

# MULTIFUNCTION GAUGE

## SERVICE TOOLS

| Description                | Part Number       | Page    |
|----------------------------|-------------------|---------|
| FLUKE 115 MULTIMETER ..... | 529 035 868 ..... | 280–281 |

## SERVICE PRODUCTS

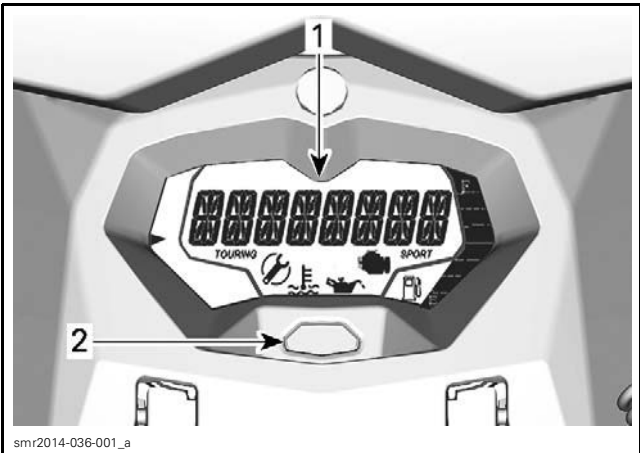
| Description             | Part Number       | Page     |
|-------------------------|-------------------|----------|
| DIELECTRIC GREASE ..... | 293 550 004 ..... | 277, 284 |

GENERAL

MULTIFUNCTION GAUGE

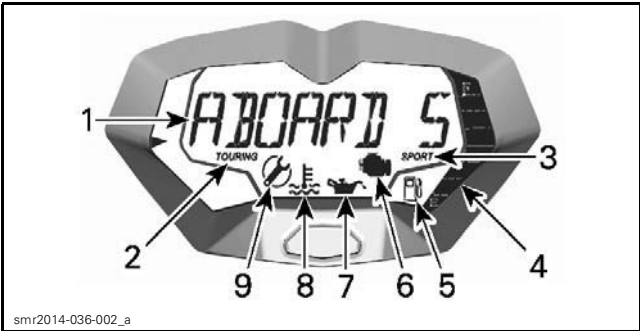
 **WARNING**

Do not adjust the display while riding, you could lose control.



1. Multifunction gauge  
2. Mode button

Multifunction Gauge Description



1) Multifunction Display

- The multifunction display is used to:
- Display the WELCOME message on power up.
  - Activating and setting modes of operation.
  - Display scrolling messages of function activation or system faults.
  - Display the accumulated engine hours.
  - Provide various indications as selected by the operator.

**NOTE:** If a fault occurs, the multifunction display will periodically scroll the applicable fault message and revert to the RPM indication, depending on the severity of the fault detected.

2) Touring Mode Indicator

When the TOURING mode indicator is ON, the default TOURING mode is active.

Refer to *INTELLIGENT THROTTLE CONTROL (ITC)* subsection for details.

**NOTE:** Touring mode is only applicable to the ACE 900 HO models.

3) Sport Mode Indicator

The SPORT mode indicator is normally off.

When sport mode of operation is selected, the SPORT mode indicator will come on and stay on until sport mode is deactivated, or the watercraft is shut down.

**NOTE:** Sport mode is only available on the ACE 900 HO models. It is not the default riding mode. To be active, it must be selected on after starting the engine.

Refer to *INTELLIGENT THROTTLE CONTROL (ITC)* subsection for detailed instructions.

4) Fuel Level Indication

A bar gauge located in the RH side of the multifunction display continuously indicates the amount of fuel in the fuel tank while riding.

When the fuel tank is full, 8 segments (bars) of the indicator are turned on.

When there is only 2 segments of fuel indicated (approximately 12 L (3.2 U.S. gal.)), the following indications will come ON to advise you that a low fuel condition exists.

| LOW FUEL LEVEL INDICATIONS         |                                |
|------------------------------------|--------------------------------|
| Last 2 fuel gauge segments         | Flashing                       |
| Fuel tank symbol                   |                                |
| Audible advisory (a 2 second beep) | Periodically (every 5 minutes) |

5) Low Fuel Level Indicator

When the low fuel indicator starts flashing, it indicates that there is approximately 12 L (3.2 U.S. gal.) of fuel left in fuel tank.

6) Check Engine Light

The check engine light comes ON when a fault is detected by the engine management system.

The check engine light may be accompanied by the applicable scrolling fault message in the multifunction display.

**7) Low Oil Pressure Indicator**

When this indicator is ON, it indicates a low oil pressure condition which may be due to a low oil level. Look for a message in the multifunction display.

**8) High Temperature Indicator**

The high temperature indicator comes ON when a high engine temperature or a high exhaust system temperature is detected.

**9) Maintenance Reminder Indicator**

The maintenance reminder indicator comes ON when required maintenance is due.

