ELECTRICAL

Section 2D – Wiring Diagrams

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Warning System Signals

NOTE: *The warning system signals which includes audible and visual indicator involving the horn and gauges will identify the potential problems listed in the chart*

Problem	Horn	Monitor Display	Guardian Activated	Engine Speed Reduction Activated
Power Up/System Check	Single Beep	Yes	N/A	No
Low Oil	4 Beep... 2 Minutes Off	Yes	No	No
Oil Pump Electrical Failure		Yes	Yes	Yes (See Guardian System)
Over Heat	Continuous Beep	Yes	Yes	Yes (See Guardian System)
Water In Fuel	4 Beep... 2 Minutes Off	Yes	No	
Over Speed	Continuous Beep	Yes	Yes	Yes (See Guardian System)
Coolant Sensor Failure	No	Yes	No	No
MAP Sensor Failure	No	Yes	No	No
Air Temperature Sensor Failure	No	Yes	No	No
Ignition Coil Failure	No	Yes	No	No
Injector Failure	No	Yes	No	No
Horn Failure	N/A	Yes		No
Battery Voltage too high (16V) or too low (11V) or very low (9.5V)	No	Yes	Yes	Yes (See Guardian System)
Throttle Sensor Failure	Continuous Intermittant Beeping	Yes	Yes	Yes (See Guardian System)
Block Water Pressure	Yes	Yes	Yes	Yes (See Guardian System)
Calculated Oil Level Critical	Yes	Yes	Yes	Yes

Guardian Protection System

The guardian protection system monitors critical engine functions and will reduce engine power accordingly in an attempt to keep the engine running within safe operating parameters.

IMPORTANT: The Guardian System cannot guarantee that powerhead damage will not occur when adverse operating conditions are encountered. The Guardian System is designed to (1) warn the boat operator that the engine is operating under adverse conditions and (2) reduce power by limiting maximum rpm in an attempt to avoid or reduce the possibility of engine damage. The boat operator is ultimately responsible for proper engine operation.

Guardian System Operation with Gauges

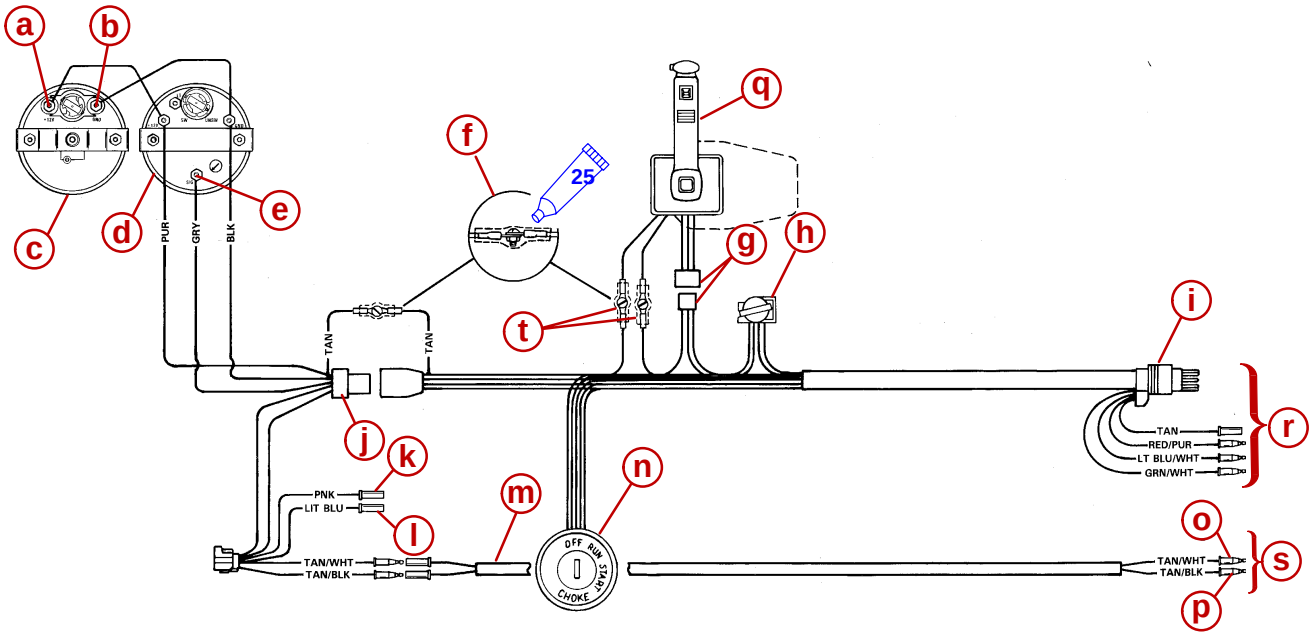
Smartcraft Gauge/Monitor	System will sound warning horn and display the warning message.

Guardian System Activation

Warning Horn		
Function	**Sound**	**Description**
Cooling System Problem	Continuous	Engine Guardian System is activated. Power limit will very with level of overheat. Shift outboard into neutral and check for a steady stream of water coming out of the water pump indicator hole. If no water is coming out of the water pump indicator hole or flow is intermittent, stop engine and check water intake holes for obstruction. The Guardian system must be RESET before engine will operate at higher speeds. Moving throttle lever back to idle resets the system.
Oil Level Is Critically Low	Continuous	Engine Guardian System is activated. Power limit will limit engine speed. The oil level is critically low in the engine mounted oil reservoir tank. Refill the engine mounted oil reservoir tank along with the remote oil tank.
Oil Pump Failure	Continuous	Engine Guardian System is activated. Power limit will limit engine speed. The warning horn is activated if the oil pump should ever stop functioning electrically. No lubricating oil is being supplied to the engine.

Engine Overspeed	Continuous	The warning horn is activated any time engine speed exceeds the maximum allowable RPM. The system will limit the engine speed to within the allowable range. If the overspeed condition continues, the Engine Guardian System will place the engine in power reduction. The Guardian system must be RESET before engine can resume full power. Moving throttle lever back to idle resets the system. Engine overspeed indicates a condition that should be corrected. Overspeed could be caused by incorrect propeller pitch, engine height, trim angle, etc.
Sensor out of Range	Continuous	Engine Guardian System is activated. Power limit may activate at full throttle speed.
	Intermittent Beep	Engine Guardian System is activated. Power limit may restrict engine speed to idle.

Analog Gauge Panel Mount Remote Control Wiring Installation

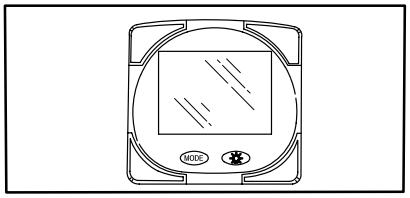


BLK = Black
BLU = Blue
BRN = Brown
GRY = Gray
GRN = Green
ORN = Orange
PNK = Pink
PUR = Purple
RED = Red
TAN = Tan
WHT = White
YEL = Yellow
LIT = Light
DRK = Dark

25 Liquid Neoprene (92-25711--2)

a - (+) 12 Volt Terminal
b - (–) Ground Terminal
c - Speedometer
d - Tachometer
e - Tachometer Signal Terminal
f - Connect Wires Together with Screw and Hex Nut (3 Places); Apply Quicksilver Liquid Neoprene to Connections and Slide Rubber Sleeve Over Each Connection.
g - Power Trim Connector
h - Horn
i - 8 Pin Harness Connector
j - Multi-Function Adapter Harness
k - To Fuel Sender (Optional)
l - To Oil Sender (Optional)
m - Two Wire Harness
n - Ignition/Choke Switch
o - Low Oil Sender Lead
p - Over Temperature Switch Lead
q - Panel Mount Remote Control
r - To Engine
s - To Engine
t - Neutral Safety Switch Lead

System Monitor V2.0



Basic Operation

The System Monitor is an LCD multi-function display gauge. A variety of displays can be activated using the MODE button.

Pressing the MODE button scrolls the following displays: fuel used, tachometer (RPM), fuel flow, power trim position, engine temp, water pressure, battery voltage, traveling range (if calibrated), and water depth (if equipped with transducer).

The System Monitor will power up when the ignition is turned on.

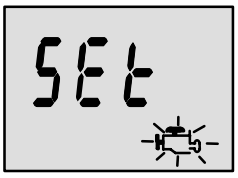
The display includes a backlight which allows you to read it at night. The backlight brightness is adjustable using button.

In the event of a warning alarm, the warning icon(s) will be displayed.

The System Monitor can be calibrated to display both the English or the Metric system. The System Monitor can also be calibrated so that the trim position is displayed whenever the propulsion unit is trimmed. Refer to *Cal1* Calibration Section for details.

Initial Power Up (Or After Master Reset)

Unit will display software level then flash the word **"SEt"** in conjunction with engine icon.

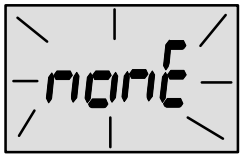


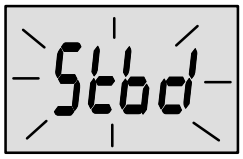
Press the MODE button.

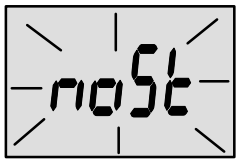
The unit will begin it's **"Auto–detection"** of engine type procedure. In this procedure System Monitor checks with the engine control module (ECM) to see what type of engine you have and presets the data monitoring screens accordingly, (e.g., If System Monitor detects an inboard engine connected to the data network it will turn off all engine/drive TRIM functions as these functions are not used in an inboard engine installation). The intention is to make initial setup easier.

NOTE: *If "2001" comes up during auto detect the gauge has detected that your engine is a pre 2002 model. You will need to manually select your engine type. Use the button to scroll through the choices. Stnd = Stern Drive, Inbd = Inboard, JEtd = Jet Drive, Out2 = Outboard 2 Stroke, Out4 = Outboard 4 Stroke. Press MODE to continue.*

NOTE: *If you see the flashing message,* ***(A) "nonE"*** *after the Auto–detection occurs, the gauge can not find an engine. Please check wiring for correct connection. If you receive one of the following other flashing messages:* ***(B) "Stbd"****or,* ***(C) "noSt"*** *refer to the "Set–Up Errors Section".*

A) 

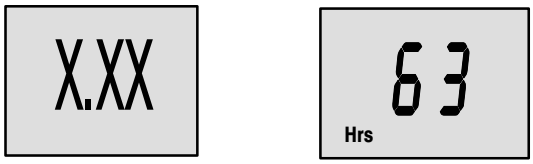
B) 

C) 

Standard Information Display Screens

START UP SCREEN

At power up, a momentary (1 second) screen displays the current System Monitor software version, followed by a 4 second display showing hours of engine use.



NOTE: *NOT ALL SCREENS MAY APPLY TO YOUR ENGINE TYPE.*

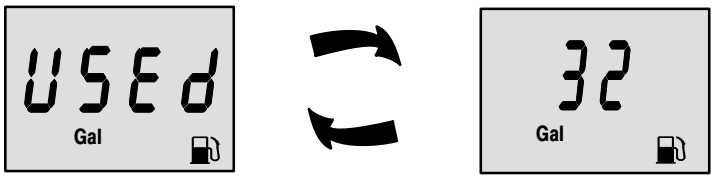
NOTE: *Screens can be turned on/off in Cal1. Refer to the Cal1 calibration section for details.*

RPM SCREEN

Tachometer – Displays engine speed in Revolutions Per Minute (RPM).

FUEL USED SCREEN

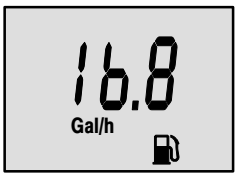
The System Monitor displays approximate fuel used since the last reset.



Fuel Used Reset will return display back to 0. You can preform a **Fuel Used Reset** anytime by pressing MODE and ☼ buttons together momentarily.

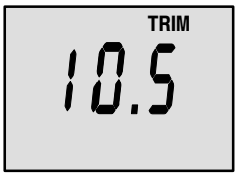
FUEL FLOW SCREEN

The System Monitor displays current estimated individual engine fuel consumption in Gallons per hour (Gal/hr) or Liters per hour (Ltr/hr).



TRIM POSITION SCREEN

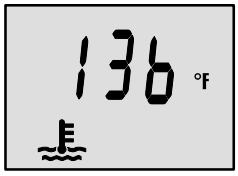
Displays trim position of the propulsion unit up to the maximum trim position, and then displays trailer position. 0 = down, 10 = maximum trim, and 25 = full trailer.



NOTE: *The System Monitor may be calibrated so that trim is displayed whenever the trim switch is used. Refer to the Cal1 Calibrations Section for details.*

ENGINE TEMPERATURE SCREEN

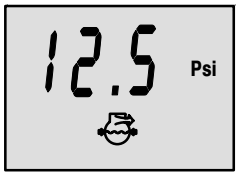
Displays the engine temperature in degrees Fahrenheit (°F) or Celsius (°C).



NOTE: *You can change the units of measure within Cal1. Refer to the Cal1 Calibration Section for details.*

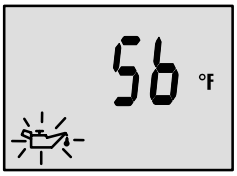
WATER PRESSURE SCREEN

Displays cooling system water pressure of the engine in Psi or Bar.



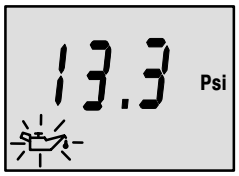
OIL TEMPERATURE SCREEN

Displays the engine oil temperature in degrees Fahrenheit (°F) or Celsius (°C).



OIL PRESSURE SCREEN

Displays engine oil pressure in Psi or Bar.



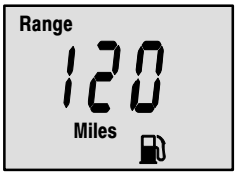
BATTERY VOLTAGE SCREEN

Displays voltage level (condition) of battery.

Display of Range and Depth Information

RANGE SCREEN

Displays estimated traveling range based on current fuel consumption and fuel remaining in the tank that is connected to the system. The number displayed is an estimate of the distance you can travel on the remaining fuel at current boat speed.

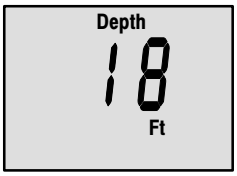


NOTE: *To activate this screen, you must perform the fuel tank calibration in Cal2. Refer to the Cal2 Calibration Section for details.*

NOTE: *You must have a speed input device connected to the system (paddle wheel or pitot pressure transducer).*

WATER DEPTH SCREEN

Displays the depth of water under the transducer if connected.

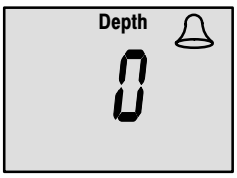


SHALLOW WATER ALARM FEATURE

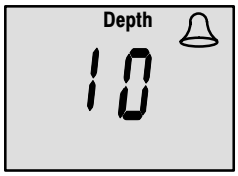
You can set an alarm to trigger whenever the boat moves into water shallower than the alarm level.

Setting Shallow Water Alarm.

1. The water depth screen must be displayed. Be sure Depth is turned on in *Cal2*. Refer to *Cal2* Calibration Section for details.
2. Press both MODE and ☼ buttons together for 3 seconds.
3. The alarm on or off menu will appear.
4. Press the ☼ button to toggle to ON.



