SUBARU®

Confidence in Motion

Technician Reference Booklet

2015 Legacy and Outback

New Technology Training

Module 926

AUTOMOTIVE Youth Educational Systems PROUD PARTNER

WE SUPPORT PROFESSIONAL CERTIFICATION THROUGH THE National Institute for AUTOMOTIVE SERVICE EXCELLENCE

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June 2014

This Technical Reference Booklet (TRB) is designed to be used in a classroom environment or as a guide for self study.
The TRB is not intended to be used as a supplement or substitute for the Subaru Service Manual. Always consult the appropriate Service Manual when performing any diagnostics, maintenance or repair to any Subaru vehicle.

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Table of Contents

Introduction

Body

The 2015 model year of the Legacy and Outback introduces full model changes that focus on safety, fuel efficiency, and improved Human Machine Interface Systems.

2015 Legacy

2015 Outback

Legacy Model Lineup	Outback Model Lineup
2.5i	2.5i
2.5i Premium	2.5i Premium
2.5i Limited	2.5i Limited
3.6R Limited	3.6R Limited

All models are equipped with Lineartronic Continuously Variable Transmissions (CVT). Generation 2 CVT (TR58) will be installed on 2.5i vehicles. High torque Generation 1 CVT (TR69) will be installed on all 3.6R models.

New or enhanced driver assistance systems:

- Welcome Lighting
- Steering Responsive Fog lights
- Electronic Power Steering
- Eyesight
- Subaru Rear Vehicle Detection
- X Mode

New or enhanced safety systems:

- Supplemental Restraint System Airbags
- Electronic Parking Brake

The Legacy and Outback for 2015 are approximately 10% more aerodynamic. This streamlining is the result of design changes to the front and rear corners of the vehicle, side view mirrors, under chassis air flow, and introduction of the Active Grille Air Shutter System (AGAS).

Active Grille Air Shutter System (AGAS)

All 4 cylinder models of the 2015 Legacy and Outback are equipped with the Active Grille Air Shutter System (AGAS).

The AGAS is designed to improve fuel efficiency by improving body aerodynamics and decreasing engine warm up time.

AGAS Closed

AGAS Open

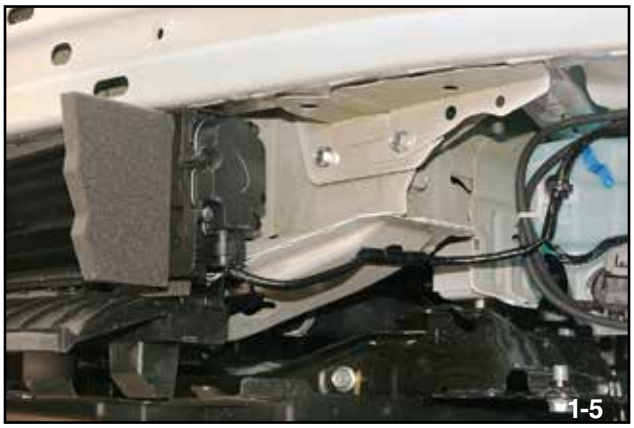
The AGAS defaults to the open position in case of electrical communication malfunction.

Note: The AGAS is not spring loaded to the open position.

Note: The AGAS will remain closed if the ambient temperature is lower than 37 degrees Fahrenheit (3 degrees C).

The opening and closing of the AGAS is determined by ambient temperature, coolant temperature, and vehicle speed.

The three wire actuator receives command signals and transmits its position through a single LIN communications wire that is routed to the Engine ECM.

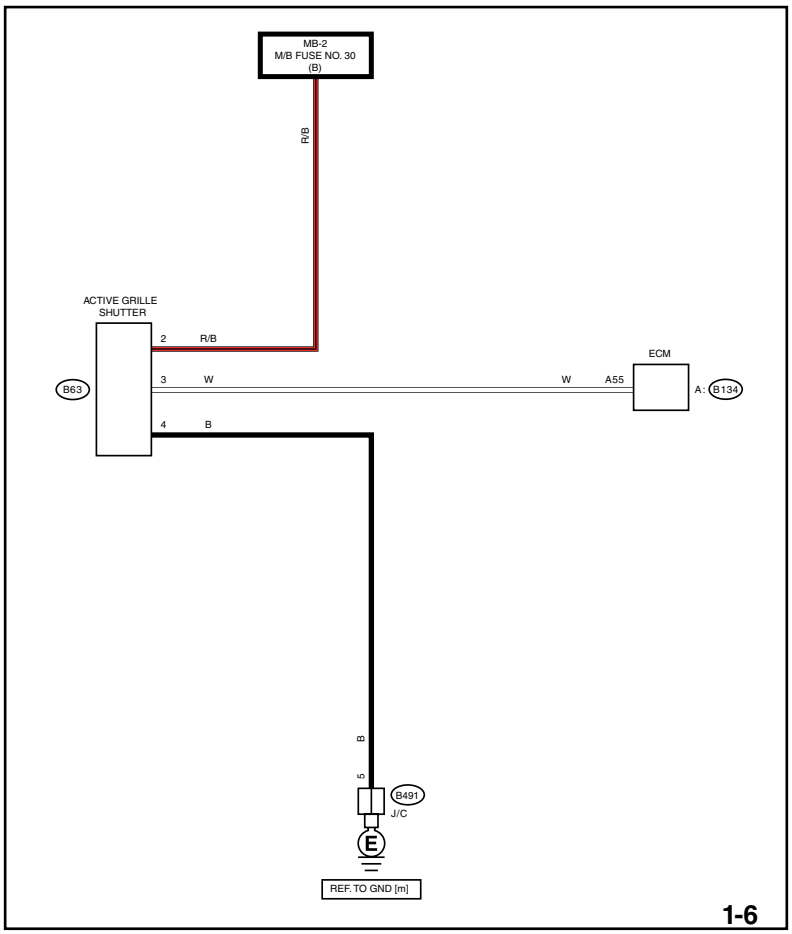


AGAS Actuator

Note: The Engine ECM of the 2015 Legacy and Outback is LIN compatible.

During service or replacement, the AGAS automatically initializes so there is no special procedure required to calibrate the AGAS to the vehicle.

Note: Work support for the AGAS has been added to the ECM menu.



AGAS Wiring Schematic

Bumper Cover Removal

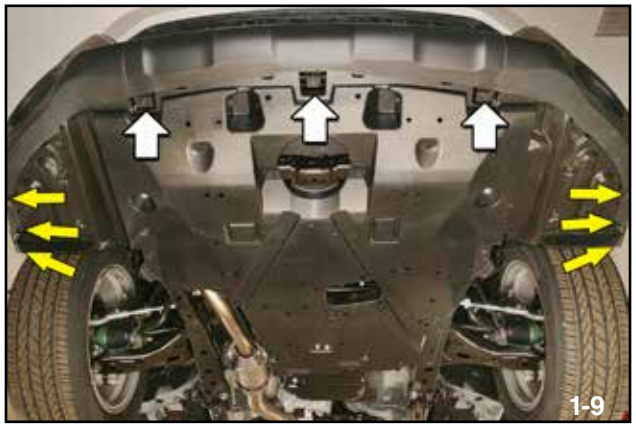
Bumper cover removal is necessary when removing the radiator. The bumper cover (front and rear) is attached to the body with trim clips only.

Begin bumper cover removal by removing the six clips along the top side at the indicated positions.

Upper Clips

Inner Fender Clip

Elevate the vehicle and remove the inner fender trim tab from each front inner wheel well. Raise the vehicle high enough to remove the three lower bumper cover trim tabs and the three trim tabs located in front of each tire.



Lower Clips

Lower the access panel and disconnect the fog light connector (left and right).
Pull outward and upward to disengage the bumper cover locking tabs from the body mounts.

Fog Light

Removing Bumper Cover

Place the bumper cover in a safe location. Inspect the locking tabs and body mounts for damage.

Front End

Locking Tabs

Note: The bumper cover locking tabs have been strengthened to prevent deformation during removal.

DRL Resistor

The Daytime running light resistor, horn, and windshield washer reservoir are located under the left side of the bumper cover. The second horn is located under the right side of the bumper cover.

Radiator or Condenser Removal

Note: Radiator or condenser removal requires bumper cover removal.

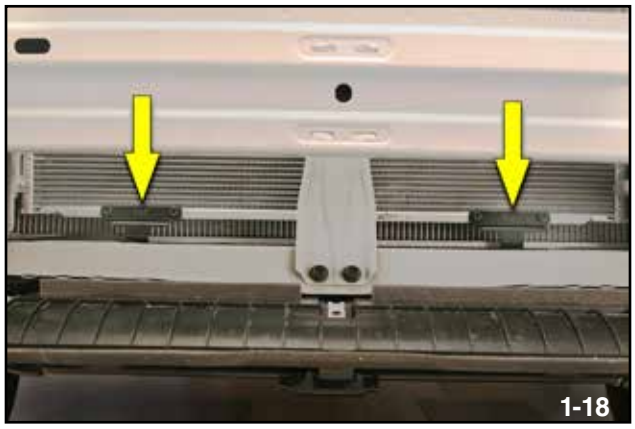
After bumper cover removal, remove the four clips along the top and the two clips that face forward that secure the grille bracket to the vehicle and remove the grille bracket.

Grille Bracket Clips

Under Grille Bracket

Remove the left and right upper radiator brackets, and two upper radiator to condenser bolts.

Upper Radiator Bracket



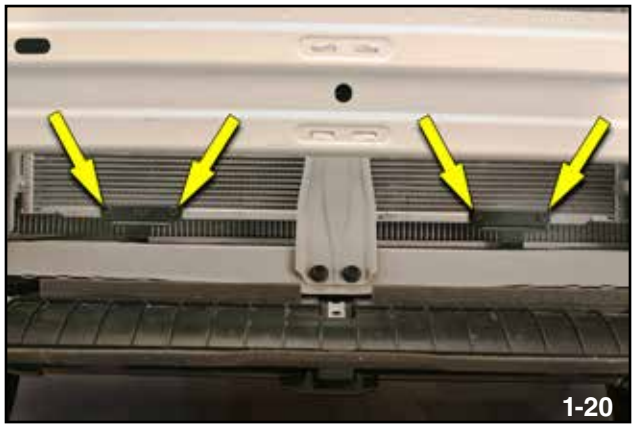
Condenser To Radiator Bracket

Next remove the bolts that secure the “condenser to radiator bracket”.

Remove the left and right lower bolts first, then the 4 upper bolts. Remove the two brackets from the vehicle to prevent damage to the radiator or condenser.

Note: For lower bolt removal:
The radiator and condenser can be raised slightly as an assembly for bolt removal while using a socket and ratchet. The SST 73099SG000 must be used to correctly torque the bolt(s). The radiator and condenser must be seated before the bolt(s) are torqued.

Removing Lower Bolt



Upper Bolts

Secure the condenser to the vehicle with string to prevent damage as the radiator is removed.

Condenser Secured

If the condenser is being removed, leave the radiator in the vehicle with the coolant hoses attached. Push the radiator inward slightly and remove the condenser.

Fuel Tank Position Check

A new positioning check is required if the fuel tank is removed from the vehicle. A new fuel tank positioning mark is made onto the vehicle.

Fuel Tank

Measuring Fuel Tank Position

Check that the leading edge of the fuel tank is 14.5 millimeters or less as measured in the picture above. Reposition the fuel tank if the measurement exceeds the specification. Measurements exceeding specifications that cannot be adjusted to specifications, indicate damage has occurred to the tank or the vehicle body.

NOTES:

Battery Hold Down Bracket

A new battery hold down bracket with captured mounting bolts and positioning guide is installed on the new Legacy and Outback.

Battery Hold Down Bracket Bolt and Guide

Guide in Place

The positioning guide temporarily holds the new bracket in place while the bolts are started.

Note: The mounting bolt capture washer may stay with the battery tray upon removal. Retain the washer for bolt installation.

Hold Down Bracket Complete

Battery Tray

The battery hold down positioning guide is installed on the inboard side of the battery (engine side).

Tool Kit and Spare Tire

The tool kit of the Outback includes a tow hook and a flat tire storage bag with tie down strap. The storage bag is needed because the spare tire well is not large enough to hold a flat full size tire (225/60 R18).

Note: The Legacy tool kit does not include a tow hook.

Tool Kit

Flat Tire Bag and Tie Down Strap

The Outback spare tire is a T155/80 R 17. A polystyrene spacer prevents the spare tire from creating any noise or vibration while stored.

Spare Tire

Spacer

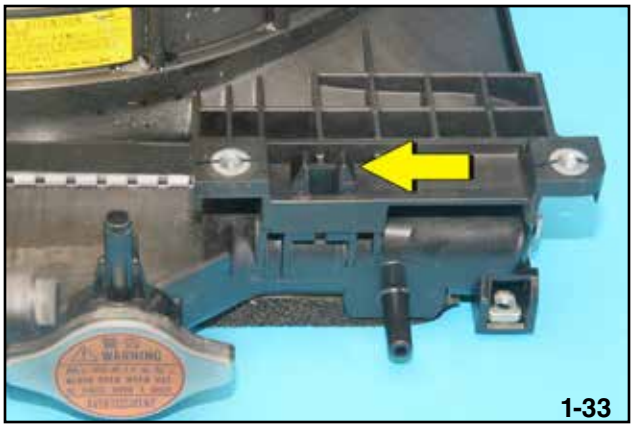
An air bubble filled painted vibration dampening sheet coats the bottom of the spare tire well.

Coolant Fan Mounting

The coolant fan assembly is attached to the radiator and can be removed with the radiator still mounted in the vehicle.

Note: Engine coolant must be drained to allow the coolant overflow bottle and the upper radiator hose to be removed.

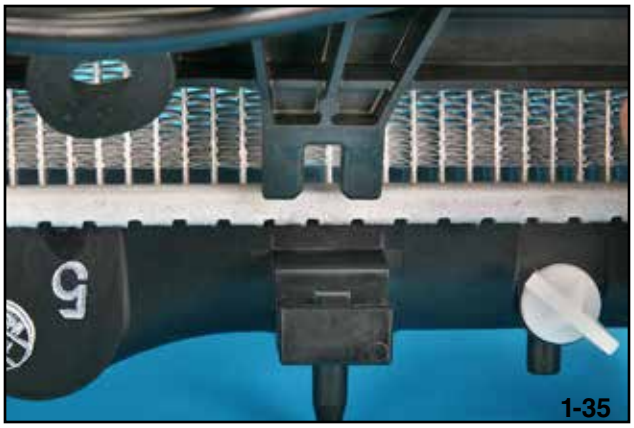
Radiator and Cooling Fans



Upper Locking Tab

The upper left and right corners of the coolant fan assembly are secured to the radiator with locking tabs that are disengaged by squeezing the two tabs together.

Removing Cooling Fans



Lower Docking Slot

The two lower corners are positioned into a docking slot and do not require any unlocking for removal. Lift the coolant fan assembly away from the radiator after the two upper locking tabs have been released.

HVAC

The Legacy and Outback 2.5i models are equipped with Manual Air Conditioning. 2.5i Premium and Limited Models are equipped with Dual Zone Automatic Climate Control.

2.5i Premium and Limited Models are also equipped with rear seat air conditioning vents and rear seat heaters.

Note: The temperature output to the rear seat air conditioning vents is controlled by the temperature setting for the passenger side front.

HVAC Controls

Rear A/C Vents and Seat Heater Switches

Rear Seat Heater Control Unit

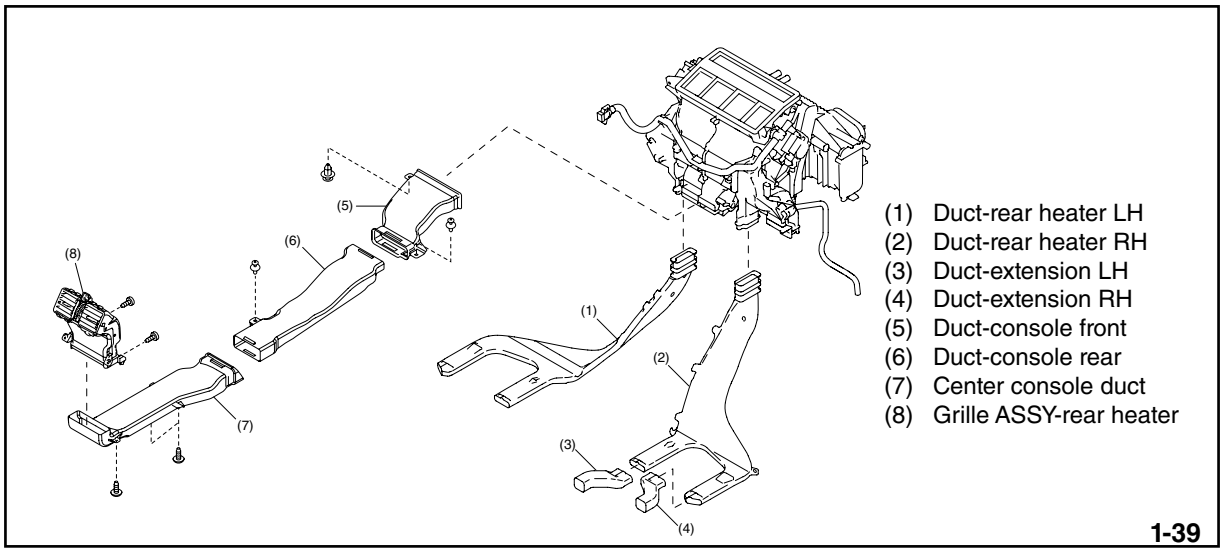
The 2 level rear seat heaters are controlled by the Rear Seat Heater Control Unit, which is located in the left rear of the vehicle.

Note: The front seat heaters retain their set positions after the ignition has been turned off. The rear seat heaters default to off.

Rear Vent Door Actuator Operation

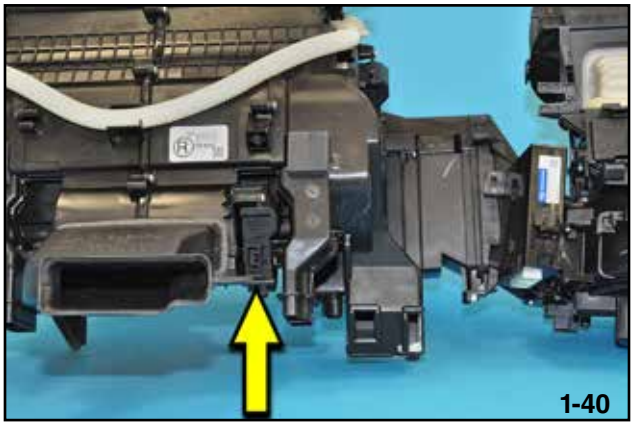
The rear vent door actuator (introduced 2013 MY) controls the temperature of the air delivered to the rear passengers through the center console rear vents. Set temperature for the rear passengers is strictly controlled by the front passenger temperature control dial. Airflow mode setting has no effect on rear vent door actuator position. The rear vent door actuator mixes chilled air from the evaporator with heated air from the heater core. The SSMIII PID for this is **Rr Vent Door Actuator Position.**

If the displayed value is at 75% (lowest temperature setting), the rear vent door is biased to allow more cold air to flow. As the PID value decreases from 75% to -5% (temperature set point increased) the amount of cold air mixed decreases and hot air increases. At the lowest value of -5% (highest temperature setting) the air flow will essentially shut off for both hot and cold. Work support can be accessed on the SSMIII by selecting All other models ⟶ Each System Check ⟶ Air Condition System ⟶ Work Support ⟶ System Operation Check Mode.



HVAC Duct Layout

The actuator can only be replaced by removing the heating and cooling unit and blower motor housing from the vehicle.



Rear A/C Vent Actuator

In Compartment HVAC Assembly

Sun Visors

The Sun Visors are mounted on a sliding rod that allows the position of the Sun Visor to be adjusted after being moved to the side.

Sun Visor Collapsed

Sun Visor Expanded

Audio and Navigation

The 2015 Legacy and Outback will be equipped with 3 styles of Audio and Audio/Navigation systems.

6.2 Inch Display

7 Inch Display

7 Inch Display With Navigation

The 2.5i models will be equipped with the Clarion Audio Infotainment system with a 6.2 inch display. 2.5i Premium and Limited models will be equipped with the Fujitsu Ten Audio Infotainment system with a 7.0 inch display. An optional Fujitsu Ten Audio and Navigation Infotainment system with a 7.0 inch display, will be available for the 2.5i Premium and Limited models.

The 7.0 inch display Infotainment systems have voice control capability and can communicate with the Automatic Climate Control, via UART, allowing the HVAC to be operated with voice commands.

Note: Refer to the Subaru owner's manual for a list of voice commands.

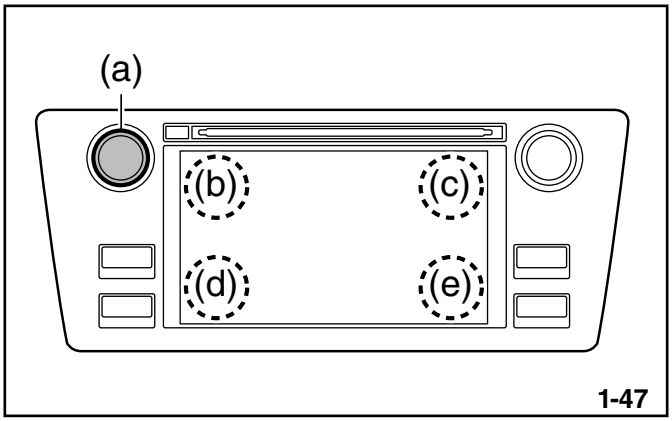
The 7.0 inch display Infotainment systems are connected to the high speed Body CAN. This allows communication between the Fujitsu Ten and the Subaru Select Monitor.

Diagnostic Trouble Codes are also available to assist with diagnostics. The data displayed provides more detailed data than the built in Line Check function.

Both the 6.2 inch and 7.0 inch Infotainment systems are equipped with Line Check functions.

6.2 Inch Display

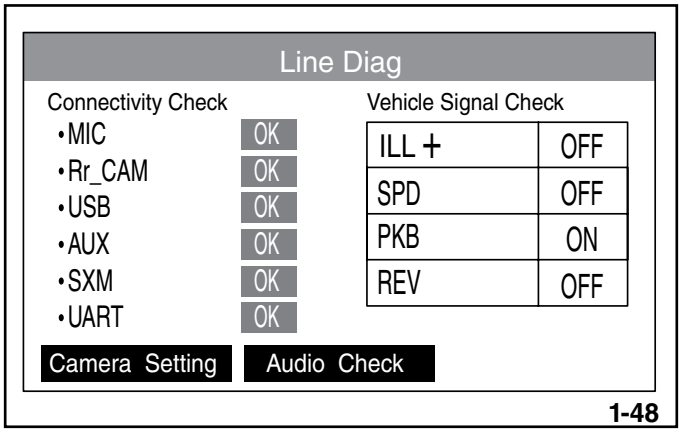
1. (a) Press the button to display the Audio OFF screen.
2. Touch the screen in order from (b) to (e).



Activating Line Check

Note: To exit the diagnostic mode, turn the ignition switch from ACC OFF to ON.

3. <<LineDiag>> screen is displayed.



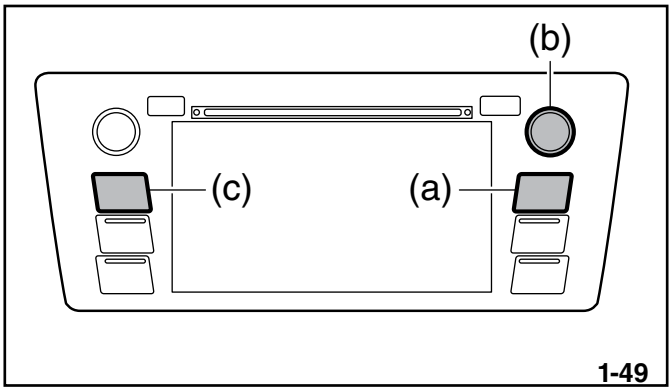
Line Diagnostic Information

This Line Check function allows the displayed signals to be checked for connection to the Infotainment system. Activate each device to create the input signal needed to change the detection status from NG to OK.

The Camera Setting allows adjustment of the displayed guide lines that appear when the vehicle is in reverse gear range. Audio check rotates the sound from the radio to each speaker. Turn up the volume to monitor each speaker.

7.0 Inch Display

1. With the main power OFF, press the button (b) twice while pressing the button (a) simultaneously.



Activating Line Check

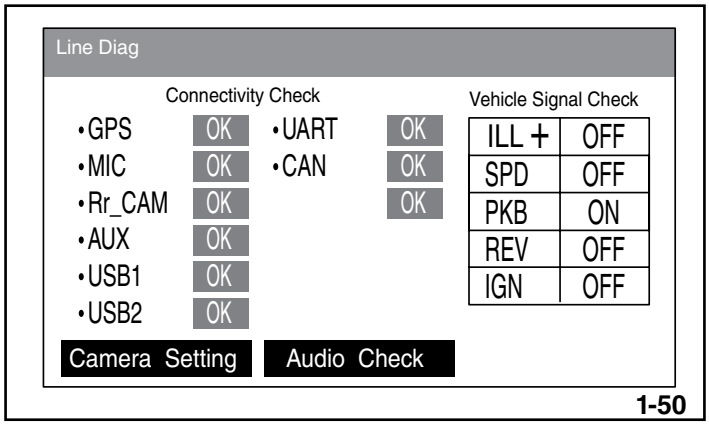
Note: Pressing the button (c) for 3 seconds or more, or turning the ignition from ACC OFF to ON position can exit the diagnostic mode.

2. << Line Diag>> screen is displayed.
3. Check the connection status for each item listed in {Connectivity Check} displayed on the left of the screen.

This Line Check function allows the displayed signals to be checked for connection to the Infotainment system. Activate each device to create the input signal needed to change the detection status from NG to OK.

The Camera Setting allows adjustment of the displayed guide lines that appear when the vehicle is in reverse gear range. Audio check rotates the sound from the radio to each speaker. Turn up the volume to monitor each speaker.

Note: GPS will indicate NG on non-Navigation equipped Infotainment systems.



Line Diagnostic Information

Note: The vehicle signal check does not change to "OFF" after a signal has been received (ON) and then removed, until the ignition is cycled.

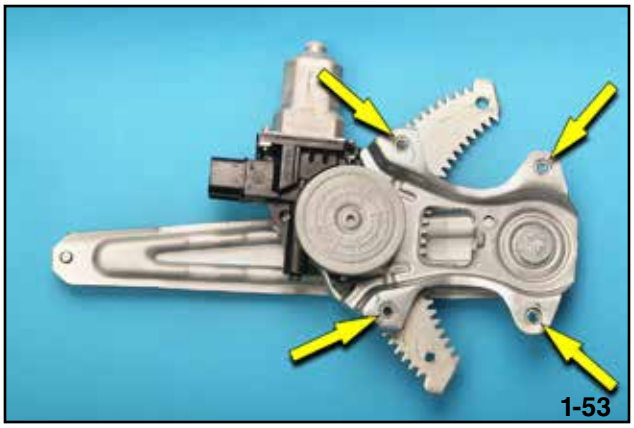
Rear Window Regulator

The rear window regulator of the Legacy and Outback is described as an “I Arm” window regulator. This type uses a single roller that moves through a channel that is attached to the window glass. The height of the window is controlled by the position of the roller in the channel.

Rear Window Assembly

I Arm And Roller

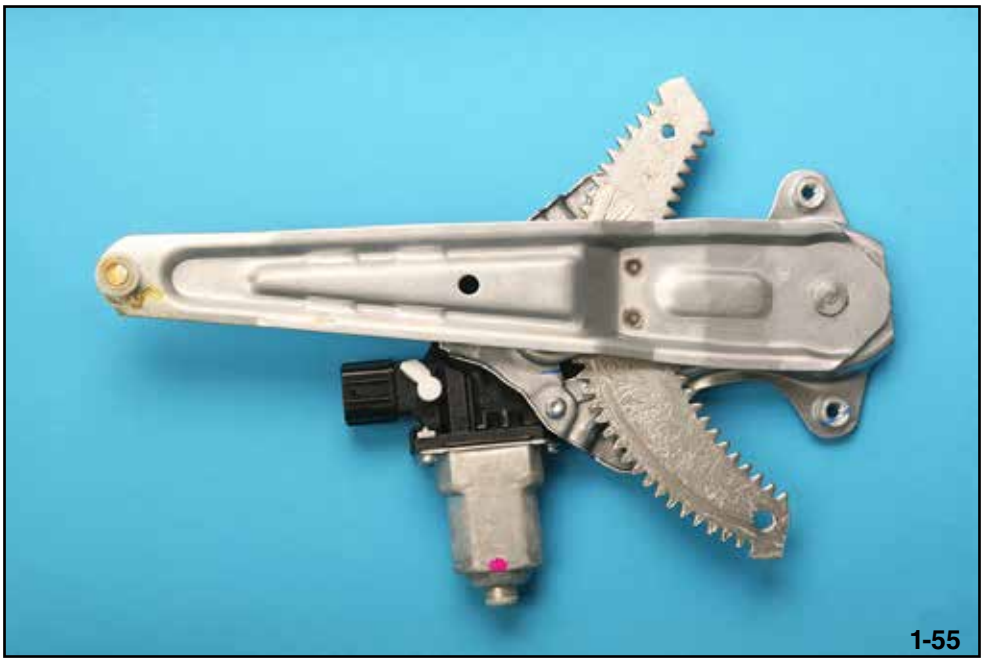
The regulator is attached to the door with 4 bolts and is easily removed through the opening in the lower section of the door.



Regulator Mounting Points

Window Taped In Position

The window glass must be taped to the door to prevent the glass from dropping after the regulator has been removed.



Back Side Of Regulator

Trailer Adapter Connector

The trailer adapter connector is taped to the body behind the trim panel on the left rear of the vehicle, just behind the rear seat.

Trailer Adapter Connector

Assist Grip Removal

The Assist Grips are attached to the vehicle with a new style locking clip that allows for faster removal and installation. Begin removal by compressing (downward) the locking tab of the cap and then push up slightly on the bottom side of the cap.

Note: Do not push on the clips after the caps are removed or they will fall into the area above the headliner. The clip must be retrieved to prevent NVH issues and possible interference with Curtain Airbag Operation.

Compressing Locking Tab

Pushing Up on Cap

Remove the caps and set aside in a safe place. Pull the Assist Grip straight away from the headliner without changing the mounting angle of the clips.

Cap Removed

Assist Grip Clips in Place

If the clips are pushed inward after Assist Grip removal, the clip will fall into the area above the headliner. **The clip must be retrieved to prevent NVH issues and possible interference with Curtain Airbag operation.**

The clips must be removed from the body to reinstall to the Assist Grip. Squeeze the clip near the body. The locking tabs are on the outer side of the mounting area to prevent the clip from sliding outward after installation of the Assist Grip.

Note: A hook tool secured into the lower side of the clip will prevent the clip from falling into the body during removal.

Move the clip up and down to clear the locking tabs from the body (mounting area).

Removing Clips

Clip and Hook Tool

The clip can be re-used if not deformed. Install both clips into Assist Grip. The clips must be flush on the inboard side.

Clip and Assist Grip

Clip Installed

Install and fully seat the cap on both ends of the Assist Grip. The front and rear Assist Grips are different. Be certain to install to the correct location.

Installing Cap

Assist Grip Ready for Installation

Align the Assist Grip over the body and firmly press inward. Test the installation by pulling on the Assist Grip.

Dash Pad

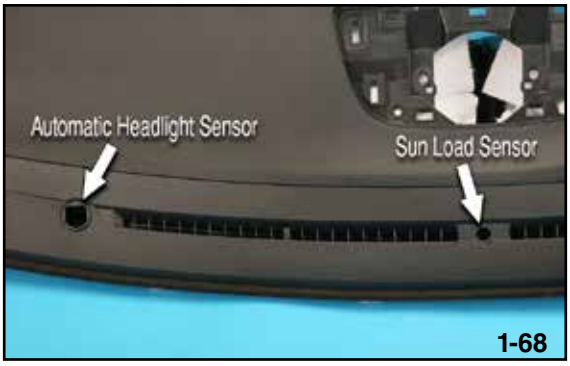
The construction of the dash pad, instrument panel wiring harness, bulkhead wiring harness, and steering beam, make it necessary to remove the dash pad and steering beam separately. The instructions for servicing these parts are covered in detail in the service manual. **The following information and precautions need to be observed to prevent unnecessary work and possible damage to vehicle components.**

The Sunload sensor and Automatic Headlight sensor have been separated.

Note: DTCs for the Sunload sensor and can generate from use inside a shop.

The wiring harnesses that connect to these components are short and very difficult to reach once they have fallen into the dash pad. The sensors are mounted to the front defogger trim panel which must be lifted on the trailing edge to allow servicing of the sensors. **The forward leading edge of the front defogger trim panel must not disengage from the dash pad. The entire dash pad will need to be removed from the vehicle and disassembled, to re-seat the forward leading edge of the front defogger trim panel.**

Automatic Headlight Sensor



Sunload and Automatic Headlight Sensor Locations

The Automatic Headlight sensor is located on the outside edge of the trim panel and Sunload sensor is towards the middle of the trim panel. **Confirm operation and identification before beginning removal.**

Removing Sunload Sensor

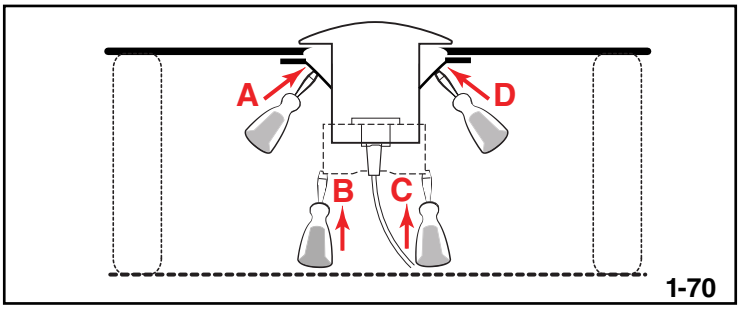
Begin by removing the speaker covers from each end of the front defogger trim. Next, use a trim stick and slowly pry up the trailing edge of the front defogger trim. Use several pry points across the trim panel.

Note: Apply downward pressure to the leading edge of the defogger trim panel while prying up on the trailing edge.

Note: The wiring harness for the sensor located in the middle of the defogger trim (Sunload) has the shortest harness and there is a trim tab directly in front of the area needed to see the sensor. Shift your line of sight from side to side of the trim tab while working to release the locking tabs of the sensor.

The next step is to support the defogger trim panel to a height that allows enough room to work without stressing the leading edge of the defogger trim panel. Support the trim panel approximately 2 inches away from center on both sides at an approximate height of 1 ½ inches. The objects supporting the defogger panel should be firm enough to support the trim panel at the height needed, without deforming the dash or scarring the trim panel.

1. Using a long screwdriver, apply gentle inward pressure at point A. The locking tab should move to an unlocked position while pressure is applied.
2. Using another long screwdriver, apply gently upward pressure at point B. The locking tab and sensor should clear the defogger trim panel on the side that is being released.



Removing Sensor

3. Remove the two screwdrivers.
4. Using a long screwdriver, apply gently upward pressure at point C.

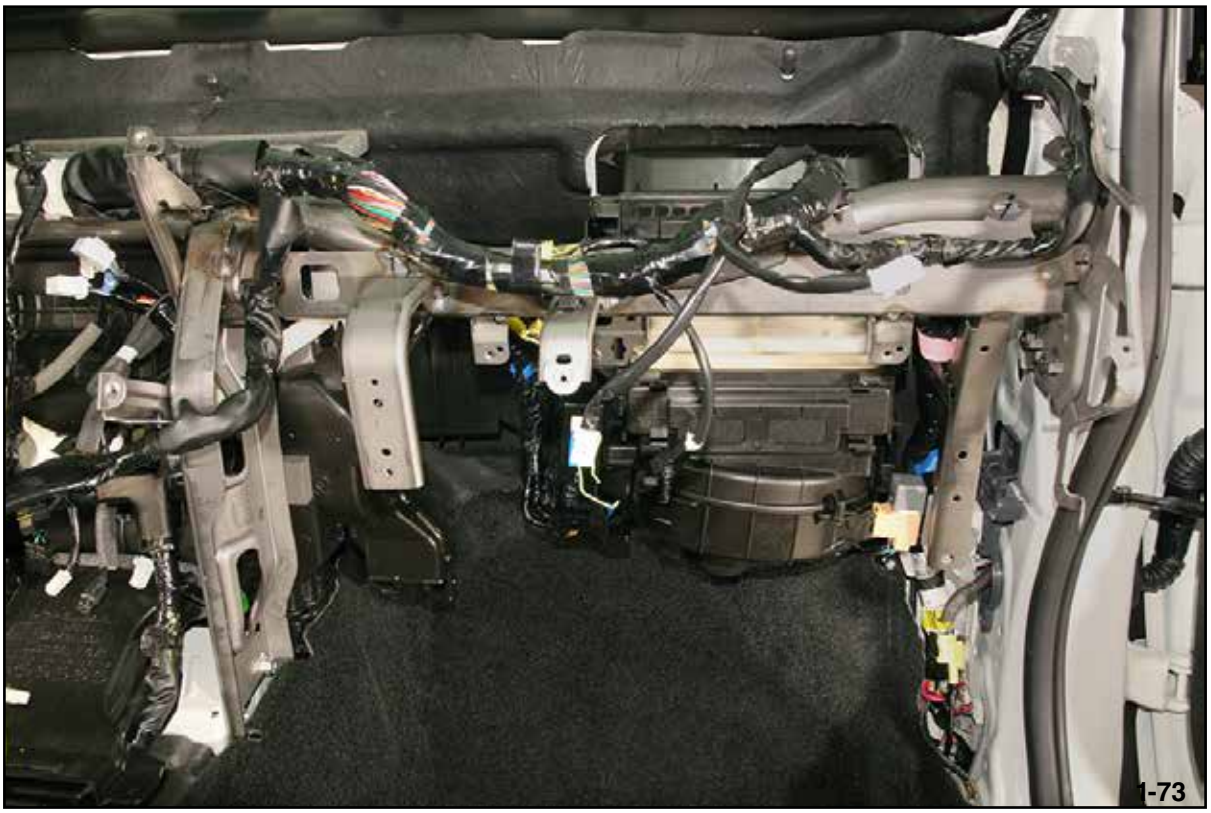
Note: The pressure applied at point C must be balanced so that the previously released side is not pushed back down.

5. Using another long screwdriver, apply gentle inward pressure at point D. The locking tab should move to an unlocked position while pressure is applied.
6. Remove the screwdrivers.
7. Gently pull the sensor by hand away from the defogger trim panel.
8. Tie a long string (Approximately 4 feet), below the sensor electrical connector.
9. **If the dash panel is being removed, perform the release procedure to both sensors.**

Secure Sensor

Both Sensors Secured

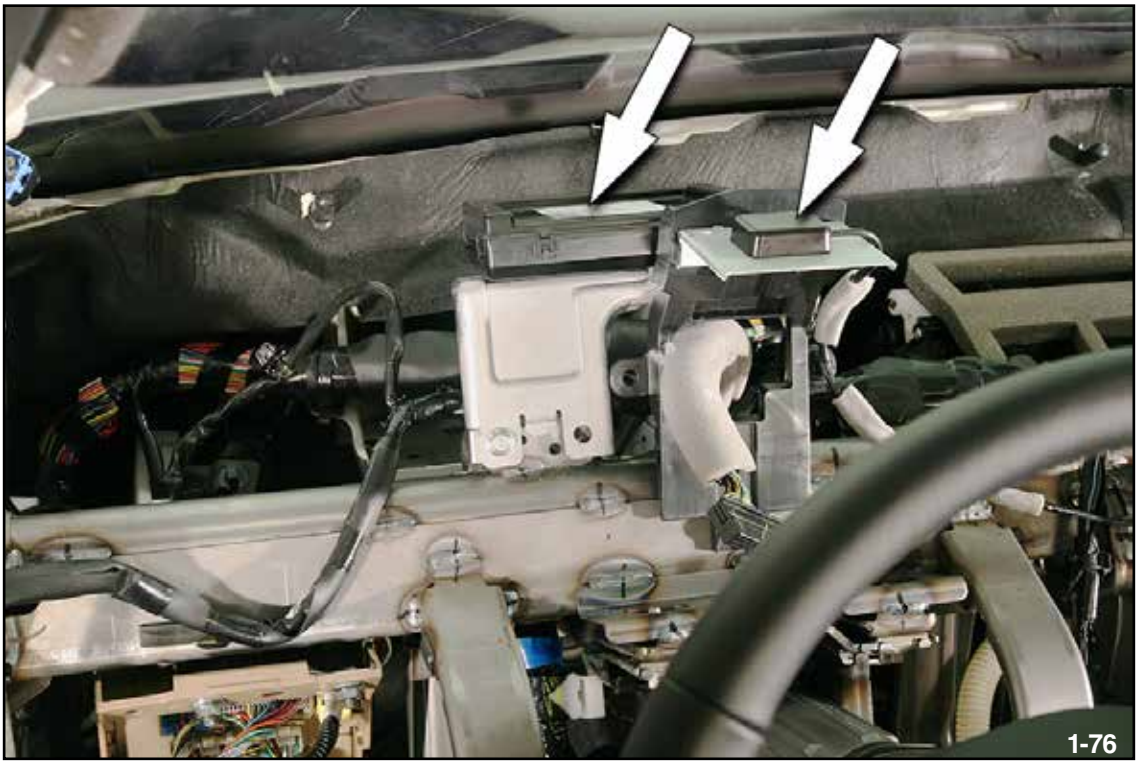
Steering Support Beam and Wiring Harnesses



Right Side, Dash Pad Removed

Center, Dash Pad Removed

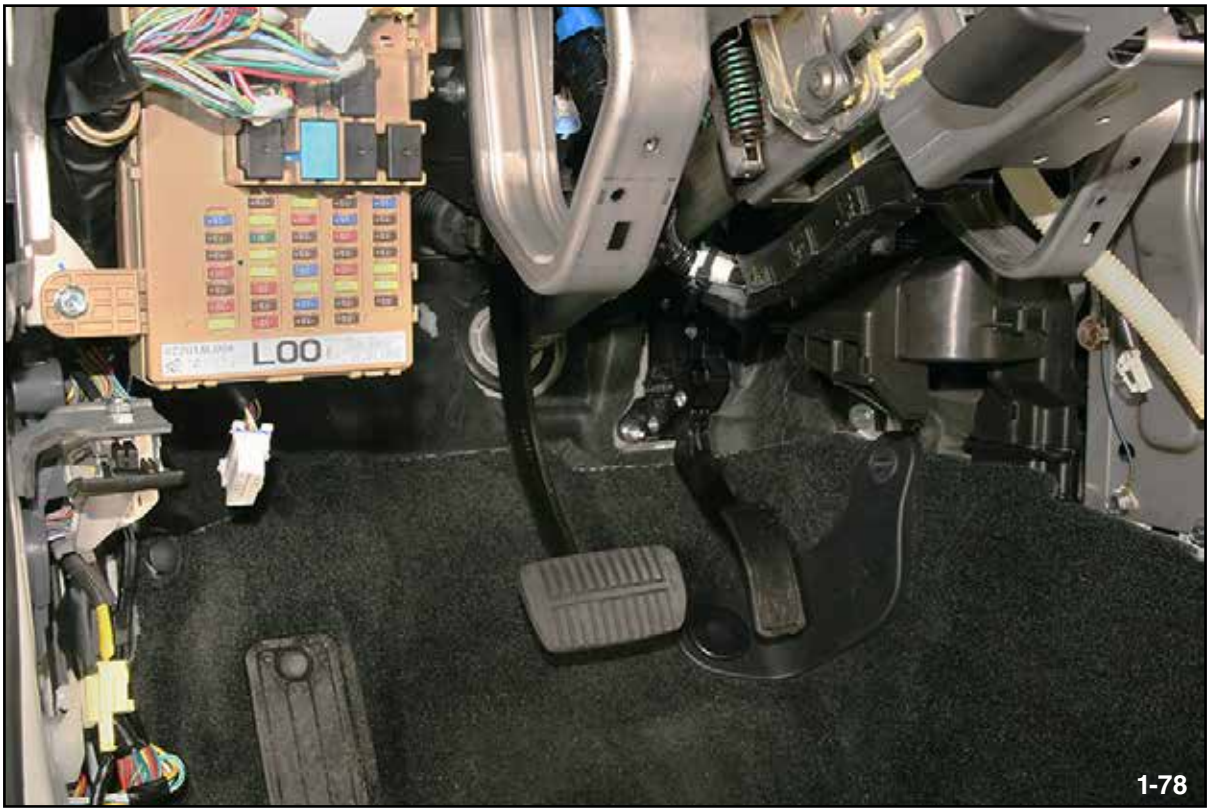
Left of Center, Dash Pad Removed



Above Steering Wheel, Dash Pad Removed

Note: GPS antenna, Keyless Access and Push Button Start Control Unit have been reinstalled for photography.

Left of Steering Wheel, Dash Pad Removed and Steering-Responsive Fog Light Control Unit (SRF)



Driver Side Lower, Dash Pad Removed

NOTES:

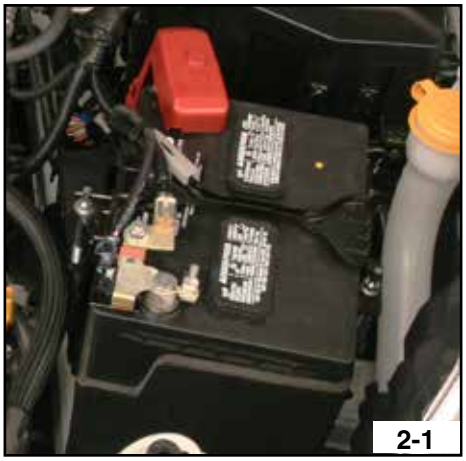
Electrical

Introduction

The 2015 Legacy and Outback feature a variety of refinements to the electrical systems to improve efficiency and maximize the Human Machine Interface (HMI).

Battery

The 2015 Legacy and Outback FB 2.5 models are now equipped with a 55D23R for a weight savings of 4.4 lbs. (2kg). EZ 3.6 Models are equipped with the 75D23R.

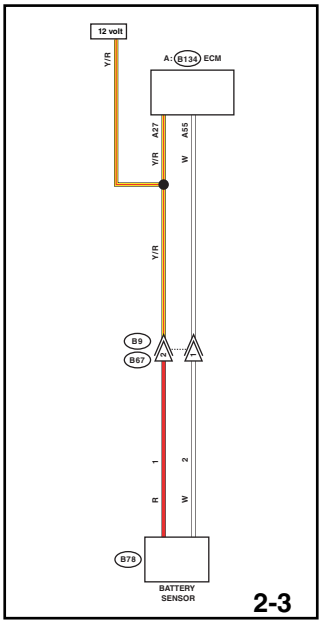


55D23R Battery

Battery Sensor

A Battery Current and Temperature Sensor has been added to the 2015 Legacy and Outback. Detected information is transmitted to the ECU via a LIN communication line. This is the same design as the 2015 WRX STI and 2014 XV Crosstrek Hybrid.

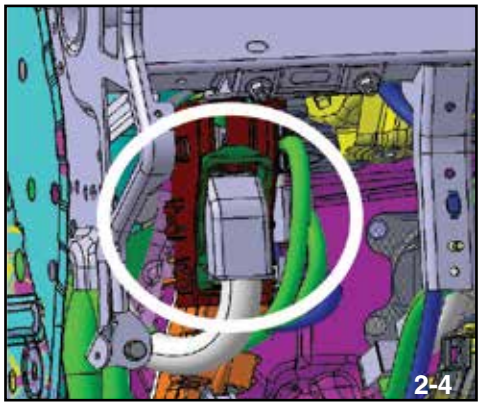
Battery Current & Temperature Sensor



Battery Sensor Wiring

Wiring & Connectors

Throughout the vehicle, smaller 0.22mm^2 gauge wiring (23-24 AWG) and 0.24mm width connector terminals are now utilized to reduce weight and cost. In these areas, Hinge lock style connectors have been utilized to ensure sufficient terminal contact.

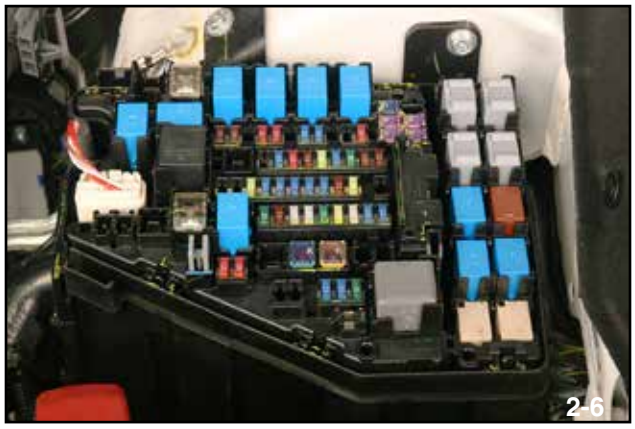


Hinge Lock Style Connector (Artwork)

Hinge Lock Style Connector

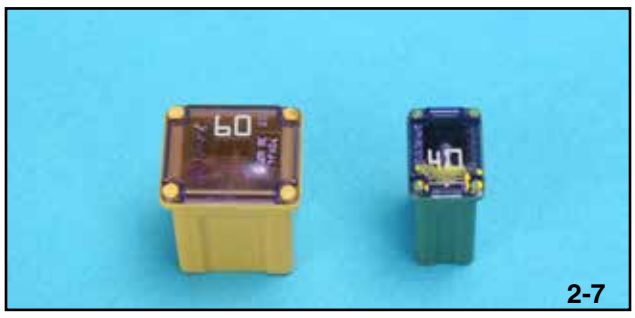
Fuse Box

The engine compartment main fuse box has been redesigned to decrease weight and improve space.

