

LIGHTS, GAUGE AND ACCESSORIES

SERVICE TOOLS

Description	Part Number	Page
12 V BATTERY SUPPLY CABLE	529 035 997	5
FLUKE 115 MULTIMETER	529 035 868	9, 14–15, 22, 25
POWER INTERFACE	515 177 223	5

SERVICE TOOLS – OTHER SUPPLIER

Description	Part Number	Page
MULTILOCK - TERMINAL EXTRACTION TOOL.....	755430-2	26

SERVICE PRODUCTS

Description	Part Number	Page
LOCTITE 5900	293 800 066	20

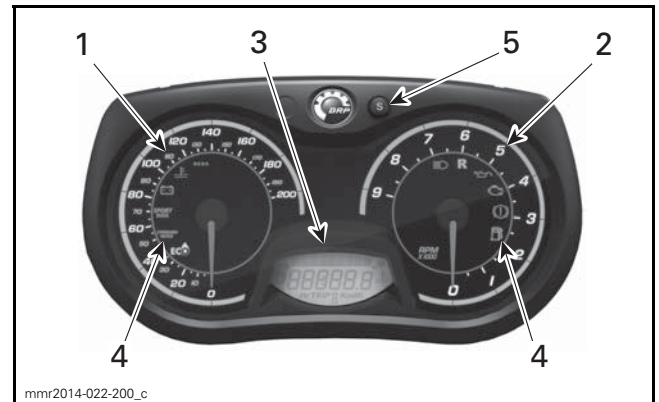
GENERAL

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

⚠ CAUTION The battery charging fuse should always be removed before carrying out any maintenance on the vehicle to prevent any unexpected electrical activation. Removal of this fuse isolates the battery from the vehicle electrical system, except for the starter relay input terminal.

⚠ WARNING

Torque wrench tightening specifications must be strictly adhered to. Locking devices must be replaced with new ones when removed (e.g.: locking tabs, elastic stop nuts, self-locking fasteners, cotter pins, etc.).



ANALOG/DIGITAL GAUGE (STANDARD)

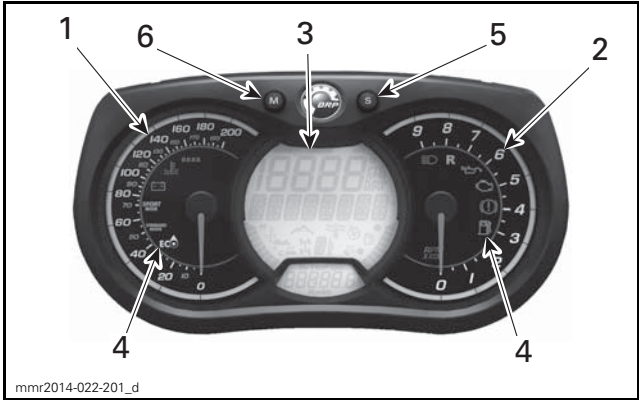
1. Speedometer
2. Tachometer (RPM)
3. Gauge Digital Display
4. Gauge Pilot Lamps
5. Gauge SET "S" button

SYSTEM DESCRIPTION (GAUGE)

Two different type gauges which provide all indications in a single unit are used. An **analog/digital gauge (standard gauge)** and a **multifunction analog/digital gauge (premium gauge)**.

The premium gauge provides more functions and display features.

Both units can be set to indicate in metric or imperial units.



MULTIFUNCTION ANALOG/DIGITAL GAUGE (PREMIUM)

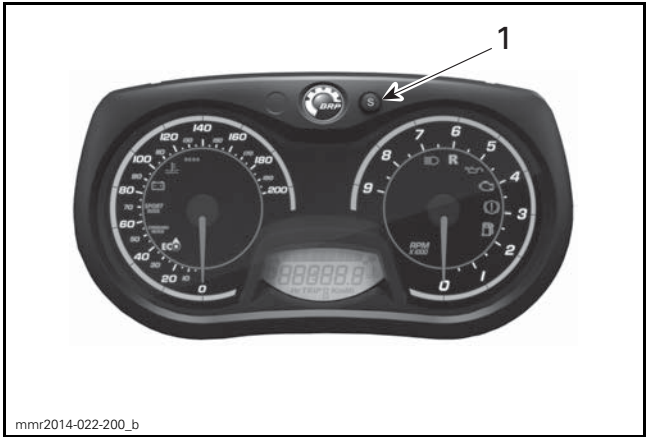
- 1. Speedometer
- 2. Tachometer (RPM)
- 3. Gauge Multifunction Digital Display
- 4. Gauge Pilot Lamps
- 5. Gauge MODE "M" button
- 6. Gauge SET "S" button

The premium gauge is also used to control 9 heating intensity settings for the heated hand grips and the heated throttle lever.

Mode and Set Buttons

Analog/Digital Gauge

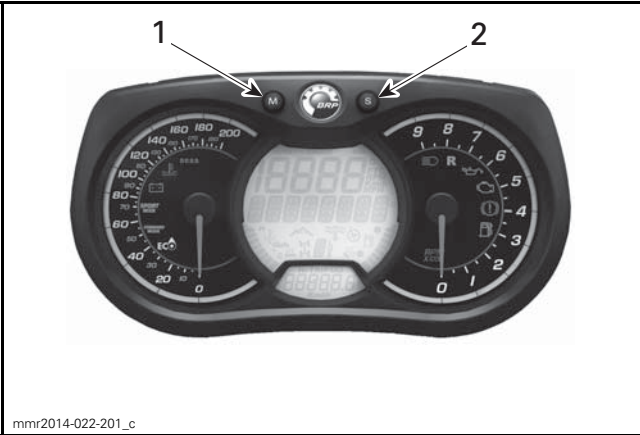
The standard gauge is equipped with a SET button only at the top of the indicator.



- 1. SET button

Multifunction Analog/Digital Gauge (Premium)

The premium gauge is equipped with MODE and SET buttons at the top of the indicator.



PREMIUM GAUGE

- 1. MODE button
- 2. SET button

These buttons allow you to toggle through the different functions and settings of the indicator.

All vehicles that are factory equipped with the premium gauge also come with a remote M/S button on the LH multifunction switch. It can be used instead of the buttons on the gauge simply by pressing the "M" for MODE and "S" for SET.

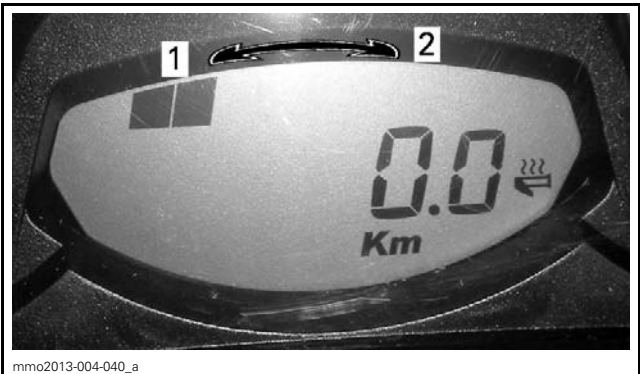
SYSTEM DESCRIPTION (HEATED THROTTLE LEVER)

The type of system used is usually determined by the gauge package installed at the factory, standard gauge or premium gauge.

The throttle lever heat is controlled through the gauge.

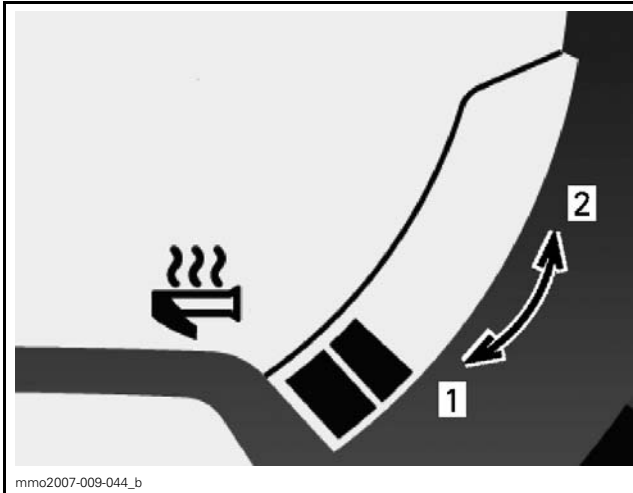
A three position switch on the LH multifunction switch allows selection of 9 heat levels, which are displayed in the indicator.

NOTE: The heating intensity is displayed via the digital display with the activation of the throttle lever switch. When released, display will return to fuel tank level.



VARIABLE HEATING INTENSITY DISPLAY - STANDARD GAUGE

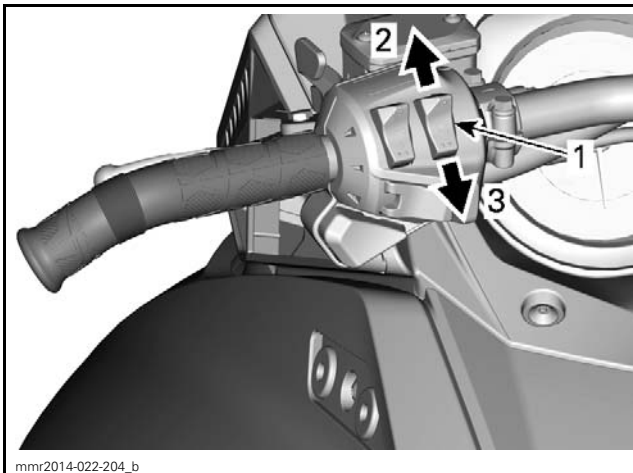
- 1. Less heat
- 2. More heat



THROTTLE LEVER HEAT INDICATOR - PREMIUM GAUGE

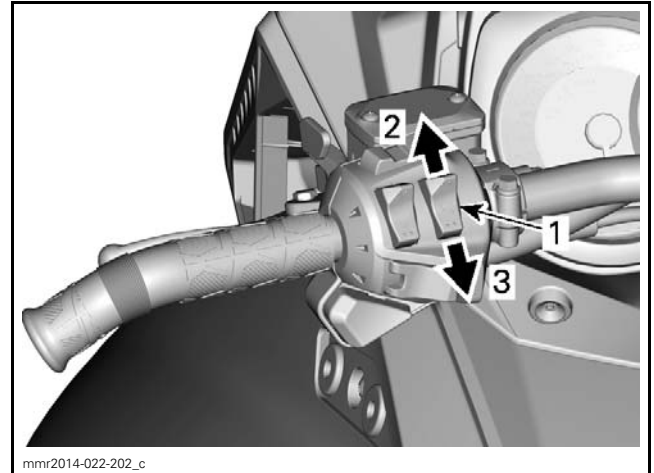
1. Decrease heat
2. Increase heat

The switch selection sends a signal to the premium gauge to increase or decrease heat.



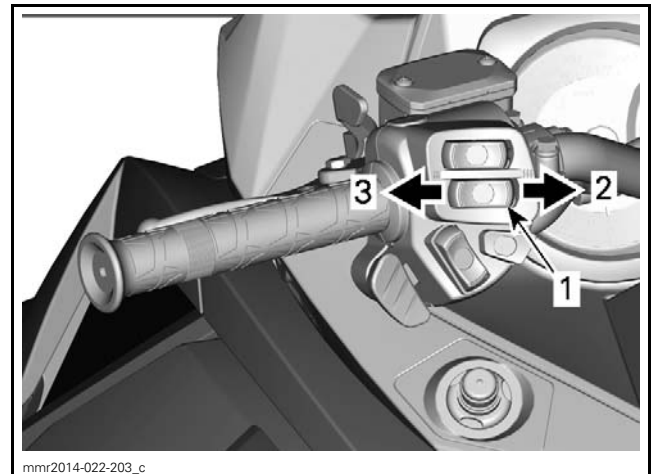
ALL MODELS EXCEPT GSX AND GTX

1. Heated throttle lever switch
2. Increase
3. Decrease



GSX MODELS

1. Heated throttle lever switch
2. Increase
3. Decrease



GTX MODELS

1. Heated throttle lever switch
2. Increase
3. Decrease

The gauge then applies the appropriate amount of current to the heater according to the selection.

To turn OFF the heaters, select heat down until there is no more indication on the bar graph.

When released, the switch springs back to the center neutral position.

SYSTEM DESCRIPTION (HEATED HANDLEBAR GRIPS)

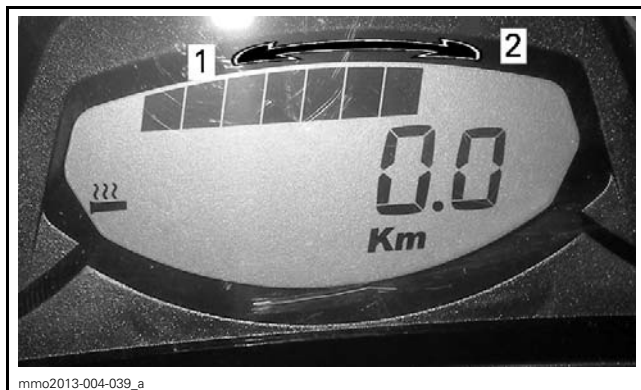
The type of system used is usually determined by the gauge package installed at the factory, standard gauge or premium gauge.

The grip heat is controlled through the gauge.

A three position switch on the LH multifunction switch allows selection of 9 heat levels, which are displayed in the indicator.

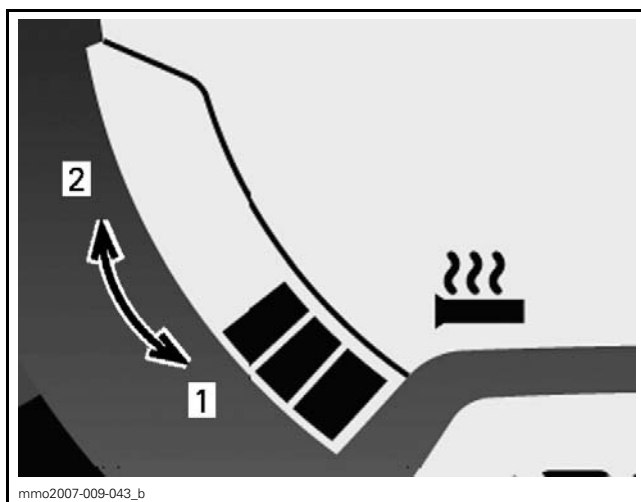
Subsection 11 (LIGHTS, GAUGE AND ACCESSORIES)

NOTE: The heating intensity is displayed via the digital display with the activation of the heated grips switch. When released, display will return to fuel tank level.



