



SUBARU[®]

Confidence in Motion

Technician Reference Booklet

ELECTRICAL SYSTEMS OPERATION & DIAGNOSIS

Module 602



MSA5P0135C

June 2013

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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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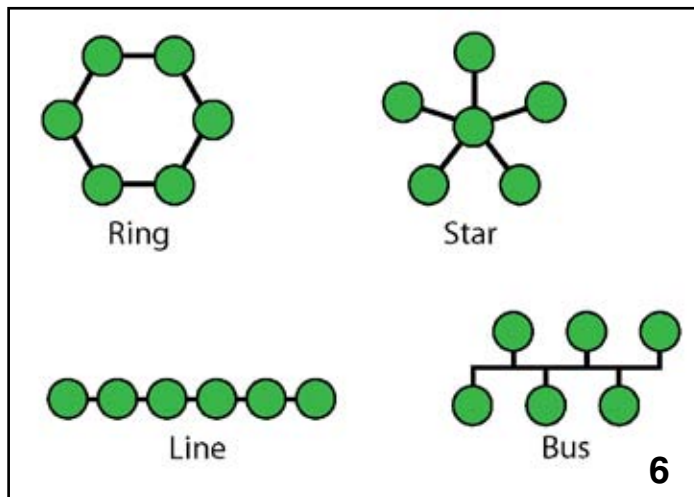
Introduction

This module will provide information and hands on experience that will provide you with an understanding of Subaru Electrical System Operation and Diagnosis.

Classroom and lab participation is encouraged so that you may gain the experience needed to repair Subaru electrical Systems on your first attempt correctly and in a timely manner.

LAN/CAN Introduction

LAN/CAN systems first appeared on the 2005 Legacy vehicles and were phased into new generations of all existing models. Any new model introduced from 2005 was equipped with LAN/CAN. The LAN (Local Area Network), a system where multiple computers are linked together with a single pair of twisted wires, improves equipment operation and functions while reducing the weight of the vehicle by eliminating a considerable amount of wiring harnesses. LAN (Bus) is a type of computer network topology or wiring that connects all computers of a system or device.



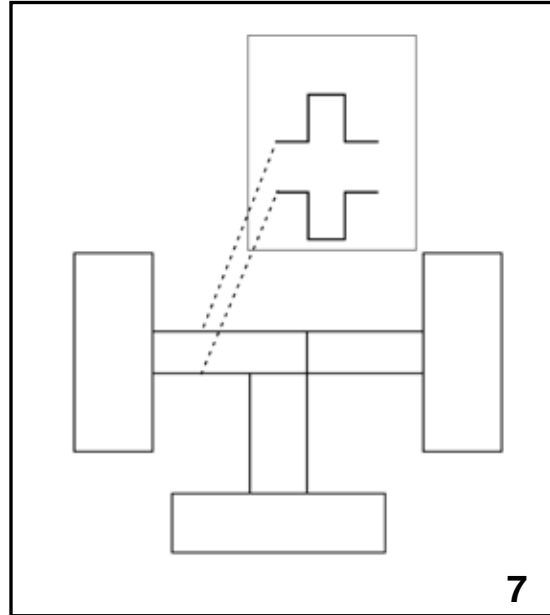
LAN Topologies

LAN BUS configuration allows communications between computers to continue if one of the other members of the LAN drops out or malfunctions.

The LAN operates using Controller Area Network (CAN) communications protocol. CAN communications are frames of vehicle data that deliver and share all vehicle information among the computers of the LAN. The frames of data are composed of binary code or 0s and 1s that are coded and decoded by the LAN. The voltage values that represent the 0s and 1s varies depending on the type of CAN. Two types of CAN will be reviewed in this section of the reference booklet, the High speed and Low speed CAN. The first LAN/CAN system equipped on Subaru vehicles was a combination of the High speed and Low speed CAN. As the years progressed a switch to High speed CAN only was employed.

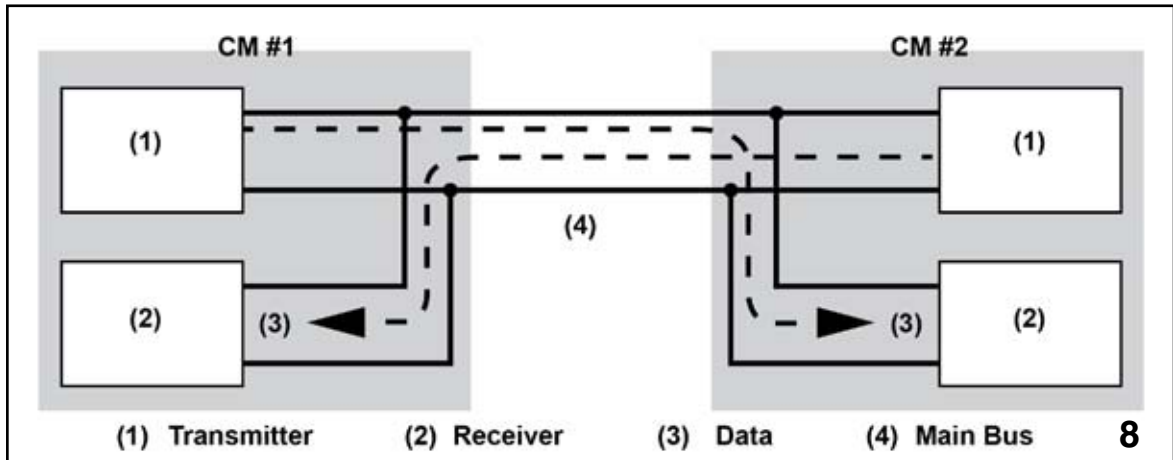
Electrical Systems Operation & Diagnosis Module (602)

A Controller Area Network (CAN) signal is composed of two separate pulses. One pulse is low voltage changing to high voltage and one pulse is high voltage changing to low voltage. Each pulse has its own wire. The two pulses are sent simultaneously from one control unit to all the other control units on the Local Area Network (LAN). A control unit receiving the two pulses compares the potential difference between them.



Potential Difference

Each control module has a transmitter and receiver, which enables bidirectional communication among the control modules.

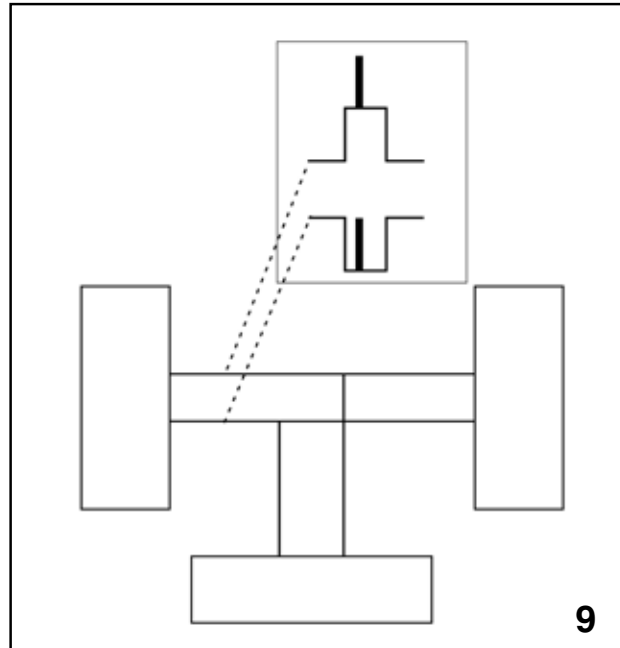


Bidirectional Communication

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The CAN wires are twisted together along the entire length of the LAN. This protects the integrity of the CAN signal if an unintentional signal is created in the circuit from an overlying circuit that induces a magnetic field into the CAN wires. This magnetic field will place noise or an unwanted voltage signal into the CAN signal.

The polarity of the unwanted signal will usually be constant. Superimposed over the CAN signal the noise will cancel itself out as the control units only view the potential difference between the two wires. The more twists per meter a wire has the more it reduces noise.



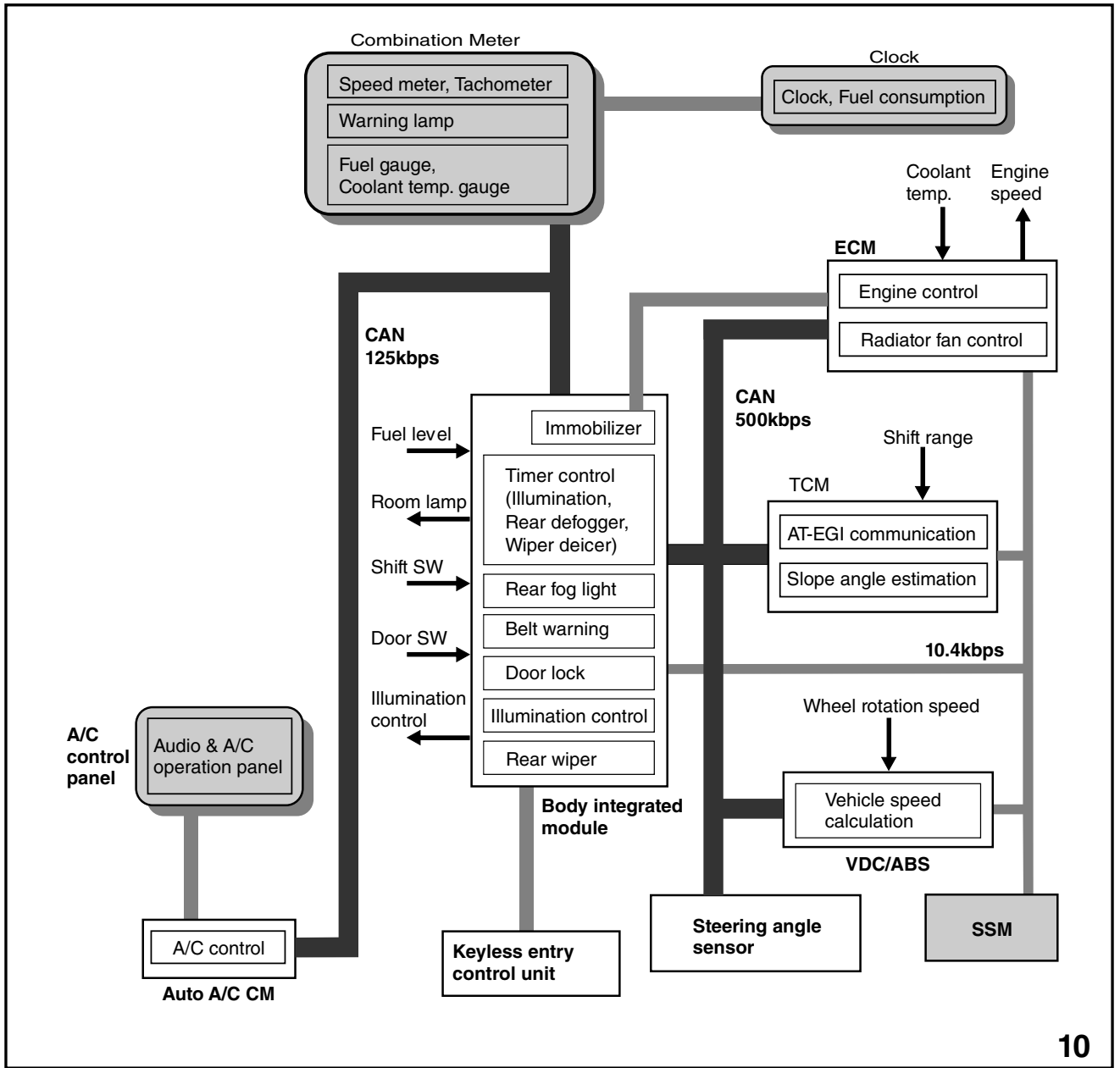
Noise (ARTWORK)

CAN communications are designed to operate at different speed levels dependant on the operating speeds of the components on different parts of the LAN. The power train side of the LAN operates at 500 Kbps (500,000 bytes per second). The body side of the LAN operates at a slower rate of 125 Kbps (125,000 bytes per second). The individual sides of the LAN are referred to as bus. Any references to the high speed bus are referencing to the power train side of the LAN and the low speed bus is referring to the body side of the LAN. Communications between the high speed and low speed bus sides of the LAN are not possible unless the data to be shared is adjusted to the same rate of speed. This adjusting process is referred to as passing through the gateway. The gateway function is accomplished by the Body Integrated Unit (BIU). Additional functions of the BIU control and monitor body related electrical circuits such as the rear defogger and door switches.

Components of the high speed bus include the Engine ECM, Transmission Control Module, ABS/VDC ECM and the Steering Angle Sensor (Vehicles with VDC). The number of control modules on the CAN continue to increase. The most recent additions are the Keyless Access and EyeSight™ Control Modules.

Components of the low speed bus include the Combination Meter and A/C Control Unit (Auto A/C).

The twisted wire connecting all components of the CAN to the BIU must maintain its twisted shape to help with keeping out electrical interference. Repairs to the wire are allowed but the length of the twisted wire cannot differ more than 3.94 inches (8 cm).



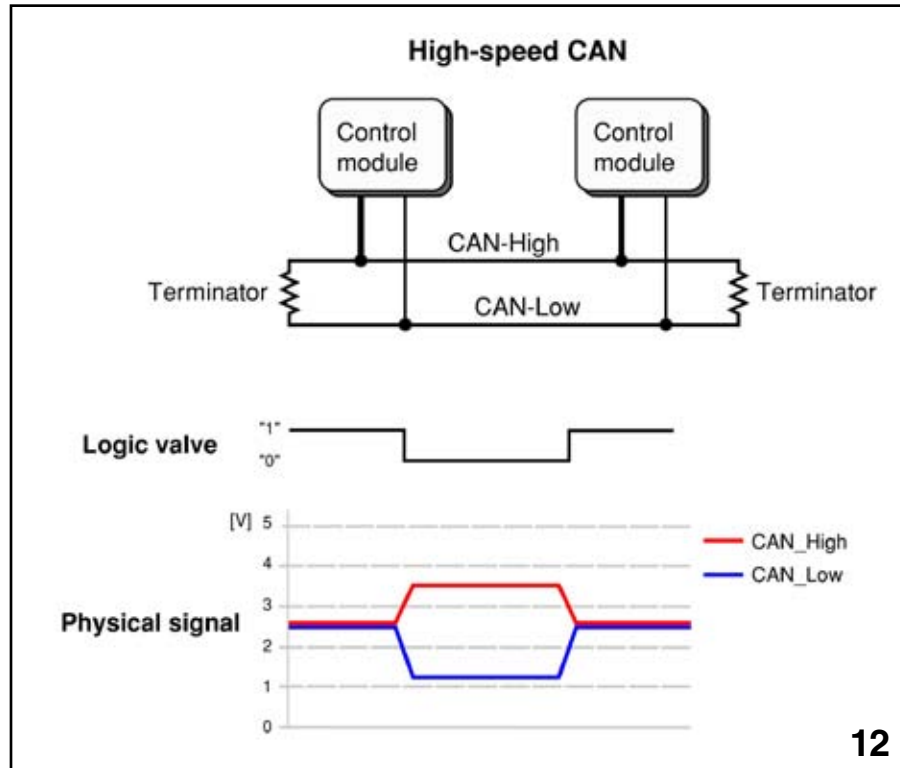
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LAN (ARTWORK)

NOTES:

High Speed CAN Signal Construction

When reviewing the service manual you will find references to High Speed CAN and Low Speed CAN. Each of these has a CAN-High wire and a CAN-Low wire. The differences in operating speed have already been discussed and now the construction of the two circuits needs to be understood before fully understanding operational differences.



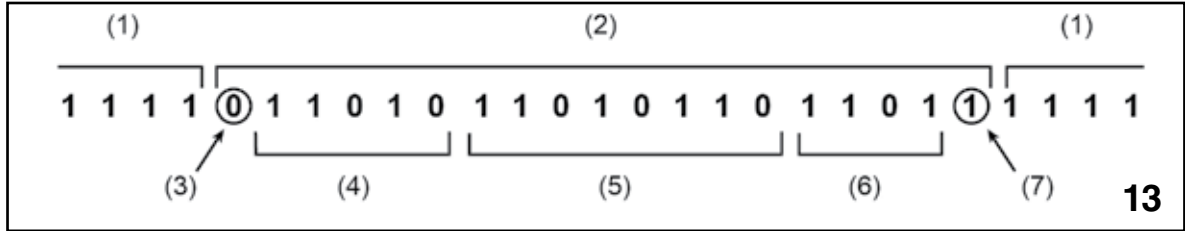
High Speed CAN (ARTWORK)

When the logic value of the High Speed CAN is 1 there is no potential difference between the voltage levels of CAN High and CAN Low. The level of both signals is 2.5 volts. When the logic value changes to a 0 the voltage level of both signals move away from each other. CAN High will be 3.5 volts and CAN Low will be 1.4 volts. This operation helps to ensure that there is no electrical interference and the signals received by the various components of the LAN are receiving genuine signals.

Outline of Data Frame

When data is generated, the signal “Frame” comprises of a “start bit” and a “stop bit” to indicate the beginning and end of a signal. The frame also includes identification data, main data, and an error detection code.

Example



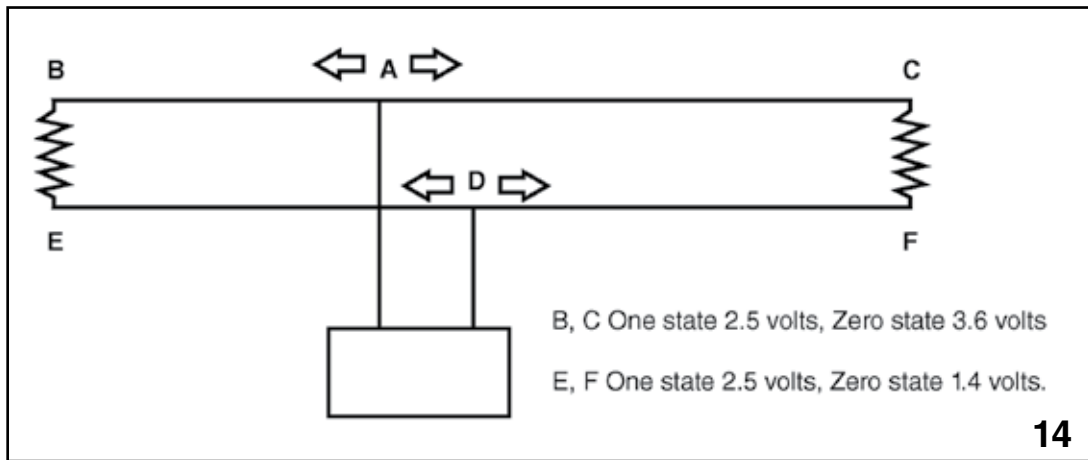
Outline of Data Frame Example

- (1) Bus idle: Idle state
- (2) Frame: Data transmission state
- (3) Start bit: Transmission starts
- (4) ID bit: It shows what kind of data, for example, TCM, ABS, or ECM.
- (5) Data bit: It shows what contents of the data, for example, RPM, shift Position, etc.
- (6) Error detection code: It is to avoid wrong recognition of data.
- (7) Stop bit: Data transmission stops

“Bus idle” refers to the area between data when no information is being transmitted. At this time, the data logic value is “1”. Therefore, when the High Speed CAN circuit is 2.5 volts, the system is at “Bus idle”.

When a CAN High or CAN Low wire of the High speed CAN carries a transmitted signal, the signal travels in both directions until the signal reaches the end of the respective wire. At this point the signal is absorbed by the terminator to the opposite CAN wire.

NOTES:



B, C CAN High Wire and E, F CAN Low Wire

For example the CAN High Wire (B, C) receives a voltage signal ranging from 2.5 volts to 3.6 volts. The signal originates at point A and travels to point B and point C simultaneously.

The potential difference between B, C and E, F during One state is 0 volts but during the Zero state, the potential difference is 2.2 volts.

During normal operation this potential difference will remain constant.

The voltage output of B, C during the Zero state is actually higher than 3.6 volts but the terminators allow paths to E, F and 3.6 is the remaining voltage.

The voltage output of EF during the Zero state is actually lower than 1.4 volts but the voltage from terminators and BC increase the minimum voltage reading to 1.4 volts.

Fail-safe and driveability conditions resulting from problems with the CAN change from year to year and model to model. These conditions could result in no engine start, limited Electronic Power Steering operation, non-operative shifter control and many more conditions that control or monitor normal vehicle operations.

Diagnostics for CAN issues vary as much as the fail-safe and driveability conditions. However; all High speed CAN circuits share the same circuit structure for the main CAN bus circuit. This commonality allows the following checks to be performed regardless of model or year of production:

CAN diagnostic checks

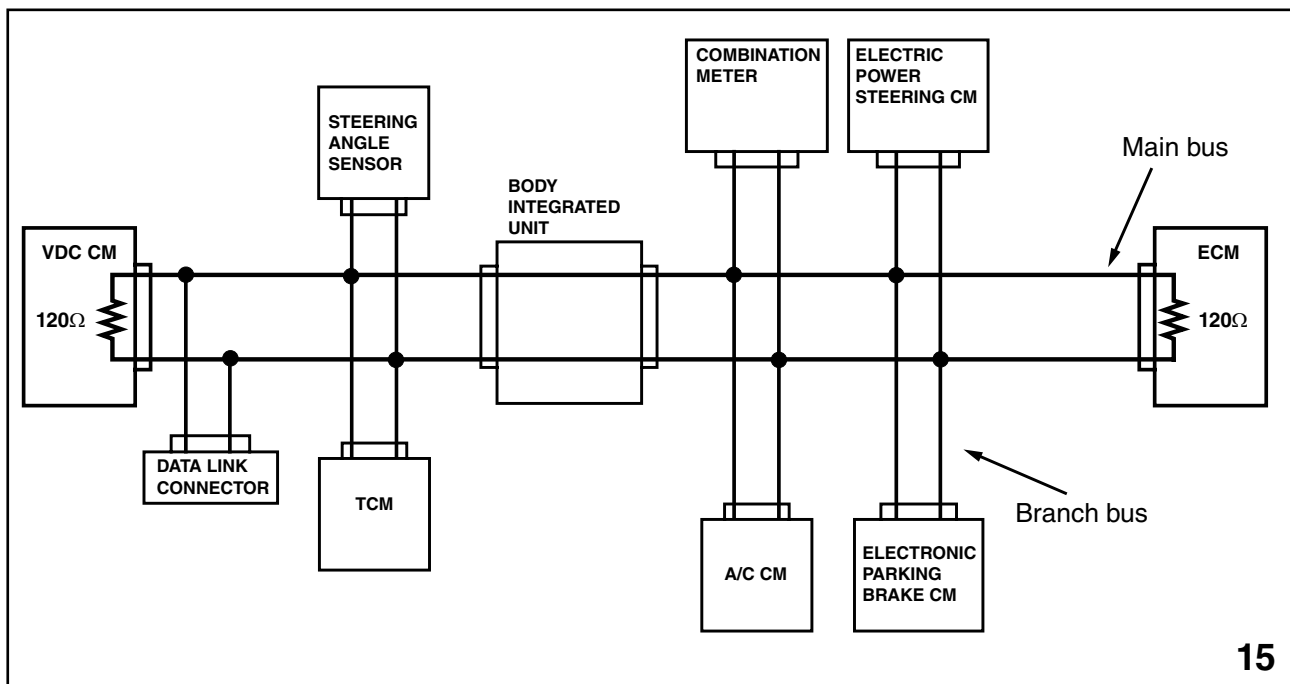
1. Resistance
 - A. Ohm meter
2. Voltage
 - A. Voltmeter
 - B. Oscilloscope
3. Communications
 - A. CAN diagnostic
 - B. K line

High Speed CAN Communication Circuit

The high speed CAN communication circuit is configured as shown in the illustration.

The communication line connecting the ECM and the VDC is called the main bus, and the communication lines connecting the main bus and the other control modules are called the branch buses. Main bus and branch buses are connected by joint connectors.

There is a 120 Ohm resistor in the ECM and VDC CM. They are connected to the circuit as terminator resistors.



High Speed CAN Resistance Check

The DLC is the most accessible connector to measure the resistance of the main bus. If the DLC is correctly connected to the main bus, the total circuit resistance of the main bus should be 60 ohms. Two 120 ohm resistors wired in parallel provide two paths for the CAN circuit. Since the resistors have the same value this simple formula determines the total circuit resistance:

$$RT = V/N \quad RT = 120/2 \quad RT = 60$$

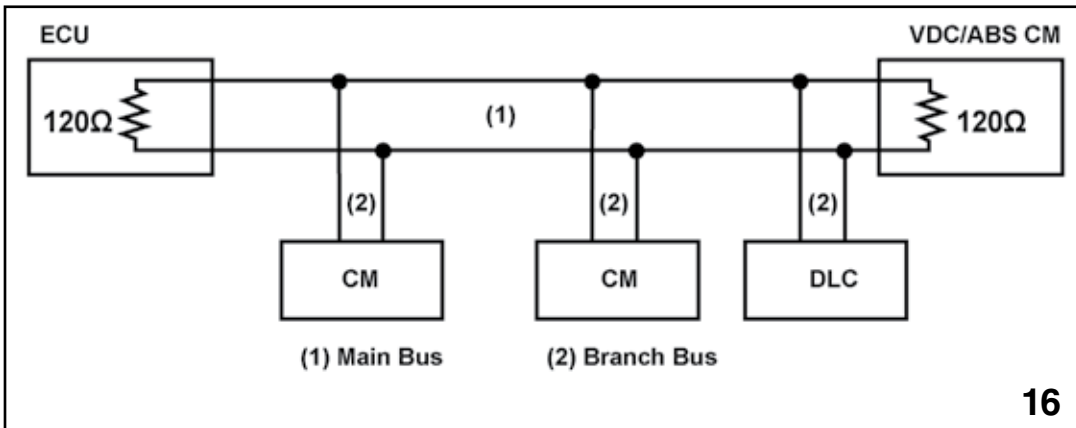
RT = Resistance total

V = Value of the resistor

N = Number of like resistors

An open, short, or additional resistance added from a malfunction in a control module will affect the total circuit resistance. This can be measured from the DLC provided no electrical power is flowing through the CAN.

Note: The total circuit resistance of a parallel circuit is always lower than the smallest value resistor in the circuit.



High Speed CAN Voltage Check

Voltage checks from the DLC are possible with the CAN active (Ignition on, Engine off). The normal voltage readings will vary by year, model, and the amount of data being carried on the CAN. The CAN high wire and the CAN low wire will always have a different value during normal circuit operation.

Can High Wire

Checked with an oscilloscope, the pattern of the signals will change from approximately 2.50 volts to 3.60 volts. If you check this value with a voltmeter, the voltage reading will average out to approximately 2.60 volts.

Can Low Wire

Checked with an oscilloscope, the pattern of the signals change from approximately 2.5 volts to 1.4 volts. If you check this value with a voltmeter, the voltage reading will average out to approximately 2.40 volts.

Note: Any change to the total circuit resistance of the CAN will result in changes to the volt meter readings for the CAN high and CAN low wire at the same time. One cannot change without affecting the other.

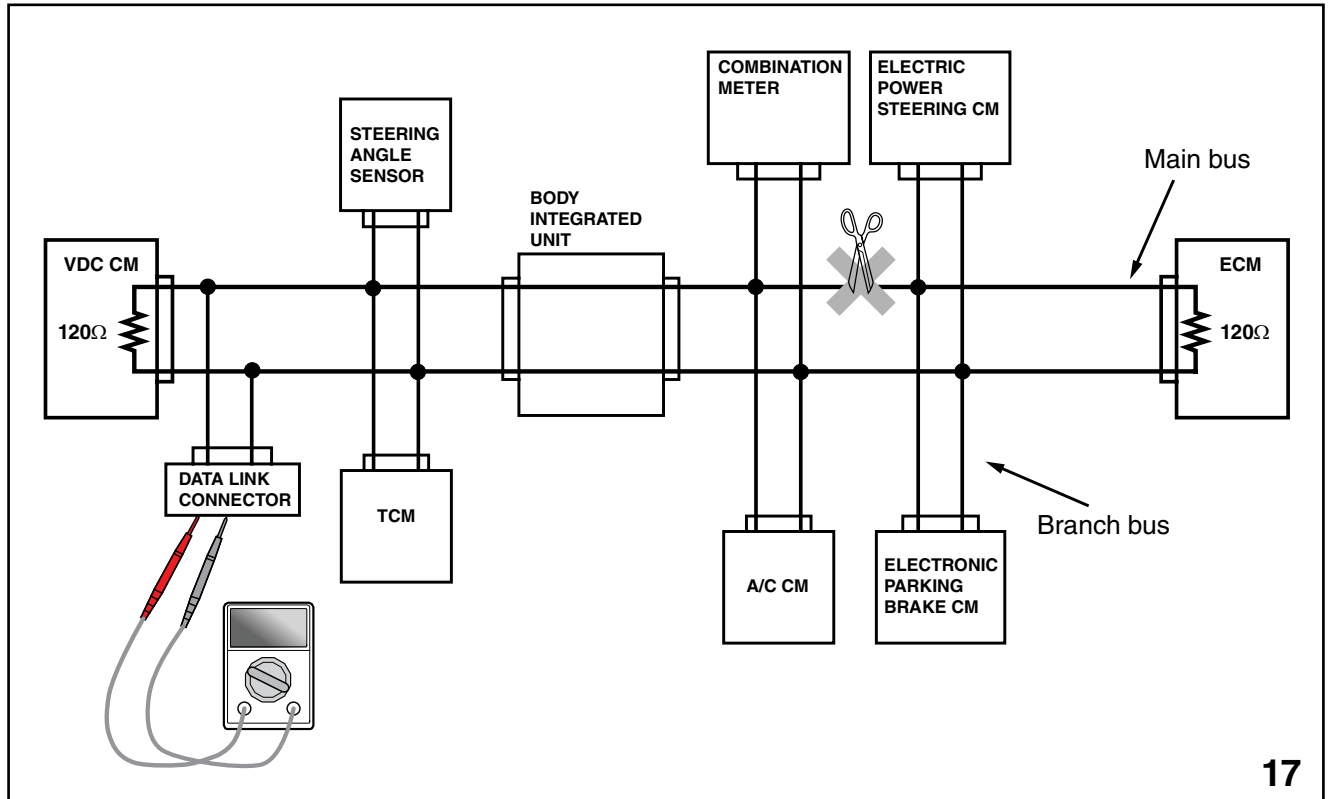
NOTES:

Open Circuit in Main Bus

An open circuit on the main bus can be detected by measuring the resistance between HS-CAN High and HS-CAN Low. For example, when measuring the resistance between HS-CAN High and HS-CAN Low at the DLC, the resistance should be 60 Ohms.

When an open circuit occurs on the main bus, the resistance becomes 120 Ohm.

In this case, communication with control modules that are connected after the open circuit becomes disabled. In the illustration below the BIU cannot communicate with ECM, EPS, and EPB.



Open Circuit in Main Bus

RT = _____

1 state

0 state

Voltage CAN High _____

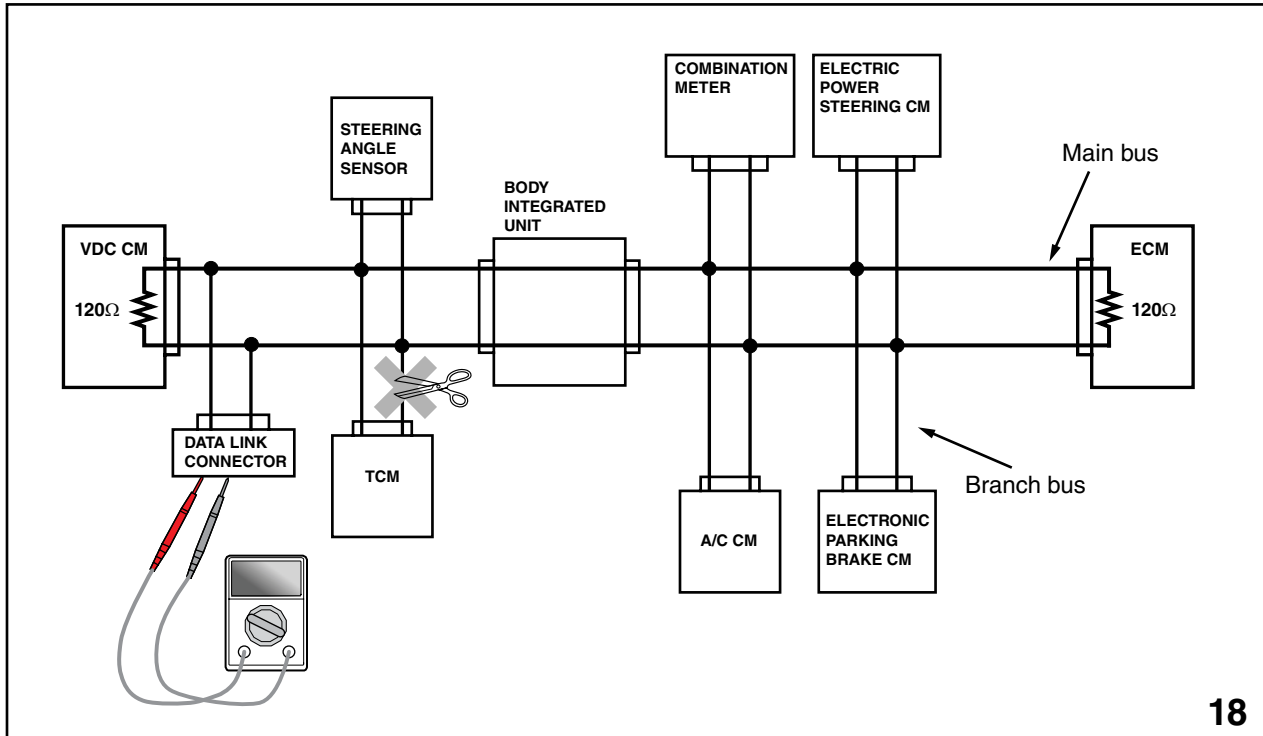
Voltage CAN Low _____

Control Modules that cannot communicate

Open Circuit in Branch Bus

When an open circuit occurs on the Branch Bus, communication with the control module connected to that branch bus becomes disabled. In the example below, the BIU cannot communicate with the TCM.