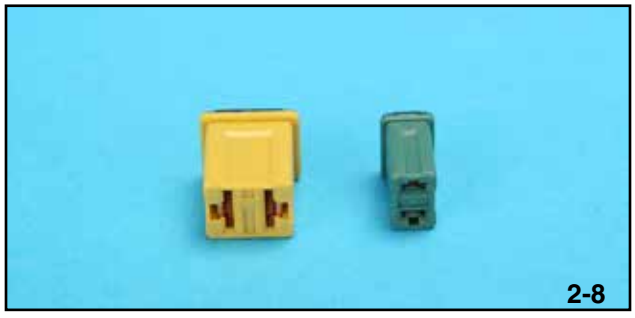


Main Fuse Box

Smaller Slow-Burn Fuses (SBF) are used to reduce weight and space.

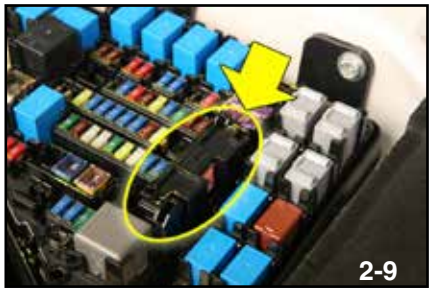


Top of Slow Burn Fuse (SBF)

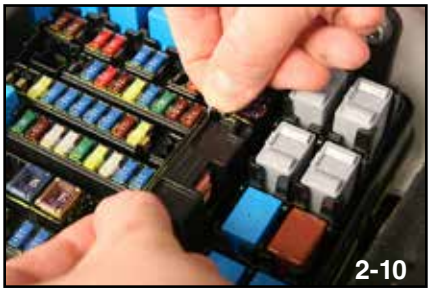


Bottom of Slow Burn Fuse (SBF)

The Main Fuse is located under a small protective panel. It is accessed by pressing the outer tabs inward and pulling up on the cover.



Main Fuse cover



Cover Tabs

Cover Removed

Lighting

The Headlights on the 2015 Legacy and Outback include new safety and visibility features such as Welcome Lighting, Enhanced Day-time Running Lamps, and Steering Responsive Fog Lights.

Low Beams

Two headlight options are available. Standard Halogen or HID with an Automatic Leveling system. Headlight range has been increased to support the longer and wider visible range of the Version 3 Eyesight Driver Assist System.

Halogen

HID with Leveler

Welcome Lighting

For added night time security, the 2015 Legacy and Outback feature standard Welcome Lighting that automatically turns on cabin illumination and exterior lights (low beams and position lamps) as the driver approaches/unlocks or leaves/locks the vehicle.

Welcome Lights OFF

Welcome Lights ON

Welcome Lighting operating conditions for approaching the vehicle

- Lighting ON
  - Doors are unlocked with the remote key
  - The Headlight switch is set to the "AUTO" position
  - The area around the vehicle is dark (Light Sensor input)
- Lighting OFF
  - Doors are relocked
  - The Headlight switch is turned to a position other than "AUTO"
  - The Ignition switch is turned to the "ON" or "ACC" positions
  - Automatically, based on a customizable Delay Time setting (30/60/90 sec).

Welcome Lighting operating conditions for leaving/Exiting the vehicle

- Lighting ON
  - When Ignition switch is turned to the "OFF" position or key is removed from ignition
  - The area around the vehicle is dark (Light Sensor input)
- Lighting OFF
  - The Headlight switch is turned to a position other than "AUTO"
  - The "Locking" operations is performed twice from either the door handle or keyless remote
  - Automatically after Driver's door has been opened and closed, based on a customizable Delay Time Setting (30/60/90 sec)
  - Automatically after 3 min. even if the Driver's door is opened, but not closed. (To conserve the battery)

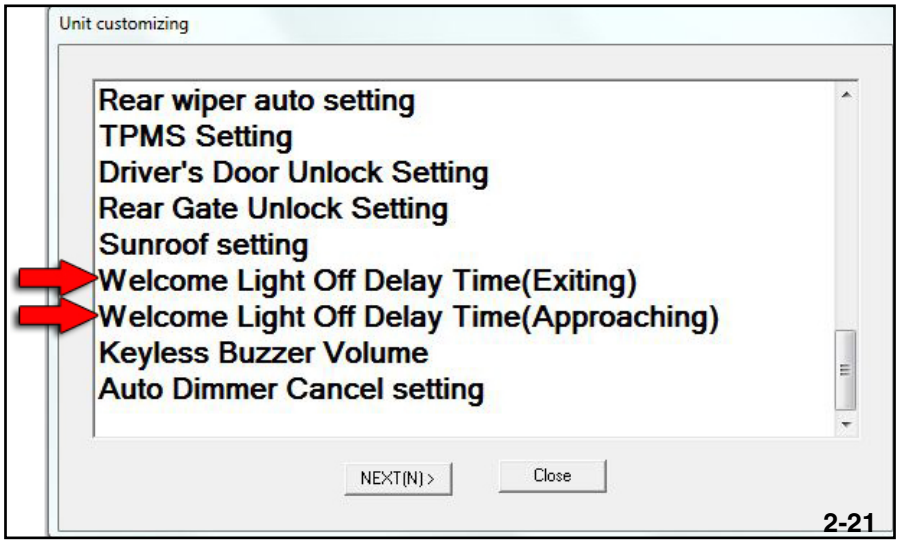
Approach and Leaving/Exiting Delay times can be adjusted for Welcome Lighting through the BIU or Combination Meter. This can be set to 30, 60, or 90 second delays.

Vehicle Settings

Welcome Lighting

Approaching time set

Leaving time set



BIU Customizing

Day-time Running Lamps (DRL)

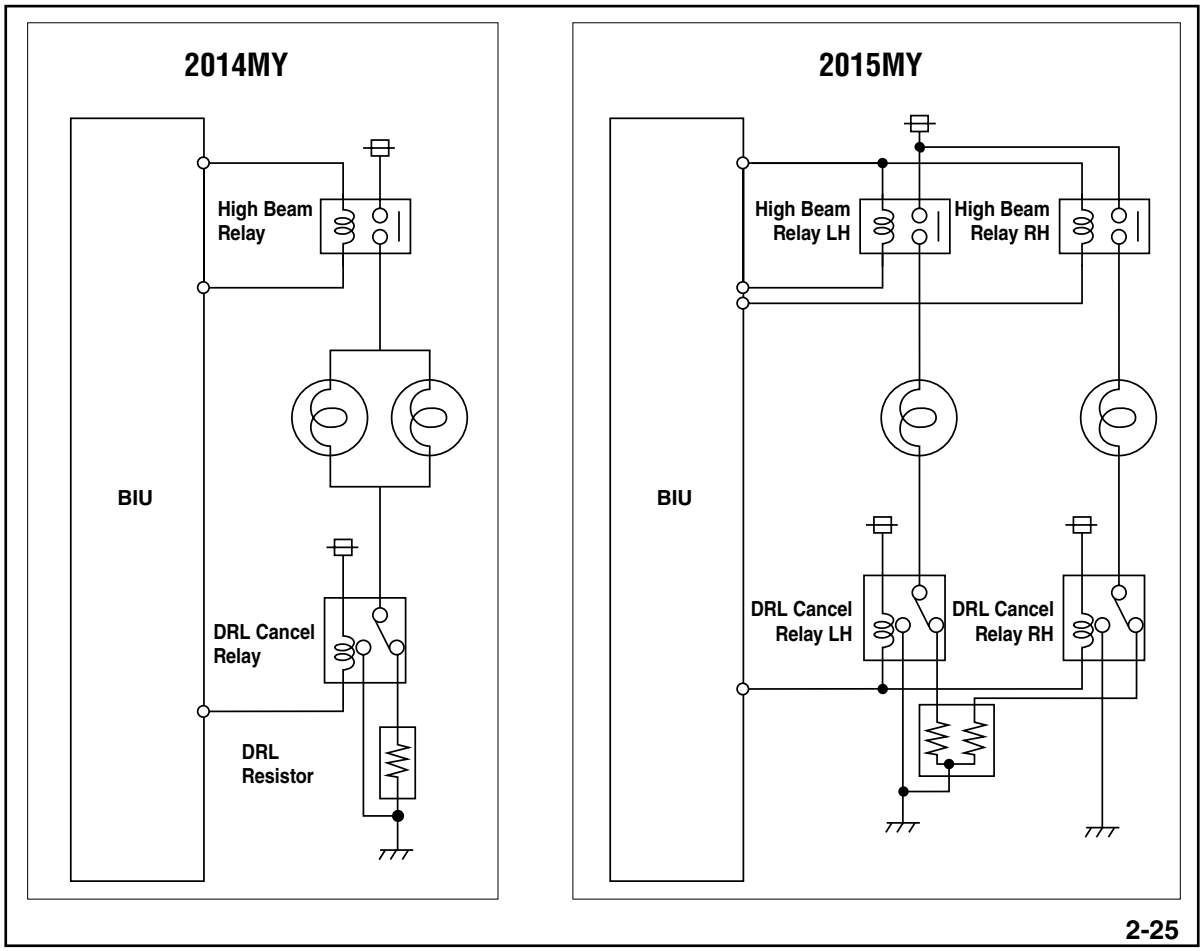
DRLs for the 2015 Legacy and Outback now function with the turn signals to improve visibility. When a turn signal is activated, the corresponding DRL will turn off to improve the visibility for surrounding vehicles and pedestrians.

DRLs OFF

DRLs ON

Left Turn Signal ON

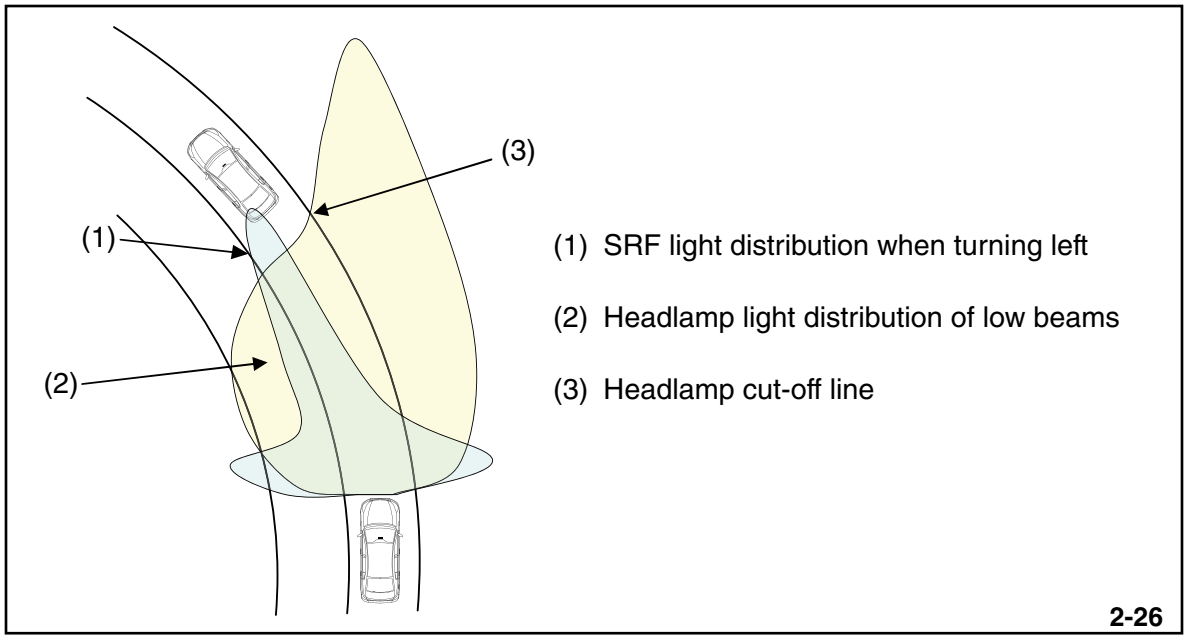
In order to achieve this individual control in response to turn-signal function, Headlight control is now independent for each side and additional relays have be added.



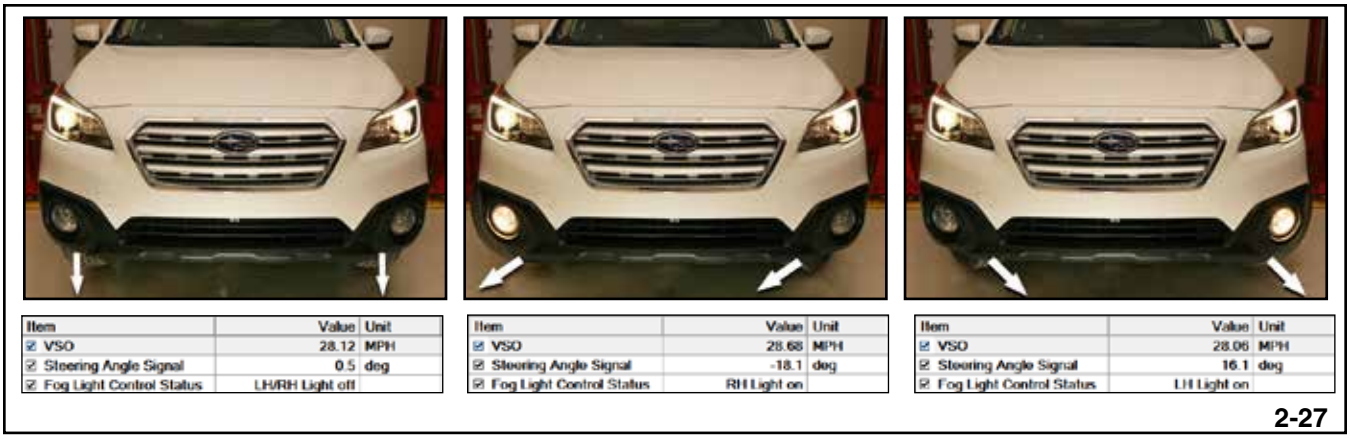
DRL Wiring Diagrams

Steering-Responsive Fog Lights (SRF)

The 2015 Legacy and Outback are optionally equipped with a new Steering-Responsive Fog Light system. An SRF Control Module communicates with the Main CAN to monitor vehicle speed and steering angle. The system activates the left and right fog lights independently to provide enhanced visibility in the direction of the turn.



SRF Light Distribution



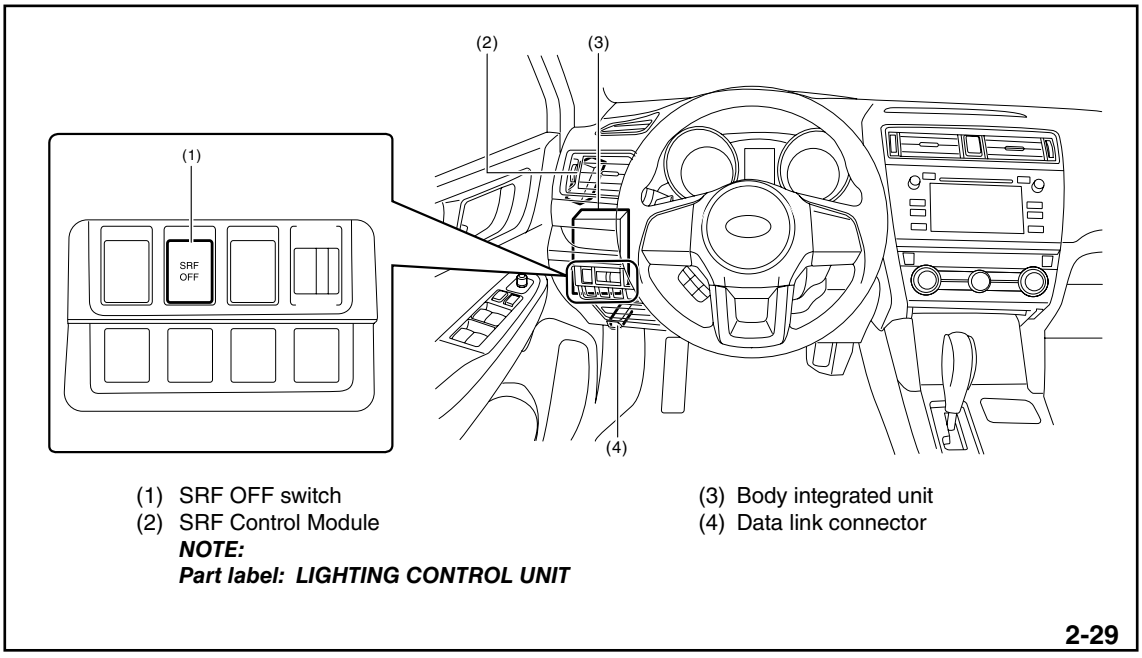
Fog Lights OFF *Right Turn, Fog Light ON* *Left Turn, Fog Light ON*

The following conditions must be satisfied in order for the SRF system to function.

Low beam light	ON
Fog lamp	OFF
Shift position	Except “R”
SRF OFF switch	OFF
Vehicle speed & Steering angle condition is satisfied	

The SRF system can be temporarily disabled by pressing the Instrument Panel located “SRF OFF” button. However, SRF is defaulted to the ON position when the ignition cycled.

SRF OFF Switch



(1) SRF OFF switch
(2) SRF Control Module
NOTE:
Part label: LIGHTING CONTROL UNIT
(3) Body integrated unit
(4) Data link connector

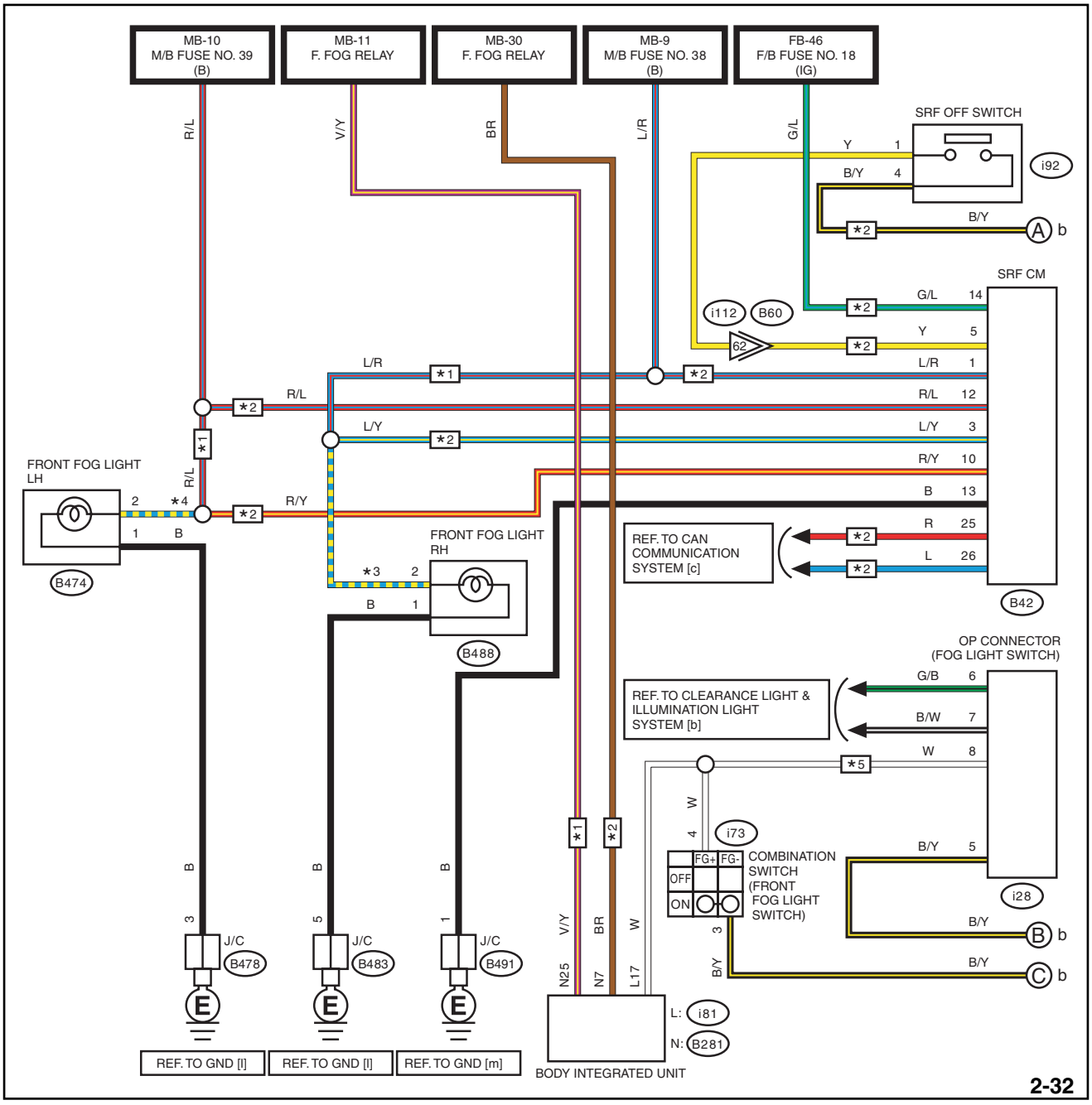
SRF Component Locations

The SRF Control Unit is located on the driver side of the vehicle against the bulkhead. This is interchanged with the Auto Headlight Leveling (AHL) Control Unit for models equipped with HID headlights. On AHL equipped vehicles, all SRF functions are controlled by the AHL control unit.

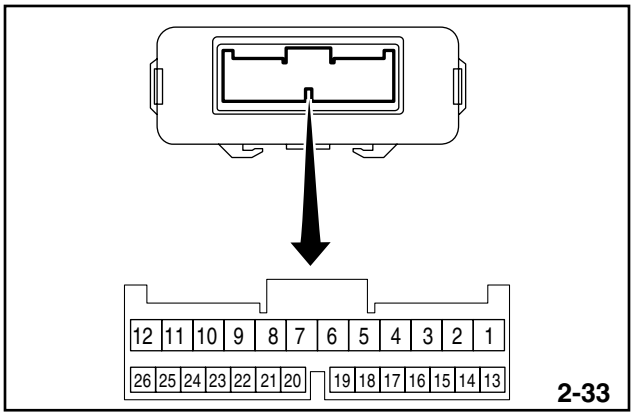
Lighting Control Unit

SRF Control Unit (Dash removed)

NOTES:



SRF Wiring Diagram



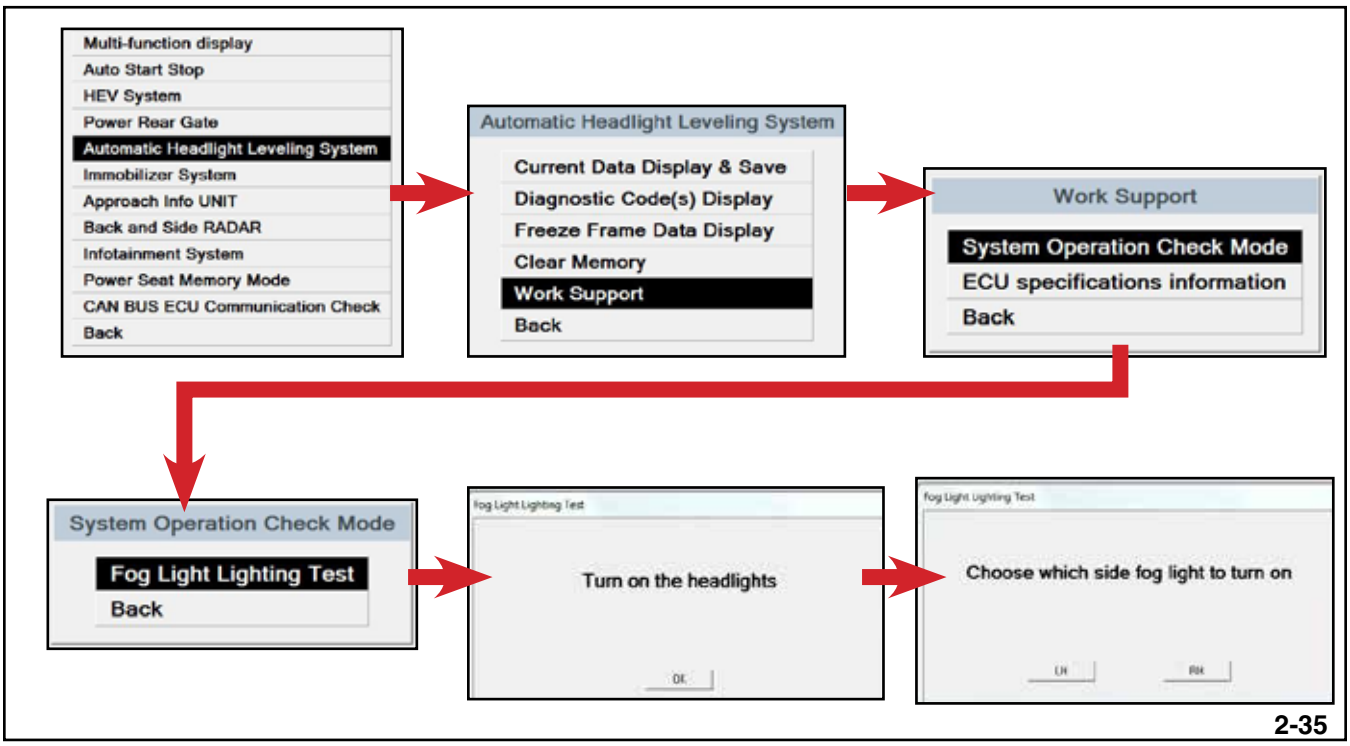
SRF Module Connector (B42)

SRF Module Disconnected

Terminal No.	Content	Measuring condition	Standard
1 ←→ Chassis ground	Battery power supply (right)	Always	8 — 16 V
2 ←→ Chassis ground	—	—	—
3 ←→ Chassis ground	Fog light output (right)		
4 ←→ Chassis ground	—	—	—
5 ←→ Chassis ground	SRF OFF switch		
6 ←→ Chassis ground	—	—	—
7 ←→ Chassis ground	—	—	—
8 ←→ Chassis ground	Rear vehicle height sensor signal*1	IG ON (with no passenger, no load and vehicle stopped)	Approx. 2.5 V (changes according to vehicle condition)
9 ←→ Chassis ground	—	—	—
10 ←→ Chassis ground	Fog light output (left)		
11 ←→ Chassis ground	—	—	—
12 ←→ Chassis ground	Battery power supply (left)	Always	8 — 16 V
13 ←→ Chassis ground	GND	Always	Less than 1 Ω
14 ←→ Chassis ground	Ignition power supply	Ignition switch ON	8 — 16 V
15 ←→ Chassis ground	Leveling actuator power supply*1	Ignition switch On	8 — 16 V
16 ←→ Chassis ground	Leveling actuator GND*1	Always	Less than 1 Ω
17 ←→ Chassis ground	—	—	—
18 ←→ Chassis ground	—	—	—
19 ←→ Chassis ground	—	—	—
20 ←→ Chassis ground	—	—	—
21 ←→ Chassis ground	Leveling actuator signal*1	Headlight off → on	Less than 1 V → 1.0 — 14.4 V (for 17 seconds)
		Headlight on, no vehicle height change → change and hold vehicle height for 3 seconds or more	
22 ←→ Chassis ground	—	—	—
23 ←→ Chassis ground	Rear vehicle height sensor power supply*1	Ignition switch On	4.75 — 5.25 V
24 ←→ Chassis ground	Rear vehicle height sensor GND*1	Always	Less than 1 Ω
25 ←→ Chassis ground	CAN-H (CAN communication line)	Cannot be measured	—
26 ←→ Chassis ground	CAN-L (CAN communication line)	Cannot be measured	—

**1: With auto headlight beam leveler system*

Inspection of the SRF system can be performed using the Subaru Select Monitor III.

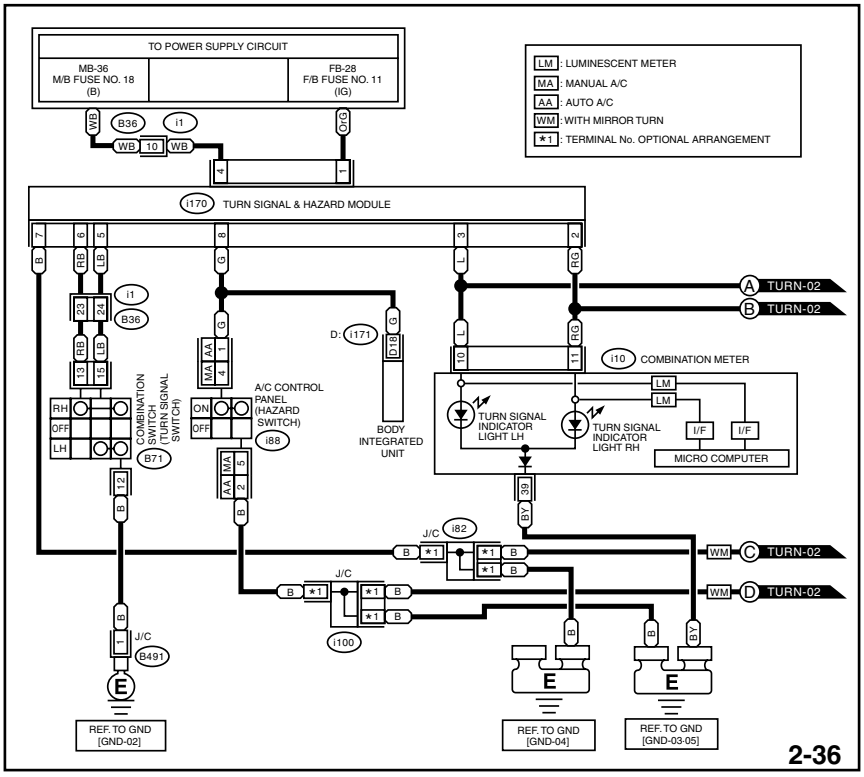


Inspection of the SRF System with SSMIII

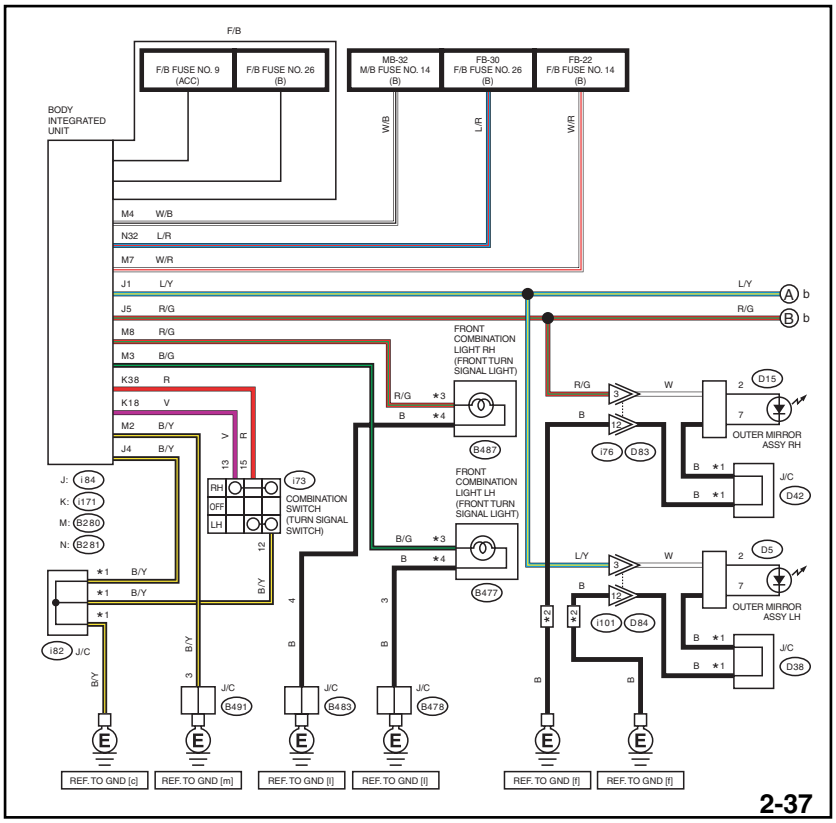
DTCs for the SRF system

DTC	Item	Reference
U0074	Control Module Communication Bus “Body-CAN” Off	<Ref. to SRF(diag)-18 DTC U0074 CONTROL MODULE COMMUNICATION BUS “BODY-CAN” OFF, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0101	Lost Communication With TCM	<Ref. to SRF(diag)-18 DTC U0101 LOST COMMUNICATION WITH TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0122	Lost Communication With Vehicle Dynamics Control Module	<Ref. to SRF(diag)-18 DTC U0122 LOST COMMUNICATION WITH VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0402	Invalid Data Received From TCM	<Ref. to SRF(diag)-18 DTC U0402 INVALID DATA RECEIVED FROM TCM, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U0416	Invalid Data Received From Vehicle Dynamics Control Module	<Ref. to SRF(diag)-18 DTC U0416 INVALID DATA RECEIVED FROM VEHICLE DYNAMICS CONTROL MODULE, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1140	Lost Communication With Body Control Module Body-CAN	<Ref. to SRF(diag)-18 DTC U1140 LOST COMMUNICATION WITH BODY CONTROL MODULE BODY-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
U1422	Invalid Data Received From Body Control Module Body-CAN	<Ref. to SRF(diag)-18 DTC U1422 INVALID DATA RECEIVED FROM BODY CONTROL MODULE BODY-CAN, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2900	AHLCU Error	<Ref. to SRF(diag)-19 DTC B2900 AHLCU ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2902	Rear Height Sensor Error	<Ref. to SRF(diag)-20 DTC B2902 REAR HEIGHT SENSOR ERROR, Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2906	Fog Light Harness(RH)	<Ref. to SRF(diag)-22 DTC B2906 FOG LIGHT HARNESS(RH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>
B2907	Fog Light Harness (LH)	<Ref. to SRF(diag)-22 DTC B2907 FOG LIGHT HARNESS(LH), Diagnostic Procedure with Diagnostic Trouble Code (DTC).>

The “Turn & Hazard Unit” has been eliminated. All previous functions are now controlled by the BIU.



2014 Outback Turn Signal Wiring



2015 Outback Turn Signal Wiring

Immobilizer & Keyless Entry

The Keyless Entry System for the 2015 Legacy and Outback features restyled transmitters. Immobilizer functionality remains the same as previous Immobilizer Type D systems.

2015 Legacy and Outback KAC Transmitters

The mechanical key for KAC vehicles is now laser cut on one side only. A Key Number tag is supplied upon delivery.

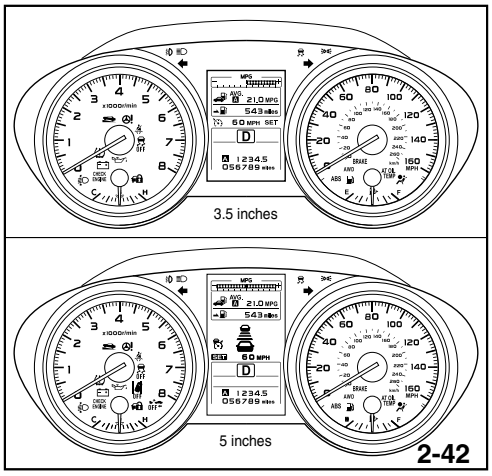
Mechanical Key Removed

Mechanical Key Cut

Combination Meter

The 2015 Legacy and Outback feature a new sporty instrument panels highlighted by two binocular-style gauge pods. Centered in the panel is a standard 3.5” LCD or a 5” LCD for models with the Eyesight driver-assist system. The Premium and Limited-trim levels feature electro-luminescent gauges.

Outback 5”LCD Combination Meter

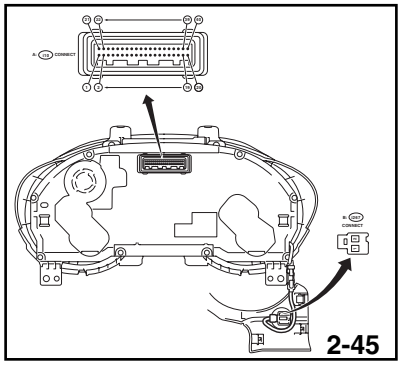


Available Combination Meters

The Combination Meter has an additional 2 wire harness (connector i267) that connects to the dash mounted Trip Reset Switch.

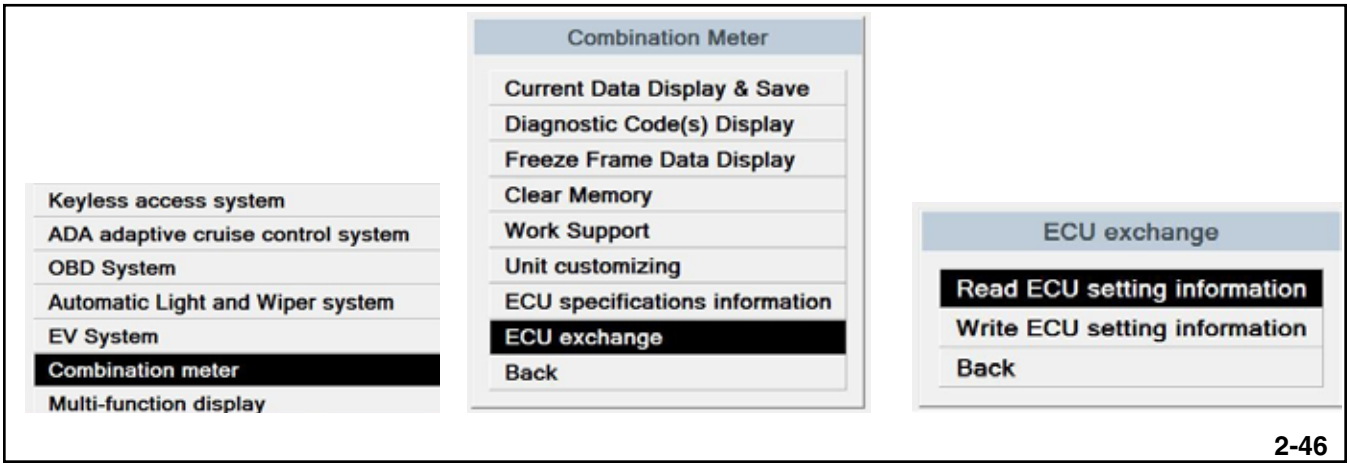
Trip Reset Switch

Trip Reset Switch Connector



Combination Meter Connectors

In the event of replacement, the Combination Meter now requires a Selection of Parameter similar to VDC modules. This procedure is completed using the SSMIII

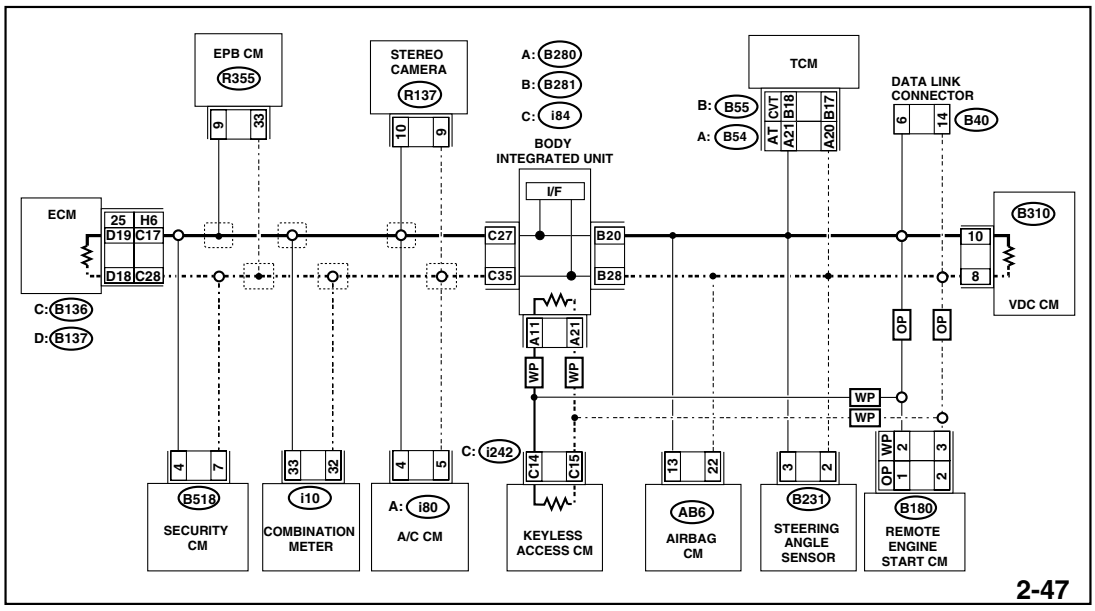


SSMIII Selections For Replacing Combination Meter

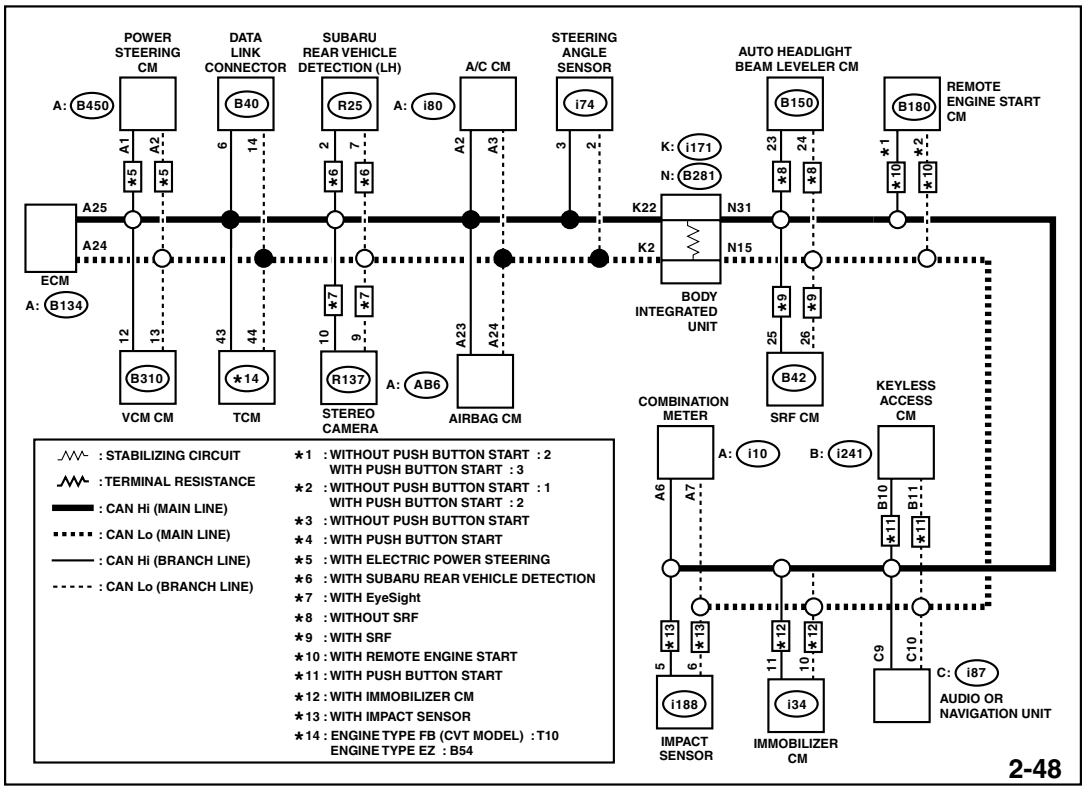
NOTES:

LAN/CAN Changes

The 2015 Legacy and Outback receive a new CAN configuration to accommodate the increased numbers of modules and functions. In comparison to previous models, the primary difference is that the CAN has been divided into two separate High Speed circuits identified as “Main CAN” and “Body CAN”. New members to the CAN include the Subaru Rear Vehicle Detection, Auto Head Lamp Leveler (or SRF CU), and Infotainment units.



2014 Legacy And Outback CAN



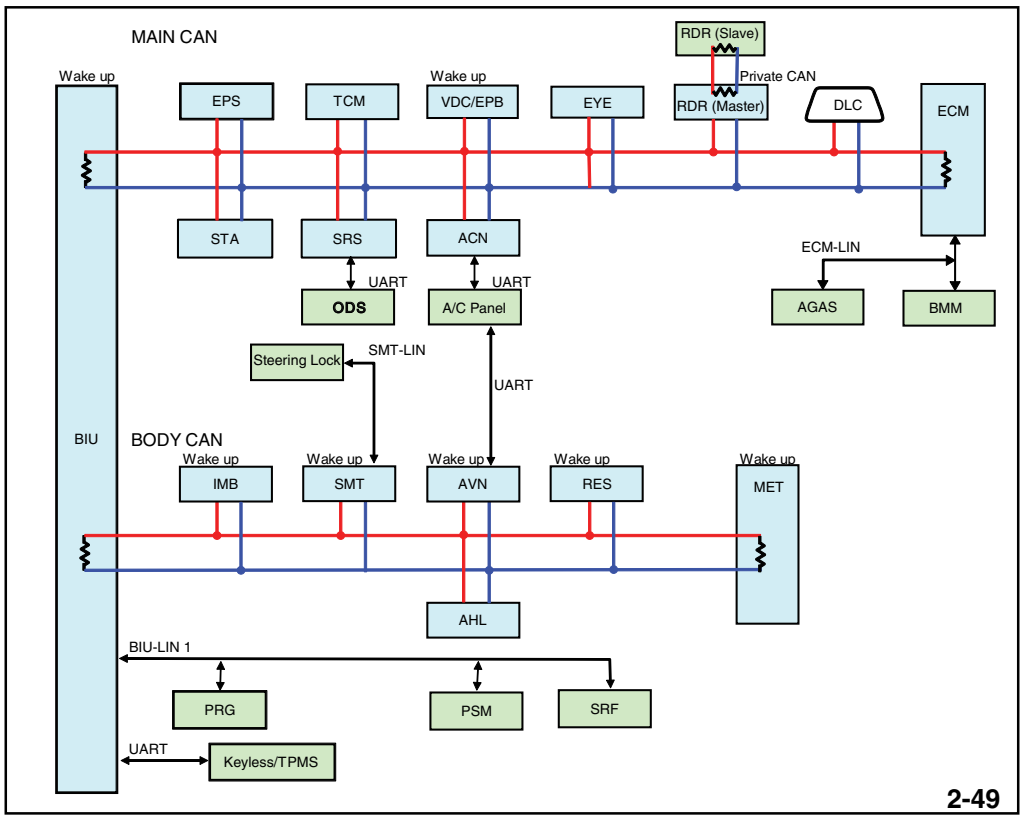
2015 Legacy And Outback CAN

CAN Diagnostics

Terminating Resistors for the Main CAN are located in the ECM and BIU. In previous models, the terminating resistors were located in the ECM and VDC.

Terminating Resistors for the Body CAN are located in the BIU and Combination Meter. Regardless if working with the Main or Body CAN, Terminating Resistor values remain the same from previous model years and should produce 53 – 61Ω when measured across the CAN High and CAN Low wires.

Please note modules that have the ability to “wake” the CAN Circuit from a “sleep” mode. Failures within these modules may cause parasitic draw (dark current) as a related symptom.

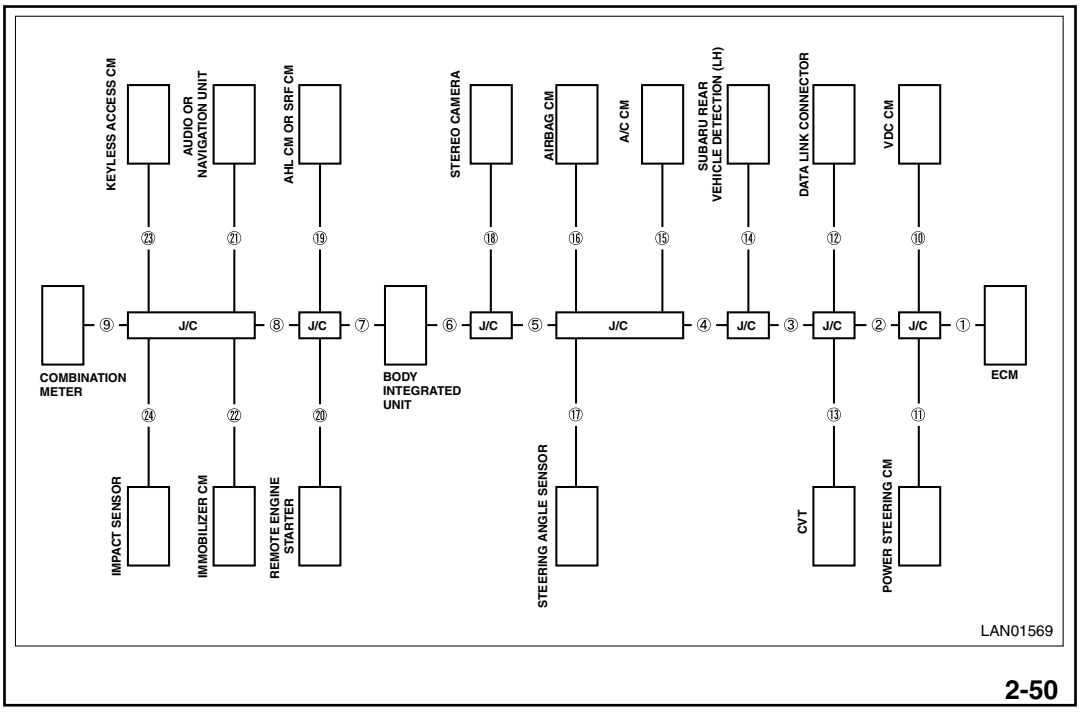


CAN Configuration

EPS - Electric Power Steering	IMB - Immobilizer (UK / Canada only)
TCM - Transmission Control Module	PRG -Power Rear Gate
SRS - Supplemental Restraint System Control Unit	VDC/EPB - Vehicle Dynamics Control/ Electronic Parking Brake
RDR - Subaru Rear Vehicle Detection (SRVD)	AVN - Audio/Video/Navigation
DLC - Data Link Connector	AHL - Auto Head lights
ECM - Engine Control Module	RES - Remote Engine Start
AGAS - Active Grille Air Shutter System	SRF - Steering Responsive Fog Lights
BMM - Battery Monitor Module	MET - Combination Meter
STA - Steering Angle Sensor	A/C - Air Conditioning
EYE - Eyesight	ACN - Air Conditioning Control Module
ODS – Occupant Detection System	PSM - Power Seat Memory
BIU - Body Intergrated Unit	SMT - SMART (Keyless Access Control)

The Subaru 2015 Legacy and Outback Service Manual provide updated diagnostics to differentiate operating faults and communication inabilities.