5. Push MODE button to save.
6. The depth number will be flashing. Press the ☼ button to set the flashing number to desired alarm depth. 100 ft. maximum depth and 2 ft. minimum depth.



7. Push MODE button to save.

Warning System

NOTE: *Alarm warnings may vary depending on your engine type. Some warnings listed may not apply to your engine. Please consult your engines owners manual for a complete list of engine warnings.*

The System Monitor warning system incorporates the display screen, the warning horn and the Guardian Protection system. The warning horn is located inside the remote control or is part of the ignition key switch wiring harness.

- **Alarms Warnings –** When a problem is detected, the warning horn sounds and the offending icon appears on the display.
  If problem can cause immediate engine damage – The horn will sound continuously and the Engine Guardian System will respond to the problem by limiting engine power. Immediately reduce throttle speed to idle and refer to the warning messages on the following pages that tell you what to do about it.
  If problem will not cause immediate engine damage – The horn will sound but not continuously. Refer to the warning messages on the following pages that tell you what to do about it.
- **Engine Guardian System –** Monitors the critical sensors on the engine for any early indications of problems. The system will respond to a problem by reducing engine power in order to maintain a safe operating condition.

NOTE: *If the mode button is pressed to a different screen, the flashing alarm signal will remain flashing to indicate there still is a problem.*

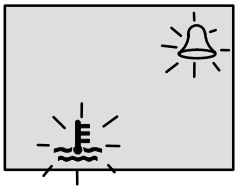
Warning Display Screens

The engine has an **"Engine Guardian System"**. The ECM Engine control module monitors the critical sensors on the engine for any early indications of problems. The Guardian System will respond to a problem by reducing engine speed in order to maintain a safe operating condition. The System Monitor will display the alarm.

The warning system will alert the operator to the potential problems. Refer to the pages following for explanation of the problem and the correct action to take.

ALARM – OVERHEAT

The Bell and Temperature icons are displayed and the warning horn begins sounding continuously to inform the driver that there is insufficient water pressure in the cooling system. The Engine Guardian System will start limiting engine power.



If the engine overheats, immediately reduce throttle speed to idle. Shift into neutral. If outboard: check for a steady stream of water coming out of the water pump indicator hole.

NOTE: *The throttle will have to be returned to idle to reset the system.*

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. Operating the engine while overheated will cause engine damage.

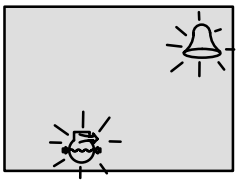
If a steady stream of water is coming out of the water pump indicator hole and the warning horn continues to sound, there still may be insufficient cooling water or an engine problem. Stop engine. Operating the engine while overheated will cause engine damage.

The overheat problem must be corrected before you can resume normal operation.

NOTE: *If you are in a stranded situation, stopping the engine and allowing it to cool back down will usually allow some additional low speed (idle) running time before the engine starts to overheat again.*

ALARM – LOW WATER PRESSURE

The Bell and Water Pressure icons are displayed and the warning horn begins sounding continuously to inform the driver that there is insufficient water pressure in the cooling system. The Engine Guardian System will start limiting engine power.



Some causes of insufficient cooling water pressure are (1) obstructed cooling water intake holes (2) blockage in the cooling system or a water pump problem. Running the engine with the cooling water intake holes out of the water.

NOTE: *The throttle will have to be returned to idle to reset the system.*

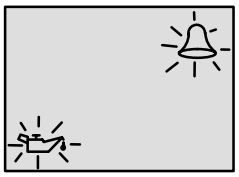
If the warning system is activated, immediately reduce throttle speed to idle. Shift engine into neutral. and check for a steady stream of water coming out of the water pump indicator hole.

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. Have the outboard checked by your dealer. Operating the engine without adequate cooling water pressure will overheat the engine.

If the warning signals stop and a steady stream of water is coming out of the water pump indicator hole, return engine to normal operation. If the warning system is activated repeatedly, have the outboard checked by your dealer.

ALARM – LOW OIL RESERVE – OUTBOARD 2 STROKE

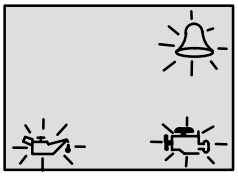
The bell and oil icons are displayed and the warning horn begins sounding a series of four beeps every two minutes to inform the driver that the oil level is critically low in the engine mounted oil reservoir tank. When the oil level gets close to empty, the horn begins sounding continuously and the Engine Guardian System will start limiting engine power.



The engine mounted oil reservoir tank along with the remote oil tank will have to be refilled (refer to Fuel & Oil Section).

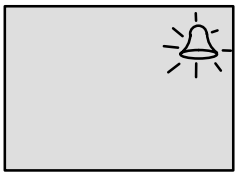
ALARM – OIL PUMP FAULT

The Bell, Engine and oil icons are displayed and the warning horn begins sounding continuously to inform the driver that the oil pump has stopped functioning electrically. No lubricating oil is being supplied to the engine. Stop the engine as soon as possible. The Engine Guardian system will start limiting the engine power. Consult your dealer for assistance.



ALARM – ENGINE OVERSPEED

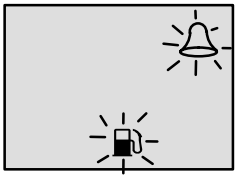
The Bell icon is displayed and the warning horn begins sounding continuously to inform the driver that the engine speed exceeded the maximum allowable RPM. The system will automatically reduce the engine speed to within the allowable limit.



NOTE: *Engine speed should never reach the maximum limit to activate the system unless the propeller is ventilating, an incorrect propeller is being used, or the propeller is faulty.*

ALARM – WATER IN FUEL

The Bell and Fuel Icon will appear and the warning horn will begin sounding a series of four beeps every two minutes when water in the water-separating fuel filter reaches the full level. On some engines water can be removed from the filter. Refer to Maintenance Section for filter removal.

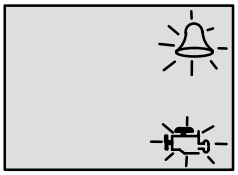


ALARM – LOW FUEL

The Bell and Fuel Icon will appear and the warning horn will sound a series of four beeps. This alarm occurs when there is less than 1/8 of the total fuel capacity left. Once the four beeps have sounded, this alarm will not reoccur unless the condition still exists after next key up.

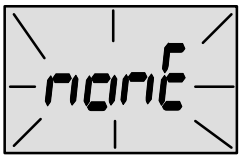
ALARM – ENGINE MALFUNCTION

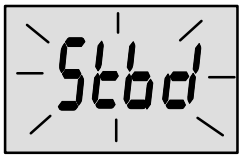
The Bell and Engine Icon will appear to inform the driver that an engine problem has occurred. If the warning system senses that the problem could cause permanent engine damage, the Engine Guardian System will start limiting engine power.

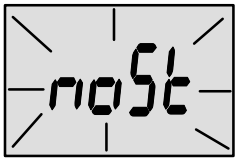


INSTALLATION ERROR DETECTION

1. System Monitor flashes a **"nonE"** message when there is no communication between System Monitor and an ECM. Check for loose wiring. Preform master reset and try auto detecting again. (Refer to Page 45 for Master Reset.)
2. System Monitor flashes a **"Stbd"** message when there is more than one Stbd ECM present on the SmartCraft network. Need to configure ECM's to proper engine location using DDT or Quicksilver Diagnostics Tool.
3. System Monitor flashes a **"noSt"** message when there are no Stbd ECM's present on the SmartCraft network. Need to configure ECM's to proper engine location using DDT or Quicksilver Diagnostics Tool.

A) 

B) 

C) 

CAL1 Calibration

***Cal1* Display Calibrations:**
•Trim Pop up Screen (On or Off) •Trim Calibration •English or Metric Units Selection •Range Units Selection •(On or Off) Depth, Trim, Engine Temperature, Oil Pressure, Oil Temperature, Water Pressure, Volts, Engine Hours, and Data Simulator pages.

NOTE: NOT ALL SCREENS MAY APPLY TO YOUR ENGINE TYPE.

CAL1 HEADER SCREEN

1. Turn ignition key to the on position.
2. Press and hold MODE and ☼ for 3 seconds to bring up the *Cal1* calibration screen. Release the buttons to enter *Cal1*.
3. Press the MODE button to advance through the *Cal1* calibration functions.
4. Press and hold MODE and ☼ for 3 seconds to save changes and exit the *Cal1* calibration screen.

Press the MODE button to move to the next calibration screen.

NOTE: *Pressing the ☼ button while in this header screen, will "transfer" you straight into Cal2.*

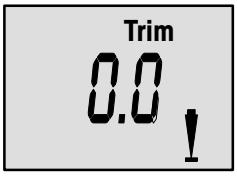
TRIM POP UP SCREEN (ON OR OFF)

If you want the power trim display screen to pop up as you trim the propulsion unit, calibrate as follows: With the pop up screen displayed and the number "flashing", press the ☼ button to select 1=ON or 0=off.

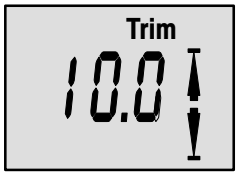
Press the MODE button to save and move to the next function.

Set the trim sensor as follows:

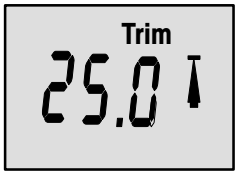
Calibration 0.0 – The word "Trim" and down arrow should be blinking. Use the trim switch and trim the unit to the full Down/In position. Press the ☼ button to save. Press the MODE button to advance to the Calibration 10.0 setting.



Calibration 10.0 – The word “Trim” and the down and up arrows should be blinking. Trim the unit out to the maximum trim **(not trailer)** position. Press the button to save. Press the MODE button to advance to the Calibration 25.0 setting.

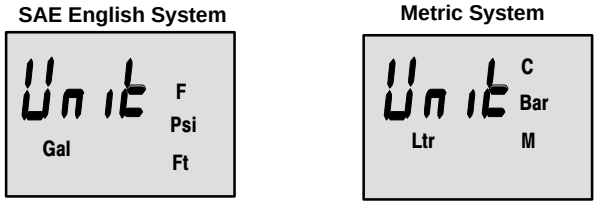


Calibration 25.0 – The word “Trim” and up arrow should be blinking. Use the trim switch and trim the unit out to the maximum trailer position. Press the button to save. Press the MODE button to move to the next function.



ENGLISH OR METRIC READINGS SELECTION

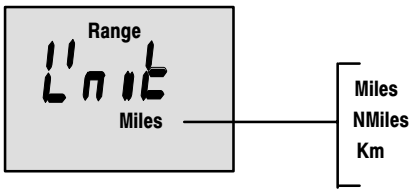
The System Monitor allows you to display reading in the SAE (standard) English system or the Metric system. Press the button to toggle between units.



Press the MODE button to save and move to the next function.

RANGE READINGS SELECTION

The System Monitor allows you to display reading in Miles, Nautical Miles or Kilometers. Press the button to toggle between units.



Press the MODE button to save and move to the next function.

DATA PAGE SELECTIONS

Select if you would like to display Depth, Trim, Engine Temperature, Oil Pressure, Oil Temperature, Water Pressure, Volts, Engine Hours, and Data Simulator pages or not.

NOTE: *The engine connected may not support all screen functions.*

Press the button to toggle between units.

Press the MODE button to save and move to the next function.

CAL2 Calibration

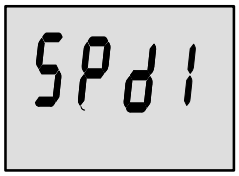
CAL2 Display Calibrations:
•Paddle Wheel Speed Sensor Frequency Setting •Pitot Water Pressure Speed Sensor Input Setting •Pitot Water Pressure Speed Sensor Multiplier •Fuel Tank Calibration

CAL2 HEADER SCREEN

1. Turn ignition key to the on position.
2. Press and hold MODE and ☼, System Monitor will first display *Cal1*,and then after 6 seconds will display *Cal2*. Release the buttons to enter the *Cal2* calibration screen.
3. Press the MODE button to advance through the *Cal2* calibration functions.
4. Press and hold MODE and ☼ for 3 seconds to get out of the *Cal2* calibration screen.

PITOT WATER PRESSURE SENSOR INPUT SETTING (SPD1 OR SPD2)

Select the PSI input of the Pitot water pressure sensor on the engine. Press the ☼ button to select 1 = 100 PSI or 2 = 200 PSI. The standard PSI input on production Mercury product is 100 PSI. Certain High Performance applications may require a 200 Psi input.



Press the MODE button to save and move to the next function.

PITOT WATER PRESSURE SENSOR MULTIPLIER (1.XX)

This multiplier can be used to adjust the pitot speed to match speed as measured on GPS or radar gun. Press the ☼ button to select change.

Press the MODE button to save and move to the next function.

Frequency can be changed to match requirements of different sensors. 4.9 (hz/Mile) is the frequency of the paddle wheel speed sensor provided by Mercury Marine.

Press the MODE button to save and move to the next function.

FUEL TANK CALIBRATION:

NOTE: *There are three methods to set up fuel tank level monitoring feature:*

First: Do nothing. Linear readout based on raw sensor values. This mode does not factor in irregular tank shapes.

Second: By following the tank calibration procedure described on pages 33–35, but without actually adding fuel. System Monitor will supply an estimated range value based on linear interpolation of the sensor range values. This mode does not factor in irregular tank shapes.

Third: By following the tank calibration procedure described on pages 33–35 completely System Monitor will display an estimated range value that factors in the tank shape.

1. Scroll using the MODE key until you see **"t1"**. This tells you that you have entered tank 1 calibration.
2. Press MODE once more.
3. You will see the word **"no"** and the gas tank icon. Enter the capacity of tank 1 in gallons using the ☼ key.

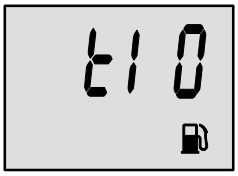
NOTE: *The word **"no"** will not go away unless the gauge sees a tank connected to the system. With no tank connected you will not be able to enter a capacity.*

4. Press MODE once more.
5. You will see **"t2"**. This tells you that you have entered tank 2 calibration.
6. Press MODE once more.
7. You will see the word **"no"** and the gas tank icon. Enter the capacity of tank 2 in gallons using the ☼ key.

NOTE: *The word **"no"** will not go away unless the gauge sees a tank connected to the system. With no tank connected you will not be able to enter a capacity.*

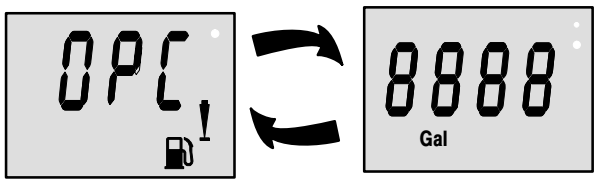
NOTE: *Tank 2 does not have to be a fuel tank. It could represent an oil tank for example. See page 35 for tank 2 selection.*

Select whether you want to calibrate the fuel tank **"t1"**. (The gauge will not let you calibrate the fuel tank until the capacity had been entered). Press the ☼ button to select 0= off or 1= on.

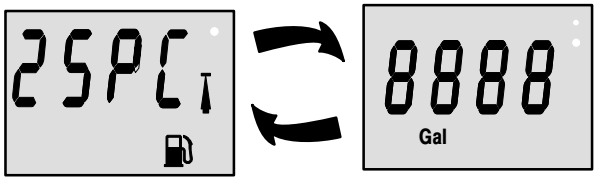


Selecting **"1"** will bring up the following calibration screens.