When an open circuit occurs in a branch bus, the resistance between HS-CAN High and HS-CAN Low will be 60 Ohm, the same as under normal conditions.



Open Circuit Branch Bus

DLC

RT = _____

1 state 0 state

Voltage CAN High _____

Voltage CAN Low _____

TCM Connector

RT = _____

1 state 0 state

Voltage CAN High _____

Voltage CAN Low _____

An open branch in the CAN results in the loss of communications with a control module. This will result in the loss of all of the data that the control module supplied to the CAN as well as the control that the control module provided to the vehicle. Diagnostics using resistance or voltage will determine that the main CAN bus has no problems so you must check at the affected control module.

Disconnect the affected control module. Failure to do so will result in the monitoring of signals or voltage outputted from the control module that is not making contact with the CAN.

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Resistance checks should show continuity or very low resistance from the DLC to the CAN high wire and CAN low wire. Check the CAN high wire first. Check from the DLC to the affected modules electrical connector. Record the value and then check the CAN low wire the same way.

Voltage checks at the affected control module electrical connector should show the same value monitored at the DLC.

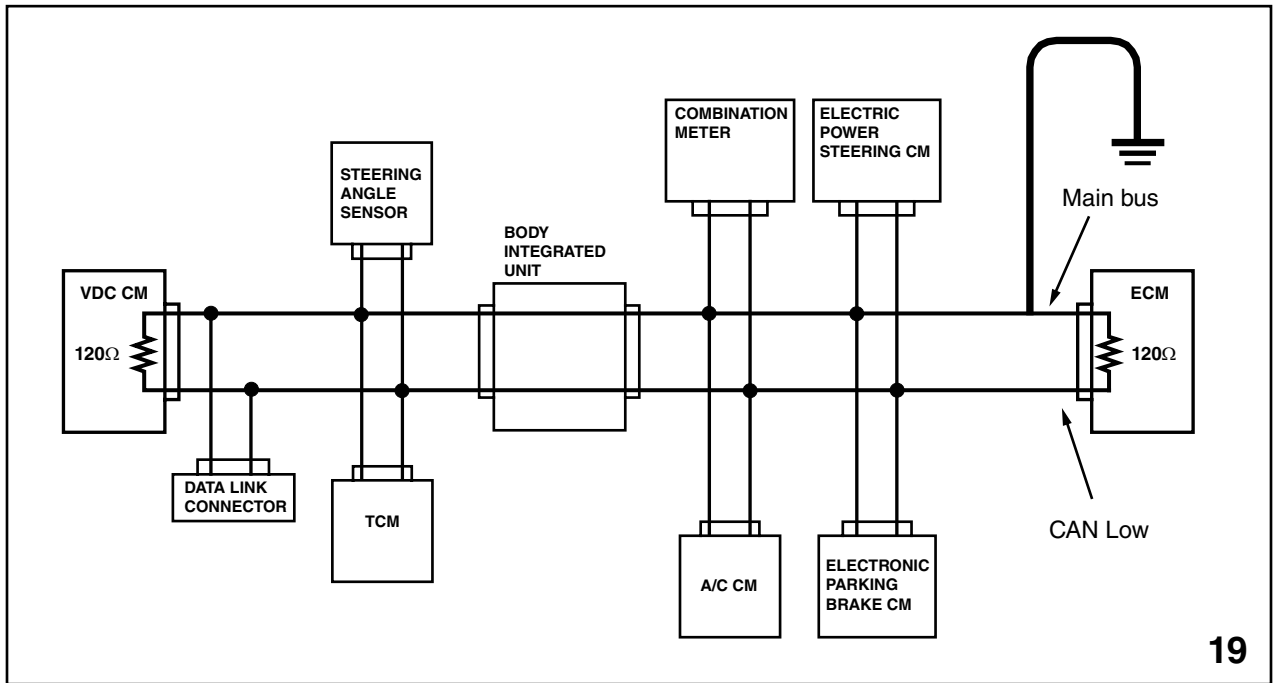
If either resistance or voltage checks indicate that an open circuit exists then the next step is to locate the CAN Joint Connector that connects the affected control module to the CAN.

Check the CAN Joint Connector for resistance or voltage to the affected module's CAN wires.

Once the open circuit is located, repair the circuit and recheck the entire CAN operation.

Ground Short of CAN High Wire

When a short to ground occurs on the CAN high wire, the voltage difference between the CAN high wire and CAN low wire is not high enough for any control module to receive and understand the data being sent. The voltage level of the CAN high wire must always be higher than the CAN low wire or communications on the CAN stop.



CAN High Wire

RT = _____

1 state

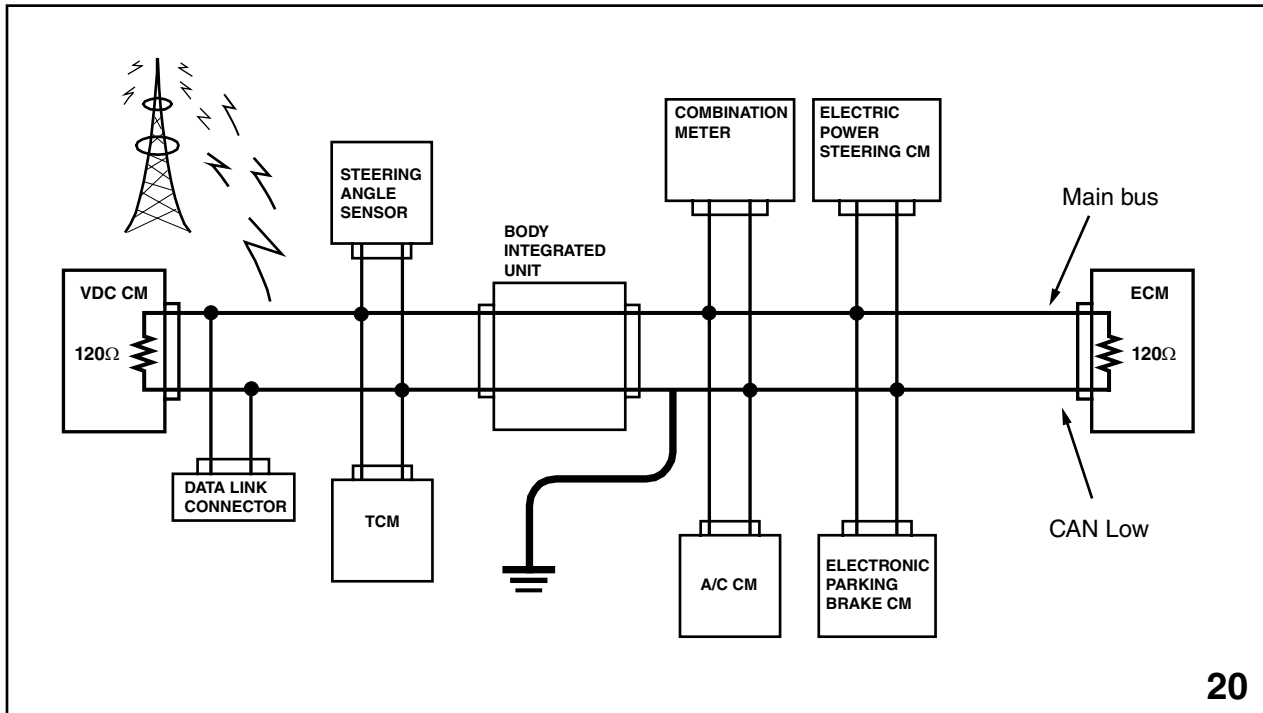
0 state

Voltage CAN High _____

Voltage CAN Low _____

Ground Short of CAN low Wire

When a short to ground occurs on the CAN low wire, the voltage and data on the CAN low wire is not received by the CAN. The voltage of the CAN high wire drops because of the parallel wiring with the terminators. The voltage levels of the CAN high wire will increase enough to allow data to be sent and received throughout the CAN. The noise insulating properties of the CAN will be lost but most vehicle systems will continue to function.



CAN Low Wire

RT = _____

1 state

0 state

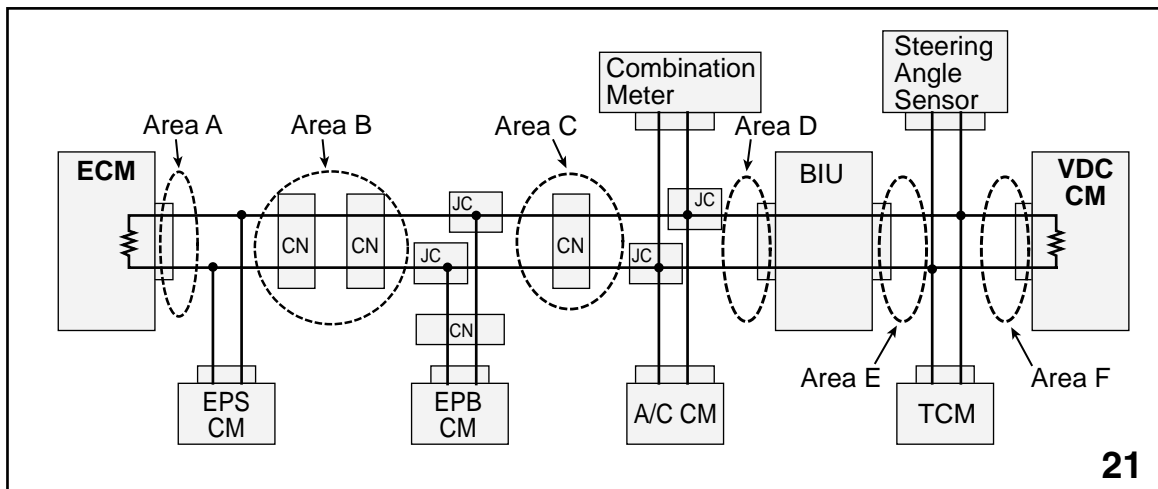
Voltage CAN High _____

Voltage CAN Low _____

Diagnostic Procedure using HS-CAN DTCs

When communication with a control module becomes disabled, the BIU judges a defect exists and sets a DTC. The trouble location can be narrowed down by reading the DTC memory.

With the circuit configuration of the figure, the trouble location can be determined as in the range from area A to area F by reference to the DTC contents of Table.

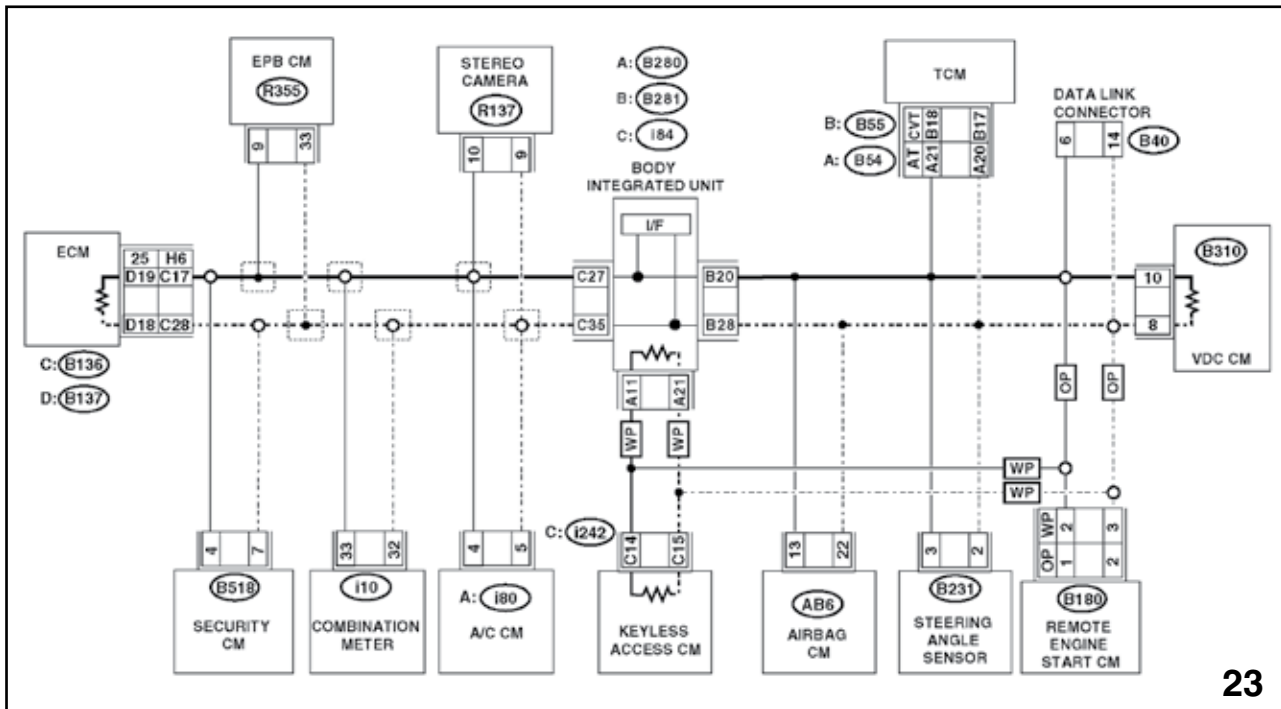


Diagnostic Procedure for HS-CAN

Area A	Area B	Area C	Area D	Area E	Area F
U1221	U1221	U1221 U1229	U1221 U1229 U122A U122B	U1222 U1223	U1223
U1201 (U1202)	U1201 (U1202)	U1201 (U1202)	U1201 (U1202)	U1201 (U1202)	U1201

DTC	Meaning of DTC
U1221 (CAN-HS ECM no-receive data)	BIU receive no data from ECM
U1222 (CAN-HS TCM no-receive data)	BIU receive no data from TCM
U1223 (CAN-HS VDC no-receive data)	BIU receive no data from VDC
U1229 (CAN-HS EPB no-receive data)	BIU receive no data from EPB
U122A (CAN-HS meter no-receive data)	BIU receive no data from Combination meter
U122B (CAN-HS A/C no-receive data)	BIU receive no data from A/C
U1201 (CAN-HS counter abnormal)	Count of communication error exceeds the limit.
U1202 (CAN-HS bus off)	This DTC show CAN system is not operating.

CAN Bus B or KAC



CAN Bus B or KAC

Keyless Access and Push Button Start vehicles are equipped with a second High speed CAN. The name for this new High Speed CAN will be High Speed CAN Bus B or KAC.

This circuit is isolated from the Main CAN Bus and only functions with Keyless Access control and diagnostics.

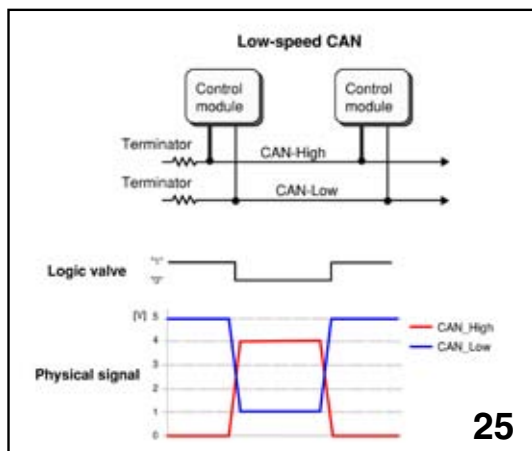
The circuit design of CAN Bus B is the same as the Main Can Bus. 120 ohm terminators are located in the BIU and the Keyless Access Control Module.

The only branch currently installed on CAN Bus B is the Remote Engine Start Control Module.

C 14 is the CAN Bus B High wire and C 15 is the CAN Bus B Low wire.

This CAN circuit controls the lock and unlock signals from the Keyless Access CM to the Body integrated Unit. A failure disables the Keyless Access lock and unlock functions.

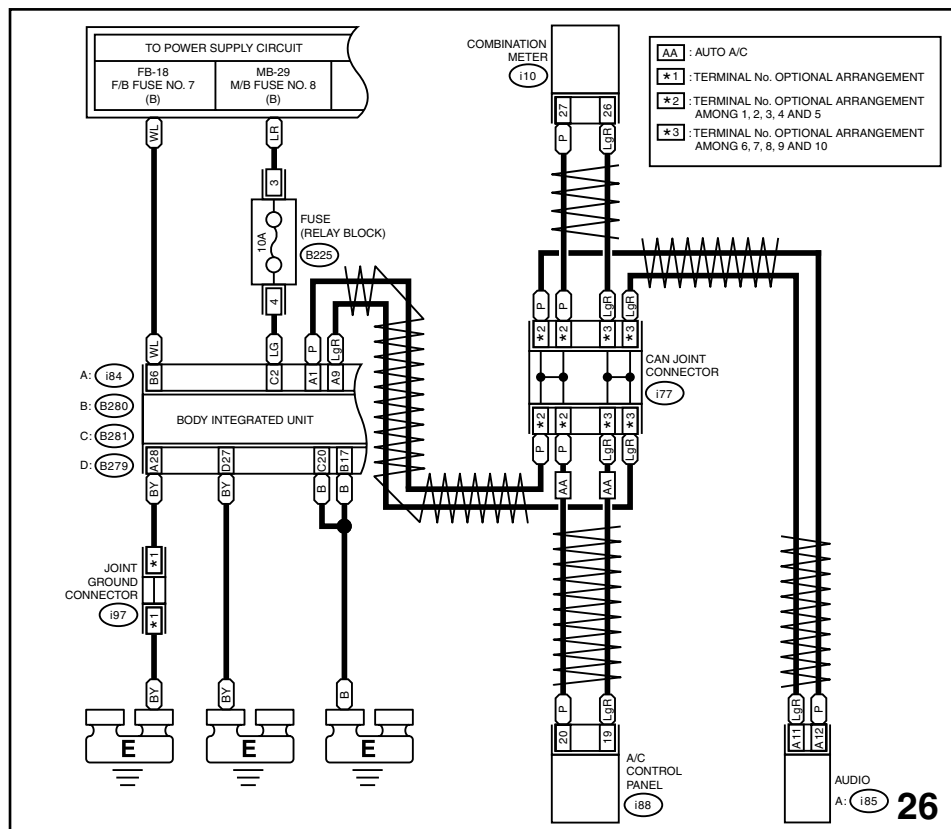
Low Speed CAN



Low Speed CAN (ARTWORK)

When the logic value of the Low Speed CAN is 1 the voltage of the CAN High signal is 0 volts and the value of the CAN Low signal is 5 volts. As the logic changes to 0 the CAN High voltage will change to 4 volts and the CAN Low signal will change to 1 volt.

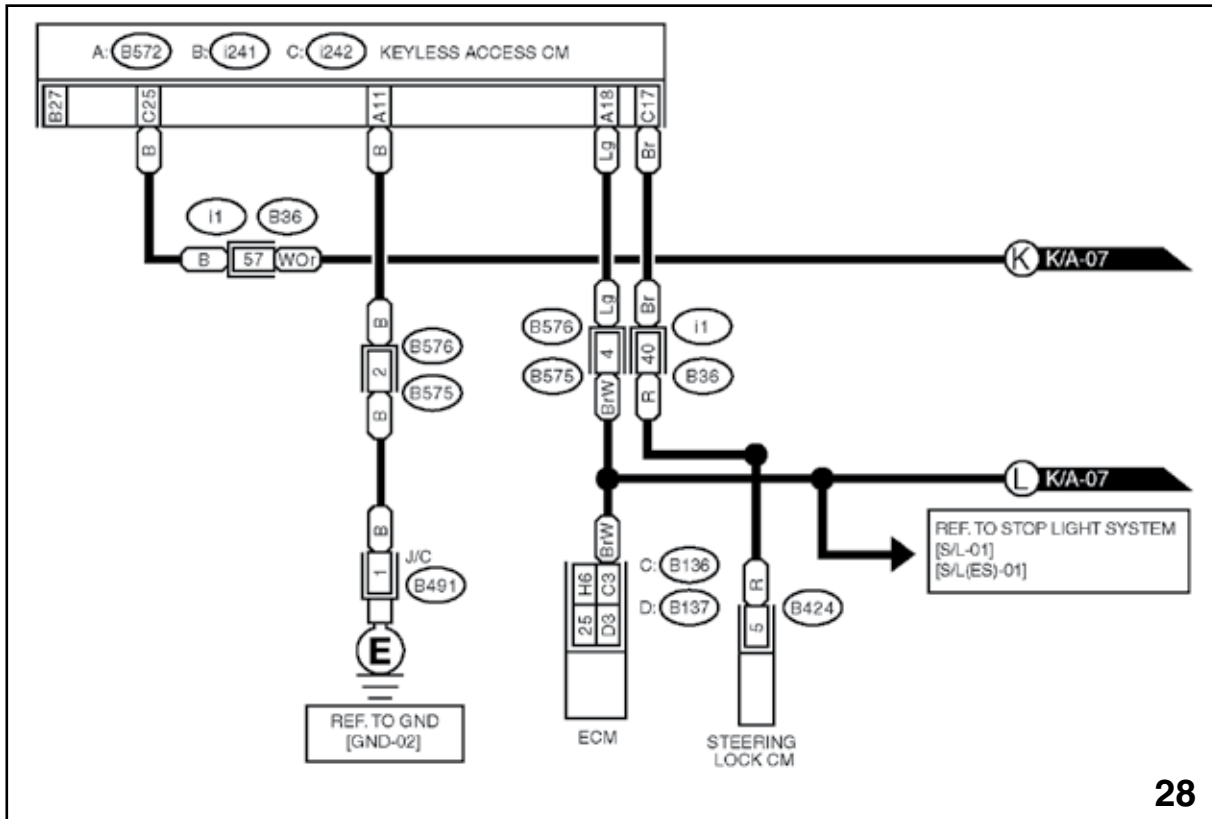
The terminators of the Low Speed CAN only operate while the circuit is active. This prevents checking of the total circuit resistance of the Low Speed CAN. If a trouble code of the Low Speed CAN is present, check the voltage at the Low Speed CAN high and low wires for voltage or oscilloscope patterns. Resistance checks can also be performed when no voltage is in the circuit.



Low-Speed CAN Wiring (2012 WRX-Sti)

Local Interconnect Network (LIN)

A Local Interconnect Network (LIN) connection is utilized on some models where control and confirmation of operation of a device is required. The LIN is a circuit that uses the body ground and one wire from a controller to a device. The operational speed is much slower than CAN (up to 20 kbits/s).



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LIN

An example of a LIN circuit is the wire from the Keyless Access and Push Button Start Control Module to the Steering Lock Control Module. The Electronic Steering Lock operates to lock or unlock the Steering Column from commands issued from the Keyless Access and Push Button Start control module. The Steering Lock control module sends a signal back to the Keyless Access and Push Button Start control module to confirm the operation is complete.

NOTES:

Monitoring of Trouble in the System

The control modules in the LAN system monitor the communication data between them. When a control module detects an error in the data it immediately transmits an error flag to notify the error to all the other modules of the LAN. This prevents reception of messages with an error by the other modules. When the trouble is detected in the system, the Body Integrated Unit transmits trouble information to the Combination Meter and displays it on the Trip Meter. (Applicable models only.)



ER IU

The Combination Meter will display the LAN system codes any time the ignition is on and in case of multiple codes the display is determined by priority listed below:

- High Speed CAN
- Low Speed CAN
- Body Integrated Unit
- ECM
- TCM
- VDC/ABS
- Vehicle Speed

CAN Trouble Codes

Er-- High speed and low speed CAN communication error at the same time

Er HC High speed CAN communication error

Er LC Low speed CAN communication error

Er IU No data or irregular data received from the Body Integrated unit

Er EG Engine Control Module or CAN communication error

Er TC Transmission Control Module or CAN communication error

Er Ab ABS/VDC Control Module or CAN communication error

Er SP Irregular vehicle speed signal (ABS/VDC Diagnostic Code Information)

CAN data vehicle speed – Pulse input vehicle speed ≥ 15 km/h

Er SS Irregular vehicle speed signal (Wheel Speed Signal error)

Pulse input vehicle speed –CAN data vehicle speed ≥ 15 km/h

Er Pd Power Window Control Module or CAN communication error

Electrical Systems Operation & Diagnosis Module (602)

The Combination Meter can also be used to display Diagnostic Trouble codes of the ECM, TCM and ABS/VDC system.

The display function of the DTC's is activated by turning on the ignition and while the Combination Meter needles are sweeping, push the Trip Meter control stalk one time.

2005MY THE D CHECK CONNECTORS OF THE COMBINATION METER MUST BE CONNECTED.

2006MY and Newer THE D CHECK CONNECTOR OF THE COMBINATION METER HAVE BEEN ELIMINATED.

The DTC display is designed to communicate in four ways.

- Receiving DTC, The P (EGI and TCM) or C (ABS/VDC) flashes while the codes are being received from each control module.
- There is no code. The P or C illuminates steady with a — following the letter
- The P or C illuminated with the numerical code following (codes are displayed in the order in which they were stored)
- CAN communication error, A — will be displayed indicating it is impossible to communicate with the LAN

NOTES:

Combination Meter

The Combination Meter receives CAN and Analog data. The CAN data is received from the LAN while the Analog data is received directly from individual control modules or switches.

Examples of CAN and Analog Data:

CAN data	Analog data
Fuel gauge	Speedometer
Coolant temperature gauge	Tachometer
Door open warning light	Brake fluid level warning light
Front fog light indicator light	Parking brake warning light
AWD warning light (Tire air pressure)	ABS warning light
VDC warning light/VDC off indicator	SRS airbag warning light
ATF temperature warning light	Oil pressure warning light
Sport shift indicator (AT model)	Charge warning light
Sport mode indicator (AT model)	Check engine light
AT select level lever position	Security/immobilizer indicator light
VDC operation light	Head light beam indicator
Cruise control main switch indicator	Lighting switch indicator
Cruise set indicator	Turn signal indicator
Low fuel warning light	Seat belt warning light
Rear fog light indicator*	
VSP/ Speedometer	

The vehicle speed signal provided as the input to the Combination Meter has CAN data and pulses (analog data). Normally the pulse data input is used for the driving of the speedometer. The CAN data is used as a backup when there is a problem with the analog data.

Select Monitor

The Select Monitor will display analog and CAN data while viewing the Integ. Unit mode.

Examples of SSMIII BIU Data:

Analog data	CAN data
BATT Voltage (Control)	Key lock warning SW
BATT Voltage (Back up)	Stop Light Switch
IG power supply voltage	Front Fog lamp switch
ACC Voltage	Rear Fog lamp switch*
Illumination VR voltage	Lighting SW
Illumi. Output d-ratio	Door key lock SW
Ambient temp sensor V	Door unlock SW
Ambient temperature	Passenger door SW
Fuel level voltage	Rear right door SW
Fuel level resistance	Rear left door SW
Key lock solenoid V	Rear gate SW
Number of regist.	Manual lock SW
Front wheel speed	Manual unlock SW

NOTES:

BIU Customizing

The select monitor is also used to change the settings of the following items. This can be used to increase a customer’s satisfaction of the vehicle and during vehicle diagnosis.

Examples of BIU Customizing Settings:

Settings and Contents			
The items that can be set with the Select Monitor and the setup contents are shown in the following table.			
No.	Item (SSM display)	Setting	Setting contents
1	Off delay time		After closing doors After unlocking doors with keyless entry
		OFF	0 sec. 0 sec.
		Short	3 sec. 10 sec.
		Normal	5 sec. 20 sec.
		Long	8 Sec. 30 sec.
2	Rr defogger op.mode	Normal	Automatically stops 15 minutes after switch has been turned on.
		Continue	Turns on for 15 minutes and turns off for 2 minutes repeatedly until switch is turned off.
3	Wiper deicer op. mode	Normal	Automatically stops 15 minutes after switch has been turned on.
		Continue	Turns on for 15 minutes and turns off for 2 minutes repeatedly until switch is turned off.
4	Security alarm setup	ON	Set to "ON" to activate alarm
		OFF	
5	Impact sensor set up	ON	Set to "ON" to activate Impact sensor
		OFF	
6	Alarm delay setup	ON	Set to "ON" to activate delay
		OFF	
7	Lockout prevention	ON	Activates lockout prevention.
		OFF	Stops operation of lockout prevention
8	Impact sensor	ON	Set to "ON" to activate sensor
		OFF	
9	Siren setting	ON	For Japanese domestic models only. Set to "OFF" for all other models
		OFF	
10	Answer-back buzzer setup	ON	Set to "ON" to activate answer back buzzer
		OFF	
11	Hazard answer-back setup	ON	Activates hazard light during Lock/Unlock operaton using Keyless Entry.
		OFF	Deactivates hazard light opertation duing Lock/Unlock operation using Keyless Entry.
12	Ans.-back buzzer	ON	Set to "ON" to activate buzzer
		OFF	
13	Initial keyless setting	!	!
		Execution	Returns to initialization of setup contents related to Keyless Entry. (No.2=30 sec. No.11=OFF, No 12=ON, No. 13+ON, No. 14=OFF)
14	Initial button setting	!	!
		Execution	Returns to initialization of various setup contents. (No.1=Normal, No. 3=Normal, No 4=Normal, No. 8=ON)
15	Initial security setting	!	!
		Execution	Returns to initialization of Security setup contents. (No.5=OFF , No 6=OFF, No. 7=ON, No. 10=OFF)

Settings and Contents

The items that can be set with the Select Monitor and the setup contents are shown in the following table.

No.	Item (SSM display)	Setting	Setting contents
16	Passive alarm	Support	For US models only. Set to "No support" for all other models
		No support	Set to "Support" for US models equipped with a passive alarm system.
17	Door opening warning	Support	Turns off the room light, key ring light, and door open warning light if the door is left open for more than 30 minutes, to prevent the battery from becoming depleted. (The door courtesy light is not turned off however.)
		No support	The room light, key ring light, and Door Open warning light stay on continuously.
18	A/C ECM	Support	Set to "Support" for models equipped with A/C.
		No support	Set to "No support" for models not equipped with A/C.
19	Center display failure	Support	If set to "No support" in models equipped with a Center Display, the display may not show information correctly.
		No support	
20	Wiper deicer	Support	If set to "No support" in models equipped with a wiper deicer, the wiper deicer will not operate even if the wiper deicer switch is turned on.
		No support	
21	Factory initial setting	Factory	If set to "Market," all items from No. 18 through 20 will be set to "No support." Once "Factory" has been set, it must be set again. If this item is set to "Factory", key ring light will blink.
		Market	

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SETTINGS AND CONTENTS (CONTINUED)

Body Integrated Unit Customizing

(New Items)

- MT / AT: Disable or enable Key inter lock, shift lock.
- 6 MT / Other than 6 MT: Allows speed sensor signal from 6 MT to serve as an input for VDC.
- Sedan / Wagon: Disable or enable the electrical lock of rear Gate.

Keyless Access with Push Button Start System

The Keyless Access with Push Button Start System allows:

- Doors to be unlocked or locked with a touch of the hand.
- The trunk can be unlocked by pushing the exterior trunk opener button.
- The vehicle to be started using a push button.

Note: Do not leave a spare remote transmitter in the vehicle or store any remote transmitter within 5 meters (16 ft.) of the vehicle. The keys and the vehicle will maintain constant communications and drain the remote transmitter's battery.

Normal Operation



Driver's Hand in Door Handle

Vehicle Entry and Locking

1. The driver approaches the vehicle with the remote transmitter key in his or her pocket. The driver's hand is positioned into the pull area of the door handle. The receiver receives the wireless signal from the remote transmitter and unlocks the driver's door. The entry illumination activates.