Using stored DTCs, reference the Check Sheet to identify the failure location in the Network Diagram.



Network Diagram

	(A)	(B)				ECM	TCM	VDC	STA	EPB	EPS	BIU	A/B	MET	AVN	A/C	IMB	SUN	AHL	SEAT	PRG	ACT	KPS	BIU	RDR	EYE	BAT
		U0073	U0074	U0075	U0077	U0100	U0101	U0122	U0126	U0128	U0131	U0140	U0151	U0155	U0162	U0164	U0167	U0169	U0181	U0208	U0230	U0284	U0327	U1140	U1232	U1235	U1712
ECM			-	-		-			-	-	-	-	-		-	-	-	-	-	-	-		-	-	-		
VDC			-	-	-			-		-	-		-	-	-	-	-	-	-	-	-	-	-	-	-		-
EPS			-	-	-		-			-	-	-	-		-	-	-	-	-	-	-	-	-	-	-		-
TCM			-	-	-		-		-	-	-		-		-		-	-	-	-	-	-	-	-	-		-
RDR		-		-	-				-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-
A/C			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/B			-	-	-				-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-
EYE			-	-	-					-			-		-	-	-	-	-	-	-	-	-	-	-	-	-
BIU				-	-				-			-			-				-			-		-	-	-	-
AHL		-		-	-	-	-		-	-	-		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SRF		-		-	-	-			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-
RES		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVN					-				-		-	-	-		-			-	-	-	-	-				-	-
IMB		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS			-	-	-				-	-	-		-		-	-	-	-	-	-	-	-	-	-	-	-	-
IMP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET				-	-		-		-					-				-		-	-	-					-

LAN01594

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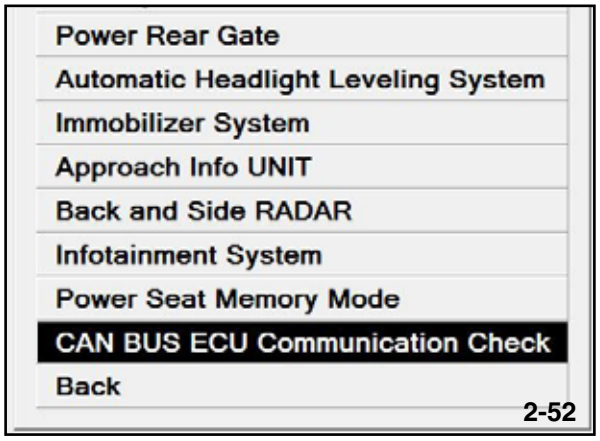
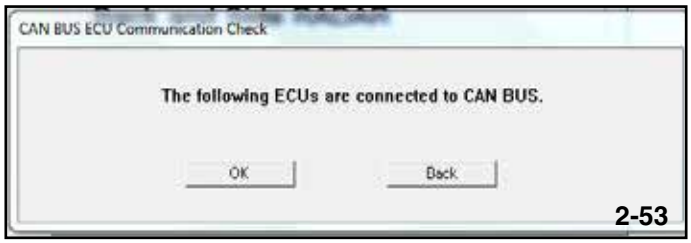
Communication Check Sheet

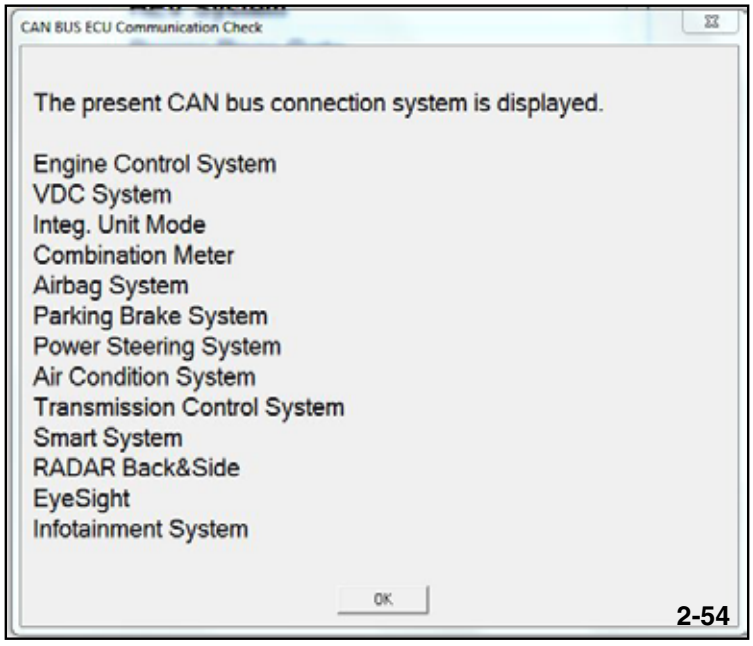
This step can also be supplemented by using a new function of the SSMIII. However, the list of ECU's displayed does not confirm communication, only their required presence in the vehicle. Communication for initializing should be performed with each of the ECUs separately to verify communication.



CAN BUS Communication (1)



CAN BUS Communication (2)



CAN BUS Communication (3)

Although communication may be possible with all modules on the CAN, it is possible an operating fault still exists. Use the Error Check Sheet to identify the source.

	(A)	ECM U0401	TCM U0402	VDC U0416	EPB U0417	EPS U0420	BIU U0422	MET U0423	A/C U0424	IMB U0426	KPS U0427	STA U0428	BIU U1422	EYE U1433	KEY U1500	BIU U1673
ECM		-			-	-	-		-	-	-	-	-	-	-	-
VDC				-	-	-		-	-	-	-		-		-	-
EPS			-		-	-	-	-	-	-	-	-	-		-	-
TCM			-		-	-				-	-	-	-		-	-
RDR					-	-			-	-	-	-	-	-	-	-
A/C		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
A/B					-	-			-	-	-	-	-	-	-	-
EYE					-				-	-	-		-	-	-	-
BIU						-	-					-	-	-		
AHL		-	-		-	-		-	-	-	-	-	-	-	-	-
SRF		-			-	-	-	-	-	-	-	-		-	-	-
RES		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AVN		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IMB		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
KPS			-	-	-	-		-	-	-	-	-	-	-	-	-
IMP		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MET		-	-	-	-	-	-	-	-	-	-	-	-		-	-

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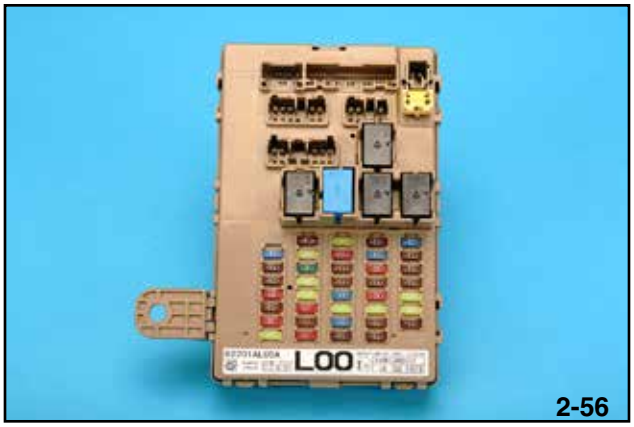
2-55

Error Check Sheet

BIU

The BIU on the 2015 Legacy and Outback has been redesigned to combine the interior fuse/relay box and joint box.



2-56

Joint Box / BIU Front

2-57

Joint Box / BIU Rear

CAUTION: These components cannot be disassembled. Assembly replacement is required.

NOTES:

Power Rear Gate (PRG)

The 2015 Outback is optionally equipped with a Power Rear Gate (PRG). The PRG provides an electric powered opening and closing feature that is controlled through a switch on the rear gate, instrument panel, keyless access remote, or the mechanical keyless entry key.

Open PRG

Opener Switch

The Opener switch on the PRG is located between the rear license plate light lenses.

Closer Switch

Switch Cluster

The Closer switch is located on the left side of the gate, near the mechanical latch assembly.

The interior PRG Opener/Closer switch and PRG Memory Height switch are located on the switch cluster to the left of the steering wheel.

Note: The PRG of the 2015 Outback operates from a constant mesh gear drive system. Do not use excessive force to manually operate the PRG or damage to the PRG will occur.

Warning: Keep away from the closing area of the rear gate (PRG). The outer edge of the rear gate (PRG) beyond the touch sensor cannot detect solid objects and will not trigger a safety maneuver until the amperage of the rear gate (PRG) exceeds a pre-established specification.

The 2015 Outback PRG is classified as an Arm Lift system that receives mechanical power from the motor through a set of stacked reduction and drive gears. A spring is used to assist with the initial movement of the gate (opening or closing). Gate operation of the Forester Spindle Drive PRG is accomplished with a threaded drive block and rotating threaded drive rod.

Arm Lift PRG

Spindle Drive PRG

The PRG of the Outback can never be separated from the reduction drive gears. This type of system eliminates the need for a motor clutch and half stop solenoid. The combined gear ratio and force from the gate struts will hold the gate in a set position.

The Forester PRG is equipped with an electric clutch to disengage the Spindle Drive system from the reduction gears and motor. A Manual Release lever allowed for a fail-safe mechanical disengagement of the moving parts that can be utilized if an electrical or mechanical problem prevented the gate from opening.

PRG Gear Set

Manual Release Lever

Constant mesh Arm Lift PRGs cannot separate the gate lifting mechanism from the drive system which prevents any type of fail-safe mechanical release. Removing the lift arm is the only way to separate the gate from the PRG assembly.

Construction

The PRG is driven by a DC brushed motor that delivers power to the PRG gear assembly. The motor transfers mechanical power though a flexible metal drive shaft to a worm gear.

PRG Assembly

PRG Motor And Drive Shaft

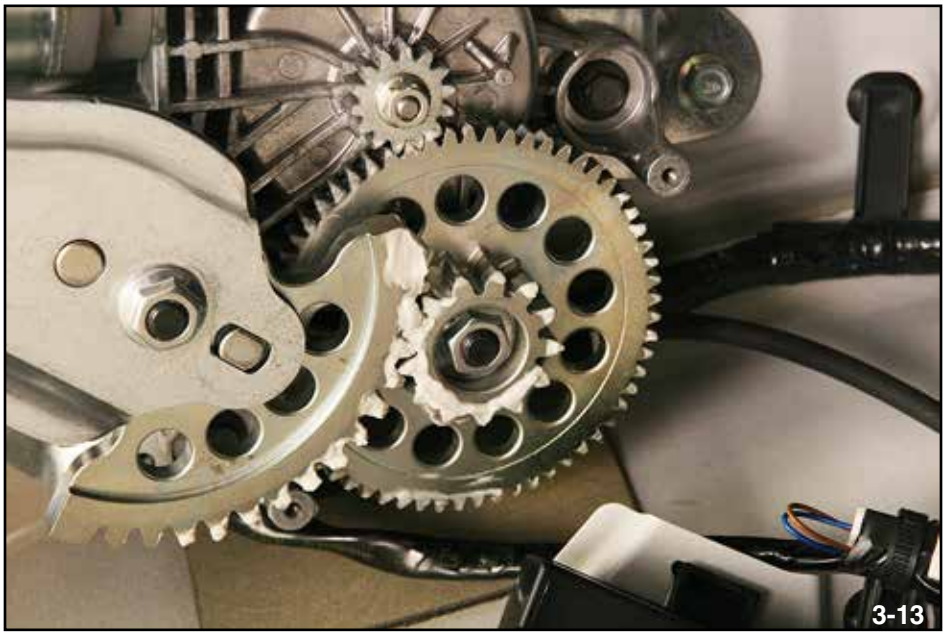
The metal drive shaft is wire wound to increase strength. A spiral wound fiber thread surrounds the drive shaft to ensure the clearance between engagement points is minimum.

Drive Shaft

Drive Shaft And Worm Gear

The drive shaft transfers power from the motor rotor to the worm gear set of the PRG gear assembly. The final gear ratio provides the strength and speed needed to open and close the rear gate.

All gears are lubricated during construction and require no additional maintenance.



Gears and Lubrication

Note: Due to the constant mesh design of the gear set, Manual Mode is not recommended. The opening force required to open the rear gate in Manual Mode is 25 to 30 lbs., which is approximately double the force required to open the Forester Spindle Drive PRG.

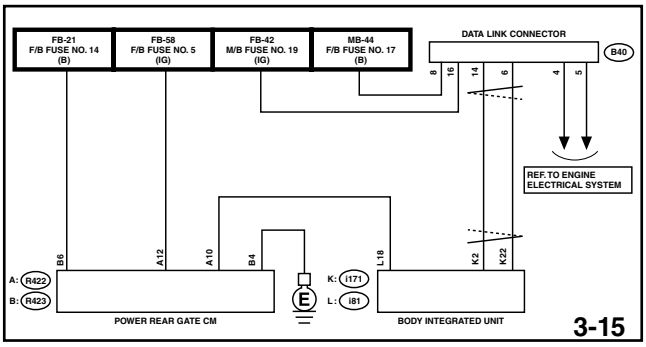
NOTES:

Electrical Control

The PRG Control Unit is located next to the PRG motor assembly and is secured to the vehicle body with 2 clips that are made onto the plastic body of the control unit. Use care when removing the control unit so that the clips are not damaged. The PRG control unit communicates with the BIU through a LIN communications wire for all PRG operations. Data to the Select Monitor will be slow due to the reduced communications speed of the LIN circuit.

Note: The operation of the Auto Closer assembly is the same as the Forester type PRG. Refer to the 602 TRB for details on Auto Closer operation.

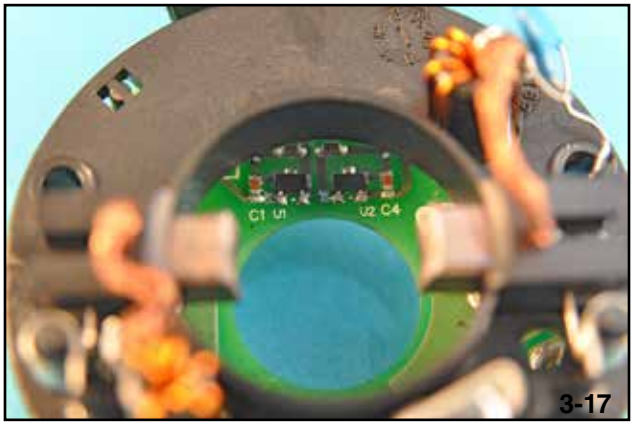
PRG Control Unit



LIN Circuit

The armature of the PRG motor is equipped with a revolution sensor reluctor which is constructed with alternating magnetic poles. Two Hall sensors, Hall 1 and Hall 2, create input signals to the PRG control unit as the alternating magnetic poles revolve by the sensors.

Revolution Sensor Reluctor

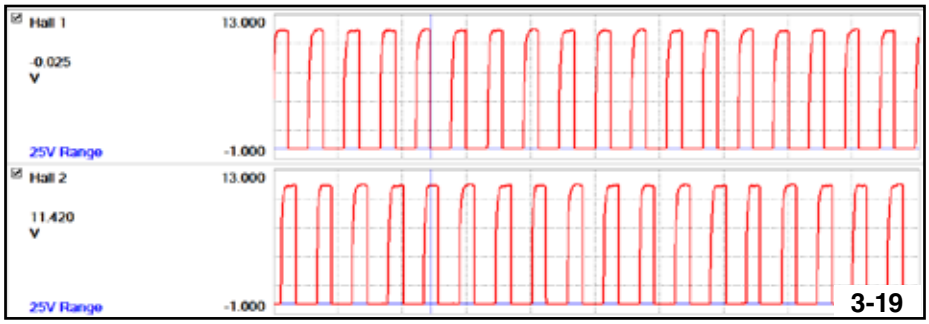


Hall Sensors

The PRG control unit combines the two signals to create the data viewed on the Subaru Select Monitor as Rear Gate Speed and Pulse-count 2.

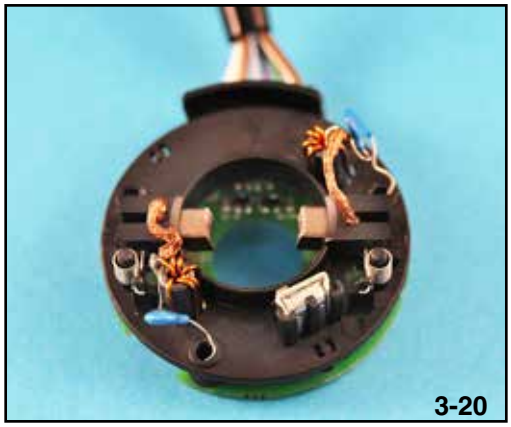
Item	Value	Unit	
☑ Rear Gate Target Speed	60	mm/s	
☑ Rear Gate Speed	66	mm/s	
☑ PRG MOTOR Duty	49	%	
☑ Pulse-count 2	1432	Count	3-18

Select Monitor Hall Sensor Data

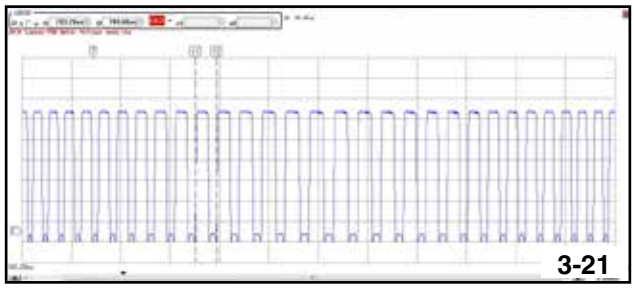


Revolution Sensor Patterns

The speed and direction of the PRG motor is controlled by the power supply frequency and duty ratio to the brushes and armature.

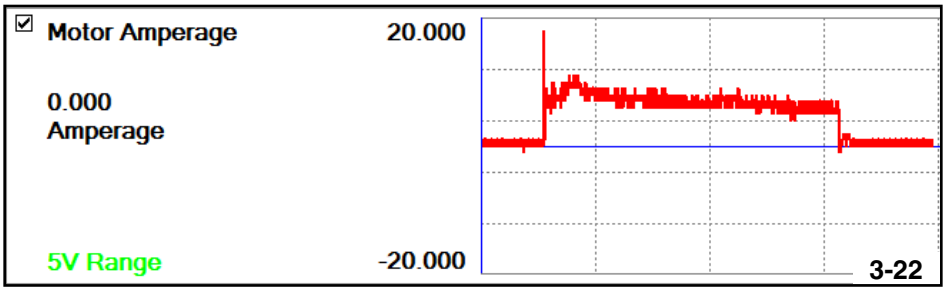


Brushes



PRG Motor Control

The frequency of the power supply can reach as high as 16,000 Hz. Typical motor amperage is 18 amps during start up and 6 to 8 amps during normal movement. A blocked rear gate can create current flow as high as 23 amps in the motor drive circuit, which will result in a reversal of the rear gate direction.



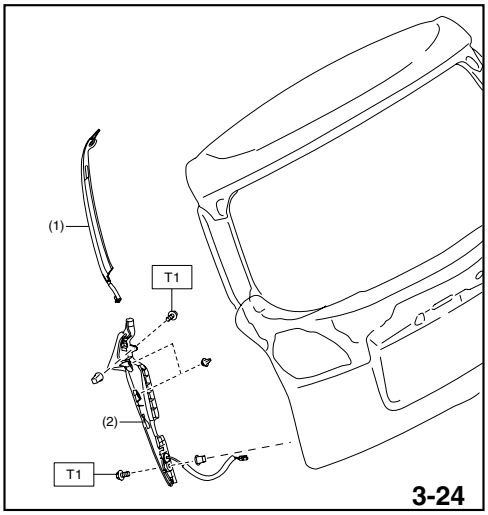
Normal PRG Motor Amperage

Touch Sensors

The pinch or Touch Sensor of the Outback PRG is comprised of four individual sensor strips that are wired in series, providing only one input to the PRG control unit. Each side of the gate has upper and lower sensor strips that are connected together under the upper edge trim of the lower sensor. The lower sensor strips are bolted into place while the upper sensor strips are held in place by an adhesive strip. Never re-use an upper sensor strip once it has been removed from the vehicle.

Note: If the rear window glass is removed, the upper sensor strips must be replaced.

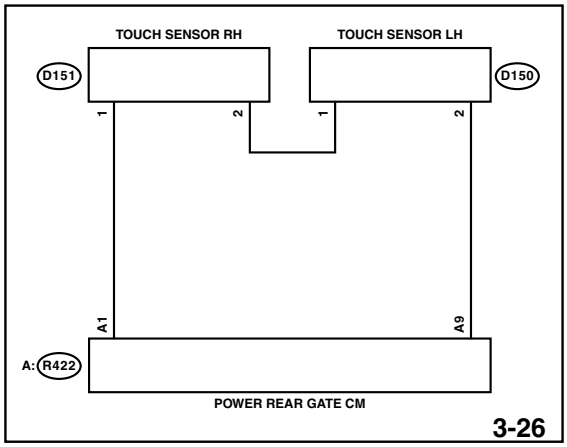
Touch Sensors



Upper and Lower Touch Sensors

Always separate the upper and lower sensor strips during diagnostics to isolate an open or short circuit of the individual sensors strips.

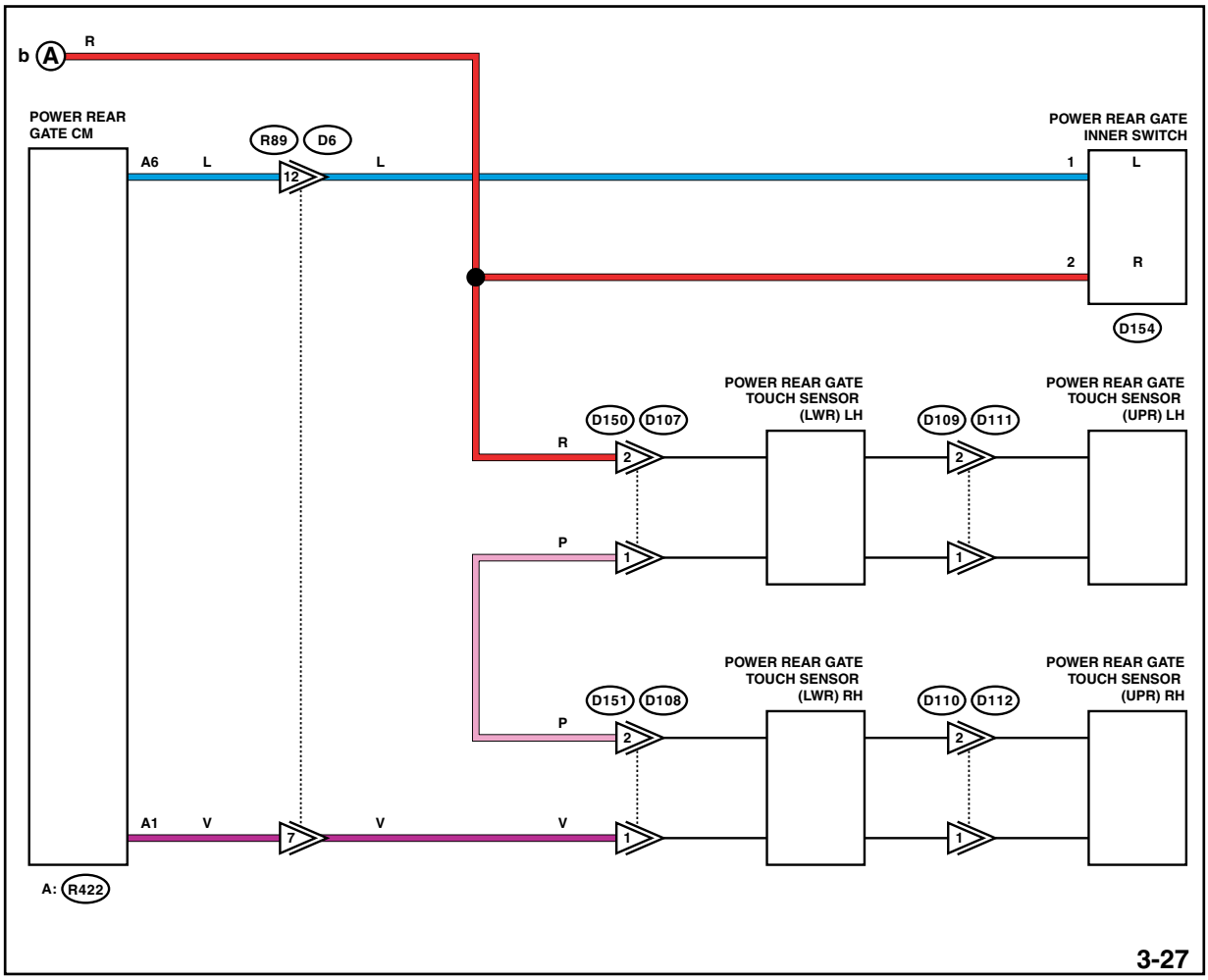
Connector



Touch Sensor Artwork

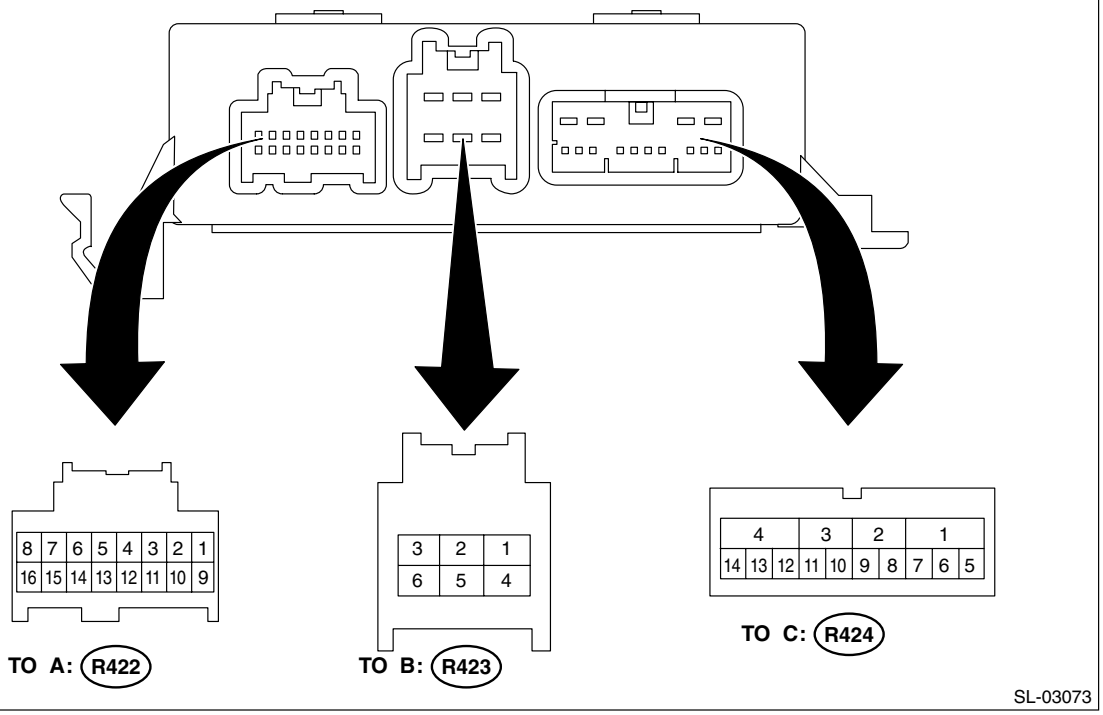
A single DTC, B2524 Touch Sensor Failure, is provided to indicate a problem with the Touch Sensor.

Note: The line drawing of the Touch Sensor in the PRG Diagnostics section of the service manual does not include the detail needed to perform diagnostics. Always refer to the PRG wiring schematics in the electrical section of the Subaru Service Manual.



Touch Sensor Wiring Schematic

NOTES:



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PRG I/O Chart Connectors

Terminal No.	Description	Measuring condition	Standard
(R422) No. 1 ←→ Chassis ground	Touch sensor	When sensor is ON	Less than 1 V
(R422) No. 2 ←→ Chassis ground	—	—	—
(R422) No. 3 ←→ (R422) No. 9	Latch switch	When rear gate is fully closed	4 — 6 V
(R422) No. 4 ←→ (R422) No. 9	Courtesy switch	When rear gate is fully closed	4 — 6 V
(R422) No. 5 ←→ (R422) No. 9	Sector switch	When rear gate is fully closed	Less than 1 V
(R422) No. 6 ←→ (R422) No. 9	PRG inner SW	When power rear gate inner switch is ON	10.5 — 16 V
(R422) No. 7	—	—	—
(R422) No. 8 ←→ Chassis ground	Memory height switch	When memory height switch is On	10.5 — 16 V
(R422) No. 9	Switch GND	—	—
(R422) No. 10	LIN communication line	—	—
(R422) No. 11	—	—	—
(R422) No. 12 ←→ Chassis ground	Ignition SW	When ignition switch is On	—
(R422) No. 13 ←→ Chassis ground	Power rear gate driver's switch	When driver's switch is ON	10.5 — 16 V
(R422) No. 14 ←→ Chassis ground	—	—	—
(R422) No. 15 ←→ Chassis ground	Hazard output	When hazard is not operating	Less than 1 V
(R422) No. 16 ←→ Chassis ground	—	—	—

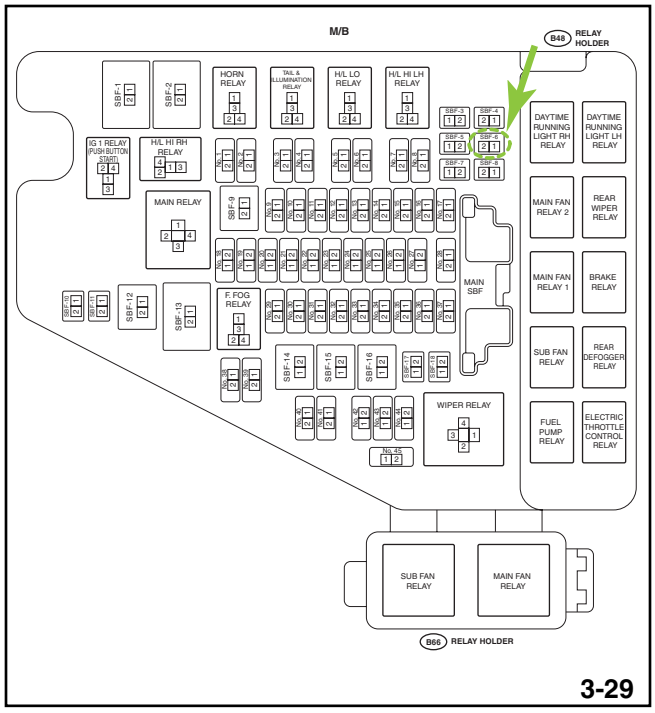
Terminal No.	Description	Measuring condition	Standard
(R421) No. 1 ←→ Chassis ground	Battery power supply (+POWER B)	Always	10.5 — 16 V
(R421) No. 2 ←→ Chassis ground	Closer (CLOSE)	When the power rear gate auto closer is performing the pull-in operation	10.5 — 16 V
(R421) No. 3 ←→ Chassis ground	Closer (OPEN)	When power rear gate auto closer is performing the release operation	10.5 — 16 V
(R421) No. 4 ←→ Chassis ground	GND	Always	Less than 1 Ω
(R421) No. 5 ←→ Chassis ground	—	—	—
(R421) No. 6 ←→ Chassis ground	Battery power supply (+B)	Always	10.5 — 16 V
(R424) No. 1 ←→ Chassis ground	—	—	—
(R424) No. 2 ←→ Chassis ground	—	—	—
(R424) No. 3 ←→ Chassis ground	Motor (CLOSE)	When auto-closing is in operation	10.5 — 16 V
(R424) No. 4 ←→ Chassis ground	Motor (OPEN)	When auto-open is in operation	10.5 — 16 V
(R424) No. 5	Buzzer (-)	—	—
(R424) No. 6 ←→ (R424) No. 5	Buzzer (+)	When buzzer sounds	Pulse
(R424) No. 7 ←→ Chassis ground	—	—	—
(R424) No. 8 ←→ Chassis ground	HALL RETURN	—	—
(R424) No. 9 ←→ Chassis ground	HALL2	—	—
(R424) No. 10 ←→ Chassis ground	HALL1	—	—
(R424) No. 11 ←→ Chassis ground	HALL FEED	—	—
(R424) No. 12 ←→ Chassis ground	—	—	—
(R424) No. 13 ←→ Chassis ground	—	—	—
(R424) No. 14 ←→ Chassis ground	—	—	—

Separating the Rear Gate from the PRG Assembly

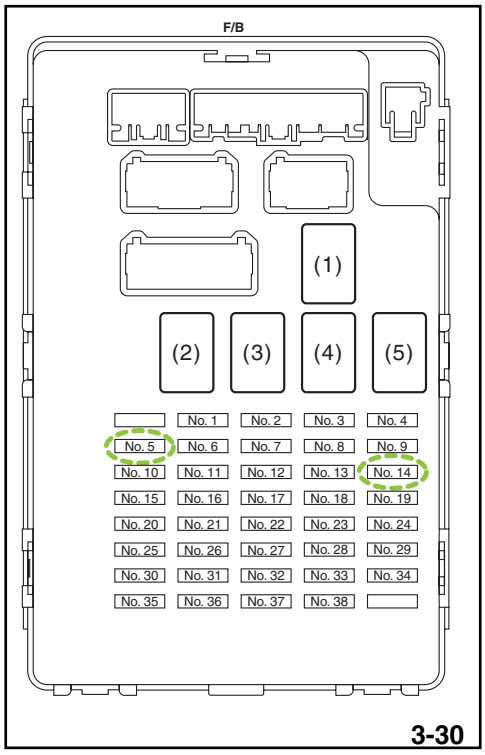
Rear Gate will not close

Caution: Disconnect the power supply or fuse from the PRG motor before removing the lift arm.

SBF-6, Fuse Number 14, and Fuse Number 5



Main Box, Engine Compartment



Fuse Box, In Car

Should a mechanical condition prevent the PRG of the 2015 Outback from closing, release the lift arm at the motor arm and then release the opposite end at the gate.

Access Panel Removed

Lift Arm

An access panel is provided to allow a technician room for removing the lift arm connection.

Rear Gate will not open

Open Access Panel with Gate Closed

Top of Gate Lift Arm Gate Closed

If the PRG will not open from a mechanical condition, remove the power supply as previously described and enter the rear of the vehicle from the back seat. Remove the lift arm at the gate and open the gate from the emergency release. Exit the vehicle from the rear.

Emergency Release

Note: Access to the emergency release is gained by removing the cover panel and pushing on the indicated lever towards the driver side of the vehicle.

"Memory Height" Learning Procedure

Memory Height Button

Closer Switch

Note: The ignition should be off and the PRG should be closed (Memory Height Button should be "OFF").

1. Open the rear gate by using the power rear gate function.
2. With the rear gate at the desired height, stop it by using the power rear gate function (use any control button to stop the gate).
3. Press the memory switch to select the "ON" status (Lowest Position).

Power Rear Gate Button

4. With the rear gate at the desired height, press and hold the power rear gate button on the inside edge of the rear gate until an electronic chirp is heard and the hazard warning lights flash three times.

The electronic chirp and the flashing hazard warning lightts confirm the selected rear gate height has been registered.

It is possible to register the height from approximately 12 in (30cm) or more from the completely closed position.

Retrieval of the rear gate height:

To open the rear gate and stop it at the registered height, perform the following procedure.

1. Press the memory switch to select the ON status.
2. Press and hold any of the power rear gate switches. Even if any of the power rear gate switches are pressed and held while the memory switch is in the OFF status, you can stop it at the registered height by pressing the memory switch to select the ON status before the rear gate reaches the registered height.

Operating Characteristics

Note: The rear gate will open to the position that is stored in the memory function even if the rear gate is opened by the reverse (Safety) function.

Rear gate drop prevention function

If, while fully opened via the power rear gate function, the rear gate is lowered by the weight of snow and such, an electronic chirp will sound and the rear gate drop prevention function will apply braking to the rear gate so that it prevents a rapid closure of the rear gate.

Note: If there is snow on the rear gate only use the power rear gate function after removing the snow.

If you close the rear gate manually just after the rear gate is fully opened using the power rear gate function, the rear gate drop prevention function will operate, detecting a rapid closure of the rear gate and apply braking to the rear gate. In this case, this is not a malfunction.

If the reverse function is operated 3 times consecutively, automatic opening and closing of the power rear gate function will be canceled and the rear gate will stop opening or closing suddenly.

Whether the rear gate opens or closes depends on the rear gate height when automatic operation is ceased. Be careful that the rear gate does not hit anyone's head or face, etc. and that fingers and baggage, etc. are not caught in it.

Take care not to damage the touch sensors. Otherwise, the reverse function may cease to operate.

If, while opening or closing using power rear gate, the rear gate catches persons or baggage or hits an obstacle, an electronic chirp will sound 3 times and the rear gate will operate as follows:

When opening the rear gate: The rear gate will automatically close.
When closing the rear gate: The rear gate will automatically open.

The power rear gate operates only when all of the following conditions are satisfied.

1. The vehicle is stopped completely.
2. The outside temperature is within a specified range.
3. The ignition switch is in the “LOCK”/ “OFF” or “ACC” position. Or, the ignition switch is in the “ON” position and the parking brake is applied (MT models)/the select lever is in the “P” position (CVT models).

NOTE: If the power rear gate button is pressed repeatedly while the power rear gate is operating, the system may ignore the button operation in order to avoid being damaged. Do not press the button unnecessarily.

It is not possible to stop the rear gate temporarily while opening between the completely closed position and approximately 12 in (30 cm) open. If you press one of the power rear gate buttons briefly during this range, the rear gate will be closed.

If the vehicle starts to move while the power rear gate is operating, the system sounds a buzzer and closes the rear gate automatically. At this time, if the system detects jamming, it will deactivate the power rear gate and the rear gate will not be closed. If this occurs, close the rear gate via regular procedures.

If you try to open the rear gate using the power rear gate function immediately after closing the rear gate using the power rear gate function, an electronic chirp will sound and the rear gate will not open. Wait for a while before trying to open the rear gate.

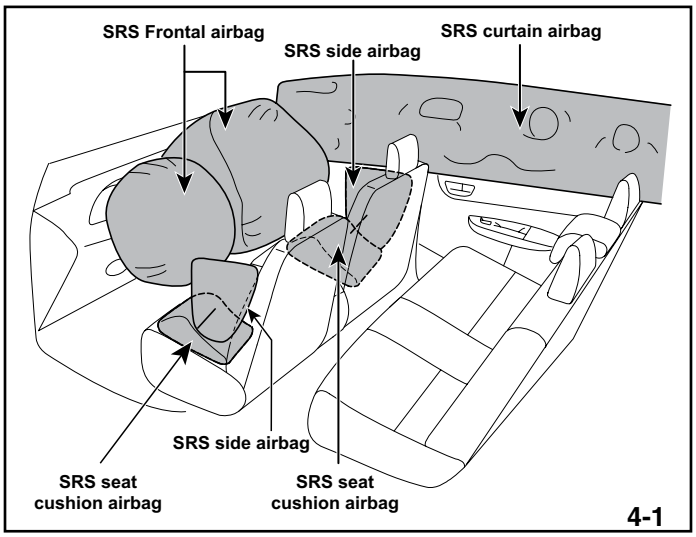
NOTES:

Supplemental Restraint System (SRS)

The 2015 Legacy and Outback Supplemental Restraint System (SRS) has been designed to conform to the new body interior layout while meeting the newest in Federal Motor Vehicle Safety Standards.

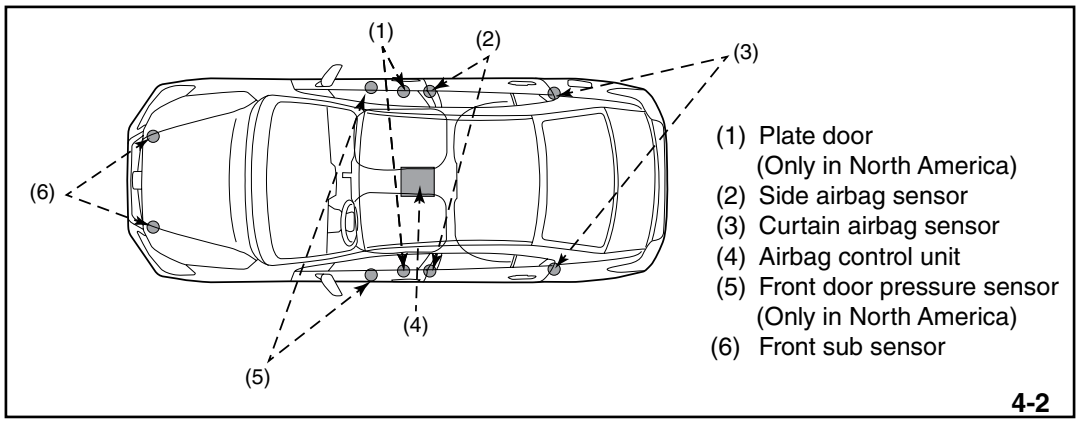
SRS Airbag Components include the following:

- Dual Deployment Driver Front Airbag
- Dual Deployment Passenger Front Airbag
- Single Deployment Curtain Airbags, Left and Right Side
- Single Deployment 2 Chamber Front Seat Side Airbags, Driver and Passenger
- Single Deployment Front Seat Cushion Airbags, Driver and Passenger
- Front Seat Shoulder Belt Pretensioners, Driver and Passenger Side



Airbag Configuration

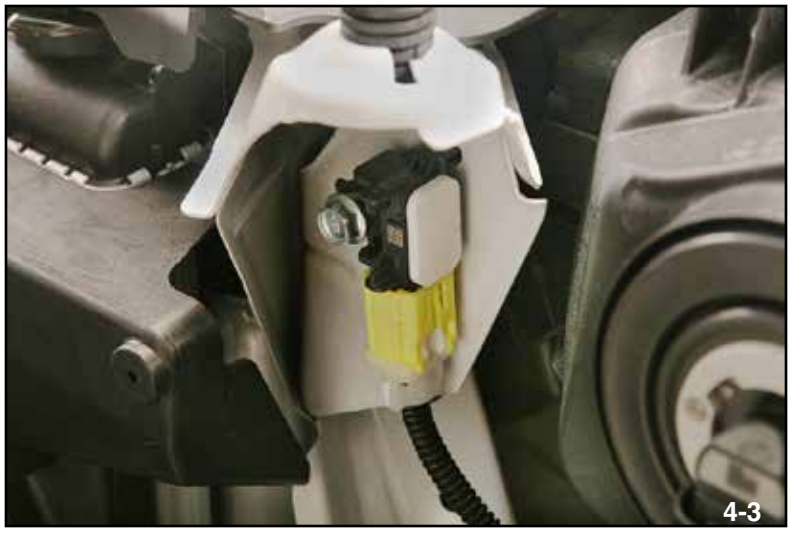
Note: The 2015 Legacy and Outback are not equipped with Knee Airbags or Lap Belt Pretensioners.



Sensor Locations

Airbag components

The two front Sub Sensors are now located more to the center of the vehicle, under the hood stopper bumpers. Always use the correct bolt to secure the sensor to the vehicle body. Bolts that are too long will change the accuracy of the sensor as it will make contact with other body components.



Front Sub Sensor

A new Front Door Sensor has been installed to the vehicles' SRS systems. The sensor detects changes in air pressure in the chamber that exists between the outer and inner door walls. An Impact to a door changes the shape of the outer wall and changes the air pressure that exists in the chamber at the instant of impact. A plastic door plate has been installed over a portion of the inner wall to restrict the volume of air that would be displaced during a collision. This improves the sensitivity of the Front Door Sensor.

Door Panel

Front Door Sensor

Air enters the sensor through the funnel shaped duct and directs the air to a pressure sensor located inside the sensor.

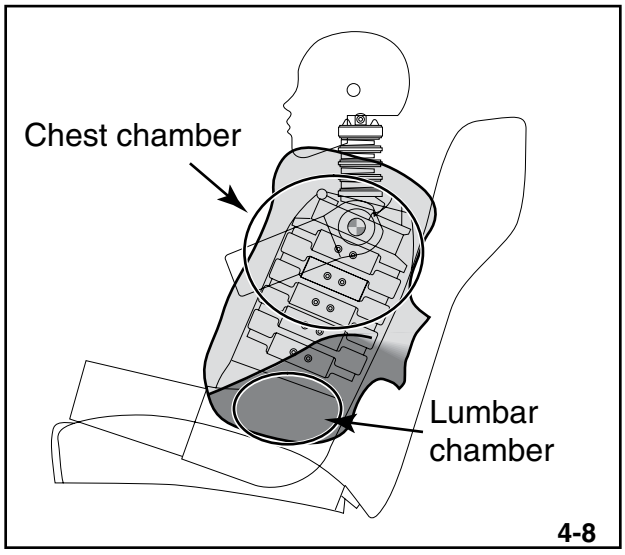
Internal View Front Door Sensor

O-ring Front Door Sensor

The back side of the sensor is equipped with an O-ring to prevent air from leaking into the back side of the sensor during collision. Never re-install a sensor that has been removed as the sealing qualities of the O-ring will be reduced.

The Front Seat Side Airbags

The Front Seat Side Airbags have been redesigned to provide two protection zones. The construction of the airbag now includes two chambers that provide a high pressure lumbar area protection zone and a softer low pressure chest and rib protection zone.



Side Airbag Design

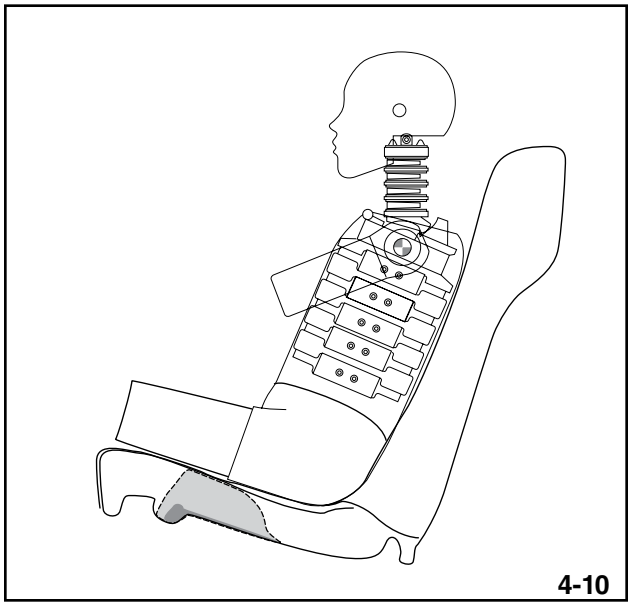
Side Airbag

The airbag is provided with two paths for the expanding gas to flow as the airbag deploys. The lower chamber of the airbag is stitched at a height that allows a tighter protection zone to form. The upper chamber has a potentially higher volume area and forms a softer zone during deployment. Both chambers are filled at the same time and from the same inflator.

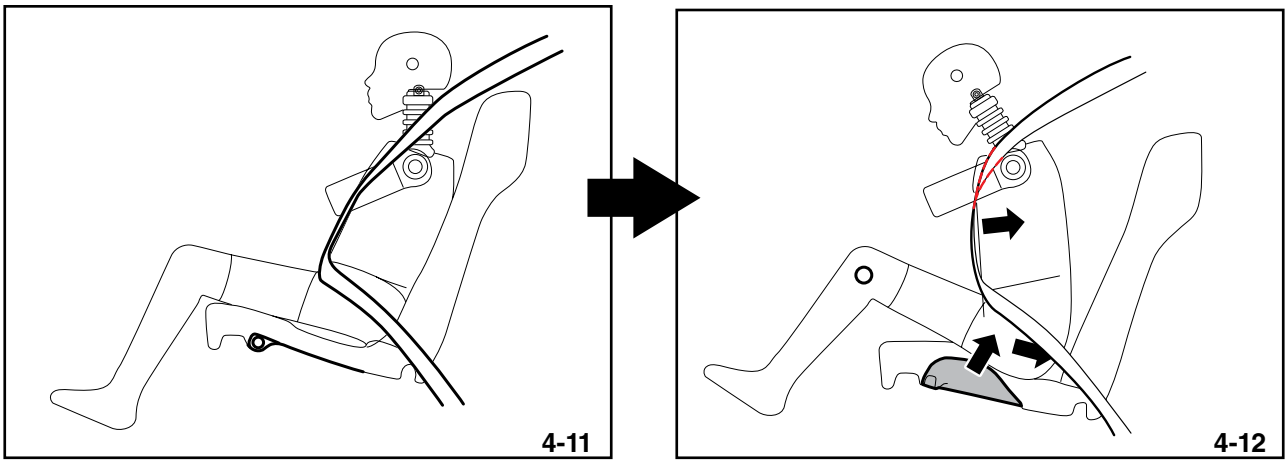
Seat Cushion Airbag

The driver and passenger front seat are equipped with a seat cushion airbag.