HEATING INTENSITY DISPLAY - STANDARD GAUGE

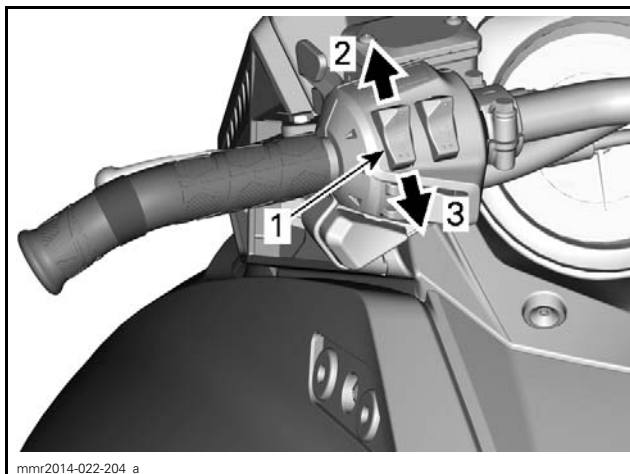
1. Less heat
2. More heat



HEATING INTENSITY DISPLAY - PREMIUM GAUGE

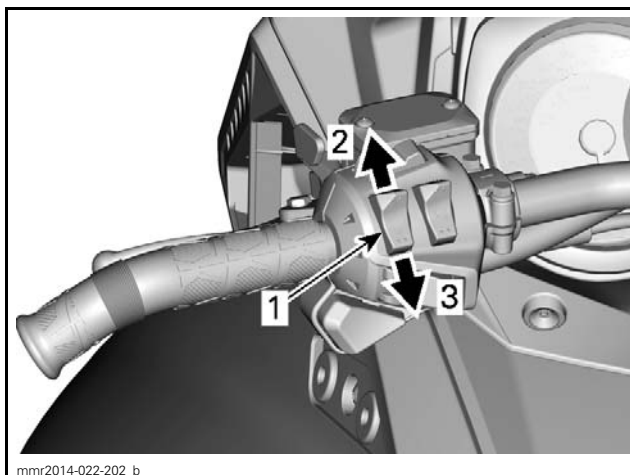
1. Decrease heat
2. Increase heat

The switch selection sends a signal to the premium gauge to increase or decrease heat.



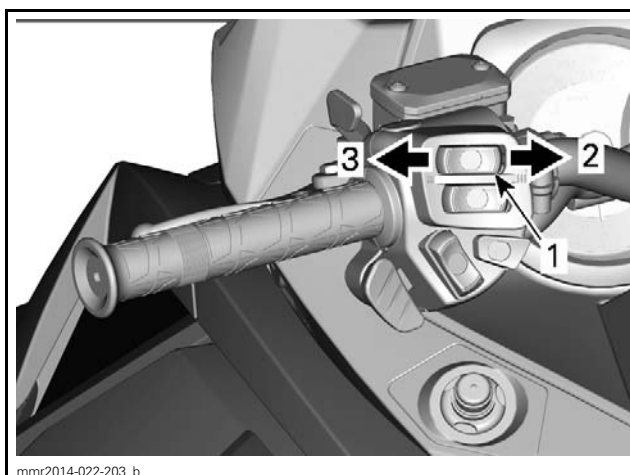
ALL MODELS EXCEPT GSX AND GTX

1. Heated grips switch
2. Increase
3. Decrease



GSX MODELS

1. Heated grips switch
2. Increase
3. Decrease



GTX MODELS

1. Heated grips switch
2. Increase
3. Decrease

The gauge then applies the appropriate amount of current to the heater according to the selection.

To turn OFF the heaters, select heat down until there is no more indication on the bar graph.

When released, the switch springs back to the center neutral position.

TROUBLESHOOTING

LIGHTING AND ACCESSORIES SYSTEM TESTING

All vehicle lights are powered from the primary 12 Vdc circuit. This circuit is powered from and controlled by the ECM when the engine reaches 800 RPM. The accessories circuit is powered from and controlled by the ECM when the engine reaches 2000 RPM.

There are no relays or fuses outside the ECM to test or replace for the light circuits. Refer to *CHARGING SYSTEM* for more information on testing the primary 12 Vdc circuits.

If a light does not come ON, carry out the following:

- Obtain access to the bulb and make sure it is not burnt.
- Test for input voltage to the bulb.
- Test for continuity of the ground circuit.
- Test the applicable control switch (brake switch, headlight switch).

Refer to *WIRING DIAGRAM* for circuit details.

To provide power to specific circuits, refer to the following chart to meet the required conditions.

SYSTEM	MODEL	CONDITIONS REQUIRED
<ul style="list-style-type: none"> – Lights – Gauge – Heaters 	All	<ul style="list-style-type: none"> – POWER INTERFACE (P/N 515 177 223) – 12 V BATTERY SUPPLY CABLE (P/N 529 035 997) (for manual start) – 12-volt battery (for manual start)
<ul style="list-style-type: none"> – Heaters 	All	<ul style="list-style-type: none"> – Start engine and rev above 2000 RPM for at least 2 seconds – OR – Use B.U.D.S. and activate the Accessory Relay

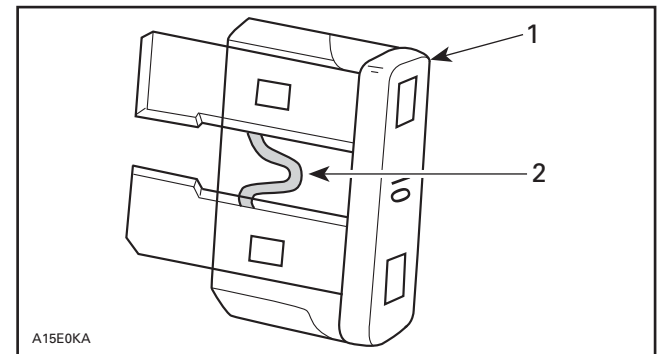
To use B.U.D.S., refer to the *COMMUNICATION TOOLS AND B.U.D.S.* subsection for proper connections.

PROCEDURES

FUSES

Fuse Inspection

Check if filament is melted. Replace as necessary.

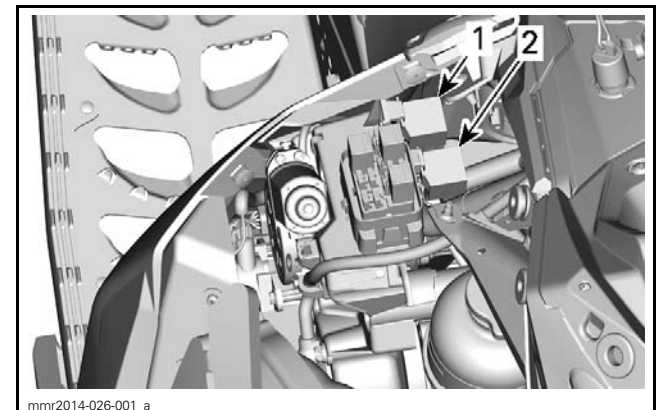


1. Fuse
2. Check if melted

NOTICE Do not use a higher rated fuse as this can cause severe damage to electric components and/or a fire. If fuse has burnt out, the cause of the malfunction should be determined and corrected before restarting.

Fuse Location

All fuses are located near the battery.



TYPICAL - RH SIDE OF ENGINE COMPARTMENT

1. 40 A Battery charging
2. 15 A start

Fuse Description

FUSE	DESCRIPTION	LOCATION
40 A	Battery charging (FA)	Attached to battery
15 A	START)	Attached to battery

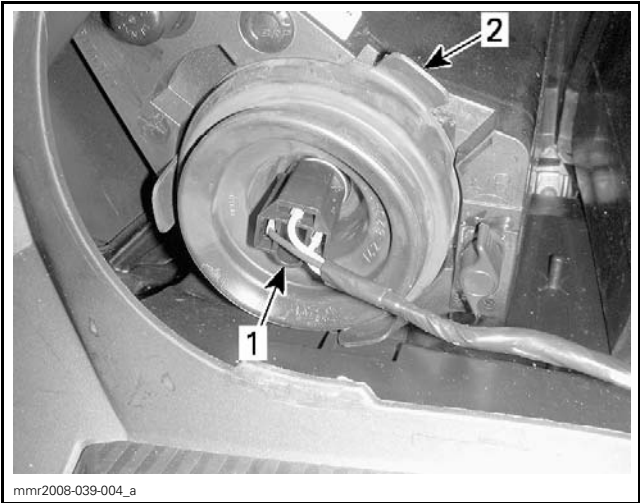
HEADLIGHTS

Headlight Bulb Removal

XR Models

If a headlight bulb is burnt, proceed as follows.

- 1. Remove multifunction gauge to gain access to headlight bulbs, see procedure in this section.
- 2. Remove bulb connector.
- 3. Remove top and center portion of rubber boot from headlight.

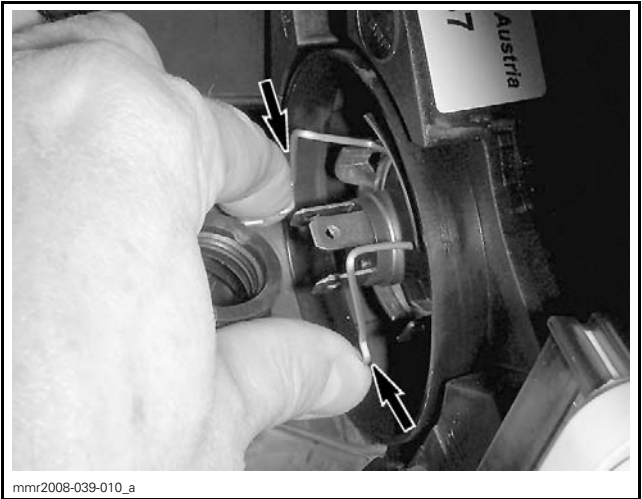


- 1. Remove headlight connector
- 2. Remove rubber boot

NOTE: It is not necessary to fully remove rubber boot.



- 4. Press both sides of the bulb holder (spring clip) inwards at the same time, and pull it out to release it from the bulb support.



SQUEEZE INWARDS AND PULL OUT

- 5. Pull bulb from headlight.

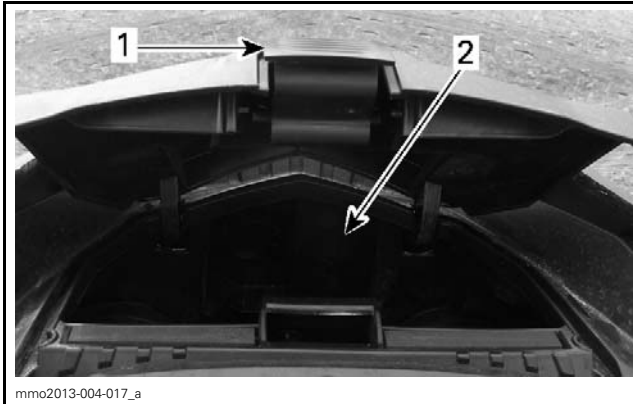


PULL TO REMOVE BULB

XS Models

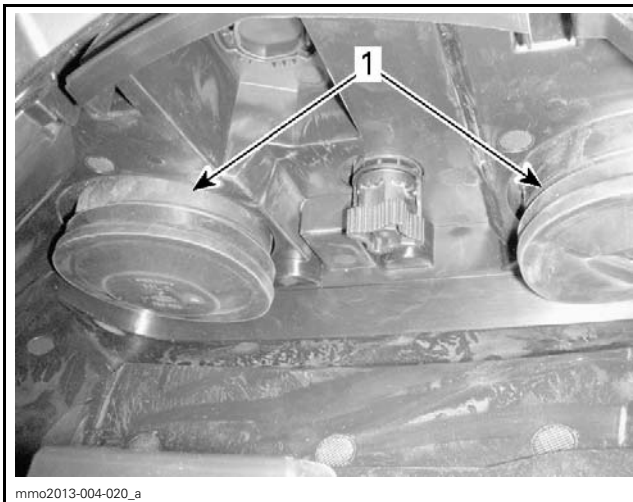
If a headlight bulb is burnt, proceed as follows.

- 1. Open the front storage compartment by pulling the tab.



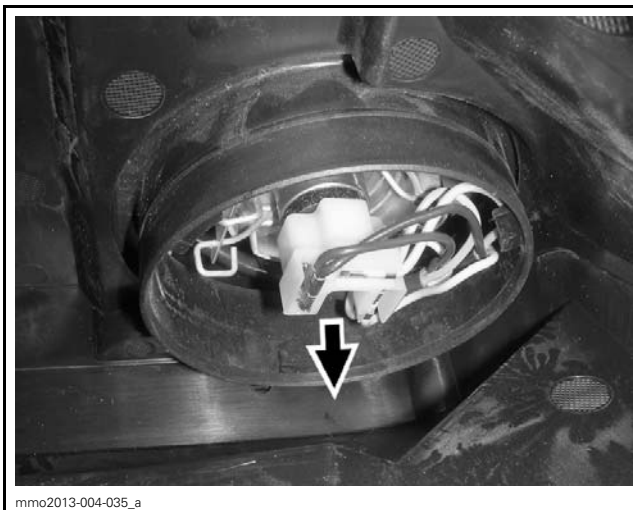
1. Tab
2. Storage compartment

2. Remove the applicable rubber boot.



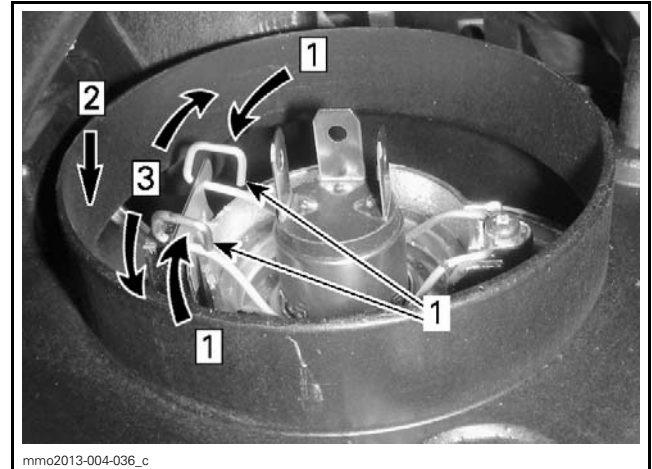
1. Rubber boots

3. Disconnect electrical connector.



ELECTRICAL CONNECTOR

4. Press and pull both sides of the retaining clip at the same time to release it from bulb support.



Step 1: Push both sides
Step 2: Push down to release
Step 3: Release both sides

1. Retaining clip

Headlight Bulb Installation

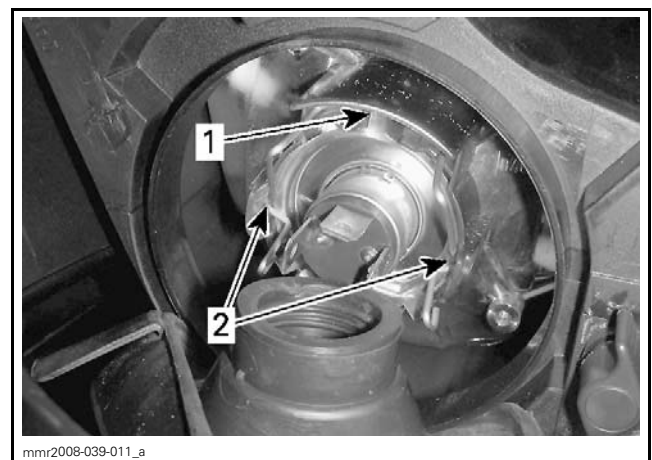
NOTICE Never touch glass portion of a halogen bulb with bare fingers, it shortens its operating life. If glass is touched, clean it with isopropyl alcohol which will not leave a film on the bulb.

XR Models

1. Insert bulb in headlight.

NOTE: Widest alignment tab on bulb should be at top of headlight.