NOTE: *The next 10 pages use artwork and photographs to describe the natural progression for Keyless Access and Push Button Start functions.*



Legacy/Outback Antenna



BRZ Antenna

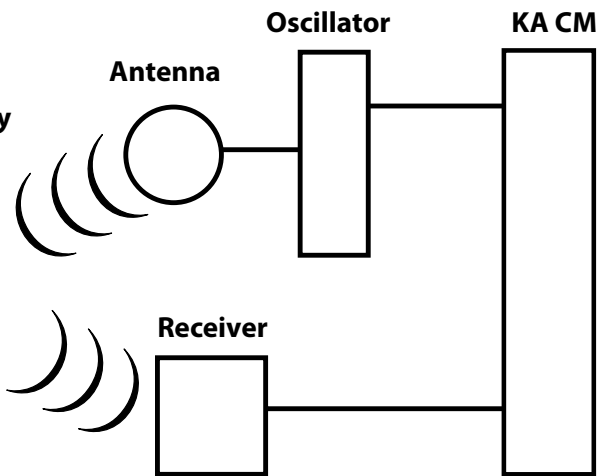
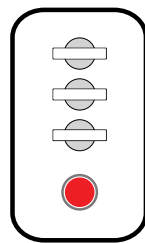


Legacy/Outback Remote Key



BRZ Remote Key

Remote Key



Legacy/Outback Receiver

Keyless Access Receiver for Legacy/Outback is **SEPARATE** from the TPMS receiver.



BRZ Receiver

Keyless Access Receiver for BRZ is shared with TPMS.

Remote Key Location
Outside of Car

Keyless Access Function
Initial Contact

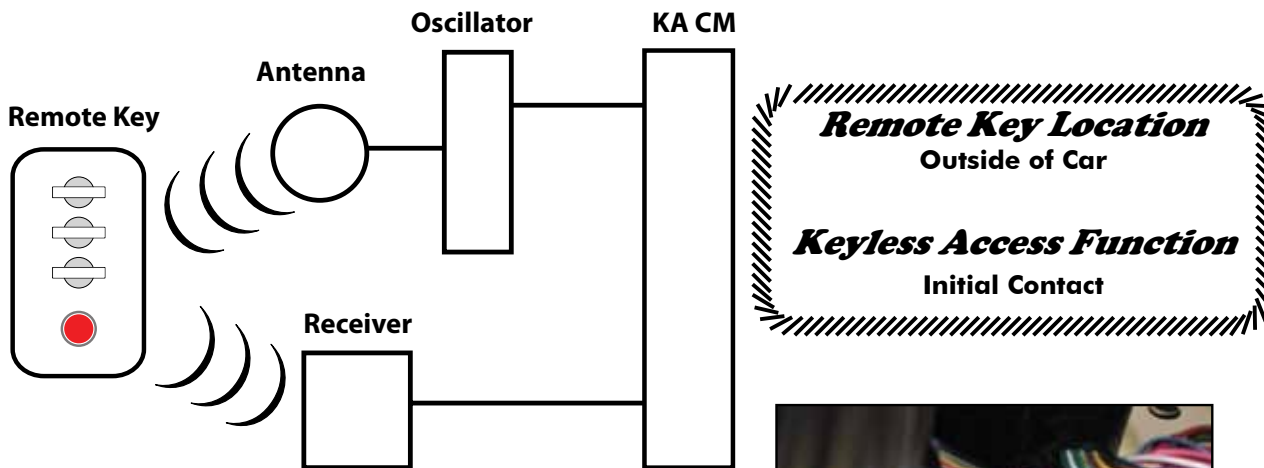
Legacy/Outback Oscillator



BRZ Oscillator



Oscillators Control and boost the wireless signal to the remote key when the remote key is outside of the vehicle.



BRZ KA CM

The BRZ Keyless Access CM is located behind the glove box, next to the A Pillar.



Legacy/Outback KA CM

The Legacy/Outback KA CM is located under the driver side kick panel.



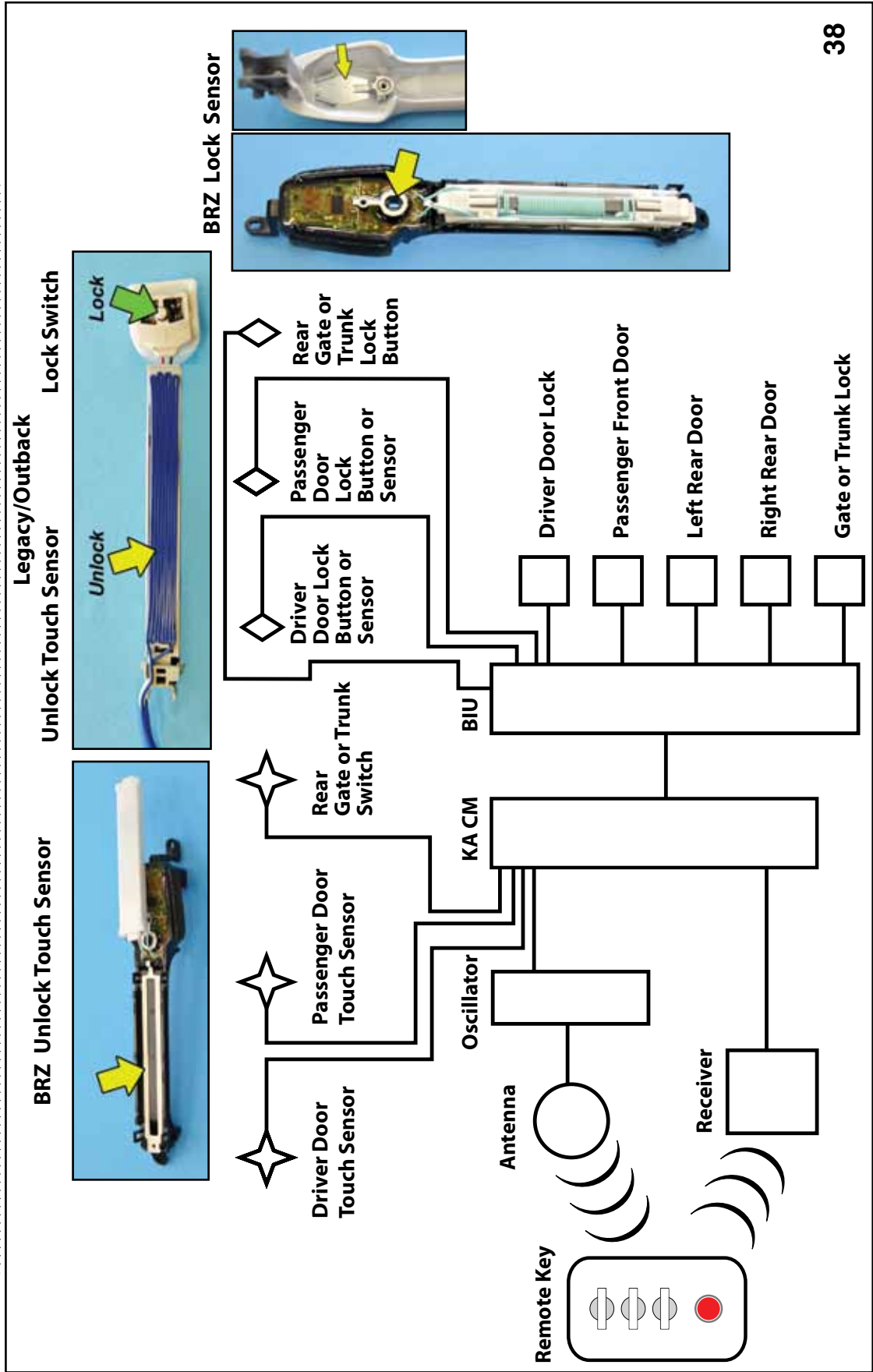
Driver Touching Thumb Switch Area

2. The driver changes their mind and shuts the door. The driver touches the lock button or sensor of the door handle and the doors lock. The entry illumination turns off.

NOTES:

Remote Key Location
Initial Contact

Keyless Access Function
Unlocking / Locking doors, Gate or Trunk



The touch sensors are one wire capacitance type sensors. Touching the sensor or sensor cover (door handle) changes the capacitance of the sensor circuit and determines the location and function to be performed.

Electrical Systems Operation & Diagnosis Module (602)

Note: If the vehicle is unlocked with the remote transmitter or keyless entry controls and the door is not opened, the doors will automatically lock after 1 minute (BRZ only).



Driver Touching Trunk Switch



Trunk Switch

3. The driver walks to the trunk or luggage area and pushes the trunk opener switch (a slight delay is normal). The trunk exterior antenna transmits a signal to the remote key and the remote key transmits a signal to the receiver. The trunk is unlocked. The trunk mechanically locks when the trunk lid is closed.
4. The vehicle can also be unlocked or locked with the keyless entry controls of the remote transmitter.
5. The vehicle can be locked using the mechanical or electrical unlock and lock buttons on the door panel. The door handle of the vehicle must be held out as the door is closed.



Mechanical Key in Door Lock



Trunk Mechanical Key Slot

6. The driver door or trunk can be unlocked with the mechanical key contained inside the Remote Transmitter. The vehicle alarm will activate as the door or trunk is opened. Turning the ignition on will deactivate the alarm.

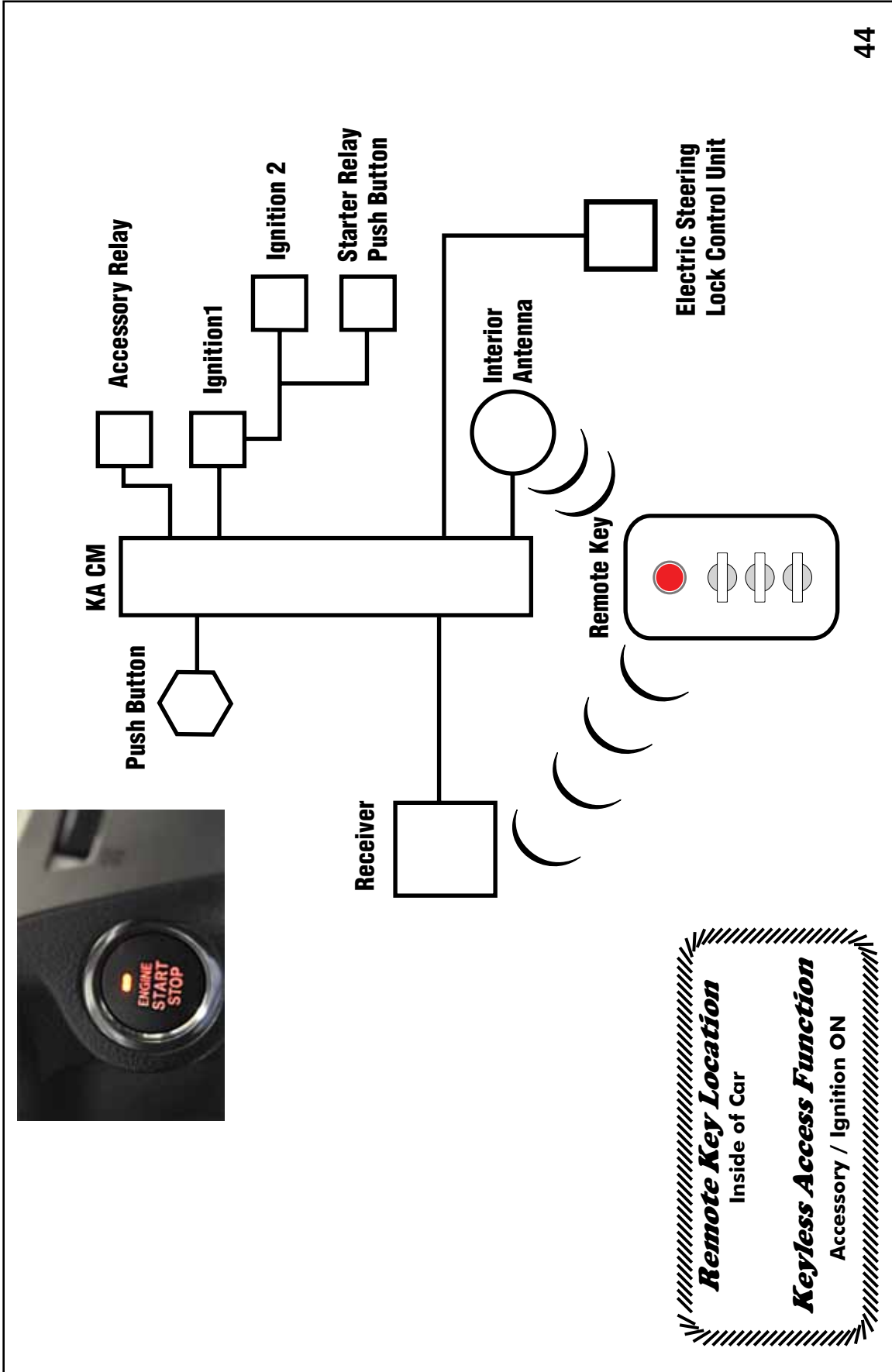
Ignition and Engine Start



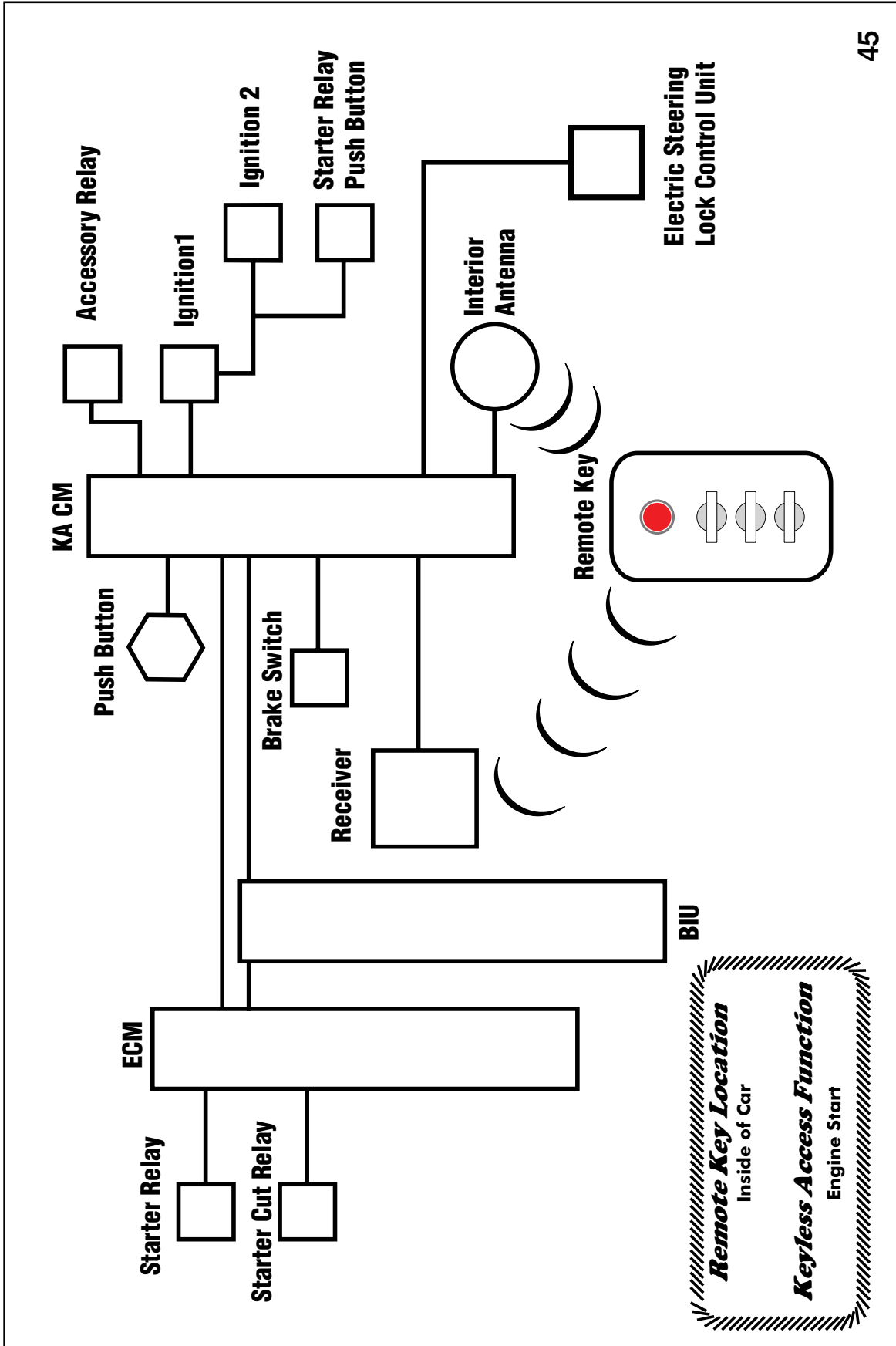
Engine Start Stop Button

1. The driver sits in the driver seat. The interior antenna transmits a signal to the remote key. The remote key transmits a signal to the receiver.
2. The driver presses the Engine Start and Stop button once with their foot off of the brake pedal. The accessory position circuit turns on and allows operation of all accessory circuit devices.

NOTES:



3. The driver presses the Engine Start and Stop Button twice with their foot off of the brake pedal. The ignition turns on and allows operation of all ignition circuit devices.



4. The driver presses the brake pedal and pushes the Engine Start and Stop button once. The starter engages and operates until the engine starts or for 10 seconds.

Electrical Systems Operation & Diagnosis Module (602)

Note: Pressing the Engine Start and Stop button while the starter is operating will turn off the starter.



Remote Transmitter Position for Dead Transmitter Battery

5. A dead battery in the remote transmitter will prevent normal starting of the engine. In this condition, hold the remote key to the chrome ring of the Engine Start and Stop button and push the Engine Start and Stop button once while holding the brake pedal. The starter will engage and operates until the engine starts or for 10 seconds.
6. The engine and ignition are turned off by pressing the Engine Start and Stop button once.
7. The starter can be engaged without pressing on the brake pedal by performing the following:
Turn the Accessory position on and press the Engine Start and Stop Button a second time but do not release the button. Holding the button in this condition for 20 seconds will engage the starter until the engine starts or for 10 seconds (BRZ, Legacy and Outback).

Note: **If the vehicle is moving, the engine and ignition will turn off if the Engine Start and Stop Button is pressed for 3 seconds. Restart is accomplished by shifting to neutral, lightly pressing the brake pedal and pushing the Engine Start and Stop button once.**

NOTES:

Key Warning



BRZ Combination Meter Warning Light

1. If the remote transmitter is removed from the vehicle with the engine operating, a flashing indicator light on the combination meter will activate and an audible chirp will be sounded.

Note: This function is cancelled if the check engine is illuminated. (BRZ Only)

2. If the remote transmitter exits the vehicle the engine and the ignition will remain on, but the vehicle will not restart.
3. If the ignition is turned off and the driver side door is opened and remains open (key left in vehicle), a continuous tone from the warning buzzer is activated. This can be disabled during service work by pressing and releasing the door switch (open and close switch).

NOTES:

Wireless Communications

1. When the vehicle and the remote transmitter are separated, the vehicle outputs a signal every 250 milliseconds. This is the signal that wakes up the remote key. The wake signal is transmitted by the door handle antennas or trunk exterior antenna. Each antenna is equipped with an oscillator that controls the signal.
2. The remote transmitter LED (BRZ only) will begin to flash when the remote transmitter is within range of the wake up signal.
3. The remote transmitter will transmit a continuous signal to the vehicle when the remote transmitter is within range.
4. The wake up signal will change frequency to 1 signal every 3 seconds when the remote transmitter has been activated.
5. When the remote transmitter crosses the threshold of outside to inside the vehicle, the door handle antenna stops transmitting. The LED on the remote transmitter will stop blinking.

Collation and Immobilizer

1. The vehicle transmits a wireless signal (135 KHZ) to the Remote Transmitter.
2. The Remote Transmitter transmits a wireless signal (315 MHZ) to the vehicle.
3. The signal from remote transmitter includes the Immobilizer Identification.

Headlights

The headlight operating logic for 2008 Impreza, 2009 Forester, 2010 Legacy and Outback and newer vehicles is described below.

Lighting Switch

No parking switch is available.

Headlight Operation

Condition	Explanation of condition	Headlights switch condition needed to turn on headlights or parking lights
Normal	Ignition or Engine ON	Turn switch to ON
Key In	Ignition OFF	A. Lights turn ON when key is placed into the ignition switch. (Lights were on when the key was last removed.) B. Turn switch to ON
Key Out		A. Turn switch to On B. Turn switch OFF then ON NOTE: BUZZER SOUNDS IN THIS MODE WHEN THE DRIVER'S DOOR IS OPEN

Automatic Transmission models - DRLS DO NOT OPERATE IN PARK.

All models parking brake ON - DRLS DO NOT OPERATE.

All models have a Headlight ON indicator.

Additionally a setting for automatic headlights has been incorporated.

When in Auto Mode, the headlights and tail-lights turn on and off based on the ambient light detected by the Sunload Sensor.

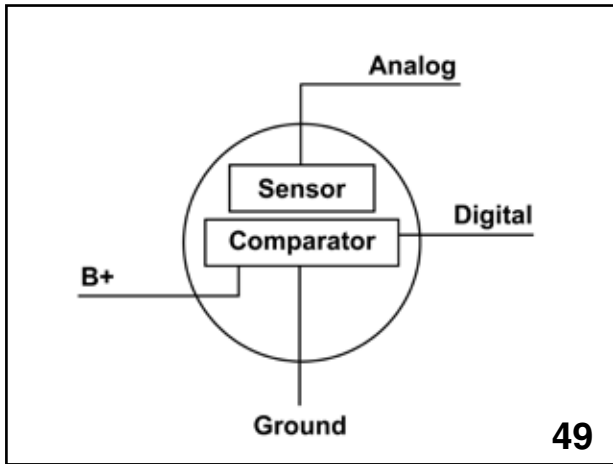
The Sunload Sensor (applicable models) of the HVAC System performs two jobs.

- Sunload for HVAC System
- Ambient light for the Automatic Headlights

Conventional Sunload Sensors have 2 wires.

The New Sunload Sensor has 4 wires.

B+, ground, analog signal to HVAC, and a wire delivering a digital signal to the BIU.



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Sunload Sensor 4 Wires (ARTWORK)

A comparator circuit is built inside the Sunload Sensor that produces a constant triangle or ramp wave. This provides one input to the comparator circuit.

The other input is the voltage generated by the absorbed sunlight. The comparator evaluates the 2 voltages and outputs a square wave duty ratio that is sent to the BIU. When the duty ratio crosses a set level up or down, the headlights and taillights turn on or off.

There are 4 levels of sensitivity that can be set by a technician using the SMIII.

- Dull
- Normal
- Sensitive
- Very Sensitive

Note: The number of levels may change by model.

These settings as listed on the SSMIII refer to the Sunload Sensors ability to detect darkness.

Dull would be late on and early off.

Very Sensitive would be early on and late off.

The Integ mode of the SSMIII shows the duty ratio from the Sunload Sensor.

Dull on approx. 150 HZ, Off approx. 440 HZ

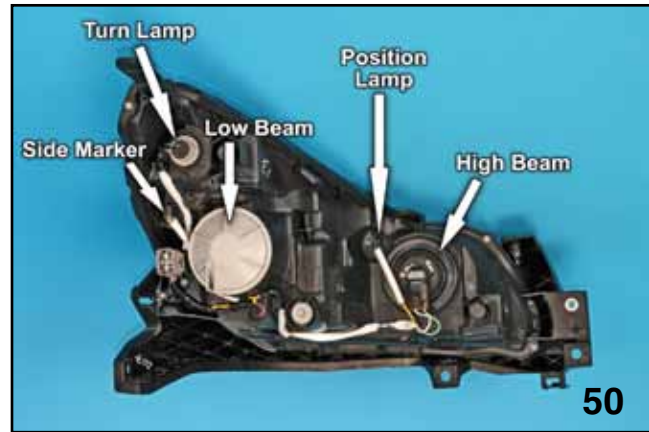
Very Sensitive on approx 350 HZ, off 500 Hz

Use the BIU customizing Menu to adjust the automatic headlight sensitivity.

If a customer prefers that the automatic headlights activate closer to dark and turn off early after sunrise then select “Dull”

If long before dark and long after Sunrise operation is preferred then select “Very Sensitive”

Normal and sensitive fall in between the two extremes.



Headlight Assembly on Bench

The high beam and position light bulbs can be serviced while the headlight assembly is mounted in the car.

Note: Always review service procedures in the applicable Subaru Service Manual.

NOTES:

Immobilizer Type A

System Construction

The Subaru Immobilizer is designed to prevent unauthorized people from operating the vehicle. This is accomplished by the use of a coded transponder key that reacts with the Body Integrated Unit (BIU), Engine Control Module (ECM) and the Combination meter.

The Immobilizer almost simultaneously checks the key, BIU, combination meter and Engine Control Module to see if they are all part of a matched set. If any one part does not match, the vehicle becomes inoperable.

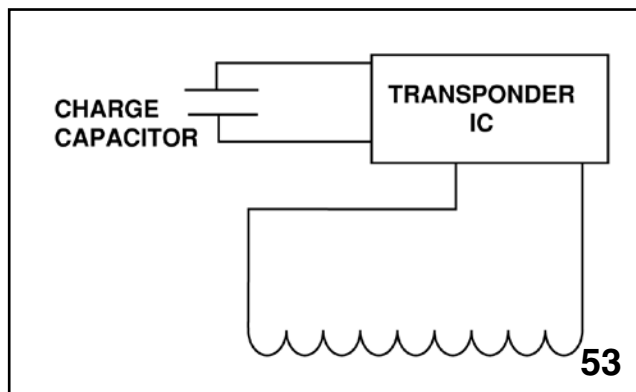
The Immobilizer is not a security system. However the vehicle is wired to accept the addition of the components needed to install the security system.

Note: The installed items must be programmed into the BIU using the Subaru Select Monitor III.



Key

The key contains the transponder which consists of an antenna, capacitor and integrated circuit.

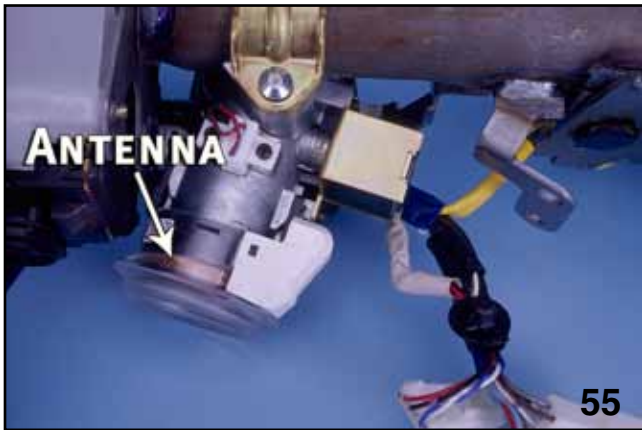


Transponder (ARTWORK)



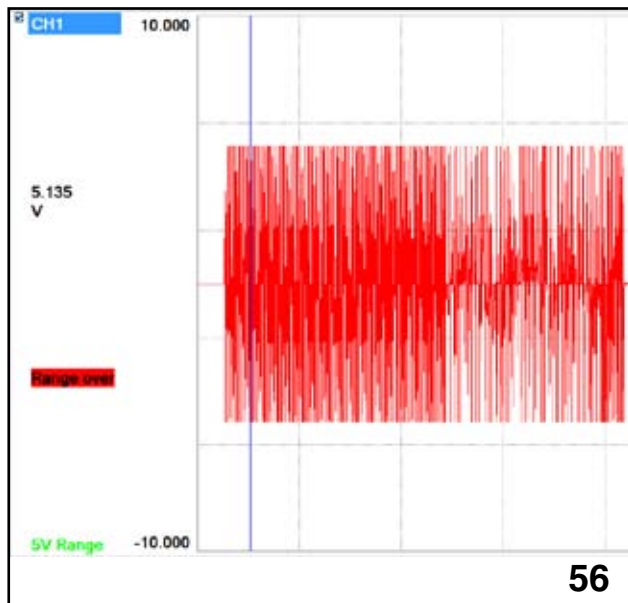
Ignition switch

When the key is placed into the ignition a signal from the key warning switch activates the BIU to send a high frequency electric wave to the antenna coil surrounding the ignition switch.



Antenna

The electric wave, absorbed by the antenna in the transponder, charges the capacitor in the transponder. An encrypted code is sent at the end of the charging wave. The transponder decrypts the code and sends an encrypted code back to the antenna coil, which travels back to the BIU.



Signal sent and received at Antenna Coil

The BIU compares the code sent by the transponder with the code programmed into the BIU and sends an encrypted code to the combination meter.



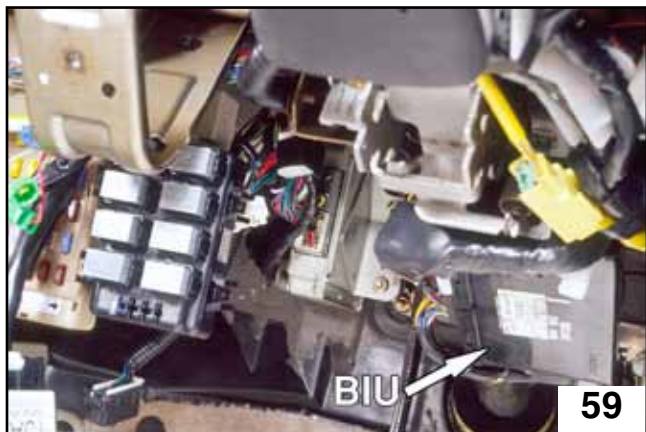
Combination Meter

The combination meter decrypts the code and sends a response back to the BIU.

The result of this signal determines if the engine is allowed to continue operating if it has been started.



ECM

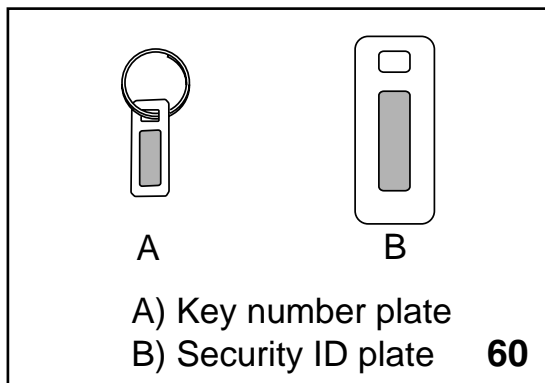


BIU

The result sent from the combination meter is stored in the BIU until the Engine control module has requested a decision to allow the engine to operate or to turn off the injectors and shut the engine off.

Key

The vehicle is shipped with two keys (May change by model and year). Both keys contain a transponder that is registered to the vehicle. One key is the master key and the other key is the valet key. The only functional difference is that the valet key will not open the trunk lock. Also shipped with the vehicle, on the key ring, are two metal tags.



Key Tags

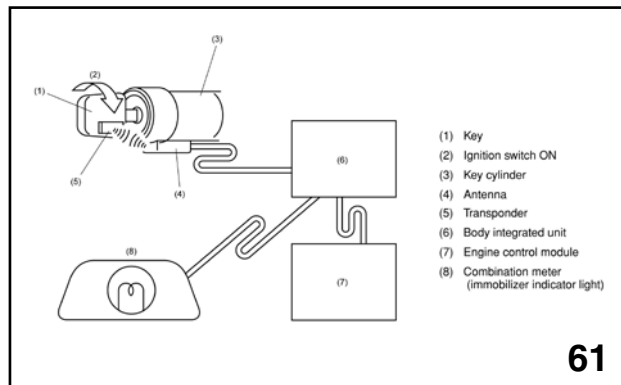
The smaller tag is the mechanical key code. This is what the customer would use to have another key cut for the vehicle. The larger tag is the security code for the Immobilizer. This number must be available to the Technician when the vehicle Immobilizer system and its components are being serviced.

A key can only be registered to one vehicle. A vehicle may have up to four keys registered to it. The registration process, once started, clears the BIU of all keys. This means that when one key is registered, they all must be registered. The registration process is accomplished using the Subaru Select Monitor III.

BIU

Replacing the BIU requires that all the keys be replaced. The new keys must be registered to the vehicle and the new BIU (2005-2009).

Note: The Keys do NOT need to be replaced when changing the BIU for 2010 Legacy and newer and 2011 Forester and newer.



BIU (ARTWORK)

Note: The installation of a new BIU requires that all keyless transmitters be reprogrammed to the vehicle. The BIU customizing features must be set at this time. If possible record the current settings of the BIU before replacement. If the current settings cannot be obtained ask the customer to provide you with their selections.

Electrical Systems Operation & Diagnosis Module (602)

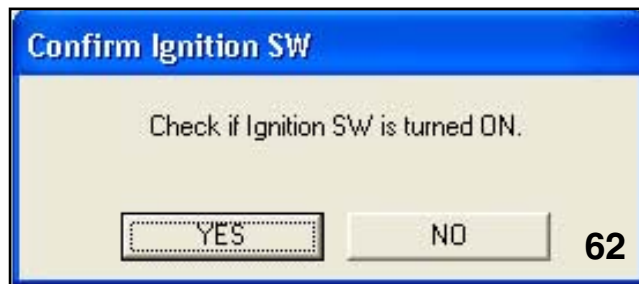
Note: The BIU on all vehicles must be set to “market mode”.

Combination Meter or Engine Control Module

Replacement of the combination meter or Engine Control Module* requires that the new part be registered to the vehicle after installation. Also all the keys previously registered to the vehicle must be present. Failure to register the current keys during the registration process will result in the absent keys not being able to start the engine.