If a frontal crash occurs, the inflation of the airbag inside the seat gives backward pressure to the chest and reduces chest compression from the seatbelt. Moreover, the airbag prevents the waist from sinking in a frontal collision and reduces abdominal compression by the seatbelt, thus enhancing the restraining force of the seatbelt.



Seat Cushion Airbag Location



Normal *Front Collision*

Note: Seatbelts must be buckled before Seat Cushion Airbags will deploy. Input signals from the seatbelt switch carry the "buckled" signal to the SRS control unit.

The construction of the Seat Cushion Airbag provides lift to the forward section of the airbag and allows for expansion in a separate chamber to the rear of the airbag. No exhaust ports are provided which allows for an extended inflation time.

Seat Cushion Airbag

The Seat Cushion Airbag can be replaced on the driver seat after deployment without replacing any other seat components. If the Seat Cushion Airbag deploys on the passenger side, the entire lower seat assembly must be replaced.

Normal Seat

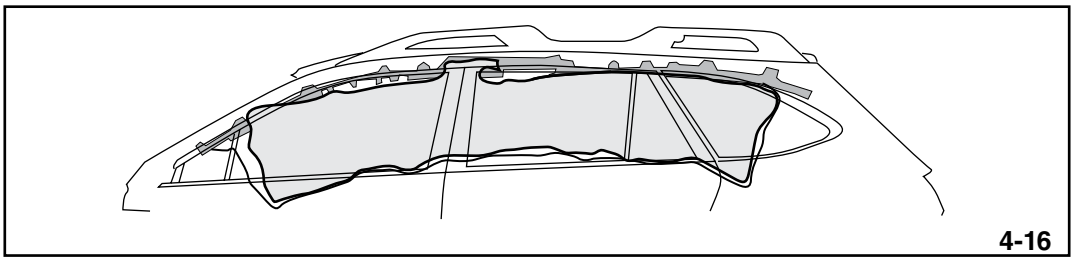
Deployed Seat Cushion Airbag

Note: The photographs above have been staged to show the airbag inflation shape. The final shape will be determined by the weight of the driver which will displace more of the expanding gas towards the front of the seat cushion.

NOTES:

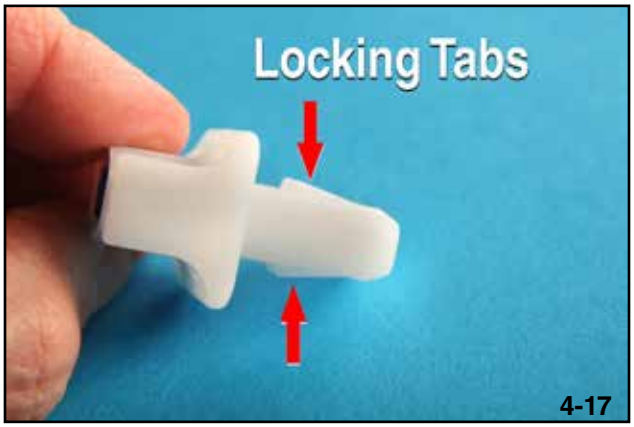
Curtain Airbag

The protection area of the airbag has been expanded to improve protection of front and rear seat occupants. The inflator is now located in the center of the B pillar and provides faster deployment of the airbag.

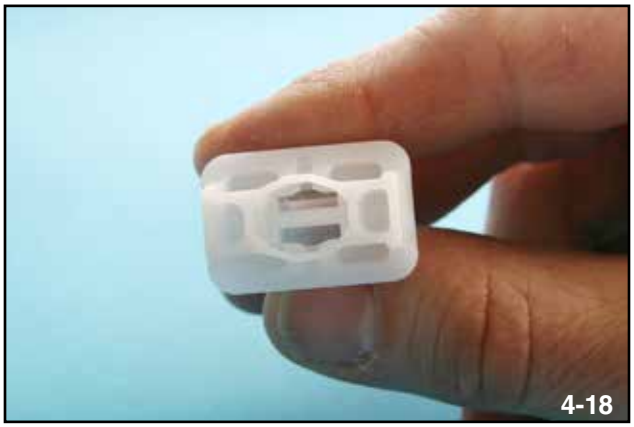


Curtain Airbag Shape

A new clip is utilized to secure the Curtain Airbag to the vehicle body. The clip must be removed in a precise method to avoid damage to the airbag and vehicle body. The inside of the clip is made with 2 chambers that guide a locking tab expander into the lock position.

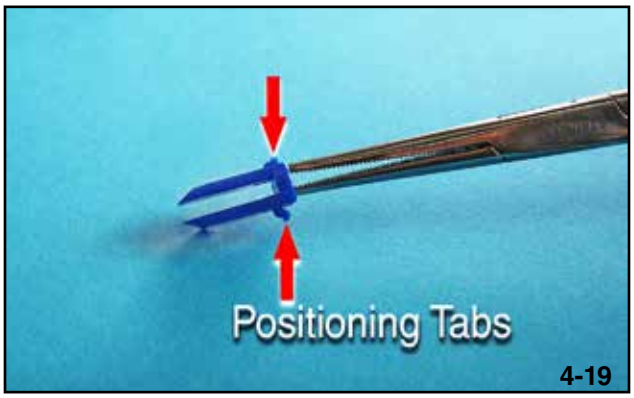


Curtain Airbag Clip

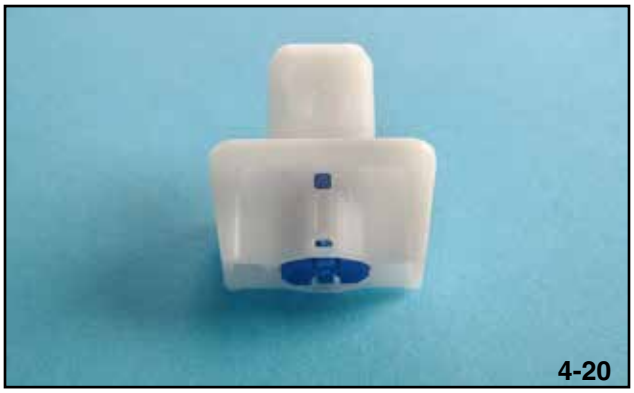


2 Chambers

The locking tab expander itself is constructed with positioning tabs that permanently lock the locking tab expander to the body of the Curtain Airbag Clip.



Positioning Tabs



New Curtain Airbag Clip

New Curtain Airbag Clips are assembled and delivered in an unlocked position. Do not push the locking tab expander inward until all parts are properly installed to the vehicle.

The Curtain Airbag Clips secure fabric and plastic hangers of the Curtain Airbag to the vehicle body. The clips must not be re-used. Always replace a Curtain Airbag clip once it has been removed.

Close-up, Installed Clip

Wide View, Curtain Airbag

The thickness of the vehicle body at the Curtain Airbag attachment point is thin and can be deformed if the Curtain Airbag Clip is removed incorrectly. Care must also be taken to prevent damage to fabric hangers of the Curtain Airbag.

Fabric Hanger

Replace the Curtain Airbag if a fabric hanger is torn or damaged.

Note: Refer to the appropriate Subaru Service Manual for safe and proper Curtain Airbag removal.

Begin removal of the Curtain Airbag clip by cutting a "V" shaped notch deep into the top and bottom side of the clip. This takes away the locking points of the locking tab expander.

Next, remove the locking tab expander by gripping the expander with a thin pair of needle nose pliers and pulling outward gently.

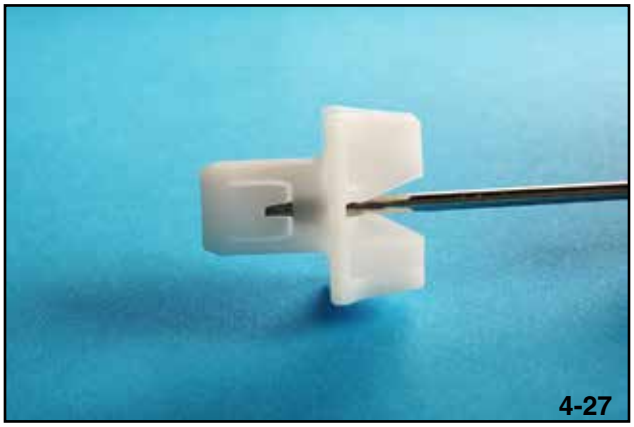
Cutting "V" Shaped Notch

Removing Locking Tab Expander

Note: Do not re-use a locking tab expander after it has been removed.

The next step is to compress the locking tabs of the Curtain Airbag Clip, one at a time, sliding each one past the vehicle body.

Locking Tab Expander



Compressing Locking Tab

A thin screwdriver or a similar tool is required to fit in the small groove made onto each locking tab. The "V" shaped notch, cut into the Curtain Airbag Clip in an early step, allows the screwdriver to be moved upward and downward to compress the locking tab.

While compressing the locking tabs, slightly pry outward on Curtain Airbag Clip on the side that is being compressed. Perform this procedure on the top and bottom side of the clip.

Removing Clip

Install new Curtain Airbag Clips only after all Curtain Airbag hangers have been double checked for proper position. Press the new clip into place until the locking tabs are correctly positioned.

Installing New Clip

Seating Locking Tab Expander

Next, place a screwdriver over the locking tab expander.

Locking Tab Expander Installed

Push the expander inward until the positioning tabs of the expander lock into place.

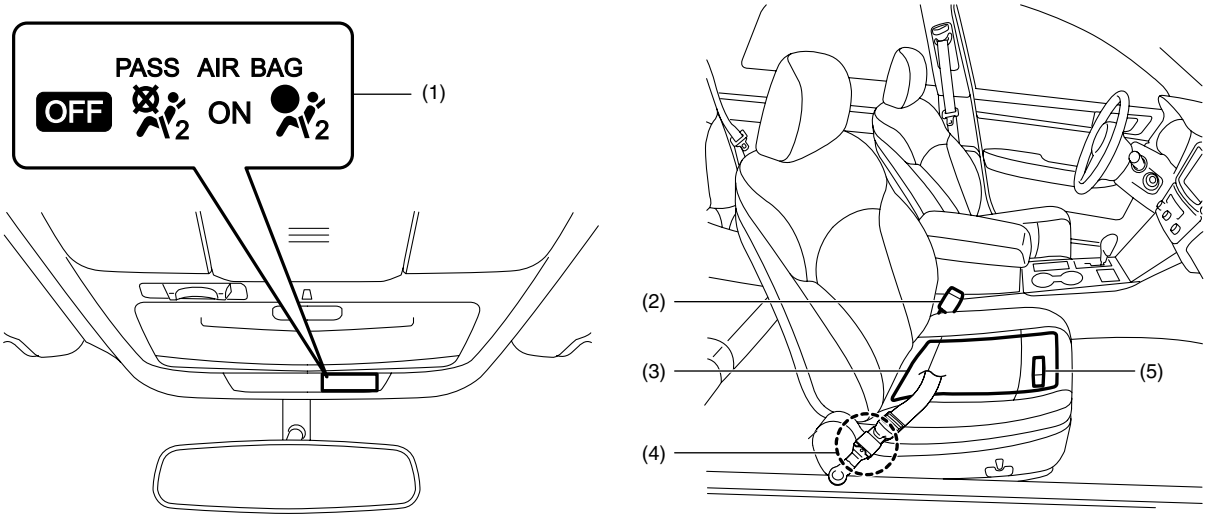
Occupant Detection System

The occupant detection system consists of a sensor mat (bladder) installed under the passenger seat cushion, seatbelt buckle and seatbelt tension sensor attached to the passenger seat seatbelt anchor. Based on the sensor output and information of the passenger seat belt buckle switch, the system judges the state of the occupant in the passenger seat.

Based on the information on the occupant in the passenger seat, the airbag ECU controls the deployment / non-deployment of the passenger seat airbag and the lighting of the passenger seat airbag ON/OFF indicator, and transmits to the ODS Operation Light information as to whether the occupant in the passenger seat is wearing his/her seat belt.

Note: If the Seat Belt Tension Sensor detects high tension, the Seat Cushion Airbag and Passenger Front Airbag will not deploy.

The ODS operation light has been relocated to headliner trim, near the rear view mirror.



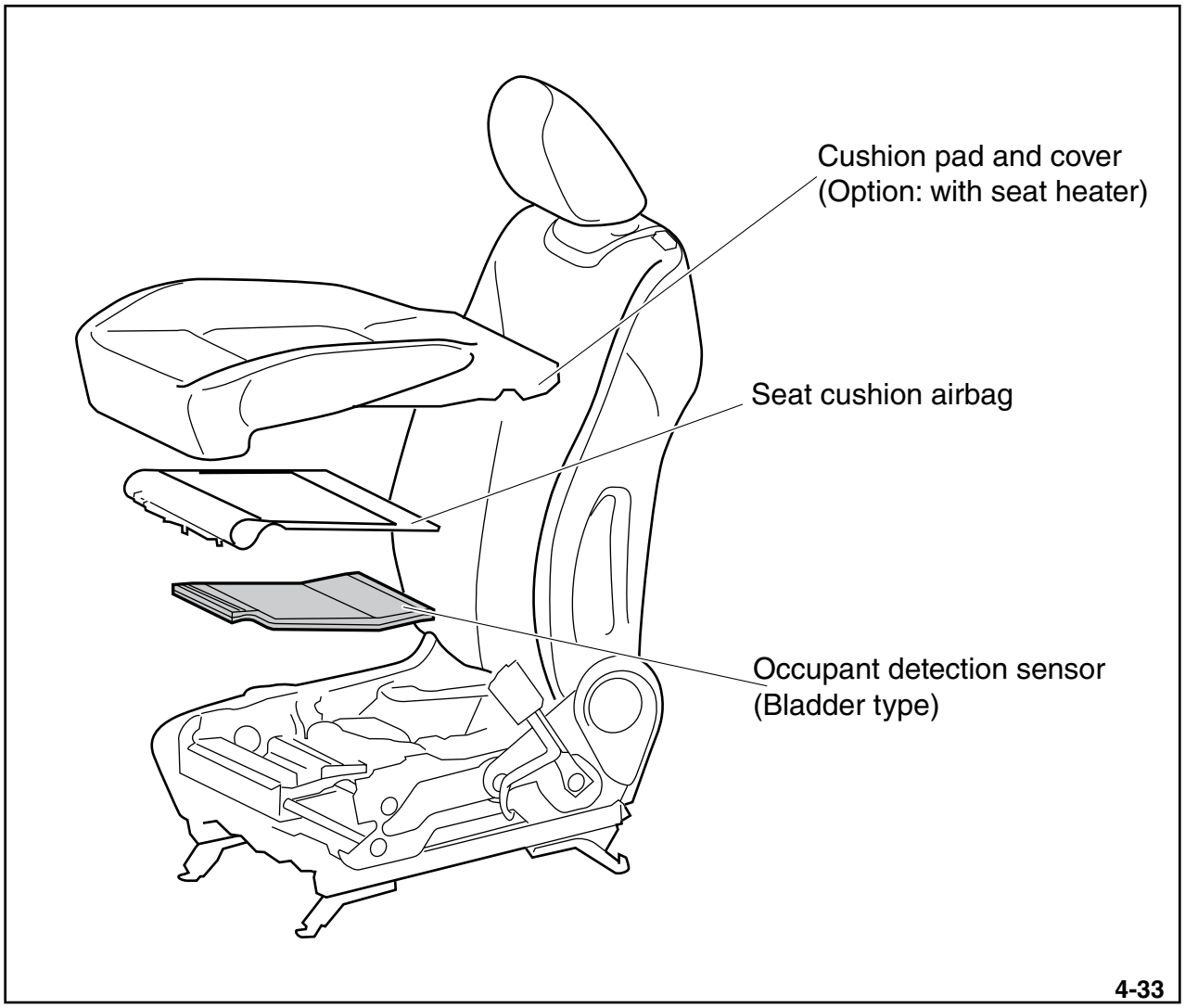
(1) Airbag ON/OFF indicator
(2) Buckle switch (Passenger seat)
(3) Occupant detection control unit
(4) Belt tension sensor
(5) Occupant detection control unit

4-32

ODS Operation Light and ODS Sensors

NOTES:

Front Passenger Seat Construction



Passenger Seat Construction

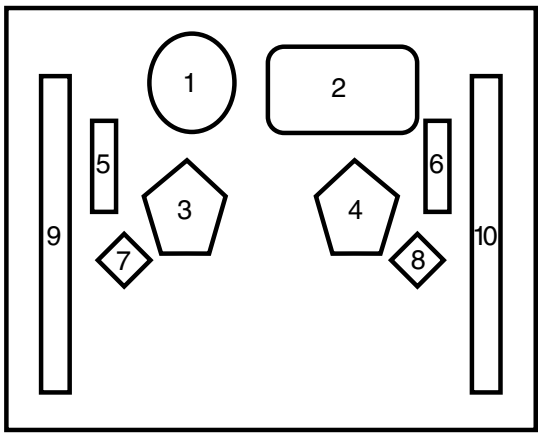
Note: The seat cover, seat cushion and heater can be serviced. If problems with the ODS sensor, or cushion airbag exist, replace the lower seat assembly.

Deployment Logic

The SRS and ODS control unit uses input from all of the SRS sensors to determine individual and group control deployment of all SRS components. The new mounting positions and design of the SRS sensors provide very precise impact detection, allowing the best deployment control for occupant protection.

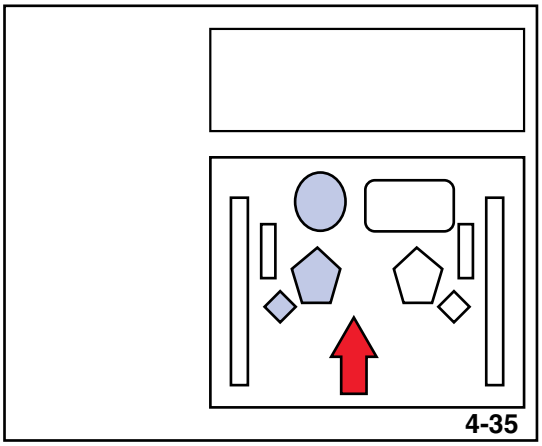
The following examples show possible deployment combinations, but do not show all possible combinations.

1) Driver front airbag
2) Passenger front airbag
3) Driver seat cushion airbag
4) Passenger seat cushion airbag
5) Driver side airbag
6) Passenger side airbag
7) Driver shoulder belt pretensioner
8) Passenger shoulder belt pretensioner
9) Left curtain airbag
10) Right curtain airbag



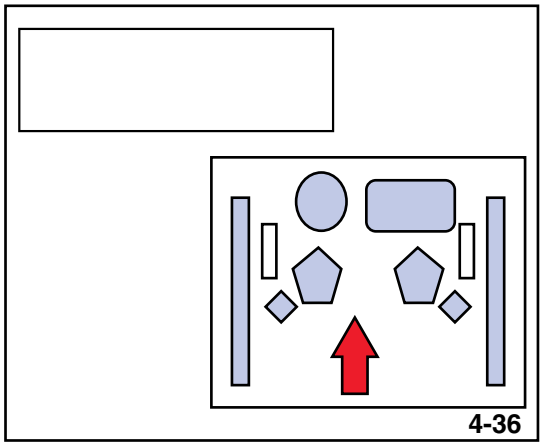
4-34

SRS Component Layout



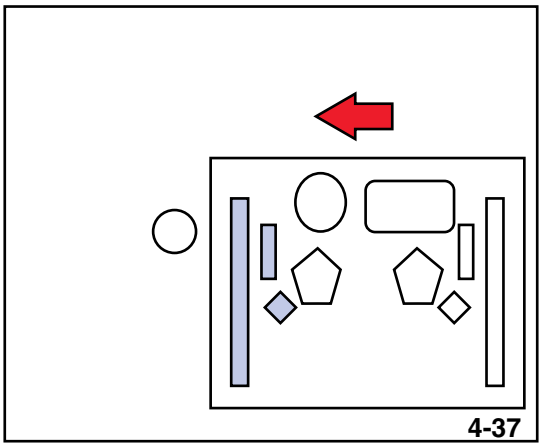
4-35

Frontal center collision

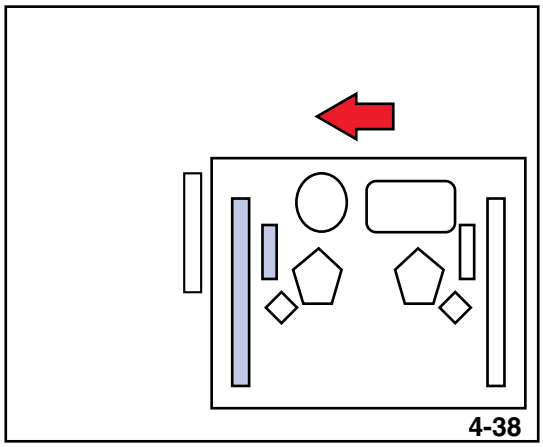


4-36

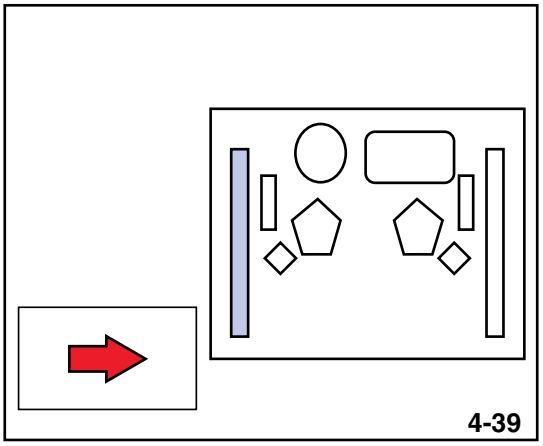
Frontal offset collision
(With or without ODS Input, excluding Tension Sensor)



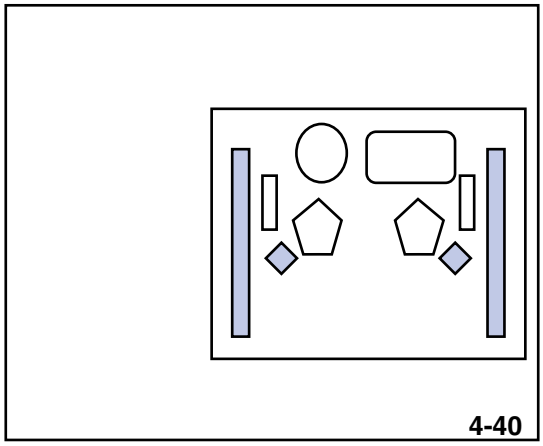
Side collision towards front with small diameter object



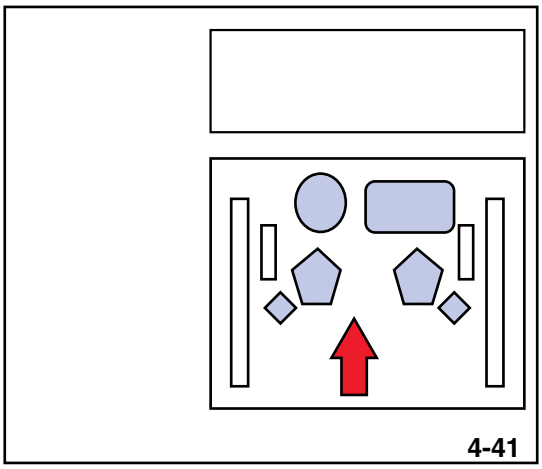
Side collision towards front with large surface area object



Side collision towards rear



Rollover



Frontal center collision with front seat passenger

Note: Seatbelts, Seatbelt Tension Sensors, and ODS must be at the correct values for deployment of the SRS components pictured above.

Additional Information

1. Control of curtain airbag and pretensioner operation in a roll-over:

   Rollover sensing has been applied to the Legacy. This control meets the requirements for preventing the occupants from being ejected outside the vehicle under FMVSS 226 in North America.

2. Fuel cut control

   In addition to frontal and side collisions, rear end collisions were added to the conditions of fuel cut signal output.

   When a frontal, side, or rear end collision has been judged, the crash detection signal is sent to the ECU via the CAN. Triggered by this signal, the ECU instructs the fuel cut operation.

SRS Control Unit

Note: The SRS control unit is located more towards the center of gravity of the vehicle, (between the front seat belt buckles), under the center console.

NOTES:

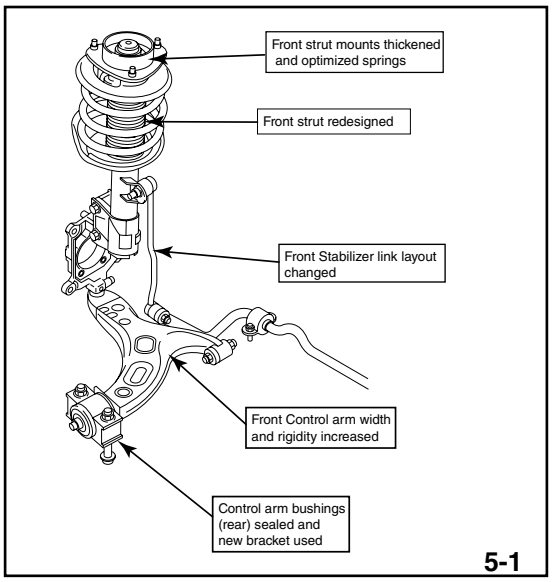
Chassis

Introduction

The front and rear suspension for the 2015 Legacy and Outback have been improved to provide enhanced handling, durability, vibration reduction and a more comfortable experience for the driver.

Front Suspension Key Changes include:

- Front strut mounts thickened and springs optimized
- Front struts redesigned
- Front stabilizer link layout changed
- Front control arm width and rigidity increased
- Control arm bushings (rear) sealed and new bracket used



Front Suspension

Front Stabilizer Link

The front Stabilizer link location has been moved from the control arm to the strut housing. This increases roll stiffness and improves handling.

Front Stabilizer Link

Control Arm Bushings Rear

The rear control arm bushing layout has been changed and a sealed style bushing is used to reduce vibration. The movement of the rear bushing now allows for front-to-back movement as compared to vertical movement of previous models. A new aluminum bracket is now used for weight reduction.

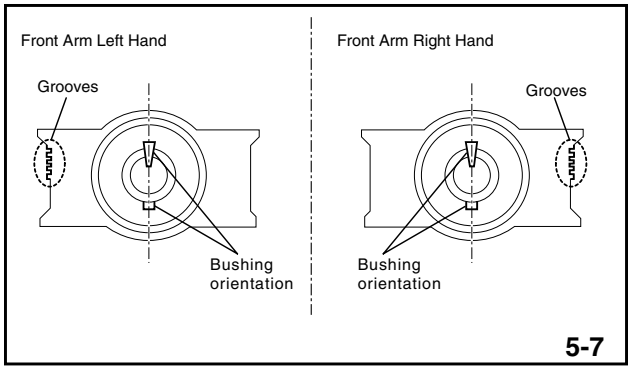
Front Control Arm

2014MY Rear Bushing

2015MY Rear Bushing

Note: Verify the orientation of the bushing and the grooves on the control arm bracket before installation.

Rear Bracket and Bushing Orientation

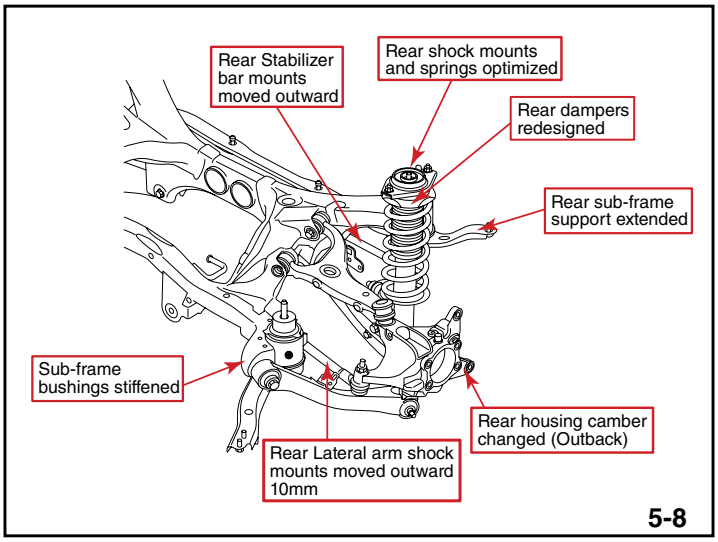


Rear Bracket Grooves

Rear Suspension

Rear Suspension Key Changes Include:

- Rear stabilizer bar mounts moved outward
- Rear shock mounts and springs optimized
- Rear dampers redesigned
- Rear sub-frame support extended
- Rear lateral arm shock mounts moved outward 10mm
- Rear housing camber changed (Outback)
- Sub-frame bushings stiffened



Rear Suspension

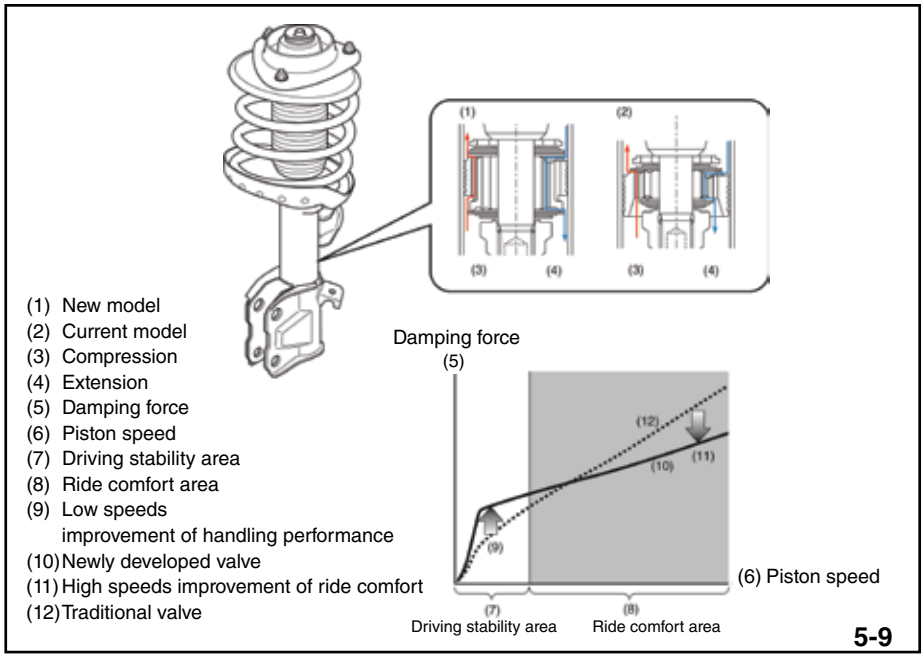
Alignment

Alignment specifications have been changed to improve rear grip and steering response. Additional toe-in and negative camber have been added to the rear specifications.

Model			Sedan		Outback	
Model Year			New	Current	New	Current
Front	Wheel arch height mm (in)		397 (15.63)	395	467	448
	Camber		–0°15’	–0°15’	0°00’	–0°20’
	Caster		5°51’	5°55’	5°02’	5°15’
	Steering angle	Inner Wheel	37.6	37.9°	38.6°	37.7°
		Outer Wheel	32.8	33.4°	33.8°	33.5°
	Toe-in mm		0±3	0±3	0±3	0±3
	(in)		(0±0.12)	(0±0.12)	(0±0.12)	(0±0.12)
	King pin angle		13°56’	13°20’	12°16’	12°05’
Rear	Wheel arch height (in)		381 (15.00)	387	467 (18.39)	453
	Camber		–1°25’	–1°10’	–1°00’	–0°25’
	Toe-in mm		3±3	0±3 (0±0.12)	3±3	3±3
	(in)		(0.12±0.12)		(0.12±0.12)	(0.12±0.12)
	Thrust angle		0°00’	0°00’	0°00’	0°00’

Dampers (Front and Rear)

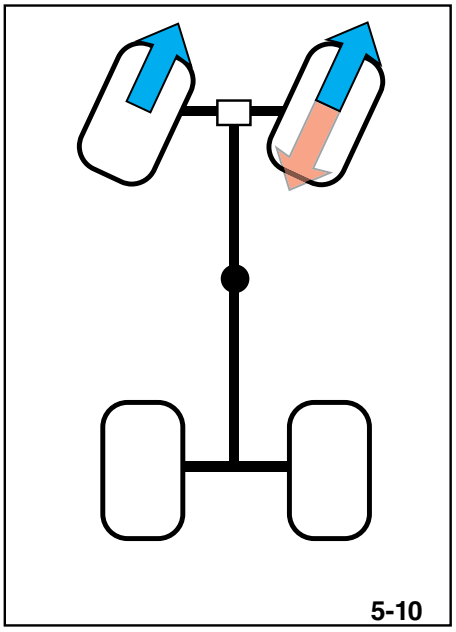
The piston valve has been modified to increase damping force. This improves low speed handling and high speed comfort.



Dampers

Active Torque Vectoring

Similar to the 2015 WRX and STI, Active Torque Vectoring has been added to the 2015 Legacy and Outback. This logic uses the VDC unit to apply a slight brake force to the front inner wheel if understeer is detected by the lateral G-Sensor, Yaw Rate Sensor, Vehicle Speed Sensors, and Steering Angle Sensor.



Torque Vectoring (Right Turn)

X-Mode and Hill Decent control have been added to 2015 Outback models only. This is the same function as 2014 Forester models.

X-Mode Switch

NOTES:

Tire Pressure Monitoring Systems

The new ATEQ VT 30 TPMS tool (J-51443) has been introduced for all Subaru vehicles. This serves as a replacement for SST J-51443.

ATEQ VT 30 TPMS Tool (J-51443)

Using the SSMIII, navigate to the TPMS Registration menu. Turn on the ATEQ VT 30 and select the appropriate vehicle for which you are servicing. Beginning with the L/F Tire, position the VT 30 on the sidewall of the tire just above the valve stem and initialize the trigger cycle by pressing the button with the red wireless symbol in the lower right of the touchpad. Work in a clockwise rotation and ensure that all four transmitters have been registered with the SSMIII. After successful registration of each transmitter, the VT 30 will display transmitter ID, measured pressure, and frequency data.

Item	Value
☑ Registered ID 1	11774806
☑ Registered ID 2	11784975
☑ Registered ID 3	11768899
☑ Registered ID 4	11801871

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TPMS Transmitter ID's

ATEQ VT 30 Display

EyeSight® (Version 3)

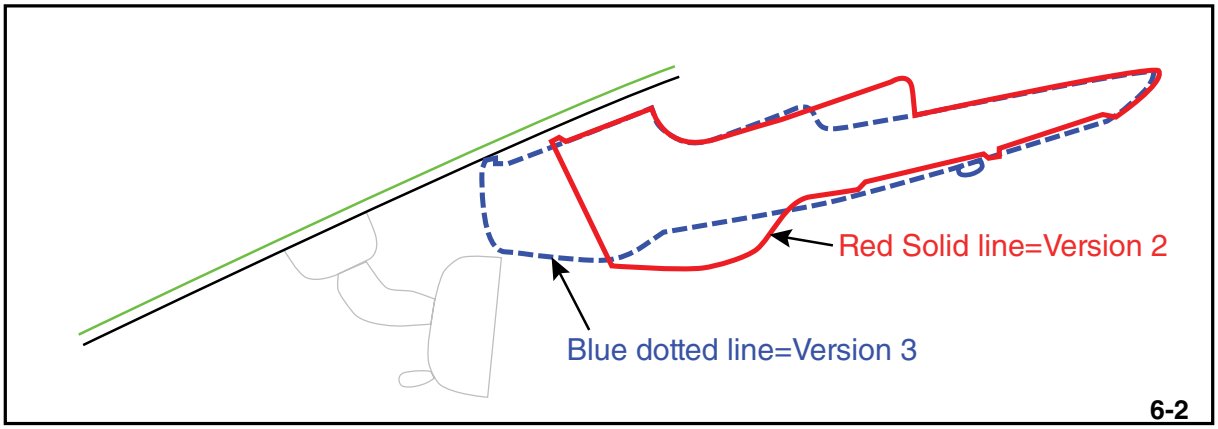
Introduction

2015 Legacy and Outback receive the improved Version 3 EyeSight® Driver Assistance system. The Version 3 system offers the same features as the Version 2 with the addition of Pre-collision Steering Assist. Existing features receive several performance enhancements increasing overall range and response speed.

Performance Area	13MY EyeSight® (Version 2)	15MY EyeSight® (Version 3)	Enhancement results
Forward Distance Range	262 ft (80 m)	Increased appx. 40%	Increased detection distance
Horizontal Range	25°	Increased appx. 40%	Increased horizontal detection
Camera Recognition	Monochrome	Color	Brake Lamp Recognition
Image Processing engine	Base	New	Increased durability to environment (Ex. Sunlight)

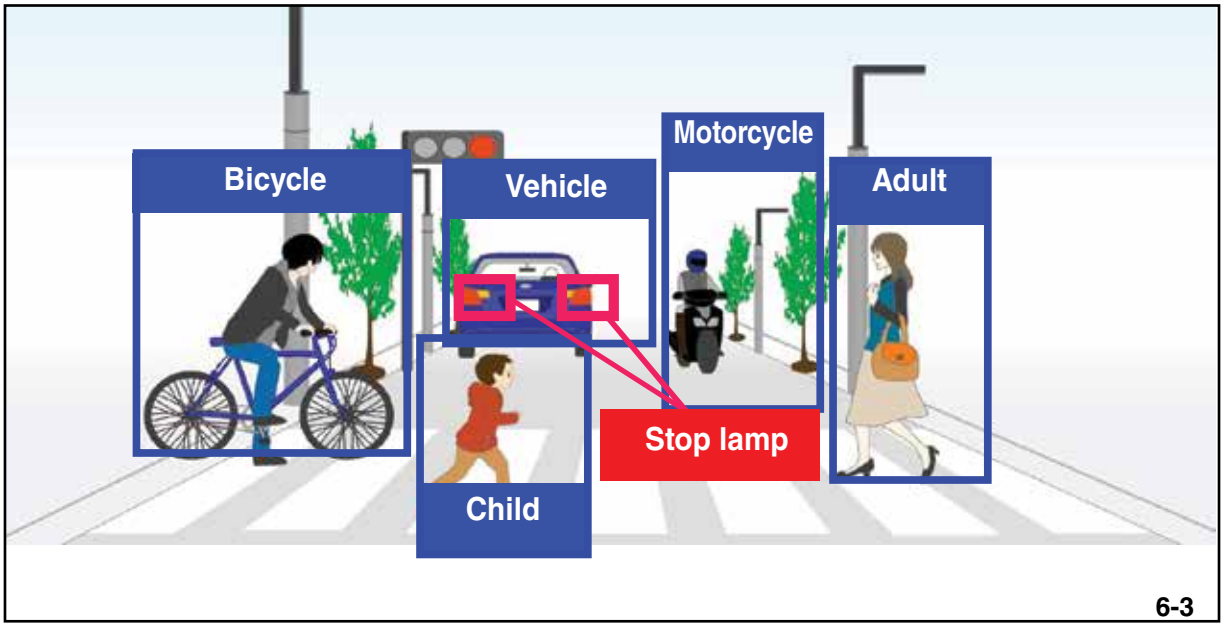
The Version 3 EyeSight® cameras have been redesigned to be more compact. However, the windshield prohibited areas remain the same due to the increased horizontal range. Windshield repair and Electronic Toll Collection (ETC) areas also remain the same.

Version 3 EyeSight® Cameras



Camera Comparison

The Version 3 Cameras are able to detect colors allowing the system to identify brake lamps from vehicles ahead. Accuracy for pedestrian and bicyclist detection has also been improved.



Version 3 Object Detection

The Lane Departure Warning OFF and Pre-collision Braking OFF switches are now located on the console to the left of the steering wheel. On Version 2 models, these switches were mounted overhead on the Camera assembly.

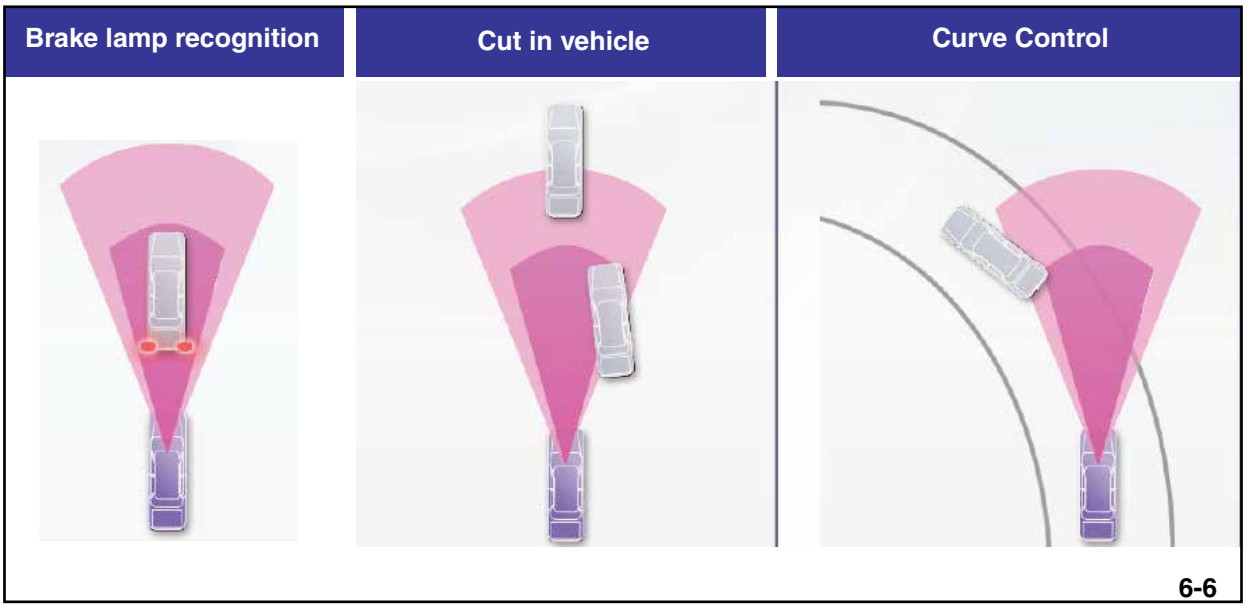
EyeSight® OFF Buttons

LDW and PCB OFF Switches

System Features

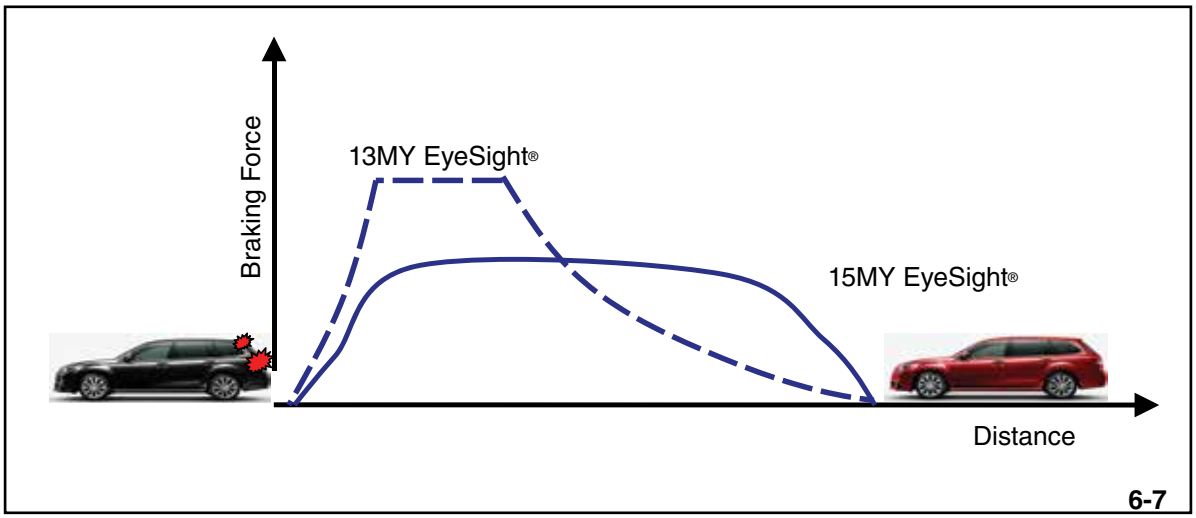
Adaptive Cruise Control

The Version 3 EyeSight® system features improved adaptation to the deceleration and acceleration of forward vehicles, vehicles cutting in, and curve control.



Adaptive Cruise Function Comparison

Adaptive Cruise Control deceleration becomes faster responding when brake lamps are detected from the forward vehicle. This produces a more natural deceleration feeling.



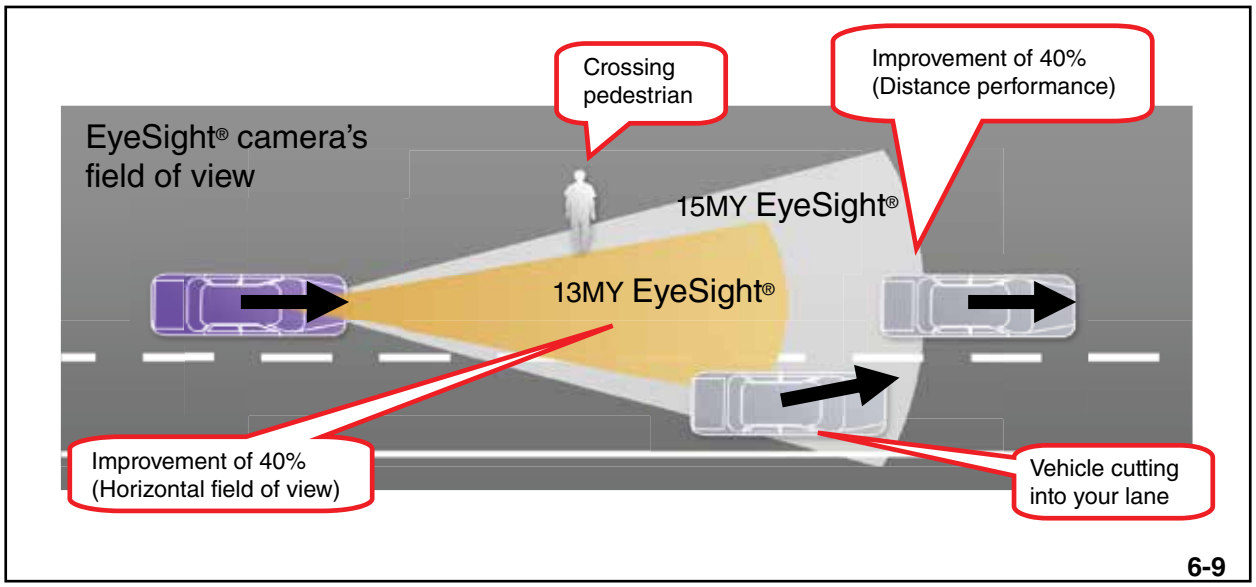
Adaptive Cruise Control Deceleration

Adaptive Cruise Controls functions can be adjusted with the redesigned satellite switches. A new Following Distance switch has been incorporated. The RES/+ and SET/- function have been redesigned with a seesaw 4-step type switch. Each direction has a deep and shallow step. A shallow step will increase or decrease speed 1 mph. A deep step will increase or decrease speed 5 mph.

Adaptive Cruise Control Buttons

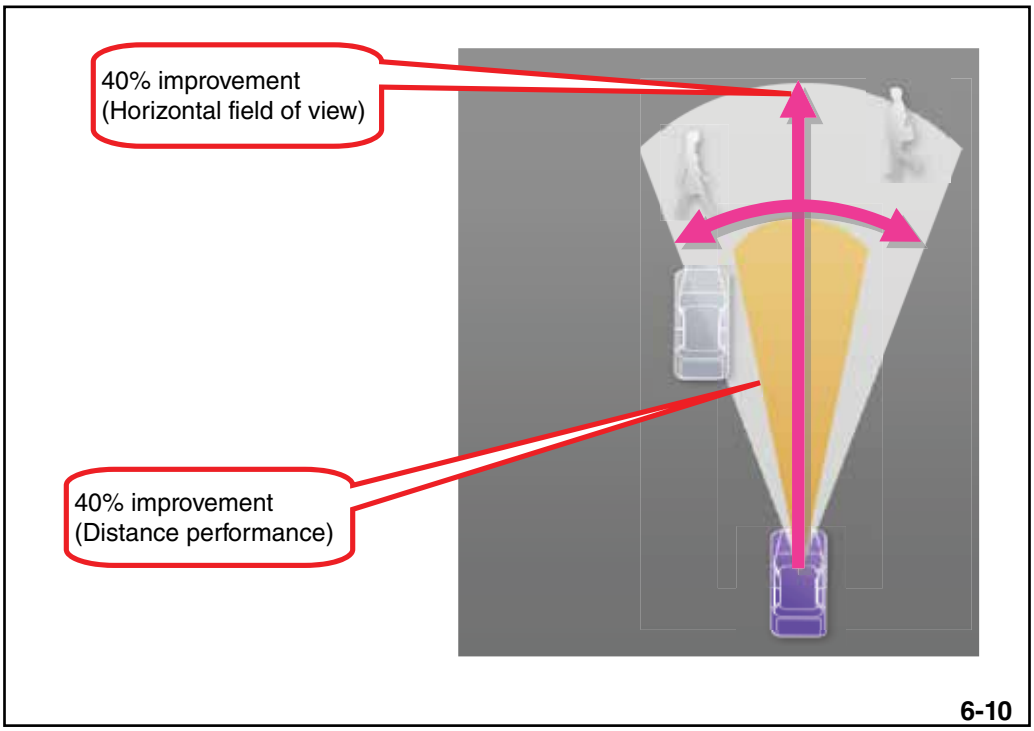
Pre-collision Braking Control

Expanded camera distance and horizontal range ability to detect brake lamps have improved the performance of the Pre-collision Braking feature. As a result, collisions can be avoided when the speed difference between the vehicle and obstacle is approximately 31 mph (50km/h) or less. This is compared to 13MY Version 2 systems that could potentially avoid collisions when the speed difference is approximately 18 mph (30km/h).



