mounted oil reservoir is full. 	<ol style="list-style-type: none"> 1. Refill both oil tanks. Loosen the fill cap on the engine oil reservoir tank. Run the engine until all the air has been vented out of the oil reservoir tank. 2a. Air was never purged from reservoir tank 2b. Fill cap is leaking on remote tank 2c. Remote oil hose (blue stripe) is blocked. 2d. Remote pulse hose is blocked or punctured. 2d. Restricted oil outlet filter in the remote tank. 2e. Faulty pressure check valve. Located at engine end of pulse hose. 3. Test float switch. Refer to service manual.
<p>Water in Fuel Message</p> <p>Warning horn will begin sounding a series of four beeps every two minutes</p> <ol style="list-style-type: none"> 1. Water in the water separating fuel filter reached the full level. 2. Wire connection to sensor contaminated with water. 	<ol style="list-style-type: none"> 1. Remove water from filter. 2. Remove and dry connection.
<p>Overheat Message</p> <p>The warning horn begins sounding continuously. The Engine Guardian System will start limiting engine power.</p> <ol style="list-style-type: none"> 1. Engine is overheated 	<ol style="list-style-type: none"> 1. If no water is coming out of the water pump indicator hole or flow is intermittent, stop engine and check cooling water intake holes for obstruction. If no obstruction is found, this may indicate a blockage in the cooling system or a water pump problem. If a steady stream of water is coming out of the water pump indicator hole and the warning horn continues to sound, there still may be insufficient cooling water or an engine problem.

Problem	Corrective Action
<p>Pressure Message</p> <p>The warning horn begins sounding continuously. The Engine Guardian System will start limiting engine power.</p> <ol style="list-style-type: none"> Insufficient water pressure in the cooling system. 	<ol style="list-style-type: none"> Obstructed cooling water intake holes. Blockage in the cooling system or a water pump problem. Running the outboard with the cooling water intake holes out of the water.
<p>Fault Water Temp Message</p> <p>This fault is for lake water temperature not engine temperature.</p> <ol style="list-style-type: none"> Sensor (located in the paddle wheel) for measuring outside lake/sea water temperature is not functioning. 	<ol style="list-style-type: none"> Check the wiring going to the paddle wheel. If the paddle wheel is not being used or If only one paddle wheel is used for dual engine setup, edit the corresponding tachometer calibration to delete the water temp sensor.
<p>Fault Oil Pump Message</p> <p>The Engine Guardian system will start limiting the engine power.</p> <ol style="list-style-type: none"> Open circuit to the oil pump. 	<ol style="list-style-type: none"> Oil pump electrical failure Wiring Plug not connected Open in wiring between ECM and Oil pump
<p>Fault Injector Message</p> <ol style="list-style-type: none"> One or more of the fuel injectors have stop functioning electrically. 	<ol style="list-style-type: none"> Use DDT to locate the faulty injector(s).
<p>Fault Ignition Message</p> <ol style="list-style-type: none"> Problem has developed in the ignition system. 	<ol style="list-style-type: none"> Use DDT to locate the problem
<p>Fault Horn Message</p> <ol style="list-style-type: none"> Open circuit to the horn 	<ol style="list-style-type: none"> Wire is open to the horn Horn is missing from the circuit
<p>Fault Sensor Message</p> <ol style="list-style-type: none"> One of the sensors is not functioning correctly. 	<ol style="list-style-type: none"> If the throttle sensor has failed, the warning horn will sound a continuous beeping and the engine will not reach its full power. If the throttle sensor and manifold pressure sensor both fail, the warning horn will sound a continuous beeping and the engine speed will stay at idle. If the temperature or block pressure sensor should fail, the Engine Guardian System will limit the maximum engine power by 25 percent.