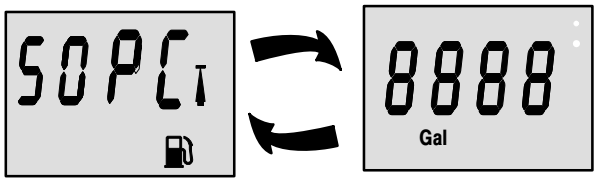
Calibration 0% – The "0 percent" display alternates between percent of tank capacity and quantity of fuel to add based on total capacity entered in *Cal2.* Add fuel to total quantity displayed and push the ☼ button to save. Press the MODE button to advance to the Calibration 25% setting.



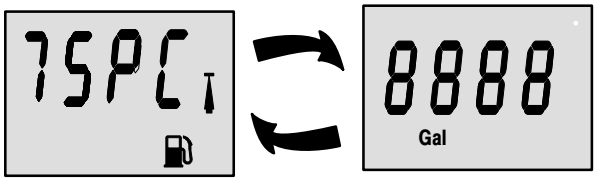
Calibration 25% – The "25 percent" display alternates between percent of tank capacity and quantity of fuel to add based on total capacity entered in *Cal2.* Add fuel to total quantity displayed and press the ☼ button to save. Press the MODE button to advance to the Calibration 50% setting.



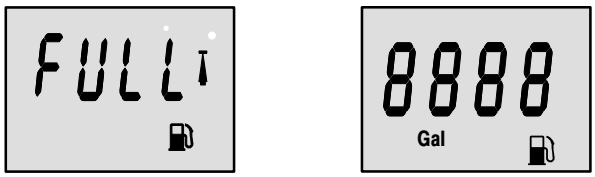
Calibration 50% – The "50 percent" display alternates between percent of tank capacity and quantity of fuel to add based on total capacity entered in *Cal2.* Add fuel to total quantity displayed and press the ☼ button to save. Press the MODE button to advance to the Calibration 75% setting.



Calibration 75% – The "75 percent" display alternates between percent of tank capacity and quantity of fuel to add based on total capacity entered in *Cal2.* Add fuel to total quantity displayed and press the ☼ button to save. Press the MODE button to advance to the Calibration FULL setting.

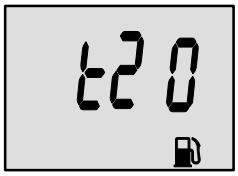


Calibration FULL – The "FULL percent" display alternates between percent of tank capacity and quantity of fuel to add based on total capacity entered in *Cal2.*

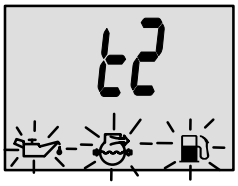


Add fuel to fill tank and press the ☼ button to save. Press the MODE button to move to the next function.

At this point you have completed tank 1 calibration and you will see **"t2"**.



Change **"t20"** to a 1 (on). Press the button, you will see a blinking tank icon. Using the button, select which tank you want tank 2 to be, (oil, fuel or water/waste). Press the MODE button to continue.



NOTE: *If you choose oil or water/waste, no further cal will be needed.*

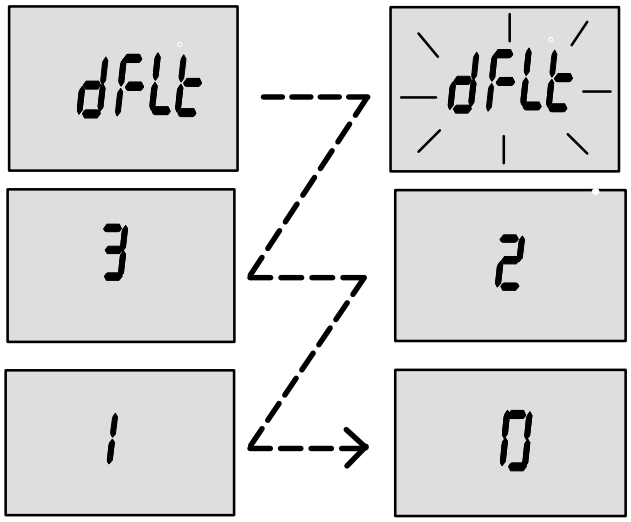
Repeat tank calibration procedure described on page 34 and 35 if calibration of the second tank is desired.

Master Reset Command

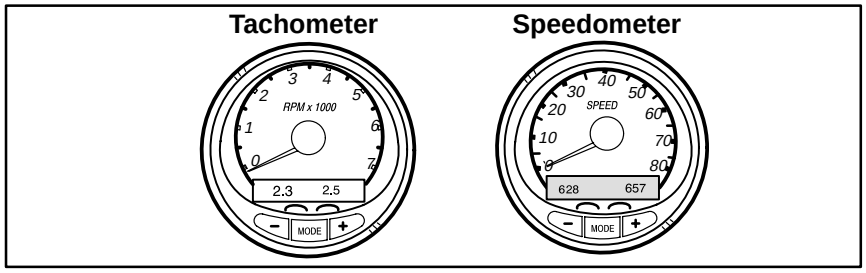
Master Reset: You can return the gauge back to factory presets through the Master Reset command.

IMPORTANT: Performing a master reset will reset the unit back to all factory defaults, thus eliminating any installation calibrations performed during set up of product.

1. Hold in MODE and for approximately 12 seconds. You will see the word **"dFLt"** let go of the buttons.
2. Immediately press and hold in MODE and again until the unit counts down to zero **"0"**.
3. The **"SEt"** message flashing on the screen indicates that the unit has been reset to factory defaults.



System Tach & Speed



Basic Operation and Features

Power up: Each gauge will power up when the ignition is turned on. Gauges will stay on as long as the ignition is on.

On first time power up of gauge or after a "Master Reset", gauge will show "**Auto detect**". Upon pressing the mode button, gauge will automatically determine engine type. This will preset the data monitoring screens accordingly. The intention is to make initial setup easier. If gauge shows a warning of "No Starboard Engine" or "Multiple Starboard Engines", engine will need to be properly selected (Port and Stbd) using a Mercury engine diagnostic tool. "Master Reset" and "Auto detect" again. (See page 45 for "Master Reset").

Lights: The brightness and contrast are adjustable.

Buttons: The MODE button is used for selecting information screens. The **"+"** and **"–"** buttons are used for setting engine speed during troll control and setting gauge calibrations.

Troll Control: Allows the operator to set and control the idle speed of the engine for trolling without using the throttle.

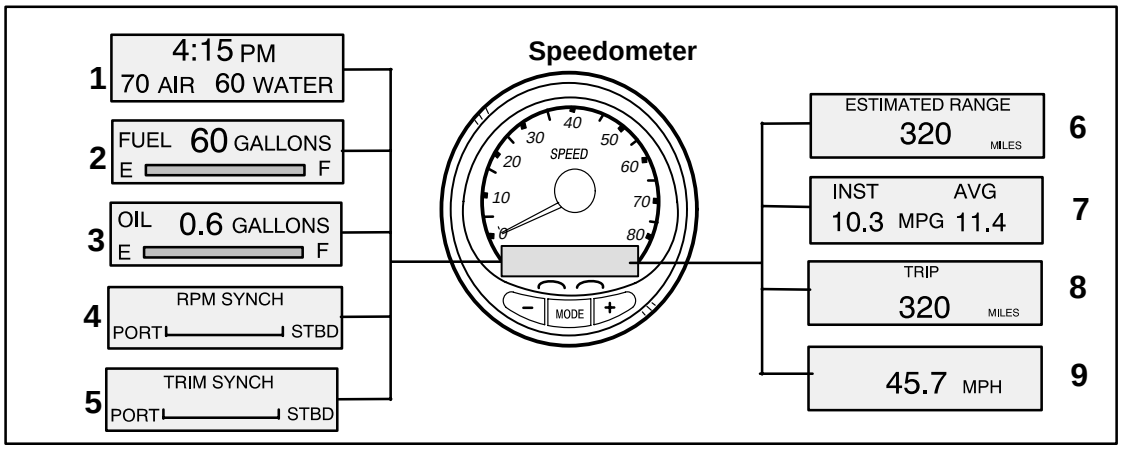
Engine Guardian System: Monitors the critical sensors on the engine for any early indications of problems. The system will respond to a problem by reducing engine speed in order to maintain a safe operating condition.

Warning System: The system will sound the warning horn and display the warning message.

Digital Display Screen: Displays the following engine information.

Tachometer Display Screen:	Speedometer Display Screen:
DEPENDING ON ENGINE TYPE Engine Break–in Engine Temperature Oil Psi Trim and RPM Trim and Water Pressure Water Pressure Battery Voltage and Engine Hours Fuel Flow and Fuel Used RPM	***DEPENDING ON ENGINE TYPE*** Speed Fuel Used COG/SOG – If GPS Input Distance and fuel to way point – *if way point programmed into optional GPS* Clock – Air/Sea Temp Inst. and Ave. Fuel Economy Trip Odometer Fuel Tank Levels Oil Tank Levels Fresh Water Tank2 or Level(s) Waste Water Level(s) or *Dual Engine* Trim and RPM Synchronizer – Fuel Range Fuel Economy Trip Odometer

Speedometer Display Screens



NOTE: NOT ALL SCREENS MAY APPLY TO YOUR ENGINE TYPE.

When the ignition is turned on, the speedometer will show the last screen that was displayed before the ignition was turned off.

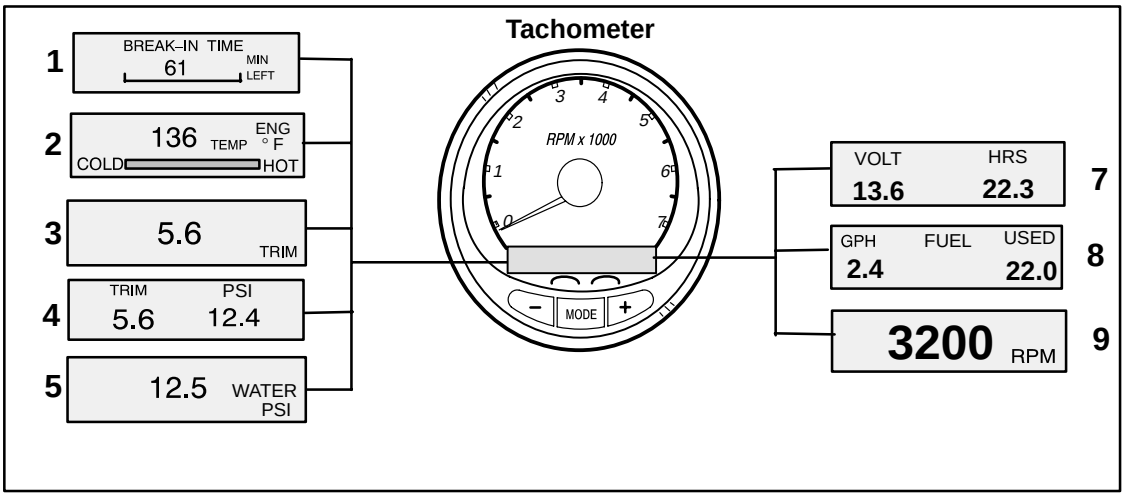
Press MODE to change display screens. You can revert back to the previous screen by pressing and holding MODE for 2 seconds. This will reverse the display rotation.

NOTE: *Readings can be displayed in English (U.S.) or Metric. Refer to Calibrations.*

NOTE: *Descriptions are necessarily in order on the gauge. Order changes depending on engine type.*

1. **Clock - Temp –** Clock, air temperature and water temperature. The air and water temperature sensors will have to be connected to obtain display readings.
2. **Fuel Level –** Displays the amount of fuel remaining.
3. **Oil Level –** Displays the amount of engine oil remaining, or water/waste tank level (if attached).
4. **RPM Synchronizer –** Dual Engines Only – Monitors the revolutions of both engines.
5. **Trim Synchronizer –** Dual Engines Only – Displays the trim position of both engines. Simplifies keeping trim levels equal.
6. **Traveling Range –** The estimated traveling range is based on boat speed, fuel consumption and fuel remaining in the tank. The numbers displayed indicates an estimate of the distance you can travel with the remaining fuel. Speed input required (Paddle Wheel, Pitot Pressure or GPS).
7. **Fuel Economy –** The display shows average **"AVG"** fuel consumption as well as Instantaneous **"INST"** fuel economy. The numbers displayed indicate miles per gallon "**MPG"** or kilometer per liter **"KM/L"**.
   Fuel Reset – To reset, select the display screen and press MODE and TROLL – buttons.
8. **Trip Odometer –** Tells how far you've gone since you last reset the gauge to zero. **Trip Reset** – To reset, select the display screen and press MODE and TROLL – buttons.
9. **Digital Speedometer –** Can display boat speed in miles per hour, kilometer per hour, or nautical miles per hour. The (LCD) digital speedometer will continue to increase even if **"StEt"** is at maximum. The speedometer will use the paddle wheel for its low speed readings but will switch to the speedo or GPS (if connected) for high speed readings. (Transition point setting described in Cal2, page 51.)

Tachometer Display Screens



NOTE: NOT ALL SCREENS MAY APPLY TO YOUR ENGINE TYPE.

When the ignition is turned on, the tachometer will display the last screen that was displayed before the ignition was turned off.

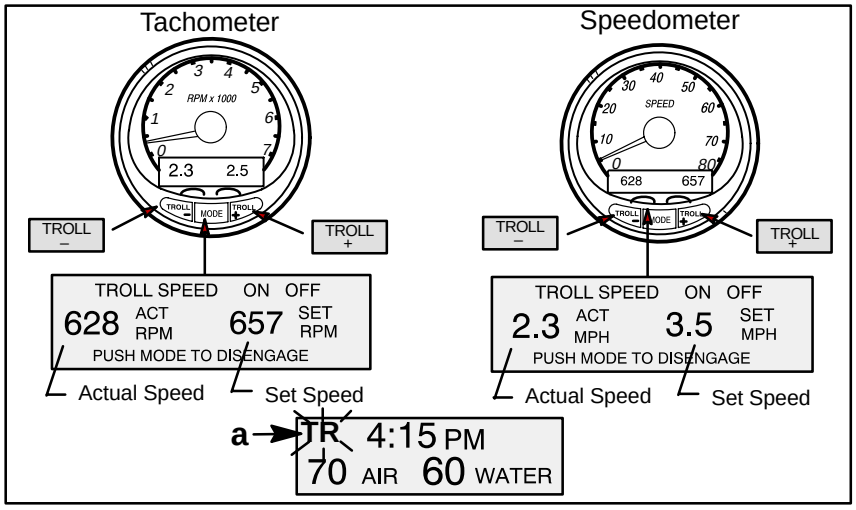
Press MODE to change display screens. You can revert back to the previous screen by pressing and holding MODE for 2 seconds. This will reverse the display rotation.

NOTE: *Readings can be displayed in English (U.S.) or Metric. Refer to Calibration.*

1. **Engine Break-in –** Displays time remaining on the break-in period of a new engine. This screen will automatically disappear after the break-in period is complete.
2. **Temperature –** Displays engine coolant temperature from Cold to Hot.
3. **Power Trim Angle:** Displays trim angle of the outboard or sterndrive up to the maximum trim angle, and then displays the trailer angle. 0 = down, 10 = maximum trim, and 25 = full trailer.
4. **Power Trim Angle - Water Pressure –** Displays trim angle of the engine and cooling system water pressure.
5. **Water Pressure:** Displays cooling system water pressure at the engine.
6. **Oil Pressure (Not Shown Above) –** Displays engine oil pressure in units of Psi or Bar.
7. **Battery Voltage –** Displays voltage level (condition) of battery. Also records the running time of engine.
8. **Fuel Flow –** Displays engine fuel use in gallons per hour or liters per hours.
9. **Digital Tachometer:** Displays engine speed in Revolutions Per Minute (RPM).