Pre-collision Braking Range

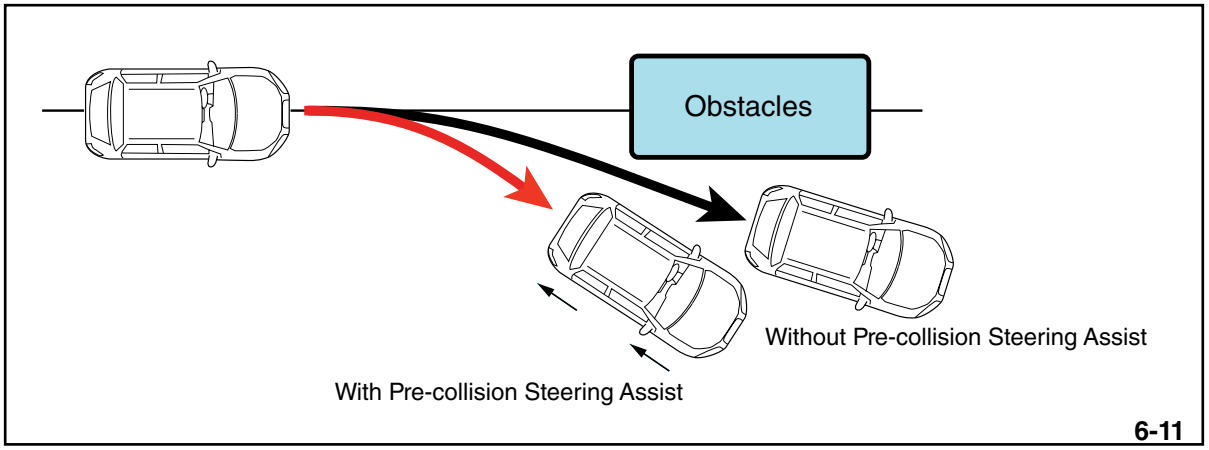
The vehicle can detect crossing pedestrians and control braking from an earlier stage. Collisions can be avoided when the speed difference between the vehicle and the crossing pedestrian is about 4 mph (7km/h) or less (Compared to 2 mph (3km/h) for 13MY Version 2 EyeSight®).



Pre-collision Braking with Pedestrians

Pre-collision Steering Assist (NEW)

Pre-collision Assist alters the characteristics of the VDC system, increasing the vehicle yaw rate to improve the drivers ability to avoid a collision.



Pre-collision Steering Assist

Pre-collision Braking Assistance

Pre-collision Braking Assistance provides additional braking force if the system judges that the braking force applied by the driver is inadequate for the possibility of collision with the object ahead. This is also enhanced by the increased range and color detection.

Pre-collision Throttle Management

Pre-collision Throttle Management remains unchanged with the Version 3 EyeSight® System.

Lane Departure Warning

Lane Departure Warning remains unchanged with the Version 3 EyeSight® System.

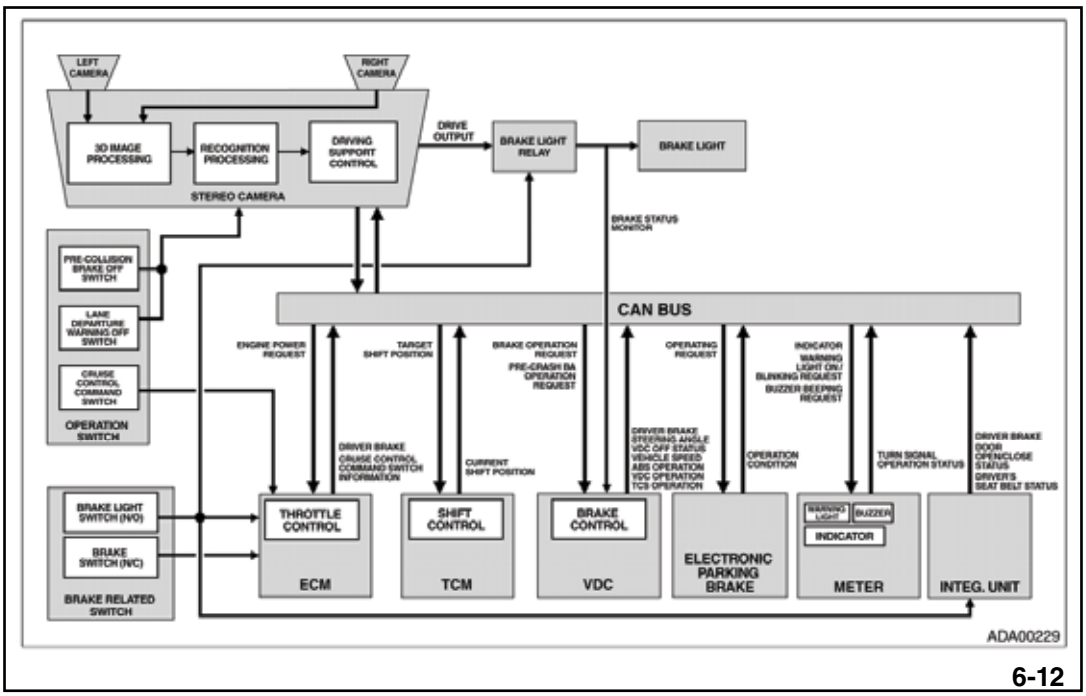
Lane Sway Warning

Lane Sway Warning remains unchanged with the Version 3 EyeSight® System.

NOTES:

System Layout

The Version 3 EyeSight® system has a similar layout to the Version 2 system. The only difference is configuration of the brake lights and brake light relay. In the Version 2 system, the EyeSight® Camera directly controlled the brake light relay. In the Version 3 system, the EyeSight® Camera sends a request through the CAN to the VDC Unit where brake light functions are controlled.



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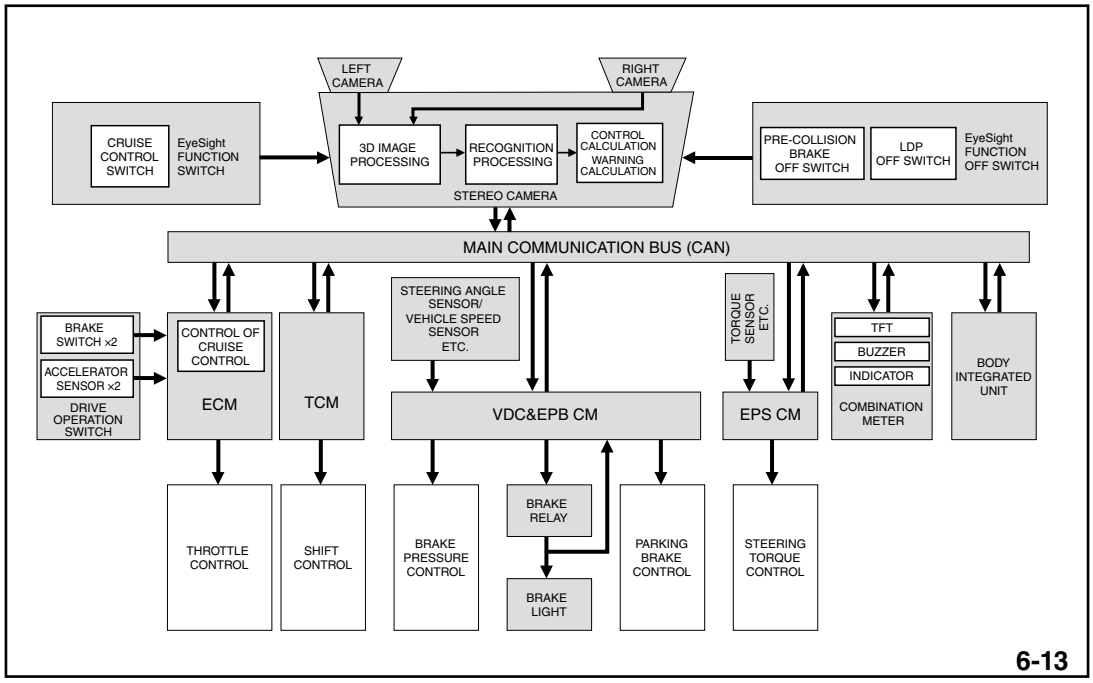
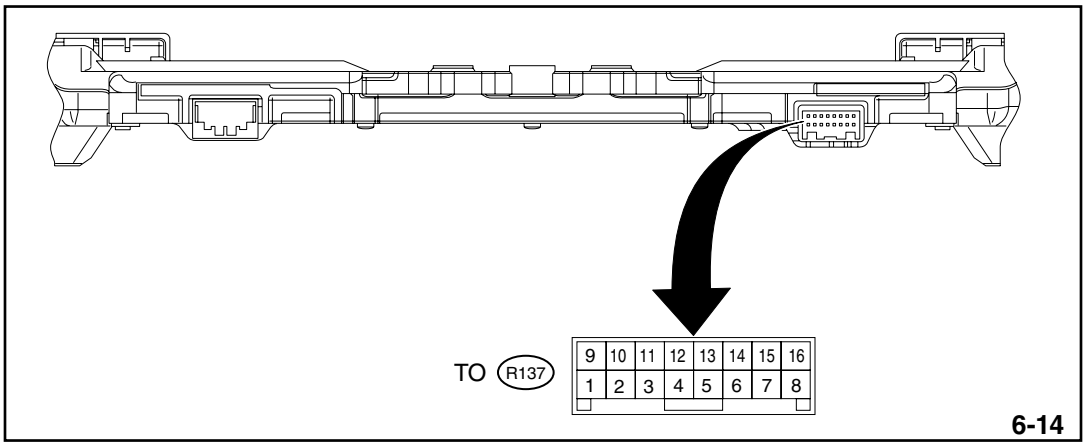
EyeSight® Version 2 System Layout



6-13

EyeSight® Version 3 System Layout



EyeSight® Camera Connector

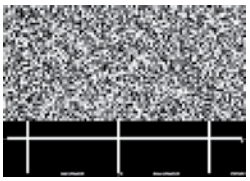
Terminal No.	Content	Measuring condition	Standard
(R137) No. 1	—	—	—
(R137) No. 2	—	—	—
(R137) No. 3	—	—	—
(R137) No. 4	—	—	—
(R137) No. 5	—	—	—
(R137) No. 6 ←→ Chassis ground	Ignition power supply	Ignition switch OFF → ON	Less than 1 V → 9 — 16 V
(R137) No. 7 ←→ Chassis ground	GND	Always	Less than 1 Ω
(R137) No. 8 ←→ Chassis ground	Battery power supply	Always	9 — 16 V
(R137) No. 9 ←→ Chassis ground	CAN L	Always	1 MΩ or more
(R137) No. 10 ←→ Chassis ground	CAN H	Always	1 MΩ or more
(R137) No. 11	—	—	—
(R137) No. 12	—	—	—
(R137) No. 13	—	—	—
(R137) No. 14 ←→ (R137) No. 15	Cruise switch input	Cruise switch OFF → ON	0 V → approx. 5 V
(R137) No. 15 ←→ Chassis ground	Cruise control switch GND	Always	Less than 1 Ω
(R137) No. 16 ←→ (R137) No. 15	Cruise control switch input	No switch operation	3.5 V — 4.5 V
		RES/+ OFF → ON	Less than 1 V → 2.5 V — 3.5 V
		Following distance setting	Less than 1 V → 1.5 V — 2.5 V
		SET/-	Less than 1 V → 0.5 V — 1.5 V
		CANCEL OFF → ON	Less than 1 V

Camera Adjustment

The Version 3 Camera Adjustment procedure is almost identical to the Version 2 with the following differences

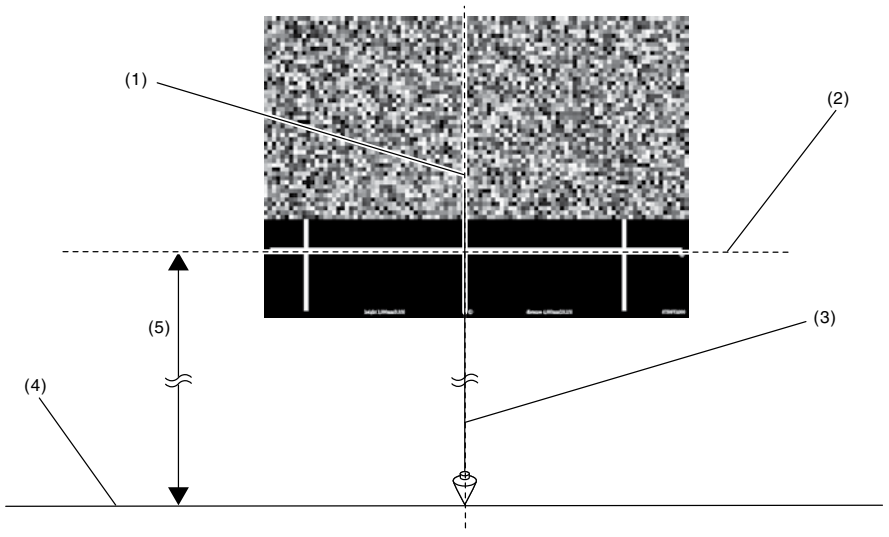
1. A new SST Random Chart must be used
2. A new method for establishing the vehicle center line is used
   a. New rear plumb bob location (point B)
   b. New front plumb bob location (point A)

New SST EyeSight® Random Chart – New EyeSight® SST 87599VA000 (Random Chart) has been introduced for the Version 3 EyeSight® System. This chart is used only for Version 3 systems. Mounting height and location is similar to Version 2 systems.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST87599VA000	87599VA000	RANDOM CHART	Used for adjusting stereo camera.

6-15

Version 3 Random Chart

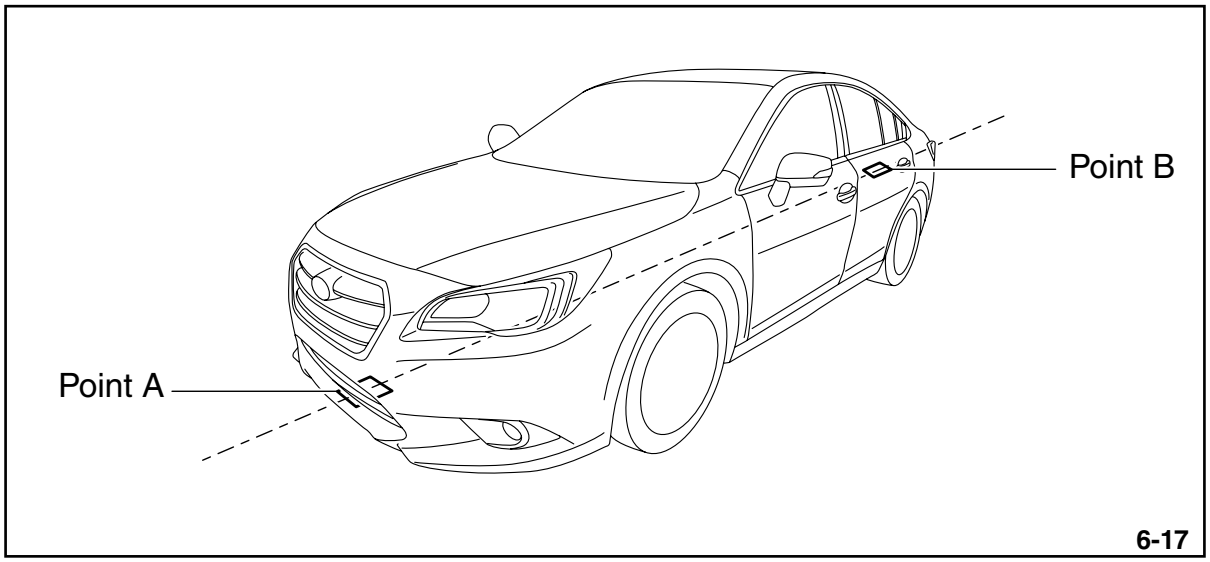


(1) ① = Setting reference (vertical line) and vehicle body center line (A-B line)
(2) ② = Setting reference (horizontal line)
(3) Plumb bob
(4) E-F line
(5) 1000 mm (3.3 ft)

6-16

Random Chart Preparation

Establishing the center line of the vehicle has been changed. New locations are used to measure Point A and Point B.

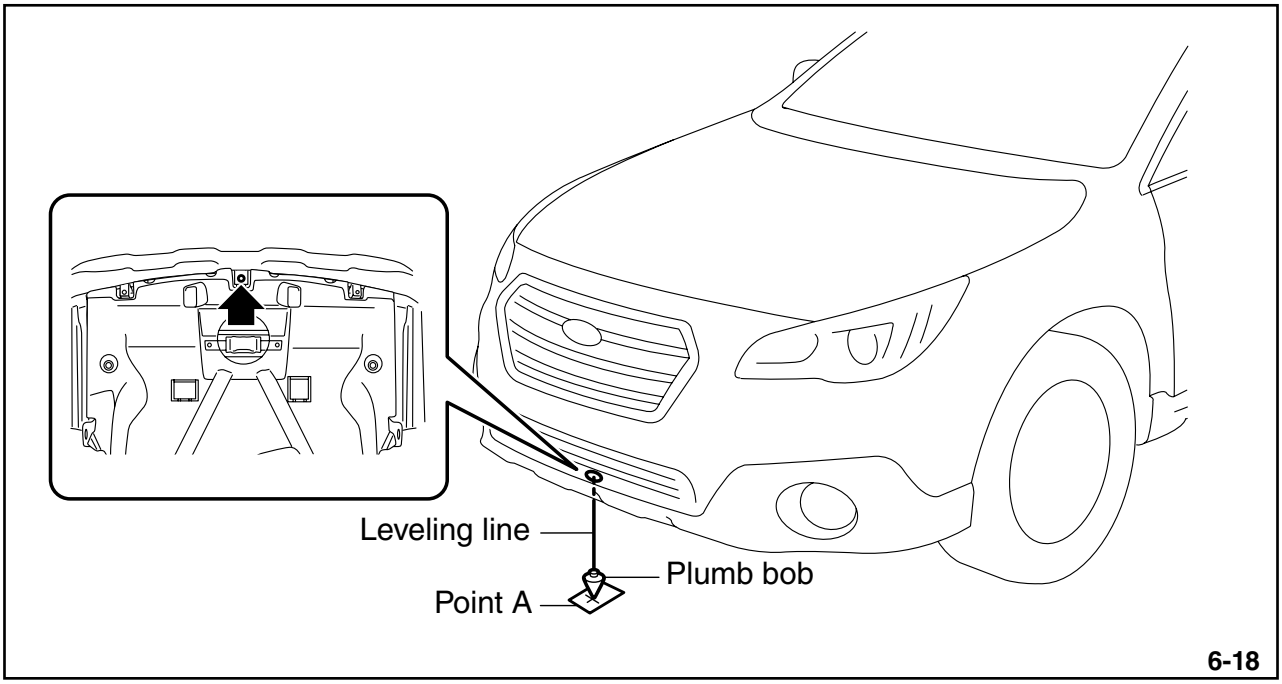


Vehicle Center Line

Point A

The front plumb bob location (Point A) has been moved to center clip on the lower side of the front bumper. Previously, the center of the license plate mount was used.

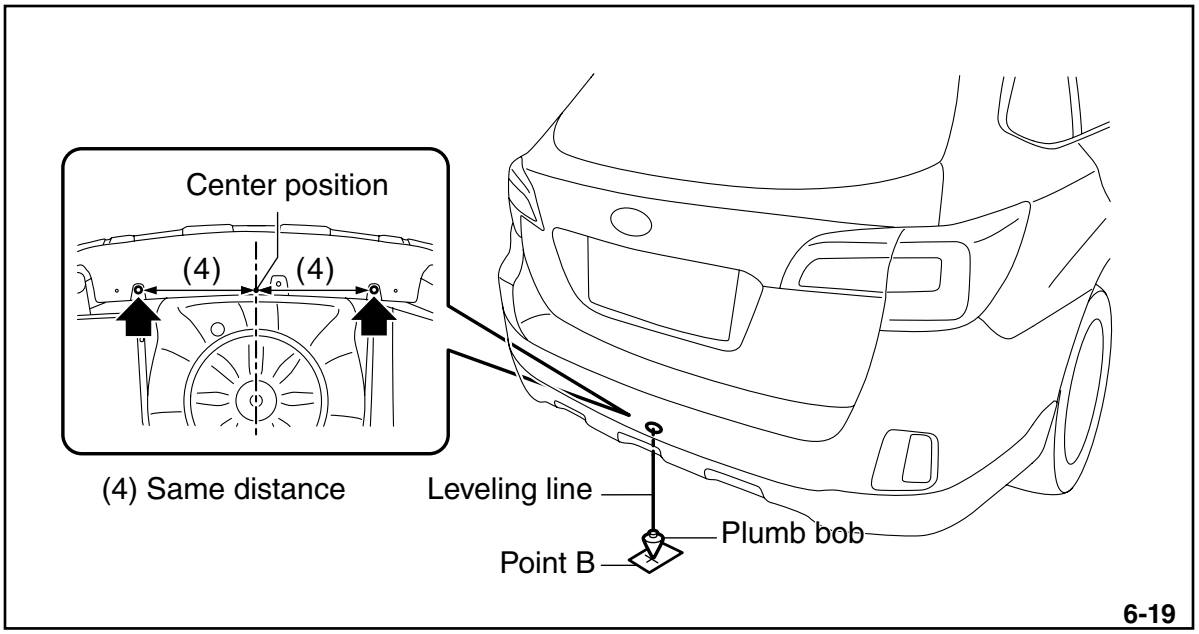
Suspend the plumb bob with leveling line from front center position of vehicle (center clip on lower side of front bumper), and mark the position where the plumb bob touches the ground. (Point A)



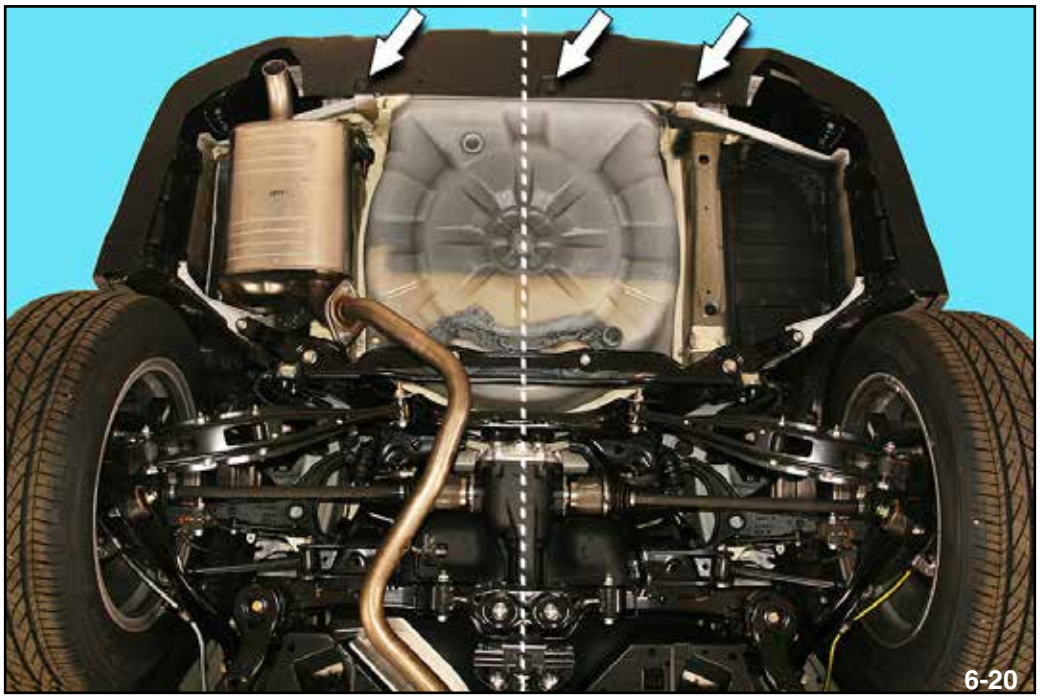
Point A Location

Point B

The rear plumb bob location (point B) has been moved for Outback models only. Legacy models still use the center clip under the rear bumper. However, the center clip on Outback models is offset from the vehicle center. Therefore, a measurement between the two outer clips must be performed to establish the center point.



Point B Location (Outback)



Point B Measurement (Outback)

NOTES:

Subaru Rear Vehicle Detection (SRVD)

Introduction

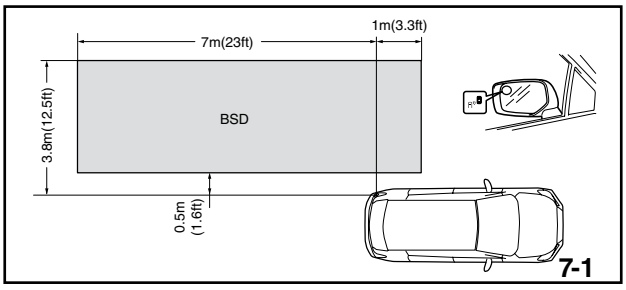
The new Subaru Rear Vehicle Detection System (SRVD), which is standard on the 2015 Outback 2.5i Limited and 3.6R Limited and available for the 2.5i Premium, offers three functions. Blind Spot Detection detects vehicles on either side of the vehicle, in the driver's blind spots. Lane Change Assist detects fast-approaching vehicles in adjacent lanes, and Rear Cross Traffic Alert detects vehicles approaching from a perpendicular direction while reversing, such as from a driveway. LED indicators on the side mirrors alert the driver. Rear Cross Traffic Alert uses an indicator in the rear view camera display.

Subaru Rear Vehicle Detection functions

Blind Spot Detection (BSD)

BSD notifies the driver of vehicles traveling at a similar rate of speed in neighboring lanes behind the C or D pillars by illuminating an LED indicator in the side mirror. The detection area for BSD is approximately 23 ft from the rear bumper cover.

Note: If the driver attempts to change lanes by enabling the turn signal while a vehicle is in the vehicle's blind spot, a flashing LED indicator in the side mirror will alert the driver to the potential hazard.

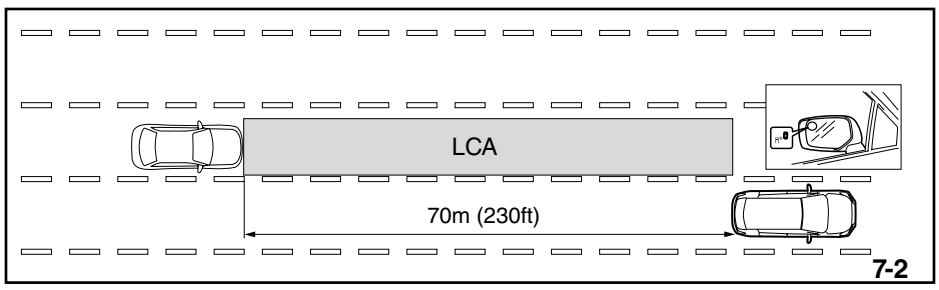


BSD Detection Area

Lane Change Assist (LCA)

LCA notifies the driver of fast-approaching vehicles in neighboring lanes by illuminating the LED indicator in the side mirror. The detection area for LCA is approximately 230 ft from the rear bumper cover and is based on Time to Collision (TTC) calculations.

Note: If the driver attempts to change lanes by enabling the turn signal while a vehicle is approaching at a higher speed, a flashing LED indicator in the side mirror will alert the driver to the potential hazard.



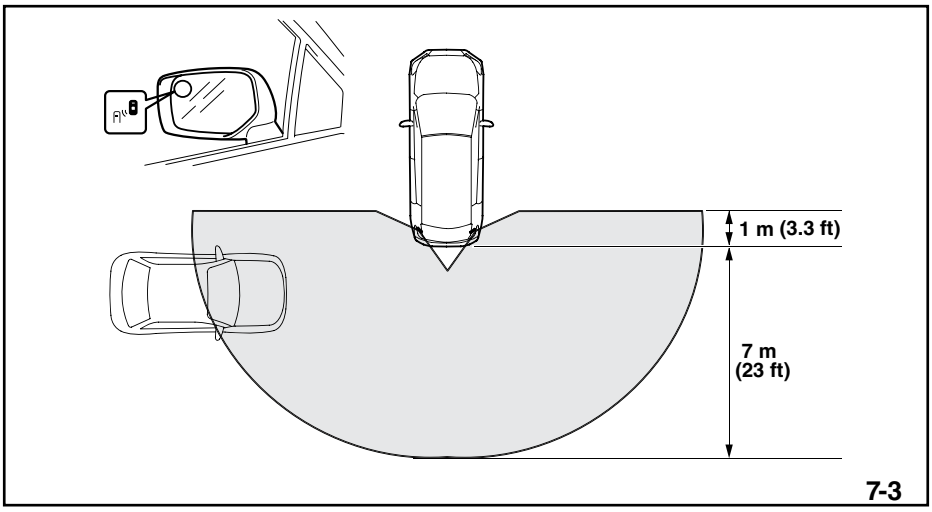
LCA Detection Area

Visual alerts are issued for any vehicle with a Time to Collision (TTC) of approximately 4.5 seconds. Large variations in relative speed difference will result in more advanced notice from the LCA system. See chart below for estimates of relative speed differences versus distance of TTC warning.

Relative Vehicle Speed Difference	Inter-vehicular Distance
6.2 mph (10km/h)	**Within 41 ft** (12.5 m)
12.4 mph (20km/h)	**Within 82 ft** (25 m)
18.6 mph (30km/h)	**Within 139 ft** (42.5 m)
24.9 mph (40km/h)	**Within 164 ft** (50 m)

Rear Cross Traffic Alert (RCTA)

RCTA detects vehicles approaching from a perpendicular direction while in reverse. A flashing LED indicator in the side mirror, a pattern of audible tones, and a flashing indicator in the rear view camera display alert the driver of potential hazards with a Time to Collision (TTC) of approximately 3.5 seconds.



RCTA Detection Area

See chart below for estimates of relative speed differences versus distance of TTC warning.

Relative Vehicle Speed Difference	Inter-vehicular Distance
6.2 mph (10 km/h)	**Within 31 ft** (9.7 m)
12.4 mph (20 km/h)	**Within 63 ft** (19.4 m)
18.6 mph (30 km/h)	**Within 95 ft** (29.1 m)

Operating Conditions

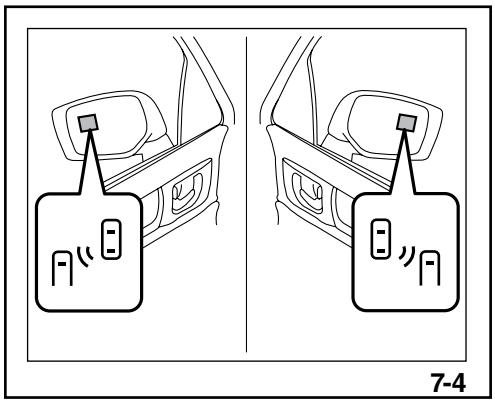
The SRVD system functions will operate when all the following conditions are met:

1. The ignition switch is in the “ON” position
2. The SRVD warning indicator and SRVD OFF indicator are turned off
3. The vehicle is driving at speeds above 10 mph (15 km/h) (Except when reversing)
4. The shift lever is in the “R” position (when reversing)

Driver Alerts

SRVD Approach indicator lights

Side mirror LED indicators promote awareness without interrupting the driver's line of sight. These indicators may illuminate or flash during BSD, LCA and RCTA operations.



Side Mirror LEDs

Side Mirror LED OFF

Side Mirror LED ON

Note: When affected by direct sunlight, it may be difficult to recognize the SRVD approach indicator lights.

Rear View Camera Indicator

RCTA uses the rear view camera to display alerts on the upper corner of the corresponding side from which a vehicle is detected.

Rear Camera Alert OFF

Rear Camera Alert ON

SRVD Approach Warning Buzzer

An audible warning buzzer can be heard from the Combination Meter during Rear Cross Traffic Alert (RCTA) functions. This volume can be customized through the Combination Meter.

SRVD Settings

SRVD Warning Volume

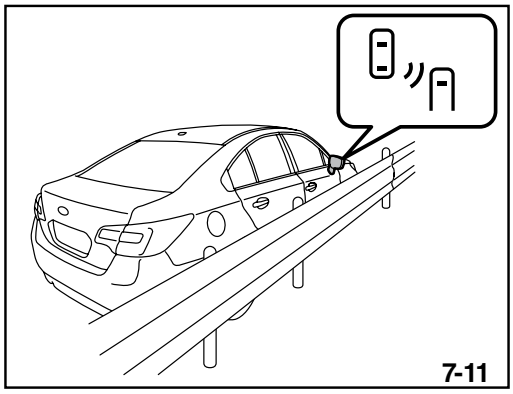
NOTES:

The SRVD system will not operate in the following situations:

1. The SRVD OFF indicator is illuminated
2. The vehicle speed is below 10 mph (15 km/h) even when the SRVD OFF indicator is not illuminated (Except when reversing)

The following may cause the SRVD system indicators to illuminate:

1. Driving close to solid objects such as guardrails, tunnels, and sidewalls
2. Turning at an intersection in an urban area
3. A building or wall exists in the reversing direction
4. On a road with extremely narrow lanes, the system may detect vehicles driving in a lane next to the neighboring lane



Driving to close to Guard Rail

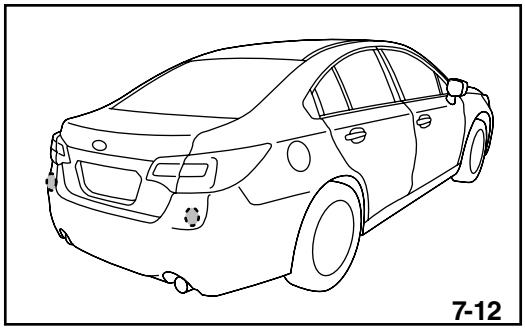
The Radar sensors may not detect or may have difficulty detecting the following vehicles or objects

1. Small motorcycles, bicycles, pedestrians, and stationary objects on the road or road side
2. Vehicles with body shapes that do not reflect radar (vehicles with low body height such as a trailer with no cargo and sports cars)
3. Vehicles that are not approaching your vehicle even though they are in the detection area either on a neighboring lane to the rear or beside your vehicle when reversing (The system determines the presence of approaching vehicles based on the data detected by the radar sensors)
4. Vehicles traveling at significantly different speeds
5. Vehicles driving in parallel at almost the same speed as your vehicle for a prolonged period of time
6. Oncoming vehicles
7. Vehicles in a lane beyond the neighboring lane
8. Vehicles traveling at a significantly lower speed that you are trying to overtake

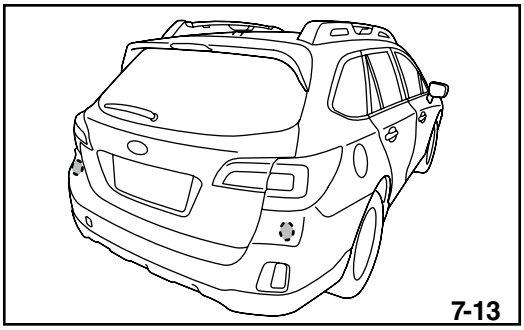
Caution: The driver is responsible for driving safely. Always be sure to check the surroundings with your eyes when changing lanes or reversing the vehicle. This system is designed to assist the driver by monitoring the rear and side areas of the vehicle during lane change and reversing. However, you cannot rely on this system alone in assuring safety during a lane change or reversing. Over-confidence in this system could result in an accident and lead to serious injury or death. Since the system operation has various limitations, the flashing or illumination of the SRVD approach indicator light may be delayed or it may not operate at all even when a vehicle is present in a neighboring lane or approaching from either side.

Construction

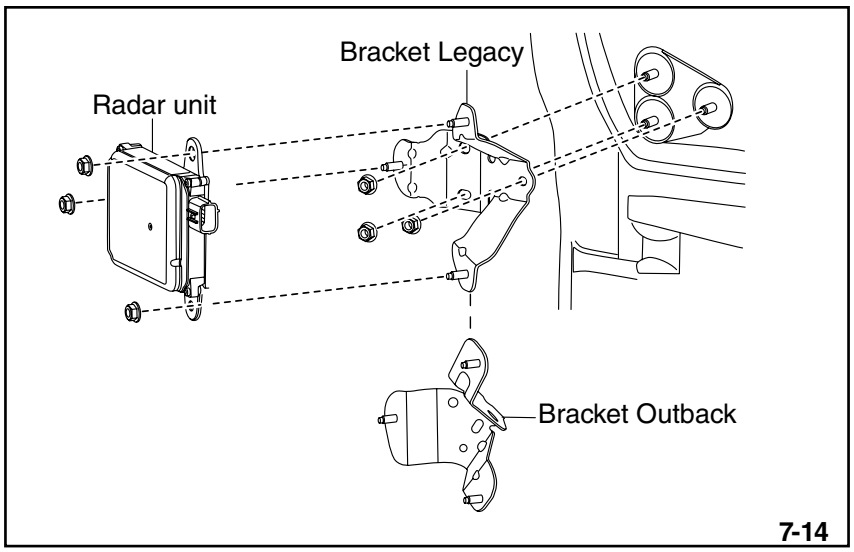
The Subaru Rear Vehicle Detection system consists of two rear Radar units symmetrically fitted behind the bumper cover under the rear tail lights.



Radar Units (Legacy)



Radar Units (Outback)

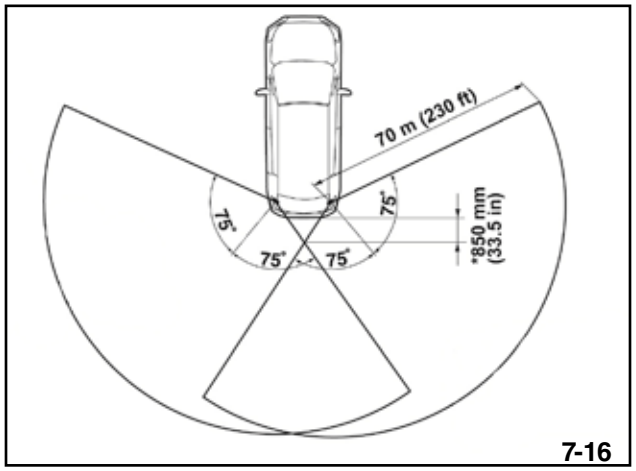


Radar Unit Mounting

LH Radar Unit (Outback)

The Subaru Rear Vehicle Detection system is classified as a Short Range Radar system. Each of the two Radar units contains a Radio Frequency (RF) antenna that emits electromagnetic radiation in the 24 GHz frequency range. At a distance of 20cm from the sensor, the radiated power is 0.0027 mW/cm^2. This is well below the human exposure protection limit of 1.0 mW/cm^2.

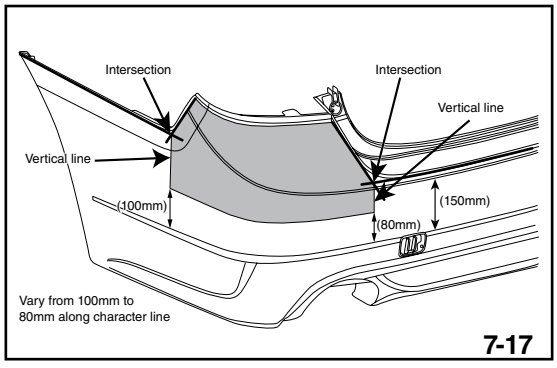
The detectable angle from the center of each RF antenna is 75° or 150° total with a range of approximately 230ft (70m). Regardless if the system is using BSD, LCA, and RCTA, the RF antennas are always monitoring a 150° angle with a range of 230ft. What differentiates BSD, LCA, and RCTA is the logic used to estimate relative speed difference versus distance of Time to Collision (TTC) warning.



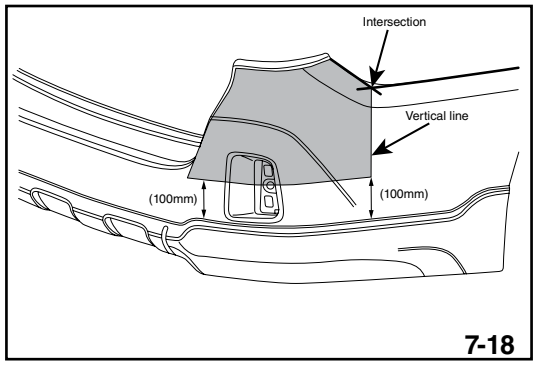
SRVD Detection Area

To ensure correct operation of the SRVD system, observe the following precautions:

1. Always keep the bumper surface near the radar sensor clean
2. Do not affix any stickers of other items on the bumper surface near the radar sensors
3. Do not modify the bumper near the radar sensors
4. Do not paint the bumper near the radar sensors
5. Do not expose the bumper near the radar sensors to strong impacts. If a sensor becomes misaligned, a system malfunction may occur, including the inability to detect vehicles entering the detection areas

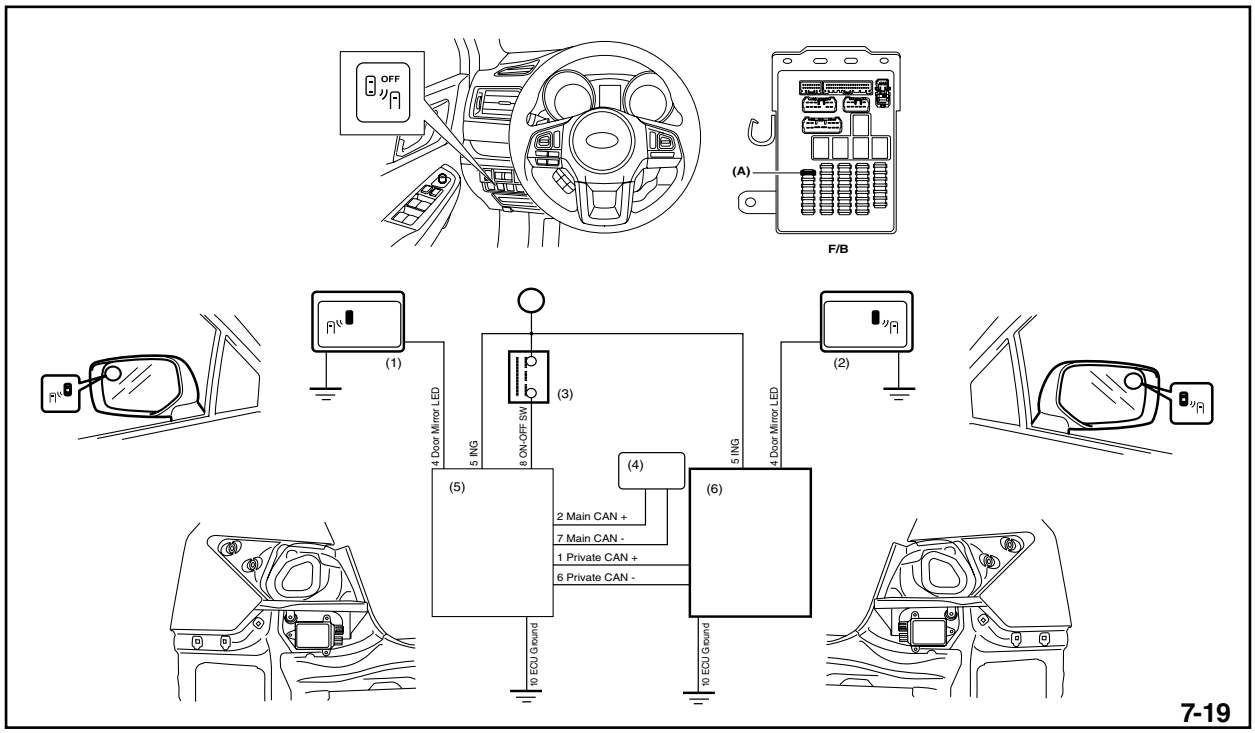


Bumper Prohibited Areas Legacy



Bumper Prohibited Areas Outback

Each Radar unit contains an internal control unit that processes information from the RF antenna and controls alert decisions. The left and right rear Radar units are distinguished as Master (LH) and Slave (RH). The Master and Slave Radar units are connected to each other via a private CAN network where alert decisions are determined. The Master (LH) Radar unit communicates with the Main CAN for necessary vehicle information and receives a direct input from the console mounted SRVD “OFF” switch. Each Radar unit has direct control over its respective side mirror LED indicator.



SRVD System Overview

Item	Value	Unit
Trip Count	262	Time
Count	Common	
Time Count	251700	ms
SRVD System fail flag	Normal	
SRVD System HALT flag	Normal	
SRVD System ON-OFF flag	ON	
LH-Side Target detection flag	Un-detect	
LH-Side BSD caution 1st flag	OFF	
LH-Side LCA caution 1st flag	OFF	
LH-Side RCTA caution flag	OFF	
LH-Side Radar Voltage value	12.3	V
LH-Side Temperature value	82	°F

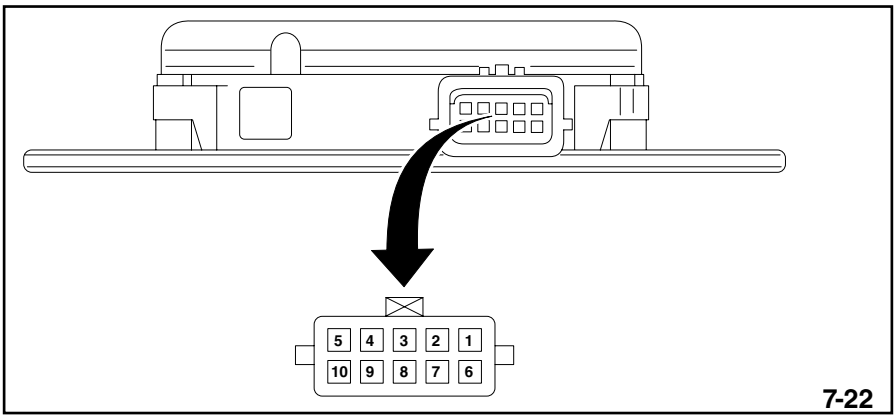
7-20

SRVD LH (Master) Data

Item	Value	Unit
Trip Count	262	Time
Count	Common	
Time Count	269800	ms
SRVD System fail flag	Normal	
SRVD System HALT flag	Normal	
SRVD System ON-OFF flag	ON	
RH-Side Target detection flag	Un-detect	
RH-Side BSD caution 1st flag	OFF	
RH-Side LCA caution 1st flag	OFF	
RH-Side RCTA caution flag	OFF	
RH-Side Radar Voltage value	12.4	V
RH-Side Temperature value	84	°F

7-21

SRVD RH (Slave) Data



Radar Unit Connector

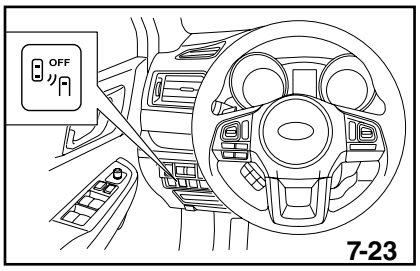
Terminal No.	Contents		Measuring condition	Standard
	Radar LH (master)	Radar RH (slave)		
1 ←→ Chassis ground	Private CAN H	Private CAN H	Always	1 MΩ or more
2 ←→ Chassis ground	Master CAN H	—	Always	1 MΩ or more
3 ←→ Chassis ground	—	—	—	—
4 ←→ Chassis ground	Left mirror LED output	Right mirror LED output	When Ignition key Inserted	Pulse generation
5 ←→ Chassis ground	Ignition power supply	Ignition power supply	Ignition switch OFF → ON	Less than 1 V →9
6 ←→ Chassis ground	Private CAN L	Private CAN L	Always	1 MΩ or more
7 ←→ Chassis ground	Master CAN L	—	Always	1 MΩ or more
8 ←→ Chassis ground	Subaru Rear Vehicle Detection OFF switch	—	• Ignition switch ON • Subaru Rear Vehicle Detection switch OFF → ON	Less than 1 V → 9 — 16 V
9 ←→ Chassis ground	—	—	—	—
10 ←→ Chassis ground	GND	GND	Always	Less than 1 Ω

SRVD "OFF" Switch

A console mounted SRVD "OFF" switch functions to disable the SRVD system.