## Section 05 ELECTRICAL SYSTEM

### Subsection 05 (MULTIFUNCTION GAUGE)

## MULTIFUNCTION DISPLAY MESSAGES

| ADVISORY MESSAGES                                                                                      |                                                                 |
|--------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| WELCOME ABOARD SEA-DOO                                                                                 | Power up display                                                |
| RPM                                                                                                    | RPM indication                                                  |
| ENTERING SPORT MODE -<br>INCREASED ACCELERATION -<br>INSTRUCT PASSENGERS TO HOLD -<br>PRESS SET BUTTON | Message when SPORT mode is selected                             |
| SPORT MODE ACTIVATED                                                                                   | Message when SPORT mode is activated                            |
| SPORT MODE - RETURN TO IDLE TO<br>ACTIVATE                                                             | Message when SPORT mode cannot be activated, engine not at idle |
| SPORT MODE ACTIVE - RETURN TO<br>IDLE TO CANCEL                                                        | Message when SPORT mode is in use                               |
| SPORT MODE DEACTIVATED                                                                                 | Message when user first returns to TOURING mode                 |

| FAULT MESSAGES             |                                                                     |
|----------------------------|---------------------------------------------------------------------|
| LO OIL                     | Engine low oil pressure detected                                    |
| HI EXHAUST TEMP            | High exhaust temperature detected                                   |
| HI ENGINE TEMP             | High engine temperature detected                                    |
| CHECK ENGINE               | Engine system malfunction or maintenance required                   |
| HI BATTERY VOLTAGE         | High battery voltage detected                                       |
| LO BATTERY VOLTAGE         | Low battery voltage detected                                        |
| LIMP HOME                  | Major fault detected, engine power limited                          |
| FUEL SENSOR DEFECTIVE      | Fuel level sensor fault                                             |
| CALIBRATION CHECKSUM ERROR | Cluster programming corrupted, need to be re-flashed using B.U.D.S. |
| MAINTENANCE REQUIRED       | Watercraft maintenance required                                     |
| OTAS FAILURE               | OTAS is not correctly adjusted                                      |

## TROUBLESHOOTING

### DIAGNOSTIC TIPS

**NOTE:** It is a good practice to check for fault codes using B.U.D.S. software as a first troubleshooting step. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

**IMPORTANT:** When troubleshooting an electrical system fault, check battery condition, cables and connections first.

### Electrical System Activation

1. Press the START/STOP button.

**NOTE:** Pressing the START/STOP button without the tether cord installed on the engine cut-off switch will turn on electrical power without starting the engine; the multifunction gauge will cycle through a self-test function and shut off its display after a few seconds. However, the electrical system will stay powered up for approximately three minutes after the START button was pressed.

2. After pressing the START/STOP button, install the tether cord on the engine cut-off switch to maintain the multifunction gauge active when testing procedures require it to stay active.

**IMPORTANT:** When B.U.D.S. is being used, the ECM will eventually stop communicating with B.U.D.S. Therefore, operations with B.U.D.S. will

be interrupted. To reestablish communication, briefly press the START button. **Do not hold** the START button to avoid engine starting.

### Circuit Testing

Check the related-circuit fuse condition with a fuse tester or ohmmeter (a visual inspection could lead to a wrong conclusion).

### Electrical Connection Inspection

When replacing an electric or electronic component, always check electrical connections. Make sure they are tight, make good contact, and are corrosion-free. Dirty, loose or corroded contacts are poor conductors and are often the source of a system or component malfunction.

Pay particular attention to ensure that pins are not bent or pushed out of their connectors.

Ensure all wire terminals are properly crimped on wires, and connector housings are properly fastened.

Check for signs of moisture, corrosion or dullness. Clean pins properly and coat them with DIELECTRIC GREASE (P/N 293 550 004) or other appropriate lubricant when reassembling them, except if otherwise specified such as for the ECM connectors.

Pay attention to ground wires.

## TROUBLESHOOTING GUIDELINES

Press the START/STOP button and install the tether cord on the engine cut-off switch.

**NOTE:** The multifunction gauge should come on, cycle through its self test function, and stay on for approximately 3 minutes after which all electrical power will turn off.

Briefly press the START/STOP button every 3 minutes to reenergize the electrical system. Do not hold the START/STOP button to avoid engine starting.

**NOTE:** When troubleshooting using the following guidelines, it is important to remember that some indications, functions and features described may not apply to every PWC model, or may be available as an option.

### Multifunction Gauge “Does Not Turn ON”

If the multifunction gauge does not turn ON when the START/STOP button is pressed, the power circuit or ground circuit to the multifunction gauge is probably open.

Check the following in the listed order:

- 15A battery fuse (F3)
- 10A ACC fuse (F1)
- 5A START/STOP fuse (F2)
- Test for battery voltage at contacts on top of the ACC fuse (F1)
- If voltage good on both contacts of F1, carry out *MULTIFUNCTION GAUGE INPUT VOLTAGE TEST*
- Continuity of gauge ground circuit (gauge connector pin 4 (BLACK wire) to engine or battery ground)
- If no voltage at F1, test relay in fuse box
- Refer to *ECM WAKE-UP CIRCUIT TEST* in *ELECTRONIC FUEL INJECTION (EFI)* subsection.