Troll Control

BASIC OPERATION



With troll control you can maintain a trolling speed of 550 to1000 rpm without using the throttle.

NOTE: *Troll control may not be available on all engine models.*

NOTE: *Troll control min/max range may change depending on engine type.*

You can set the troll control by using either the tachometer or speedometer. Tachometer will set the speed in RPM and speedometer will set the speed in MPH, Kph or KN.

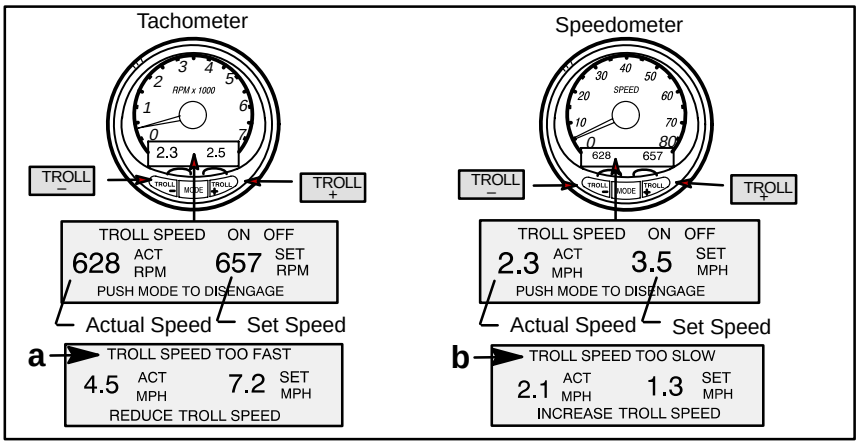
You can shut off troll control anytime by pushing the MODE button when in the troll display screen or by moving the throttle.

If you have troll control set at a desired speed and then you shut off the troll control, the system remembers the set speed and will return to that speed when re-engaged.

The display screen will revert back to the previous screen after 10 seconds of no activity. Push the TROLL + or TROLL – button to reactivate the display screen.

When the troll control is engaged and you are out of the troll control screen, a flashing signal **"TR"** (a) will appear in the upper left corner of the display to indicate troll control is still running.

SETTING TROLL CONTROL



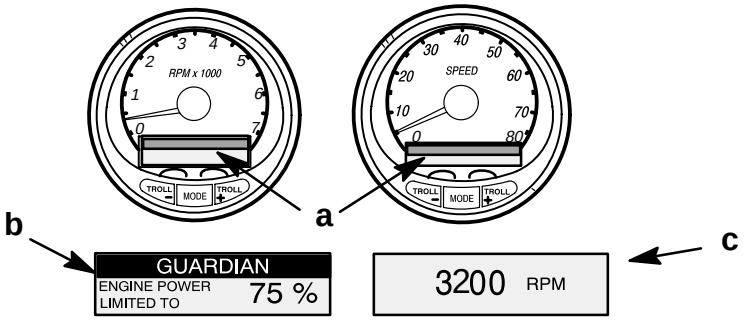
1. With the engine running, shift engine into gear. Set engine speed at idle.
2. Push in the TROLL + or TROLL – button to bring up the troll control display screen.
3. Press MODE to engage (turn on) the troll control.
4. Use the TROLL + TROLL – buttons to set the desired speed. Use **(+)** to increase speed and **(–)** to decrease speed.
5. If you set troll control to a higher speed than the troll rpm can bring the boat to, the **TARGET SPEED TOO FAST** (a) message will appear. Reduce troll speed.
6. If you set troll control to a slower speed than the troll rpm can bring the boat to, the **TARGET SPEED TOO SLOW** (b) message will appear. Increase troll speed.

EXITING TROLL CONTROL

There are three ways to turn off the troll control:

- Press the MODE button when in the troll display screen.
- Move the throttle to a different speed.
- Shift engine into neutral.

Warning System



NOTE: *Warnings may be different depending on engine type. Please consult your engines owners manual for a complete list of failures.*

The SmartCraft warning system incorporates the display screens (a) the warning horn and the Guardian Protection system. The warning horn is located inside the remote control or is part of the ignition key switch wiring harness.

- **Alarms Warnings –** When a problem is detected, the warning horn sounds and the name of the offending alarm appears on the display.
  If problem can cause immediate engine damage – the horn will sound continuously and the Engine Guardian System (b) will respond to the problem by limiting engine power. Immediately reduce throttle speed to idle and refer to the warning messages on the following pages that tell what to do.
  If problem will not cause immediate engine damage – The horn will sound but not continuously. Refer to the warning messages on the following pages that tell what to do.

  The alarm message will stay displayed until the mode button is pressed. If there are multiple alarms, these will cycle on the display at five-second intervals.
  If the mode button is pressed to a different screen, the flashing alarm signal **"AL"** (c) will appear in the upper right corner to indicate there still is a problem.
- **Engine Guardian System –** Monitors the critical sensors on the engine for any early indications of problems. The system will respond to a problem by reducing engine power in order to maintain a safe operating condition. The display screen will show the percent of power available.

Alarm Messages

These messages will appear and the horn will sound if there is a problem detected in one of the engine systems.

NOTE: *The warning system will alert the operator to the potential problems listed in the chart. Refer to the page listed for explanation of the problem and the correct action to take.*

PROBLEM	TACHOMETER DISPLAY	SPEEDOMETER DISPLAY	ENGINE GUARDIAN SYSTEM ACTIVATED	HORN ONLY
BATTERY *	●		●	
ENGINE DATA BUS	●			
FAULT – HORN	●			
FAULT – IGNITION	●			
FAULT – INJECTOR	●			
FAULT – OIL PUMP	●		●	
FAULT – SENSOR	●		●*	
FAULT – WATER TEMP	●			
LOW FUEL		●		
LOW OIL		●		
OIL TEMP	●			
OIL PSI	●			
OVERHEAT	●		●	
OVER SPEED	●			
PRESSURE	●		●	
RESERVE OIL	●		●	
WATER IN FUEL	●			
FLASH CHECK SUM				●
MAP				●
MAT				●
TPS				●

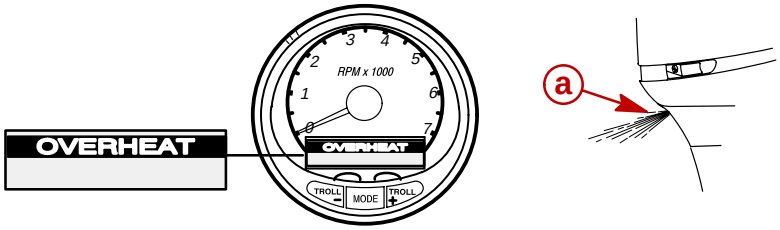
* Throttle and manifold pressure sensors only

OVERHEAT

The overheat alarm message appears and the warning horn begins sounding continuously. The Engine Guardian System will start limiting engine power.

If the engine overheats, immediately reduce throttle speed to idle. Shift engine into neutral. Check for an obstruction covering the water intake holes on the engine.

NOTE: *The throttle will have to be returned to idle to reset the system.*



a - Water Pump Indicator Hole

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. Operating the engine while overheated will cause engine damage.

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. Operating the engine while overheated will cause engine damage.

NOTE: *If you are in a stranded situation, stopping the engine and allowing it to cool back down will usually allow some additional low speed (idle) running time before the engine starts to overheat again.*

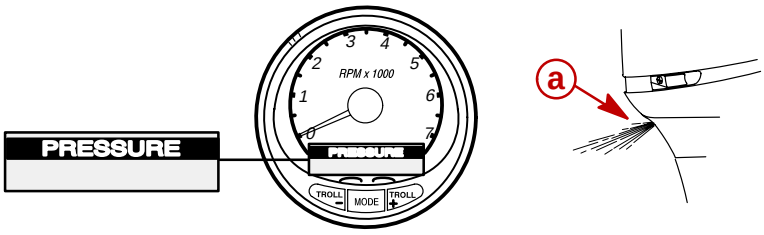
The overheat problem must be corrected before you can resume normal operation.

PRESSURE

This alarm message is displayed and the warning horn begins sounding continuously to inform the driver that there is insufficient water pressure in the cooling system. The Engine Guardian System will start limiting engine power.

Some causes of insufficient cooling water pressure are (1) obstructed cooling water intake holes (2) blockage in the cooling system or a water pump problem (3) running the engine with the cooling water intake holes out of the water.

NOTE: *The throttle will have to be returned to idle to reset the system.*



a - Water Pump Indicator Hole

If the warning system is activated, immediately reduce throttle speed to idle. Shift engine into neutral and check for a steady stream of water coming out of the water pump indicator hole.

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. Operating the engine without adequate cooling water pressure will overheat the engine.

If the warning signals stop and a steady stream of water is coming out of the water pump indicator hole, return engine to normal operation. If the warning system is activated repeatedly, have the outboard checked by your dealer.

OVERSPEED (a)

This message is displayed and the warning horn begins sounding continuously to inform the driver that the engine speed exceeded the maximum allowable RPM. The system will automatically reduce the engine speed to within the allowable limit.

NOTE: *Your engine speed should never reach the maximum limit to activate the system unless the propeller is ventilating, an incorrect propeller is being used, or the propeller is faulty*

WATER IN FUEL (b)

This message will appear and the warning horn will begin sounding a series of four beeps every two minutes when water in the water-separating fuel filter reaches the full level. Water can be removed from the filter. Refer to Maintenance Section for filter removal.

FAULT-HORN (c)

This message informs you that the warning horn is not functioning correctly.

RESERVE OIL LOW – 2 STROKE OUTBOARD ONLY (d)

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.

The engine mounted oil reservoir tank along with the remote oil tank will have to be refilled (Refer to Fuel & Oil Section).

FAULT-OIL PUMP (e)

This message is displayed and the warning horn begins sounding continuously to inform the driver that the oil pump has stopped functioning electrically. No lubricating oil is being supplied to the engine. Stop the engine as soon as possible. The Engine Guardian system will start limiting the engine power.

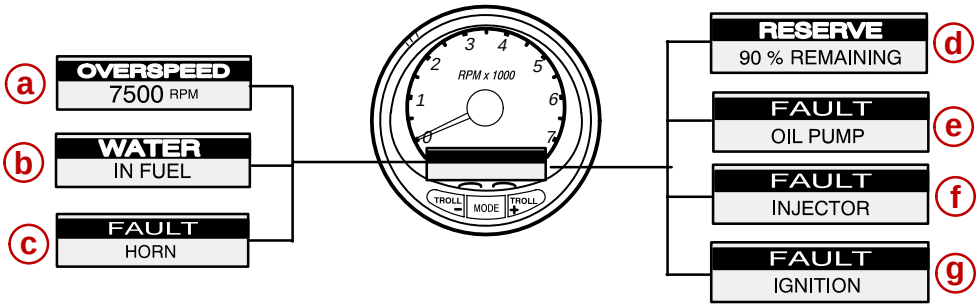
NOTE: *The throttle will have to be returned to idle to reset the system.*

FAULT-INJECTOR (f)

This alarm informs you if one or more of the fuel injectors have stop functioning electrically.

FAULT-IGNITION (g)

This alarm informs you that a problem has developed in the ignition system.



BATTERY (a)

When the electrical system is not charging, or the battery charge is low, the warning message is designed to come on and the Engine Guardian System will start limiting engine power. If the message appears immediately after starting, it is possible that the engine alternator can re-charge the battery after operating awhile. If this message appears while driving or comes on after starting and continues to be displayed, check engine to determine the cause of the problem and to avoid being stranded with a dead battery. To help the alternator recharge the battery quickly, reduce the load on the electrical system by turning off any unneeded accessories.

NOTE: *The throttle will have to be returned to idle to reset the system.*

ENGINE DATA BUS (b)

This message tells you that the data communication link between the tachometer and engine is not connected.

LOW FUEL LEVEL (c)

This message serves as a warning that the fuel level in the fuel tank is critically low. You should stop for fuel immediately to avoid running out.

LOW OIL LEVEL – OUTBOARD 2 STROKE ONLY (d)

This message serves as a warning that the oil level in the remote oil tank is low. You should stop and refill the oil tank immediately to avoid running out.

FAULT-SENSOR (e)

This message informs you if one of the sensors is not functioning correctly

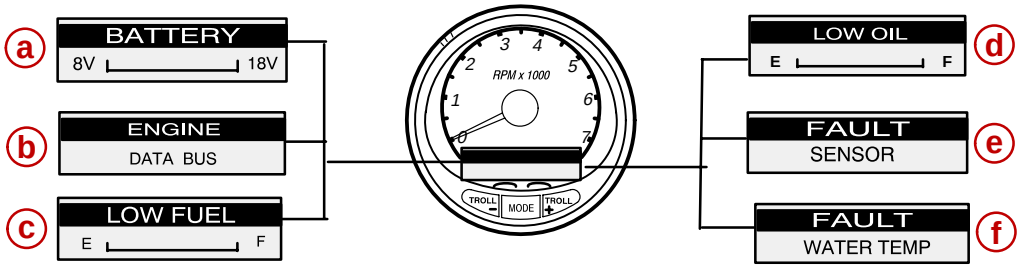
If the throttle sensor has failed, the warning horn will sound a continuous beeping and the engine will not reach its full power.

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 to 75 percent.

FAULT-WATER TEMP (f)

This message informs you that the sensor for measuring outside lake/sea water temperature is not functioning correctly.



WARNING NO STARBOARD ENGINE (a)

Informs you that the Instrument does not see the starboard engine computer. Usually indicates that no data is being transferred from the engine's computer to the gauge. (Check wiring, also make sure both terminator resistors are installed in the bus). Make sure both ECM's are not configured for port location using a DDT or Quicksilver Diagnostic Tool.

WARNING MULTIPLE STARBOARD ENGINE (b)

Informs you that the instruments are recognizing multiple engines as starboard.

In multiple engine applications, each engine must first be assigned a position (starboard, port, starboard2 or port2) with a Quicksilver Diagnostic Tool before the system will function properly.

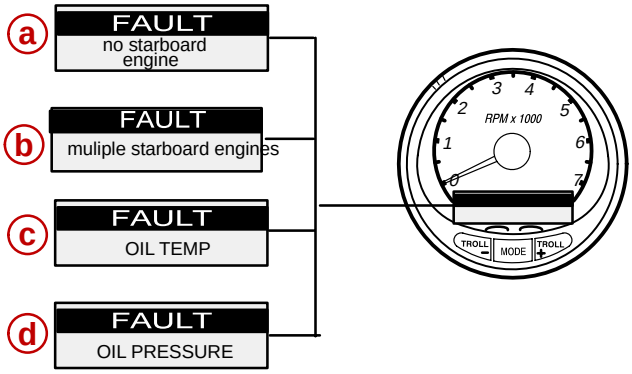
If you have a dual engine application, you must first program the port engine with a Quicksilver Diagnostic Tool.

OIL TEMPERATURE (c)

This overheat alarm message appears and the warning horn begins sounding continuously. The Engine Guardian System will start limiting engine power.