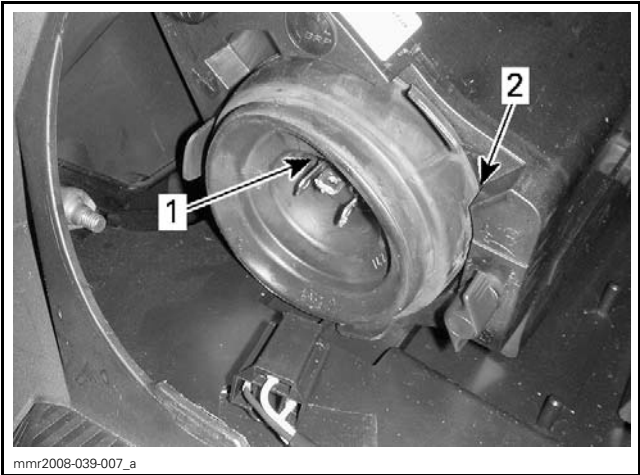
2. Insert top of bulb holder (spring clip) as you squeeze the two sides inwards. Release bulb holder so that it locks in the grooves on either side of headlight.



1. Wide bulb tab
2. Bulb holder locked

3. Install rubber boot. Ensure cover is properly inserted in groove provided in the headlight, and around the base of the bulb.

Subsection 11 (LIGHTS, GAUGE AND ACCESSORIES)



- 1. Insert around bulb
- 2. Insert in groove provided

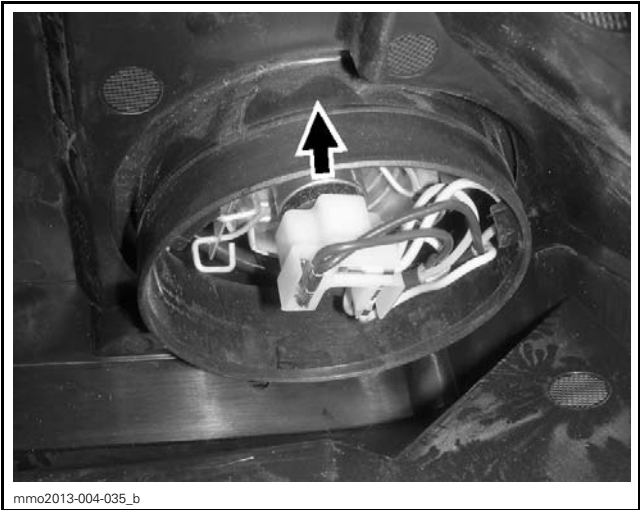
- 4. Install light connector.
- 5. Always test light operation after bulb replacement.
- 6. Install gauge, see procedure in this section.

XS Models

- 1. Insert bulb in headlight.

NOTE: Widest alignment tab on bulb should be at top of headlight.

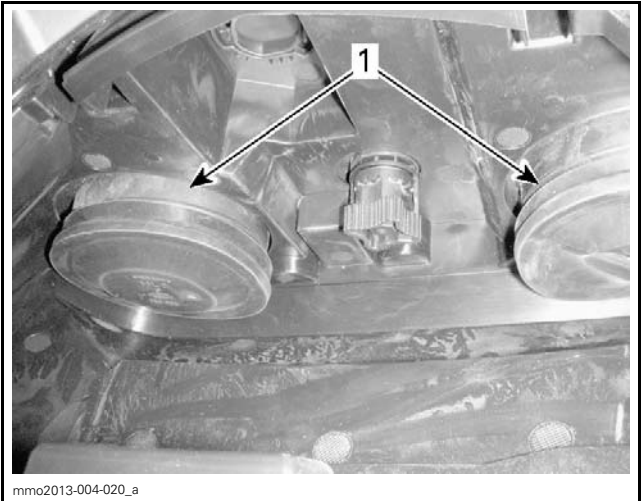
- 2. Insert top of bulb holder (spring clip) as you squeeze the two sides inwards. Release bulb holder so that it locks in the grooves on either side of headlight.
- 3. Connect electrical connector.



ELECTRICAL CONNECTOR

- 4. Install rubber boot cover. Ensure cover is properly inserted in groove provided in the headlight, and around the base of the bulb.

NOTE: Make sure to properly reinstall both rubber boots to ensure that no humidity gets inside the headlamp. Humidity can create fog inside the headlamp.



1. Rubber boots

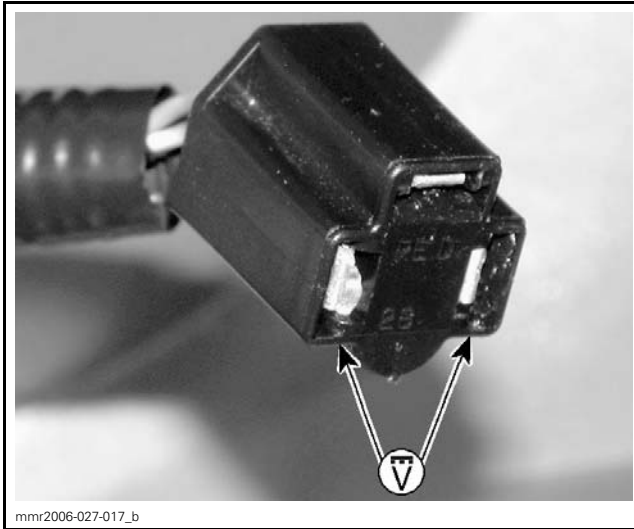
- 5. Always test light operation after bulb replacement.

Headlight Input Voltage Test

If a headlight does not function, proceed as follows.

- 1. Remove multifunction gauge, see procedure in this subsection.
- 2. Disconnect headlight connector(s).
- 3. Provide electrical power to the headlights for testing. Refer to *LIGHTING AND ACCESSORIES SYSTEM TESTING* in the *TROUBLESHOOTING* topic at the beginning of this subsection for proper procedure.
- 4. Read voltage at headlight connector as follows.

SWITCH POSITION	WIRE COLOR (HEADLIGHT CONNECTOR)		VOLTAGE
LO beam	GY/OG	BK	Battery voltage (Vdc)
HI beam	GY/WH	BK	



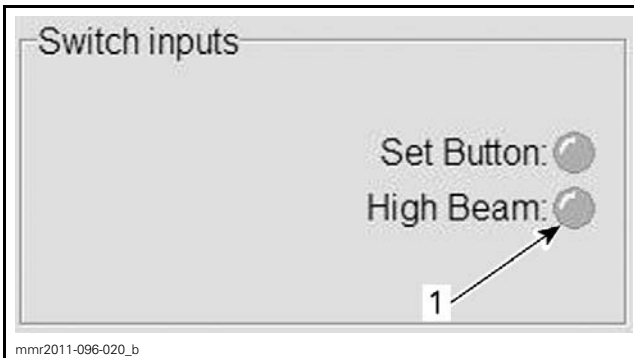
TYPICAL

If voltage is inadequate, carry out the following to find the source of the problem:

- Test headlights dimmer switch. Refer to *HEADLIGHT DIMMER SWITCH CONTINUITY TESTING* in this subsection.
- Test wiring harness and connectors.
- Test primary 12 Vdc system. Refer to *CHARGING SYSTEM*.

Headlight Dimmer Switch Test with B.U.D.S.

1. Using the B.U.D.S. software, select the **Monitoring** tab.
2. On the bottom of the page, choose the **Cluster** tab.
3. Set vehicle dimmer switch to High Beam and look for applicable indicator light in the **Switch inputs** field to turn green.



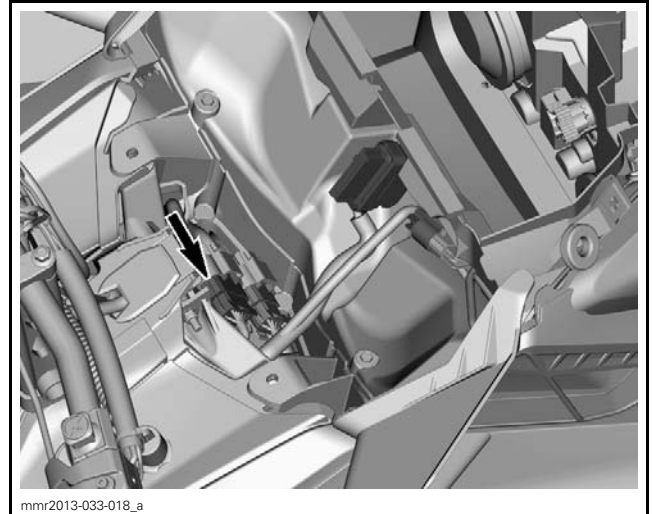
TYPICAL

1. Indicator light

If the indicator light come ON in B.U.D.S., the dimmer switch is functioning correctly.

Headlight Dimmer Switch Continuity Test

1. Remove the gauge.
2. Disconnect the SH-2 connector (12 positions).



TYPICAL - SH CONNECTOR

3. Using the FLUKE 115 MULTIMETER (P/N 529 035 868), select the Ω position.
4. Test switch circuits on SH-2 connector (12 positions) on harness side as per table.

HEADLIGHT DIMMER SWITCH CONTINUITY TEST

SWITCH POSITION	SH-2		RESISTANCE
HIGH	M	G	Close to 0 Ω
	F	G	Infinite (OL)
LOW	F	G	Infinite (OL)
	M	G	Close to 0 Ω

If tests were good, switch is functioning properly.

If any test failed, check wiring and connections going to switch.

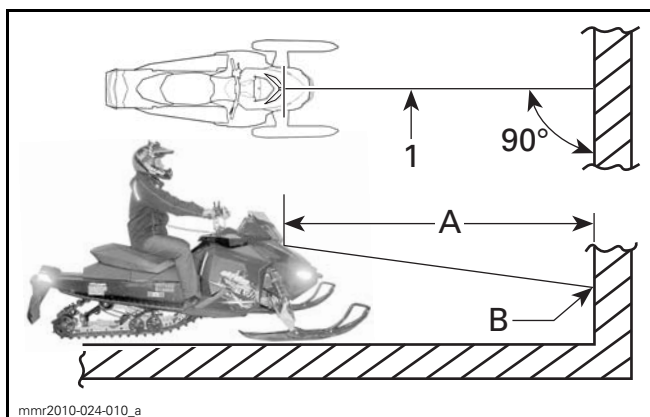
If test of wiring and connections was good, replace switch.

NOTE: When testing headlight dimmer switch from SH-2 connector, if an open circuit is found through the switch, remove the screws retaining the multifunction switch, disconnect the LA and LB connectors and test for continuity of switch and wiring separately.

Headlight Beam Aiming

Beam aiming is correct when center of high beam is 25 mm (1 in) below the headlight horizontal center line, scribed on a test surface, 381 cm (12 ft 6 in) away.

1. Place the vehicle on a flat surface perpendicular to test surface (wall or screen) and 381 cm (12 ft 6 in) away from it.
2. Ask rider to sit on vehicle seat, or apply equivalent weight on the vehicle.
3. Select **high** beam.
4. Measure headlight center distance from ground. Scribe a line at this height on test surface (wall or screen). Light beam center should be 25 mm (1 in) below scribed line.



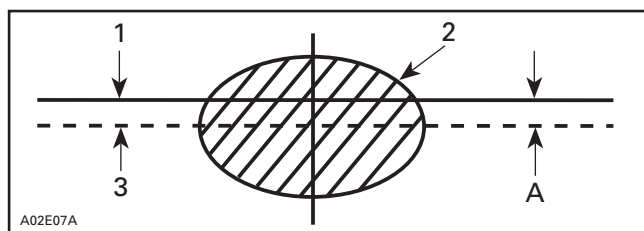
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TYPICAL

1. Headlight center line

A. 381 cm (12 ft 6 in)

B. 25 mm (1 in) below center line



A02E07A

1. Headlight horizontal

2. Light beam (high beam) (projected on the wall)

3. Light beam center

A. 25 mm (1 in)

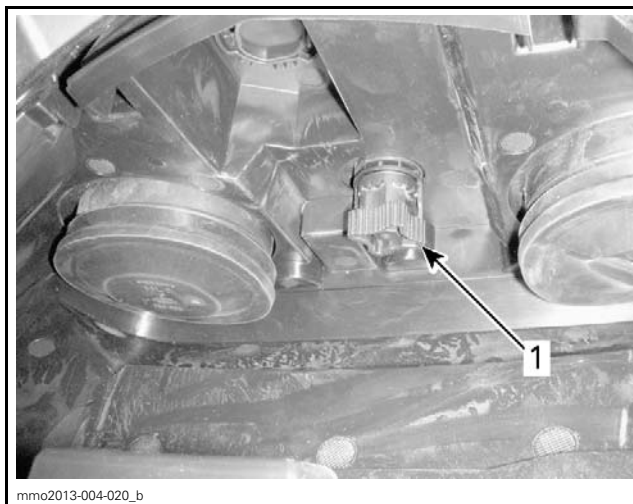
Beam Aiming Adjustment

Open the front storage compartment.

Turn knob clockwise to lower the beam height.

Turn knob counterclockwise to raise the beam height.

NOTE: Avoid reaching extreme adjustments as the headlight assembly might move out of position.



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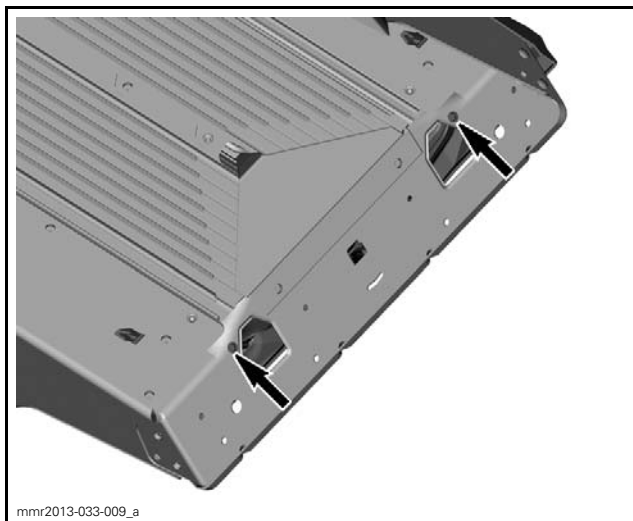
TYPICAL

1. Knob

TAILLIGHT

Taillight Replacement

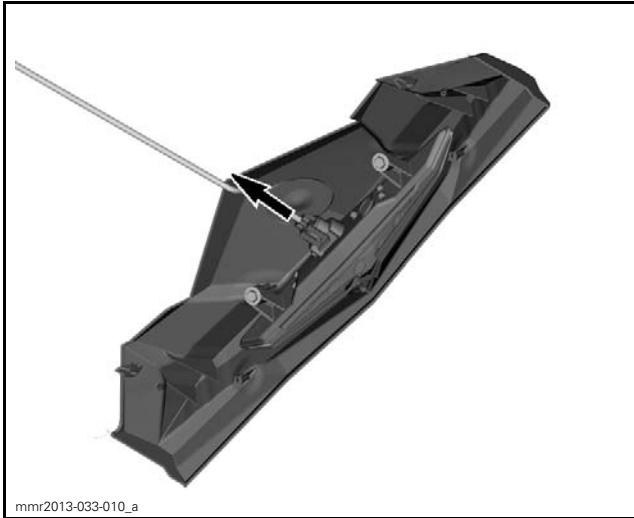
Remove both retaining bolts securing rear taillight to frame.