**NOTE:** When testing for power, be sure to test within 3 minutes after pressing the START button.

### Multifunction Gauge Turns ON with Some Indications Missing

1. Connect to the latest applicable B.U.D.S. version, refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Read the fault codes, refer to *DIAGNOSTIC AND FAULT CODES* subsection.

If a fault code is related to a communication problem, carry out a continuity test of the CAN bus wires. Refer to *WIRING DIAGRAM* and *CONTROLLER AREA NETWORK (CAN)* subsections.

**NOTE:** The multifunction gauge, ECM, and the diagnostic connector are linked together through CAN bus. If one wire of the two wire CAN bus system is open, communication will be slower than normal. Multiple fault codes may be generated and the ECM may put the watercraft in LIMP HOME mode.

If one module cannot be seen in B.U.D.S., the fault may be the wires that link the module to the CAN bus, or a problem internal to that module. Test the CAN bus wires of the faulty module for continuity before assuming the problem is the module.

### Multifunction Gauge Goes Blank Except for:

- Fuel level ON
- No other indications visible.

There is no communication between the multifunction gauge and the ECM.

---

## Section 05 ELECTRICAL SYSTEM

### Subsection 05 (MULTIFUNCTION GAUGE)

---

Carry out a continuity check of the CAN bus wires from the multifunction gauge (pins 5 and 6) to the ECM and diagnostic connector. Refer to the *WIRING DIAGRAM* and *CONTROLLER AREA NETWORK (CAN)* subsections for details.

If an open circuit is detected, carry out same test from the 20 pin steering connector (pins 2 and 3).

#### NO RPM Indication and NO Engine Hour Display

If there is NO RPM indication, and NO engine hour display (on power-up), and the watercraft is in LIMP HOME mode, the CAN bus to the ECM is open.

Carry out a continuity check of the CAN bus wires from the ECM module, connector "B" pins C1 and C2 (B-C1 and B-C2) to the gauge and diagnostic connector. Refer to the *WIRING DIAGRAM* and *CONTROLLER AREA NETWORK (CAN)* subsections for details.

#### NO Fuel Level Indication

If there is no fuel level indication, test the fuel level sensor and its wiring circuit to the multifunction gauge. Refer to *FUEL TANK AND FUEL PUMP* subsection.

#### Beeper Does Not Function

The beeper is incorporated within the multifunction gauge.

If no beep code is heard when pressing the START button and installing the tether cord, first ensure ECM is powered. Refer to *ELECTRONIC FUEL INJECTION (EFI)* subsection.

In B.U.D.S., carry out the following:

- **Cluster Buzzer Test** on the cluster activation page
- Check for fault codes. Carry out service actions as applicable.

If the **Cluster Buzzer Test** failed, the ECM is powered, and the ECM and multifunction gauge are communicating properly through the CAN bus, replace the multifunction gauge.

## PROCEDURES

### MULTIFUNCTION GAUGE

#### Multifunction Gauge Self Test Function

When the START/STOP button is pressed momentarily and the vehicle powers up, all LCD segments and indicator lights in the multifunction gauge will turn **ON for approximately 3 seconds**

(self test function). This self test function allows the driver time to ensure that all indications are functioning properly.

It also validates the multifunction gauge internal circuits, however, this does not validate proper operation of the individual external circuits and sensors that provide inputs to the multifunction gauge.

If a system fault is detected by the ECM, the applicable message and/or indicator light will be displayed, and a beep code may be heard.

If the tether cord is not installed, the indications in the multifunction gauge will shut off a few seconds after the self test function, but the electrical system power stays on for approximately 3 minutes. Installing the tether cord on the engine cut-off switch will turn the indications back on.

If the tether cord is installed, the multifunction gauge will stay on for approximately 3 minutes.

**NOTE:** If the START/STOP button is pressed and held without the tether cord installed, the multifunction gauge will stay on as long as the START button is held.

#### Multifunction Gauge Setup

##### Units of Measurement and Language Setting

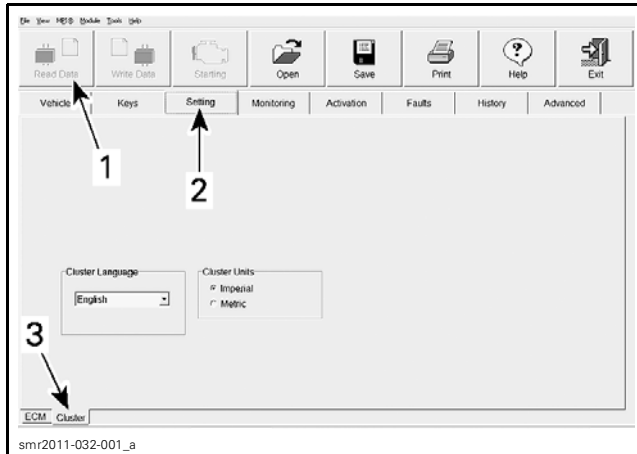
1. Connect vehicle to the latest applicable B.U.D.S. version, refer to the *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Press the START/STOP button to energize the electrical system.