OIL PRESSURE (d)

This alarm message is displayed and the warning horn begins sounding continuously to inform the driver that there is insufficient oil pressure.



Auto-Detection Engine Function

AUTO–DETECTION ENGINE FUNCTION – System tach and speed come standard with the **"Engine Auto–detection Screen"** this screen lets the gauge on its initial power up automatically detect which engine type you are using and preconfigure the gauge to match that vessel type.

Master Reset Command

MASTER RESET – By pressing TROLL – and TROLL + simultaneously for approximately 10 seconds (Until the graphic bars "collide"). You will be able to restore the unit back to factory presets.

WARNING: After a master reset all previously saved data will be lost (example: calibrations, clock settings, and trip logs).

Tachometer Calibration

Quick Cal – This calibration for setting lighting and contrast.

1. Press in the MODE and TROLL + buttons for up to 2 seconds to get to Quick Cal screen.
2. Press MODE to advance through the lighting and contrast sections.

Cal1 – This calibration level lets you turn on and off the system screens. You may configure the system to display as little or as much information as you prefer.

1. Press in the MODE and TROLL + buttons and hold for approximately 7 seconds until you see the calibration1 (*Cal1*) screen.
2. Press MODE to advance through the calibration selections.

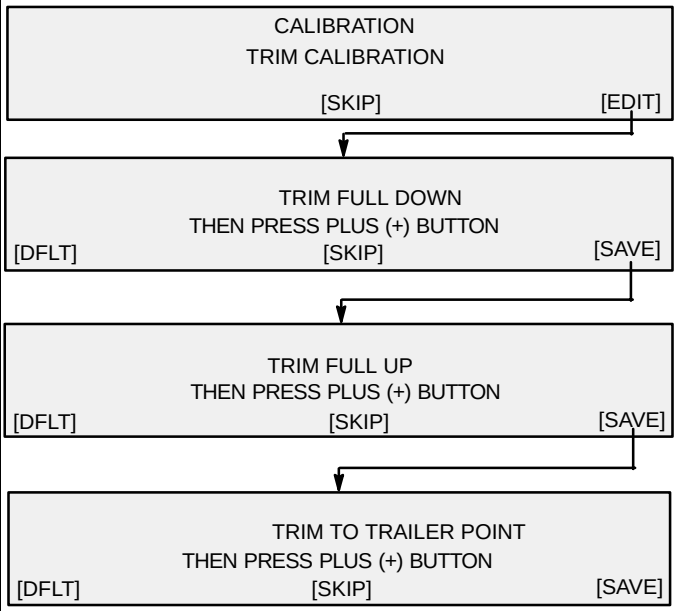
Cal2 – This calibration level lets you configure the system sensor inputs.

1. Press in the MODE and TROLL + buttons and hold for approximately 10 seconds for calibration2 (*Cal2*) screen.
2. Press MODE to advance through the calibration selections.

TACH CALIBRATION – CAL 1 LEVEL

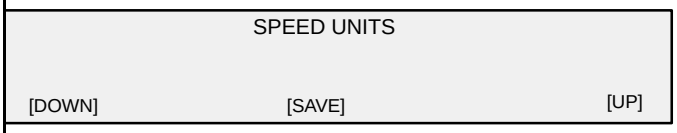
1. Press in the MODE and TROLL + buttons and hold for approximately 7 seconds until you see the calibration1 (*Cal1*) screen.
2. Press MODE to advance through the calibration selections.

REMOTE SCREENS? [NO] [SAVE] [YES]	If yes is selected, then screen changes made on this SC1000 tach will effect any other SC1000 tach in the system. ***NOTE:*** *all tach will need to have this screen turned to "Yes" for this function to work.*
REMOTE LCD LIGHT? [NO] [SAVE] [YES]	If yes is selected, then lighting levels made on this SC1000 tach will effect any other SC1000 tach in the system. ***NOTE:*** *all tach will need to have this screen turned to "Yes" for this function to work.*
REMOTE LCD CONTRAST? [NO] [SAVE] [YES]	If yes is selected, then contrast levels made on this SC1000 tach will effect any other SC1000 tach in the system. ***NOTE:*** *all tach will need to have this screen turned to "Yes" for this function to work.*
TRIM POPUP? [NO] [SAVE] [YES]	Do you want power trim display screen to pop up momentarily when you trim the engine?

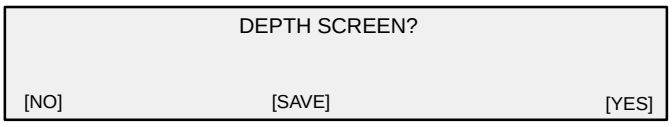


Choosing edit allows you to calibrate the gauge to the standard 0–10 unit trim and 11–25 trailer position scale.

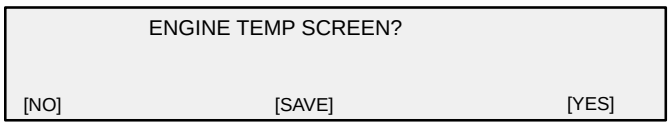
Lets you change units of measure between English (standard) or Metric.



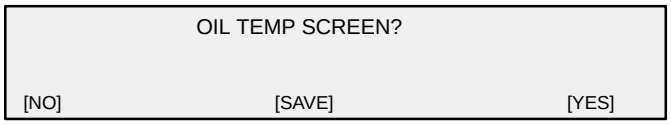
Lets you select speed units. You can choose from MPH (Miles Per Hour), KN (Nautical Miles Per Hour) or KMH (Kilometers Per Hour).



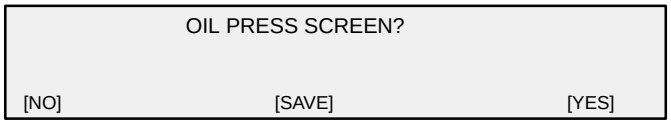
Do you want to turn on the depth screen? (Remember: You must have a Smart Craft depth transducer connected to the system for this screen to operate)



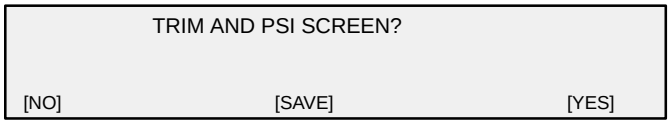
Do you want to turn on the engine temp screen?



Do you want to turn on the oil temp screen?



Do you want to turn on the oil pressure screen?



Do you want to turn on the trim and water pressure split screen?

WATER PSI SCREEN? [NO] [SAVE] [YES]	Do you want to turn on the water pressure screen?
TRIM AND RPM SCREEN? [NO] [SAVE] [YES]	Do you want to turn on the trim and RPM split screen?
RPM SCREEN? [NO] [SAVE] [YES]	Do you want to turn on the digital RPM screen?
SIMULATOR MODE? [NO] [SAVE] [YES]	Do you want to turn on a simulation mode? (used for demonstration purposes).
EXIT? [NO] [SAVE] [CAL2]	Do you want to exit calibration? Or jump straight into calibration level 2?
EXTERNAL SENSORS [SKIP] [EDIT]	This section lets you enable or disable the following external sensor inputs.
PITOT SENSOR? [NO] [SAVE] [YES]	Is the boat equipped with a pitot sensor to measure boat speed?
PADDLE SENSOR? [NO] [SAVE] [YES]	Is the boat equipped with a paddle wheel to measure boat speed?
TRIM SENSOR? [NO] [SAVE] [YES]	Is the boat equipped with a trim sensor?
SEA TEMP? [NO] [SAVE] [YES]	Is the boat equipped with a water temperature sensor?
INVERT STEERING [NO] [SAVE] [YES]	Is steering angle showing up on the link gauge opposite the direction that it should be? If it is then this feature will reverse the signal so it is displayed properly.

TACH CALIBRATION – CAL 2 LEVEL

SPEED OPTION [SKIP] [EDIT]	This section lets you configure the following speed sensors.
PITOT SENSOR? [NO] [SAVE] [YES]	Select pitot transducer type. You can choose 100 or 200 PSI. (100 PSI is the most common)
PITOT SENSOR MULTIPLIER [DOWN] [SAVE] [UP]	Adjust the pitot pressure sensor for correcting display readings that are to high/low.
PADDLE SENSOR PULSE FACTOR [DOWN] [SAVE] [UP]	Adjust paddle wheel frequency for display readings that are to high/low.
PADDLE TO PITOT TRANSITION [DOWN] [SAVE] [UP]	Set the speed at which the gauge stops looking at the paddle wheel and starts using pitot to measure boat speed.

There are three methods for calibrating System Tach fuel tank level monitoring feature:

First: Do nothing. Linear readout based on raw sensor values. This mode does not factor in irregular tank shapes.

Second: By following the tank calibration procedure described on pages 33–35, but without actually adding fuel. Calibrate fuel tank by pressing the **"dEFLt"** button. System Tach will supply an estimated range value based on linear interpolation of the sensor range values. This mode does not factor in irregular tank shapes.

Third: By following the tank calibration procedure described on pages 33–35 completely System Tach will display an estimated range value that factors in the tank shape.

FUEL TANK CAPACITY [DOWN] [SAVE] [UP]	Lets you enter the capacity of your boats fuel tank. This option is the same for tank 1 as it is for tank 2.
CALIBRATION FUEL TANK [SKIP] [EDIT]	Lets you enter the mode where you can calibrate your fuel tank. Fuel tank calibration procedure is the same for tank 1 as it is for tank 2.
FILL TO 1/4 THEN PRESS PLUS BUTTON [DFLT] [SKIP] [SAVE]	You can choose to have tank at 1/4 and hit SAVE, or hit DFLT and a default value will be entered based on the capacity of the tank.

FILL TO 1/2 THEN PRESS PLUS BUTTON [DFLT] [SKIP] [SAVE]	You can choose to have tank at 1/2 and hit SAVE, or hit DFLT and a default value will be entered based on the capacity of the tank.
FILL TO 3/4 THEN PRESS PLUS BUTTON [DFLT] [SKIP] [SAVE]	You can choose to have tank at 3/4 and hit SAVE, or hit DFLT and a default value will be entered based on the capacity of the tank.
FILL TO FULL THEN PRESS PLUS BUTTON [DFLT] [SKIP] [SAVE]	You can choose to have tank at full and hit SAVE, or hit DFLT and a default value will be entered based on the capacity of the tank.
DEPTH SENSOR OFFSET [DOWN] [SAVE] [UP]	Lets you electronically configure a depth offset. Entering a negative number gives you a water line offset. A positive number gives you a keel offset.
DEPTH ALARM [DOWN] [SAVE] [UP]	Lets you enter a depth value. When the depth transducer reads that value or below, the shallow water alarm will sound.
EMPTY TANK THEN PRESS PLUS BUTTON [DFLT] [SKIP] [SAVE]	You can choose to have an empty tank and hit SAVE, or hit DFLT and a default value will be entered based on the capacity of the tank.

Speedometer Calibration

Quick Cal – This calibration for setting lighting and contrast.

1. Press in the MODE and TROLL + buttons for up to 2 seconds to get to Quick Cal screen.
2. Press MODE to advance through the lighting and contrast sections.

Cal1 – This calibration level lets you turn on and off the system screens. You may configure the system to display as little or as much information as you prefer.

1. Press in the MODE and TROLL + buttons and hold for approximately 7 seconds until you see the calibration1 (*Cal1*) screen.
2. Press MODE to advance through the calibration selections.

Cal2 – This calibration level lets you configure the system sensor inputs.

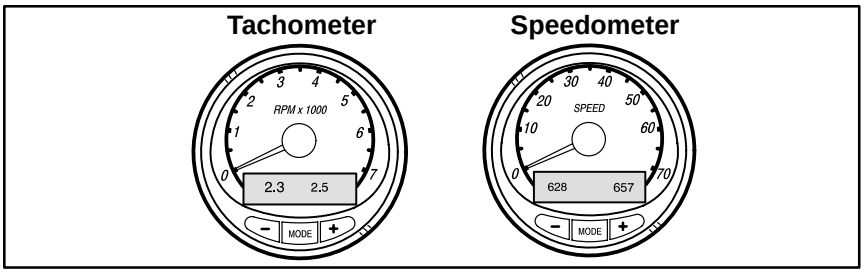
1. Press in the MODE and TROLL + buttons and hold for approximately 10 seconds for calibration2 (*Cal2*) screen.
2. Press MODE to advance through the calibration selections.

SPEEDOMETER CALIBRATION CAL 1 LEVEL

REMOTE LCD LIGHT? [NO] [SAVE] [YES]	Enables you to set the lighting levels on all the SC1000 simultaneously from this gauge.
REMOTE LCD CONTRAST? [NO] [SAVE] [YES]	Enables you to control the contrast from another System TACH/Speed simultaneously from this gauge.
TIME [NO] [SKIP] [EDIT]	Allows you to set the time.
TIME FORMAT [DOWN] [SAVE] [UP]	Choose between a 12 hour and 24 hour format.
USE GPS TIME? [DOWN] [SAVE] [UP]	If you have a GPS connected this feature enables the gauge to let the GPS update the gauges internal clock.
CALIBRATION HOUR 12:00 AM [DOWN] [SAVE] [UP]	Adjust the gauges internal clock to match your local time. First set the hours then press MODE button to set the minutes.
DISPLAY UNITS [DOWN] [SAVE] [UP]	Lets you change units of measurement between English (standard) or Metric.
SPEED UNITS [DOWN] [SAVE] [UP]	Lets you select the units at which speed is displayed. You can choose from MPH (Miles Per Hour), KTS (Knots), or KMH (Kilometers Per Hour).
TO WAY POINT SCREEN? [NO] [SAVE] [YES]	If you have a GPS connected you can turn on the screen that shows your distance and fuel to a way point.
SIMULATOR MODE? [NO] [SAVE] [YES]	Do you want to turn on a simulation mode? (Used for demonstration purposes).
EXIT? [NO] [YES] [CAL2]	Do you want to exit calibration? Or jump straight into calibration level 2?
EXTERNAL SENSORS [SKIP] [EDIT]	This lets you enable or disable external sensor inputs.

AIR TEMP? [NO] [SAVE] [YES]	Are you using a air temp. sensor?
GPS? [NO] [SAVE] [YES]	Do you have a GPS sensor installed?
USE GPS SPEED? [NO] [SAVE] [YES]	Use the GPS input to drive the speed display?
WATER TEMPERATURE ADJUST [DOWN] [SAVE] [UP]	Adjust water temp. transducer to match actual sea water temperature.

SmartCraft Gauge Operation



Basic Operation and Features

Power up: Each gauge will power up when the ignition is turned on. Gauges will stay on as long as the ignition is on.

Lights: The brightness and contrast are adjustable. Refer to Gauge Calibration following.

Buttons: The MODE button is used for selecting information screens. The + and – buttons are used for setting engine speed during troll control and setting gauge calibrations.

Troll Control: Allows the operator to set and control the idle speed of the engine for trolling without using the throttle.

Engine Guardian System: Monitors the critical sensors on the engine for any early indications of problems. The system will respond to a problem by reducing engine speed in order to maintain a safe operating condition.

Warning System – System will sound the warning horn and display warning message.