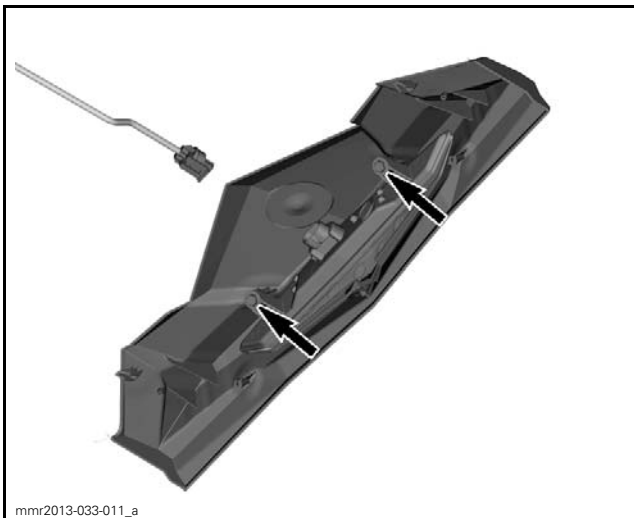
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RETAINING BOLTS LOCATION - VIEWED FROM UNDER

Pull rear taillight support out of location and disconnect taillight connector.


TAILLIGHT CONNECTOR DISCONNECTION

Remove both retaining screws securing taillight to taillight support.


RETAINING BOLTS SECURING TAILLIGHT TO TAILLIGHT SUPPORT

Replace taillight.

Installation is the reverse of removal. However pay attention to the following.

TIGHTENING TORQUE	
Taillight retaining screw	0.4 N•m (4 lbf•in)

GAUGE

Gauge Self Test Function

On ECM wake-up, the gauge will perform a self-test. All indications should come ON and gauge pointers will cycle once. You will have a few seconds to ensure the indications (LEDs and LCDs) are functioning correctly.

NOTE: This test only validates the gauge operation of the LEDs, LCDs in the gauge digital display and the pointers. It does not test the actual circuit functions related to each indication.

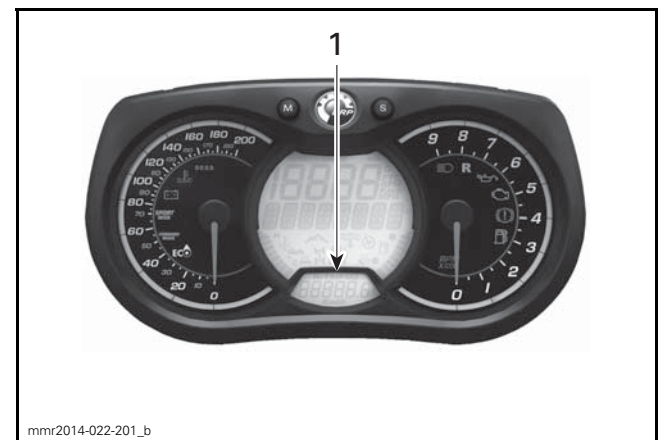
If the self test does not take place, proceed with the *GAUGE POWER INPUT TEST*.

Gauge Setup

Clock Activation (Premium Gauge)

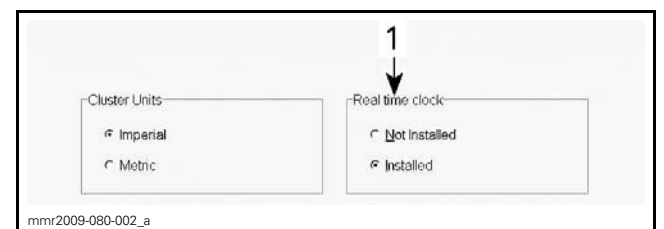
The gauge has an internal clock that can display the time of day in the lower digital display (when selected).

This clock requires power from the vehicle battery to maintain the proper time of day.



1. Clock displayed

1. Provide electrical power to the gauge, refer to *LIGHTING AND ACCESSORIES SYSTEM TESTING* in the *TROUBLESHOOTING* topic at the beginning of this subsection.
2. In B.U.D.S., select the **Setting** tab.
3. At the bottom of the page, select the **Cluster** tab.
4. Select the **Installed** in the **Real time clock** field if the vehicle is equipped with a battery. Choose **Not installed** if the vehicle does not have a battery.



1. Real time clock selection field

Subsection 11 (LIGHTS, GAUGE AND ACCESSORIES)

Changing Gauge Units of Measurement

The gauges are factory preset to indicate in metric units and can be changed using the B.U.D.S. software.

To change the gauge units of measurement in B.U.D.S.:

1. Provide electrical power to the gauge, refer to *LIGHTING AND ACCESSORIES SYSTEM TESTING* in the *TROUBLESHOOTING* topic at the beginning of this subsection for proper procedure.
2. In B.U.D.S., select the **Setting** tab.
3. At the bottom of the page, select the **Cluster** tab.
4. Select **Imperial** or **Metric** in the **Cluster Units** field.

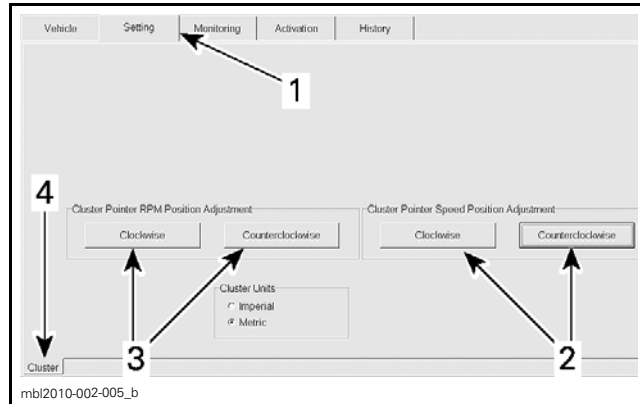


1. Cluster Units field

NOTE: Speedometer, odometer and trip meter will have their units (kilometer or miles) changed simultaneously.

Speedometer and Tachometer Pointer Adjustment

1. Make connections to use B.U.D.S. Refer to *COMMUNICATION TOOLS AND B.U.D.S.*
2. In B.U.D.S., select the **Setting** tab.
3. At the bottom of the page, select the **Cluster** tab.
4. Ensure to be facing gauge to prevent parallax error.
5. Click on **Clockwise** or **Counterclockwise** button to align gauge pointer with the zero (0).

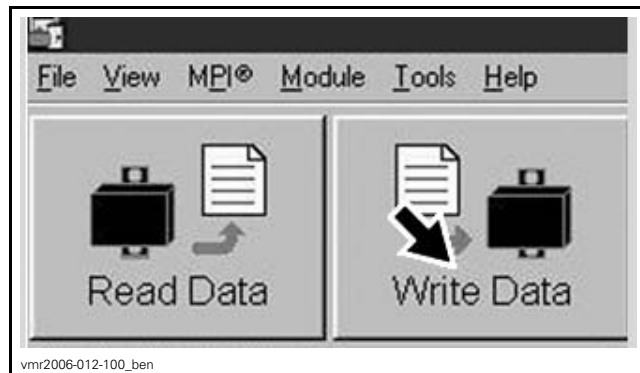


TYPICAL

1. Setting tab
2. Speedometer pointer buttons
3. Tachometer pointer buttons
4. Cluster tab

NOTE: Because of the fine tuning of the pointer, the button must be pressed several times before perceiving pointer movement.

6. Click on **Write Data** to save the new setting in the gauge.



WRITE DATA

Displaying "P" Codes (Premium Gauge Only)

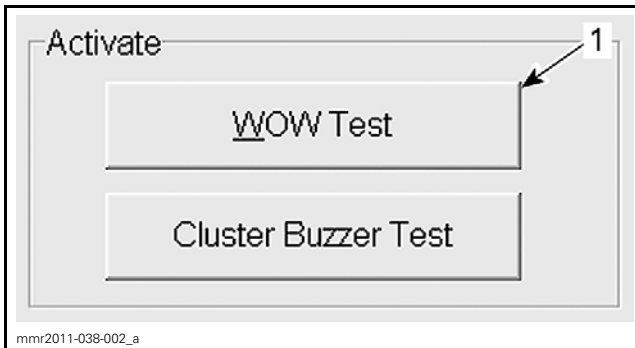
1. To activate **P CODE** mode, push and hold the "M" button for 2 seconds.
2. As you hold the "M" button, quickly turn ON and OFF the high beams a few times. The gauge will enter **P CODE** mode.
3. While in **P CODE** mode, use the "M" or "S" button to scroll over available failure codes.
4. Push and hold the "M" button to exit **P CODE** mode.

A **NO ACTIVE P CODE** message is displayed if there are no **P CODES** in memory.

Gauge Test With B.U.D.S.

The *GAUGE SELF TEST* can be duplicated using B.U.D.S.

1. Connect vehicle to B.U.D.S. Refer to *COMMUNICATION TOOLS AND B.U.D.S.* subsection.
2. In B.U.D.S., choose the **Activation** tab.
3. At the bottom of the page, select the **Cluster** tab.
4. Select **WOW Test** in the **Activate** field.



1. Select this button

Gauge Power Input Test (Main 12 Vdc)

If the gauge does not come on when the engine is started, carry out the following test.

1. Remove multifunction gauge.
2. Disconnect the gauge connector.
3. Set multimeter to Vdc.
4. Start engine.
5. Measure voltage with the battery ground as per following table.

GAUGE CONNECTOR	VOLTAGE
Pin 8 (RD/GY)	Approximately 14 Vdc

6. If gauge main power input test was as specified, carry out the gauge *GROUND CIRCUIT CONTINUITY TEST*.
7. If no voltage was read, test wiring continuity. Refer to *WIRING DIAGRAM* for details.

NOTE: The gauge receives its main power input directly from the primary 12 Vdc bus. There are no fuses or relays to test, only wiring and connectors.

Gauge Ground Circuit Continuity Test

1. Set multimeter to Ω selection.
2. Measure for continuity of gauge ground wire as per following table.

GAUGE CONNECTOR	RESISTANCE
Pin 11 (BK)	Close to 0 Ω

If ground test failed, check vehicle ground. Refer to *POWER DISTRIBUTION* subsection.

If gauge power input test and ground circuit continuity tests are good, replace gauge.

Clock 12 Vdc Input Test (Premium Gauge)

If the clock function in the premium gauge does not hold the proper time of day when the engine is not running, carry out the following test.

NOTE: The clock receives 12 Vdc from the battery through the 15 A START fuse (FB) in order to maintain correct time when the engine is not running.

1. Remove multifunction gauge.
2. Disconnect the gauge connector.
3. Set multimeter to Vdc.
4. Measure voltage as per following table.

MODELS	GAUGE CONNECTOR	VOLTAGE
All	Pin 9 (RD/BN)	Battery voltage

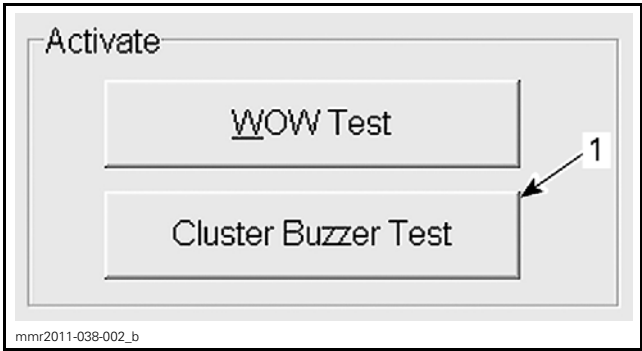
NOTE: If the START fuse was open, the electrical start function, as well as the electro-mechanical reverse on **GTX and GSX models**, would not be operational.

5. If there is no voltage read, test input wire continuity. Refer to *WIRING DIAGRAM* for circuit details.

Gauge Beeper Test

To test beeper, perform the following test with B.U.D.S.

1. Connect vehicle to B.U.D.S. Refer to *COMMUNICATION TOOLS AND B.U.D.S.*
2. In B.U.D.S., choose the **Activation** tab.
3. At the bottom of the page, select the **Cluster** tab.
4. Select **Cluster Buzzer Test** in the **Activate** field.



1. Select this button

You should hear a few beeps.
– If you do not hear the beeper, replace gauge.

Gauge Button Test with B.U.D.S.

Using the B.U.D.S. software, select the **Monitoring** tab.

On the bottom of the page, choose the **Cluster** tab.

Standard Gauge

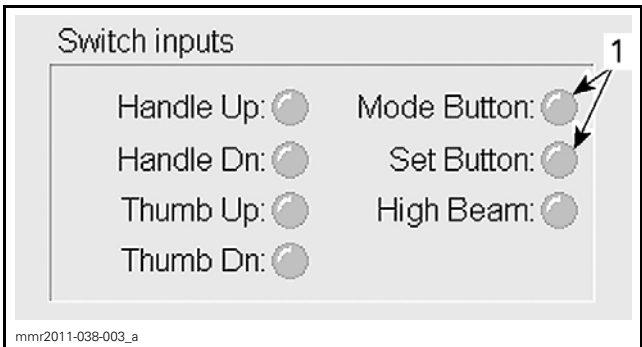
Press on the gauge “S” button and look for applicable indicator light in the **Switch inputs** field to turn green.



1. Indicator light

Premium Gauge

Alternately press on the gauge “M” and “S” buttons and look for applicable indicator light in the **Switch inputs** field to turn green.



1. Indicator lights

All Gauges

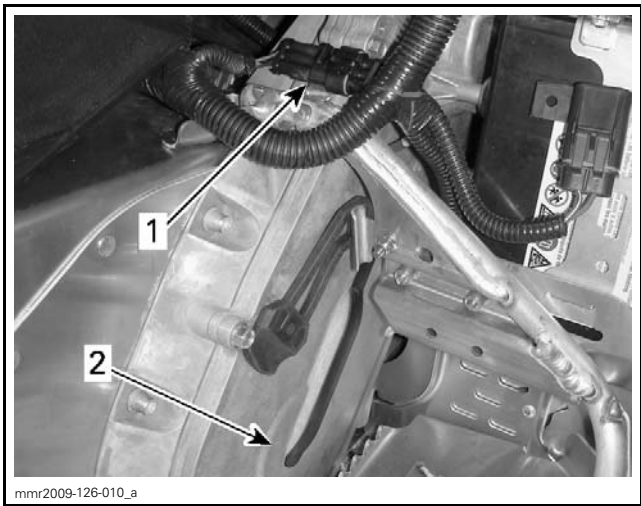
If the indicator light(s) come ON in B.U.D.S., the gauge button(s) is(are) functioning correctly.

If the indicator light(s) do not come ON, check button(s). If they are in good condition, replace gauge.

Gauge Speedometer Function Test

First ensure the gauge pointer is not stuck. Refer to *GAUGE TEST WITH B.U.D.S.* in this subsection.

- 1. Unplug speed sensor connector.



TYPICAL

- 1. Speed sensor connector
- 2. Speed sensor (inside cover)

- 2. Provide electrical power to the gauge for testing. Refer to *LIGHTING AND ACCESSORIES SYSTEM TESTING* in the *TROUBLESHOOTING* topic at the beginning of this subsection.
- 3. Use the FLUKE 115 MULTIMETER (P/N 529 035 868).
- 4. Set multimeter to Vdc.
- 5. Probe connector on vehicle harness side as per table.

GAUGE VOLTAGE TEST		
SPEED SENSOR CONNECTOR (MAIN HARNESS SIDE)		VOLTAGE
RD/BK	BK/RD	Close to battery voltage
GN/WH	BK/RD	Close to battery voltage

If test succeeded, gauge is good, proceed with *SPEED SENSOR SIGNAL TEST*.

If test failed, check wiring harness going to gauge.
If wiring harness is good, replace gauge.

Gauge Fuel Level Function Test

1. Unplug fuel pump connector.
2. Provide electrical power to the gauge for testing. Refer to *LIGHTING AND ACCESSORIES SYSTEM TESTING* in the *TROUBLESHOOTING* topic at the beginning of this subsection.
3. Use the FLUKE 115 MULTIMETER (P/N 529 035 868).
4. Set multimeter to Vdc.
5. Probe connector on vehicle harness side as per table.