- While diagnostic items are being checked, do not operate radios, portable telephones, etc. which emit electromagnetic waves near or inside the vehicle.
- When turning the ignition switch to ON or OFF while diagnostic items are being checked, do not allow keys with different ID codes close to the ignition switch. If the ignition key is in a key holder, remove it from the holder before carrying out diagnosis.
- When repeatedly turning the ignition switch to ON or OFF while diagnostic items are being checked, it should be switched in cycles of “ON” for at least 5 seconds and “OFF” for at least 8 seconds.
- If the engine fails to start with a registered ignition key, detach the ignition key from ignition switch and wait for approx. 1 second until immobilizer indicator light begins to flash. And then start the engine again.
- Before checking the diagnostic items, obtain all keys for the vehicle to be checked possessed by owner.

Registration Process



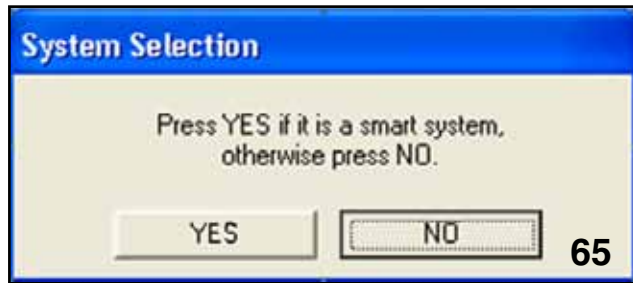
Turn Ignition Switch ON



Immobilizer OK



IMMOBILIZER SYSTEM CLICK YES



Press NO



Input Teaching Code



Key Registration Mode Execute



Security ID



Press OK to Register another Key



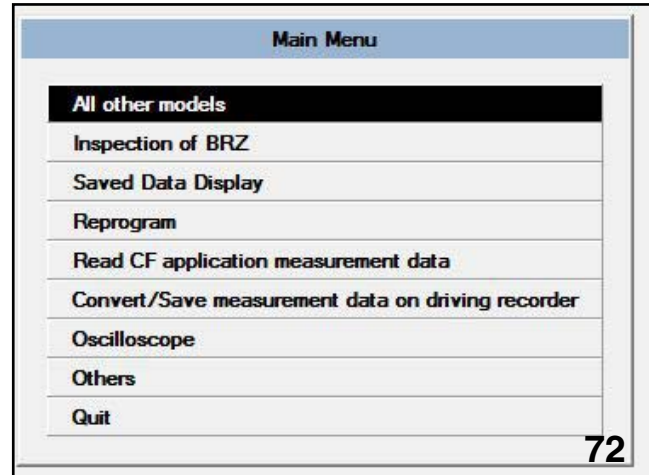
Press "OK" To Register Second Key



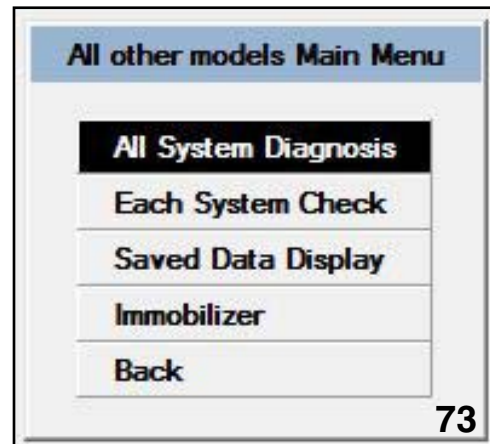
Register Third Key

ECM Replacement

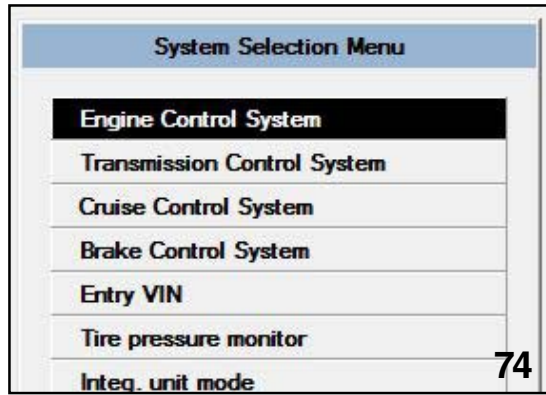
Replacement of the ECM requires that the new ECM be registered to the vehicle by the vehicle identification number (VIN). Using Subaru Select Monitor III.



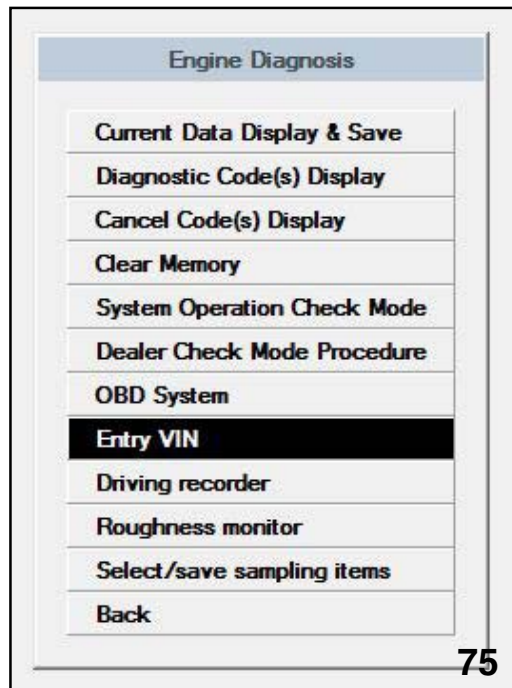
ECM Replacement Main Menu



All Other Models Main Menu



System Selection Menu



Engine Diagnosis Menu



VIN Registered in ECM

Follow the directions on the SSMIII to register the ECM. An ECM can only be registered once. Confirm the VIN before entering the number.

2012 Impreza Immobilizer Type B

The 2012 Impreza is equipped with a new Immobilizer system. This new system is identified as Immobilizer type "B". All previous Immobilizer systems will now be identified as type "A". The Immobilizer type "B" simplifies the registration of new parts and reduces the need to have all of the registered keys on hand to perform service work.

If an ECM or Combination Meter is replaced.

- Only the key accompanying the car to the dealer needs to be present. In this case only the replacement part needs to be registered.

If the BIU is replaced.

- All of the keys need to be present. (Remote Engine Start will need to be reprogrammed).
- The keys do not need to be replaced.

The Immobilizer type "B" does not utilize a security code and requires no teaching code when registering any part of the Immobilizer system. There will only be one metal tag on a new vehicle's key ring set. This tag is for the mechanical key code.

Security identification is through the use of one registered key. If all registered keys are missing, the BIU and Combination Meter must be replaced (and the number of keys requested by the customer). Four (4) keys and RES can be programmed to the Immobilizer system. The new Combination Meter and BIU will register the unregistered key.

Note: Driver's door must remain open during all registration procedures.

The following charts should be referenced when replacing single parts or multiple parts of the Immobilizer system.

When only one part is failed or lost

Destination	Parts failed/lost						Parts required to replace or prepared when items on the left fail					Procedures to perform after parts replacement			
	Key		Body integrated unit	Combination meter	Security CU	ECU	Key	Body integrated unit	Combination meter	Security CU	ECU	(1)	(2)	(3)	(4)
Others	Not all	All													
0	X					One registered key					"Immobilizer Key ID deletion" (Deleting lost keys)	"Immobilizer system registration" (Registering keys needed)			
0		X				Keys you want to register	#	#			Immobilizer system registration"				
0			X			All registered keys	X				Immobilizer system registration"				
0				X		One registered key			X		"Meter/SCU registration"				
0					X	One registered key				X	"Engine ECU registration"				

0 = Yes

X = Applicable Condition

= Not failed but must be replaced for security reasons

When two or more parts need to be replaced.

Electrical Systems Operation & Diagnosis Module (602)

Destination	Parts failed/lost						Parts required to replace or prepared when items on the left fail					Procedures to perform after parts replacement			
	Key		Body integrated unit	Combination meter	Security CU	ECU	Key	Body integrated unit	Combination meter	Security CU	ECU	(1)	(2)	(3)	(4)
	Others	Not all													
0	X			X			One registered key		X			"Meter/SCU registration"	"Immobilizer key ID deletion" (Deleting lost keys)	"Immobilizer system registration" (Registering keys needed)	
0	X					X	One registered key				X	"Engine ECU registration"	"Immobilizer Key ID deletion" (Deleting lost keys)	"Immobilizer system registration" (Registering keys needed)	
0		X	X				Keys you want to register	X	#			"Immobilizer system registration"			
0		X		X			Keys you want to register	#	X			"Immobilizer system registration"			
0		X				X	Keys you want to register	#	#		X	"Immobilizer system registration"			
0			X	X			Keys you want to register	X	X			"Immobilizer system registration"			
0			X			X	All registered keys	X			X	"Immobilizer system registration"			
0				X		X	One registered key					"Meter/SCU registration"	"Engine ECU registration"		

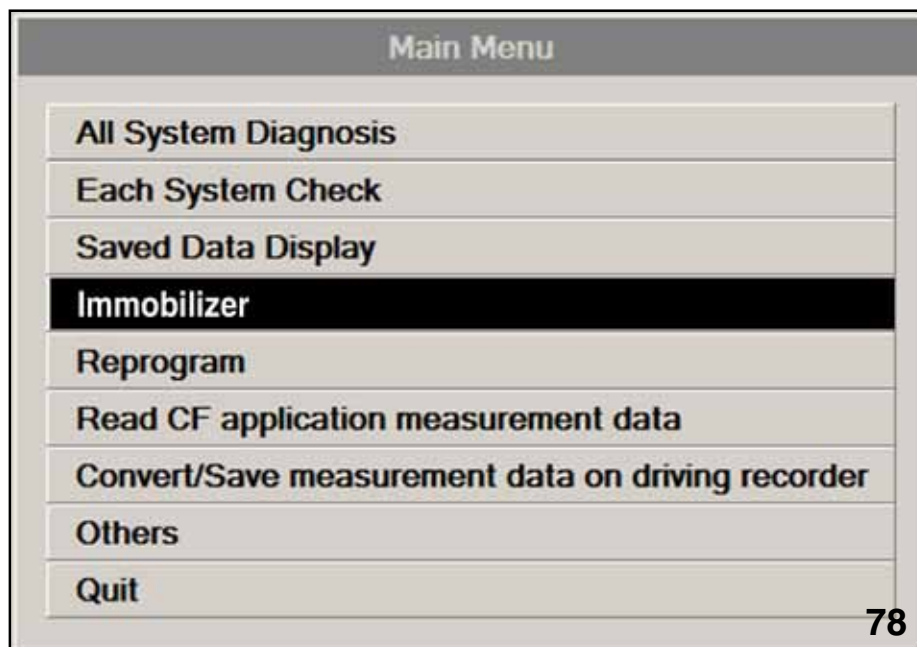
Parts and Service Guide for Two or more failed or lost Parts

0 = Yes

X = Applicable Condition

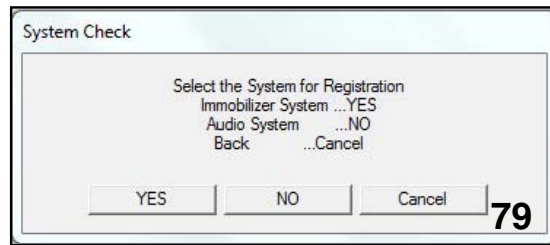
= Not failed but must be replaced for security reasons

The following is an example of the SSMIII screens and possible conditions that may exist for correct and incorrect registration procedures.



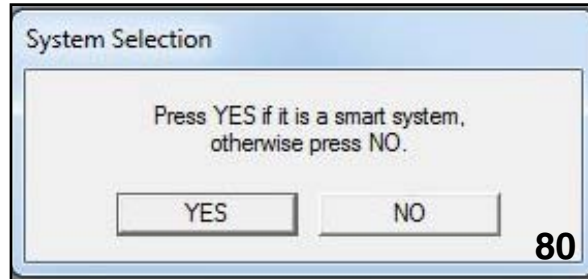
Main Menu

Enter the SSMIII Immobilizer menu and follow the instructions.



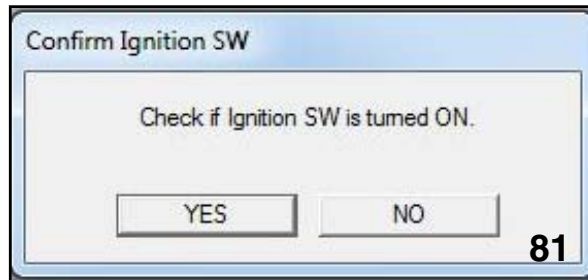
System Check

Press YES for Immobilizer.



System Selection

Press NO, if the vehicle is not Keyless Access and Push Button Start.



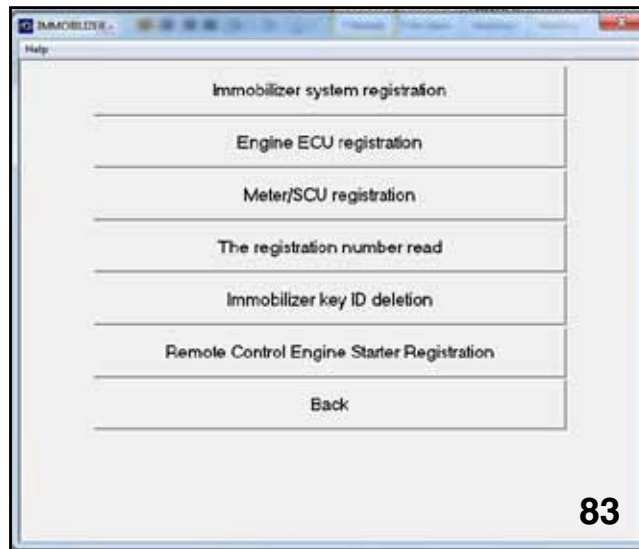
Confirm Ignition SW

The ignition switch should be in the on position.



Immobilizer

This screen confirms the correct procedure has been followed.



Immobilizer Menu-6 Choices

This decision screen provides 6 choices.

1. Immobilizer system registration-

This process closely resembles the procedure currently used for type A Immobilizer systems. New and old keys are registered with this selection. Use this selection when adding new keys (**old keys must first be deleted**), and when the BIU is replaced (**RES must also be registered using separate selection**).

Note: The only time the keys need to be replaced is when they are lost.

2. Engine ECU registration-

This process allows registration of the Engine ECU (ECM) and **eliminates the need to register each key.**

3. Meter/SCU registration-

This process registers a new Combination Meter and eliminates the need to register each key. SCU (Security Control Unit) is equipped on Canadian vehicles only.

4. The registration number read-

Indicates the number of keys registered to the car.

5. Immobilizer key ID deletion-

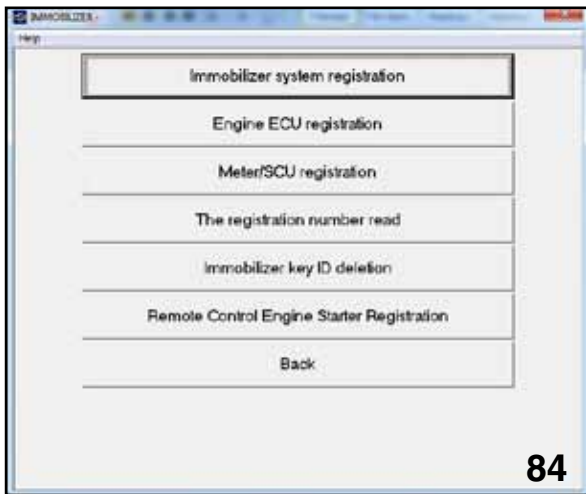
This process erases the registration of keys from the BIU except the one key that is in the ignition switch. This process is used when replacing lost or damaged keys.

Only 4 keys (plus RES) can be registered to the BIU.

6. Remote Control Engine Starter Registration-

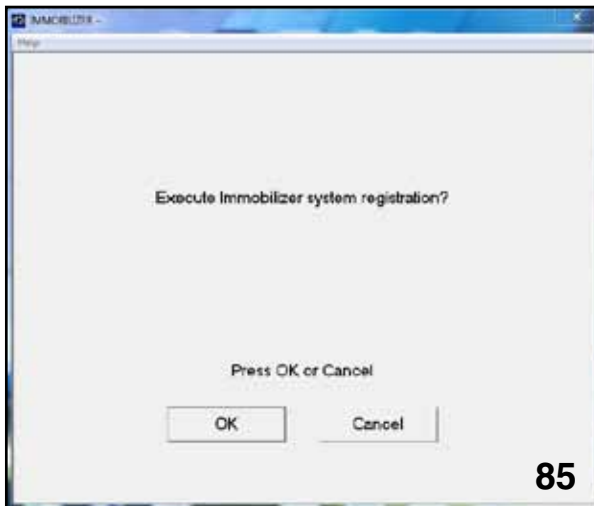
This process allows the RES to be registered to the BIU. This process should be utilized when installing RES to the vehicle or when replacing the BIU.

Immobilizer System Registration



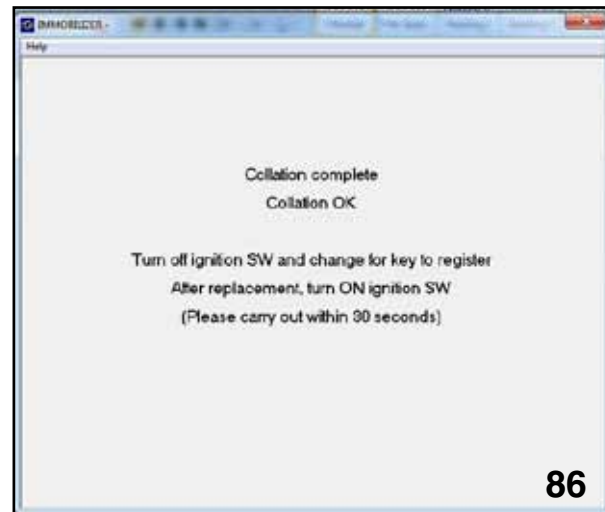
Immobilizer System Registration

This process closely resembles the procedure currently used for type "A" Immobilizer systems.



Execute Immobilizer

New and old keys are registered with this selection. Use this selection when adding new keys (old keys must first be deleted), and when the BIU is replaced. (RES must also be registered using separate selection).



Registering Each Key

This screen displays as the Immobilizer is registering each key.

If this process is accidentally exited before completion of the first key, no key will start the vehicle. (No DTCs will be created)

Correction to this condition is performed by the following:

1. Turning off the ignition and remove the key.
2. Wait for about 1 minute with the door open.
3. After one minute the BIU will enter sleep mode and click can heard from underneath the steering wheel.
4. Begin the Immobilizer system registration from the beginning.
5. Test all keys for engine start after completion.



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Registration Successful

Follow the instructions on the screen until the Immobilizer main menu is displayed.



89

Previously Registered Key

This information is displayed after attempting to register a previously registered key.



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Failed Screen

Failure to change keys within 30 seconds results in the registration of one key only. Perform the Immobilizer registration process from the beginning to register all keys.

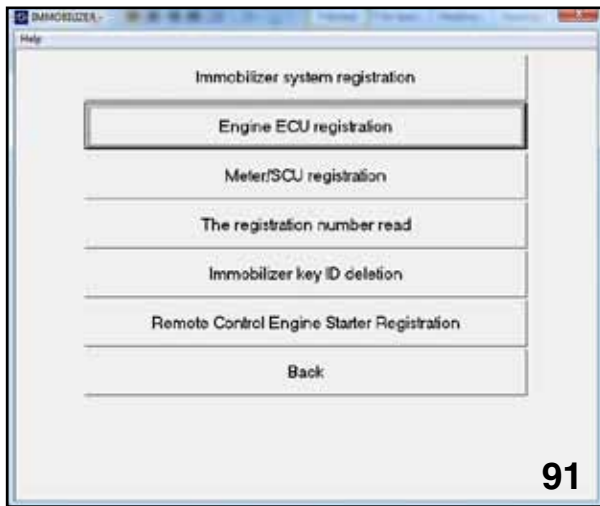


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Failed Unregistered Key

This information will be displayed if an unregistered key is being used to begin the Immobilizer registration process. Remove that key and replace the key with one that is already registered.

Engine ECU Registration



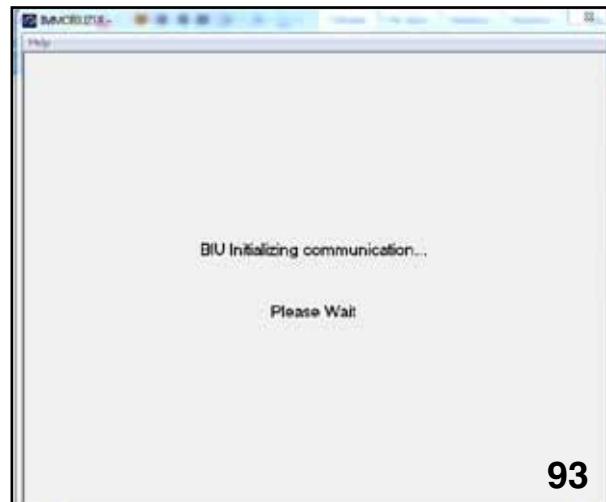
Immobilizer - Engine ECU Registration Choice

This process allows registration of the Engine ECU) and eliminates the need to register each key.



REGISTER THE ECM (ECU)

This must be performed when a new Engine ECM is installed.



BIU Initializing

This screen will display as the BIU communicates with the new Engine ECM.



Engine ECU Successful

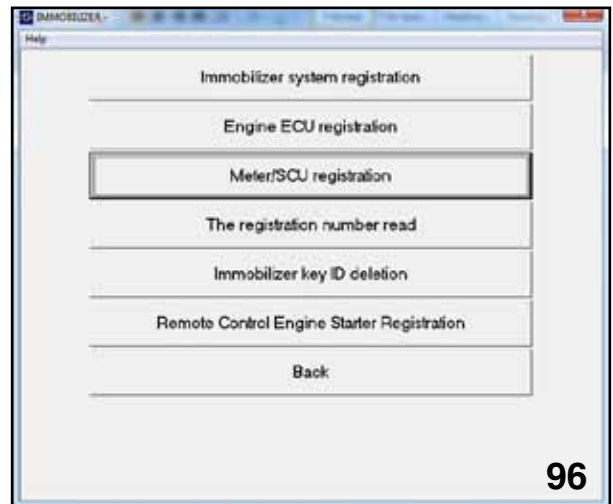
This screen will display if the registration process of the new Engine ECM completed correctly.



Engine ECU Registration Exit

Follow the instructions on the screen until the main Immobilizer menu is displayed.

Meter/SCU Registration



Meter / SCU Registration

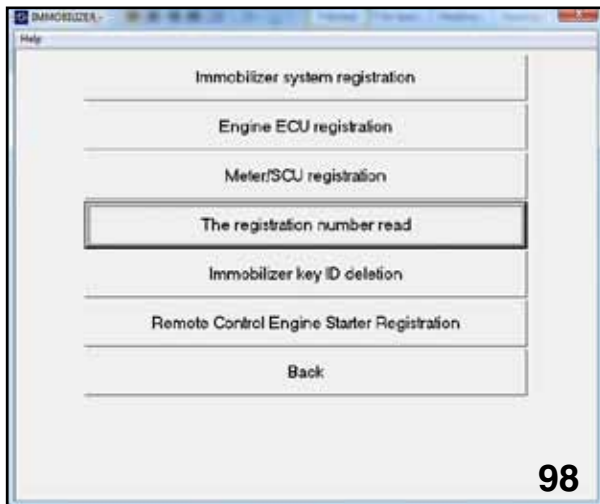


Execute Meter / SCU Registration

This process registers a new Combination Meter and eliminates the need to register each key. SCU (Security Control Unit) is equipped on Canadian vehicles only.

Follow each instruction on the screen until the Immobilizer menu is displayed.

The Registration Number Read



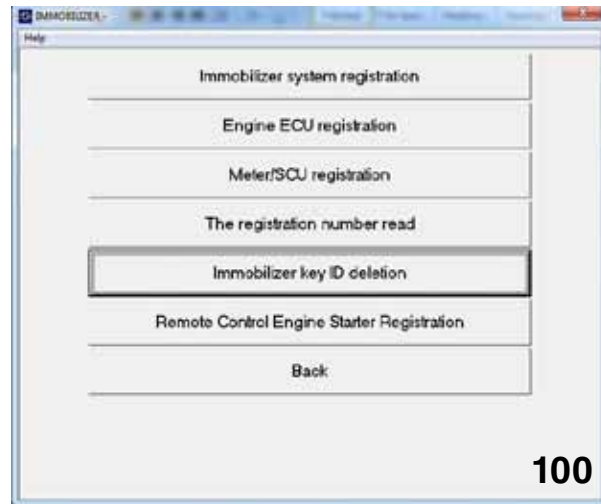
The Registration Number Read

The display will indicate the number of registered keys but will not indicate if the vehicle is equipped with RES.



How Many Keys Registered to Car

Immobilizer Key ID Deletion



Immobilizer Key ID Deletion

This process is used when replacing lost or damaged keys.



ID Deletion

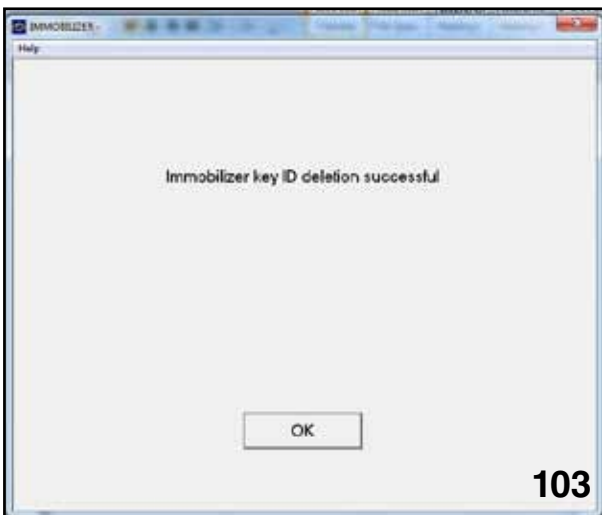
This process erases the registration of keys from the BIU except the one key that is in the ignition switch.

Only 4 keys (plus RES) can be registered to the BIU.



Erasing The Registration

This screen will be displayed as the BIU is erasing the registration of all keys except the key in the ignition switch.



Deletion successful

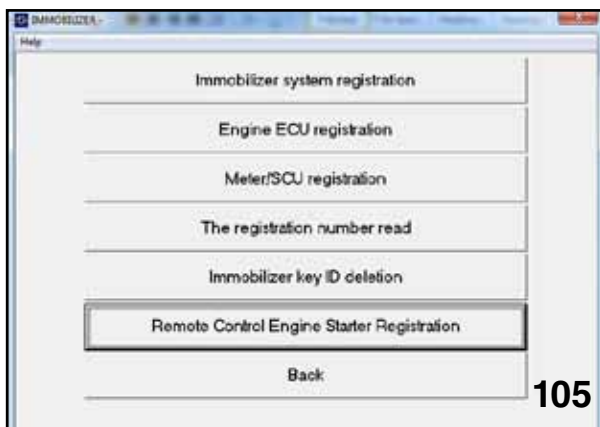
This screen indicates the deletion process finished correctly.



Deletion Exit

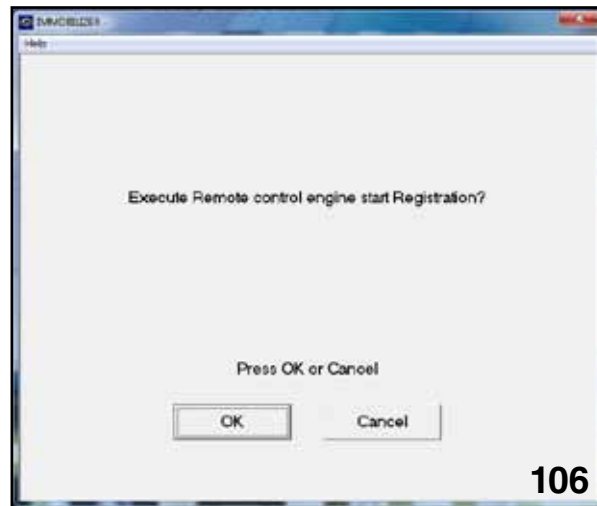
Follow each instruction on the screen until the Immobilizer menu is displayed.

Remote Control Engine Starter Registration



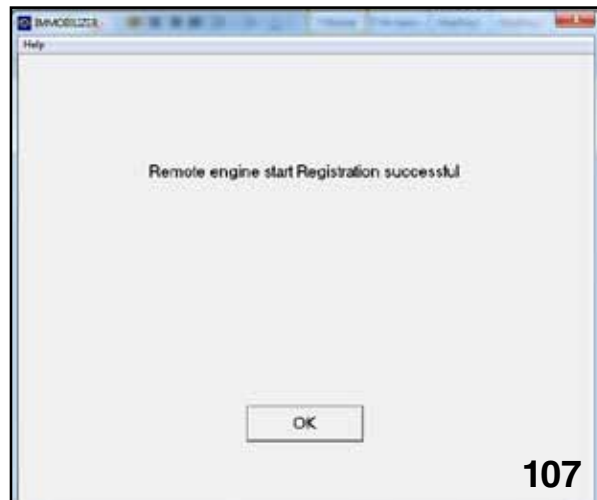
Remote Control Engine Starter Registration

This process allows the RES to be registered to the BIU.



Start Registration

This process should be utilized when installing RES to the vehicle or when replacing the BIU.



Registration Successful

Follow each instruction on the screen until the Immobilizer menu is displayed.



Exit

This screen indicates the RES was correctly registered.

Note: If a door of the vehicle is opened during RES operation, the RES turns the vehicle off and generates the following DTCs. These DTCs appear only as past codes. This condition is described as normal operation and requires no diagnosis or repair.

Examples of DTC Codes:

Code	Description & trouble position	Trouble occure...	Trip Count	Time Count	Count	
Number of Diagnostic Code(s): 2						
B1402	Immobiliser Key collation NG	—	0	0	Common	
B1410	Transponder communication abnormal	—	0	0	Common	

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DTC Codes

NOTES:

Keyless Entry

Function of Keyless Entry System



Keyless Transmitter



2011 Forester TPMS and Keyless Entry Control Unit

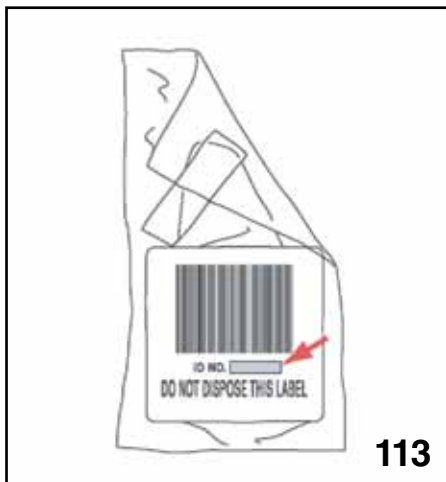
Function	Function method	Action on a vehicle	Answer back
Locking the doors	Press the Lock button once.	All doors lock.	The hazard flasher blinks once and the buzzer sounds once (if all the doors were closed when the Lock button was pressed).
			The hazard flasher blinks 5 times and the buzzer sounds 5 times (if any of the doors were open when the Lock button was pressed).
Unlocking the doors	The first time: Press the Unlock button once.	Only the driver's door unlocks. (*1)	The hazard flasher blinks twice and the buzzer sounds twice.
	The second time: Press the Unlock	All doors unlock.	
Unlocking the trunk lid	Press and hold the Trunk lid/Rear gate button for at least 2 seconds	Only the trunk lid unlocks.	The hazard flasher blinks twice and the buzzer sounds twice.
Unlocking the rear and gate.	Press the Trunk lid/Rear gate button once.	Only the rear gate unlocks.	The hazard flasher blinks twice and the buzzer sounds twice.
Panic alarm	Press the Panic button once.	The horn sounds and the hazard flasher blinks continuously.	
Stopping the panic alarm	Press any button once.	The horn stops sounding and the flasher stops blinking.	
Buzzer ON/OFF	(1) Press the Unlock button once.	The buzzer setting switches from ON to OFF.	The hazard flasher blinks twice and the buzzer sounds twice.
	(2) Simultaneously press and hold both the Lock and Unlock buttons for at least 2 seconds.	The buzzer setting switches from OFF to ON.	The hazard flasher blinks once and the buzzer sounds once.
Vehicle finder function	Press the Lock button 3 times in succession within 5 seconds.	The horn sounds once and the hazard flasher blinks 3 times.	
Confirming that doors are closed.	(1) Press the Lock button once when a door is open. (2) Close all the doors.	All doors lock.	The hazard flasher blinks once

***1: If any of the doors are open when you press the Unlock button (even for the first time), all the door will unlock.**

How To Register the Transmitter

Using the Subaru Select Monitor

- 1) Make a note of the ID number. A label showing the ID number is affixed either to the bag containing the transmitter or the circuit board inside the transmitter.