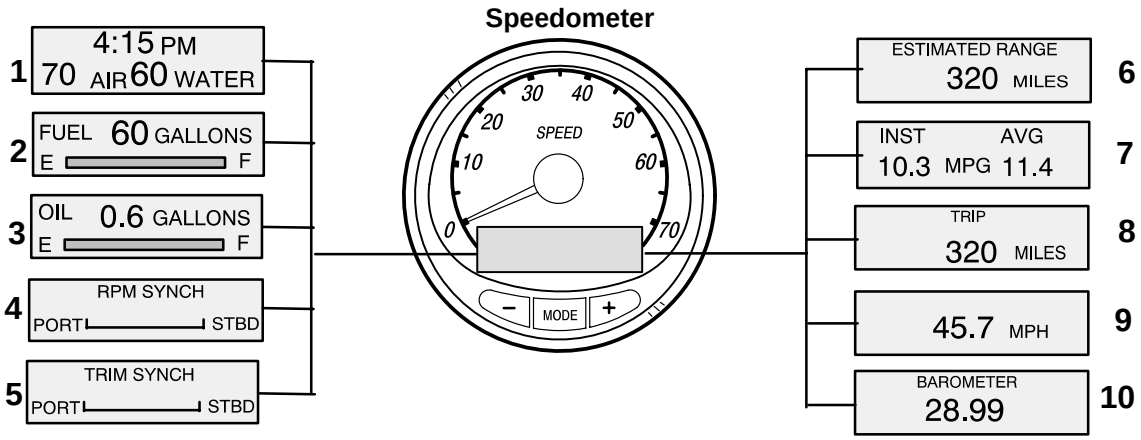
Gauge Calibrations

Digital Display Screen: Displays the following engine information.

Tachometer Display Screen:
Digital Tachometer
Hour Meter
Power Trim Angle
Fuel Flow
Engine Temperature
Battery Voltage
Water Pressure

Speedometer Display Screen:
Clock and Temperature
Fuel Tank Level(s)
Oil Tank Level(s)
Fuel Economy
Fuel Range
Trip Odometer
Digital Speedometer
Barometer Reading

Speedometer Display Screen



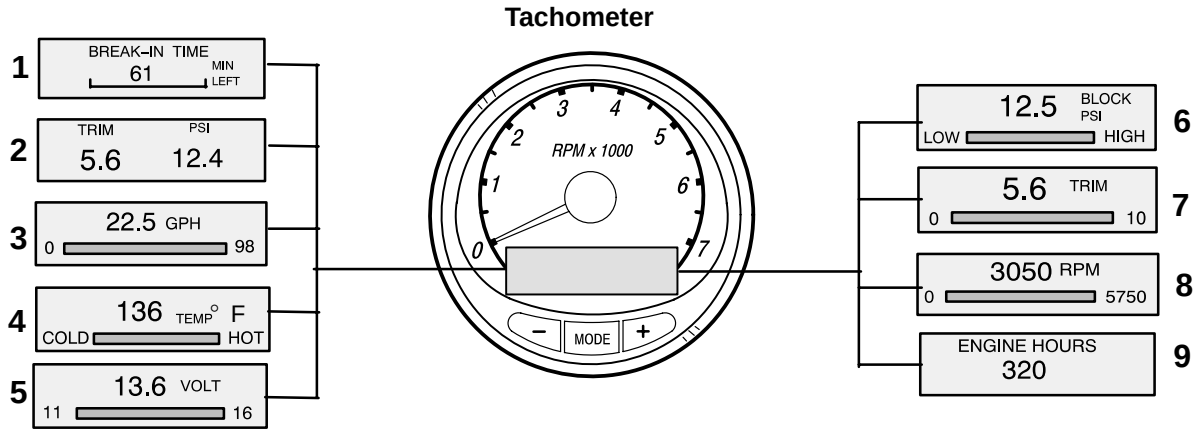
When the ignition is turned on, the speedometer will show the last screen that was displayed before the ignition was turned off.

NOTE: *Readings can be displayed in English or Metric. Refer to Calibration.*

Press MODE to change display screens. You can revert back to the previous screen by pressing and holding MODE for 2 seconds. This will reverse the display rotation.

1. **Clock - Temp** – Clock, air temperature and water temperature. The air and water temperature sensors will have to be connected to obtain display readings.
2. **Fuel Level –** Displays the amount of fuel remaining.
3. **Oil Level –** Displays the amount of engine oil remaining.
4. **RPM Synchronizer –** Dual Engines – Monitors the revolutions of both engines. Allows throttle adjustments to keep each running uniformly.
5. **Trim Synchronizer –** Dual Engines – Displays the trim position of both engines. Simplifies keeping trim levels equal.
6. **Traveling Range:** The estimated traveling range is based on current fuel consumption and fuel remaining in the tank .The numbers displayed indicates an estimate of the distance you can travel with the remaining fuel.
7. **Fuel Economy –** The display shows average **"AVG"** fuel consumption as well as instantaneous **"INST"** fuel economy. The numbers displayed indicate miles per gallon "**MPG"** or kilometer per liter **"KM/L"**. **Reset** – To reset, select the display screen and press MODE and TROLL – buttons.
8. **Trip Odometer:** Tells how far you've gone since you last set the gauge to zero. **Trip Reset** – To reset, select the display screen and press MODE and TROLL – buttons.
9. **Digital Speedometer:** Can display boat speed in miles per hours, Kilometers per hour, or knots. The digital speedometer will continue to increase even if needle is at maximum. The speedometer will use the paddle wheel for its low speed readings but will switch to the speedo or GPS (if connected) for high speed readings.
10. **Barometer:** Shows the barometer pressure reading only at the time the ignition was turned on.

Tachometer Display Screens



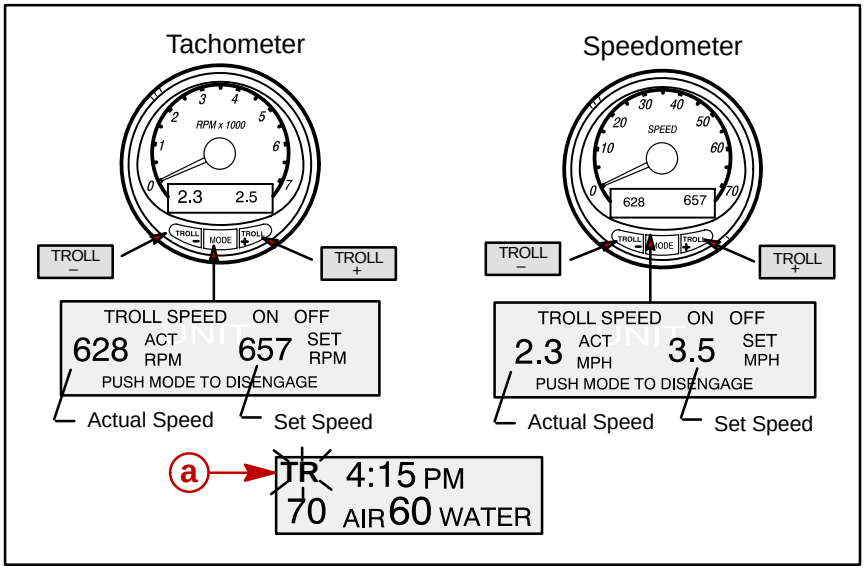
When the ignition is turned on, the tachometer will display the last screen that was displayed before the ignition was turned off.

Press MODE to change display screens. You can revert back to the previous screen by pressing and holding MODE for 2 seconds. This will reverse the display rotation.

NOTE: *Readings can be displayed in English or Metric. Refer to Calibration.*

1. **Engine Break in –** Displays time remaining on the break-in period of a new engine. This screen will automatically disappear after the break-in period is complete.
2. **Power Trim Angle - Water Pressure –** Displays trim angle of the outboard and cooling system water pressure.
3. **Fuel Flow –** Displays engine fuel use.
4. **Temperature –** Displays engine coolant temperature from Cold to Hot
5. **Battery Voltage –** Displays voltage level (condition) of battery
6. **Water Pressure:** Displays cooling system water pressure at the engine.
7. **Power Trim Angle:** Displays trim angle of the outboard up to the maximum trim angle, and than displays the trailer angle. 0 = DOWN; 10 = FULL TRIM; and 25 = FULL TRAILER.
8. **Digital Tachometer:** Displays engine speed in Revolutions Per Minute (RPM)
9. **Hour Meter:** Records the running time of the engine

Troll Control



BASIC OPERATION

With Troll control you can maintain a trolling speed of 450 to1000 rpm without using the throttle.

You can set the trolling control by using either the tachometer or speedometer. Tachometer will set the speed in RPM and speedometer will set the speed in MPH.

You can shut off troll control anytime by pushing the MODE button when in the troll display screen or moving the throttle.

If you have troll control set at a desired speed and then you shut off the troll control, the system remembers the set speed and will return to that speed when re-engaged.

The display screen will revert back to the previous screen after 10 seconds of no activity. Push the TROLL + or TROLL – button to reactivate the display screen.

When the troll control is engaged and you are out of the troll control screen, a flashing signal “TR” (a) will appear in the upper left corner of the display to tell you troll control is still running.

TO SET TROLL CONTROL

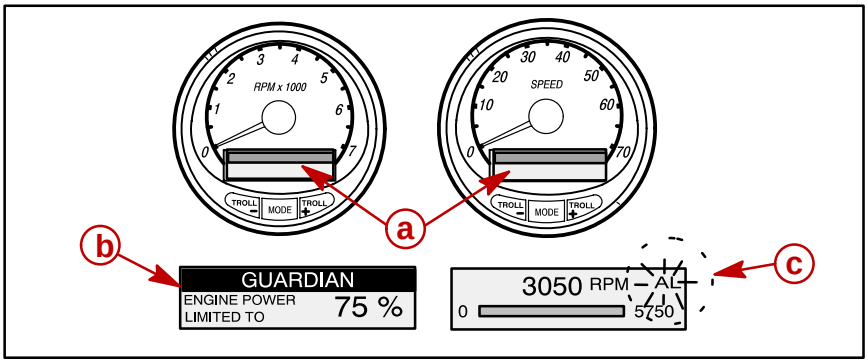
1. With the engine running, shift outboard into gear. Set engine speed at idle.
2. Push in the TROLL + or TROLL – button to bring up the troll control display screen.
3. Press MODE to engage (turn on) the troll control.
4. Use the TROLL + TROLL – buttons to set the desired speed. Use **(+)** to increase speed and **(–)** to decrease speed.
5. If you set troll control to a higher speed than the troll rpm can bring the boat to, the **TARGET SPEED TOO FAST** message will appear. Reduce troll speed.
6. If you set troll control to a slower speed than the troll rpm can bring the boat to, the **TARGET SPEED TOO SLOW** message will appear. Increase troll speed.

EXITING TROLL CONTROL

There are three ways to turn off the troll control:

- Press the MODE button when in the troll display screen.
- Move the throttle to a different speed.
- Shift outboard into neutral.

Warning System



The SmartCraft warning system incorporates the display screens (a) the warning horn and the Guardian Protection system. The warning horn is located inside the remote control or is part of the ignition key switch wiring harness.

- **Alarms Warnings –** When a problem is detected, the warning horn sounds and the name of the offending alarm appears on the display.
  If problem can cause immediate engine damage – the horn will sound continuously and the Engine Guardian System (b) will respond to the problem by limiting engine power. Immediately reduce throttle speed to idle and refer to the warning messages on the following pages that will tells you what to do about it.
  If problem will not cause immediate engine damage – The horn will sound but not continuous.
  The alarm message will stay displayed until the mode button is pressed. If there are multiple alarms, these will cycle on the display at five second intervals.
  If the mode button is pressed to a different screen, the flashing alarm signal “AL” (c) will appear in the upper right corner to indicate there still a problem.
- **Engine Guardian System –** Monitors the critical sensors on the engine for any early indications of problems. The system will respond to a problem by reducing engine power in order to maintain a safe operating condition. The display screen will show the percent of power loss.

Alarm Messages

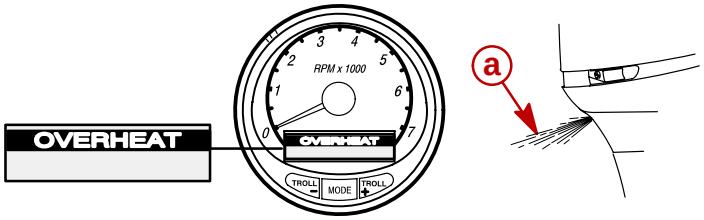
These messages will appear and the horn will sound if there is a problem detected in one of the outboard systems.

NOTE: *The warning system will alert the operator to the potential problems listed in the chart. Refer to explanations following.*

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

OVERHEAT



a - Water Pump Indicator Hole

The overheat alarm message appears and the warning horn begins sounding continuously. The Engine Guardian System will start limiting engine power.

If the engine overheats, immediately reduce throttle speed to idle. Shift outboard into neutral and check for a steady stream of water coming out of the water pump indicator hole.

NOTE: *The throttle will have to be returned to idle to reset the system.*

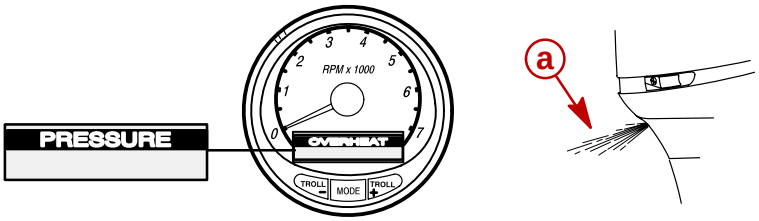
If no water is coming out of the water pump indicator hole or flow is intermittent, stop engine and check cooling water intake holes for obstruction. If no obstruction is found, this may indicate a blockage in the cooling system or a water pump problem. Operating the engine while overheated will cause engine damage.

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. Stop engine. Operating the engine while overheated will cause engine damage.

NOTE: *If you are in a stranded situation, stopping the engine and allowing it to cool back down will usually allow some additional low speed (idle) running time before the engine starts to overheat again.*

The overheat problem must be corrected before you can resume normal operation.

PRESSURE



a - Water Pump Indicator Hole

This alarm message is displayed and the warning horn begins sounding continuously to inform the driver that there is insufficient water pressure in the cooling system. The Engine Guardian System will start limiting engine power.

Some causes of insufficient cooling water pressure are (1) obstructed cooling water intake holes (2) blockage in the cooling system or a water pump problem (3) running the outboard with the cooling water intake holes out of the water.

NOTE: *The throttle will have to be returned to idle to reset the system.*

If the warning system is activated, immediately reduce throttle speed to idle. Shift outboard into neutral and check for a steady stream of water coming out of the water pump indicator hole.

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. Stop engine. Operating the engine without adequate cooling water pressure will overheat the engine.

If the warning signals stop and a steady stream of water is coming out of the water pump indicator hole, return engine to normal operation.

OVERSPEED (a)

This message is displayed and the warning horn begins sounding continuously to inform the driver that the engine speed has exceeded the maximum allowable RPM. The system will automatically reduce the engine speed to within the allowable limit.

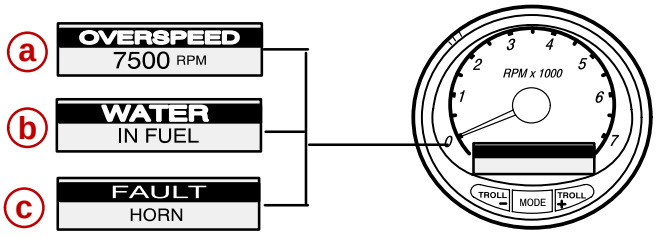
NOTE: *Your engine speed should never reach the maximum limit to activate the system unless the propeller is ventilating, an incorrect propeller is being used, or the propeller is faulty.*

WATER IN FUEL (b)

This message will appear and the warning horn will begin sounding a series of four beeps every two minutes when water in the water separating fuel filter reaches the full level. The water can be removed from the filter.