**NOTE:** You will need to press the START button every three minutes or the electrical system will shut off.

3. In B.U.D.S., select the following:
  - **Read Data** button
  - **Setting** page tab
  - **Cluster** tab.

## Section 05 ELECTRICAL SYSTEM

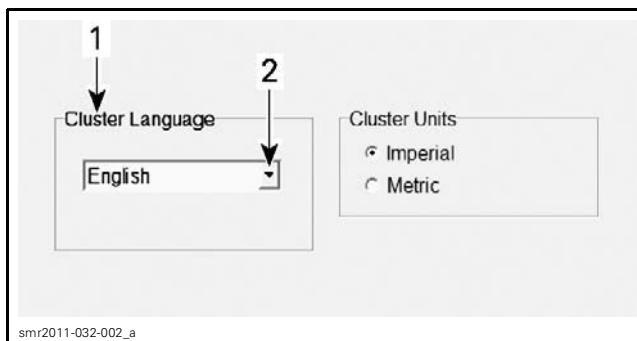
### Subsection 05 (MULTIFUNCTION GAUGE)



TYPICAL

1. Read Data
2. Setting tab
3. Cluster tab

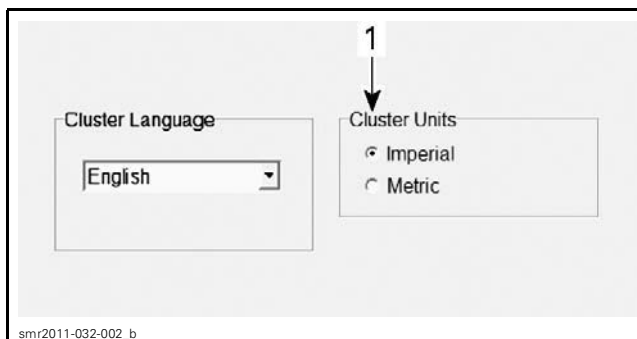
In the **Cluster Language** field, choose the desired unit of language.



TYPICAL

1. Cluster Language field
2. Click on this arrow to expand list of available languages

In the **Cluster Units** field, choose the desired unit of measurement, **Imperial** or **Metric**.



TYPICAL

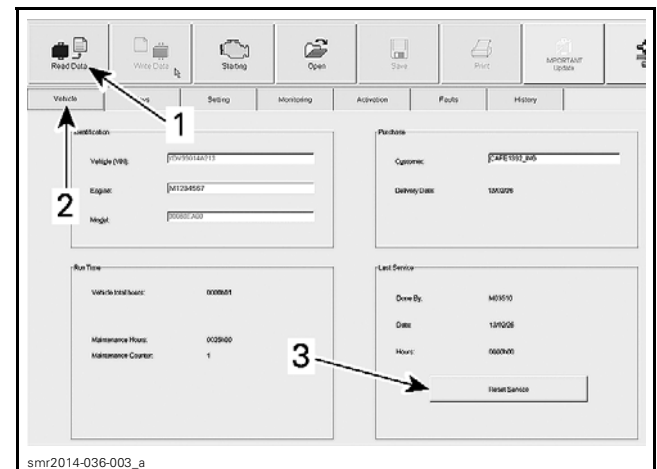
1. Cluster Units field

### Clearing the Maintenance Reminder Indicators

When the watercraft or engine are due for maintenance, the maintenance reminder indicator will come on, and a scrolling **MAINTENANCE RE-**

**QUIRED** message will scroll in the digital screen. These maintenance reminders must be cleared using B.U.D.S.

1. Connect vehicle to the latest applicable B.U.D.S. version, refer to the *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. Press the START/STOP button to energize the electrical system.
3. Install the tether cord on engine cut-off switch.
4. In B.U.D.S., select the following:
  - **Read Data** button
  - **Vehicle** page tab
  - In the **Last Service** field, **Reset Service** button.



1. Read Data

2. Vehicle tab

3. Reset Service button

### Multifunction Gauge Pin-Out

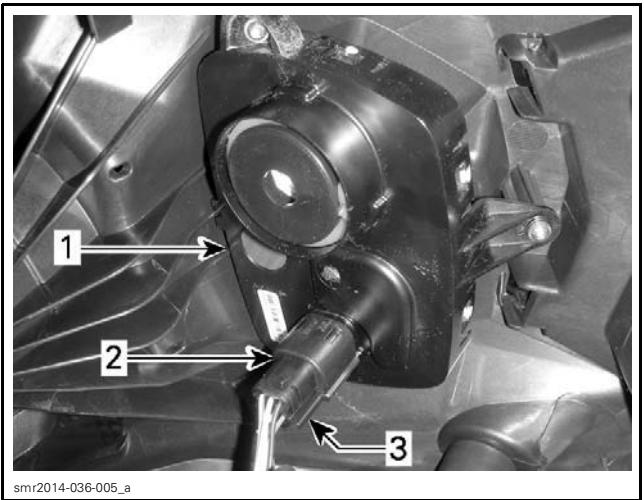
**NOTE:** Depending on watercraft model and installed accessories, some multifunction gauge connector pins may not be used.

| MULTIFUNCTION GAUGE PIN-OUT |                              |
|-----------------------------|------------------------------|
| PIN NO.                     | FUNCTION                     |
| 1                           | Gauge input Vdc power        |
| 2                           | Not used                     |
| 3                           | Fuel level sensor VDC signal |
| 4                           | Gauge GND                    |
| 5                           | CAN HI                       |
| 6                           | CAN LOW                      |