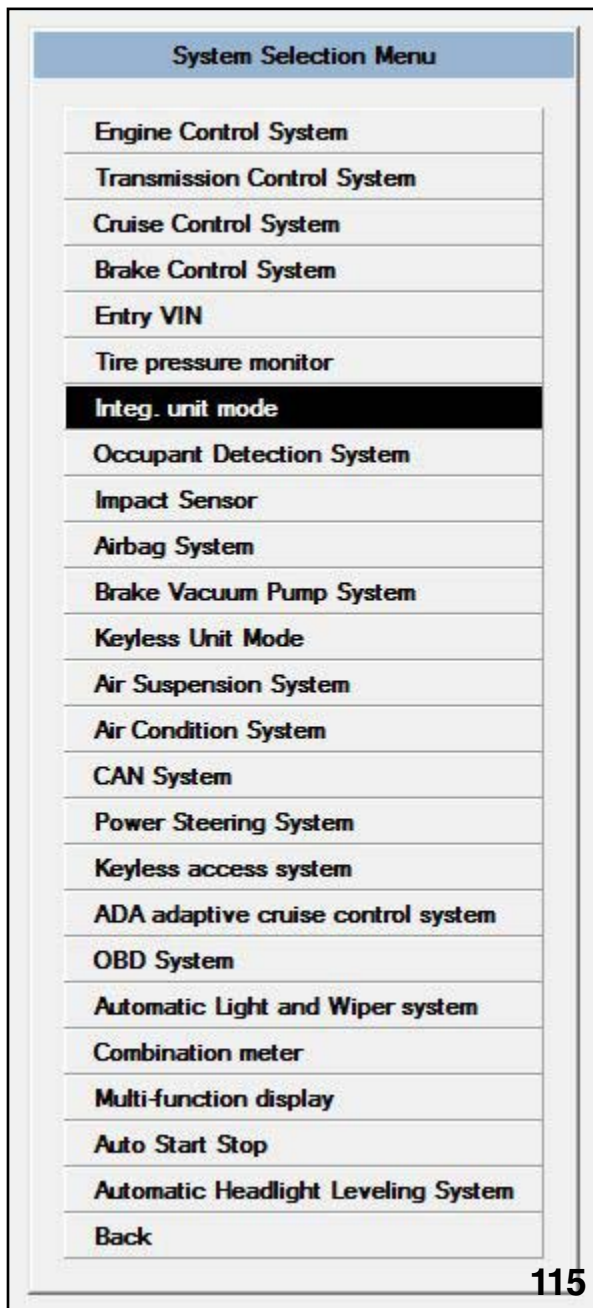
Bag (ID Number)



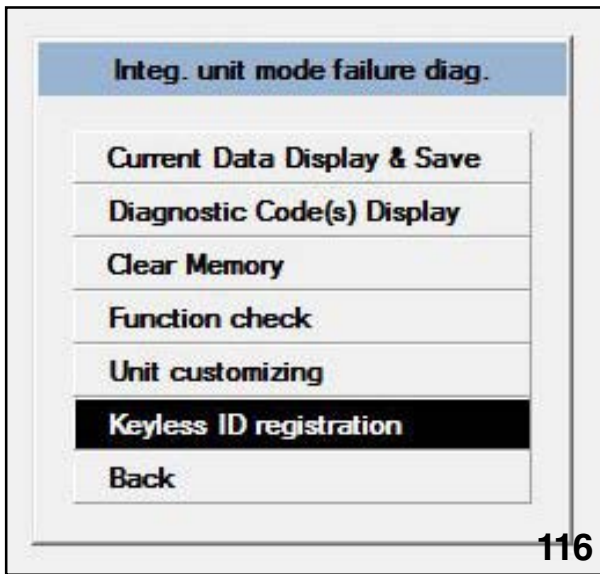
Open Transmitter

- 2) Connect the Subaru Select Monitor (SSMIII) to the vehicle.
- 3) Turn the ignition switch to the ON position.

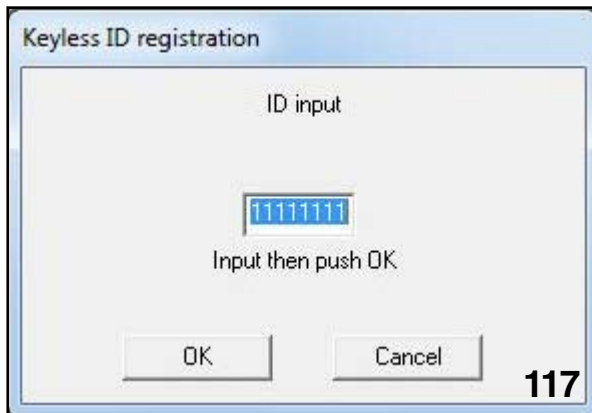
- 4) Operating the SSMIII as described below.



System Selection Menu



INTEG. UNIT Mode Failure Diag.



ID Input



ID Input

- Use the [Δ] key or the [∇] key on the SSMIII to change the number, and then use the [\triangleleft] key or the [\triangleright] key to move to the next digit.



ID Confirmation



ID Complete

- Confirm the displayed number with the number recorded in step 1.
- Press “yes” to enter another transmitter code. Press “no” to end the procedure. A maximum of four transmitters can be registered to a single vehicle.

Note: Press and hold a button on the transmitter after programming to complete the registration process.

NOTE: Go to page 140 of Supplemental information for Keyless Entry Registration of newer vehicles.

Security System

The security system for the 2005 and newer Legacy vehicles is controlled by the BIU. The security system and its chosen operating characteristics must be set and adjusted with the SSMIII.

The following select monitor displays briefly introduce the items to be set and adjusted.

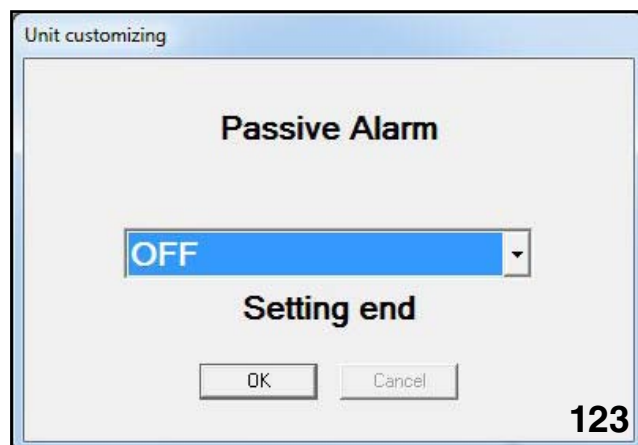


Security System



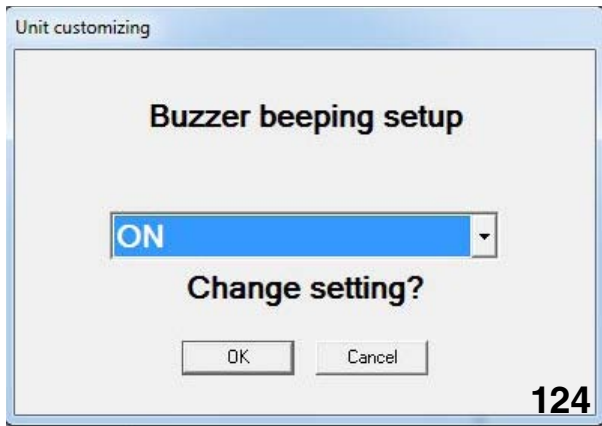
Alarm Delay Setup

Alarm Delay Setup-The Alarm System is activated by the keyless entry transmitter. The Alarm system can be adjusted to arm immediately or enter a 30 second delay. This is accomplished using the "Alarm delay Setup." During the 30 second delay the security light will flash at 5 Hz and change to a 1 Hz flash when the system is armed.

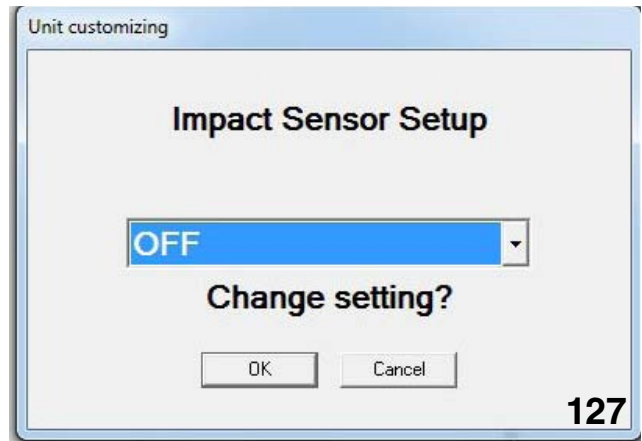


Passive Mode

Passive mode-The Alarm system is activated by exiting the vehicle. The Alarm system will arm 60 seconds after all doors are closed. This time cannot be adjusted.



Answer-Back Buzzer Setup



Impact Sensor Setup

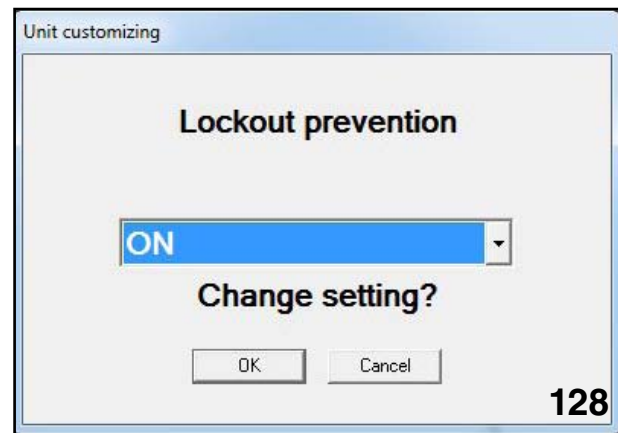
Sensitivity is adjustable on a scale of 1 to 10 with 5 being the setting from the factory.

The smaller number is, the more sensitive the sensor becomes.



Hazard Answer-Back Setup

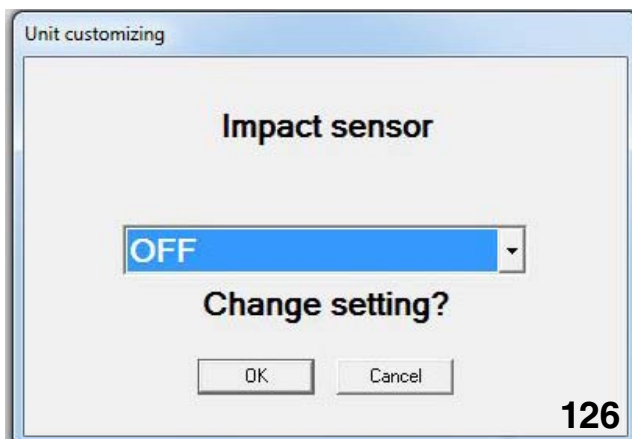
The Buzzer Beeping setup and the Hazard Light answer back can be programmed to respond or not to respond to the arming or disarming of the Alarm system.



Lockout Prevention

Lock out prevention is also adjustable. This prevents the vehicle from being locked while the keys are in the ignition.

This functions when using the lock button to lock the vehicle only.



Impact Sensor

The impact sensor must be turned ON and the sensitivity adjusted.

Remote Engine Start System (RES)

Note: Impreza 2008 and Forester 2009 are the first year of RES for those models.

All 2007 Subaru B9 Tribeca and Legacy models are pre-wired for a new Remote Starter accessory (Available for port or dealer installation). This accessory includes an additional wireless key fob that can start/stop the engine. This allows the driver to pre-warm or cool the interior prior to entering the vehicle. The climate controls must be set to the on position before exiting the vehicle.

The Remote Engine Start system (RES) operates by commanding currently installed vehicle components with signals from the RES control module.

The RES is designed to operate the engine for 15 minutes after an RES start. Unless the engine speed drops below 500 R.P.M. or increases to over 3000 R.P.M.

Note: (RES will not start the vehicle if the battery voltage is below normal).

Pressing on the brake pedal will deactivate the RES and the engine will return to off. (Opening of the drivers door will also turn off RES on some models.)

This system has been designed to work with the Immobilizer system by registering the RES software card and immobilizer interface as one ignition key. These two parts must be replaced if the BIU is replaced, along with the ignition keys currently programmed to the immobilizer system.

A service mode is available that will deactivate the RES.

Tachometer Idle Speed Programming

NOTE: IF YOU DID NOT PROGRAM THE VEHICLE'S TACH IDLE SPEED AS INSTRUCTED IN the installation instructions the vehicle will not attempt to start instead you will get three additional beeps FROM THE HORN.

THE RES SYSTEM MUST LEARN A VALID IDLE SPEED PRIOR TO ATTEMPTING TO PROGRAM THE IMMOBILIZER INTERFACE.

1. Open driver's door (leave open throughout programming operation).
2. Turn the ignition key to the ON or RUN position.
3. Press and hold the momentary programming button for approximately 10 seconds until the vehicle's horn honks (3) times.

Note: RES systems that are connected to the CAN do not require tachometer idle speed programming. See installation instructions for details.



Momentary Programming Button

4. Release the momentary programming button.
5. Press and release the momentary programming button. The vehicle's horn will honk (4) times.
6. Press and release the vehicle's brake pedal (1) time. The horn will honk (1) time to indicate that the system has entered tachometer idle speed programming mode.
7. Start the vehicle with the ignition key. The RES system will begin honking the vehicle's horn 1 time every 3 seconds to indicate a valid tach signal.
8. When the engine has settled to a normal idle speed (normally 750-1000 RPM), press and release the brake pedal (1) time. The horn will honk (2) times to indicate the system has exited tach idle speed programming.

NOTE: Be sure that the vehicle has maintained 750-1000 RPM idle speed prior to exiting tachometer idle speed programming.

Immobilizer Interface Programing

NOTE: The immobilizer interface will be programmed to the vehicle as an ignition key. This will take up one of the 4 slots available in the BIU. Three additional keys may be programed to the vehicle.

Note: Only one key fob is registered during this step but both key fobs will operate the res.

Starting your Vehicle

The remote control start function activates by pressing the START (key icon) button twice within 3 seconds on your remote control transmitter. The system will check certain **preconditions before starting, and if all safety parameters are correct, the engine will start within 5 seconds. If the vehicle's starter cranks but does not start or starts and stalls, the remote engine start system will power off then attempt to start the vehicle an additional four times. If the remote start system shuts down 2 seconds after starting the vehicle, the vehicle has a battery problem.

WARNING: ***AVOID DANGER OF CARBON MONOXIDE, NEVER REMOTE START A VEHICLE IN A CLOSED SPACE SUCH AS A CLOSED GARAGE.***

Turning Your Vehicle Off

Press and hold the START (key icon) button again to turn the vehicle off. If the vehicle is left running the remote start system will allow the vehicle to run for a total of 15 minutes and then automatically turn off.

Entering the Vehicle While it is Running via Remote Start

1. Unlock the vehicle doors using the factory keyless remote. If the vehicle's doors are unlocked manually using the key, the vehicle's security system will trigger and the remote start system will turn off. Inserting the ignition key into the ignition cylinder and turning it to the ON or Run position will disarm the security system.
2. Enter the vehicle. Do not press the brake pedal.
3. Insert the key into the ignition and turn to the ON position. If the ignition key is accidentally turned to the start position, the system's "starter anti-grind" feature will prevent the starter from re-cranking.
4. Press brake pedal. The RES disengages, the vehicle's power window features are re-enabled and the vehicle will operate normally.

To engage the service mode, turn the ignition key to the ON or Run position, depress and hold the brake pedal then, press and release the START (key icon) button on the remote control transmitter three (3) times. The system will pause for one second and then flash the parking lights three (3) times indicating the system is in service mode. When attempting to activate the remote start system while in service mode, the parking lights will flash three (3) times and will not start.

To disengage the service mode, turn the ignition key to the On or RUN position, depress and hold the brake pedal, then press and release the START (key icon) button on the remote control transmitter three (3) times. The system will pause for one second and flash the parking lights one (1) time indicating that the system has exited service mode.

* *Key in ignition or hood open, inspection mode connector connected

Important Note: When taking your vehicle in for service, it is recommended that you inform the service personnel that your vehicle is equipped with a remote start system.

Electrical Systems Operation & Diagnosis Module (602)

Remote (RES) Transmitter Programming Mode

1. Open the driver's door (the driver's door must remain opened throughout the entire process).



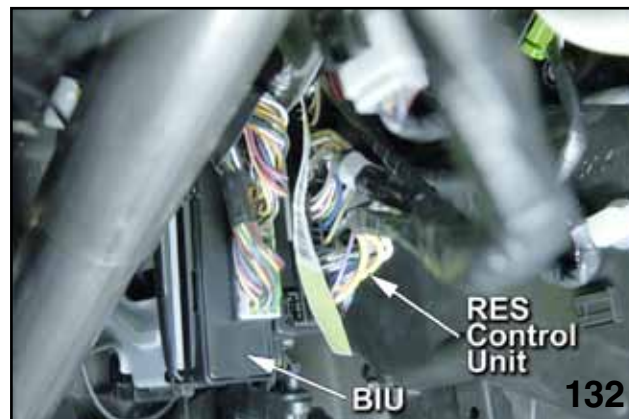
Remote Transmitter

2. Insert the ignition key into the vehicle's ignition cylinder and turn to the ON or Run position.
3. Locate the small black programming button behind the fuse box cover on the left side of the driver's side lower dashboard.
4. Press and hold the black programming button for 10-15 seconds. The horn will honk and the parking lights will flash three times to indicate that the system has entered transmitter programming mode.
5. Press and release the START (key icon) button on each transmitter. The horn will honk and the parking lights will flash one time to indicate a successful transmitter learn each time the START (key icon) button is pressed.
6. To exit transmitter programming mode, turn the ignition key to the OFF position, remove the ignition key from the ignition cylinder and test operation of the remote transmitter(s).

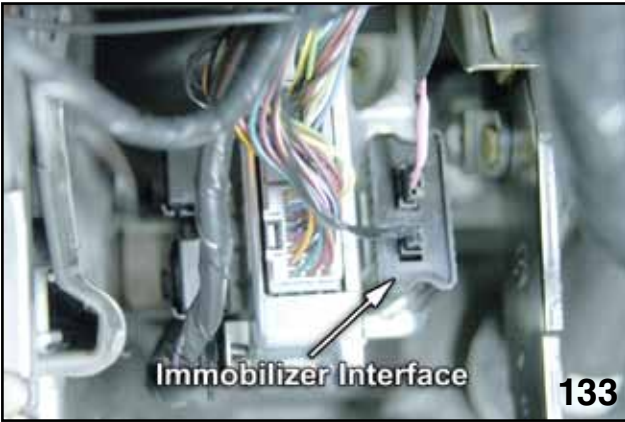
Enabling / Disabling Confirmation Horn Honks

1. Follow steps 1-4 in "Remote transmitter Programming Mode" above.
2. Pressing the vehicle's brake pedal will enable the confirmation horn honk feature. The vehicle's horn will honk 1 time to indicate that confirmation horn honks have been disabled and honk 2 times to indicate that confirmation horn honks have been enabled.
3. To exit programming mode, turn the ignition key to the OFF position, remove the ignition key from the ignition cylinder and test operation of the remote transmitter(s).

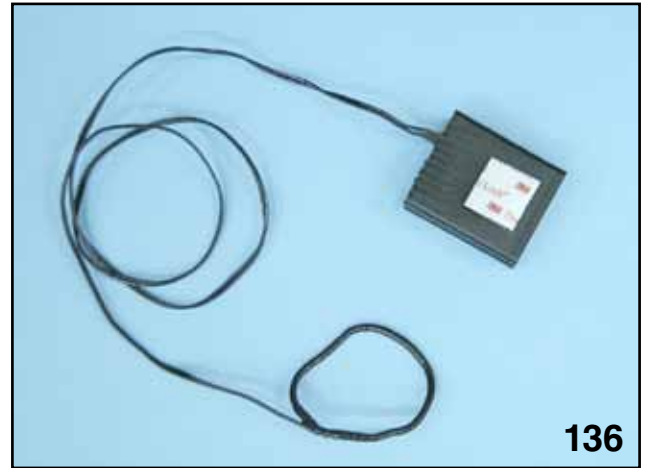
Check STIS for the most up to date information in the owner's manual on the remote engine start system.



BIU & RES Control unit Location



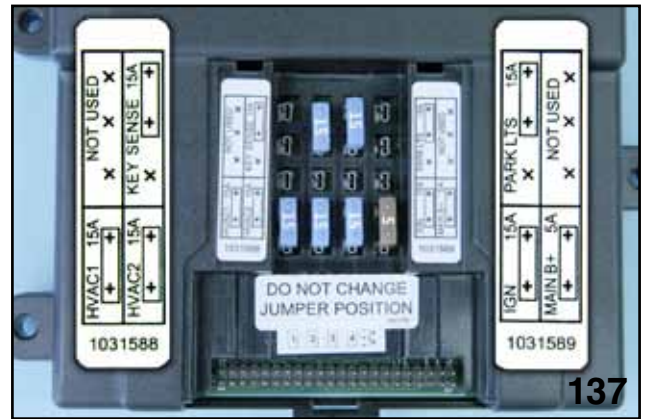
Immobilizer Interface Location



Immobilizer Interface



Software Card & Res Control Unit



Inside Res Control Unit, Under Software Card



RES Software Card

NOTE: IF THE BIU IS REPLACED ALL KEYS, SOFTWARE CARD AND IMMOBILIZER BOX OF THE RES MUST BE REPLACED.

IMMOBILIZER INTERFACE PROGRAMMING

NOTE: The immobilizer interface will be programmed to the vehicle as an ignition key

- 1. Plug the "Subaru Diagnostic Interface" (SDI) cable into the vehicle's diagnostic plug.
- 2. Turn one of the ignition keys to the RUN position.
- 3. Press the SDI Menu and C buttons until the SDI enters into "Stand Alone Mode".
- 4. Using the arrows on the SDI, select Subaru Vehicle and press enter.
- 5. On the SDI screen select "IMM Regist" using the arrows and then press enter.
- 6. The screen will display "Execute Key Reg?", press enter.
- 7. The SDI screen will prompt for the 4-digit teaching operation code (this is a number specific to the B9 Tribeca). Using the arrows, enter the teaching operation code and press enter.
- 8. The SDI screen will prompt for the 5-digit security ID (this number is vehicle specific and is located on the large metal tag attached to the vehicle's keys). Using the arrows, enter the vehicle specific security ID and press enter.
- 9. The SDI screen will display "Registering Key". After registration is complete, the SDI screen will display "Program 2nd Key", press enter.
- 10. The SDI screen will display "Key Change", turn the ignition OFF and turn the ignition ON using the 2nd key.
- 11. The SDI screen will display "Register Key?", press enter.
- 12. The SDI screen will display "Registering Key". After registration is complete, the SDI screen will display "Program 3rd Key", press enter.
- 13. The SDI screen will display "Key Change", turn the ignition OFF and turn the ignition ON using the 3rd key.
- 14. The SDI screen will display "Register Key?", press enter.
- 15. The SDI screen will display "Registering Key". After registration is complete, the SDI screen will display "Program 4th Key", press enter.
- 16. The SDI screen will display "Key Change", turn the ignition OFF and remove the 3rd key.
- 17. Press and release the remote start system programming button one time to access "Immobilizer Interface Registration Mode".
- 18. Activate the remote start system by pressing the transmitter START (key icon) button (2) times.
- 19. The ignition will power and the SDI will display "Register Key?", press enter.
- 20. The SDI screen will display "Registering Key". After complete, the SDI screen will display "Ending Key Reg", press the vehicle's brake pedal (1) time to exit "Immobilizer Interface Registration Mode" and turn the vehicle's ignition off.

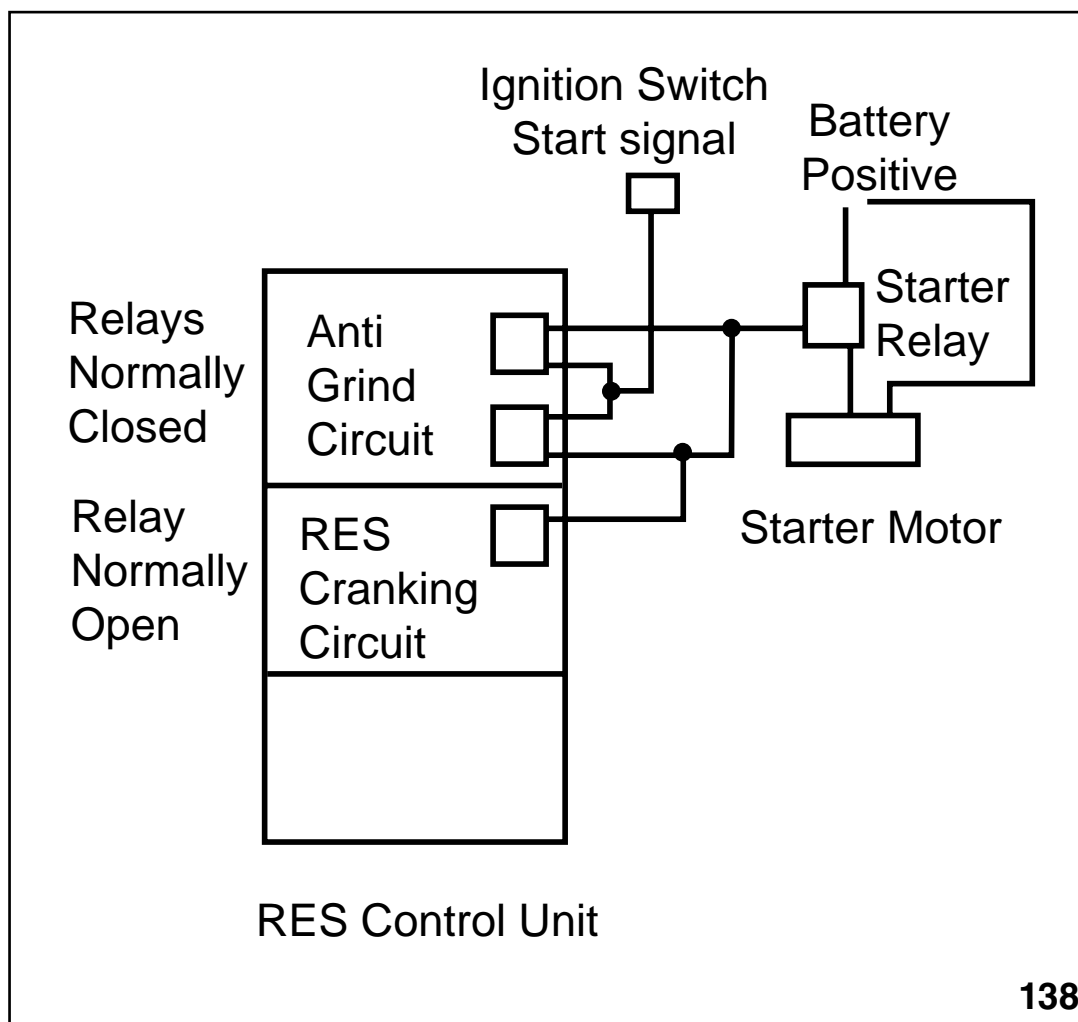
NOTE: The above steps assume that all (3) vehicle ignition keys are available at time of installation. If any keys are not present during programming, they will not operate the vehicle after these steps are completed.

NOTES:

The RES (Remote Engine Start) controls and provides the following features.

- Starter motor operation
- Anti grind
- Power supply to the Acc circuit
- Power supply to IGN 1 and IGN 2 circuit
- Horn output
- Door locking
- Power window lock out
- Power supply for security system

These controls and features are only available during RES Operation.



RES Schematic During Operation

Anti-Grind

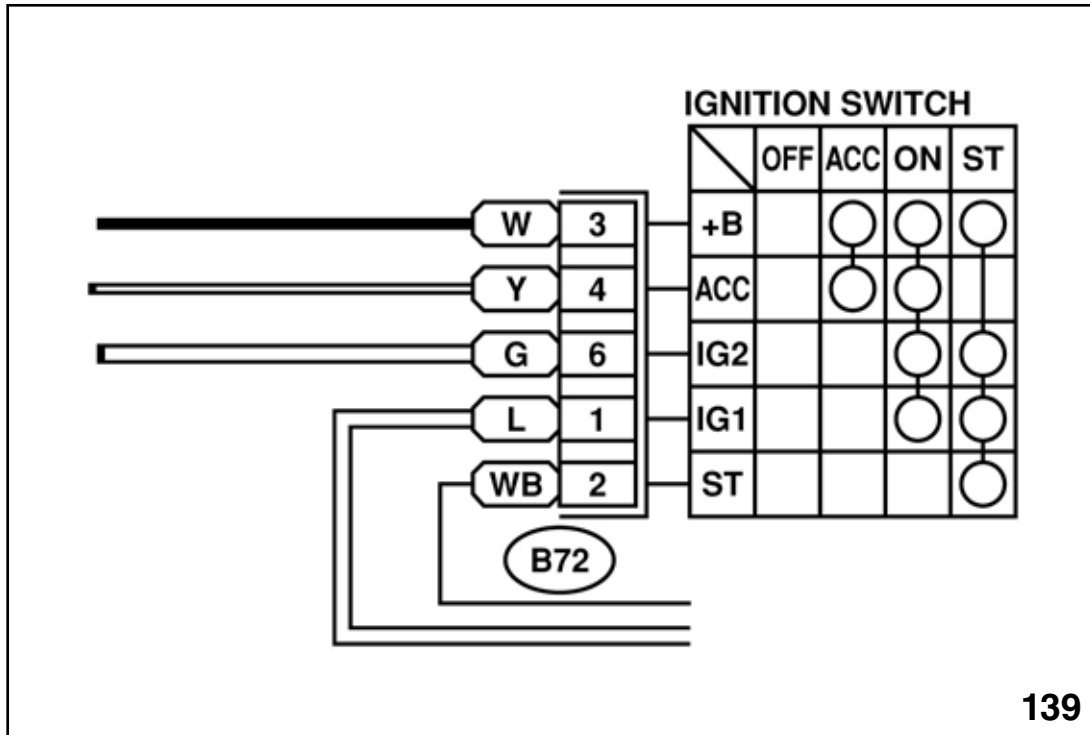
Two relays are used to provide redundancy.

Even when the engine is started with the ignition key, the power from the ignition switch is routed through the RES control unit. During RES operation these normally closed relays are opened and any power from the ignition switch (start signal) is prevented from going to the starter solenoid.

Starter Motor Operation

The RES cranking relay delivers power to the starter solenoid during RES operation.

The relay is deactivated when the engine speed signal from the ECM exceeds cranking speed.



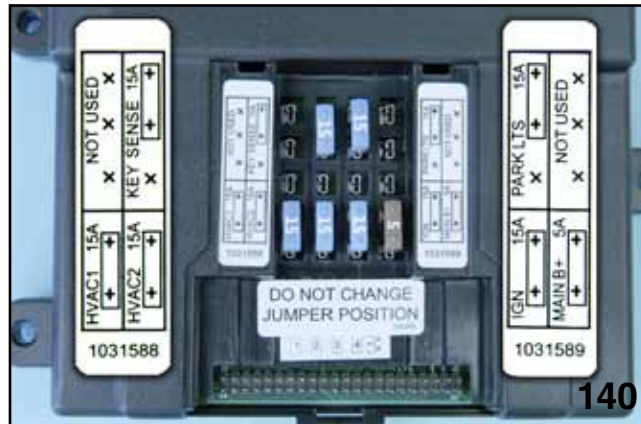
RES Ignition Switch

Accessory Power Supply

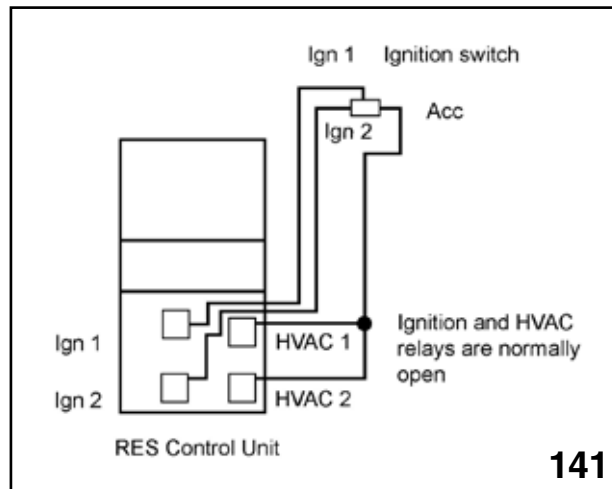
Two relays are used to deliver the amperage that may be required.

The accessory circuit power supply can be traced on STIS (Service Manual)

Currently the fuse labeling in the RES control unit marked HVAC 1 and HVAC 2 protect the RES accessory power supply circuits and Relays. Future production of RES control units will have these fuses labeled ACC 1 and ACC 2.



Inside RES Control Unit



RES Wiring

Additional RES information

Note: The ground for the power window relay is part of the RES circuit. (If the RES control unit is removed from the vehicle, the power windows will not operate.)

- RES Summary of events
- Installation-(Close hood and open windows)
- Idle speed learning
- Program Key fobs to RES
- Program all keys and key fob to Immobilizer.

(Do not forget to push the programming button during key fob Immobilizer registration.)

RES Diagnostics

Prior to beginning the trouble shooting procedure below, verify the following:

1. The vehicle's battery is fully charged.
2. All remote engine start harness connections are secure.
3. Please have a copy of the remote engine start installation and owner's instructions for reference.