FAULT-HORN (c)

This message informs you that warning horn is not functioning correctly.



RESERVE OIL LOW (a)

This message will appear and the warning horn will begin 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.

The engine mounted oil reservoir tank along with the remote oil tank will have to be refilled.

FAULT-OIL PUMP (b)

This message is displayed and the warning horn begins sounding continuously to inform the driver that the oil pump has stopped functioning electrically. No lubricating oil is being supplied to the engine. Stop the engine as soon as possible. The Engine Guardian system will start limiting the engine power.

NOTE: *The throttle will have to be returned to idle to reset the system.*

FAULT-INJECTOR (c)

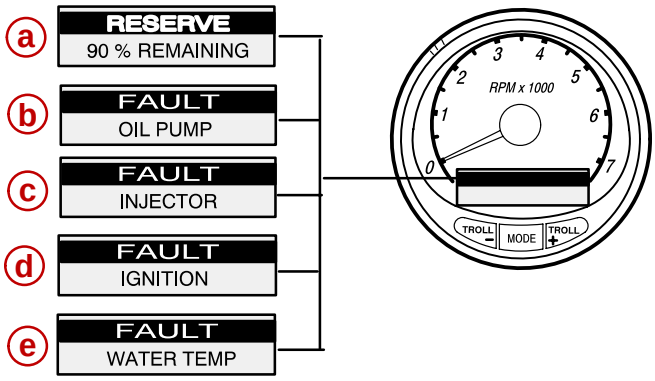
This alarm informs you if one or more of the fuel injectors have stopped functioning electrically.

FAULT-IGNITION (d)

This alarm informs you that a problem has developed in the ignition system.

FAULT-WATER TEMP (e)

This message informs you that the sensor (located in the paddle wheel) for measuring outside lake/sea water temperature is not functioning. Two possible things to check for are 1, Check the wiring going to the paddle wheel. 2, If the paddle wheel is not being used or If only one paddle wheel is used for duel engine setup, edit the corresponding tachometer calibration to delete the water temp sensor.



BATTERY (a)

The warning message is designed to come on and the Engine Guardian System will start limiting engine power when the electrical system is not charging or the battery charge is low. If the message appears immediately after starting, it is possible that the engine alternator can recharge the battery after operating awhile. If this 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 to avoid being stranded with a dead battery. To help the alternator recharge the battery quickly, you can reduce the load on the electrical system by turning off any unneeded accessories.

NOTE: *The throttle will have to be returned to idle to reset the system.*

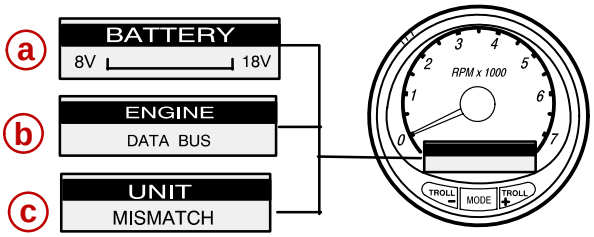
ENGINE DATA BUS (b)

This message tells you the data communication link between the tachometer and engine is not connected. Check for disconnected wires. Be sure the gray and brown/white wires are connected to the diagnostic port plug on the engine. See SmartCraft Gauge Wiring.

UNIT MISMATCH (c)

(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. Re-calibrate the tachometers.

NOTE: *When calibrating multi tachometers, have all the tachometers powered up at the same time while calibrating.*



LOW FUEL LEVEL (d)

This message tells you that the fuel level in the fuel tank is critically low. Stop for fuel immediately to avoid running out. The engine must be shut off to reset the warning system.

LOW OIL LEVEL (e)

This message tells you that the oil level in the remote oil tank is low. Stop and refill the oil tank immediately to avoid running out. The engine must be shut off to reset the warning system.

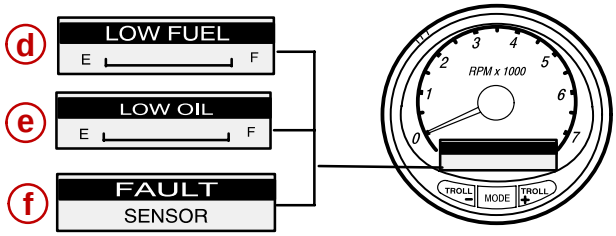
FAULT-SENSOR (f)

This message informs you if one of the sensors is not functioning correctly.

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.



Tachometer Calibration

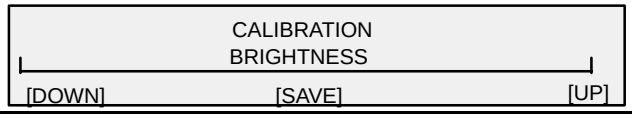
NOTE: *When calibrating multi tachometers (multi engines) turn ignition on for all the tachometers.*

Simple Calibration – This calibration for setting lighting and a few other common screens can be made while engine is running.

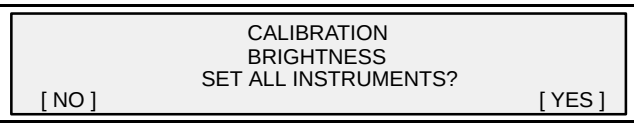
1. Press in the MODE and TROLL + buttons for calibration screen.
2. Press MODE to advance through the calibration selections.

Advanced Calibration – This calibration goes through the entire mode selections.

1. Turn ignition key to the off position.
2. Hold TROLL + TROLL – and turn ignition on.
3. Press and hold MODE for 2 seconds to bring up the calibration screen.
4. Press MODE to advance through the calibration selections.

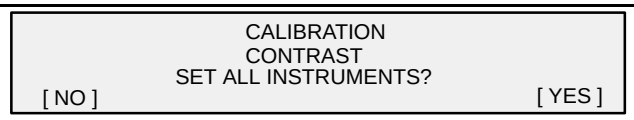


Press – or + to adjust level. **Press MODE** to save setting

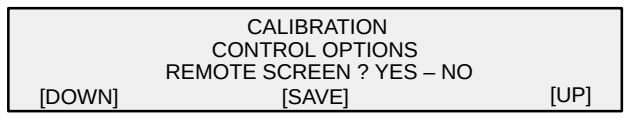


Do you want the same brightness level for all SmartCraft gauges? **Press +** for yes. **Press MODE** for no.

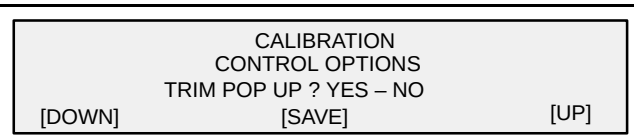
Press – or + to adjust level. **Press MODE** to save setting



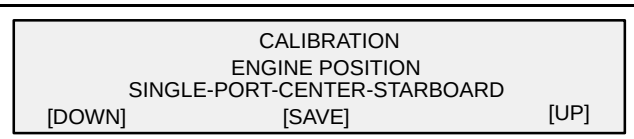
Do you want the same contrast level for all SmartCraft gauges? **Press +** for yes. **Press MODE** for no.



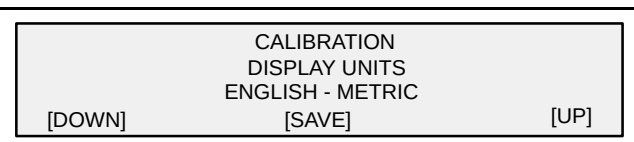
Multi Engine – Do you want tachometer display screens to advance together? **Press + or –** to select. **Press MODE** to save.



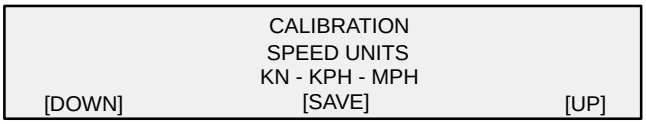
Do you want power trim angle display screen to pop up whenever you trim the outboard ? **Press + or –** to select. **Press MODE** to save.



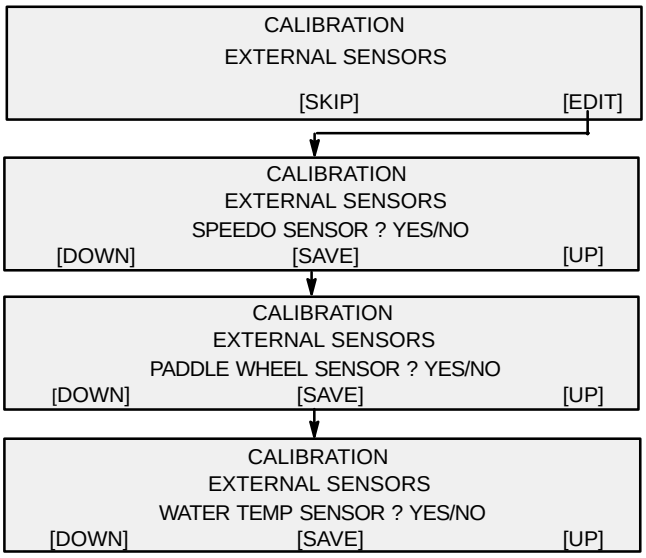
Match tachometer to the correct engine. **Press +** to select engine. **Press MODE** to save.



Select display readings in English or Metric. **Press + or –** to select **Press MODE** to save.



Display boat speed in KN (knots), KPH (kilometers per hour), MPH (miles per hour). **Press + or –** to select setting. **Press MODE** to save.



Press MODE to skip to the next display. **Press +** (edit) if your adding or deleting any external sensor to the SmartCraft System.

Editing External Sensors

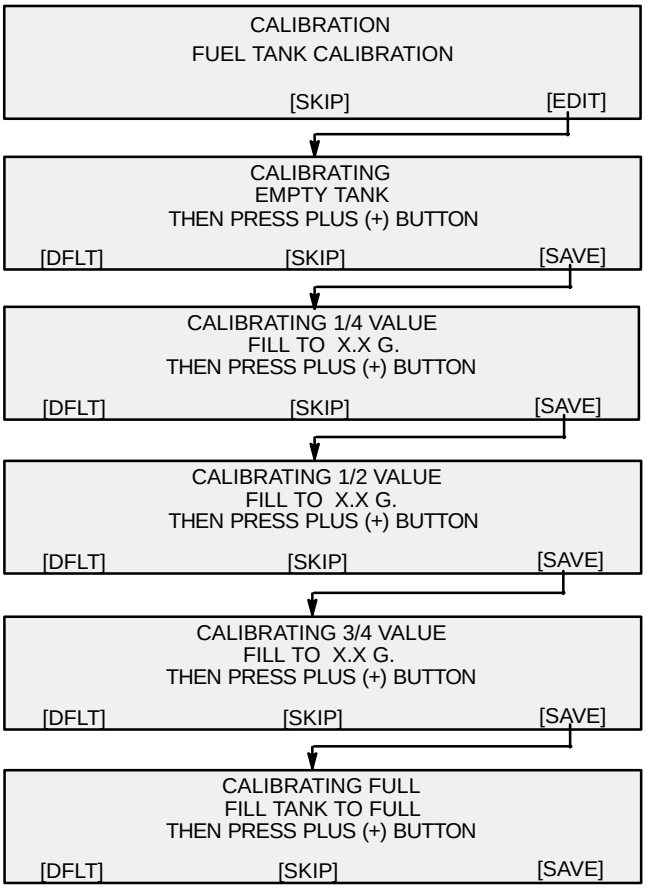
Add Yes or No for each sensor

No = not used Yes = in use

Press + or – for correct setting

Press MODE to save and advance to next sensor

Add the capacity of the fuel tank. **Press + or –** to select. **Press MODE** to save.



This calibration sets the fuel level of the tank.

NOTE: If the fuel tank is not calibrated, fuel range cannot be displayed

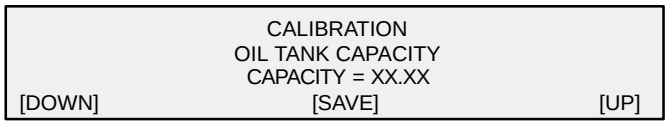
Press MODE to skip to the next display. **Press +** (edit) to calibrate the fuel tank.

Pressing DFLT (default) during edit will return to original value setting

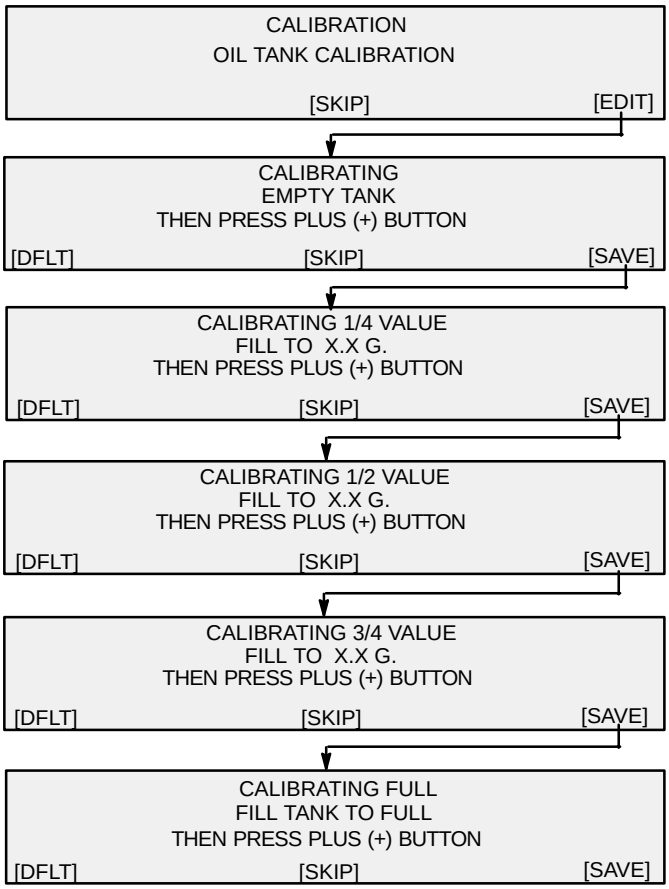
Calibrate the fuel tank as follows:

1. Empty the fuel tank, **Press +** to save
2. Fill tank to 1/4 full, **Press +** to save.
3. Fill tank to 1/2 full, **Press +** to save
4. Fill tank to 3/4 full, **Press +** to save.
5. Fill tank to full, **Press +** to save.

The fuel tank is now calibrated



Add the capacity of the oil tank. **Press + or –** to select. **Press MODE** to save.



This calibration accurately adjusts the oil level sending unit in the oil tank.

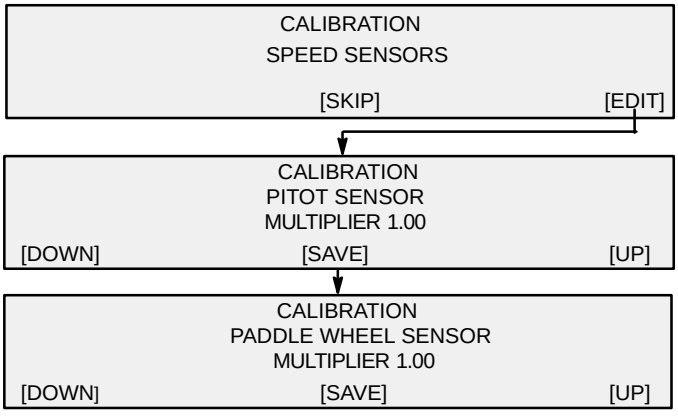
Press MODE to skip to the next display. **Press +** (edit) to calibrate the oil tank.