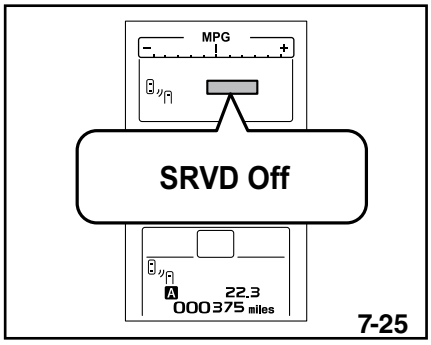
In the following cases, press the SRVD "OFF" switch to deactivate the system:

1. When towing a trailer.
2. When a bicycle carrier or other item is fitted to the rear of the vehicle.



SRVD OFF Switch Placement

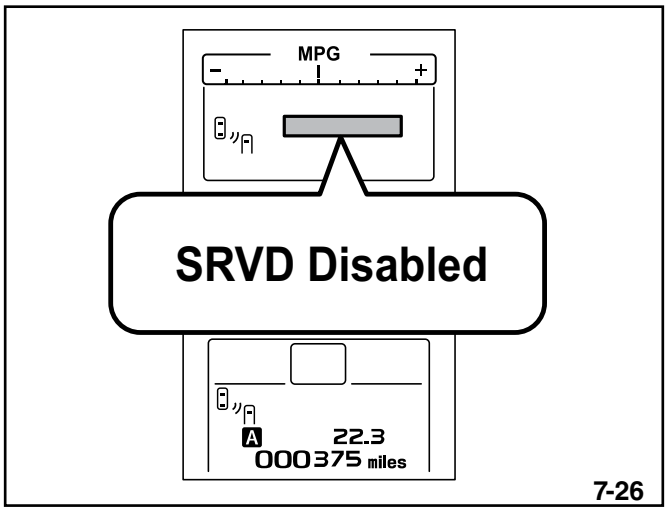
SRVD OFF Switch



SRVD OFF Indicator

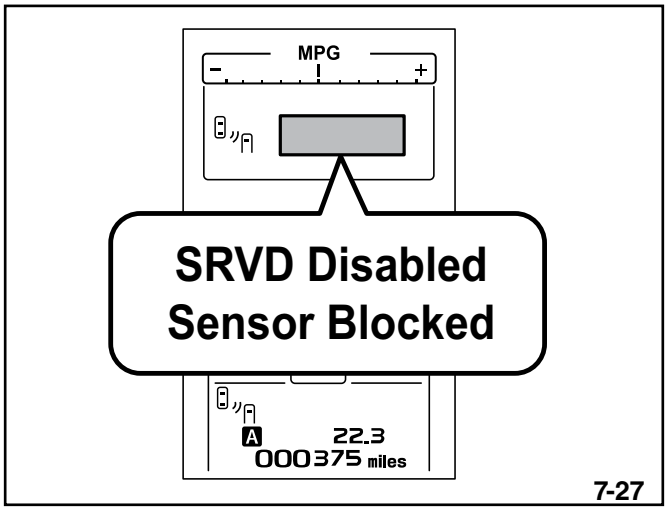
Diagnostics

The “SRVD Disabled” message is displayed when the system is used at extremely high or low temperatures or when abnormal voltage exists. Once these conditions are corrected, the system will recover from the temporary stop condition and the indicator will turn off.



SRVD Disabled Indicator

The “SRVD Disabled Sensor Blocked” message is displayed when the detectability of the radar sensor is reduced. Once the condition is corrected, the system will recover from the temporary stop condition and the indicator will turn off.



SRVD Sensor Blocked Indicator

DTC	SSM Indication	Detection Condition	Resetting Condition
B2300	RADAR ASSY B&&S LED short circuit to earth	This failure occurs if the harness from the rear side radar through the door mirror to ground short-circuits to ground.	When the ignition is set to ON, the harness should operate normally.
B2301	RADAR ASSY B&&S LED open circuit or short circuit to power supply	This failure occurs if the harness from the rear side radar through the door mirror to ground disconnects or causes a short-circuit in the power supply system.	When the ignition is set to ON, the harness should operate normally.
B2304	RADAR ASSY B&&S ON-OFF switch adhesion	This failure occurs if the harness from the rear side radar through the door mirror to ground short-circuits to ground.	When the ignition is set to ON, the switch should operate normally.
U0073	Control Module Communication Bus "A" Off	Conforms to "CAN Communication Control Specification" issued by DGSD2.	The triggered indication is reset by normalizing the CAN.
U0074	Control Module Communication Bus "B" OFF		
U0422	Invalid Data Received From Body Control Module		
U0402	Invalid Data Received From TCM		
U0401	Invalid Data Received From ECM/ PCM "A"		
U0423	Invalid Data Received From Instrument Panel Cluster Control Module		
U0416	Invalid Data Received From Vehicle Dynamics Control Module		
U0140	Lost Communication With Body Control Module		
U0101	Lost Communication With TCM		
U0100	Lost Communication With ECM/ PCM "A"		
U0155	Lost Communication With Instrument Panel Cluster (IPC) Control Module		
U0122	Lost Communication With Vehicle Dynamics Control Module		
B2311	RADAR ASSY B&&S TCM fail detection	This failure occurs if the system breaks down due to a failed rear side radar caused by a failure in the TCM.	When the ignition is set to ON, the TCM should operate normally.
B2313	RADAR ASSY B&&S VDC fail detection	This failure occurs if the system breaks down due to a failed rear side radar caused by a failure in the VDC.	When the ignition is set to ON, the VDC should operate normally.
B2320	RADAR ASSY B&&S Low Voltage (less than 9V)	This failure occurs if the voltage applied to the rear side radar stays at 9 V or lower for about 5 sec.	When the power supply becomes higher than 9 V, the triggered indication is reset.
B2321	RADAR ASSY B&&S High Voltage (more than 16V)	This failure occurs if the voltage applied to the rear side radar stays at 16 V or higher for about 5 sec.	When the power supply becomes lower than 16 V, the triggered indication is reset.
B2327	RADAR ASSY B&&S internal failure (internal electric circuit)	This failure occurs if the rear side radar internal failure is detected.	When this failure occurs, basically replace the radar with a new one.
B2328	RADAR ASSY B&&S internal failure (RADAR misalignment)	This failure occurs if eccentricity is detected in the rear side radar axis.	Adjust the axis of the radar.

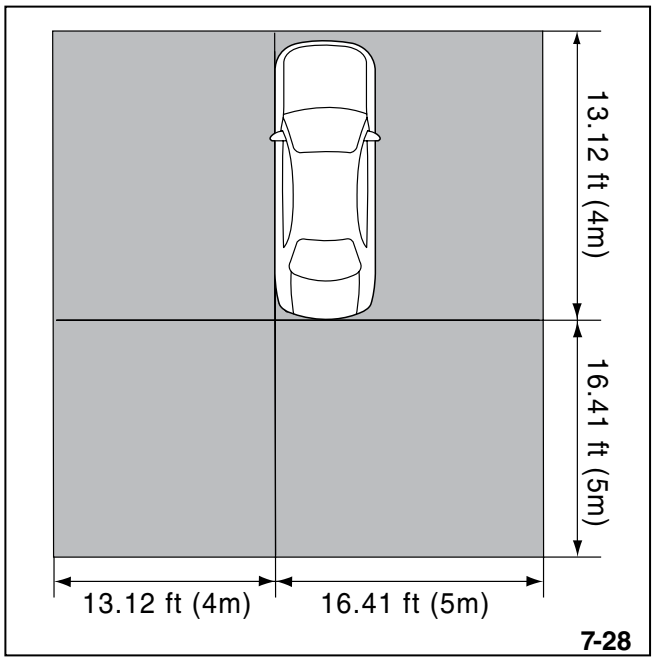
DTC	SSM Indication	Detection Condition	Resetting Condition
B2329	RADAR ASSY B&&S uncompleted RADAR alignment	This failure occurs if the axis adjustment by the SSM in the rear side radar has failed.	Adjust the axis of the radar.
B2340	RADAR ASSY B&&S high ambient temperature (more than 85°C)	This failure occurs if the temperature inside the rear side radar moves out of working temperature range.	When the internal temperature returns within the working temperature range, the triggered indication is reset.
B2341	RADAR ASSY B&&S degradation of detecting performance	This failure occurs if radar irradiation is blocked or radar reflection cannot be received.	When the radar properly irradiates or receives the reflected signal, the triggered indication is reset.
B2350	RADAR ASSY B&&S Communication error between Master and Slave	This failure occurs if there is any trouble between the Master and Slave in the rear side radar.	When the ignition is set to ON and the private CAN operates normally, the triggered indication is reset.

Radar Axis Alignment

Alignment of the Radar Axis is performed after removal/installation or replacement of a SRVD Radar unit. This includes body repairs or the replacement of a mounting bracket.

Note: This procedure outlines the Radar Axis Alignment for the Master (LH) Radar unit. Alignment of the Slave (RH) Radar unit is accomplished with the same procedure on the opposite side of the vehicle.

Secure an open and level area with 13.12 ft (4m) from the rear and side of the vehicle.

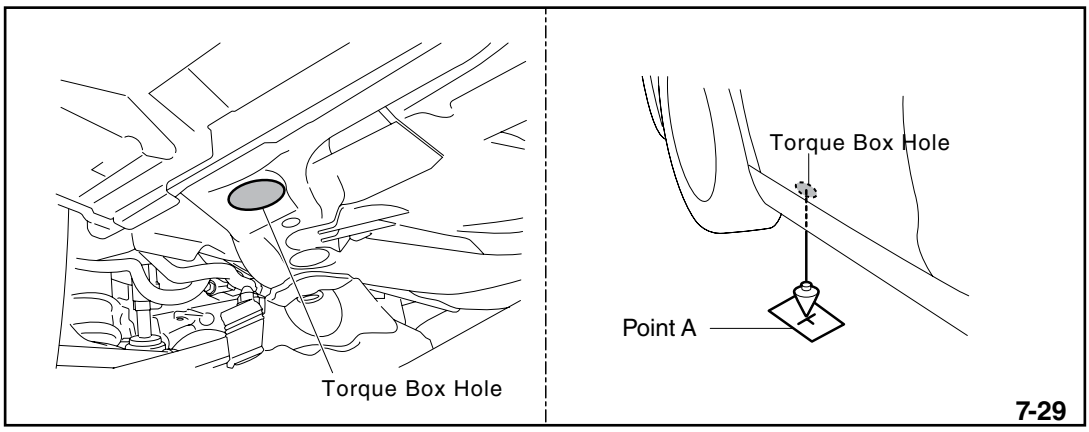


Radar Axis Alignment Area

Caution: No large metallic objects (other than SST Radar Reflector) or persons should be present in the Radar Axis Alignment area during the procedure.

Point A

Suspend a line with plumb bob from the center of the rubber cap located in drivers side torque box gauge hole, and mark Point A on the floor with tape.



Point A Set-up (Artwork)

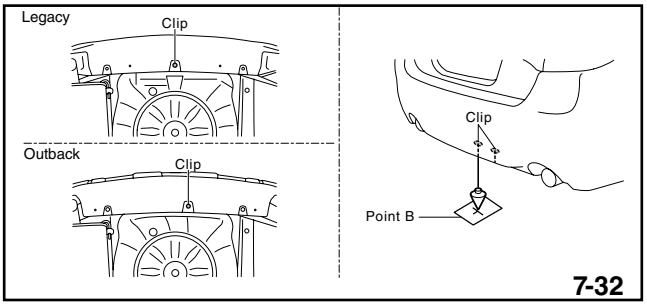
LH Torque Box Hole

Point A

Point B

Suspend a line with plumb bob from the center of the vehicle rear, and mark the center point on the floor with tape.

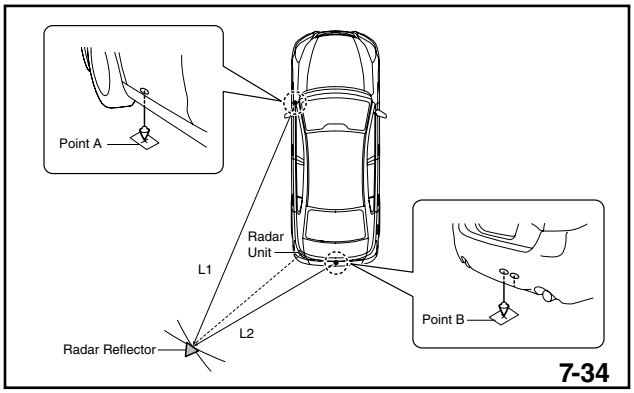
1. Remove the clip located in the vehicle center at the rear bumper.
2. Thread a line with plum bob into the hole
3. Mark Point B on the floor with tape.



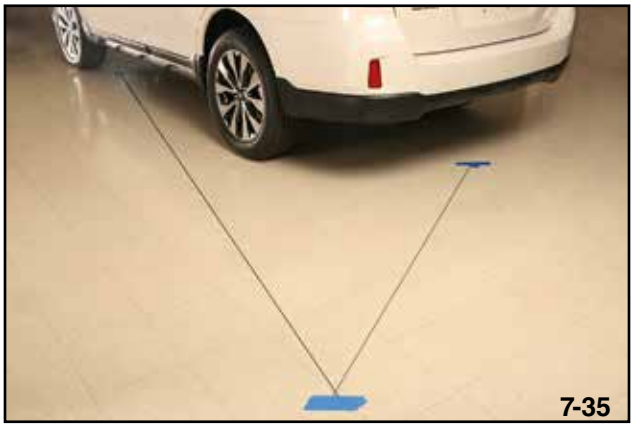
Point B Set-up (Artwork)

Point B

4. Using a strong string or soft tape measure, locate the point at which L1 and L2 intersect based on the corresponding body style.



Alignment Preparation (Artwork)

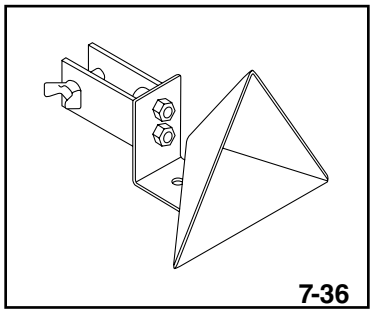


Alignment Preparation

	Sedan		Outback			
			Left		Right	
	L1	L2	L1	L2	L1	L2
Length	4,420 mm	2,025 mm	4,430 mm	2,100 mm	4,430 mm	2,005 mm
	(174.02 in)	(79.72 in)	(174.41 in)	(82.68 in)	(174.41 in)	(78.94 in)

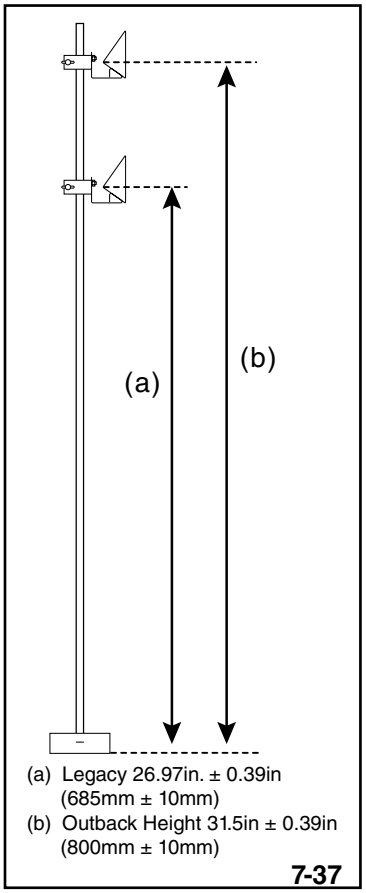
Note: Point B on Outback models is offset from the center of the vehicle. Therefore, a different length for L2 is used from side to side.

5. Prepare SSTs J-51658 (Radar Reflector) and J-51662 (Stand).



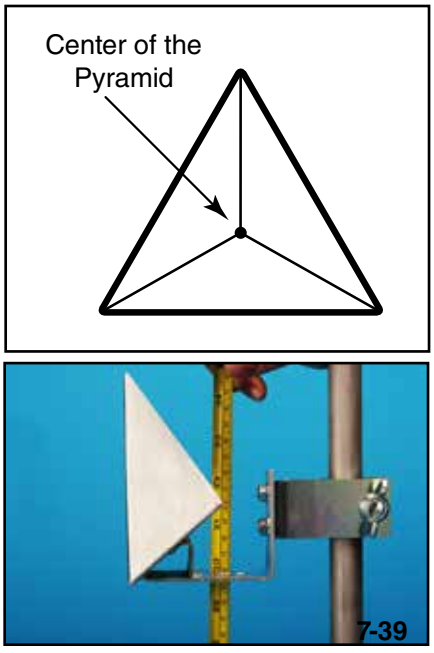
Radar Reflector

6. Using the stand, set the Height of the Radar Reflector to the corresponding vehicle body style.



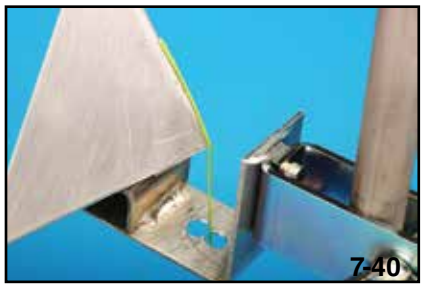
Radar Reflector Different Heights (Artwork)

Radar Reflector and Stand

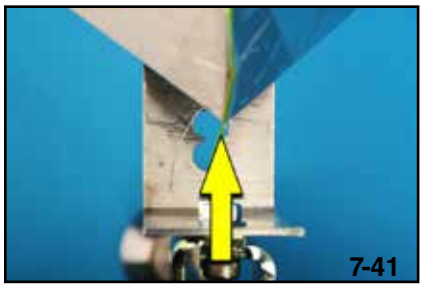


Radar Reflector Height

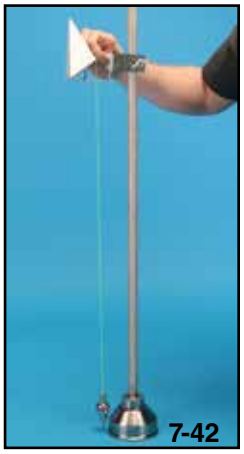
7. Suspend a line with plumb bob to align the rear of the Radar Reflector pyramid with the convergence point established by L1 and L2.



Radar Reflector Pyramid

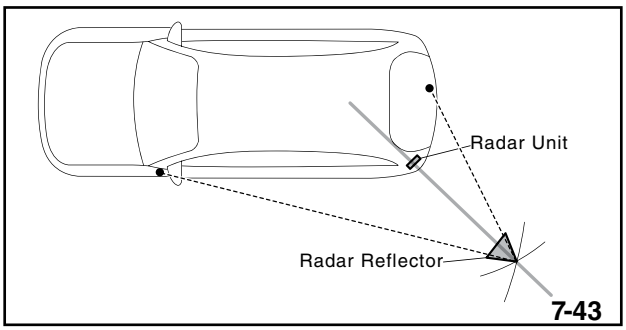


Plumb Bob Point



Radar Reflector and Stand

8. Without disturbing the alignment of the Radar Reflector, carefully aim the center of the pyramid at the Radar unit location. A slight amount of angular error is allowed.

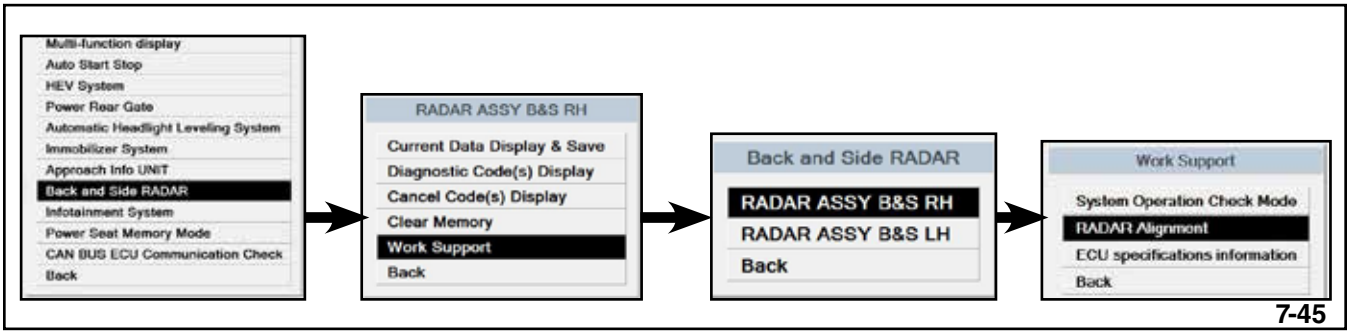


Radar Reflector Aiming Angle

Aiming Radar Reflector

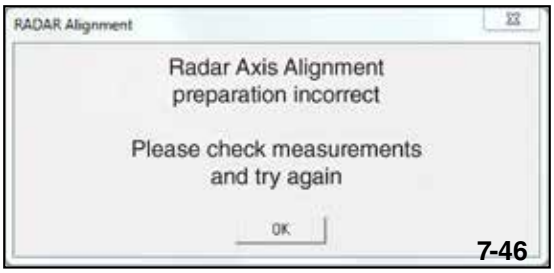
SSM Procedure

Note: Turn the Ignition switch to the ON position. Wait for 10 Seconds

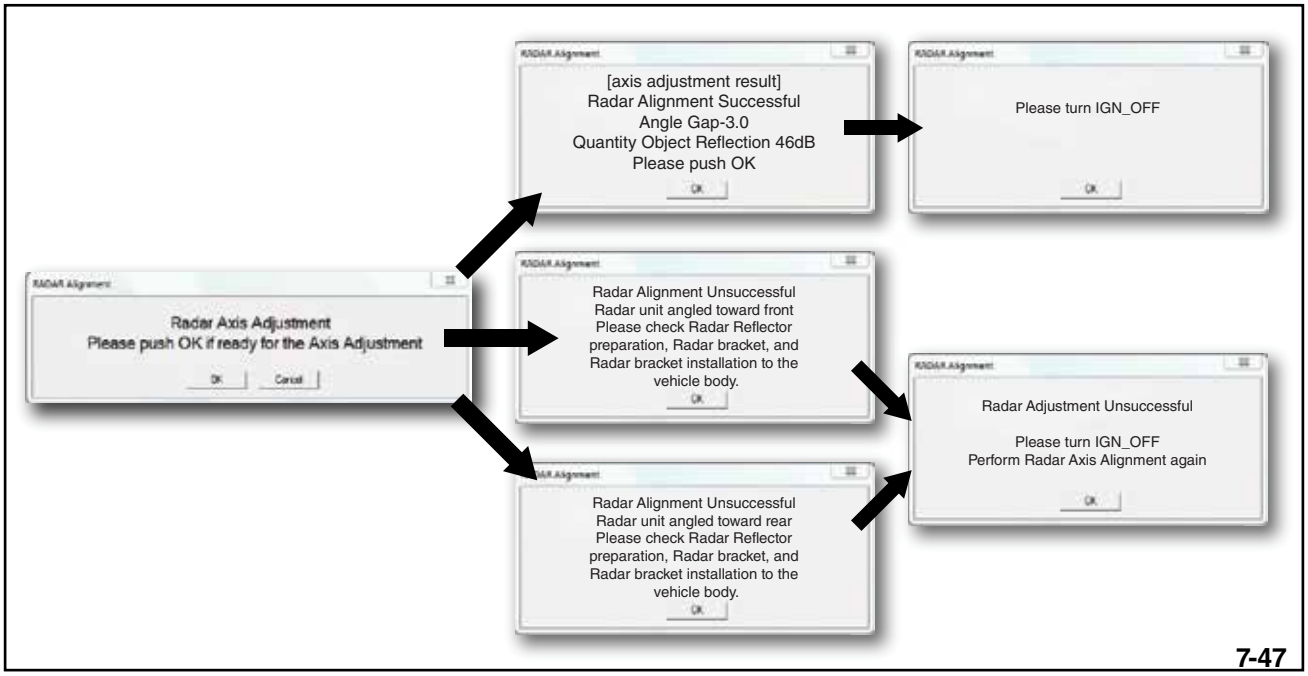


SSMII Work Support

Incorrect preparation of the Radar Axis Alignment will generate the following message:



Radar Axis Alignment

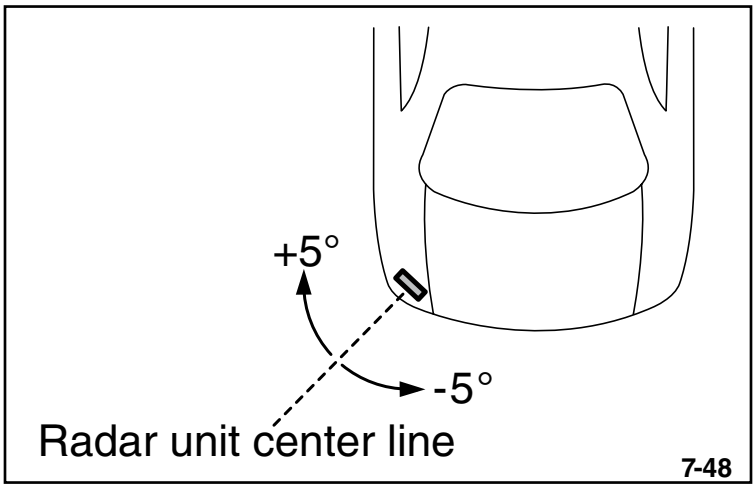


Radar Alignment SSMIII Messages

Note: "Quantity of Object Reflection (dB)" is a value to express radar signal strength and is used for research purposes only. This information is not provided for technician diagnostics.

If the result of the Axis Alignment is out of the permissive range, it is possible that the reflector position may be incorrect or the Radar unit bracket/mounting location may be deformed.

The maximum allowable misalignment of the Radar unit is ±5°. If this value is greater than ±5° then bent or damaged components exist.



Radar Alignment

NOTES:

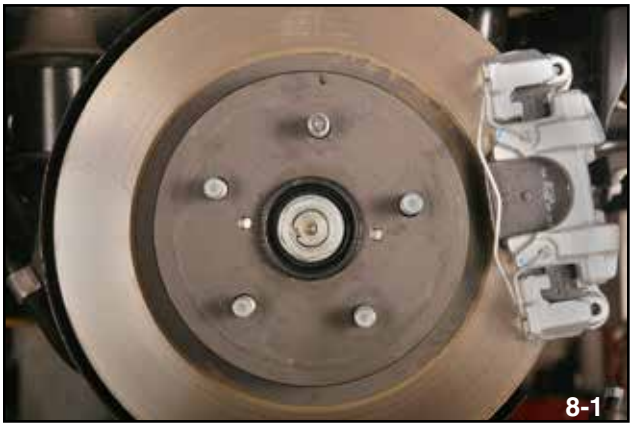
Brakes

The 2015 Legacy and Outback are equipped with a new rear braking system and parking brake. Classified as a caliper integrated Electronic Parking Brake (EPB) system, the new rear brakes provide normal hydraulic braking functions and parking brake features for the following:

- Parking Brake
- Hill Holder*
- Stay Stop Control for Eyesight*
- Emergency Brake
- Sliding Prevention
- Temperature Compensation

Note: Automatic Release Control, for the EPB is identical to the current model year Legacy and Outback.

Note: There is no manual release for the EPB.



Rear Brakes

Electronic Parking Brake

Caution: Servicing of the rear brake pads requires the use of the Subaru Select Monitor or generic caliper tool. Brake pad servicing will be covered later in this chapter.

EPB Switch

* *Operation is same as current models.*

The EPB activation and release switch is located on the center console behind the shifter. Pull up on the switch to activate the EPB. Step on the brake pedal with the engine operating or the ignition on and push down the switch to deactivate the EPB.

Specifications

Model	Outback	Sedan	
		2.5 L	3.6 L
Front	Ventilated disc 17”	Ventilated disc 16”	Ventilated disc 17”
Rear	Ventilated disc 17” (Caliper integrated EPB)		

The rear brake caliper is fixed to the caliper mounting bracket on the front side by a spring clip. The spring clip can be ordered as a separate part. Replace the spring clip if it is deformed or damaged.


8-4

Rear Caliper

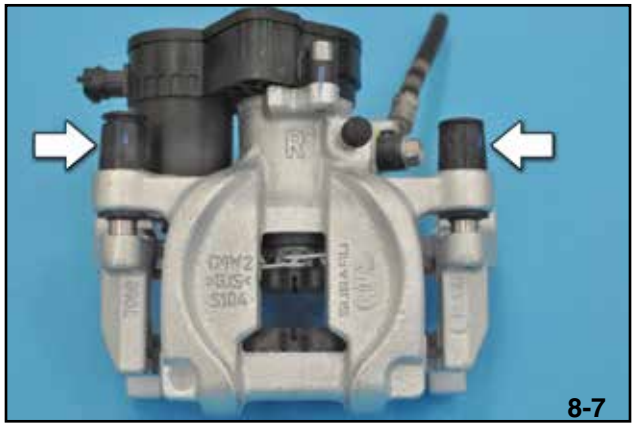

8-5

Caliper Spring Clip

The spring clip must be able to slide smoothly across the mounting bracket as the outer pad wears. If the spring clip movement is restricted, premature inner brake pad wear will occur. The back side of the rear brake caliper is secured to the mounting bracket with two internal hex drive guide pins.


8-6

Spring Clip OFF

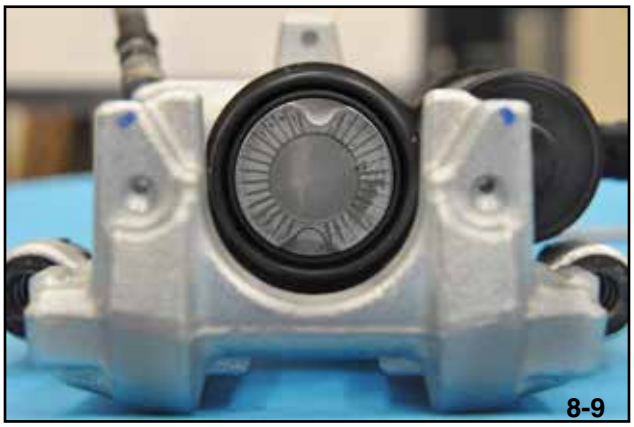

8-7

Guide Pins

The guide pins allow the caliper to float on the mounting bracket, providing for automatic clearance adjustments as the brake pad linings wear.

Rear Brake Pads

A serviceable dust seal is installed over the end of the piston. Special Tool SST 99099AL000 will be shipped to all dealers as an essential tool.

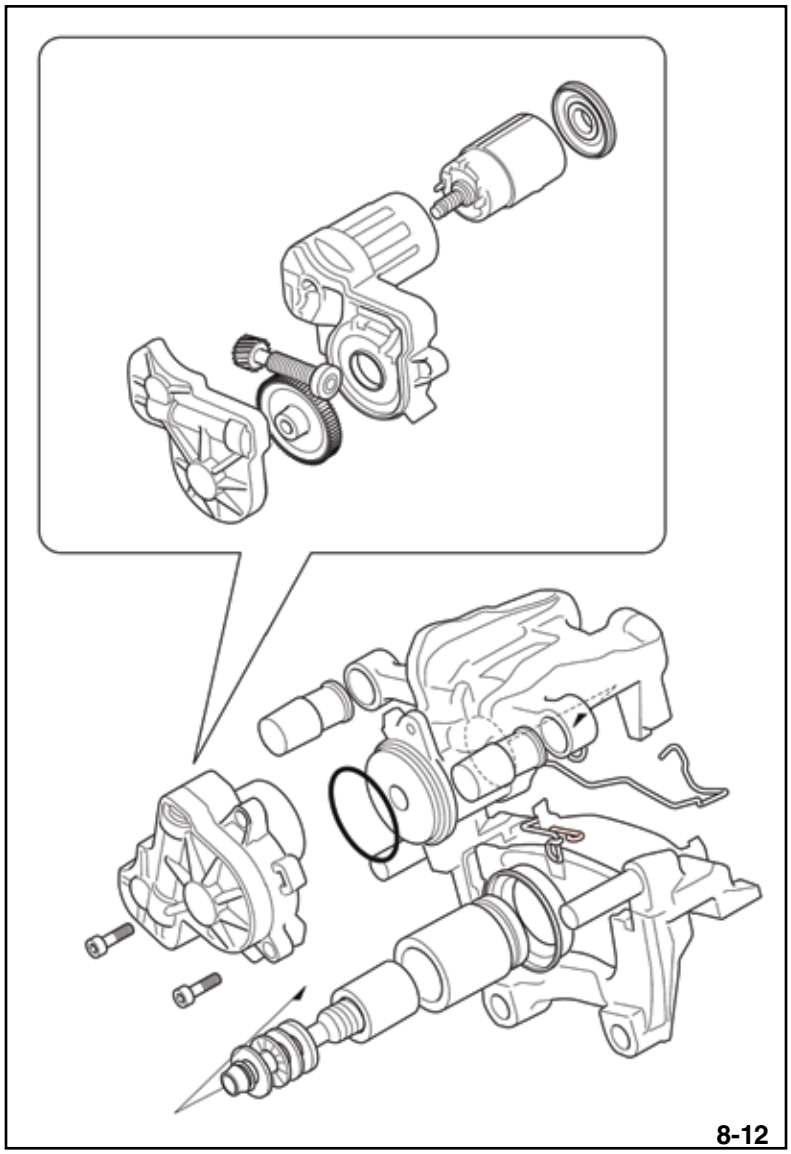


Piston and Dust Seal

Removing Seal

Dust Seal And Installation Tool

EPB Construction and Operation



Caliper (Artwork)

The EPB operates from the movement of a brushed DC voltage motor which is controlled by the Hydraulic Control Unit. A series of worm gears and reduction gears provide bidirectional movement of a ball nut that is keyed to the hydraulic piston. If the EPB is activated, the ball nut is screwed downward into the back face of the hydraulic piston and the piston moves into the inner brake pad. The pushing force pulls the caliper inward which pulls the outer brake pad into the rotor. When the EPB is released, the ball nut is reversed and the square cut caliper seal pulls the piston away from the inner brake pad and releases tension to the caliper and the outer brake pad.

Note: The caliper and motor are not serviceable. Do not disassemble for inspection or diagnosis. Calipers and motors are available as replacement parts and can be ordered separately or as an assembly.

A dust seal O-ring is positioned around the circumference of the caliper to seal the motor to the caliper. This O-ring should be replaced if the motor is ever removed from the caliper.

The motor output gear is splined to the ball nut worm gear.

Dust O-ring and Ball Nut Worm Gear

EPB Motor Drive

The ball nut moves up and down on the threads of the worm gear to apply and release mechanical pressure to the back or inside face of the hydraulic piston.

Worm Gear

Ball Nut and Piston

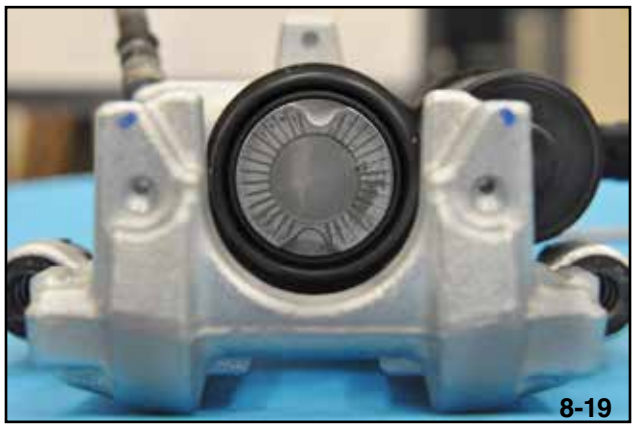
Note: The physical fit of the ball nut to the piston provides areas that can trap air. Air bleeding procedures are the same as existing models. *Brake pedal stroke length should always be checked after installing a new caliper or brake component to ensure all air is removed from the brake system.*

The ball nut is constructed of many ball bearings and keeper springs that provide for smooth movement and strength. A flat edge made onto each side of the ball nut keys into the notches made into the inside of the hydraulic piston.

Ball Nut Bearings

Piston Internal View

As the piston moves towards the inner brake pad, the serrations machined into the outer face of the piston bite into the inner brake pad shim (permanently mounted to the brake pad) to prevent the piston from rotating when mechanical force begins to increase. **Do not lubricate or apply any anti-seize paste to this area.**



Piston Serrations

Caliper Hydraulic Seals

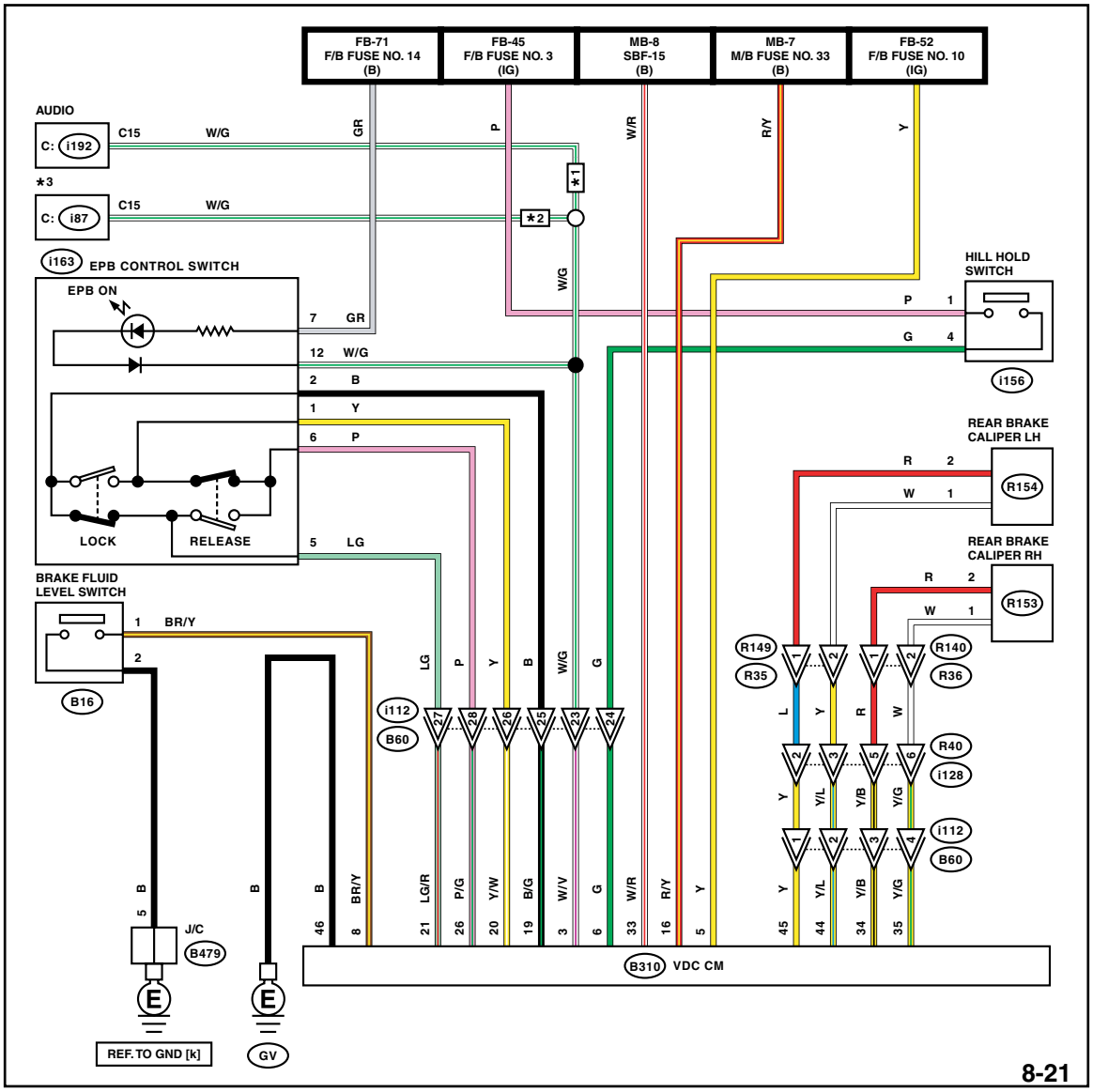
The notches located at 12:00 and 6:00 in this picture are used to turn the piston clockwise when the Subaru Select Monitor is not available.

Note: The service notches can be located in any direction and have no affect to hydraulic or parking brake operation.

The piston must be turned during service work to rotate the ball nut back to a service park position if the Subaru Select Monitor is not available.

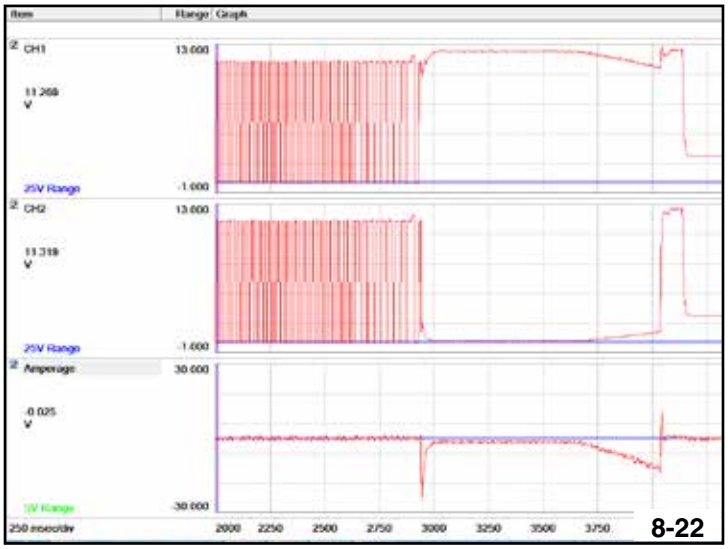
EPB Electrical Operation and Control

The operation of the EPB at each rear brake caliper is accomplished using two wires that operate the bidirectional movement of the EPB motors. There are no sensors incorporated into the caliper. Sensing for apply and release is determined by the amount of amperage measured in the Hydraulic Control Unit.



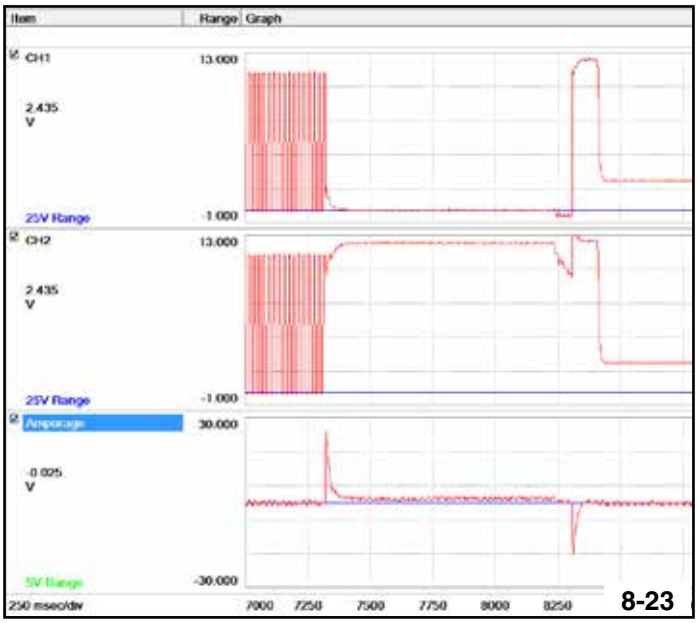
EPB Wiring Schematic

During apply control, the polarity of the wires is controlled to turn the ball nut counter clockwise. This will screw the ball nut into the piston and place mechanical force on the inner brake pad and pull the caliper inward to force the outer brake pad into the rotor. An initial current spike will occur as the motor first starts to turn and then level off as the motor turns without opposing any mechanical force. As the Hydraulic piston makes contact with the inner brake pad, current starts to increase and continues to increase as the brake caliper is pulled inward. The amperage will reach maximum level after both brake pads are contacting the rotor with a predetermined amount of mechanical force.



EPB ON

Time is measured during the application of the EPB until a pre-established amperage level is reached. This represents the normal EPB on state. This value is also used to determine how long to operate the motor in the reverse direction when the EPB is turned off. As the brake pads wear, the ball nut parks at a lower position on the worm gear. The EPB release motor operation time, determines the final position.



EPB OFF

Note: The amount of time and amperage needed to release the EPB is always lower than the application time and amperage due to the reduced work load.

During EPB release, the polarity of the wires to the EPB motor is reversed and the ball nut rotates clockwise to release the mechanical tension on the inner brake pad and caliper.

Content			Terminal No. (+) — (–)	Input/Output signal
				Measured value and measuring conditions
Power supply			5 — 46	10 — 15 V when the ignition switch is ON.
ABS wheel speed sensor	Front LH wheel	Power supply	41 — 46	0 — 18 V
		Signal	40	7 — 14 mA: Rectangle waveform
	Front RH wheel	Power supply	37 — 46	0 — 18 V
		Signal	36	7 — 14 mA: Rectangle waveform
	Rear LH wheel	Power supply	39 — 46	0 — 18 V
		Signal	38	7 — 14 mA: Rectangle waveform
	Rear RH wheel	Power supply	43 — 46	0 — 18 V
		Signal	42	7 — 14 mA: Rectangle waveform
Valve relay power supply			16 — 46	10 — 15 V when the ignition switch is ON.
Motor relay power supply			33 — 46	10 — 15 V when the ignition switch is ON.
Stop light switch			17 — 46	1.5 V or less when the stop light is OFF; otherwise, 10 — 15 V when the stop light is ON.
Brake light relay power supply			27 — 46	10 — 15 V when the ignition switch is ON.
Vehicle speed output signal			24	0 ◄—►12 V pulse
VDC OFF switch			1 — 46	1 Ω or less when the OFF switch is “ON”; 1 MΩ or more when the switch is “OFF”.
Parking brake switch			19	Pulse signal
Parking brake switch			20	Pulse signal
Parking brake switch			21	Pulse signal
Parking brake switch			26	Pulse signal
Rear brake caliper RH			34	Pulse signal
Rear brake caliper RH			35	Pulse signal
Rear brake caliper LH			44	Pulse signal
Rear brake caliper LH			45	Pulse signal
Hill hold switch			6 — 46	10 — 15 V when the hill hold switch is ON.
Parking brake indicator light			3 — 46	0 V when the light is on; 10 — 15 V when the light is off
Brake fluid level switch			8 — 46	10 — 15 V when the ignition switch is ON.
Clutch stroke sensor power supply			11— 46	4.8— 5.2 V
Clutch stroke sensor ground			15	—
Clutch stroke sensor signal			15	Pulse signal
CAN communication line (H)			10	Pulse signal
CAN communication line (L)			13	Pulse signal
Ground			46	—

Normal Voltage at EPB Motor in OFF Condition

Voltage to the two caliper wires is pulsed at the same polarity which allows for faster control.

The HCU can ground either wire while leaving the other at 12 volts positive to activate the EPB motor.

New EPB Features

The Sliding Prevention feature of the EPB allows for self activation of the EPB motor to increase the tension to the brake pads, if the parking brake had been previously set. Sliding Prevention is activated if the wheel speed sensors detect vehicle movement within 15 minutes of the EPB activation.

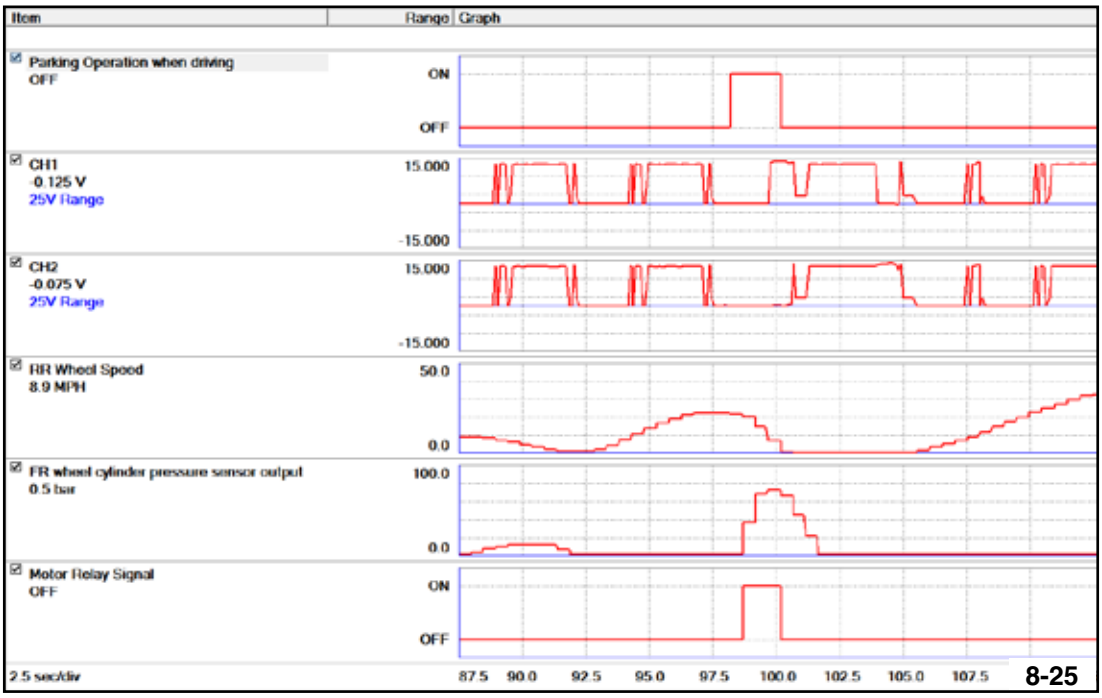
The Temperature Compensation feature of the EPB functions by calculating brake component temperature from information obtained by the CAN and HCU. The Ambient air temperature, vehicle speed, road incline, service brake use frequency, and other vehicle information are considered when calculating brake component temperature. Higher temperatures equate to expanded parts which will contract as they cool. This could produce a situation where the initial EPB activation is not strong enough to maintain vehicle position. Compensation for high temperature is achieved by two methods;

1. The EPB is activated with the Engine operating or CAN still operating. All necessary data is available to the EPB control unit (HCU) and the EPB motor applies additional mechanical force to the brake pads.
2. The EPB is activated with the Engine off and the CAN in sleep mode. Data to determine brake component temperature is not available to the EPB control unit (HCU). The initial EPB activation will be limited to learned values. An additional application of the EPB motor will be self activated by the EPB control unit (HCU) 2 minutes and 30 seconds after the EPB was initially set. This will tighten any clearances that may have developed from contracting brake parts.