	Symptom	Check	Yes	No
1	Vehicle's horn honks an additional two times after remote start confirmation.	A) Verify that the vehicle's hood is closed. B) Verify that the vehicle's brake pedal is not depressed. C) Verify that the ignition key was not left in the ignition cylinder. D) Verify that the remote start system is not in "Service mode"	End	A) Replace the hood safety switch and hood safety switch jumper harness. B) Verify operation of the vehicle's brake pedal switch and replace if necessary. C) Take the system out of "Service Mode" refer to Owner's Manual. D) Replace the remote start control module.
2	Vehicle's horn honks an additional four times after remote start confirmation.	A) Follow the installation instructions for tach idle speed programming. B) Verify that the remote start harness 24-way connector is securely connected to the vehicle's pre-fit 24-way connector.	End	Replace the remote start control module.
3	The vehicle starts then stalls when the remote start system is activated and the dashboard security light remains on solid.	Verify that the immobilizer interface module is installed as per the installation instructions and programmed	End	Replace the remote start immobilizer interface module and software card.
4	The vehicle starts when the remote start system is activated but the air conditioning/heater does not turn on.	A) Verify that the vehicle's air conditioning/heater controls are pre-set prior to activating the remote start system. B) Verify that the remote start harness 6-way ignition switch connectors are properly seated. C) Verify that the remote start module 15 AMP HVAC1 and HVAC2 fuses are not blown	End	A) Replace the 15 AMP HVAC1 and HVAC2 fuses as necessary and test operation. Replace the remote start control module.
5	The remote engine start system does not turn on the vehicle's ignition after receiving remote start confirmation.	B) Verify that the remote start harness 6-way ignition switch connectors are properly seated. C) Verify that the remote start module 15 AMP IGN fuse is not blown.	End	Replace the 15 AMP IGN fuse as necessary and test operation. Refer to Figure A.B) Replace the remote start control module.
6	The vehicle's ignition turns on when the remote engine start system is activated but does not crank the starter.	Verify that the remote start harness 6-way ignition switch connectors are properly seated.	End	Replace the remote start control module.
7	The vehicle's power windows operate while the vehicle is operating by the remote engine start system.	Verify that the remote engine start 2-way connector is properly connected to the vehicle's pre-fit 2-way connector.	End	Replace the remote start control module.

Electrical Systems Operation & Diagnosis Module (602)

	Symptom	Check	Yes	No
8	The vehicle's perimeter security system triggers when the door is opened while running by the remote engine start system.	A) Was the driver's door unlocked using the remote keyless entry transmitter? The perimeter security system will not disarm when the doors are unlocked using the ignition key. B) Verify that the remote engine start harness 24-way connector is properly connected to the vehicle's 24-way pre-fit connector.	End	Replace the remote start control module.
9	The perimeter security feature does not arm when the vehicle is operating by remote engine start.	A) Verify that all vehicle doors and hatch/truck are closed. B) Verify that the remote engine start harness 24-way connector is properly connected to the vehicle's 24-way pre-fit connector	End	Replace the remote start control module.
10	The remote engine starter transmitter range is poor. (Normal operating range should be 500'-800' depending on vehicle angle and RF interference)	A) Test and replace batteries as necessary in the remote transmitters. B) Verify that the remote engine start antenna is properly mounted and plugged into the remote start control module.	End	A) Replace the remote start transmitters. B) Replace the remote start antenna.
11	The vehicle's parking lights do not flash when the remote engine start transmitter button is pressed and do not turn on when the vehicle is operating by remote engine start.	A) Verify that the vehicle's parking lights turn on using the vehicle parking light switch. B) Verify that the vehicles parking light fuse is not blown and replace as necessary. C) Verify that the remote engine start system's 15 AMP parking light fuse is not blown and replace as necessary (refer the Figure A). D) Verify that the remote start harness 24-way connector is properly connected to the vehicle's 24-way per-fit connector.	End	Replace the remote start control module.
12	The vehicle's horn emits 1 long honk when the remote start system is activated.		End	Verify operation of the vehicle's key-in warning switch and replace as necessary.
13	The remote start system shuts down 2 seconds after starting the vehicle.	Check vehicle's battery for a low voltage condition and replace as necessary.	End	

Electrical Systems Operation & Diagnosis Module (602)

Subaru Remote Engine Start Troubleshooting Guide

Operational Conditions

	Symptom	Check	Yes	No
14	The vehicle's power windows do not operate while the vehicle is operating by the remote engine start system.	The remote engine start system is equipped with a power window disable feature during remote start operation.	End	
15	The remote start system is activated while any door is open and then all doors are closed, the doors remain unlocked. If you open any unlocked door the security system triggers and the remote start shuts down.	This is a normal function. If a door is left open during remote start activation, the automatic lock feature is disabled for that cycle to prevent accidentally locking the ignition keys in the vehicle. While the vehicle is running by RES, once all doors are closed, the door security protection arms. If a door is opened at anytime, the security system will trigger and the RES system will shut down.	End	
16	The remote start system is activated while any door is open, the customer enters the vehicle and closes all doors (the door security protection arms and the vehicle's doors remain unlocked). The ignition key is turned to the ON or RUN position. Any door is opened causing the horn to honk one time and the vehicle will stay running.	This is a normal function. When the ignition key is turned to the ON or RUN position the RES system is still in operation until the brake pedal is pressed, the transmitter button is held for 2 seconds or the door security protection is triggered. Because the RES system is still operating, opening any door will trigger the door security protection causing the horn to honk one time and the RES system will disengage and the ignition key will take over operation of the vehicle. Approximately 1 second after the RES system disengages, the system will recognize that the ignition key is in the ON or RUN position allowing the door security protection system to disarm.	End	
17	The RES fob unlock button is pressed within 5 seconds of shutting down the remote start system, the doors will unlock but the door security protection will trigger when any door is opened.	This is a normal function. When the remote start system shuts down by any means (15 minute run time expires, transmitter shutdown, hood opened, engine over-rev or stall) the vehicle's security module will initiate a security monitor and re-arm process that will prevent security system disarm for approximately 5 seconds.	End	

2010 and Newer Legacy



TRUNK SWITCH

An electrical switch on the lower left dash panel opens the trunk. This feature turns off at a vehicle speed of greater than 5 miles per hour. The BIU must be set to Sedan or this feature will not function.



Trunk Opener Cancel Button

Valet mode is activated by depressing the trunk open cancel switch in the glove box and locking the glove box with the ignition key. A valet key cannot open the glove box or open the trunk through the trunk key cylinder.



Key in Trunk Cylinder

A key cylinder is provided for manual operation.

NOTES:

Other 2010MY and Newer Electrical Advancements



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Driver Window Switch

The driver side door window is now equipped with an Auto Up feature that must be initialized each time power is removed from the window circuit or the battery is disconnected. Initialization is performed by closing the window with the driver's open/close switch and holding the switch in the closed position after the window has reached the fully closed position for at least 4 seconds. Auto Up and Down are now initialized. The driver window switch assembly contains the circuitry that controls Auto Up and Down. An Auto Reverse feature is incorporated that will automatically open the window to about halfway when an obstacle is detected in the window opening as the window is closed. An increase in amperage to the window motor signals Auto Reverse to engage.



149

Inspection Mode Fuse Location



150

Defogger Switch

The windshield deicer is now prohibited from activating in ambient temperatures above 41°F. This feature can be defeated by pushing and holding the front deicer switch for at least 4 seconds. The LED in the switch will blink when the deicer activates.

The mirror heaters, (if equipped) are activated with the rear defogger.

Multi-Function-Display (MFD) (2014 Forester)

The MFD communicates vehicle conditions, maintenance alerts, calendar reminders, and EyeSight™ operations to the driver.



Multi-Function Display



Check Engine

Display screens of the MFD are controlled through the Info/Set controls located on the steering wheel.

NOTE: The Subaru Service Manual describes the MFD display screen as a “TFT” (Thin Film Transistor).



Multi-Function Display Buttons

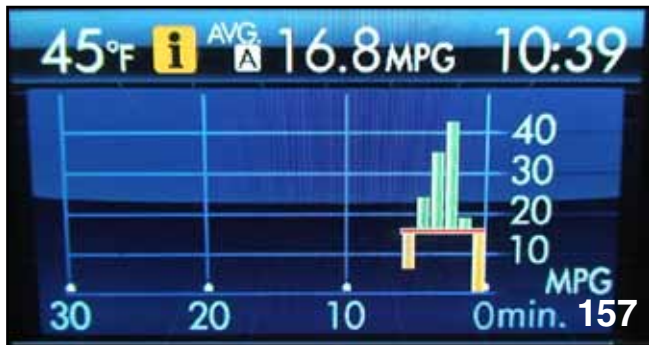
Electrical Systems Operation & Diagnosis Module (602)



Fuel Remaining



Fuel Economy Analog



Fuel Digital Gauge 2



Engine Gauges

The digital fuel usage display updates once per minute and overwrites itself after 30 minutes (Idling time is included).

NOTE: The fuel economy screen digital can be customized by the driver for 30, 60, or 120 minutes.

NOTE: The oil temperature gauge will display “— — —” until the oil temperature reaches 86° Fahrenheit.

NOTE: P.S.I. gauge value is in relative pressure.



Analog Clock

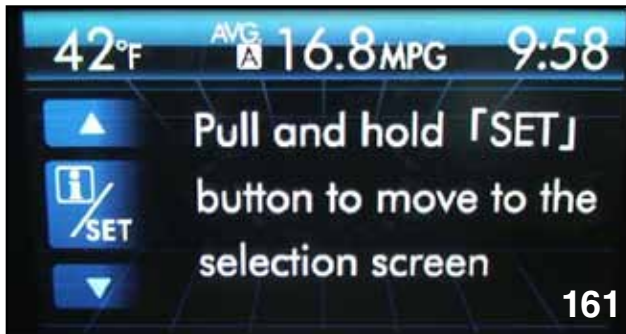
Electrical Systems Operation & Diagnosis Module (602)

A Traction/X-MODE™ screen provides details of ABS, VDC, Traction Control, and X-MODE™ operation.



HDC Off with X-MODE

Customization of the MFD can be accessed while the vehicle is stationary.



Setting Screen



Date



Car History

Electrical Systems Operation & Diagnosis Module (602)

The EyeSight™ display of the MFD provides an analog speedometer, leading vehicle indicator, set speed indicator for adaptive cruise control and a functioning brake light indicator.

NOTE: The brake light indicator only confirms the existence of the output signal of the EyeSight™ control unit “ON” signal to the brake light relay and not the actual illumination of the brake lights.



EyeSight™



EyeSight™ ACC



EyeSight™ ACC with Brake Lights

Power Rear Gate (PRG) (2014 Forester)

The 2014 Forester introduces the new Rear Power Gate (PRG). The PRG provides an electric powered opening and closing feature that is controlled through a touch switch on the rear gate, instrument panel, keyless access remote, or the mechanical keyless entry key.



Rear Gate



Gate Opener Switch Location & Keyless Access Lock Button

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



Gate Opener Switch



Gate Inner (Close) Switch

The closer switch of the PRG is mounted next to the close handle.

NOTE: Do not force the PRG closed if a memorized position has been set or if the PRG is partially open. Damage to the PRG Drive Unit may 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 pre-established specifications.

Electrical Systems Operation & Diagnosis Module (602)

The Keyless Access and Push Button Start Remote key (KAC) can be used to open and close the PRG if the ignition is in the off position. Press the PRG switch for more than 2 seconds to toggle between the open and close operation. The PRG memory switch and the interior PRG opener/closer switch are located to the lower left of the steering column.



KAC Remote Transmitter & Keyless Entry Key



Interior PRG Open/Closer Switch



Gas Shock and PRG Connecting Rod

Operation Mode

The system only operates, when the vehicle status is “not moving” and the following conditions exist:

1. AT model: Shift lever is in P position.
2. MT model: Parking brake is applied.
3. If the rear gate is open and the vehicle starts to move, the PRG will not operate and the gate will remain open. A caution buzzer alerts the driver that the rear gate is open.
4. If a switch is pushed while the rear gate is closed and the vehicle moves, the PRG will not operate.
5. If the opener switch is pushed while the gate is opening, the gate operation is changed towards the inverse direction and closes.
6. The doors must be unlocked (interior switch only).
7. Outside temperature is between -22° and 158° Fahrenheit.

Electrical Systems Operation & Diagnosis Module (602)

PRG Components and Operation

The PRG control unit is located behind the driver side rear cargo area trim panel. Communications to the LAN/CAN for operation and diagnostics are through a LIN line. Communications with the Subaru Select Monitor are very slow due to the limited speeds of the LIN line. Select only the P.I.D.s (2 or 3 maximum) required to perform diagnostics for a current condition.

NOTE: No work support is provided for the PRG.
The BIU work support provides for the PRG opening and closing.
Toggle through execution to open and close the rear gate.



PRG Control Unit

NOTE: PRG must be set to support in the BIU.

Electrical Systems Operation & Diagnosis Module (602)

The PRG drive unit consists of a motor, drive gear, driven gear, half stop solenoid, half stop solenoid switch, pulse or rotation sensor, and an electric clutch. When the driven gear turns, a threaded drive block pushes or pulls the connecting rod that opens or closes the PRG.



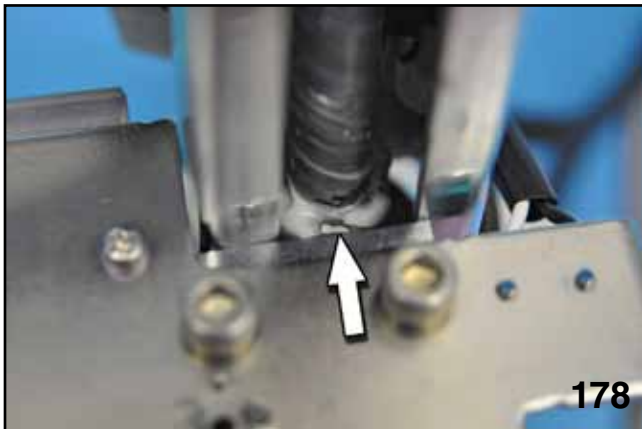
PRG Drive Unit



PRG Driven Gear

A parking or half stop gear is made onto the lower end of the driven gear. This gear is used to lock the PRG in place if the memory height has been programmed or if the PRG was opened and stopped beyond half-way.

The half stop solenoid pushes or pulls a rod that locks the parking or half stop gear, preventing the driven gear from turning and holding the PRG in place.



Half-Stop Gear



Half-Stop Solenoid

Electrical Systems Operation & Diagnosis Module (602)

A manual release lever is provided to disengage the half stop mechanism in the event of mechanical or electrical malfunction.

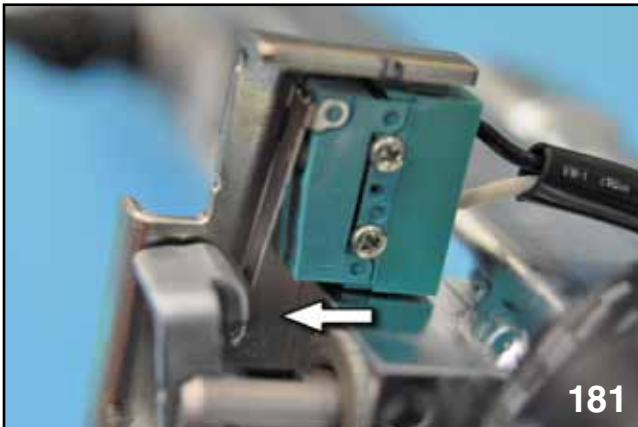
WARNING: *The PRG may operate if the lever is activated, stay away from moving parts.*

NOTE: An access panel is provided on the cargo area trim to release the half-stop solenoid in event of malfunction.

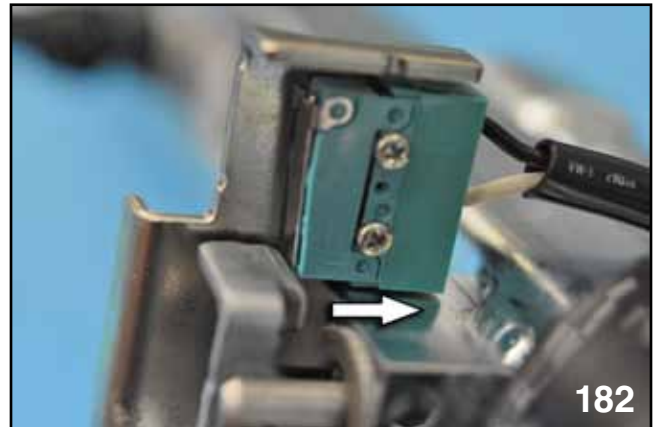


Manual Release Lever

A micro switch is attached to the half stop mechanism to signal the PRG control unit of the locked or unlocked position.



Half Stop Solenoid Unlocked



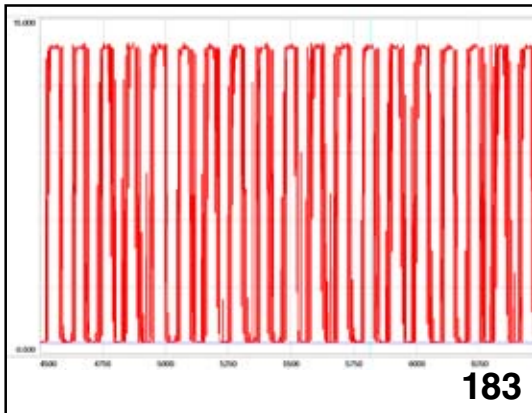
Half Stop Solenoid Locked

Electrical Systems Operation & Diagnosis Module (602)

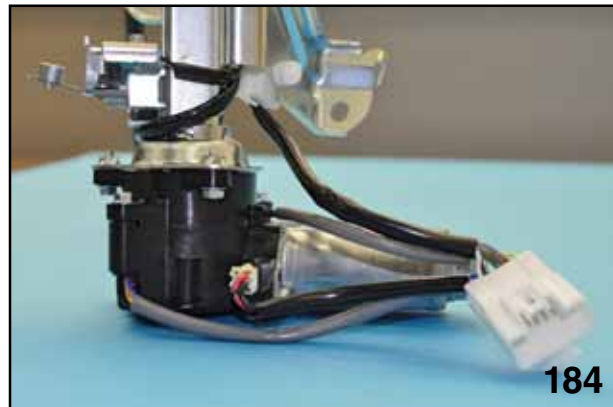
The motor direction is controlled by changing the polarity of the positive and ground supply through the PRG control unit. A duty ratio of 40 to 70 % controls the opening of the PRG and 60 to 80% duty closes the PRG. This is due to the assist and resistance provided from the gas shocks.

NOTE: The duty ratio near the end of opening or closing should be approximately 30%.

NOTE: Weak or failed gas shocks will increase the closing speed of the PRG and set a DTC.



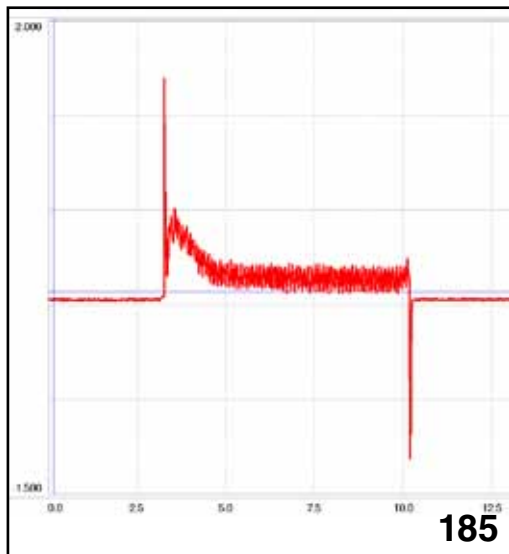
PRG Drive Unit Motor Power Duty Ratio



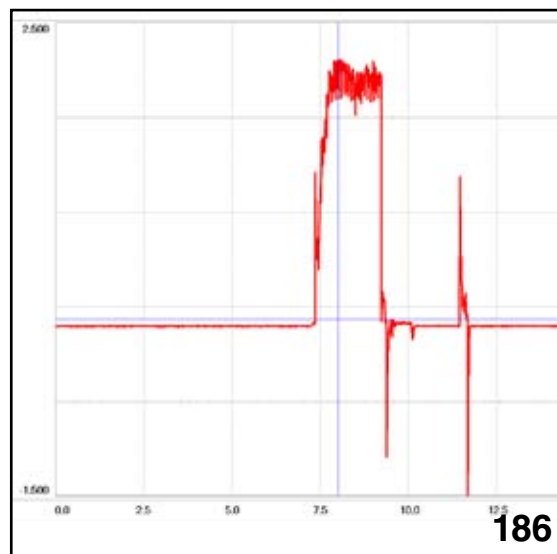
PRG Drive Unit Motor

Normal amperage flow during opening is approximately 16 amps to begin movement with a sustained 2 amps.

Amperage flow during incorrect mechanical conditions or any condition that would block the PRG from opening can reach as high as 20 amps. This high amperage will continue to flow until the PRG control unit stops the opening function and re-latches the PRG.



PRG Drive Unit Motor Amperage Normal Condition

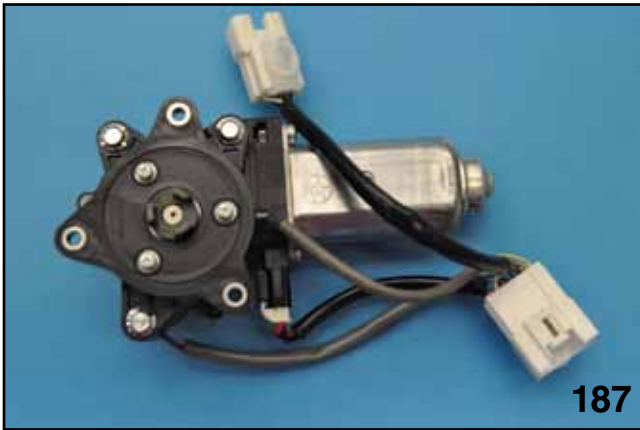


PRG Drive Unit Motor Amperage with Gate Blocked

NOTE: Continued amperage flow above normal will result in the PRG reversing direction. If the amperage is above normal for 2 consecutive attempts all PRG functions will be canceled.

Electrical Systems Operation & Diagnosis Module (602)

The drive and driven gears of the motor drive assembly and the PRG drive unit mesh together to transfer the opening or closing force needed to control the PRG. Mechanical output of the motor to the coupling gear is controlled with an electric clutch.



PRG Drive Unit Motor Coupling Gear



PRG Drive Unit Motor Coupling Gear "Close Up"

The motor is connected to a worm gear drive that meshes with a reduction gear. The reduction gear is keyed to a ferrous metal plate that locks to the output shaft of the clutch assembly. The PRG control unit controls the ground and the power for the electric clutch.



PRG Drive Unit Driven Gear Coupling Gear



Clutch and Reduction Gear



PRG Drive Unit Motor Worm Gear



Reduction Gear and Clutch Plate

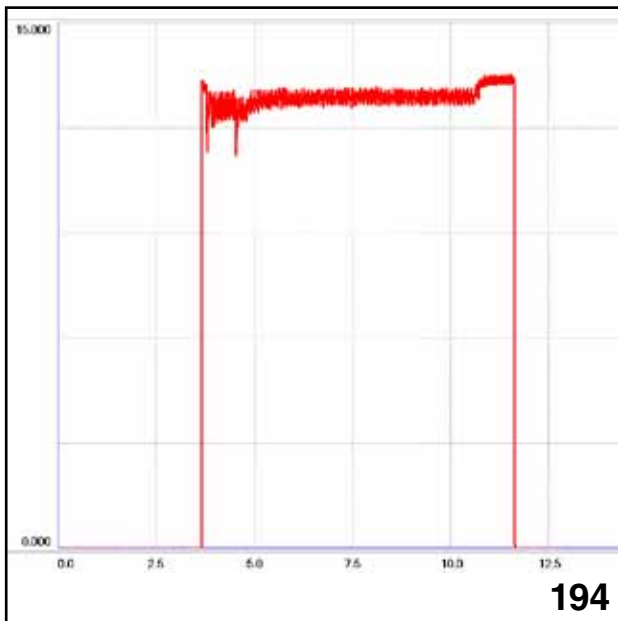
Electrical Systems Operation & Diagnosis Module (602)

If the rear gate is blocked from opening, a slipping sound will be heard from the PRG drive unit. Continued attempts to operate the PRG in this condition will damage the clutch.

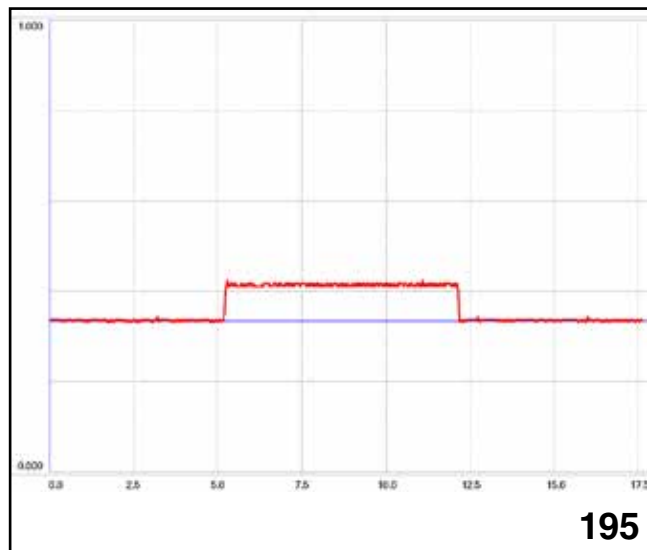


Clutch Coil and Hub

An electro-magnetic coil is located under the output shaft coupling surface. The resistance of the coil is approximately 9.8 ohms. The voltage at the clutch should be near battery voltage. A small ripple effect should be considered normal (by-product from the PRG control unit duty control of the PRG motor). Normal clutch amperage flow is approximately 1.2 amps.



Clutch Voltage



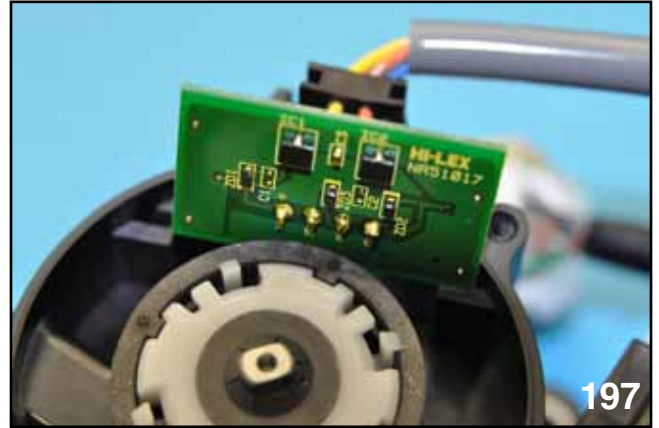
Clutch Amperage

Electrical Systems Operation & Diagnosis Module (602)

The speed and rotation of the output shaft is monitored with a hall effect switch assembly. The center rotor is comprised of permanent magnets that are arranged with alternating poles that interface with the hall effect switch assembly as the output shaft rotates. The output can be viewed on the Subaru Select Monitor as "Pulse Count"

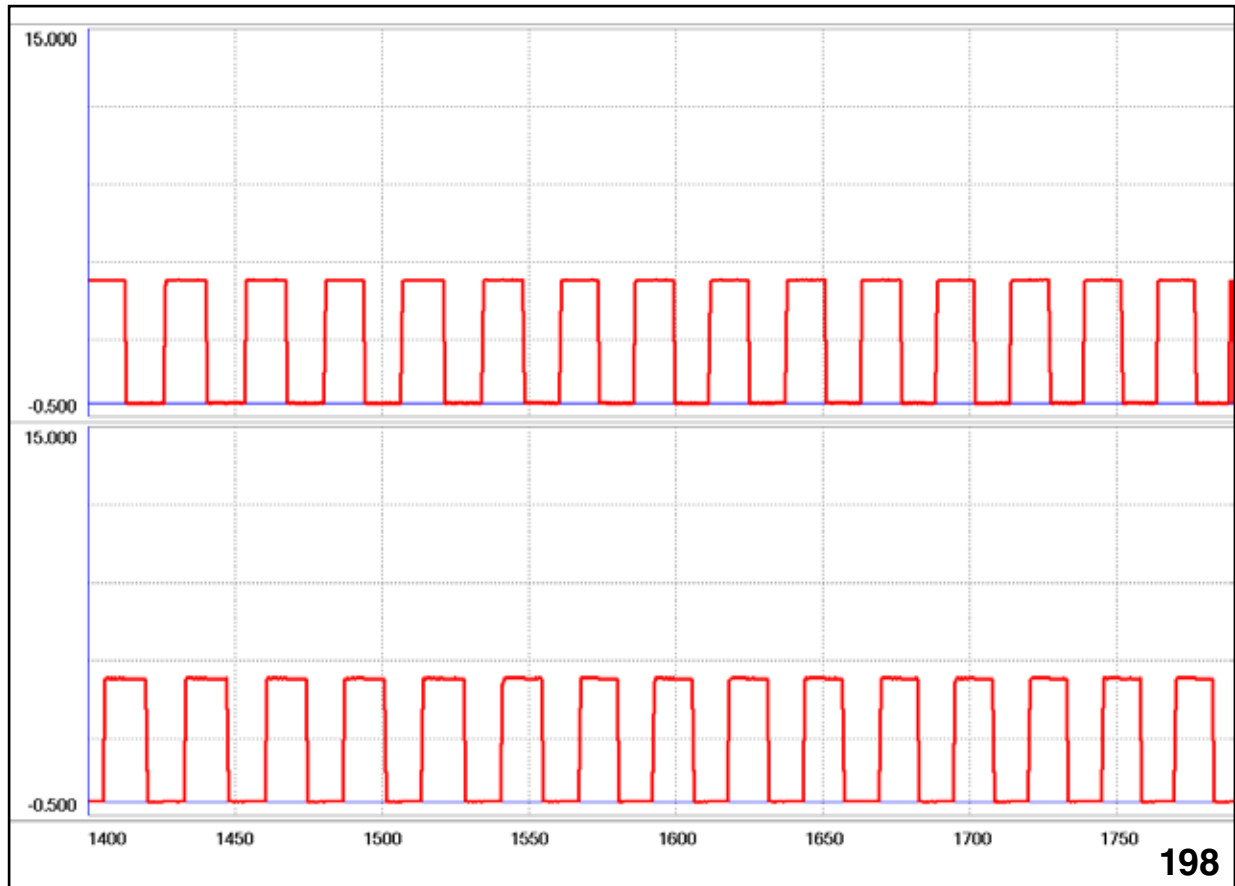


Pulse Count Sensor



Sensor A and B

The two signals are inputs to the PRG control unit. Sensor A and sensor B, as described in the I/O chart, range from 0 to 5 volts with the PRG in motion. A failure with either signal results in a DTC and PRG functions will be cancelled.



Sensor A and B Output

Electrical Systems Operation & Diagnosis Module (602)

The PRG Auto Closer is located in place of the conventional rear gate latch assembly. The PRG Auto Closer is equipped with the following components:

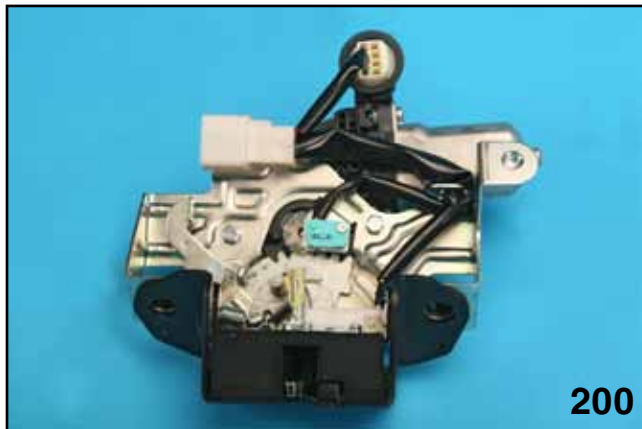
- Rear gate latch
- Gate latch motor
- Sector switch
- Courtesy and Latch Switch

NOTE: The PRG Auto Closer functions in normal PRG operations and manual mode.

NOTE: If a problem with the Sector Switch or Courtesy and Latch Switch exists, the PRG will not fully latch. The rear gate will try to fully close but the PRG control unit will sound a long beep and the gate will move away from the rear gate latch. The rear gate cannot be opened until pushed completely closed and the opener button is then pressed and held for more than 3 seconds.