Pressing DFLT (default) during edit will return to original value setting

Calibrate the oil tank as follows:

1. Empty the oil tank, **Press +** to save
2. Fill tank to 1/4 full, **Press +** to save.
3. Fill tank to 1/2 full, **Press +** to save
4. Fill tank to 3/4 full, **Press +** to save.
5. Fill tank to full, **Press +** to save.

The oil tank is now calibrated

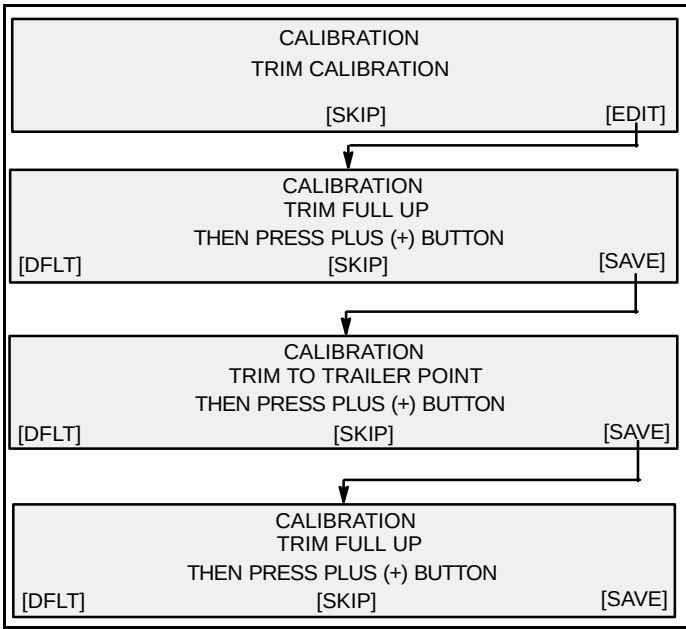


If the speedometer is not reading correctly, the speed sensors can be re-calibrated to correct the setting.

Press MODE to skip to the next display. **Press +** (edit) to calibrate the sensors.

Increasing or decreasing the multiplier will increase or decrease the speed reading

Press – or + for changing setting. **Press MODE** to save.



If the trim setting is not reading correctly, the trim sensor can be re-calibrated to correct the setting.

Pressing DFLT (default) during edit will return to original value setting

Press MODE to skip to the next display. **Press +** (edit) to calibrate the sensor.

1. Trim outboard full up, than **Press +** to save.
2. Trim outboard to the point where the trim cylinders takes over, than **Press +** to save.
3. Trim outboard full down, than **Press +** to save.

Do you want to exit the calibration mode? **Press +** for yes. **Press MODE** for no.

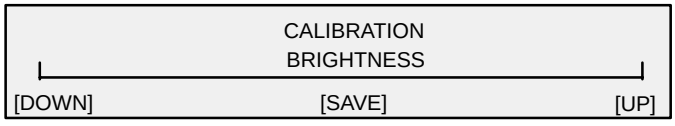
Speedometer Calibration

Simple Calibration – This calibration for setting lighting and setting the clock can be made while engine is running.

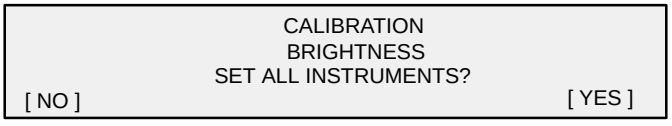
1. Press in the MODE and TROLL + buttons for calibration screen.
2. Press MODE to advance through the calibration selections.

Advanced Calibration – This calibration goes through the entire mode selections.

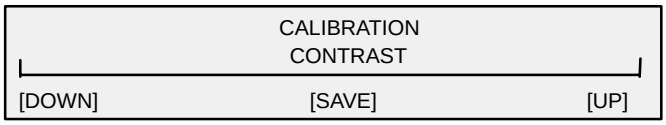
1. Turn ignition key to the off position.
2. Hold TROLL + TROLL – and turn ignition key to the on position.
3. Press and hold MODE for 2 seconds to bring up the calibration screen.
4. Press MODE to advance through the calibration selections.



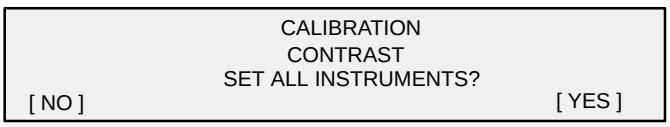
Press – or + to adjust level. **Press MODE** to save setting



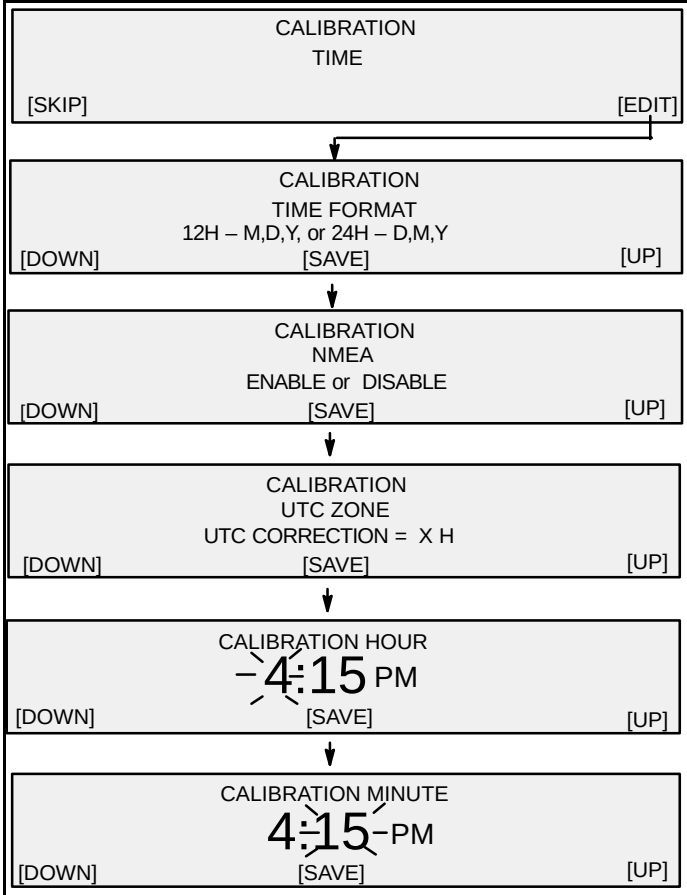
Do you want the same brightness level for all SmartCraft gauges? **Press +** for yes. **Press MODE** for no.



Press – or + to adjust level. **Press MODE** to save setting



Do you want the same contrast level for all SmartCraft gauges? **Press +** for yes. **Press MODE** for no.



If the clock display is correct , press **MODE** to skip.
To set or reset the clock **Press +**

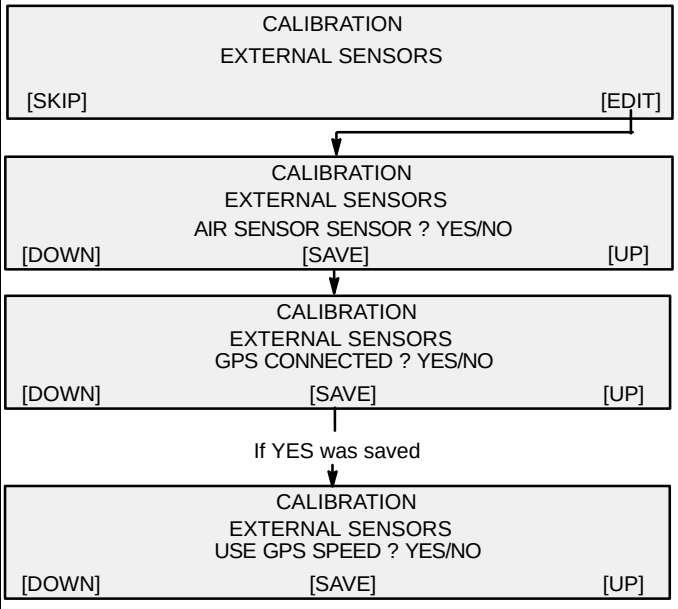
Select 12 hour or 24 hour clock set.
Press – or + to select. Press **MODE** to save.

Press – or + to enable or disable GPS time calibration. If a GPS navigation receiver is connected to the gauges, NMEA data will set the time automatically. **Press MODE** to save.

Press – or + to add UTC correction. **MODE** to save. (Hour offset from universal time constant)

Press **–** or **+** to set the hour
Press **MODE** to save.

Press **–** or **+** to set the minute
Press **MODE** to save.



Press MODE to skip to the next display. **Press +** (edit) if your adding or deleting any external sensor to the SmartCraft System.
Editing External Sensors
Chose Yes or No for each sensor
No = not used Yes = in use
Press + or – for correct setting
Press MODE to save and advance to next sensor

Chose Yes or No if you want the speedometer to read GPS speed

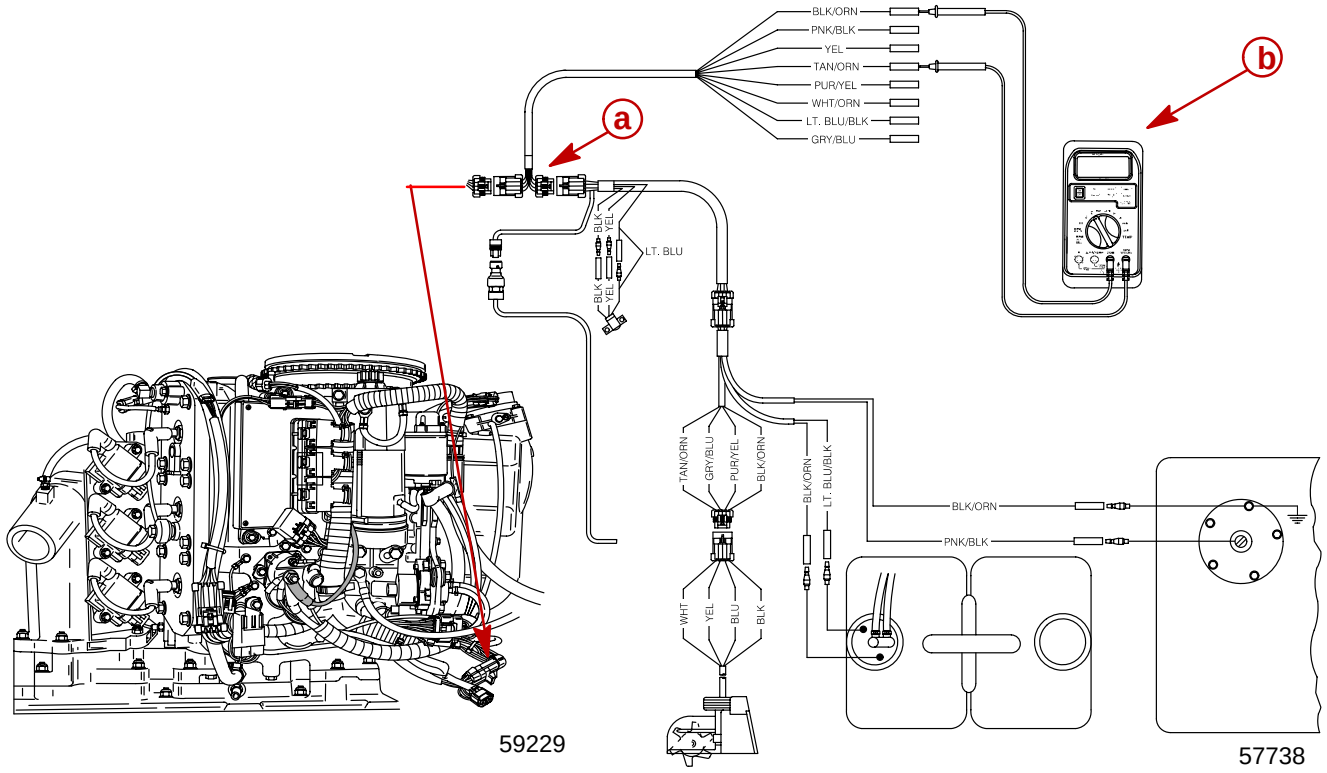
Do you want to exit the calibration mode? **Press +** for yes.
Press MODE for no.

SmartCraft Gauge Test Specifications

Test Equipment Required:

1. Test Harness 84-875233A2 (a).
2. DMT 2000 Digital Tachometer Multimeter 91-854009A1 (b).

NOTE: *Connect negative DMT lead to BLACK/ORANGE lead on test harness 84-875233A2 for all tests. Use positive DMT lead on all other test harness leads to determine if individual sensors are within specifications.*



SENSOR	RED TEST LEAD	BLACK TEST LEAD	RANGE
Trim	Yellow	Black/Orange	2.7 vdc UP – 0.6 vdc DOWN
Fuel Sender	Pink/Black	Black/Orange	0.65 vdc FULL – 2.92 vdc EMPTY
Lake Temperature	Tan/Orange	Black/Orange	2.5 vdc @ room temp. (Voltage decreases as temperature increases)
+5 vdc Sensor Power	Purple/Yellow	Black/Orange	4.9 vdc – 5.1 vdc
Pitot Pressure	White/Orange	Black/Orange	0.5 vdc static (voltage increases with pressure)
Oil Sender	Light Blue/Black	Black/Orange	0.63 vdc FULL – 2.89 vdc EMPTY
Paddle Wheel Frequency	Gray/Blue	Black/Orange	Set meter to Hz and spin paddle wheel or set meter to AC volts and spin paddle wheel. Hz or AC volts should increase as wheel spins faster.

Notes:

240 EFI Sport Jet Wiring Diagram

1 - Fuel Lift Pump
2 - 3 Amp Fuse
3 - Low Oil Switch
4 - Crank Position Sensor
5 - Oil Pump
6 - VST Electric Fuel Pump
7 - Main Power Relay
8 - 20 Amp Fuse – Fuel Injector Harness, Electric Fuel Pump, and Oil Pump
9 - 20 Amp Fuse – Ignition Coils
10 - 20 Amp Fuse – Main Power Relay, Remote Control Harness
11 - 15 Amp Fuse – Smart Craft Data Bus Circuit
12 - Accessory Power
13 - Remote Control
14 - Boat Harness
15 - Water in Fuel Sensor
16 - DDT Terminal
17 - SmartCraft Data Bus
18 - Slave Solenoid
19 - 60 Amp Alternator
20 - 100 Amp Fuseable Link
21 - Solenoid Driven Bendix Starter
22 - Starter Solenoid
23 - Port Knock Sensor
24 - Starboard Knock Sensor
25 - Port Head Temperature Sensor
26 - Air Temperature Sensor
27 - Starboard Temperature Sensor
28 - Throttle Position Sensor
29 - Block Water Pressure
30 - MAP Sensor
31 - Electronic Control Module
32 - Ignition Coil #6
33 - Ignition Coil #5
34 - Ignition Coil #4
35 - Ignition Coil #3
36 - Ignition Coil #2
37 - Ignition Coil #1
38 - Fuel Injector #1
39 - Fuel Injector #2
40 - Fuel Injector #3
41 - Fuel Injector #4
42 - Fuel Injector #5
43 - Fuel Injector #6