Section 05 ELECTRICAL SYSTEM
Subsection 05 (MULTIFUNCTION GAUGE)

Multifunction Gauge Input Voltage Test (at Gauge Connector)

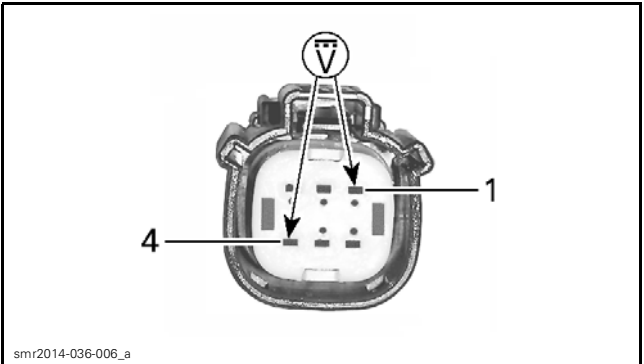
- 1. Remove the LH knee pad, refer to BODY sub-section.
- 2. Disconnect the gauge connector.



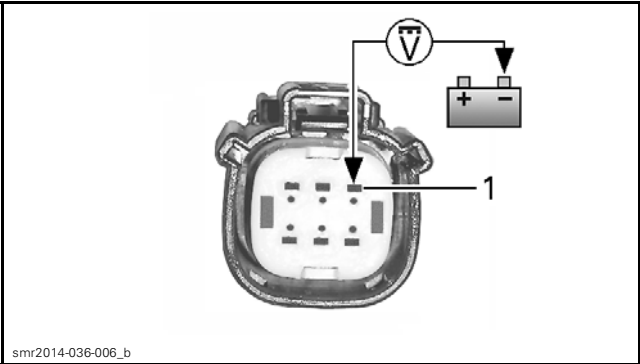
- 1. Gauge
- 2. Gauge connector
- 3. Press tab to unlock connector

- 3. Set the FLUKE 115 MULTIMETER (P/N 529 035 868) to Vdc.
- 4. Press the START button.
- 5. Install the tether cord on the engine cut-off switch.
- 6. Measure the multifunction gauge input voltage as per following table.

Table with 3 columns: PROBE, VOLTAGE. It details the input voltage test at the gauge connector, specifying pin connections (Pin 1 to VT/GY, Pin 4 to BK or Battery ground) and the resulting voltage measurement (Battery voltage).



INPUT VOLTAGE TEST AT GAUGE CONNECTOR (PINS 1 TO 4)

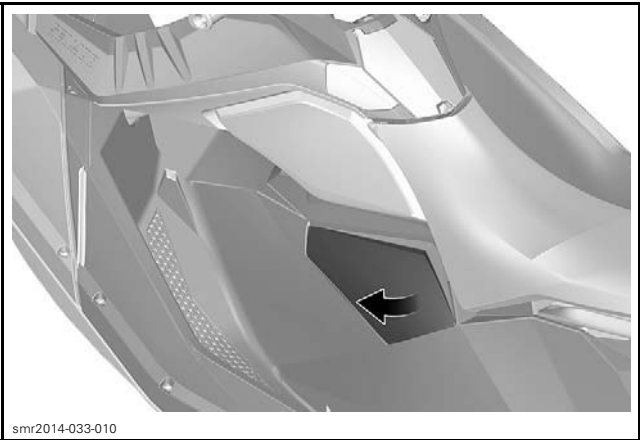


INPUT VOLTAGE TEST AT GAUGE CONNECTOR (PIN 1 TO BATTERY GROUND)

If battery voltage is measured as specified, replace the multifunction gauge. If battery voltage is measured to battery ground but not to pin 4, carry out a CONTINUITY TEST OF GAUGE GROUND WIRE circuit from the gauge connector to the engine ground. If battery voltage is not measured at the gauge connector, carry out a MULTIFUNCTION GAUGE INPUT VOLTAGE TEST (AT STEERING CONNECTOR).

Multifunction Gauge Input Voltage Test (at Steering Connector)

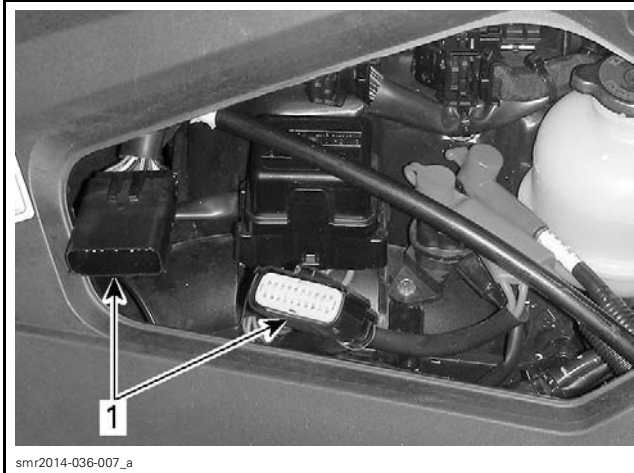
- 1. Remove LH access cover, refer to BODY sub-section.