PRG Auto Closer



Auto Closer Bottom View

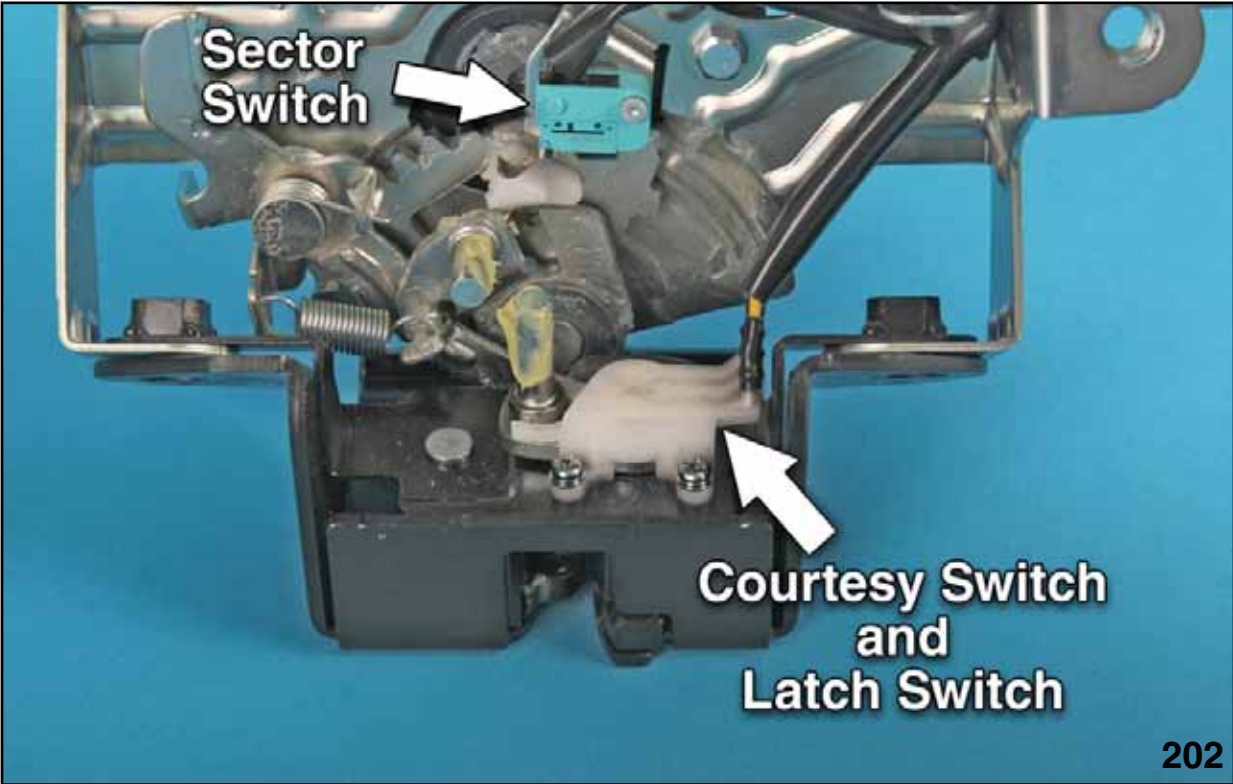


Auto Closer Top View

PRG Auto Closer Parked

During normal operation with the PRG closed, the arm of the sector switch is resting on the white plastic detent of the latch assembly driven gear (Sector gear). This represents an off or closed position for the PRG control unit. 5 volts will be present at the PRG control unit on the sector switch terminal.

At the same time, the courtesy and latch switch assembly is in the off or closed position. Five (5) volts will be present at the latch switch terminal of the PRG control unit and 12 volts will be present at the courtesy switch terminal.



Courtesy and Latch Switch Assembly and Sector Switch

NOTES:

PRG Auto Closer Opening

When the PRG power gate auto closer assembly is commanded to open, the driven gear will be turning counter-clockwise (as viewed in image 193). The gear will move as far as possible, creating a spike in amperage.

NOTE: The spring force created by the weather stripping of the PRG places a preload on the latch assembly. Additional amperage flow through the motor is required to overcome this preload and assure the unlocking and opening function is performed.

During that time, the mechanical latch assembly will be released and the gate should be traveling upward. Approximately 1 second later, the polarity at the power gate auto closer motor will be reversed. The driven gear will turn clockwise, (as viewed in image 193), until the arm of the sector switch is resting on the white plastic detent of the latch assembly driven gear. Very little amperage is required to turn the gear due to no resistance being placed on the PRG.



PRG Auto Closer Voltage and Amperage

PRG Auto Closer Closing

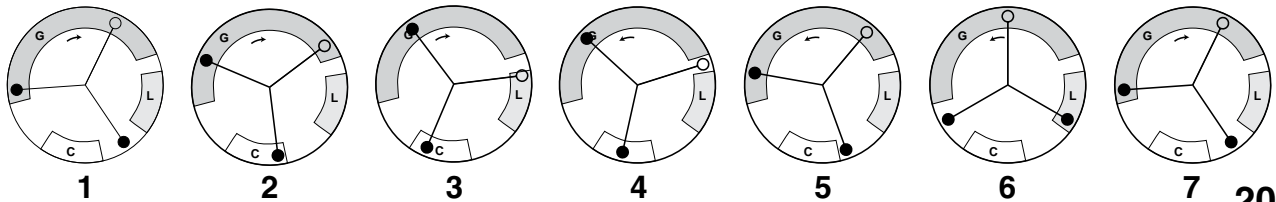
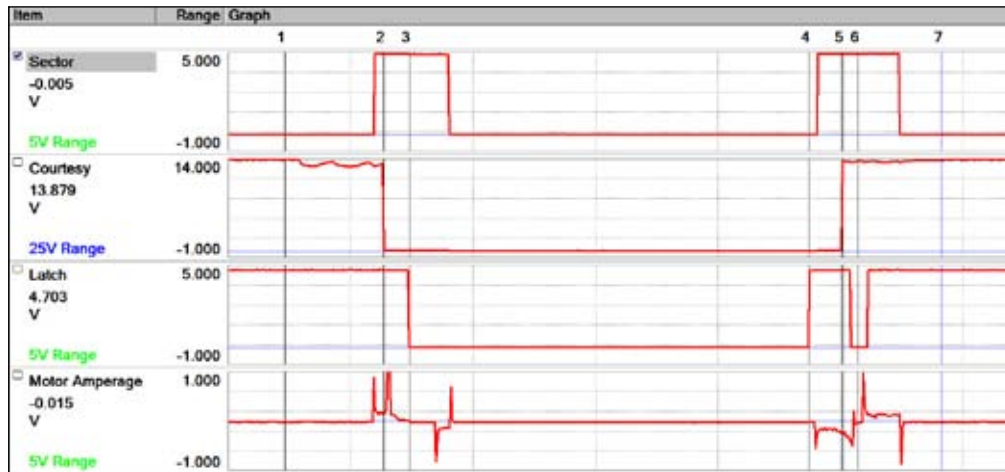
As the PRG power gate auto closer assembly contacts the gate striker, the courtesy and latch switch close. The PRG control unit combines this information with the low pulse count of the PRG drive unit motor and activates the power gate auto closer motor.

When the PRG power gate auto closer assembly is closing, the driven gear will be turning clockwise (as viewed in image 193). The gear will move as far as possible, creating a spike in amperage. The spring force created by the weather stripping applies resistance against the gate closing, therefore the amperage of the motor increases. When the motor reaches a certain amperage value, the PRG control unit will reverse the polarity and motor the reverses. The motor will continue to operate until the arm of the sector switch is resting against the white plastic detent of the latch of the driven gear.



Courtesy and Latch Switch

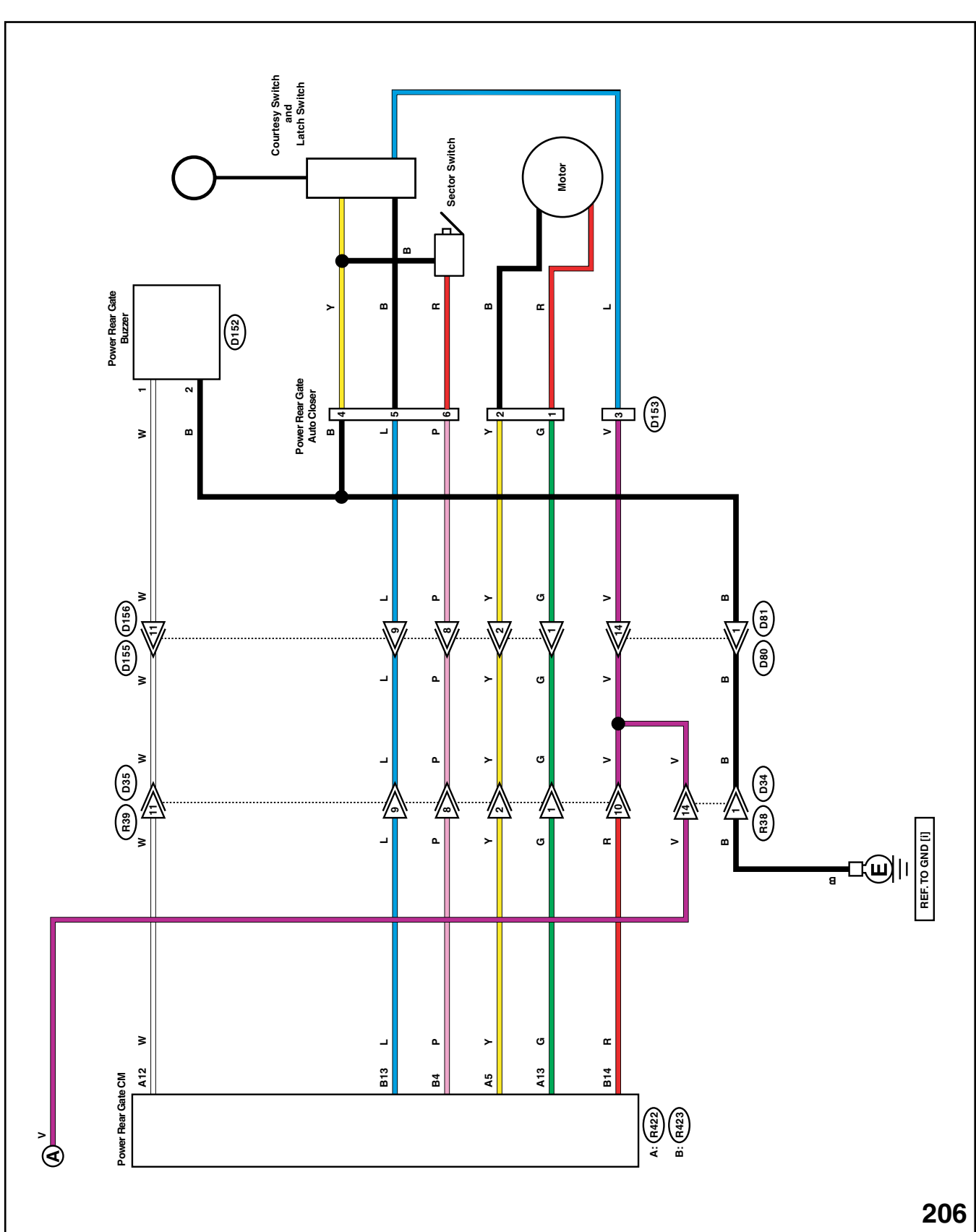
Sector Switch Arm



205

Courtesy and Latch Switch Operation

- Position 1: Auto Closer at parked position.
- Position 2: Auto Closer beginning to move in a clockwise direction. Sector switch has moved off of the park position (ground removed). Courtesy switch has been connected to ground.
- Position 3: Continued movement in the clockwise direction. Latch switch has been pulled to ground. The Auto Closer motor has finished its clockwise movement, and will begin its counter-clockwise movement after approximately 500 milliseconds. When the Auto Closer motor has finished its counter-clockwise movement the Sector switch connects to ground.
- Position 4: The latch switch opens, signaling the Auto Closer motor to begin closing movement in a counter-clockwise direction. The Sector switch moves off of the park position.
- Position 5: The courtesy switch opens. The Auto Closer motor is still moving in a counter-clockwise direction.
- Position 6: The latch switch is connected to ground. This is the signal for the Auto Closer motor to reverse direction and move clockwise.
- Position 7: The Sector switch has been connected to ground, stopping the Auto Closer motor movement. This brings the Auto Closer motor back to the park position.



PRG Auto Closer Schematic

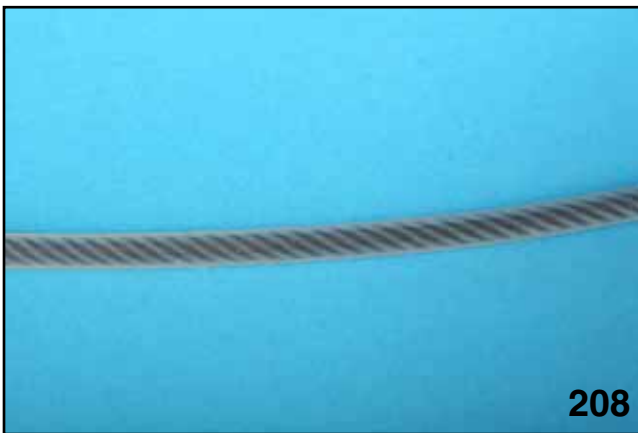
Touch Sensors

A pinch or Touch Sensor is installed on the left and right inner edge of the rear gate. If either sensor is compressed during closing, the PRG automatically reverses and moves to the open position.



Touch Sensor

The touch sensor is constructed in a soft rubber tube, consisting of 4 spiral wound wires. The wires are coated with a semi-conductive coating that allows the wires to act as a switch. When the tube or sensor is compressed, the wires will touch each other and lower the resistance in the pinch circuit. The more the wires are compressed, the lower the resistance becomes.



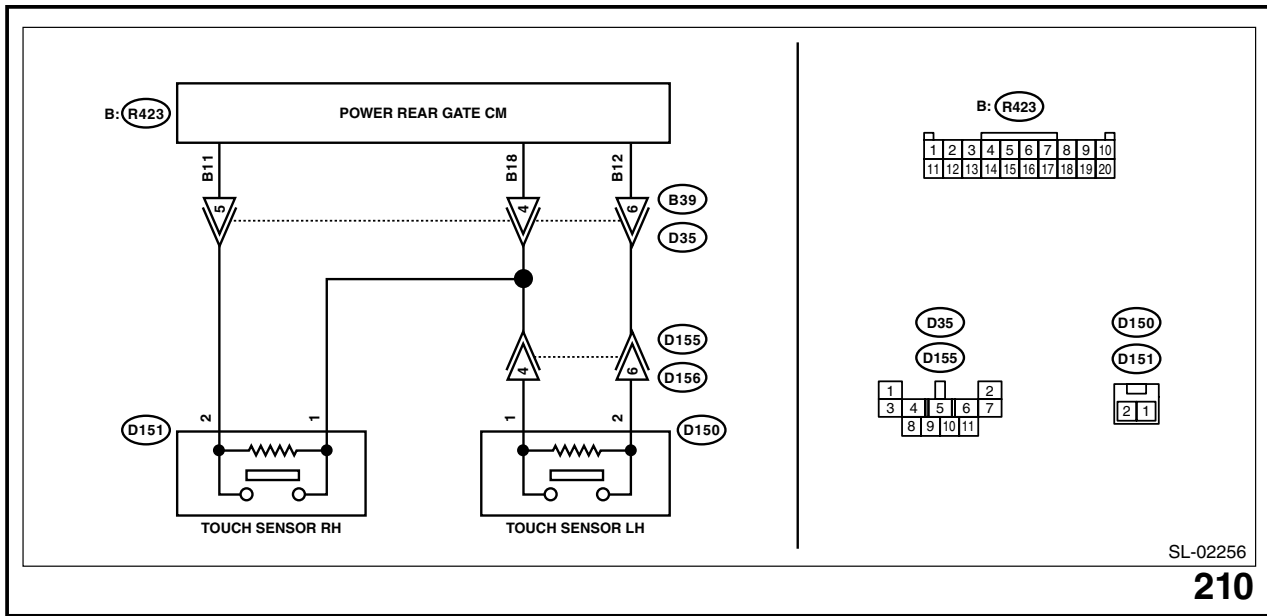
Touch Sensor Tube



Touch Sensor Resistor

A resistor (approximately 975 ohms) is connected in parallel with the touch sensor so that the touch sensors can be monitored by the PRG control unit. If either sensor is not connected, or has the incorrect resistance, a DTC will set and the PRG will not function (manual mode will be available).

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 pre-established specifications.*



Touch Sensor Schematic

NOTES:

“Memory Height” Learning Procedure

NOTE: The ignition should be off and the PRG should be closed.

1. Push the “Memory Height SW” on the instrument panel in so that it is at its lowest position. (ON)



Memory Height Switch Location



Memory Height Switch Highest Setting (OFF)



Memory Height Switch Lowest Setting (ON)



Gate Opener Switch

2. Set the PRG to manual mode by pushing the “Opener SW” on the gate for more than 0.8 seconds.

NOTE: Immediately open the PRG so that the auto close function does not engage.

3. Open the gate manually, until the position of your preference is reached and then push and hold the “**Gate Inner SW**” for more than 3 seconds. A beep notifies you that a memorized position has been set.
4. **Push down the gate manually** towards a position before the complete close point and then wait until the gate closes completely through the auto closing function.
5. **The “Memory Height SW” on the instrument panel must be kept in the on position (lowest position) for the PRG to open only to the memorized position.**
6. The Full open position of the PRG can be obtained by pushing the “**Memory Height SW**” on the instrument panel to its highest (OFF) position and then pressing any of the opener switches.
7. Manual mode can be activated by pushing the **Opener SW** on the gate for more than 0.8 seconds if the “**Memory Height SW**” is at its lowest setting (ON).
8. The memorized position is not erased if the PRG control unit power is removed. The memory once set cannot be erased, only overwritten.

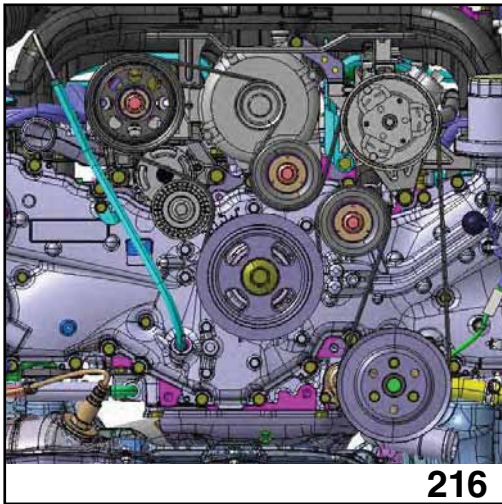
CAUTION:

DO NOT move the PRG manually if the PRG is opened to a memorized position. Damage to the half stop pin or solenoid will occur.

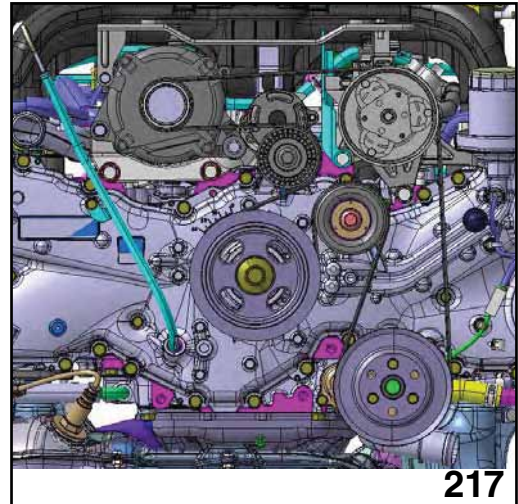
Electrical

The 2014 Forester is equipped with a 130 Amp alternator that utilizes a duty ratio to control charging output (similar to the 2012 Impreza) and a 55D23L battery.

The alternator is equipped with a de-coupler (one-way clutch) pulley that is designed to suppress auxiliary belt resonance produced as the engine torque fluctuates during driving. This change was required to maintain the correct accessory belt tension due to the changes in the belt routing and the reduction in belt tension (as compared to previous models).



(1) Alternator
With Power Steering Pump



(2) De-coupler
Without Power Steering Pump

If the alternator speed is faster than the engine or belt speed, the de-coupler releases the locking mechanism and reduces the deceleration shock to the accessory belt. The pulley is sealed on both sides to keep the non-serviceable lubricant contained in the de-coupler.



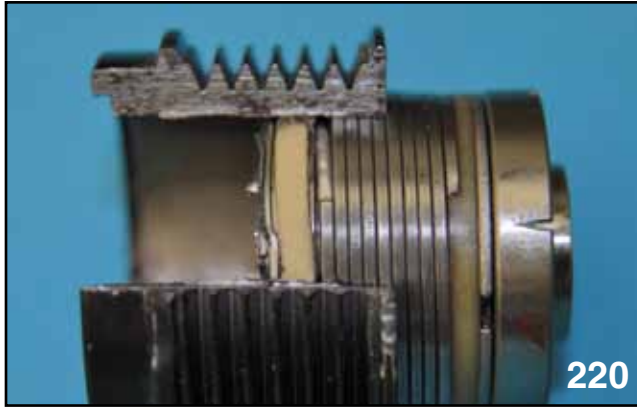
De-coupler Front View



De-coupler Rear View

The outer belt driven pulley unwinds a spring that is keyed into the inner side of the pulley hub. As the spring unwinds the friction between the hub and the pulley increases and the alternator is driven. If the speed of the alternator is greater than engine speed or outer pulley speed, the spring tightens and the friction is reduced, producing the one-way clutch action. The alternator must be serviced if the de-coupler fails.

Electrical Systems Operation & Diagnosis Module (602)



De-coupler One-way Clutch Spring

During PDI, move the power back up fuse from the shipping slot to the running position. Also, remove the delivery mode fuse and place it in the fuse box cover fuse storage slot.



Back Up Power Supply Fuses



Delivery Mode Fuse Slot

NOTE: Mechanical key vehicles are equipped with immobilizer type B. Keyless access and push button start vehicles are equipped with immobilizer type D.

Consult the Subaru Service Manual on STIS for immobilizer.

NOTES:

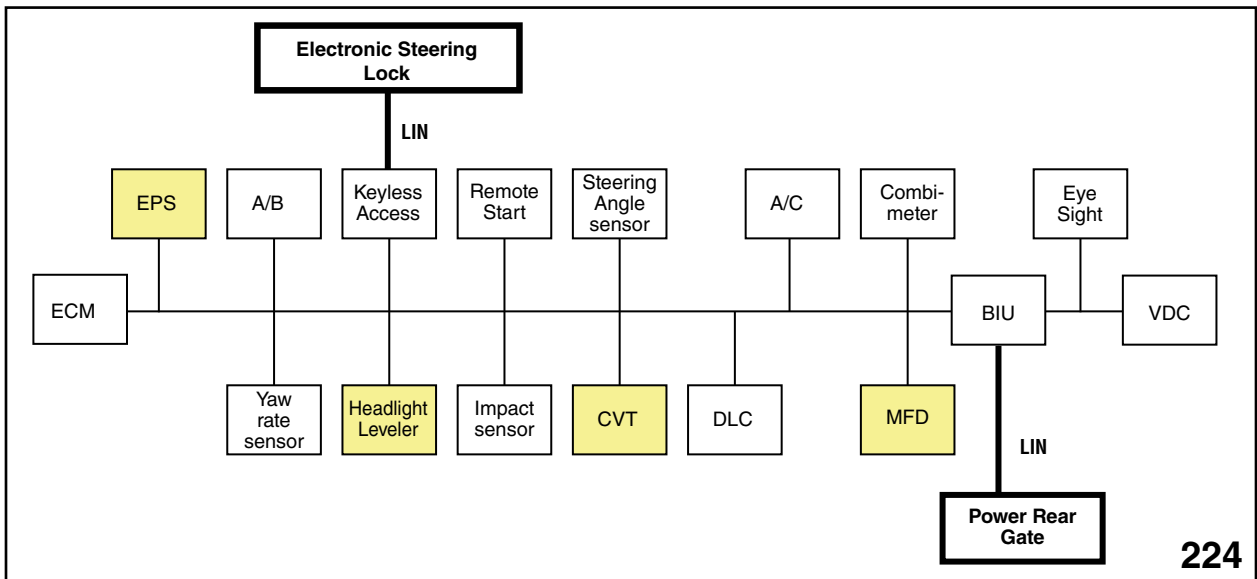
Electrical Systems Operation & Diagnosis Module (602)

The amp clamp and battery temperature sensor are combined into one unit and are located on the positive battery post connector.



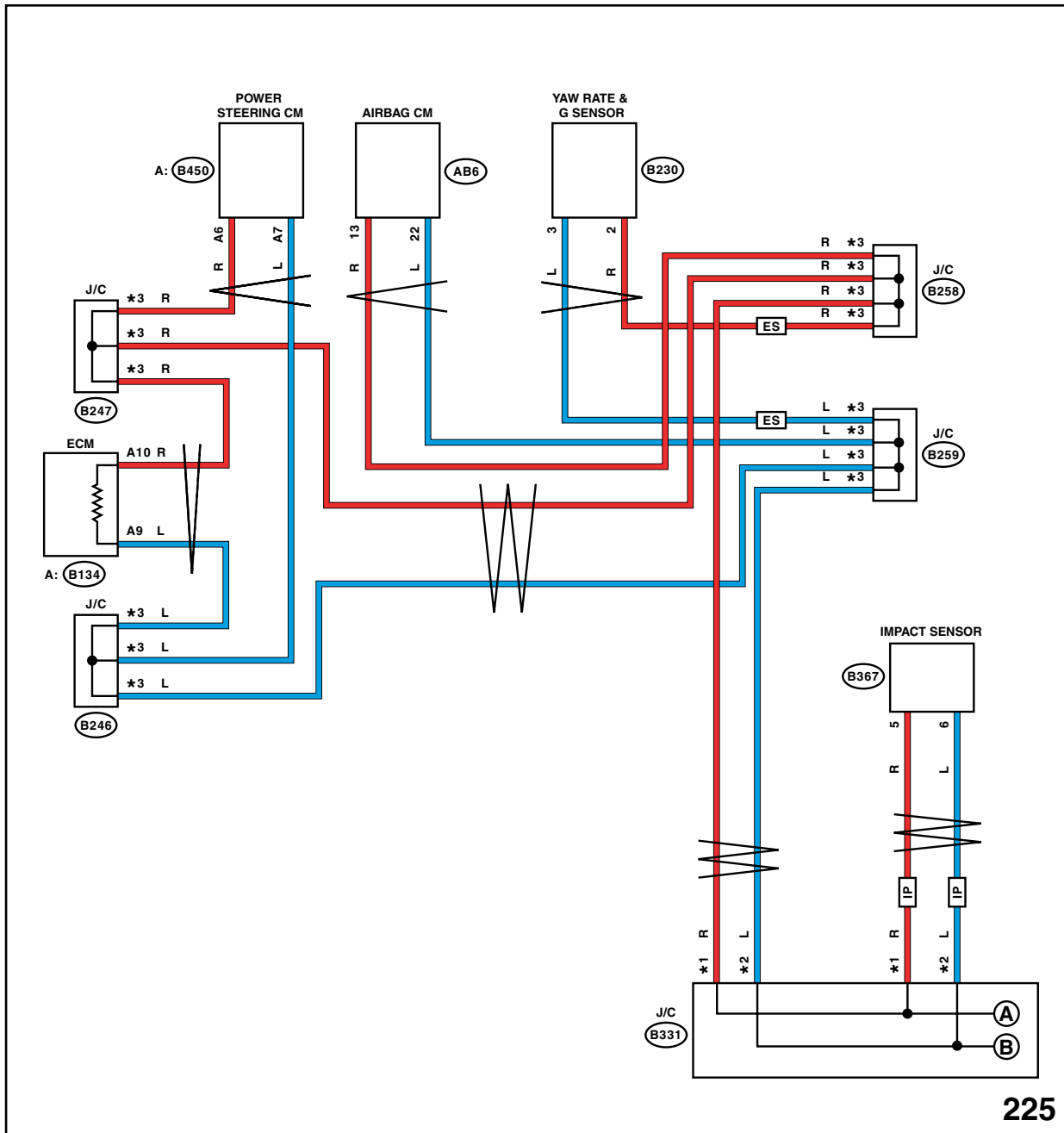
AMP Clamp Positive Battery Post

The Controller Area Network (CAN) of the 2014 Forester uses CAN diagnostics for all members of the CAN. K line diagnostics have been eliminated. This means that a failure of the CAN bus results in lack of functionality and disables the CAN diagnostic function of SSMIII beyond the affected area (open circuit or CAN Lo wire short to ground only). This allows faster isolation of the problem area.



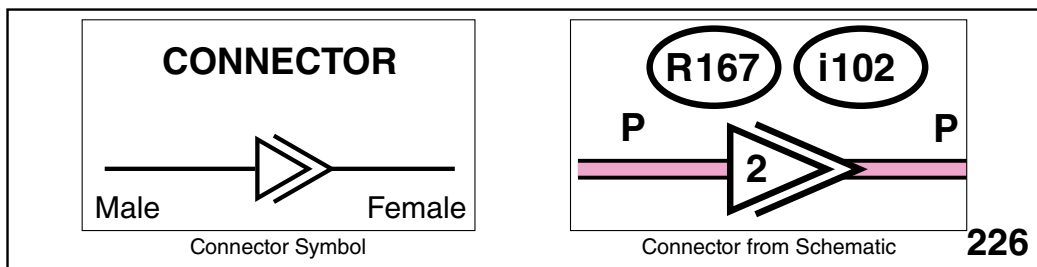
CAN Configuration

New members to the CAN include the Multi-function display and the headlight leveler sensor.



Partial CAN Schematic

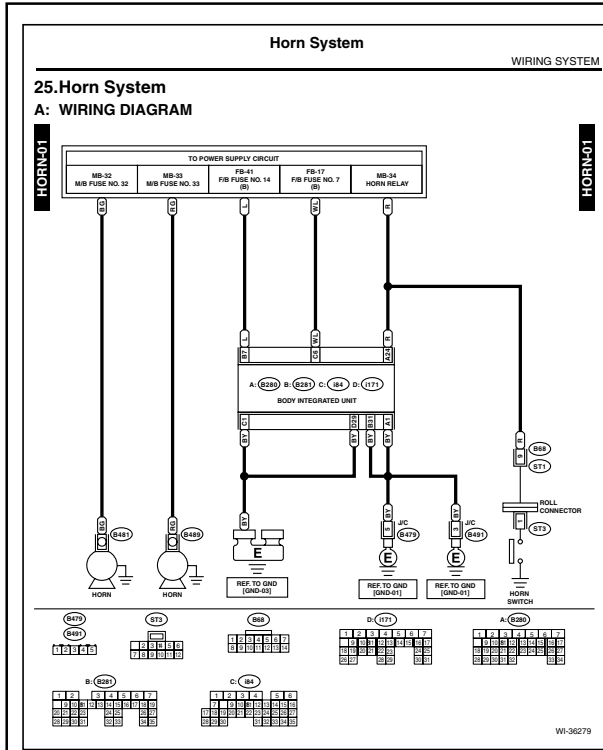
The Subaru Service Manual wiring schematics for the 2014 Forester have been enhanced. The schematics are now in color and use new terminal symbols.



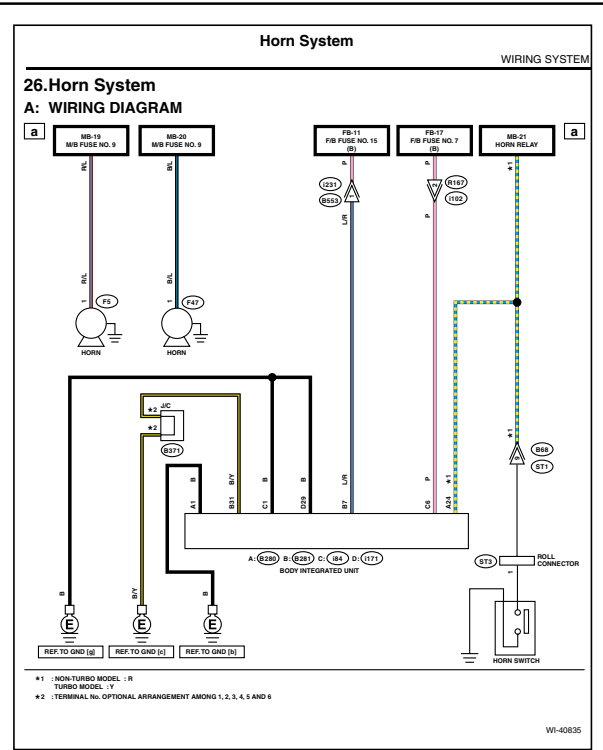
2014 Enhanced Wiring Schematic Symbols

Electrical Systems Operation & Diagnosis Module (602)

The connector description detail usually found at the end of each page has been changed. The connector detail description is now found at the end of each schematic.