An Automatic adjustment procedure is performed if no EPB operation is detected. The EPB control unit (HCU) monitors the driving mileage and will self activate the EPB with the engine off once every 1864 miles (3000 kilometers). This procedure repositions the ball nut clearance from the back face of the hydraulic piston and tests the EPB motor drive circuits. The EPB will remain on after the adjustment. EPB release is accomplished with the automatic release feature or manual release while pressing the brake pedal.

Emergency Brake Operation

The EPB also provides for an Emergency Brake function that can be activated while the vehicle is in motion. Pulling up on the EPB control lever and holding the lever upward will activate the Emergency Brake. The 2015 Legacy and Outback Emergency Brake will first attempt to slow down through the use of the normal hydraulic components. The Motor Relay and Valve Relay in the HCU will activate, supplying hydraulic pressure to all brake calipers (Front and Rear). Once maximum braking is occurring (just before wheel lock up), the pump will turn off and hold mode of ABS will maintain the current braking pressure. The EPB motor will activate only after the vehicle speed drops below a set value.



Emergency Brake ON

If hydraulic pressure cannot be established, the EPB motor will activate immediately. The rear wheels will lock up and unlock while the EPB switch is held in the on position. The EPB control unit (HCU) will control the application and release of the EPB based on wheel speed sensor input and always pulse the two sides together.

Emergency Release of the EPB

If the parking brake cannot be released with the EPB switch (example motor sticking), it is necessary to remove the parking brake motor and actuator from the caliper body.

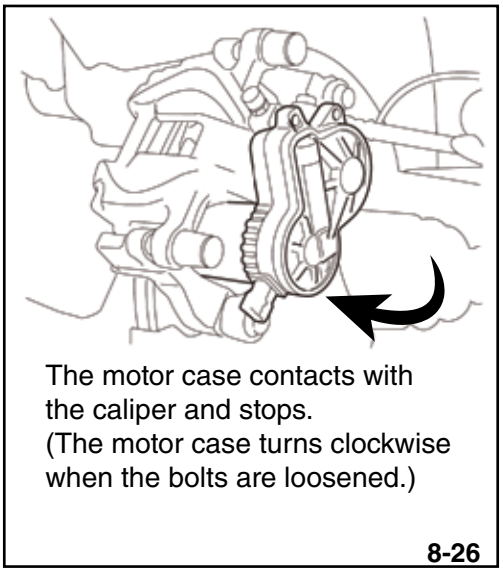
How to release

1. Lift the vehicle with a jack and remove the tire.
2. Remove the EPB connector from the motor.
3. Remove the motor attachment bolts (2 x 5 mm hexagon bolt), turn the piston shaft clockwise to loosen the ball screw and confirm the release of the EPB.
4. Install the motor.
5. Install the tire and put the vehicle on the ground.
6. Release the EPB on the opposite side in the same way.

Caution: If you loosen the motor attachment bolts with the parking brake engaged, the motor body will rotate. Use caution to prevent pinching of fingers. Support and hold the actuator and motor assembly in place and slowly allow it to move to a low tension position before removing from the caliper.

Caution: If you release the parking brake, the vehicle can start moving. Therefore, check the slope of the road and be sure the vehicle is securely stopped and front wheels are chocked.

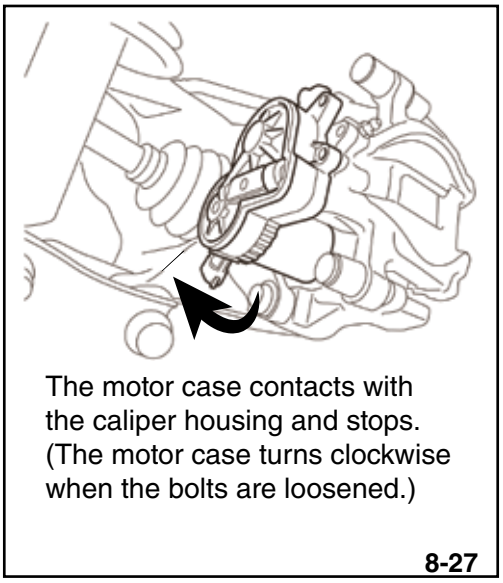
Note: While the motor is removed from the caliper, dust may contaminate the caliper. Therefore, after releasing the parking brake, install the motor body and move (drive) the vehicle.



The motor case contacts with the caliper and stops. (The motor case turns clockwise when the bolts are loosened.)

8-26

Left Side



The motor case contacts with the caliper housing and stops. (The motor case turns clockwise when the bolts are loosened.)

8-27

Right Side

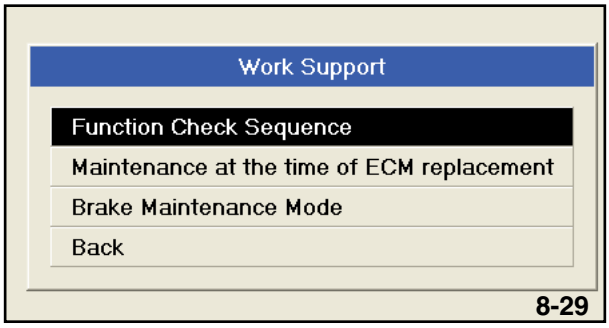
Install the new actuator seal after the EPB has been restored.

8-28

Retracting Ball Nut

Servicing Rear Brake Pads

Prepare the Subaru Select Monitor and SDI box and navigate to the Work Support of the ABS/VDC menu. Follow the steps below to correctly park and reposition the ball nut during installation of new brake pads.



Work Support

Brake Maintenance Mode

Note: The EPB must be in the released position before removing rear brake pads.

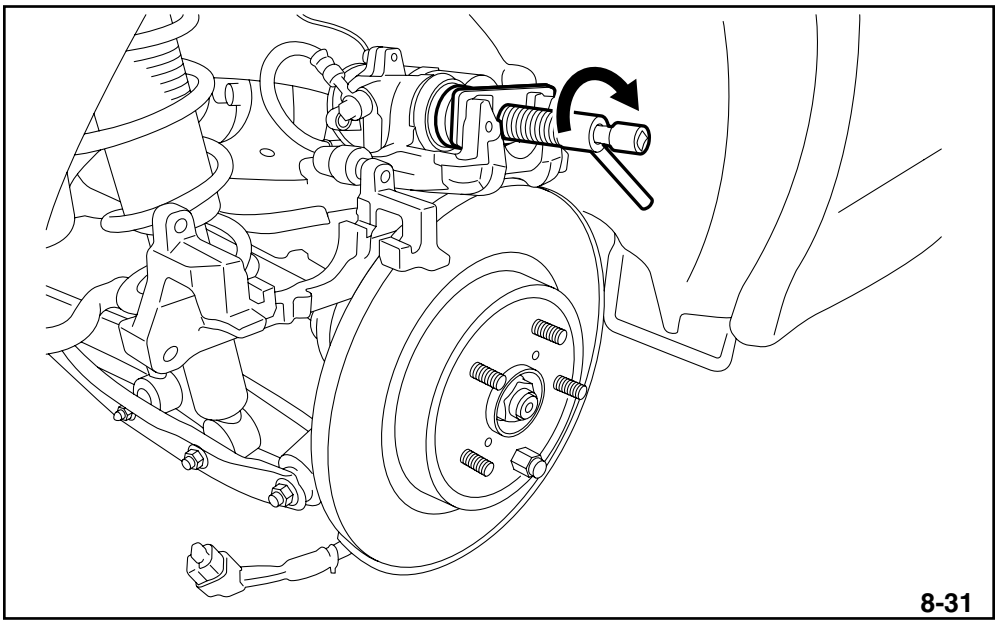
1. Select “Brake Maintenance Mode” in the SSM III before replacement. (The EPB motor will rotate in the release direction).
2. **Warning: The EPB can be operated with the ignition off, be sure to follow the steps below to place the EPB in a safe condition.**
3. Turn the ignition switch to off. Remove the battery negative terminal or disconnect the EPB motor harness connector from the EPB. Be sure to reconnect after all work is performed.
4. Push the hydraulic piston manually back into the caliper. Install the new brake pads.
5. After installation, restart the“Brake Maintenance Mode” and make the initial settings of the EPB.

Note: DTC “C1984” will be generated after selecting and completing “Brake Maintenance Mode”. Clear the DTC before test driving the vehicle.

Note: The Parking Brake Break In procedure has been eliminated and no Parking Brake, Break In procedure is required on the new system.

When the SSM III is not used (In shops that do not have the SSM III):

After removing the pad, turn the piston clockwise (release direction) with the piston rotating tool.



Turning in Ball Nut (Generic tool)

After installing the pad, operate the foot brake to move the piston to proper position. Operate the EPB 5 times or more (with the parking brake switch) to move the ball screw to the proper position. (It is prohibited to push the piston out with the EPB and not with the foot brake).

NOTES:

Electric Power Steering (EPS)

Introduction

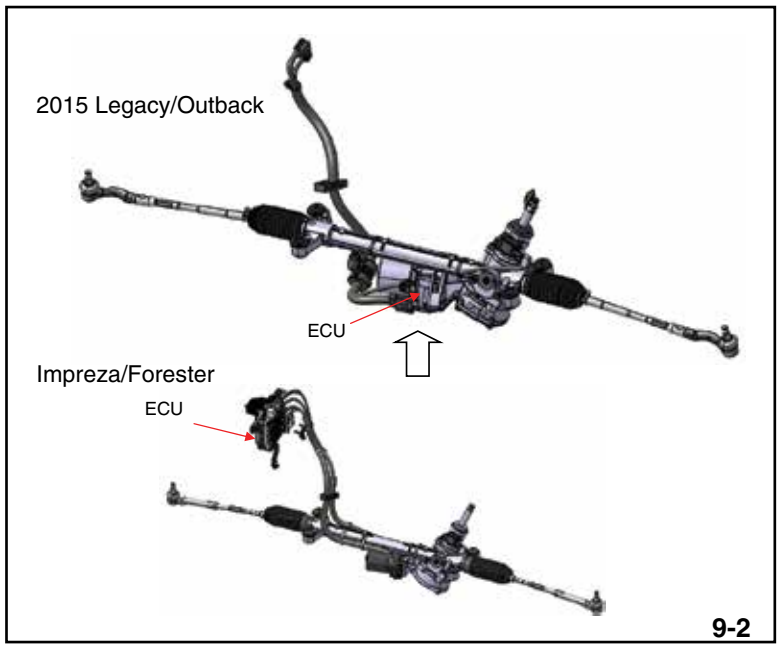
An enhanced Electric Power Steering (EPS) system has been adopted for the 2015 Legacy and Outback. This design is similar to 2012 Impreza and 2014 Forester models. In addition to a more accurate and natural steering feel, the adoption of EPS provides a 2 percent improvement in fuel efficiency over the current hydraulic system.

2015 Legacy and Outback Steering Rack

Major Changes

The EPS system on the 2015 Legacy and Outback features the following differences:

- The EPS Control Unit and Gear Box are now combined into a single assembly.
- The U, V, and W Motor Windings and the Resolver Sensor connections are provided directly within the Control Unit.
- The Torque Sensor has been changed to a Flux Ring style sensor.

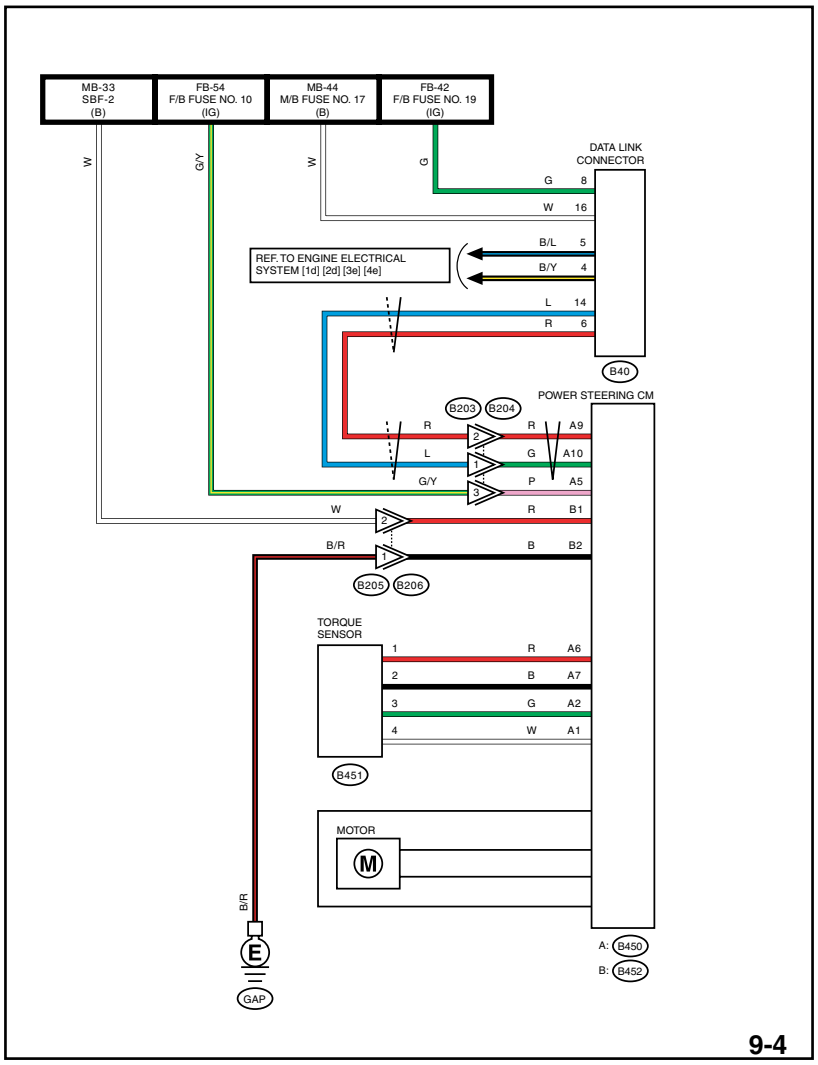


EPS Comparison

Electric Power Steering Circuit

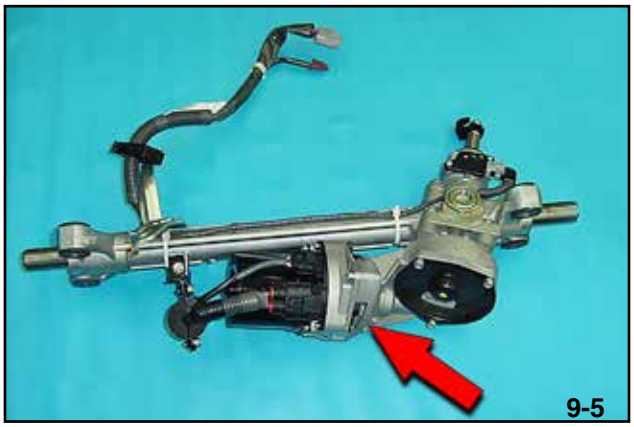
Connections from the EPS Rack assembly to the vehicle have been reduced to two. Connector B205 provides supply voltage and ground to the EPS while connector B203 contains CAN communication and an Ignition Switch signal.

EPS Wiring Harness



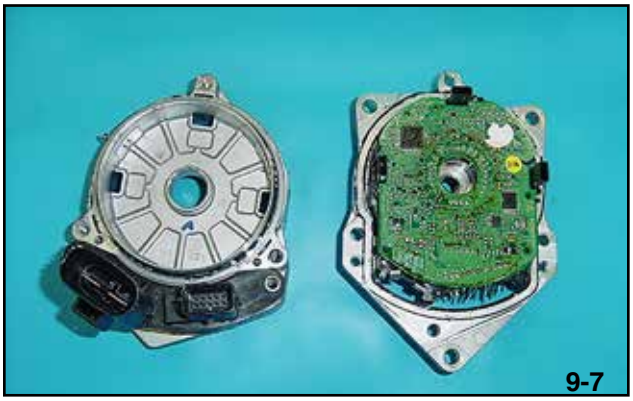
EPS Wiring Diagram

The EPS Control Unit and Gear Box are now combined into a single assembly. These components cannot be serviced individually.



Control Unit Location

Control Unit Connections



Control Unit

Drive Motor

The EPS Motor is an eight pole Permanent Magnet Synchronous AC motor. DC power and ground are supplied through connector B205 where it is controlled via “H” bridge transistors inside the EPS Control Unit.

EPS Drive Motor (In Vehicle)

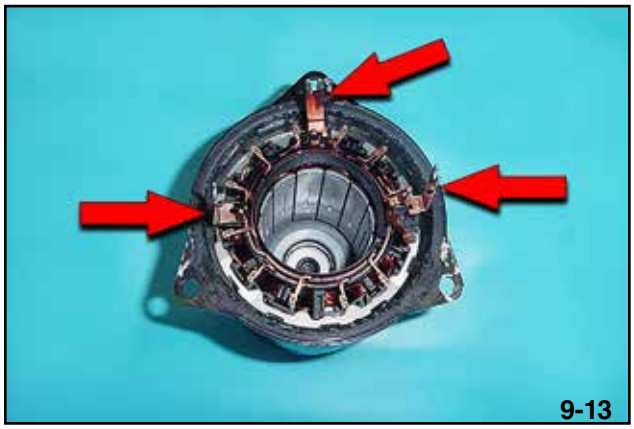
EPS Drive Motor

Exposed Rotor Magnets

Drive Motor Coupling

Connections for the U, V, and W windings are supplied through a bus bar inside the control unit.

Drive Motor Windings

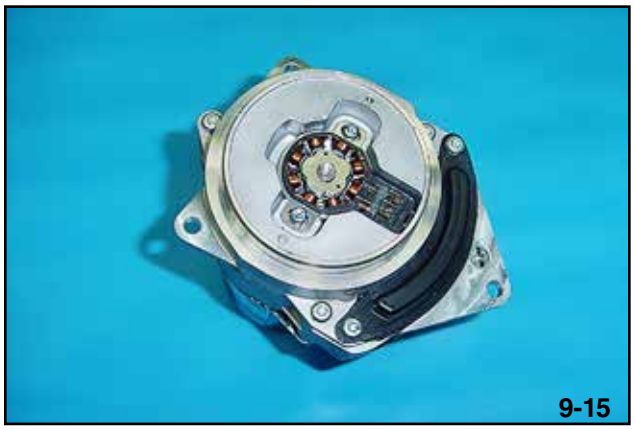


U, V, and W Connections

Resolver Sensor

The Resolver Sensor is mounted in the Motor Coupling housing and is press fitted to the motor shaft. This Resolver uses a 5 tip Rotor where as Impreza and Forester models used a 4 tip Rotor. Timing for the EPS motor is based on information provided by the Resolver Sensor.

Resolver Windings

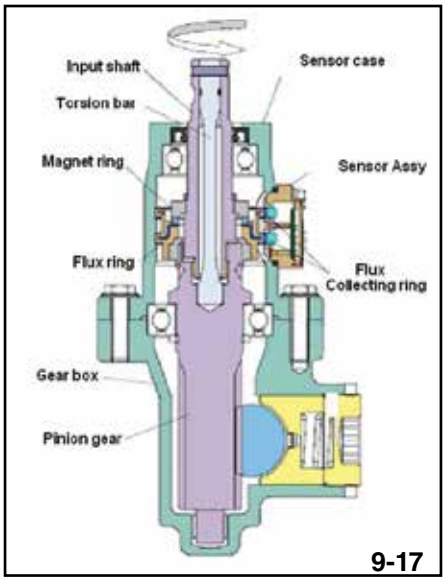


Resolver 5 Tip Rotor

Torque Sensor

The Torque Sensor delivers the driver's demand and force acting on the tires to the EPS Control Module. This EPS uses a Flux Ring style sensor that detects torque acting on the torsion bar of the Steering Rack input shaft. The sensor consists of a Magnet Ring, Flux Ring, Flux Collecting Ring, and Flux Yoke.

Torque Sensor



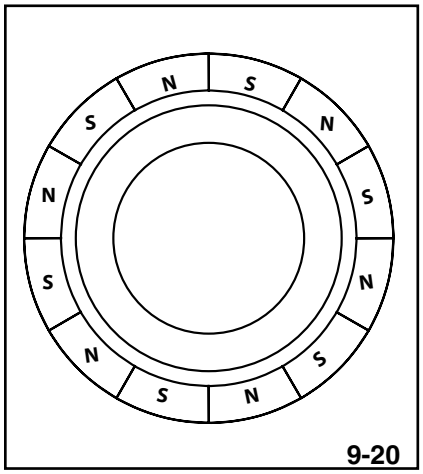
Input Shaft Cross Section

Magnetic Ring

The Magnet Ring, containing alternating North and South poles, is fixed to the Torsion Bar. As the Input Shaft rotates, resistance from the driver's demand creates torsion deforming the shaft. This deformation rotates the Magnet Ring and varies the North and South magnetic flux lines that are detected in the Flux Ring.

Input Shaft

Magnet Ring



Magnet Ring Poles

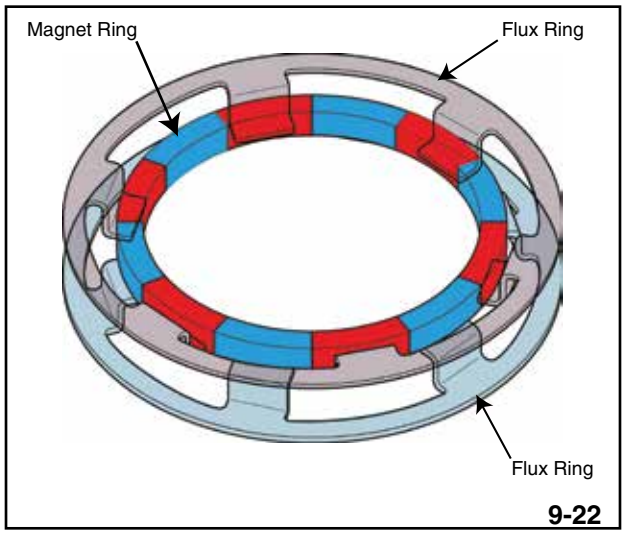
Flux Rings

The Flux Rings detect the North and South magnetic fluctuations from the Magnet Rings movement. The 2 rings are identified as the Main and Sub.

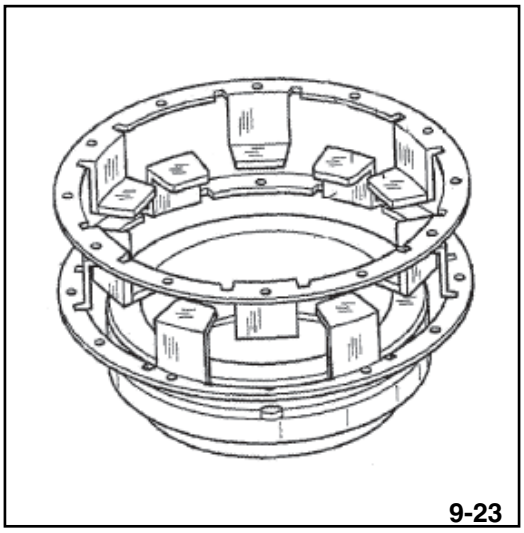
Magnet Ring and Flux Rings

Flux Collecting Rings

The Flux Collecting Rings transfer the North and South magnetic fluctuations from the Flux Rings to the Flux Collecting Yoke.



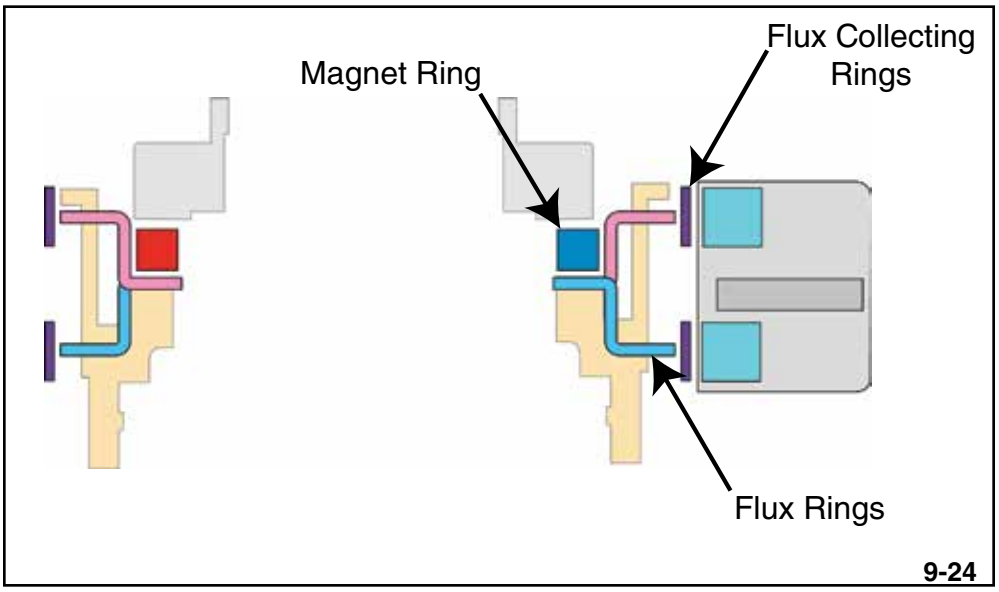
Magnet Ring and Flux Rings (Artwork)



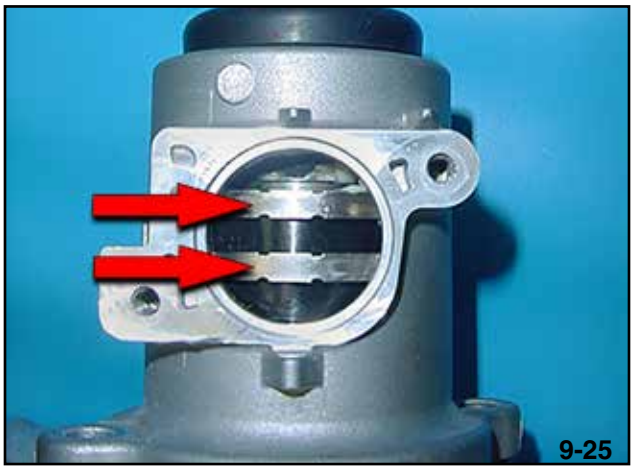
Flux Rings (Artwork)

Flux Collecting Yoke

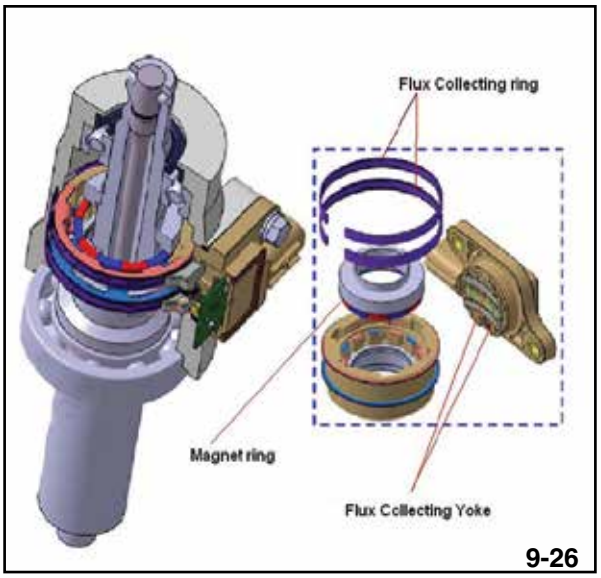
The Flux Collecting Yokes transfer the North and South magnetic fluctuations from the Flux Collecting Rings to the Hall IC of the Torque Sensor. Based on the Torque Sensors interpretations, motor direction and torque will be varied.



Flux Rings and Flux Collecting Rings



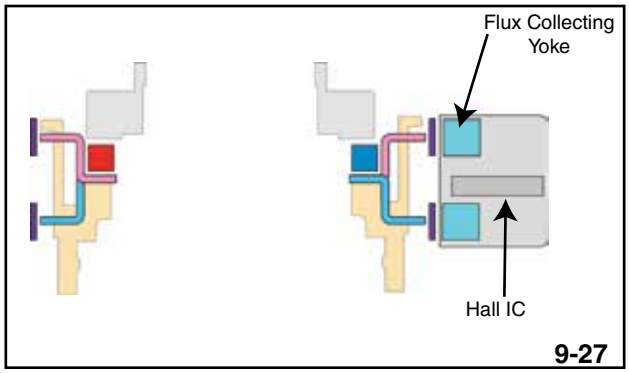
Flux Collecting Rings



Flux Collecting Rings

Flux Collecting Yoke

The Flux Collecting Yokes transfer the North and South magnetic fluctuations from the Flux Collecting Rings to the Hall IC of the Torque Sensor. Based on the Torque Sensors interpretations, motor direction and torque will be varied.



Flux Collecting Yoke and Hall IC

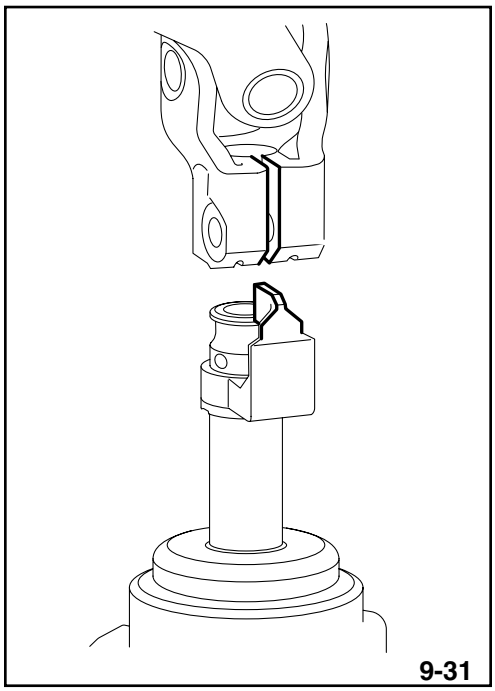
Flux Collecting Yoke and Hall IC

Sensor Removed

Alignment Collar

The Steering Gearbox shaft is now fitted with a plastic collar for alignment of the universal joint during assembly.

Alignment Collar



Universal Joint Installation

NOTES:

Diagnostics

Since the Control Unit has been incorporated into the Gear Box assembly, diagnostics have been simplified. Resolver and U, V, W Motor Winding related diagnostics are no longer necessary as any faults relating to these components will require a Gear Box assembly replacement.

Inspect harness for possible damage. Replace if necessary. If harness is OK, Torque Sensor or control Unit has failed. Replace the Gear Box assembly.

Replacement of Gear Box Assembly is necessary.

DTC	Item	Content of diagnosis
None	Without DTC	Normal
	"Assist limitation" is displayed in the current data «EPS operating condition».	Assist limitation is performed due to overheat protection control.
	"Overheating protection intervention history" in current data display shows 1 or more.	There are previous records of intervention to overheat protection control.
C2511	Torque Sensor Failure 1 (Main)	• Poor connector contact • Forgot to connect connector • Faulty torque sensor section circuit • Faulty torque sensor coil
C2512	Torque Sensor Failure 2 (Sub)	
C2513	Torque Sensor Failure 3 (Much Tolerance)	
C2514	Torque Sensor Power Supply Failure	
C2521	Motor Failure 1 (Motor)	• Poor connector contact • Forgot to connect connector • Harness open/short circuit • Motor open circuit • Power transistor shorted/open • Terminal power supply or ground short
C2522	Motor Malfunction 2 (Resolver)	
C2531	ECU Failure 1 (CPU Failure)	Faulty main unit of power steering control module
C2532	ECU Failure 2 (Peripheral Circuit Failure)	Faulty main unit of power steering control module
C2533	ECM Failure 3 (Board Temperature Sensor Failure)	Faulty main unit of power steering control module

Conventional CAN Diagnostics

DTC	Item	Content of diagnosis
C2541	Vehicle Speed Failure(Sensor Failure)	• Poor connector contact • Forgot to connect connector • Harness open/short circuit • VDC system failure
C2543	Error Passive Status	Defective CAN communication
C2545	EyeSight System Abnormal	EyeSight system failure
C2546	EyeSight Value Abnormal	EyeSight system failure
C2547	EyeSight Check Sum Abnormal	• EyeSight system failure • Defective CAN communication
C2548	Vehicle Dynamics Control Module Abnormal	VDC system failure
C2551	Power Supply Relay Failure	• Power supply voltage malfunction • Faulty relay contact
U0073	Control Module Communication Bus Off	Defective CAN communication
U0100	Lost Communication With ECM/PCM “A”	Defective CAN communication
U0122	Lost Communication With Vehicle Dynamics Control Module	Defective CAN communication
U0126	Lost Communication With Steering Angle Sensor Module	Defective CAN communication
U0155	Lost Communication With Instrument Panel Cluster (IPC) Control Module	Defective CAN communication
U0401	Invalid Data Received From ECM/PCM “A”	Defective CAN communication
U0416	Invalid Data Received From Vehicle Dynamics Control Module	Defective CAN communication
U1235	Lost Communication With EyeSight	Defective CAN communication
U1433	Invalid Data Received From EyeSight	Defective CAN communication

NOTES:

Powertrain

FB 2.5

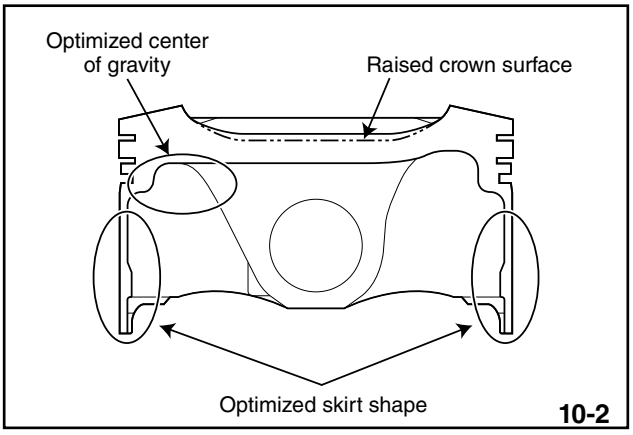
The 175-horsepower/ 174 lb-ft torque 4-cylinder FB 2.5 engine for the 2015 Legacy and Outback emphasizes manageability in practical use with enhanced medium and low-speed torque. The engine has been refined focusing on the air intake and exhaust systems. Engine quality has been enhanced with measures against noise and vibration, weight reduction, and simplification. The basic casting thickness of the cylinder block was decreased from 3.5 mm to 3.2 mm to reduce weight while maintaining rigidity.

FB 2.5 Engine

Piston

The crown surface of the piston has been raised increasing compression from 10.0 to 10.3. The center of gravity and skirt shape have been changed to reduce vibration. Sliding friction has been reduced by the application of a new coating on the piston skirts. A new PVD (physical vapor deposition) coating process is used for top compression and oil control rings to aid in abrasion resistance. Piston ring tension has been decreased to reduce friction and improve fuel economy.

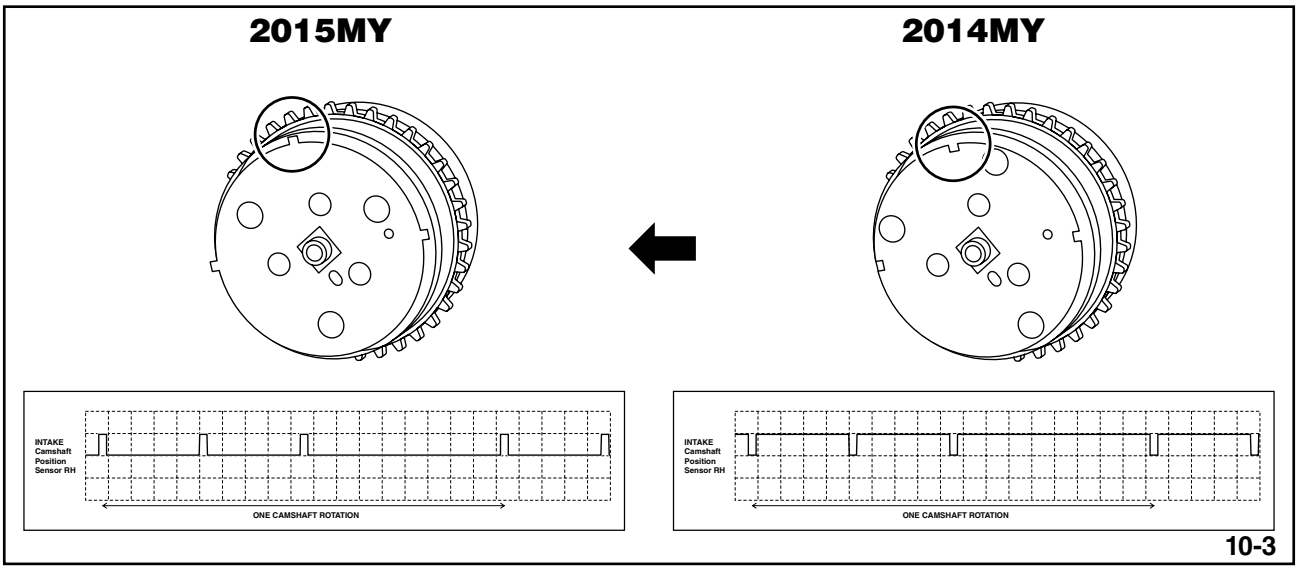
Note: Engine oil and filter replacement for all 2015MY vehicles has been reduced to 6000 miles. The excessive oil consumption rate in the Owner's Manual remains at 1 quart every 1,200 miles. Always consult the latest Oil Consumption Test procedures listed on Subarunet for updated information.



Redesigned FB 2.5 Piston

Intake Cam Sprockets

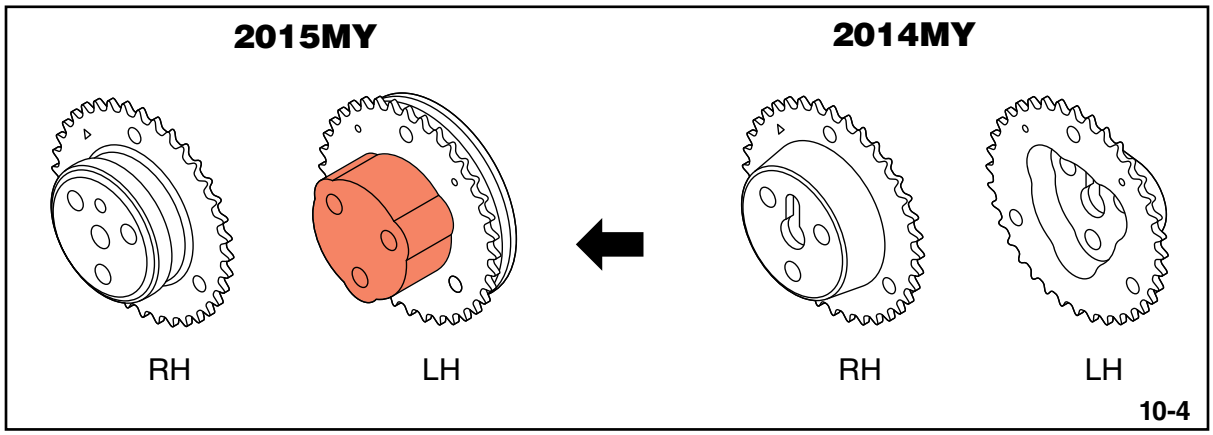
The sensing surface for the intake cam position sensors has been changed to an inverted tooth design. This is a similar design to the 2015 WRX FA 2.0.



Intake Cam Sprockets

Exhaust Cam Sprockets

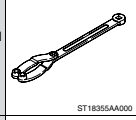
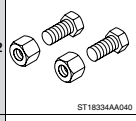
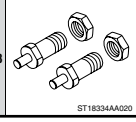
Mass has been added to the LH Exhaust cam sprocket to reduce noise from the timing chain. The RH Exhaust cam sprocket material was changed from stamped to sintered steel.



Exhaust Cam Sprockets

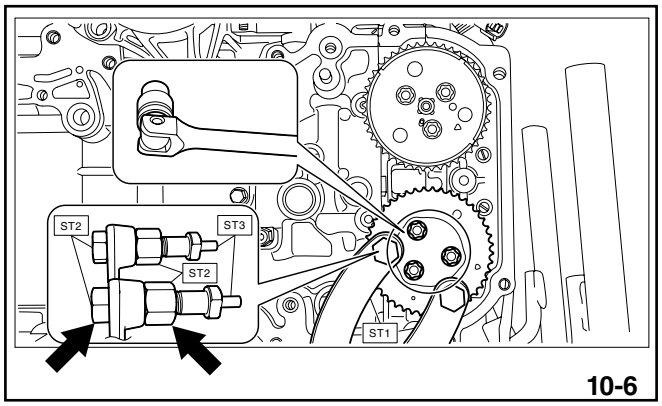
Exhaust Cam Sprocket SST

New Special Tool 18334AA040 has been added to aid in the removal of the redesigned exhaust cam sprockets. The new SST functions to extend the reach of existing SST 18334AA020.

	ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
ST 1	 ST18355AA000	18355AA000	PULLEY WRENCH	• Used for removing and installing the crank pulley. • Used for removing and installing cam sprocket. • Used for rotating the intake cam sprocket LH. • Used together with PULLEY WRENCH PIN SET (18334AA000) or PULLEY WRENCH PIN SET (18334AA020). • Used with the PULLEY WRENCH PIN SET (18334AA040) when removing and installing the exhaust cam sprocket.
ST 2	 ST18334AA040	18334AA040 (Newly adopted tool)	PULLEY WRENCH PIN SET	• Used for removing and installing exhaust cam sprocket. • Used together with PULLEY WRENCH (18355AA000) and PULLEY WRENCH PIN SET (18334AA020).
ST 3	 ST18334AA020	18334AA020	PULLEY WRENCH PIN SET	• Used for removing and installing cam sprocket. • Used for rotating the intake cam sprocket LH. • Used together with PULLEY WRENCH (18355AA000). • Used with the PULLEY WRENCH PIN SET (18334AA040) when removing and installing the exhaust cam sprocket.

10-5

Cam Sprocket Tools

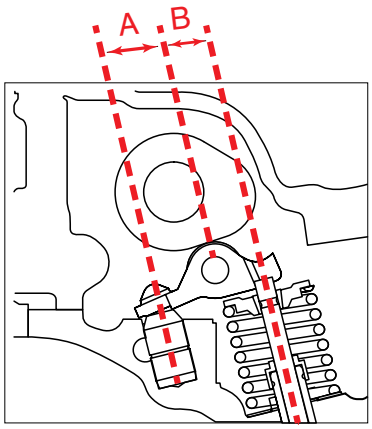


10-6

Exhaust Cam Sprocket Removal

Valve Adjustment

The valves, valve springs, rocker arms, and rocker arm pivots have been refined to reduce mechanical noise. The valve adjustment formulas have also changed.



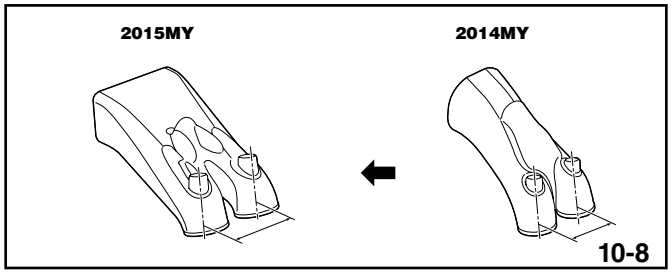
2014 DIT FA 2.0 liter formula Intake side: S = T + **1.54** x (V - 0.13 mm (0.00051 in)) Exhaust side: S= T +**1.69** x (V - 0.22 mm (0.0087 in))	**S:** Valve shim thickness required **V:** Measured cam clearance **T:** Current valve shim thickness
2015 DIT / FB 2.5 liter formula Intake side: S = T + **1.69** x (V - 0.13 mm (0.00051 in)) Exhaust side: S = T +**1.87** x (V - 0.22 mm (0.0087 in))	

10-7

Valve Adjustment

Cylinder Head

The intake ports of the cylinder head has a new shape that produces increased air flow and tumble to improve fuel economy and performance.



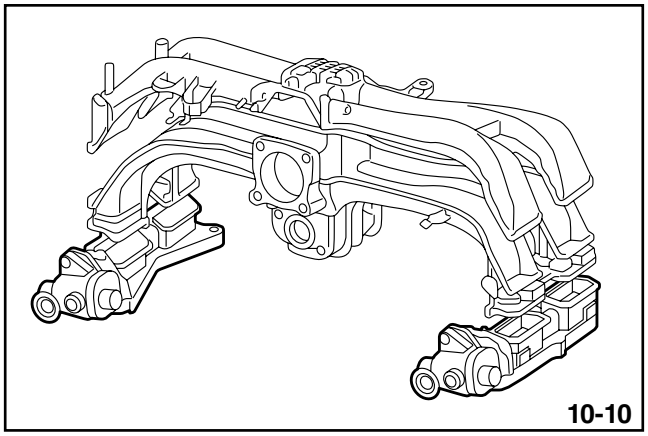
10-8

Cylinder Head Ports

Intake Manifold & Tumble Generating Valves (TGV)

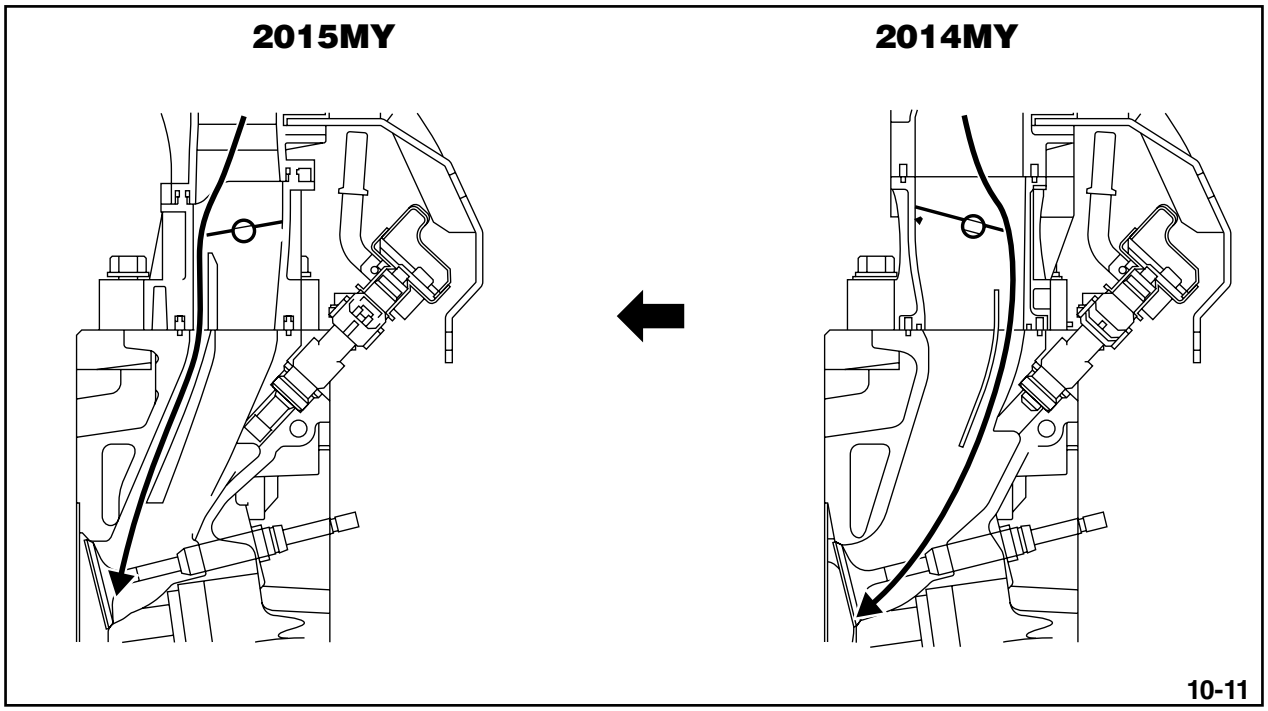
The construction of the TGVs has been changed from aluminum to resin. The TGVs are now integrated to the upper intake manifold.

TGVs



Intake Manifold Exploded View

The TGV port tract has also been changed to promote increased tumble. When the valve Is closed on the new configuration, air is forced toward the center of the engine instead of the outside.