- 2. Disconnect the 20-pin steering connector.

## Section 05 ELECTRICAL SYSTEM

### Subsection 05 (MULTIFUNCTION GAUGE)



1. Disconnected 20-pin steering connector

3. Connect the diagnostic harness between the disconnected steering connectors.

| REQUIRED TOOL                      |  |
|------------------------------------|--|
| Diagnostic harness (P/N 529036276) |  |

4. Press the START/STOP button.  
 5. Install tether cord on the engine cut-off switch.  
 6. Carry out an input voltage test at the steering connector (vehicle harness side) as per following table.

| MULTIFUNCTION GAUGE INPUT VOLTAGE TEST (STEERING CONNECTOR) |                |                 |
|-------------------------------------------------------------|----------------|-----------------|
| TEST CONNECTOR ON DIAGNOSTIC HARNESS                        |                | VOLTAGE         |
| Pin 20 (VT/GY)                                              | Pin 11 (BK)    | Battery voltage |
| Pin 20 (VT/GY)                                              | Battery ground |                 |

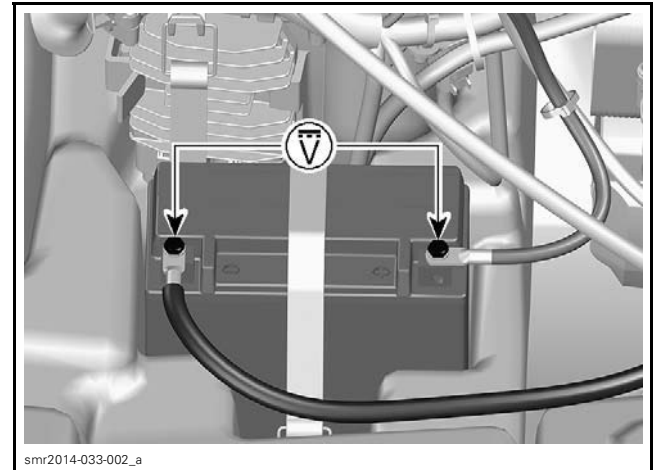
If battery voltage is read at steering connector (vehicle harness side) as specified in preceding table, but was not measured to pin 4 at the gauge connector (gauge ground wire), repair or replace the BLACK ground wire between the gauge connector and the steering connector.

If battery voltage is measured to battery ground but not to pin 11, carry out a *CONTINUITY TEST OF GAUGE GROUND WIRE* described further in this subsection.

If no voltage is measured, carry out the following steps.

7. Set multimeter to Vdc and measure voltage at battery terminals.

| REQUIRED TOOL                          |
|----------------------------------------|
| FLUKE 115 MULTIMETER (P/N 529 035 868) |



TYPICAL - BATTERY VOLTAGE TEST

8. Remove fuse box cover.



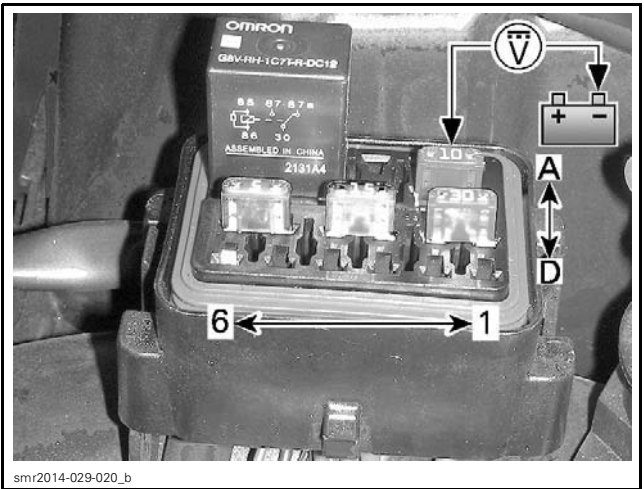
1. Fuse box cover to remove

9. Press the START/STOP button.  
 10. Install the tether cord.  
 11. Test for battery voltage between each of the terminals atop the ACC fuse (F1) and battery ground as per following table.

Section 05 ELECTRICAL SYSTEM

Subsection 05 (MULTIFUNCTION GAUGE)

| VOLTAGE TEST AT FB1 |             |                  |             |
|---------------------|-------------|------------------|-------------|
| ACC FUSE            | TEST PROBES |                  | READING     |
| Fuse pin numbers    | B1          | Battery (-) post | Battery Vdc |
|                     | B2          |                  |             |



VOLTAGE TEST AT FUSE CONTACTS

If battery voltage is measured at B2 but not at B1 (with fuse installed), replace the fuse.

If battery voltage is measured at fuse contact B1, refer to *CONTINUITY TEST OF GAUGE POWER WIRE* in this subsection.