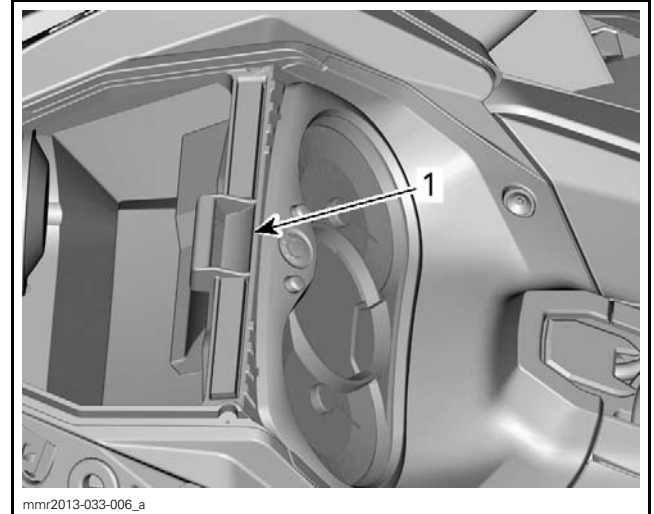
GAUGE VOLTAGE TEST		
FUEL LEVEL SENSOR CONNECTOR (MAIN HARNESS SIDE)		VOLTAGE
BU	BK/RD	Approximately 5 V

If test succeeded, gauge is good, proceed with *FUEL LEVEL SENSOR TEST* in *FUEL TANK AND FUEL PUMP* subsection.

If test failed, check wiring harness going to gauge.
If wiring harness is good, replace gauge.

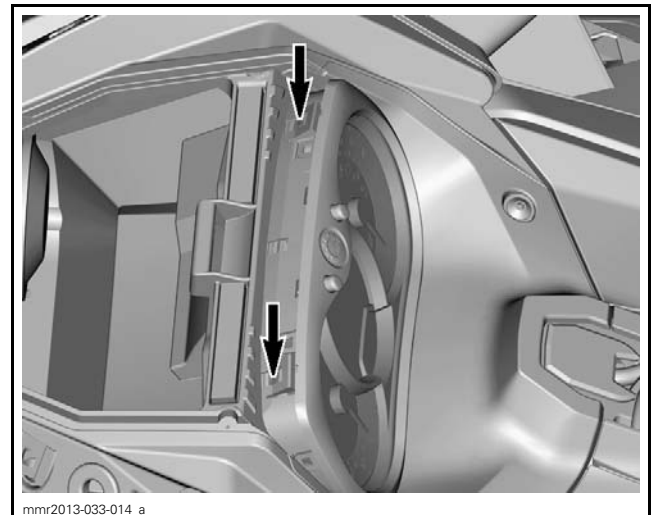
Gauge Removal

1. Open storage compartment.



1. Storage compartment

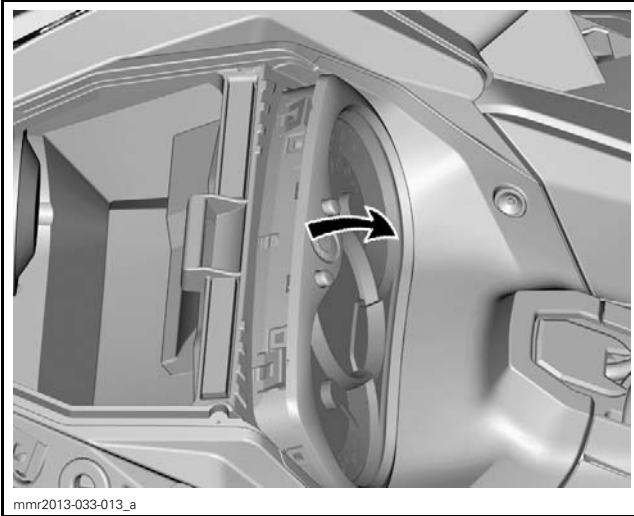
2. Insert a small screwdriver in one of the rectangular slots at top of gauge.
3. As you gently press down on the screwdriver to release multifunction gauge locking tab, pull out and hold gauge in position.
4. Insert screwdriver in second hole and press to release other tab.



RETAINING TABS TO PRESS ON

5. Gently pull multifunction gauge from gauge support.

Subsection 11 (LIGHTS, GAUGE AND ACCESSORIES)



TYPICAL

6. Press on connector locking tab and pull connector off gauge.
7. Store gauge in a secure area to prevent it from being damaged.

Gauge Installation

1. Carefully align and install gauge connector, pressing it in until connector lock engages.
2. Insert bottom of gauge in gauge holder.
3. Press top of gauge in holder until you feel locking tabs engage in holder.
4. Start vehicle engine and test gauge functions.

NOTE: If a new gauge is installed, refer to *GAUGE TO ECM MATCHING*.

Gauge to ECM Matching

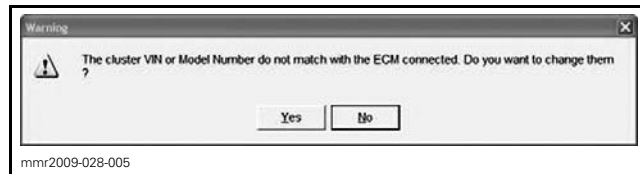
NOTE: If the gauge is replaced, the VIN (Vehicle Identification Number) and the vehicle model number must be entered in the gauge memory so they match those stored in the ECM.

If the numbers stored in the gauge do not match those stored in the ECM, the engine will start but the new gauge will stop operating within 10 seconds after the engine is started. The indicator needles will function normally but the LCD display will remain blank and the D.E.S.S. LED will be turned ON. This is a gauge anti-theft feature.

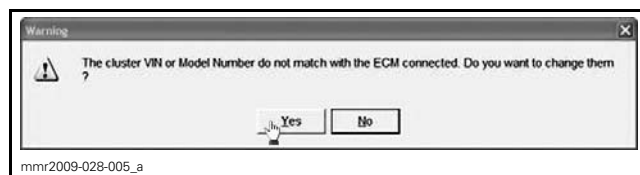
NOTE: If the ECM is replaced, the numbers stored in the ECM and gauge must match. Refer to *ECM REPLACEMENT* and *ECM DATA ENTRY*.

1. To write the VIN number and model number into the gauge, connect to the applicable B.U.D.S. version from BOSSWeb. Refer to the *COMMUNICATION TOOLS AND B.U.D.S.* subsection.

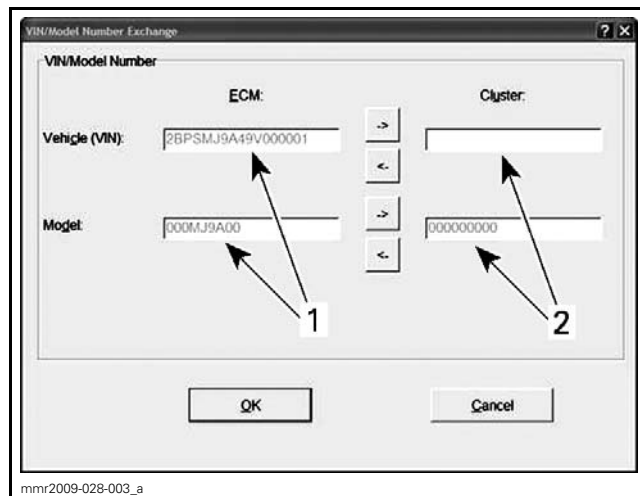
2. Follow the instructions in the referenced subsection and in the software.
3. Once connected and activated, select the **Read Data** button. You will see a message similar to the following illustration.



4. Select **Yes** in the displayed window.

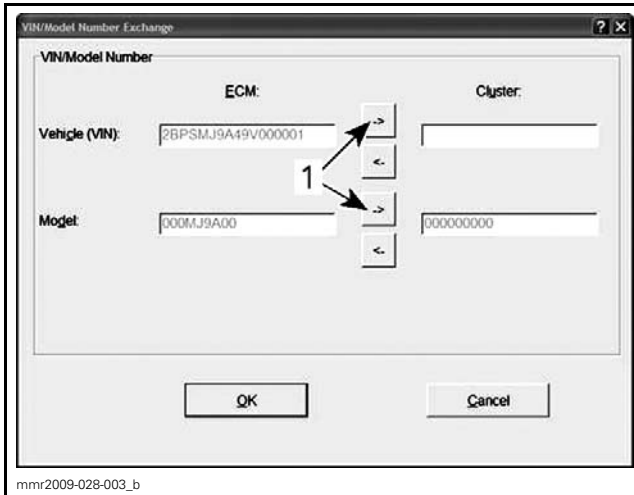


The following window illustrates that the VIN number or model number in the ECM and cluster are not the same.



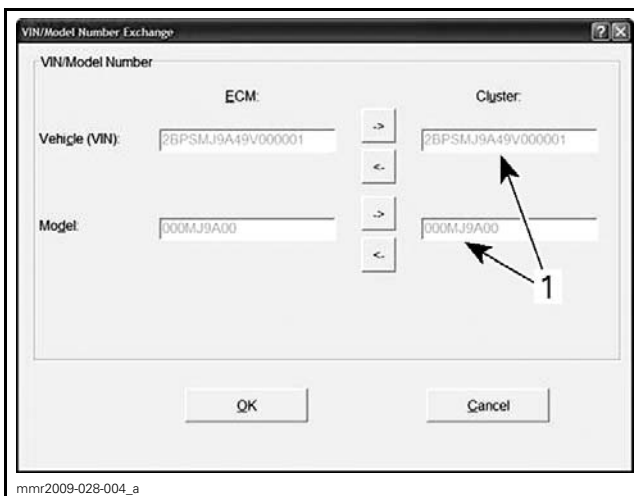
1. Numbers stored in ECM
2. No numbers stored in new cluster

5. Select each of the arrows indicated in the following illustration to copy the VIN and model numbers from the ECM to the cluster.



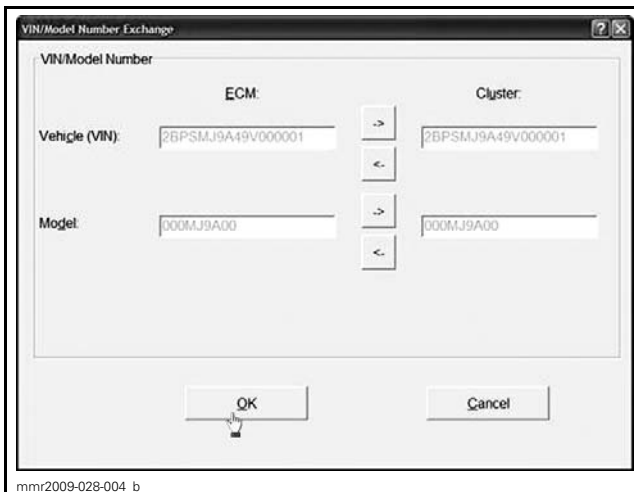
1. Select each arrow button indicated

Note how the numbers in the **Cluster** field now match those in the **ECM** field.



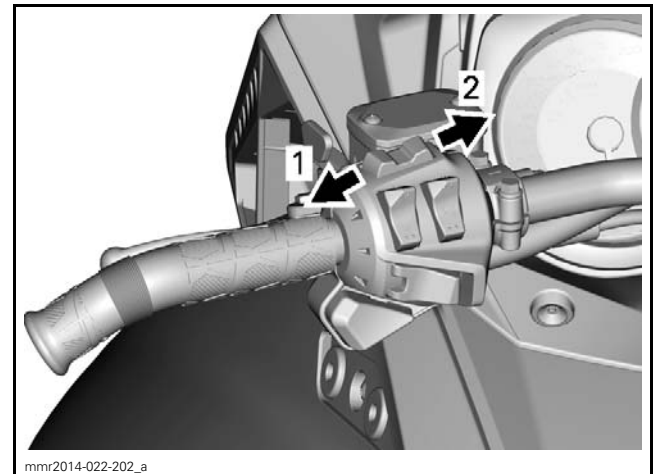
1. Numbers in Cluster field now match those in the ECM field

6. Select OK to continue.



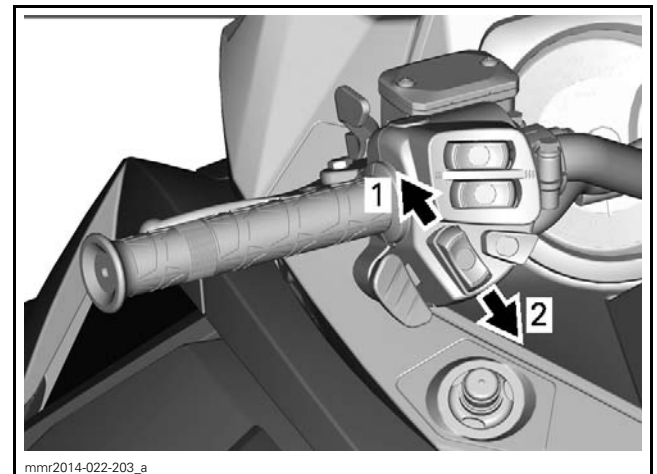
7. Once the gauge has been matched to the ECM, you will need to set the units of measurement (imperial or metric). See procedures in this subsection.
8. Ensure the gauge functions properly and that all settings and indications are within parameters.
9. Be sure to set the clock function according to gauge and vehicle type, refer to *CLOCK ACTIVATION (PREMIUM GAUGE)* in this subsection.
10. Shut down vehicle and disconnect the communication tools.

REMOTE MODE AND SET BUTTONS (PREMIUM GAUGE)



GSX MODELS - MULTIFUNCTION SWITCH

1. MODE function
2. SET function



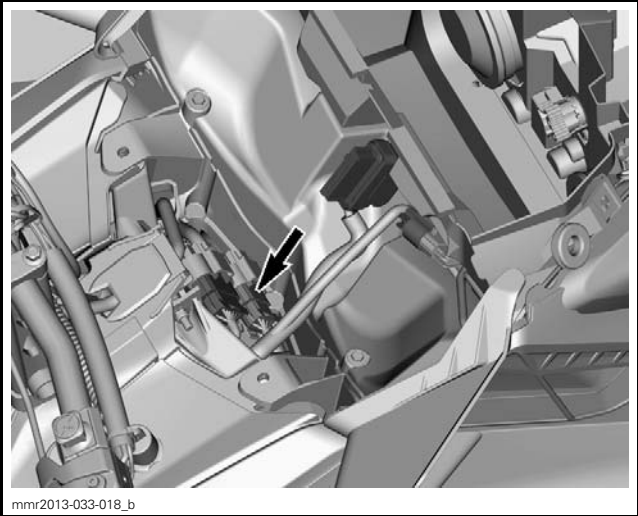
GTX MODELS - MULTIFUNCTION SWITCH

1. MODE function
2. SET function

Remote M/S Button Test with 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. Using the B.U.D.S. software, select the **Monitoring** tab.
- 3. On the bottom of the page, choose the **Cluster** tab.
- 4. Alternately press on the remote “M” and “S” buttons and look for the applicable indicator light in the **Switch inputs** field to turn GREEN.

NOTE: Indicator lights should not be GREEN when no button is pressed.



TYPICAL - WMS CONNECTOR (8 PIN)

- 4. Using a multimeter set to Ω , carry out the following continuity test.