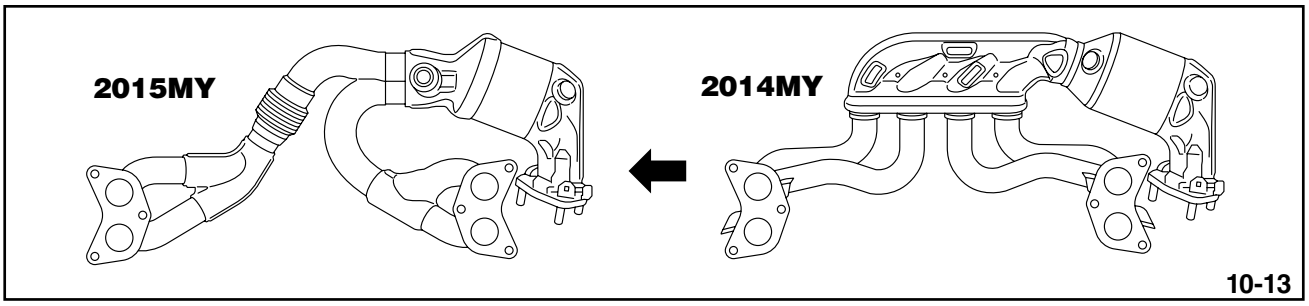


TGV Flow

Exhaust Manifold

The Exhaust Manifold has been redesigned with new routing and larger diameter piping to improve catalytic converter function while reducing overall weight.

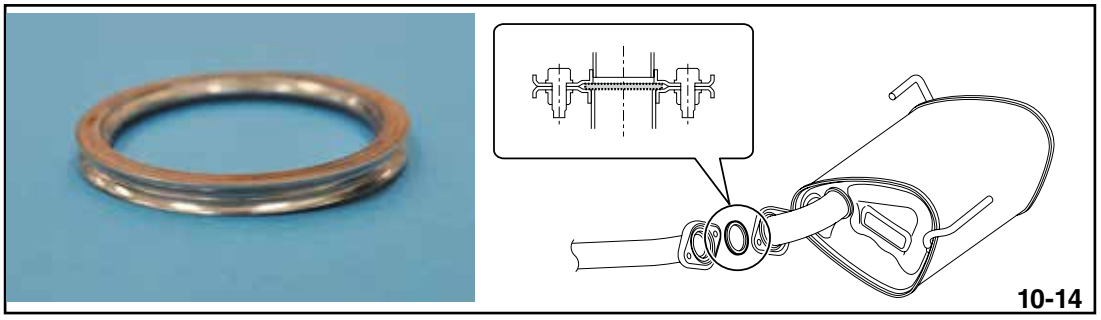
FB 2.5 Exhaust Manifold



FB 2.5 Exhaust Manifold Change

Exhaust Gasket

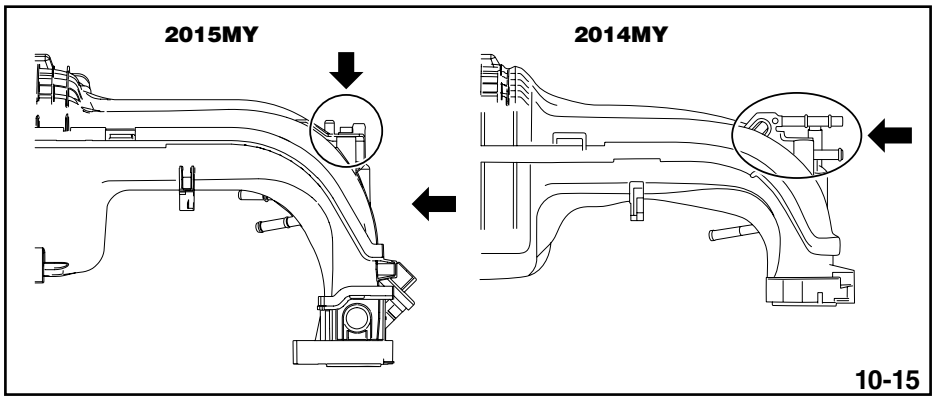
The gasket for the connection between the muffler and the rear exhaust pipe has been changed to a ring type.



Muffler Gasket

Fuel Pipe

To improve crash safety, the connection point of the fuel delivery line at the intake manifold has been changed. Additionally, a new quick disconnect that may be released with or without the use of a SST has been used.



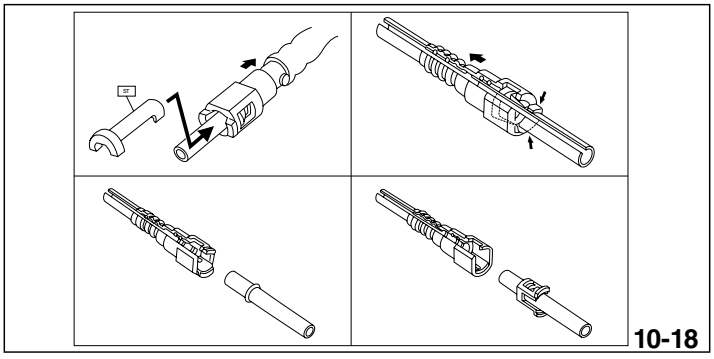
Fuel Line Relocation

Fuel Supply Line

Fuel Line Connection

Exercise caution in removing the quick disconnect with or without the ST. Please also remember not to kink the fuel delivery line as it may cause internal damage.

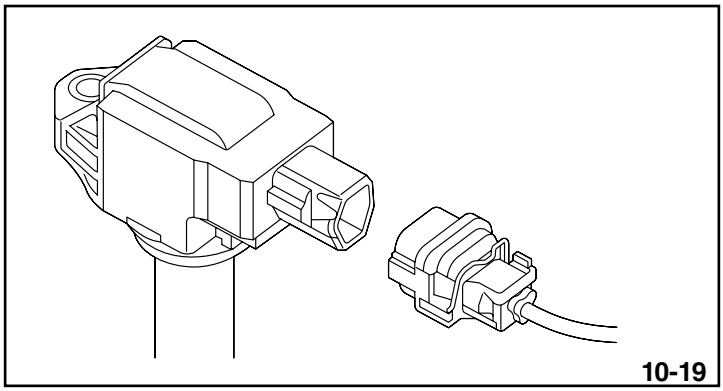
Note: Always properly relieve fuel pressure before attempting to remove fuel lines as they may be under pressure.



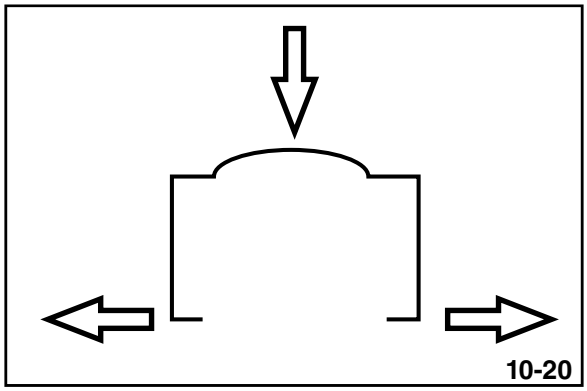
Quick Disconnect Removal

Ignition Coil

The ignition coil connectors have been changed to a spring lock type to improve reliability.



Ignition Coil Connector

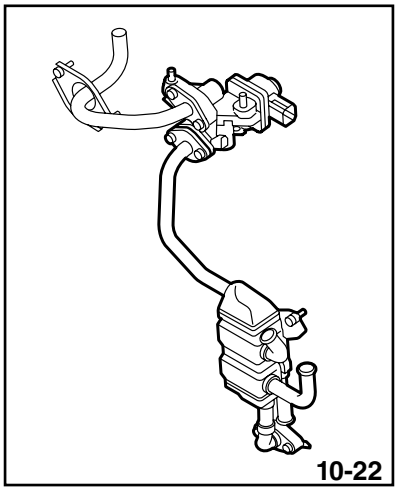


Ignition Coil Connector (Artwork)

Ignition Coil Connector

EGR Cooler

The EGR Cooler has been separated from the engine coolant crossover and replaced with an external high-efficiency unit. This results in higher rate of exhaust gas recirculation producing improved combustion efficiency and fuel efficiency.

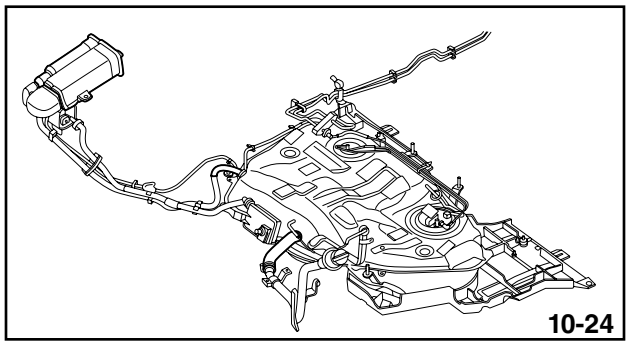


EGR

EGR Cooler

Evaporative Emissions

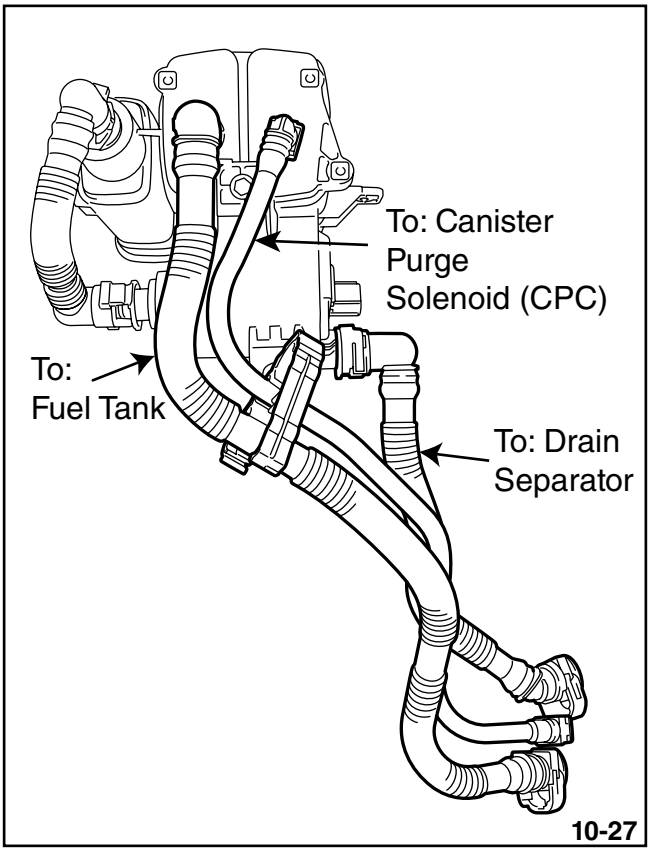
An Evaporative Leak Check Module is used for the 2015 Legacy and Outback. The internal structure of the canister has been improved to a honeycomb type, but functionality remains the same.



Evaporative Emissions System

Canister And ELCM

Hose Routing

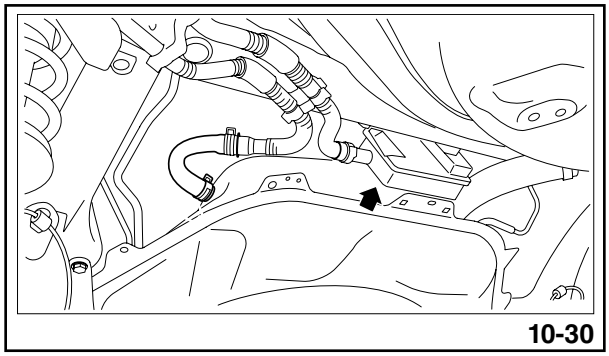


Connection Points

Hose Routing

The shape and location of the drain separator has changed. It must be unbolted from the body before the vent can be inspected or accessed for evaporative system diagnostics.

Drain Separator Removed

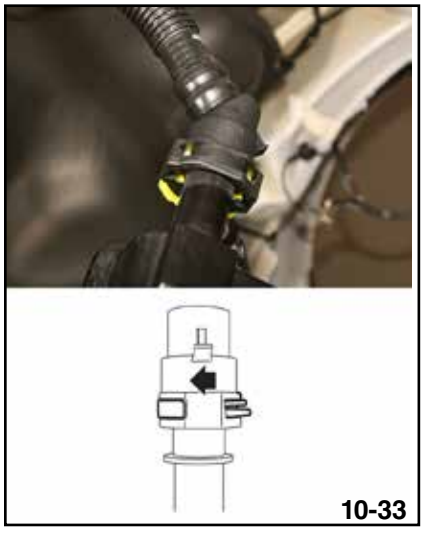


Drain Separator Location

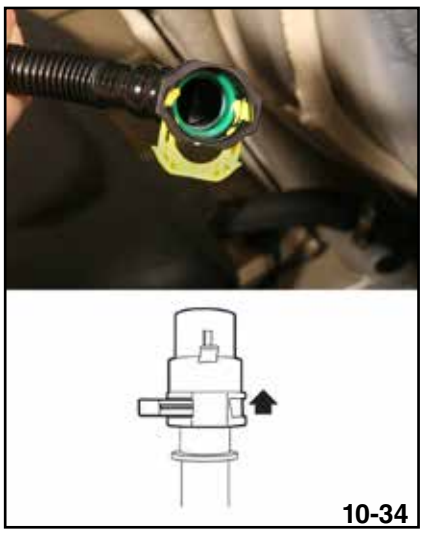
A new connector is used for the drain separator hose. Use caution when releasing the tab.

Drain Separator Connector

Connection Tabs Depressed



Connector Lock Removed



Connector Disconnected

The vent line from the filler neck passes through the body, into the rear cargo area, through the floor, and finally into the fuel tank.

Filler Neck Vent Line

Vent Line Interior Cover Panel

Vent Line Pass Through

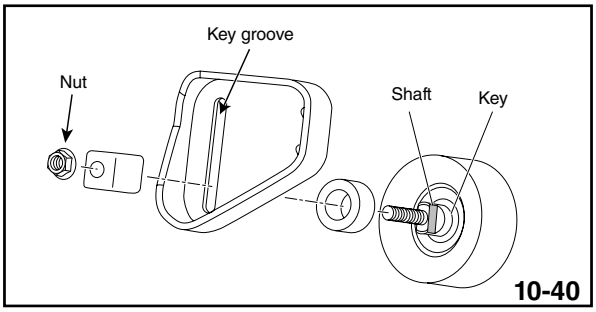
EZ 3.6 Changes

The EZ 3.6 engine for the 2015 Legacy and Outback is based on same proven platform used in previous model years producing 256 horsepower and 247 lb-ft peak torque. The EZ 3.6 has been adapted to function with the Generation 1 High-torque CVT (TR69) while maintaining the same environmental performance and fuel consumption of the original EZ 3.6 engine. Internally, the connecting rods have been manufactured with new materials and greater precision and a lower opening temperature (from 82C to 78C) thermostat has been installed.

EZ 3.6

The V-belt for the EZ 3.6 has been redesigned due to the elimination of the conventional power steering system. A new manual tensioner is now used.

EZ 3.6 V-belt



Belt Tensioner

Inspection of the V-belt can be performed using a Sonic Belt Tension (Acoustic Belt Tension)

Sonic Belt Tension Gauge

Place the microphone of the Sonic Belt Tension gauge within close proximity of the V-belt and firmly pluck the V-belt in the center of the top length.

Belt Tension Gauge Positioned

V-belt Plucked

Repeat three times to obtain an average and compare to Subaru service manual specifications.

1st Sample

2nd Sample

3rd Sample

EXAMPLE: V-belt tension (with Sonic belt tension gauge):

When installing new parts
1080 — 1230 N (110 — 125 kgf, 243 — 277 lbf)
337 — 360 Hz (frequency)
At inspection
570 — 720 N (58 — 73 kgf, 128 — 162 lbf)
245 — 275 Hz (frequency)

NOTE: Always refer to the correct Subaru Service Manual on STIS.

Service & Diagnostics

For FB 2.5 and EZ 3.6 models the Engine Control Module is located in the engine compartment along the passenger side inner body panel.

ECM Location

The small black rubber button, indicated by the arrow, allows the ECM to sample atmospheric pressure. Never Press this button as this may damage the waterproofing characteristics of the vent.

ECM Atmospheric Vent

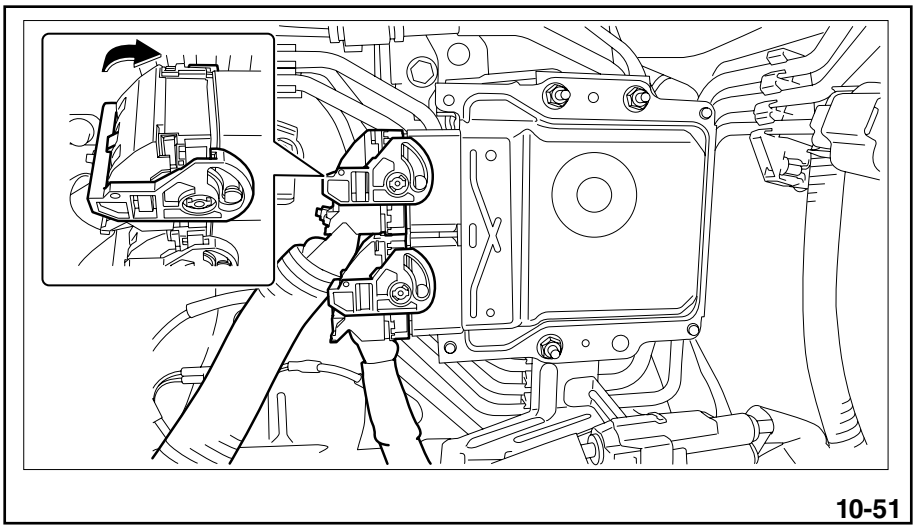
SST Check Boards

Engine diagnostics are now performed using new SSTs 18460AA050-A and 18460AA050-B.

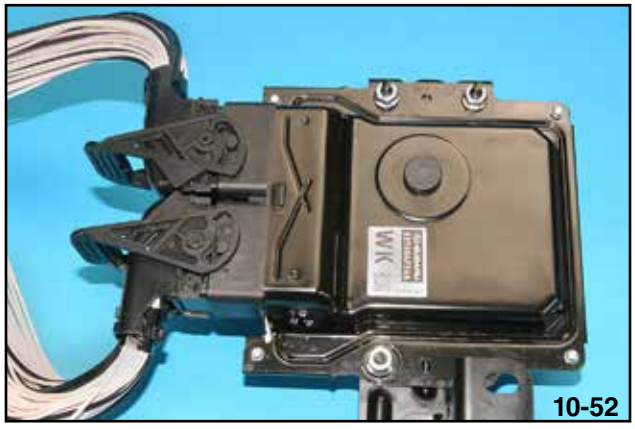
Check Board Harness

SST Identification

Ensure the hinge locks are fully seated before beginning diagnostics.



Check Board Harness Installation



Check Board Harness Unlocked

Check Board Harness Locked

Engine Support Bridge

Engine Support Bridge

A new configuration of the existing SST J-50135 (Engine Support Bridge) has been adapted for the 2015 Legacy and Outback.

Engine Support Bridge

Remove the air inlet, ducting, and alternator cover.

Engine Covers Installed

Engine Covers Removed

Prepare the mount adapters on the exposed threads of the upper strut mount.

Upper Strut Mount Exposed Threads

Mount Adapters Installed

Remove the center rubber strut caps and prepare the lateral bar supports as shown.

Rubber Strut Cap Installed

Rubber Strut Cap Removed

Lateral Bar Supports Installed

Install the Lateral Bar

Lateral Bar Installed

Prepare new SSTs J-51658 (Engine Bridge Adapter Kit) and place through the provided openings in the upper radiator garnish. Install the Stanchions with the rubber side facing up.

Prototype SSTs J-51658

Note: Prototypes shown. Actual Tools may vary.

Radiator Garnish Opening

Adaptor Installed

Stanchion Installed

Note: SSTs J-50135-5 (Long Stanchions) are used for this procedure. These SSTs are currently used as part of the BRZ Engine Support Bridge.

Install the longitudinal bars and posts.

RH Longitudinal Bar Installed

LH Longitudinal Bar Installed

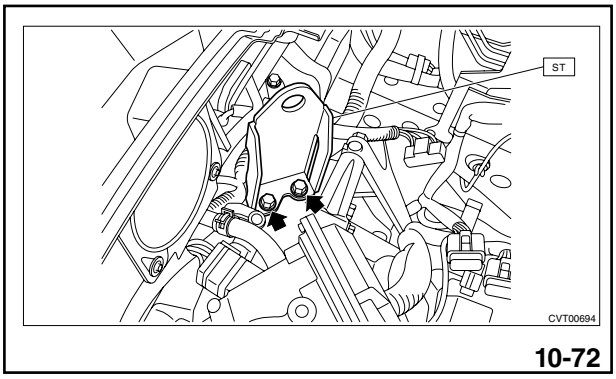
Install the lifting hooks over the longitudinal bars

Rear Lifting Hook Location

Rear Lifting Hook Installed

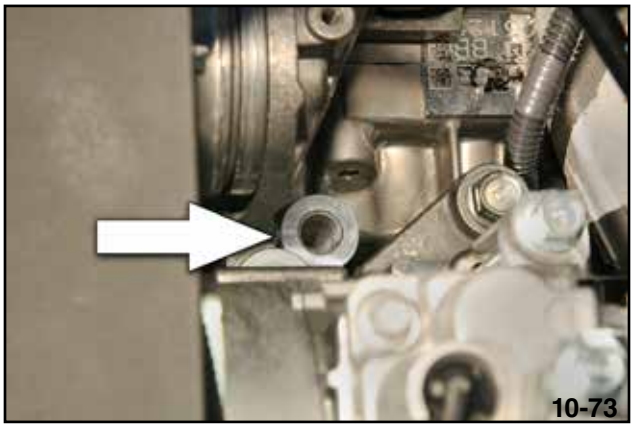
SST 18360AA020 (Hanger) must be used for EZ 3.6 Models as a hook point.

SST 18360AA020



H6 Model (ST): HANGER (18360AA020)

Install new SST 18360AA040 (hanger) to provide a front hook location during support or removal of H4 engines.

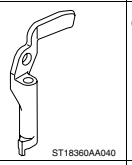
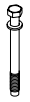


Front Hanger Location

Front Hanger Installed

Note: SST 18360AA040 (hanger) tool is not necessary for H6 Removal.

1. Using SST 18363AA050, bolt the hanger to the vacant threaded hole between the A/C Compressor and Alternator. A handle is also provided to assist in engine removal.

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18360AA040	18360AA040 (Newly adopted tool)	HANGER	Used for removing and installing the water pipe assembly LH.
 ST18363AA050	18363AA050 (Newly adopted tool)	BOLT	Used for removing and installing the water pipe assembly LH.

10-75

Special Tool Description

SST 18363AA050 & SST 18363AA040

Front Lifting Hook Installed

Install the SST J-50137 (Engine Safety Sling and Shackle) under the engine.

Safety Strap Installed

LH Frame Rail

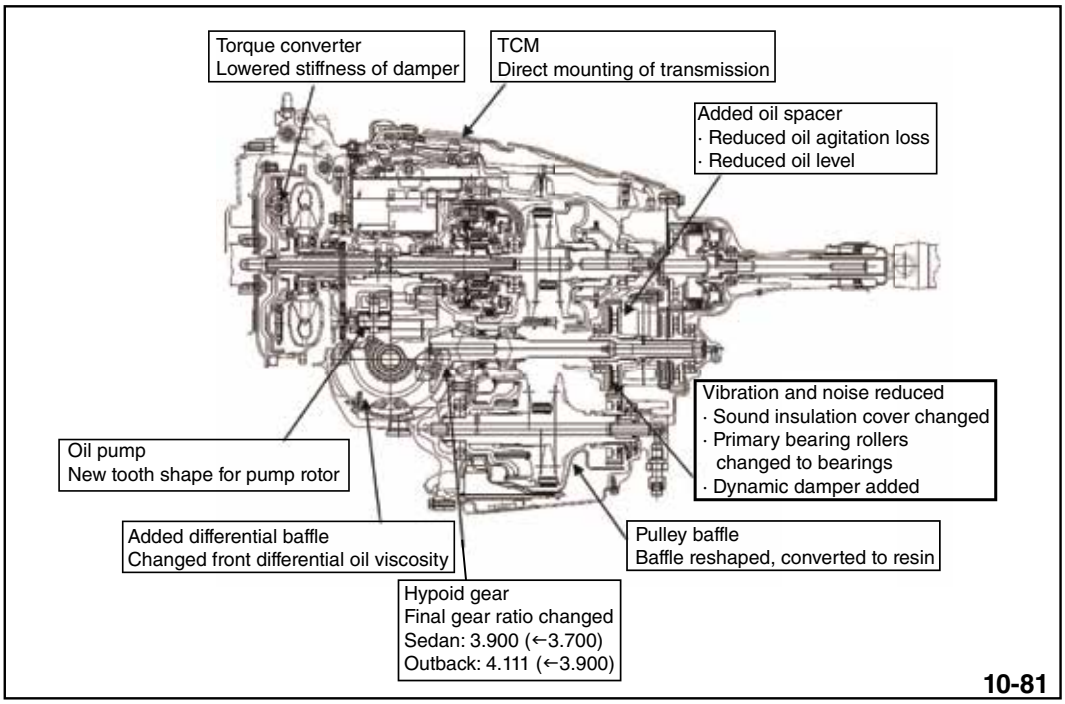
RH Frame Rail

NOTES:

Lineartronic Continuously Variable Transmission Generation 2 (CVT G2/TR58)

Introduction

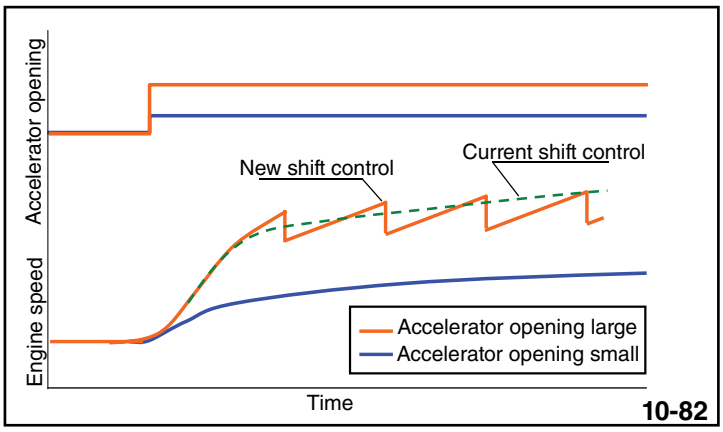
The CVT G2 is equipped for 2015 Legacy and Outback FB 2.5L models. Compared with current CVT G2 models this unit receives several refinements to improve fuel economy while reducing noise, vibration, and harshness.



CVT Gen 2 (TR58) Enhancements

Shifting Control

New shifting control has been employed to provide smoother acceleration reduce CVT tendencies such as engine speeds that raise faster than accelerator input.



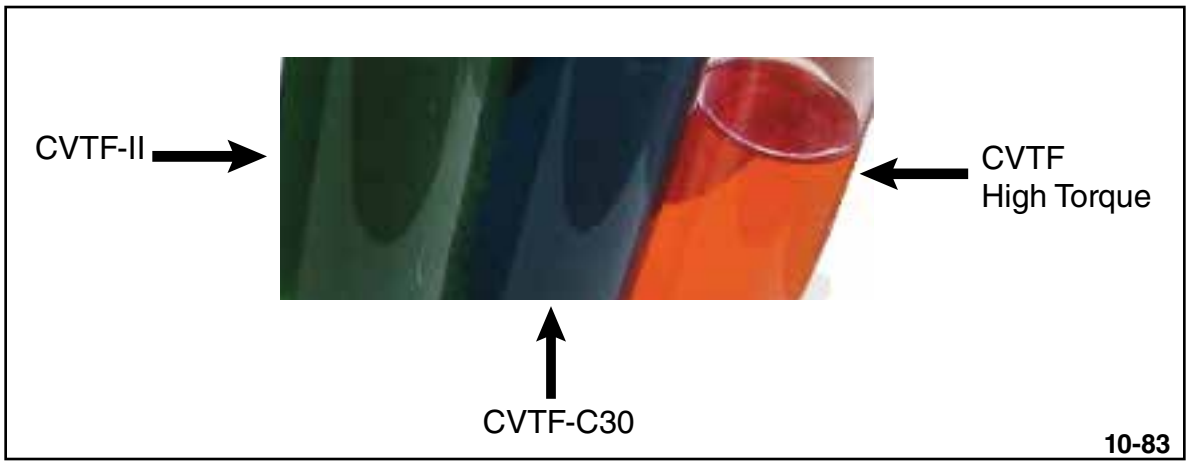
Shifting Control Comparison

CVT Fluid

A new CVT fluid (CVTF-II) has been introduced for the CVT G2 that is dark green in color. This fluid has a lower viscosity than the conventional blue CVT fluid (CVTF-C30).

CVTF-II is initially filled in and required during service for all 2015MY CVT G2 vehicles. CVTF-II will gradually replace CVTF-C30 for all previous CVT G2 and non-High Torque CVT G1 models.

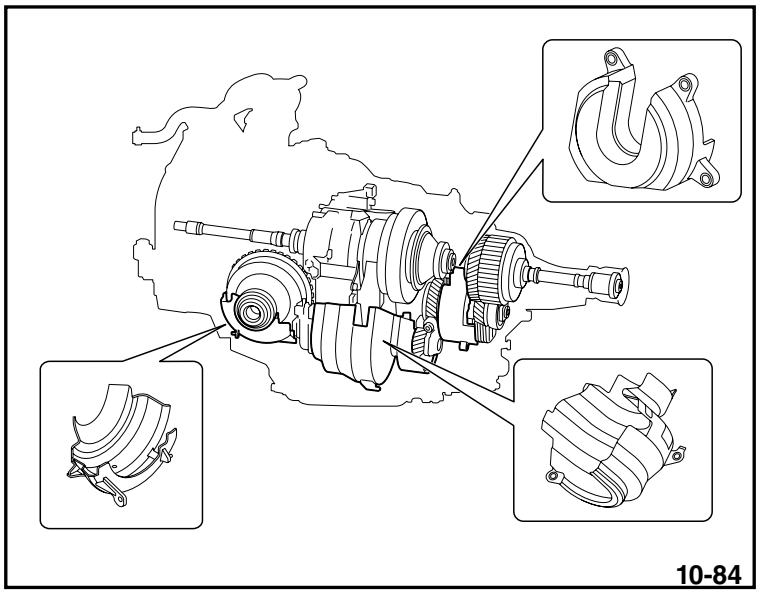
Note: The High Torque CVT G1 (TR69) still uses the orange colored CVTF-High Torque fluid. Do not mix this fluid with any of the other varieties.



CVT Fluids

Internal changes

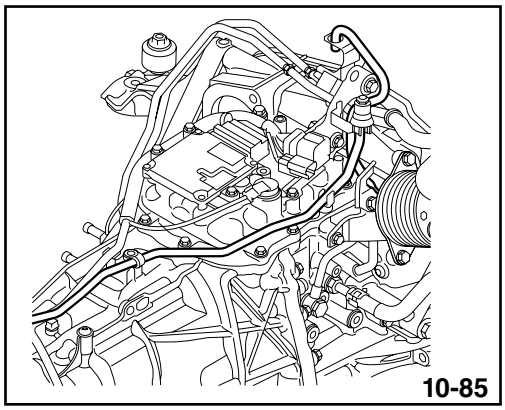
Baffles have been added internally to reduce oil agitation.



Oil Baffles

CVT Vent

A new plastic cap has been added to the CVT vent line to reduce debris from entering the CVT main case.

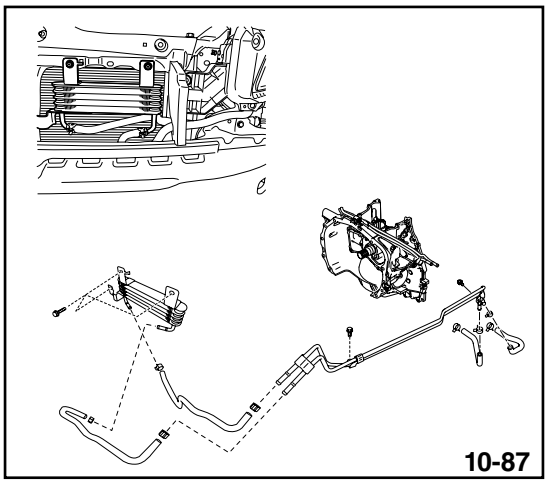


CVT Vent Line

Vent Cap

CVT Cooler

Outback models only are equipped with a CVT Fluid Air Cooler located in front of the condenser.

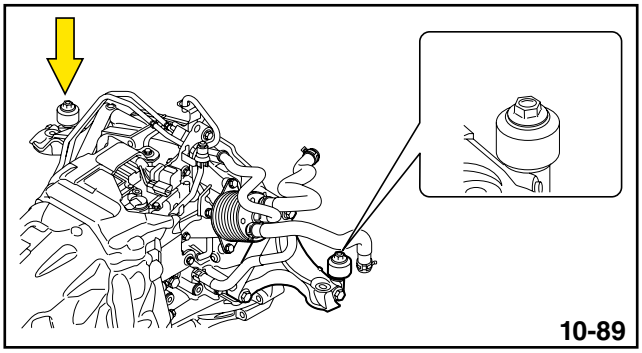


CVT Fluid Cooler Lines

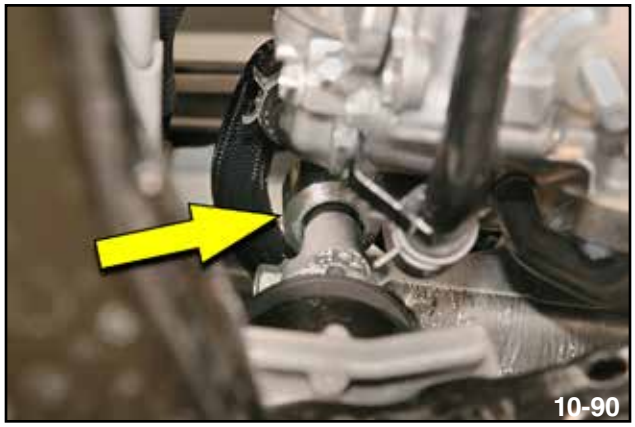
CVT Fluid Air Cooler

Dynamic Damper

A dynamic damper has been added to the transmission cradle mount bracket. This damper changes the transfer path of vibrations created by the Variator chain resulting in quieter overall operation.



CVT Dynamic Damper Locations



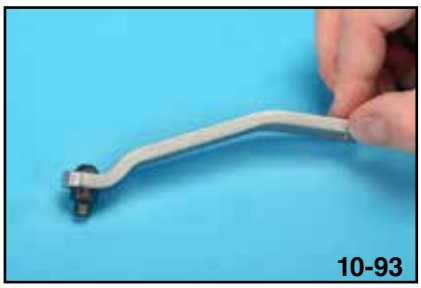
CVT Dynamic Damper

Transfer Clutch Pressure Test

SST 18270AA040 (Socket) has been made available to assist in the installation and removal of the transfer clutch pressure port plug. This socket is used in conjunction with existing SST 73099SG000 (wrench) to properly torque the plug when reinstalled.

SST 18270AA040 Socket

SST 73099SG000 Wrench



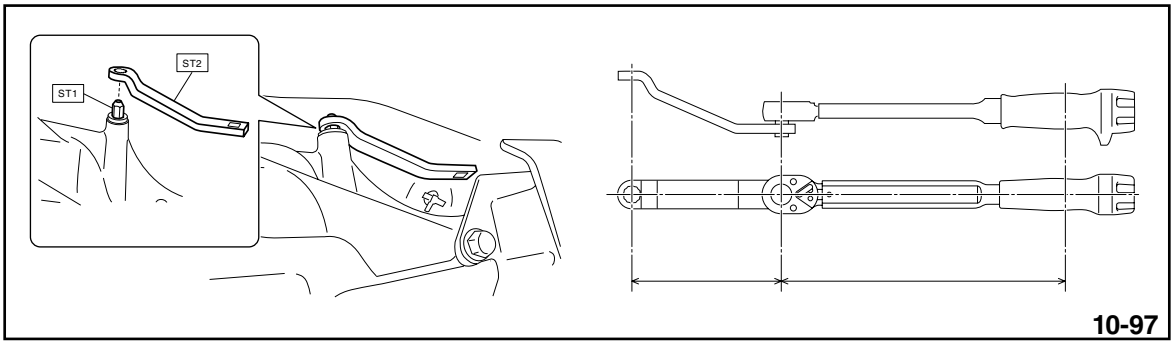
Wrench and Socket

Pressure Port Plug

SST Socket Inserted

SST Wrench Fitted

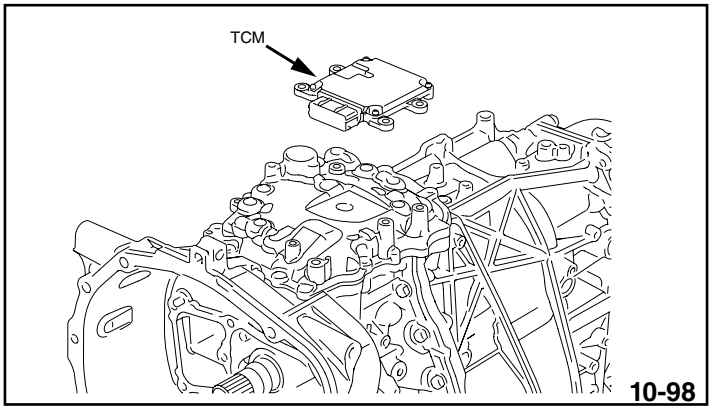
Note: Tightening torque of the pressure port plug must be recalculated due to the added length from SST 73099SG000. Always consult the Subaru Service Manual for the correct procedure.



Pressure Port Plug Installation

Transmission Control Module (TCM)

The location of the Transmission Control Module (TCM) has been moved to the top of the valve body cover. The TCM is now equipped with a waterproof lever lock type connector (same as 15MY WRX).



TCM Location

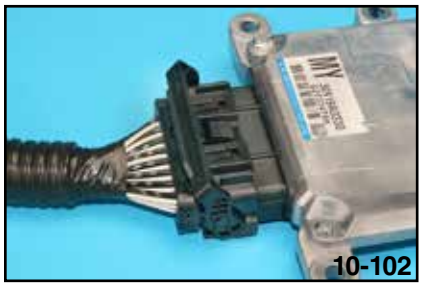
TCM Harness

TCM Connector

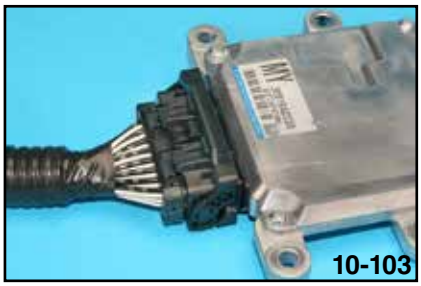
SST 18460AA040 (Check Board Harness) is necessary for all electrically related TCM diagnostics.

Note: Same SST as 15MY WRX

SST 18460AA040 (Check Board Harness)



Lock Lever Disengaged



Lock Lever Engaged

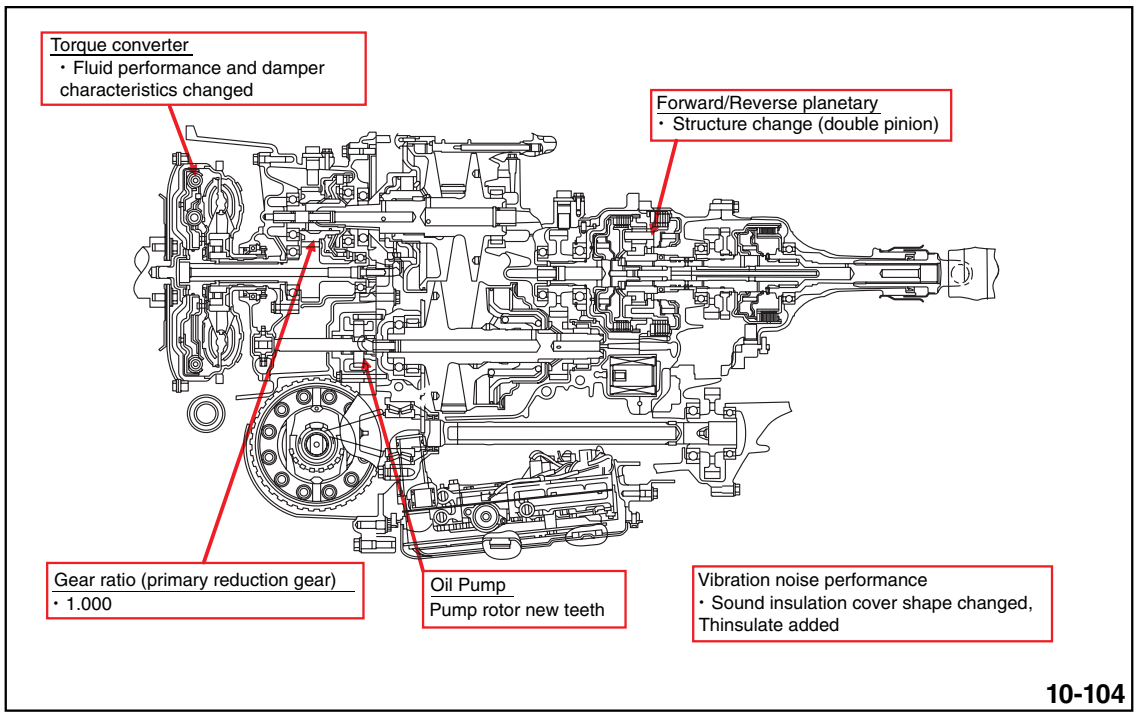
Note: Ensure lock lever is fully engaged before diagnosis.

Lineartronic Continuously Variable Transmission High-torque Generation 1 (CVT G1/TR69)

Introduction

The High-torque CVT Generation 1 is equipped on all EZ 3.6 models for 2015 Legacy and Outback models.

Note: The High Torque CVT G1 (TR69) still uses the orange colored CVT-High Torque fluid. Do not mix this fluid with any other varieties.

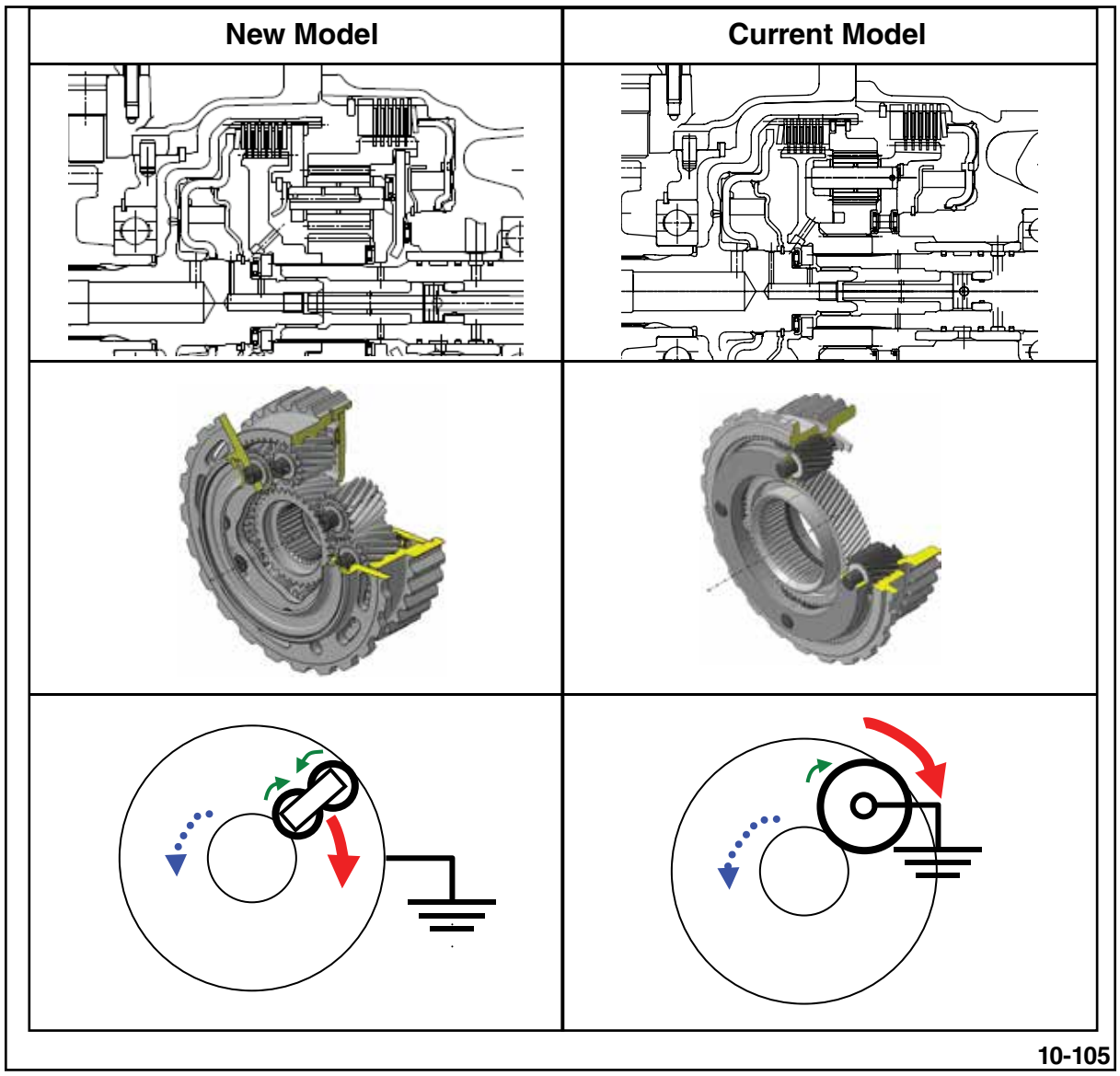


High Torque CVT G1 (TR69) Enhancements

Forward & Reverse Changeover mechanism

The F&R Changeover has been redesigned to improve vehicle performance in the Reverse range. Internally, the planetary gear set after the secondary pulley has been reconfigured with different input, output, and fixing members.

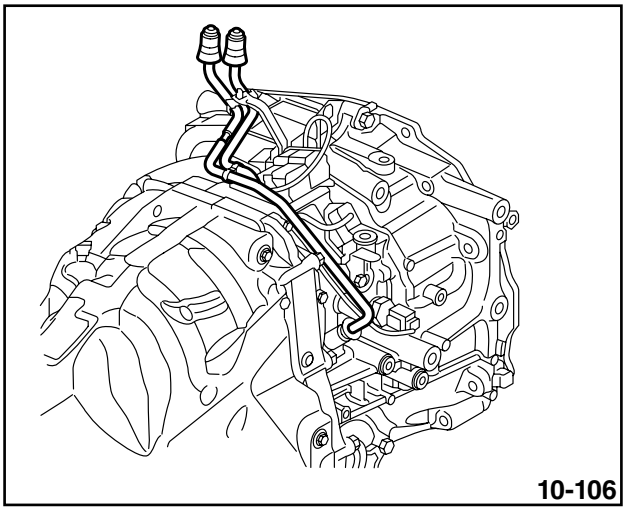
Reverse gear	2015 TR69	2014 TR69	Reference TR58
Input	Planetary carrier	Internal gear	Sun gear
Output	Sun gear	Sun gear	Planetary carrier
Fixing	Internal gear	Planetary carrier	Internal gear
Reverse gear ratio	0.972	0.669	1.024
Planetary carrier type	Double pinion	Single pinion	Double pinion



Forward and Reverse Changeover Comparison

Vent

Similar to the G2 CVT, the vent lines have been redesigned for the High-torque G1 CVT. In comparison, the High-torque G1 CVT uses 2 breather lines and caps.



CVT Vent Line

TCM

The TCM on High-torque CVT G1 models is located on the passenger side of the engine compartment. It uses the same SST Check Board Harness for electrical diagnostics.

TCM Location

Shifter

The shifter for the 2015 Legacy and Outback has been redesigned more compactly to accommodate increased driver convenience from the center console.

Shifter

Console Removed

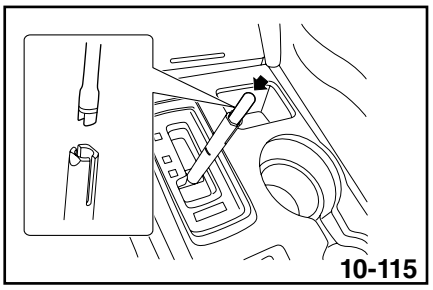
Trim Separation

Trim Separated

Remove Retaining Clip

Shifter Rod Removed

Shifter Rod Groove

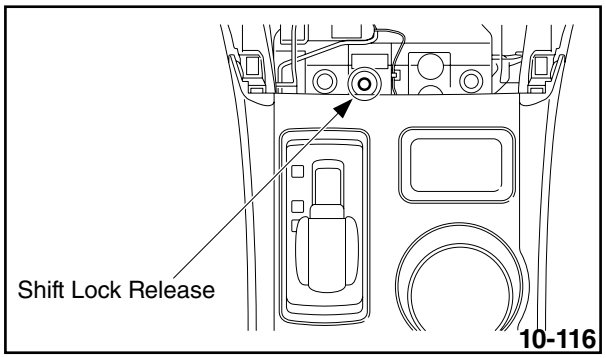


Groove Orientation

Note: Install the Shifter Rod as shown in the figure (groove left to right). Installing at a 90° angle may make it possible to shift into other gear ranges without holding down the shifter button.

Shift Lock Release

The position of the Shift Lock Release has been moved under the rubber garnish mat in front of the shifter assembly. The mat must be lifted in order to gain access to the release mechanism.



Shift Lock Release Location

Rubber Garnish Lifted

Insert Rod

Release Mechanism Depressed