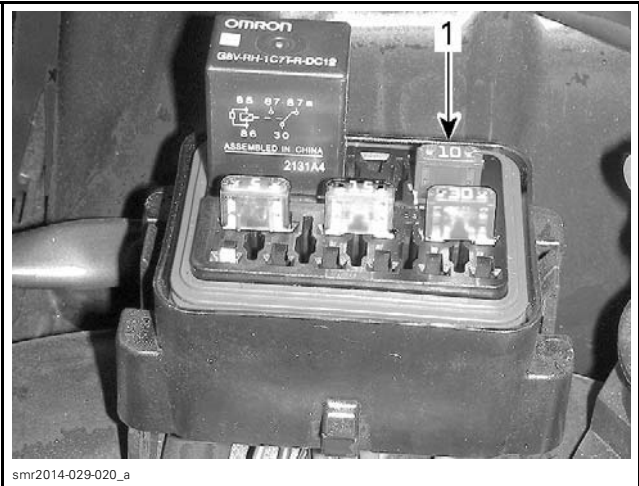
If no voltage is measured at fuse contact E8, refer to *POWER DISTRIBUTION AND GROUNDS* subsection).

Continuity Test of Gauge Power Wire

- 1. Remove tether cord from engine cut-off switch.
- 2. Disconnect gauge connector.
- 3. Disconnect 20-pin steering connector.
- 4. Connect diagnostic harness between the disconnected steering connectors.

| REQUIRED TOOL                      |
|------------------------------------|
| Diagnostic harness (P/N 529036276) |

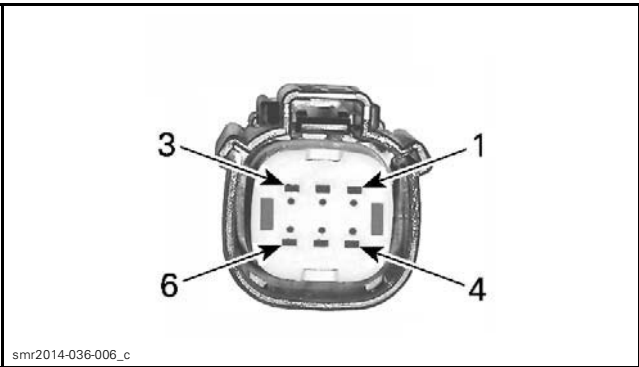
- 5. Remove the ACC fuse (F1).



1. Remove ACC fuse (F1)

- 6. Set multimeter to  $\Omega$  setting.
- 7. Test for continuity of the multifunction gauge power circuit as per following table.

| CONTINUITY TEST OF GAUGE POWER CIRCUIT |                                      |          |                     |
|----------------------------------------|--------------------------------------|----------|---------------------|
| GAUGE CONNECTOR                        | TEST CONNECTOR ON DIAGNOSTIC HARNESS | FUSE BOX | READING             |
| Pin 1 (VT/GY)                          | Pin 20 (VT/GY)                       | –        | Close to 0 $\Omega$ |
| Pin 1 (VT/GY)                          | –                                    | B1       |                     |
| –                                      | Pin 20 (VT/GY)                       | B1       |                     |



GAUGE CONNECTOR PIN-OUT



**FUSE BOX CONTACT COORDINATES**

8. If an open circuit is measured, pay attention to the following:
  - Pin and socket condition in connectors
  - Proper contact and crimping of pins and sockets in connectors
  - Wire junctions JT-2 (VT/GY) and JT-1 (VT/GY). Refer to *WIRING DIAGRAM* for details.
9. Repair or replace wiring/connectors as required.

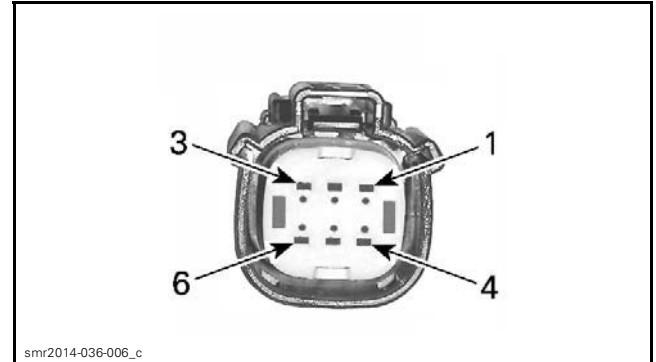
### Continuity Test of Gauge Ground Wire

1. Disconnect the 20-pin steering connector.
2. Connect the diagnostic harness between the disconnected steering connectors.

| REQUIRED TOOL                      |
|------------------------------------|
| Diagnostic harness (P/N 529036276) |

3. Set multimeter to  $\Omega$  selection and carry out a continuity test as per following table. Refer to the *WIRING DIAGRAM* for circuit details.

| CONTINUITY TEST OF GAUGE GROUND WIRE |                                      |               |                     |
|--------------------------------------|--------------------------------------|---------------|---------------------|
| MULTIMETER PROBES                    |                                      |               | READING             |
| GAUGE CONNECTOR                      | TEST CONNECTOR ON DIAGNOSTIC HARNESS | ENGINE GROUND |                     |
| Pin 4 (BK)                           | –                                    | ✓             | Close to 0 $\Omega$ |
| Pin 4 (BK)                           | Pin 11 (BK)                          | –             |                     |
| –                                    | Pin 11 (BK)                          | ✓             |                     |