REMOTE M/S BUTTON TEST			
SWITCH SELECTION	WMS CONNECTOR (8 PIN) WIRE		RESISTANCE
Centered	Pin B (YE/BN)	Pin A (BK)	Infinite Ω
	Pin G (YE/GN)		
M	Pin B (YE/BN)	Pin A (BK)	Close to 0 Ω
S	Pin G (YE/GN)		

If you do not obtain the values as specified, repair or replace switch, wiring and connections.

SPEED SENSOR

Speed Sensor Location

The speed sensor is mounted in the chaincase cover.

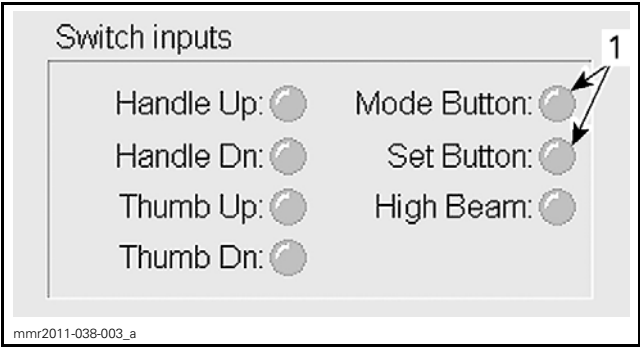
Speed Sensor Signal Test

First proceed with the *GAUGE SPEEDOMETER FUNCTION TEST* in this subsection.

- 1. Lift and support rear of vehicle.

CAUTION Use proper lifting techniques, notably using your leg force. Do not attempt to lift the vehicle if it is above your limits.

- 2. Ensure speed sensor connector is properly connected.



1. Indicator lights

If the indicator lights come ON in B.U.D.S., the remote **M/S** button is functioning correctly and the gauge receives the signals from the switches.

If the indicator lights do not come ON, verify the switch is not damaged internally, then carry out the *REMOTE M/S BUTTON CONTINUITY TEST* procedure in this subsection.

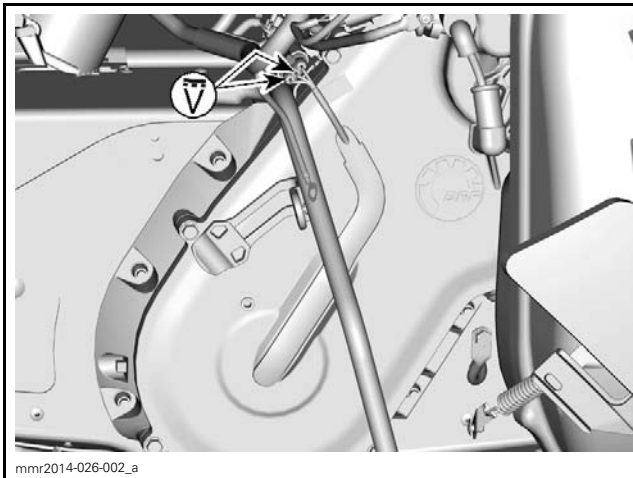
Remote M/S Button Continuity Test

- 1. If using the remote **M/S** button does not affect the indication, try using the buttons on the gauge. If they function, the remote **M/S** button circuit may be open.
- 2. Remove the gauge.
- 3. Disconnect the WMS connector (8 pin).

3. Provide electrical power to the gauge for testing. Refer to *LIGHTING AND ACCESSORIES SYSTEM TESTING* in the *TROUBLESHOOTING* topic at the beginning of this subsection for proper procedure.
4. Rotate driven pulley so that tracks rotates slowly.
5. Back-probe connector with Fluke TP88 rigid back probe pins or equivalent, between wires as per table.

NOTICE Be careful not to damage connector seals when back probing.

SPEED SENSOR SIGNAL TEST			
ROTATE DRIVEN PULLEY	SPEED SENSOR CONNECTOR (SENSOR SIDE)		VOLTAGE
	GN	BK	Alternate 7 Vdc and 0 Vdc



TYPICAL — SENSOR SIGNAL VOLTAGE TEST

The signal voltage should alternate between approximately 12 Vdc and 0 Vdc.

If test failed, replace the speed sensor.

Speed Sensor Replacement

The sensor can be replaced with the chaincase cover as an assembly. In such a case, refer to *CHAINCASE* subsection.

To replace sensor only, proceed as follows.

Speed Sensor Removal

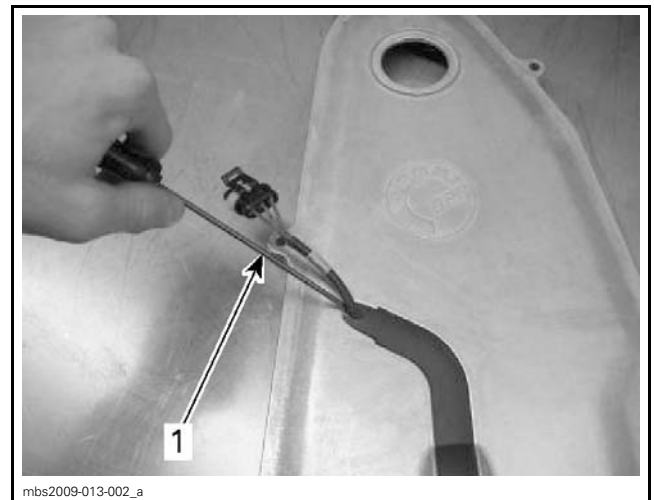
1. Remove chaincase cover, refer to *CHAINCASE* subsection.
2. Using a heat gun, heat the speed sensor at plastic sheath end.



1. Plastic sheath end

NOTE: Plastic sheath color will slightly change, which tells it is adequately heated.

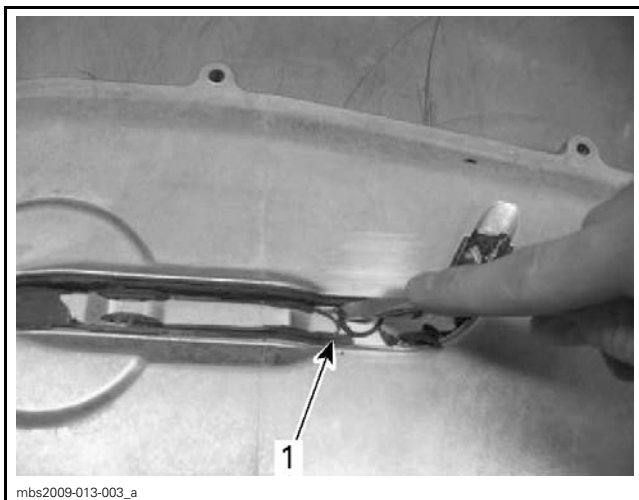
3. Use a flat screwdriver to pry out the end of the plastic sheath from chaincase cover.



1. Prying out plastic sheath

NOTICE Use care when prying out the plastic sheath not to damage the chaincase cover.

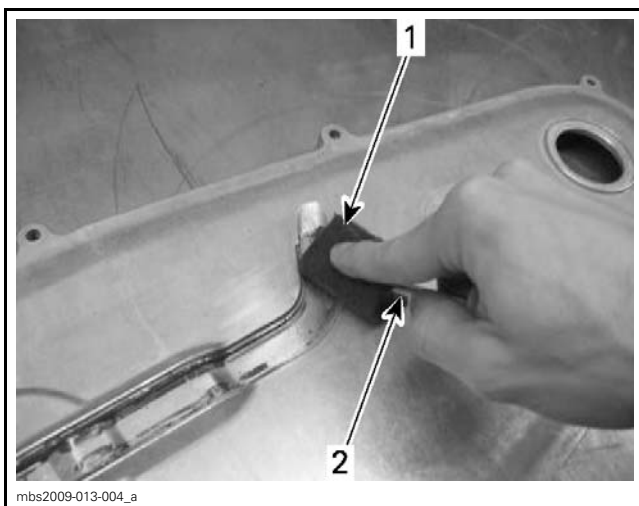
4. Heat the next section of the plastic sheath.
5. Pry out the heated section using the flat screwdriver.
6. Repeat steps 4 and 5 until the plastic sheath is completely removed.
7. Use the flat screwdriver to remove the remaining sealant from the chaincase cover.



1. Remaining sealant

NOTICE Do not apply excessive pressure when removing the remaining sealant not to damage the chaincase cover.

8. Rub the sealant using a scouring pad.



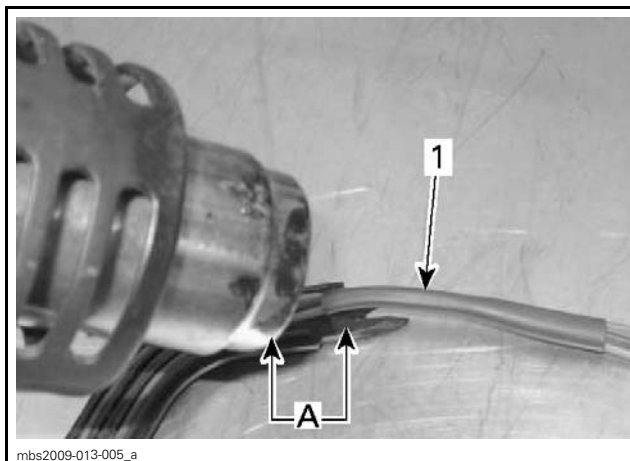
1. Scouring pad
2. Flat screwdriver

Speed Sensor Installation

1. Thoroughly clean the surface where the speed sensor is to be stuck.

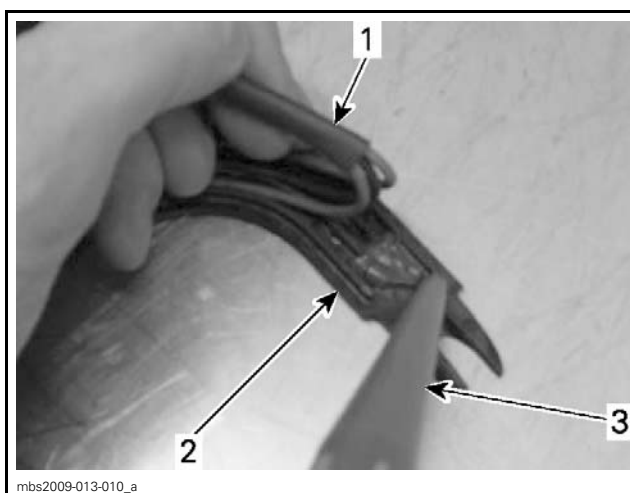
NOTE: Make sure surface is clean and free of grease.

2. Slide the shrink tubing into sensor plastic housing. The end of tubing must be inside sensor plastic housing about 15 mm (19/32 in).



1. Shrink tubing
A. 15 mm (19/32 in)

3. Apply LOCTITE 5900 (P/N 293 800 066) under the sensor wires, between the end of the guide grooves and the plastic sheath extremity.

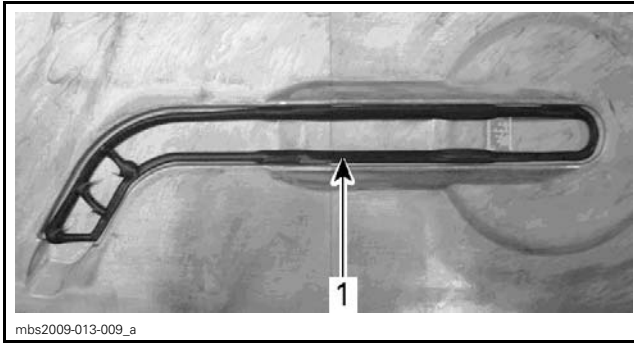


1. Sensor wires
2. Plastic sheath extremity
3. Loctite 5900 (P/N 293 800 066) bottle tip

NOTE: The assembly must be watertight.

4. Apply LOCTITE 5900 (P/N 293 800 066) all around the plastic sheath location on the chaincase cover.

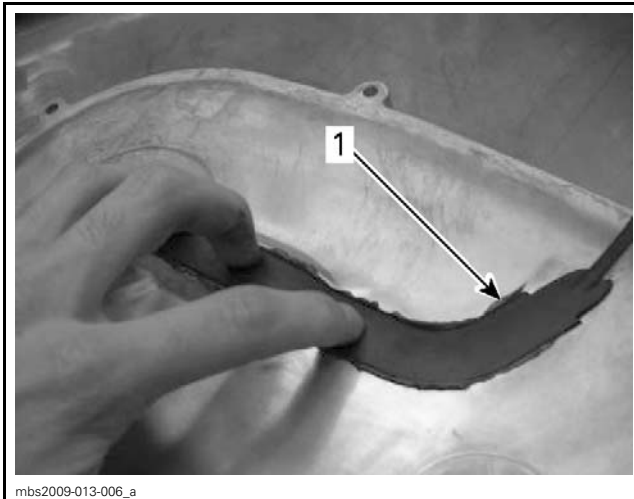
Follow the pattern shown on the next picture.



1. Loctite 5900 (P/N 293 800 066)

NOTE: Make sure the plastic sheath circumference is well covered.

5. Place the plastic sheath in position and firmly push in order to evacuate all the surplus sealant. Keep pressure for at least 1 minute.

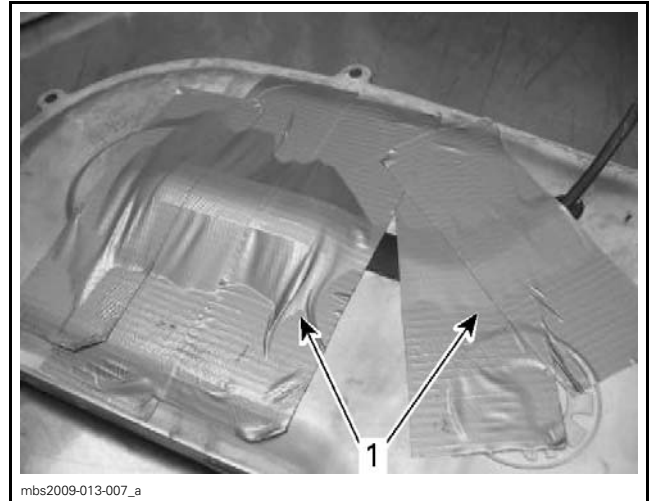


1. Surplus sealant

6. Wipe off all the sealant surplus around the plastic sheath.
7. Once cleaned up, inspect all the circumference for sealant lacks.

NOTE: Sealant must be visible all around.

8. Place some adhesive tape on the sensor to maintain a pressure on the sensor for at least 24 hours.



1. Adhesive tape

NOTE: Wait for at least 1 hour before exposing vehicle to cold temperature.

9. Reinstall chaincase cover, refer to *CHAINCASE* subsection.

FUEL LEVEL SENSOR

First proceed with the *GAUGE FUEL LEVEL FUNCTION TEST* in this subsection.

Refer to *FUEL TANK AND FUEL PUMP* for *FUEL SENSOR RESISTANCE TEST*.

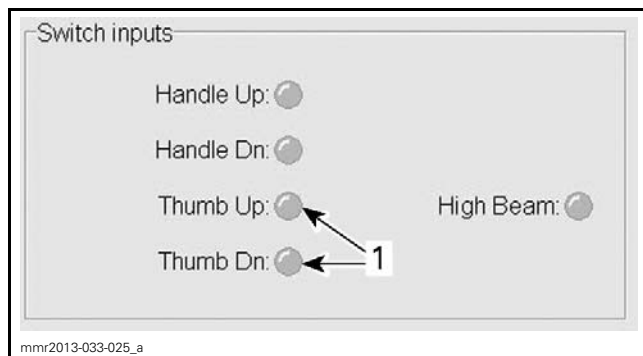
HEATED THROTTLE LEVER

Throttle Lever Heat Switch Test with B.U.D.S.