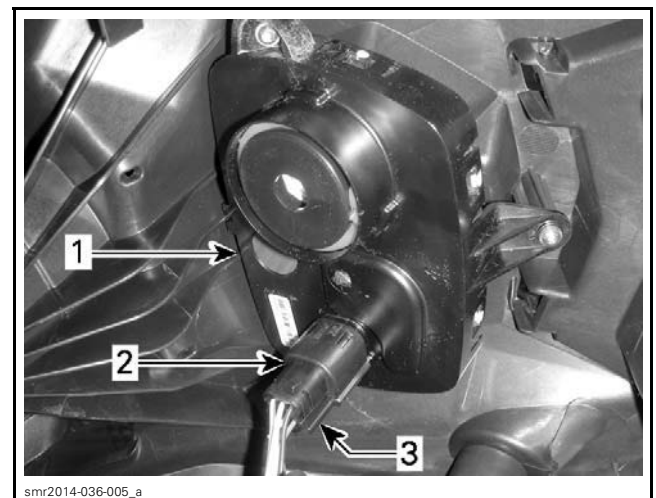


**GAUGE CONNECTOR PIN-OUT**

4. Repair wiring and connectors as required.

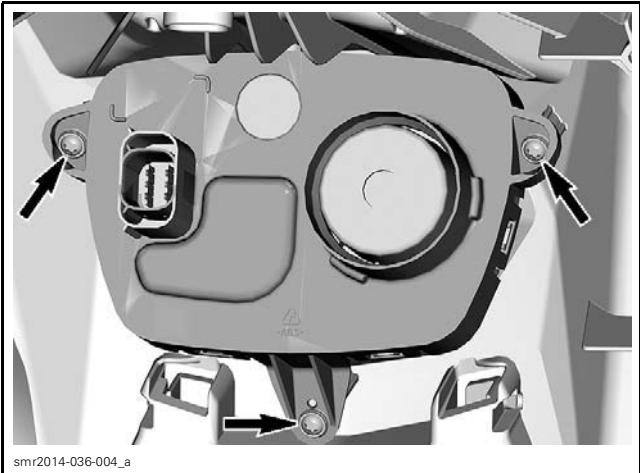
### Multifunction Gauge Removal

1. Remove LH or RH knee pad.
2. Reach in under console and disconnect multifunction gauge connector.



1. Multifunction gauge (viewed from under console)
2. Multifunction gauge connector
3. Connector release tab to press

3. Remove the 3 multifunction gauge mounting screws.



MULTIFUNCTION GAUGE MOUNTING SCREWS (3)

Multifunction Gauge Installation

Installation of the multifunction gauge is the reverse of the removal procedure. However, pay attention to the following.

- 1. Apply a small amount of dielectric grease to the gauge connector pins (harness side).

| SERVICE PRODUCT                              |                                     |
|----------------------------------------------|-------------------------------------|
| Multifunction gauge connector (harness side) | DIELECTRIC GREASE (P/N 293 550 004) |

- 2. Reconnect gauge connector and ensure proper operation of gauge.

**NOTE:** If you are installing a replacement multifunction gauge, refer to *MULTIFUNCTION GAUGE REPLACEMENT* in this subsection.

Multifunction Gauge Replacement

**NOTE:** Replacement multifunction gauges are delivered already programmed.

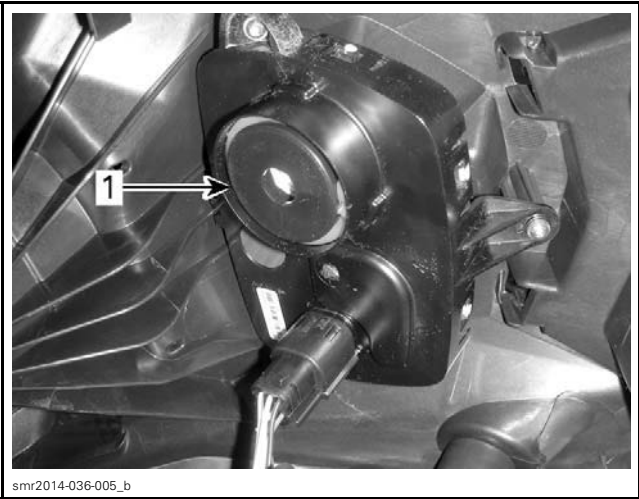
After the multifunction gauge has been replaced, connect the watercraft to the latest applicable B.U.D.S. version and carry out any updates (if required). Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

Once the multifunction gauge has been updated (if required), refer to *UNITS OF MEASUREMENT AND LANGUAGE SETTING* in this subsection.

BEEPER

Beeper Information

The beeper is part of the multifunction gauge.



1. Beeper

For a the definition of the beeper codes, refer to the *BEEPER SIGNALS* table in the *DIAGNOSTIC AND FAULT CODES* subsection.

Beeper Test

Press START button.

Install the tether cord on the engine cut-off switch. You should hear the beeper.

If you did not hear the beeper, try the beeper test in B.U.D.S..

**NOTE:** In B.U.D.S., the beeper test can be found on the cluster activation page. It is referred to as the *CLUSTER BUZZER TEST*.

If the beeper still does not sound, replace the multifunction gauge.