1. Provide electrical power to the gauge for testing. Refer to *LIGHTING AND ACCESSORIES SYSTEM TESTING* in the *TROUBLESHOOTING* topic at the beginning of this subsection for proper procedure.
2. Using the B.U.D.S. software, select the **Monitoring** tab.
3. On the lower LH side of the page, choose the **Cluster** tab.
4. Press on the vehicle thumb lever heat switch to alternately increase or decrease heat.
5. In B.U.D.S., look for the applicable indicator light in the **Switch inputs** field to turn GREEN (Thumb Up or Thumb Dn).

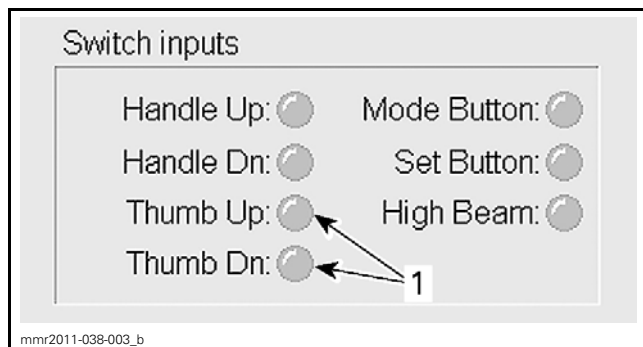
NOTE: Indicator lights should not be GREEN when no button is pressed.

Subsection 11 (LIGHTS, GAUGE AND ACCESSORIES)



STANDARD GAUGE

1. Throttle lever heat selection



PREMIUM GAUGE

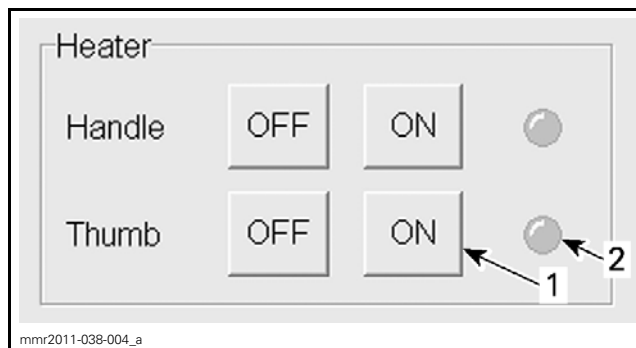
1. Throttle lever heat selection

If test is good, proceed with *GAUGE HEATER OUTPUT TEST WITH B.U.D.S.* in this subsection.

If test failed, proceed with *THROTTLE LEVER HEAT SWITCH TEST* in this subsection.

Gauge Heater Power Output Test with B.U.D.S.

1. Provide electrical power to the gauge for testing. Refer to *LIGHTING AND ACCESSORIES SYSTEM TESTING* in the *TROUBLESHOOTING* topic at the beginning of this subsection for proper procedure.
2. Using the B.U.D.S. software, select the **Activation** tab.
3. On the lower LH side of the page, choose the **Cluster** tab.
4. In B.U.D.S., select the **ON** button next to **Thumb**
5. Look for the indicator light next to the **ON** button to turn GREEN and touch throttle lever to confirm it heats up.



1. Throttle lever heat selection
2. Indicator light should turn GREEN

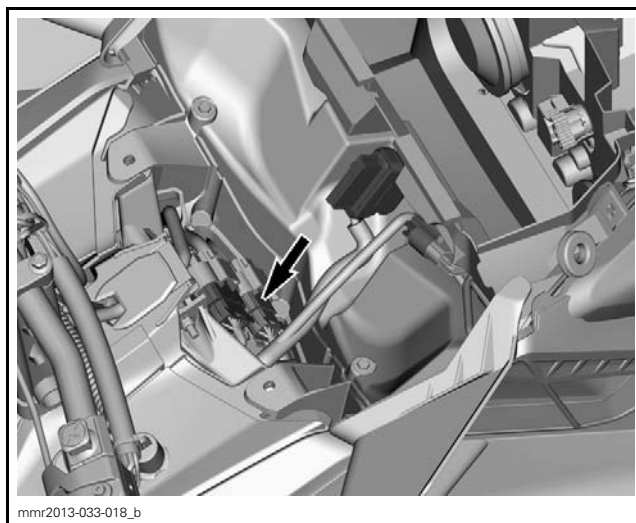
6. If test is good, the gauge output to throttle lever heater is good. Proceed with *THROTTLE LEVER HEATING ELEMENT TEST* in this subsection.

7. If the test failed, replace the gauge.

NOTE: When finished testing, ensure to select the **OFF** button next to **Thumb** in B.U.D.S.

Throttle Lever Heat Switch Test

1. Remove the gauge.
2. Disconnect the WMS connector (8 pin).



TYPICAL - WMS CONNECTOR (8 PIN)

3. Using the FLUKE 115 MULTIMETER (P/N 529 035 868), select the Ω position.
4. Test throttle lever heat switch and circuits as per table.

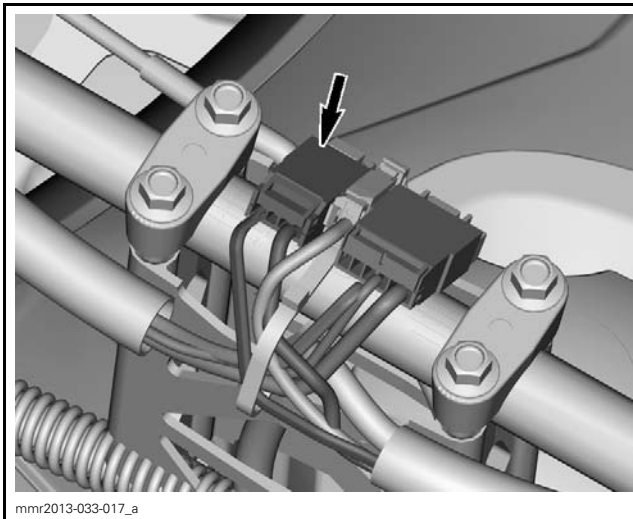
THROTTLE LEVER HEAT SWITCH TEST			
SWITCH SELECTION	WMS PIN		RESISTANCE
UP	D	A	Close to 0 Ω
	C	A	Infinite (OL)
DOWN	D	A	Infinite (OL)
	C	A	Close to 0 Ω

If continuity test is as per specification, proceed with *THROTTLE LEVER HEATING ELEMENT TEST* in this subsection.

If continuity test is out of specification, check switch circuit as per wiring diagram. If good, replace switch.

Throttle Lever Heating Element Test

1. Disconnect the RH steering connector (4 pin) located under the steering cover.



TYPICAL — RH STEERING CONNECTOR (4 PIN)

2. Carry out a resistance check of the heating elements as follows.

THROTTLE LEVER HEATING ELEMENT TEST STANDARD GAUGE			
SWITCH SELECTION	HEATER WIRE		RESISTANCE @ 20°C (68°F)
DOWN	BN/YE	BK	5.7 to 18.5 Ω
UP	BN		1.7 to 4.2 Ω

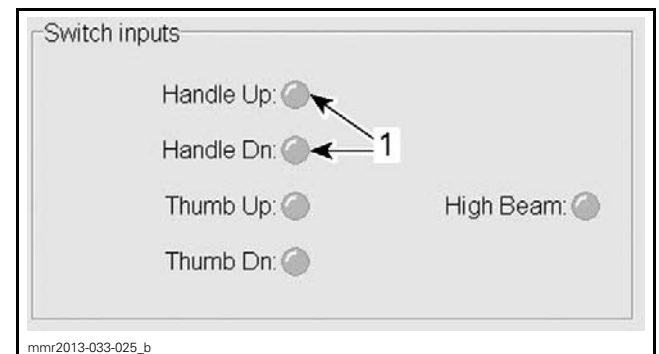
3. If readings are out of specifications, replace throttle lever.
4. If heating element readings are within specifications, check wiring and connections.
5. Reconnect connectors.

HEATED HANDLEBAR GRIPS

Handlebar Heated Grip Switch Test with B.U.D.S.

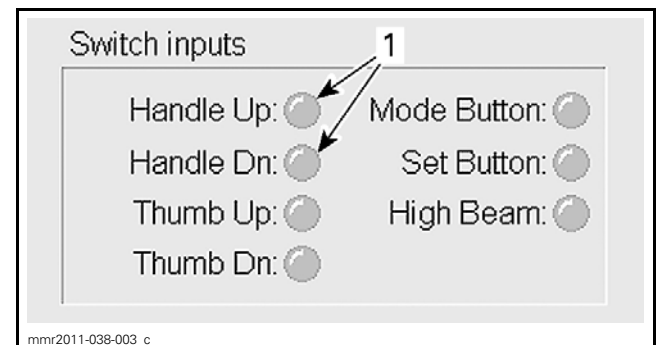
1. Provide electrical power to the gauge for testing. Refer to *LIGHTING AND ACCESSORIES SYSTEM TESTING* in the *TROUBLESHOOTING* topic at the beginning of this subsection for proper procedure.
2. Using the B.U.D.S. software, select the **Monitoring** tab.
3. On the lower LH side of the page, choose the **Cluster** tab.
4. Press on the vehicle handle grip heat switch to alternately increase or decrease heat.
5. In B.U.D.S., look for the applicable indicator light in the **Switch inputs** field to turn GREEN (Handle Up or Handle Dn).

NOTE: Indicator lights should not be GREEN when no button is pressed.



STANDARD GAUGE

1. Handle grip heat selection



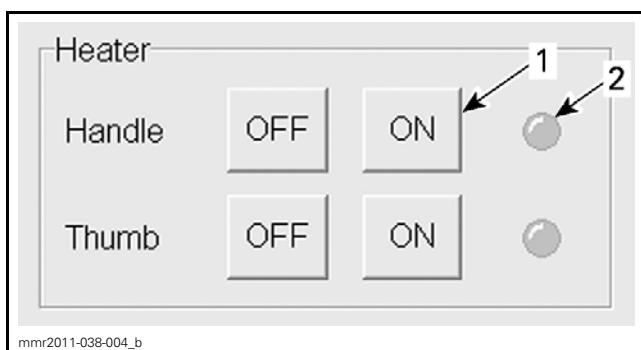
PREMIUM GAUGE

1. Handle grip heat selection

If test is good, proceed with *GAUGE HEATER OUTPUT TEST WITH B.U.D.S.* in this subsection. If test failed, proceed with *HANDLEBAR GRIP HEAT SWITCH TEST* in this subsection.

Gauge Heater Power Output Test with B.U.D.S.

1. Provide electrical power to the gauge for testing. Refer to *LIGHTING AND ACCESSORIES SYSTEM TESTING* in the *TROUBLESHOOTING* topic at the beginning of this subsection for proper procedure.
2. Using the B.U.D.S. software, select the **Activation** tab.
3. On the lower LH side of the page, choose the **Cluster** tab.
4. In B.U.D.S., select the **ON** button next to **Handle**.
5. Look for the indicator light next to the **ON** button to turn GREEN.



1. Hand grip heat selection
2. Indicator light should turn GREEN

6. If test is good, the gauge heater to handlebar grip heater is good. Proceed with *HANDLEBAR GRIP HEATING ELEMENT TEST* in this subsection.

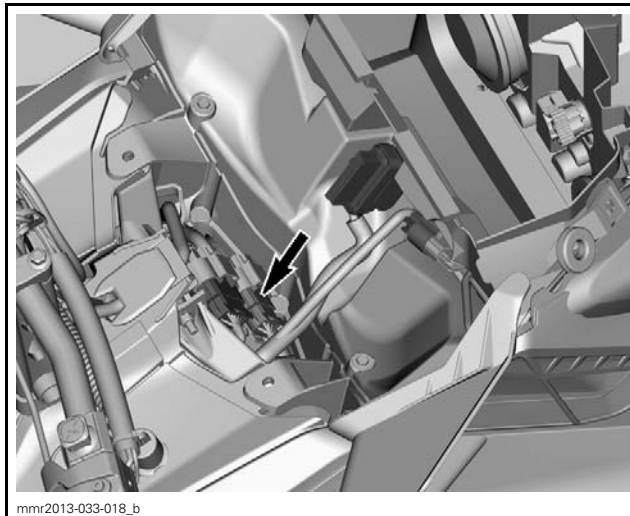
7. If the test failed, replace the gauge.

NOTE: When finished testing, ensure to select the **OFF** button next to **Handle** in B.U.D.S.

Handlebar Heated Grip Switch Test

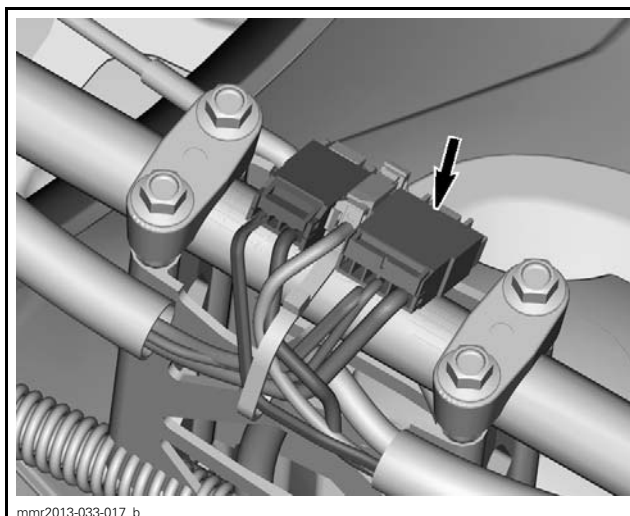
Remove the gauge.

Disconnect the WMS connector (8 pin).

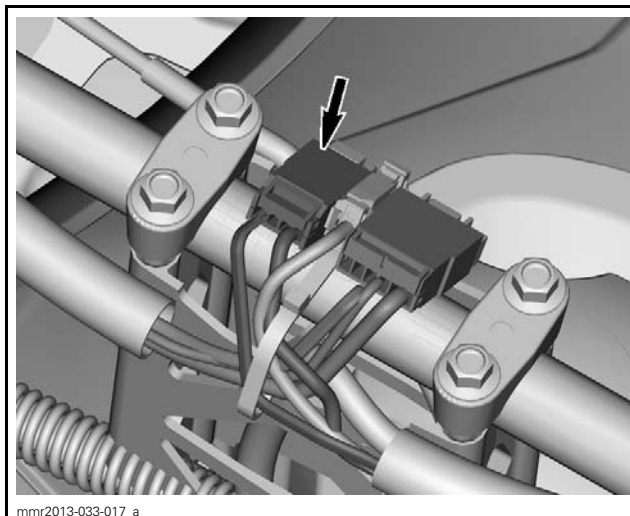


TYPICAL - WMS CONNECTOR (8 PIN)

Disconnect both LH (6 pin) and RH (4 pin) connectors under the steering cover.



TYPICAL LH STEERING CONNECTOR (6 PIN)



TYPICAL — RH STEERING CONNECTOR (4 PIN)

To test the RH heater circuit, probe the RH steering connector (4 pin).

To test the LH heater circuit, probe the LH steering connector (6 pin).

Using the FLUKE 115 MULTIMETER (P/N 529 035 868), select the Ω position.

Test handlebar grips switch and circuits as per table.

HANDLEBAR HEATED GRIP SWITCH TEST RH HEATER			
SWITCH SELECTION	WMS PIN	RH PIN	RESISTANCE
UP	F	1	Close to 0 Ω
		4	Infinite (OL)
DOWN	E	4	Infinite (OL)
		1	Close to 0 Ω

HANDLEBAR HEATED GRIP SWITCH TEST LH HEATER			
SWITCH SELECTION	CONNECTORS		RESISTANCE
	WMS PIN	LH PIN	
UP	F	2	Close to 0 Ω
		1	Infinite (OL)
DOWN	E	1	Infinite (OL)
		2	Close to 0 Ω

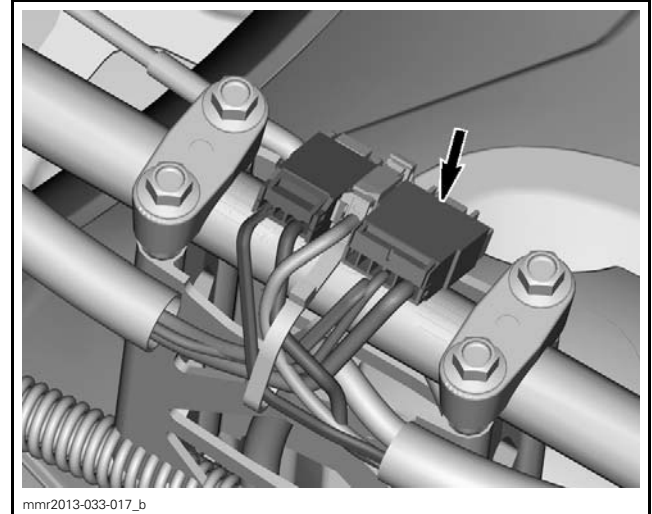
If continuity test is as per specification, proceed with *HANDLEBAR GRIP HEATING ELEMENT TEST* in this subsection.

If continuity test is out of specification, check switch circuit. If good, replace switch.

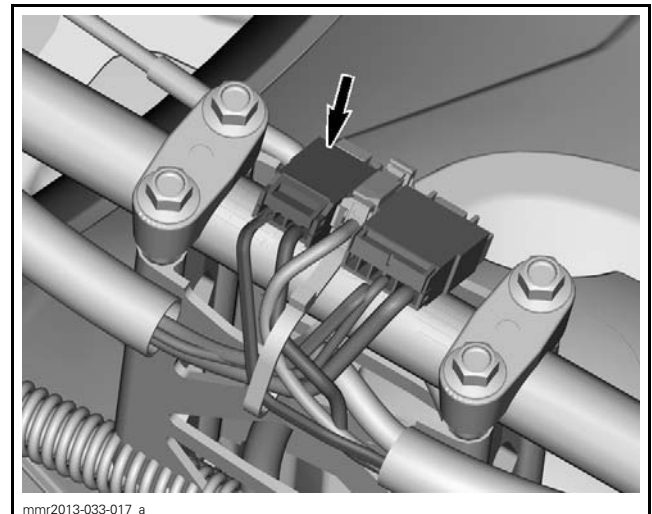
Handlebar Grip Heating Element Test

If you cannot feel the temperature increase of a hand grip heating element, carry out the following steps.

1. Disconnect the two steering connectors located under the steering cover.



TYPICAL LH STEERING CONNECTOR (6 PIN)



TYPICAL — RH STEERING CONNECTOR (4 PIN)

2. Test heating elements on either side as per following specifications.

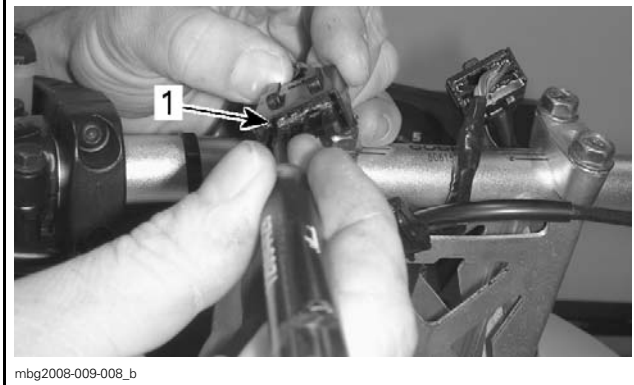
HANDLEBAR GRIP HEATING ELEMENT TEST 32 W ADHESIVE FILM HEATERS FOR ALUMINUM HANDLEBAR		
HEATER WIRE		RESISTANCE @ 20°C (68°F)
OG	BK	5.3 to 6.6 Ω

3. If readings are out of specifications, replace applicable handle grip heating element.
4. If heating element readings are within specifications, check wiring and connections.
5. Reconnect connectors.

Heater Element Removal

NOTICE Heater wire routing may vary significantly due to different type handlebars and vehicles. Its highly important to take note of exact positioning of grip heaters, locking ties, and wire routing before removing them from the handlebars. Failure to properly route wires may lead to equipment damage or failure.

1. Remove the following items as applicable, refer to *STEERING SYSTEM* subsection for details.
 - Steering cover
 - Rubber hand grip
 - Multifunction switch cover.
2. Disconnect the LH (6 pin) or RH (4 pin) steering connectors under the steering cover (as applicable).

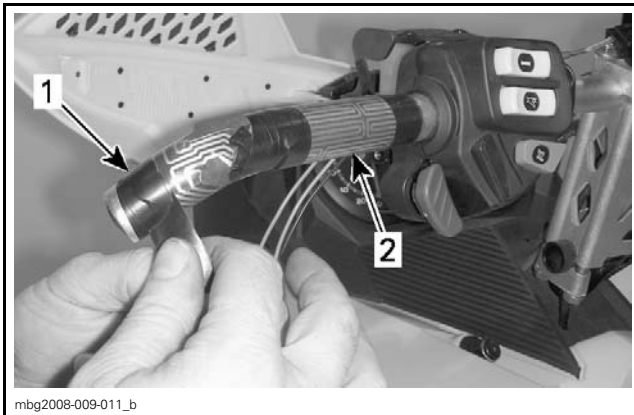


TYPICAL — UNLOCKING CONNECTOR PIN (FRONT SIDE)
1. Pin removal tool inserted above pin

NOTE: Terminals are unlocked and pushed out from the front (pin side) of the connector housing.

NOTICE Be sure to take note of exact positioning of grip heaters, locking ties, and wire routing before removing them from the handlebars.

5. Cut locking ties securing heater wires to handlebars.
6. Pull wires from harness protective sheath, multifunction switch housing or throttle lever housing.
7. Cut and remove black electrical tape from heater element and remove heater from cork insulator.



TYPICAL — LH HEATER
1. Electrical tape (4 places)
2. Heater element

8. If damaged, remove cork insulator from handlebar and clean all adhesive residue from the handlebar.

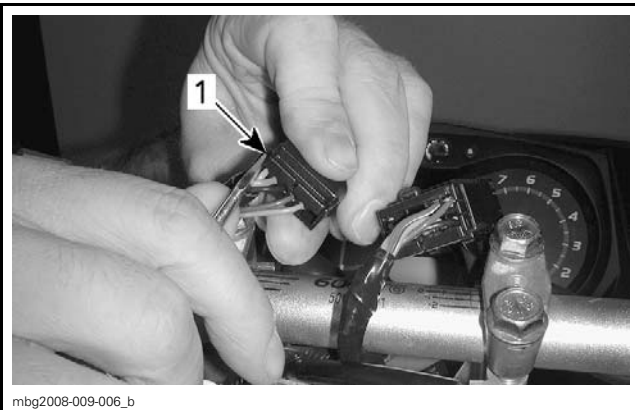
Heater Element Installation

1. Measure 159 mm (6.25 in) from the end of the handlebar, and across the top of the bend in the bar. Trace a reference line with a marker at that point on the handlebar.



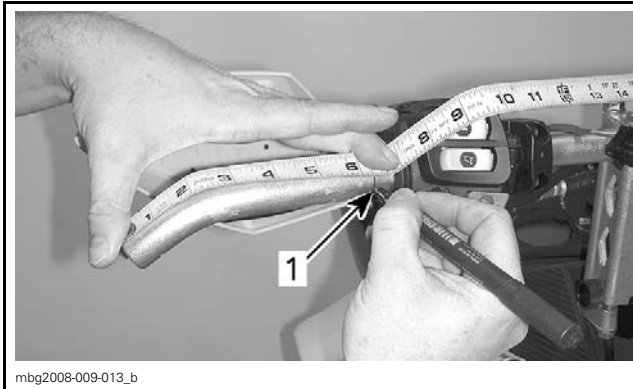
TYPICAL — STEERING CONNECTORS

3. Open the cover on the back of the connector housing using a small screwdriver or a suitable tool.



TYPICAL
1. Connector housing cover locks (one each side)

4. Using an appropriate tool such as the MULTILOCK - TERMINAL EXTRACTION TOOL (P/N 755430-2), unlock the heater wire terminals and push them out of the connector housing.



TYPICAL — MEASURING FOR HEATER POSITION

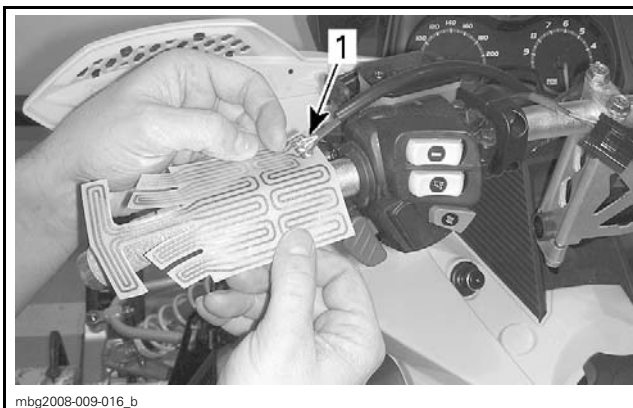
1. Trace reference line

2. Align the edge of the cork insulator with the reference line centered with the handlebar folding axis as illustrated.



TYPICAL — CORK INSULATOR ALIGNMENT

3. Apply firm pressure to cork insulator to assure proper adherence to handlebar.
4. Align the film heater element with the cork insulator and center of handlebar folding axis as illustrated.



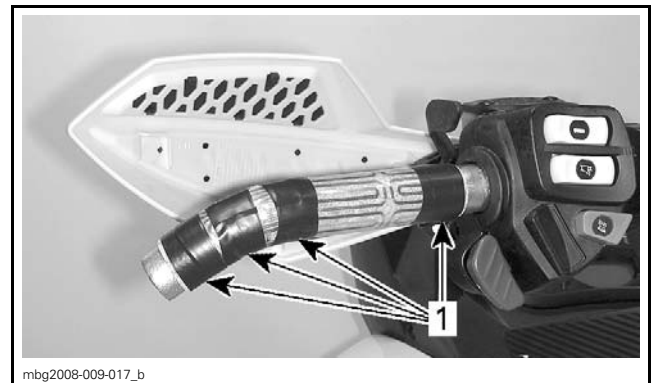
TYPICAL — HEATER ALIGNMENT

1. Heater wire position (LH front, RH rear)

5. Apply firm pressure to heater to assure proper adherence to cork insulator.

NOTE: The same heater element is used for both the LH and RH sides. Therefore, the electrical wiring will be in front of the handlebar on the LH side, and behind the handlebar (towards driver) on the RH side.

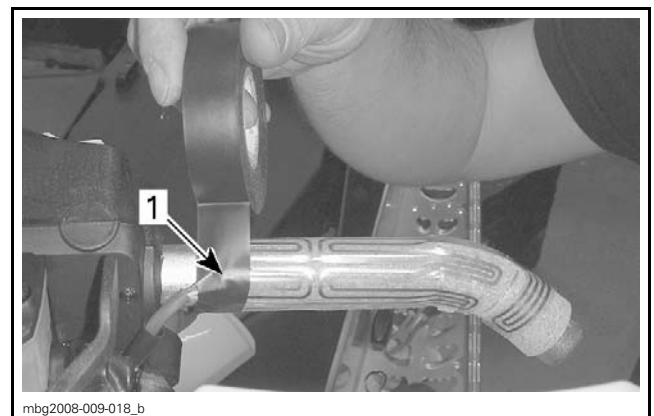
6. Apply two turns of black electrical tape at each of the four locations illustrated so that it covers the edges of the heater element and prevents snagging and damage to the element during rubber grip installation.



TYPICAL

1. Electrical tape application (4x)

NOTE: It is highly important to apply tape so that it fully secures the electrical wire connections. This will ease installation of the rubber hand grip and prevent undue stress to the connections.

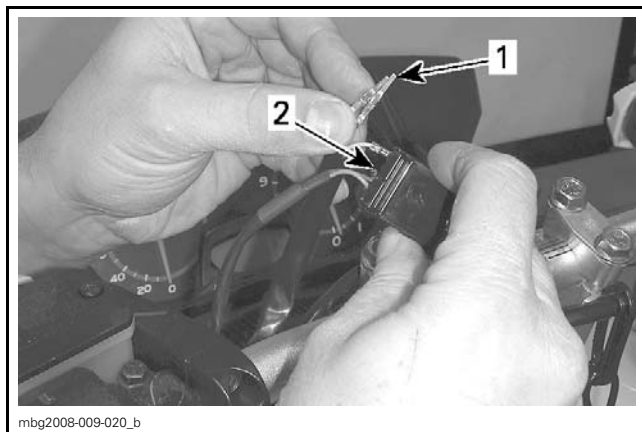


TYPICAL — IMPORTANT

1. Tape application over wire connections

7. Install rubber hand grip, refer to *STEERING SYSTEM* subsection for detail.
8. Route wiring as noted during the removal procedure.
9. Insert wire connectors in steering connector housing, refer to *WIRING DIAGRAM* for wire color and pin number locations.

Subsection 11 (LIGHTS, GAUGE AND ACCESSORIES)



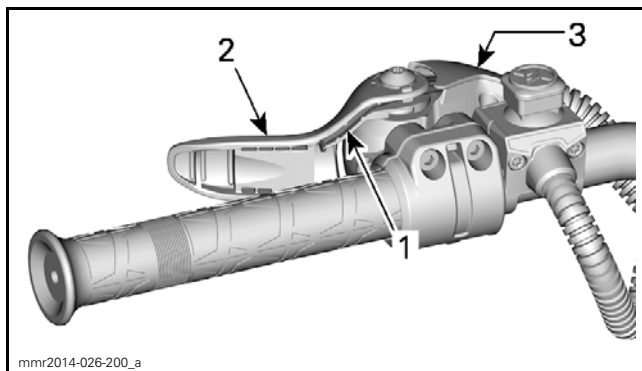
TYPICAL

1. Heater wire terminals
2. Insertion through back of connector

10. Install locking ties to secure the heater wire tightly against the handlebar.

⚠ WARNING

To ensure RH heater wires does not prevent smooth operation of throttle lever, it must be passed straight through the housing without any slack, and secured with a locking tie immediately after the lever housing.



TYPICAL

1. Heater wire straight through throttle lever housing
2. Throttle lever
3. Lever housing

NOTICE Ensure LH heater wires are properly routed through multifunction switch housing to prevent them from being pinched when installing housing cover. Pinched or damaged wires may result in a short circuit.

11. Provide electrical power to the heaters for testing. Refer to *LIGHTING AND ACCESSORIES SYSTEM TESTING* in the *TROUBLESHOOTING* topic at the beginning of this subsection for proper procedure.
12. Using the hand grip heat switch, turn on the hand grip heaters and ensure they are functioning correctly.