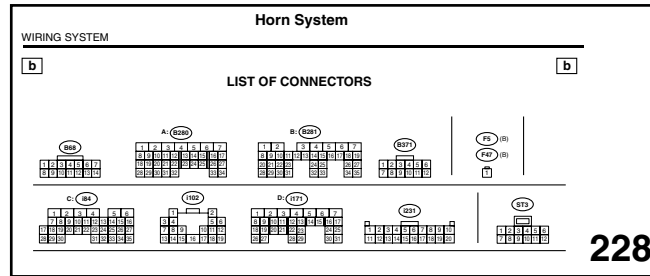
2013 Legacy Subaru Service Manual



2014 Forester Subaru Service Manual

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Comparing Different Years of Subaru Service Manual Diagrams



Horn System Connectors

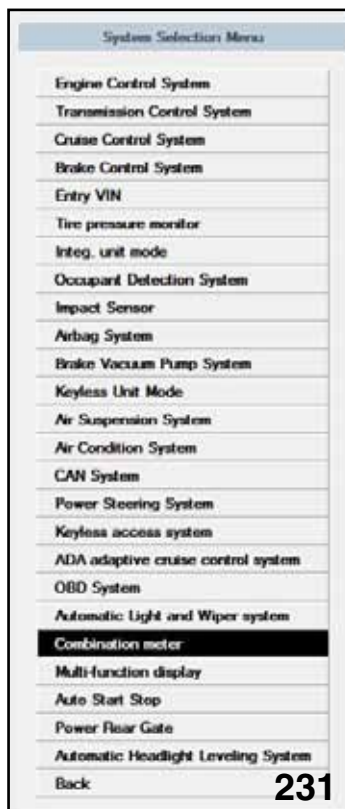
2014 Combination Meter

The combination meter of the 2014 Forester can be diagnosed with the Subaru Select Monitor III. Current data display, DTCs, Customization and Work Support are provided to adjust (applicable items only) and test all gauges and lights.

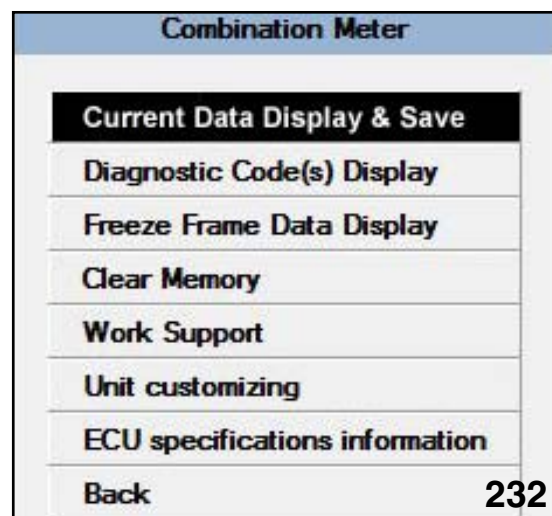


Combination Meter

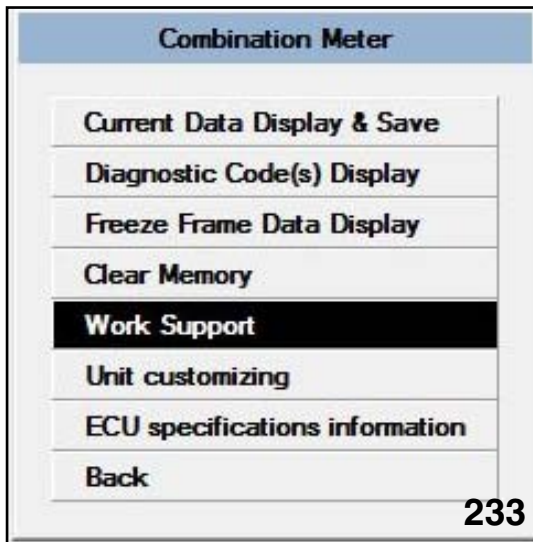
Subaru Select Monitor III (SSMIII)



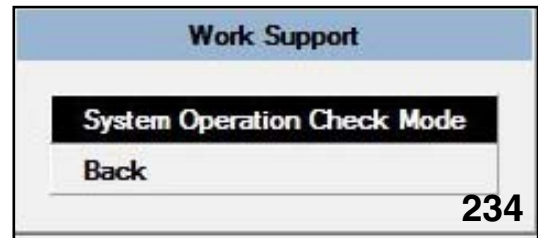
System Selection Menu



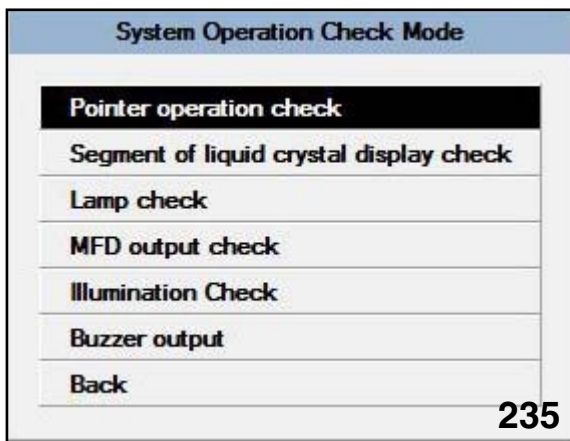
Combination Meter Menu



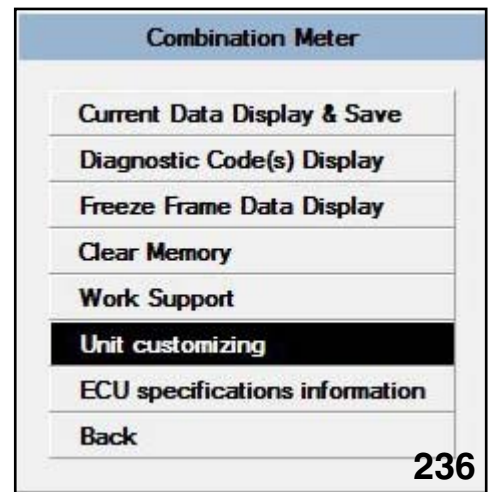
Combination Meter Work Support



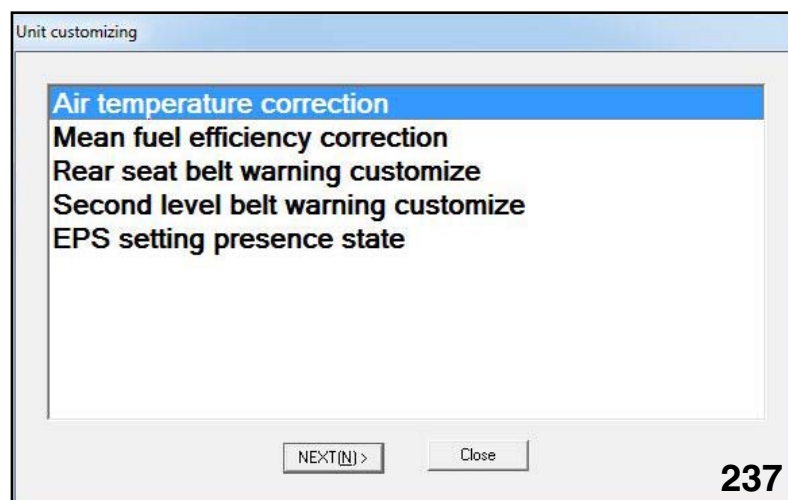
Combination Meter Work Support Menu



Available Visual And Audible Checks



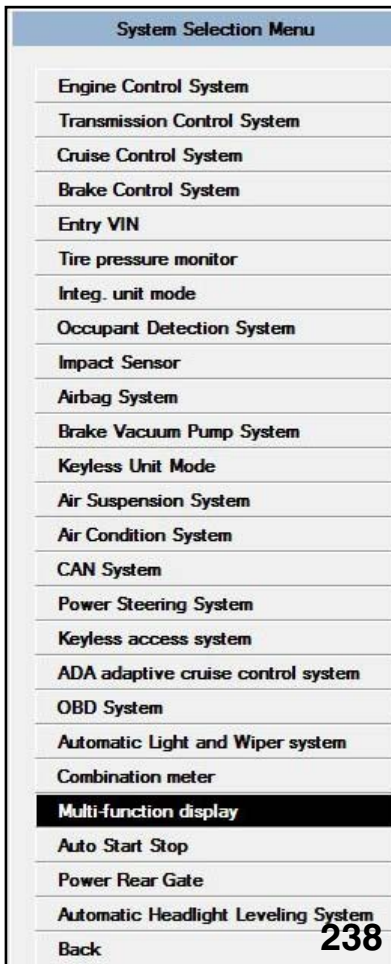
Combination Meter Unit Customization



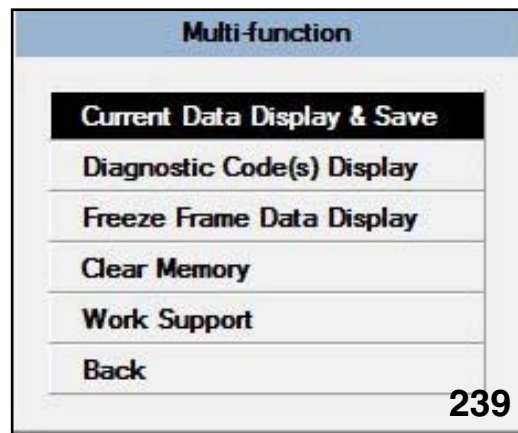
Available Items For Customization or Checking

Electrical Systems Operation & Diagnosis Module (602)

The Multi-function display has an available “Work Support” function which will only display the ECU (MFD) part number and software version.

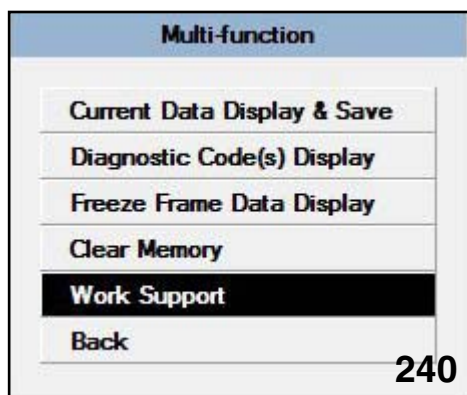


System Selection



Menu Multi-function Display Menu

Visual and audible checks can only be performed from the “Combination Work” support.



Multi-function Display Work Support

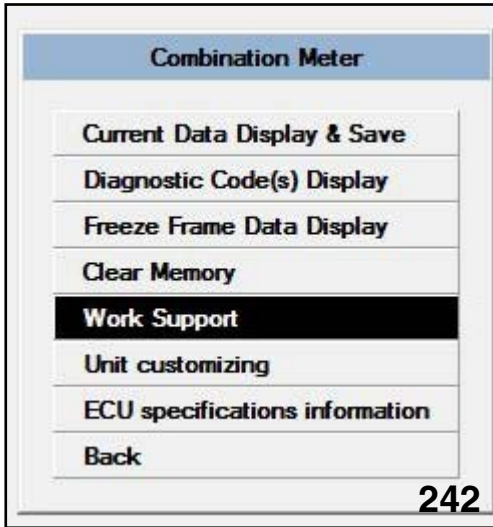


Multi-function Display Work Support Menu

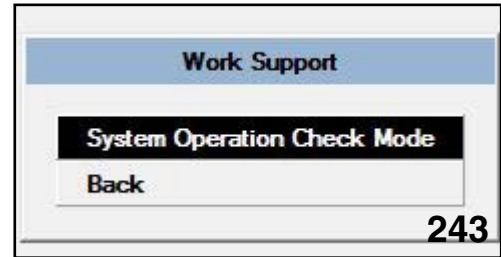
Return to the “Combination Main Menu”

1. Select “Work Support.”

2. Next, select "System Operation Check Mode"

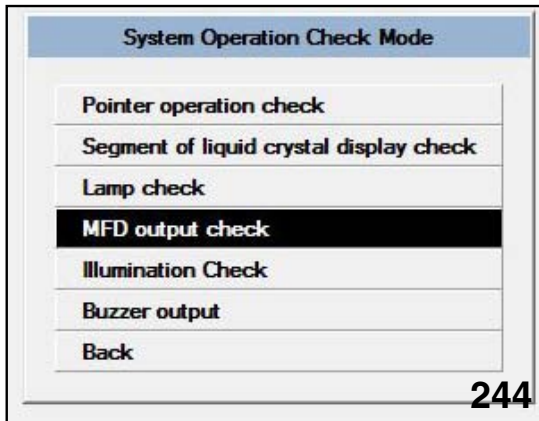


Combination Meter Work Support

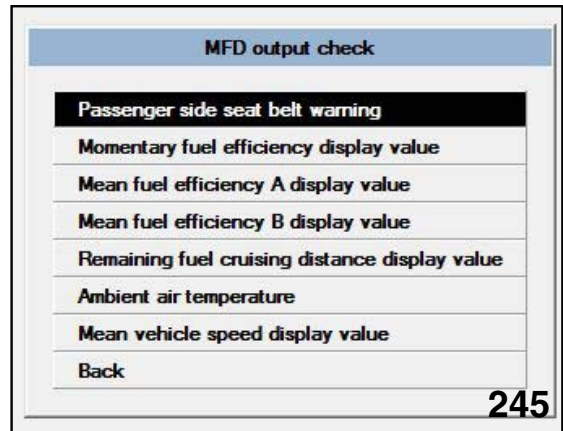


Combination Meter System Work Support Menu

Select the MFD output check and navigate to the desired check.



Available Visual And Audible Checks

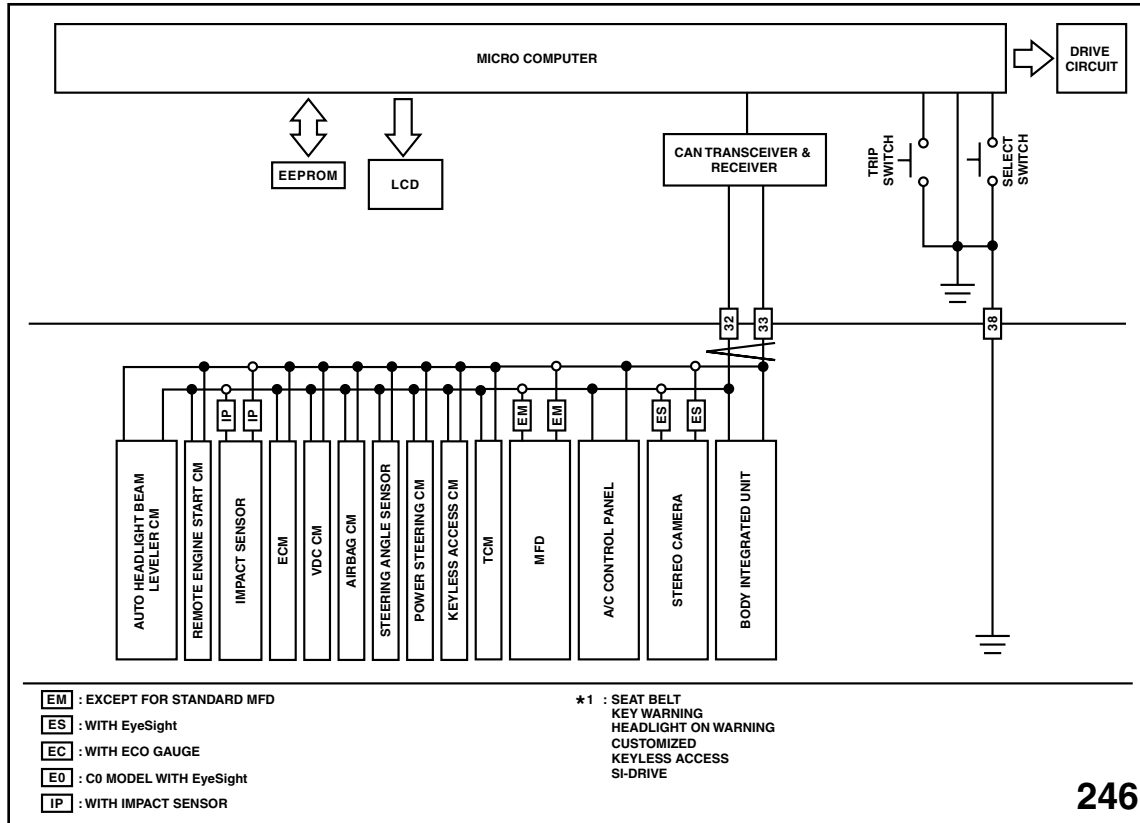


MFD Visual And Audible Checks

NOTES:

Electrical Systems Operation & Diagnosis Module (602)

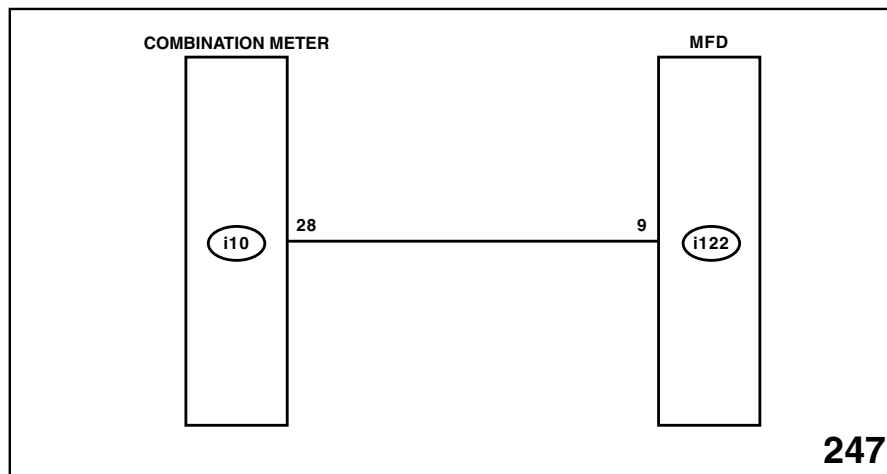
The combination meter and the MFD are both connected to the High Speed CAN. Each part obtains the information needed to operate from the CAN but the communications between each part are sent and received through a UART circuit.



Wiring Schematic

UART communications are similar to LIN communications in operating speeds, but are capable of communicating more complex data. LIN is best for commanding the operation of devices and confirming the operation was completed.

DTC U1651 Lost communication with Meter (UART)



Combination Meter Lost Communication To MFD

Electrical Systems Operation & Diagnosis Module (602)

Instrumentation/Driver Information

DTC	Item	Content
U0073	Control Module communication Bus "A" Off.	Detected when CAN line abnormality is detected.
U0100	Lost communication with ECM/PCM "A"	Detected when CAN data from the engine control module (ECM) does not arrive.
U01001	Lost communication with TCM.	Detected when CAN data from TCM does not arrive.
U0122	Lost communication with Vehicle Dynamics Control Module.	Detected when CAN data from VDC does not arrive.
U0131	Lost communication with Power Steering Control Module.	Detected when CAN data from electric power steering CM does not arrive.
U0140	Lost communication with Body Control Module.	Detected when CAN data from body integrated unit does not arrive.
U0151	Lost communication with Restraints Control Module.	Detect when CAN data from airbag CM does not arrive.
U0164	Lost communication with HVAC Control Module.	Detected when CAN data from A/C CM does not arrive.
U0327	Software Incompatibility with Vehicle Security Control Module.	Detected when CAN data from keyless access CM does not arrive.
U1201	CAN-HS Counter Abnormal.	Detected when CAN data is abnormal.
U1235	Lost communication with EyeSight™.	Detected when CAN data from stereo camera does not arrive.
U1433	Invalid Data Received from EyeSight™.	Detected when microcomputer in the stereo camera froze.
U1650	Invalid Data Received from Meter (UART).	UART data from the combination meter is abnormal.
U1651	Lost communication with Meter (UART).	UART data from the combination meter has not arrived.
B2220	Break the wire of IGN.	Voltage malfunction caused by poor contact of IGN power supply circuits.
B2222	System Microcomputer Fail.	When microcomputer froze.
B2223	GERDA Fail	When transmitting and receiving of data cannot be done normally between system microcomputer and image microcomputer.
B1500	Fuel Sender Open/Short-Circuit Detection.	Fuel gauge circuit is open or shorted.
B1501	Power Supply system Error Detection.	Combination meter power supply circuit is open or shorted.
B1507	External Air Temperature Open/Short Circuit Detection.	External air temperature sensor circuit is open or shorted.

Service Bulletins

**Be advised this may not be all the Subaru Service Bulletins pertaining to electrical systems.

**Go to Subaru Tech Info System (STIS) for all Subaru Service Bulletins.

No.	Date	Title	Subject
07-50-93R	12/02/94		Repair of rear window defogger metal tab Repair of rear window defogger grids
16-63-99R	02/27/09	1990~2009MY Models	Remanufactured Transaxles Program
08-33-02	01/07/02	2000~2004MY Legacy	Combination Switch Repairs
10-74-02	09/01/02	2001~2002MY Legacy H-6	Legacy H-6 Air Conditioner Compressor Revolution Sensor
10-72-02R	07/15/03	2002~2003 Impreza	Countermeasure to Prevent Icing in the Evaporator on Air Conditioned Vehicles Correction
06-31-03R	12/08/04	1997~04MY Legacy, Outback & Baja (Excluding VDC Equipped Vehicles); 1998~04MY Impreza and Forester	Replacement of ECU for ABS Repair
17-07-04	08/12/04	2003~2004MY Forester	Trouble code 41 & 42 in the Diagnostic system of the SRS Side Air Bag system
07-54-05	11/21/05		Front fog light lens & reflector
07-56-05	08/01/06		Fog light lens and body
08-36-05	10/05/05	2005~06MY Legacy & Outback excluding 3.0 H-6 equipped vehicles	Error code "Er SP" display in the odometer/trip meter
06-35-05R	08/19/05	2002~2003MY Subaru WRX 5MT/T	ABS Control Unit Customer Satisfaction Program
08-36-05	10/05/05	2005~06MY Legacy and Outback excluding 3.0 H-6 equipped vehicles	Error code "Er SP" display in the odometer/trip meter
08-37-06	05/09/06	2006MY Legacy and Outback (Excluding vehicles equipped with Navigation System)	"-:-" Indicated in Elapsed Time Display
07-57-06	08/24/06		Seat Heater anchor point modification
07-58-06	08/25/06		Change in Horn(s)
11-81-06	11/16/06	2005~06MY Legacy/Outback equipped with H4 and H6 2006MY B9 Tribeca	Diagnostic Trouble Codes (DTC) P0600, B0221 and/or B0223 (Codes for communication error)
07-59-07	12/17/07		Dew Formation Inside Exterior Lamps
07-60-07R	04/25/07	2000MY and Later Legacy/Outback 2.5L SOHC Vehicles	Ignition Coil and High Tension Cables

Electrical Systems Operation & Diagnosis Module (602)

No.	Date	Title	Subject
07-61-07	04/05/07	2005MY Legacy and Outback Vehicles Equipped with All Weather Package	Modified Front Seat Cushion Heater
07-62-07	01/17/08	All Models	Dark Current or Excessive Battery Draw
15-126-07	02/13/08	All Models	Radio Static when rear window defogger is on
07-63-08	06/26/08	2009MY Forester	Spot Map Light
07-64-08	12/04/08	2002~2007MY Impreza	Power Window Motor Assembly, Front
08-38-09	07/16/09	2010MY Legacy & Outback Produced Before June 30, 2009	Service Procedure for Multi-Function Display (MFD) Wire Harness Repositioning
07-65-11	05/04/11	2008MY and Later Tribeca	Headlight Assembly Rear Cover Screw
07-66-11	11/18/11	2008MY and Later, Impreza	Seat Heaters (if equipped)
07-66-11R	05/30/12	2009MY and Later, Forester	
07-68-12	09/11/12	2013MY BRZ	Alternate procedure for Removal of Front Side Marker Lamp
07-69-12	09/12/12	2012 & 2013MY Outback	Procedure to Increase Clearance / Gap between the Combination Lamp and Rear Gate Garnish
07-70-12	09/20/12	2011MY Forester Models with FB Engine	Engine Harness Retention Clip Modification Procedures
15-158-12	10/24/12	2013MY BRZ	Navigation/GPS antenna Changes SD Card Exchange Program Information
07-71-12	12/03/12	2008~2010MY 5 Door Impreza	Revised Packing Material for the License Plate Lamp
07-72-13	01/29/13	2010~2013 Legacy and Outback Models	Sunroof does Not Open or close Properly Popping or Slamming sound When Glass Lowers Prior to Opening
07-73-13	04/17/13	2013MY BRZ	Power Window Main Switch Change.

TechTIPS

**Be advised this may not be all the Subaru TechTIPS pertaining to electrical systems.

**Go to Subaru Tech Info System (STIS) for all Subaru TechTIPS.

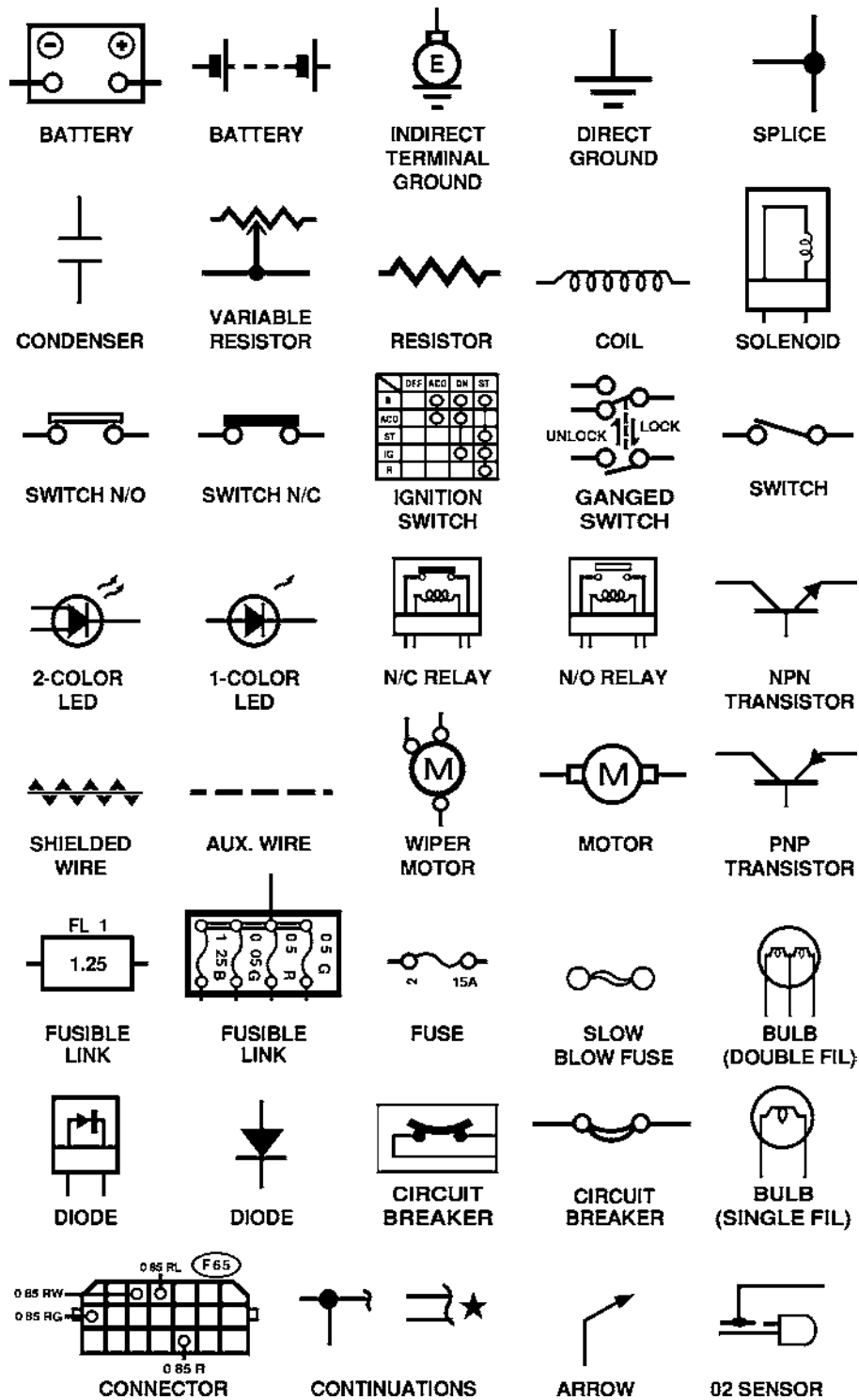
Date	Subject
01/00	2000MY Legacy Blows Fuse #5
02/00	2000MY Subaru Legacy Turn Signal Operation
04/00	2000MY Legacy & Outback Vehicles Fog light Operation
07/00	Grounds, Grounds, Grounds
08/00	Daytime Running Lights
11/00	Windshield wiper De-Icer System Not Working
01/01	Blower Motor Resistor Repairs
06/01	In-Dash Cigarette Lighter Usage
08/01	Alternator Supplier Update
03-04/02	Legacy Transit (D-check-Plug) Connectors
03-04/02	Fuse 4 Blow-Out
07/05	2005MY Legacy / Outback Trailer Hitch Harness Location
10/05	Backup Poor Supply Fuse
11/04	2005MY Forester Diagnostic connector
02/05	2005MY Legacy / Outback Electrical Diagnosis
03/05	Body Integrated Unit (BIU) Replacement
04/05	HVAC & Audio Unit Inoperative After Wiring Harness Change
04/05	2005MY Baja With Poor Radio Reception
05/05	HVAC Inoperative After Wiring Harness Change-More Information
08/05	2003MY Forester Fuse Information
09/05	Battery Going Dead Or Alarm Going Off
11/05	Information Requested For Harness Repair Kits
02/06	2006MY Legacy / Outback And B9 Tribeca Combination Meter Self Diagnosis
02/06	Change of Seat Heater Relay
06/06	Low Battery Voltage
06/06	2005MY Forester A/F & 02 Sensor Relay Location
07/06	SBF-5 Fuse Blows On 2005MY / 2006MY Impreza Vehicles
02/07	"Dark Current" Or Excessive Battery Draw
04/07	Erratic Tail Light Operation
04/07	More "Dark Current" Information
05/07	Headlight Bulb Replacements-A Reminder
06/07	New Style 2008 MY Legacy, Outback & Tribeca Keys
06/07	Midtronics in TELLECT EXP Battery Tester Logic Update
07/07	Headlight Bulb Socket Repairs
08/07	2008MY High Security Keys

Electrical Systems Operation & Diagnosis Module (602)

Date	Subject
09/07	2008MY Impreza Headlight Switch Operation
01/08	2008 Impreza Stop Light Switch C0074 and 0054
05/08	BIU Replacement and Keys
06/08	2008 Impreza Data Link connector Color Change
06/08	Legacy & Outback Door Switch (Nov 2004 production & after)
07/08	Impreza Shock Sensor Installation
12/08	Forester Sunroof Reserves when Closing
01/09	2008~09MY Impreza, Erratic Outside Temperature Gauge Operation
02/09	Door and Ignition Lock Cylinder Replacement Clarification
03/09	2009MY Forester Power Window Information
04/09	Power Door Locks Inoperative 2009MY Forester
06/09	Dark Current Information Revisited
08/09	2010MY Legacy & Outback, Auto Up/Down Feature Operation
08/09	Speedometer Inoperative? Don't Overlook the Sunroof Wiring
08/09	2010MY Legacy & Outback Low-Beam Bulb Replacement
09/09	2010MY Legacy and Outback Headlamp Bulb Replacement Info
10/09	2010MY Legacy & Outback Power Window Operation
01/10	Re-Coding Laser-Cut Keys
02/10	2010MY Legacy / Outback Oil Level Warning Info
02/10	2010MY Legacy / Outback BIU Interchangeability
03/10	2010MY Forester "Resonating" Noise When Using the Horn
05/10	2010MY Forester Dome Light Erratic Operation
10/10	2010~2011 Driver's AUTO-UP Reset Information
01/11	2008~2011 Impreza- Front Turn Signals Blink Too Fast
05/11	Remote Trunk Release Inoperative After BIU Replacement
05/11	2008 M/Y and Later Impreza Stop Light Switch Information
05/11	Sunroof Operation Service Bulletins
06/11	New DTC's After Bulkhead Harness Replacement
07/11	CAN System Diagnostic Information
08/11	Immobilizer Codes Stored, Engine Starts and Stalls Condition
10/11	2011MY Impreza High Beams Not Bright Enough
11/11	Headlight Aiming Precautions.
12/11	Tom-Tom Equipped Volume Control Information
01/12	2012MY Impreza, No Start, SBF-6 Blown
03/12	2012 Impreza Key Information
	Shift Indicator Light Application, 2012MY Impreza
	Battery Testing - The Importance of Using the right Standard
05/12	Re-programming Information for all 2011-2012MY Vehicles

Electrical Systems Operation & Diagnosis Module (602)

Date	Subject
06/12	Vehicles Equipped with EyeSight
	BRZ Trunk Release Operation
	Impreza Glove Box Light
	2013MY BRZ Antitheft Security / Alarm System Activation
09/12	2013 BRZMY Auto Up/Down Window Feature
	Push Button Start Vehicles Equipped with Remote Engine Start
10/12	EyeSight Camera Adjustment
	Accessories and EyeSight
	2013 Smart Engine Start
11/12	2013MY Legacy and Outback Accessory Charging
12/12	Electrical Devices and Airbag Systems
1/13	SDI Interface Box and Self Shut Timer
	2014 Forester Select Monitor Operation
	2013 Legacy/Outback Navigation System Volume Adjustment
2/13	2014 Forester Turbo, Battery Cable Precaution / DTC P060
3/13	Appearance of Water in BRZ Back-up Light
	Voice Clarity
	F-10 Diagnostics
	Voice Recognition

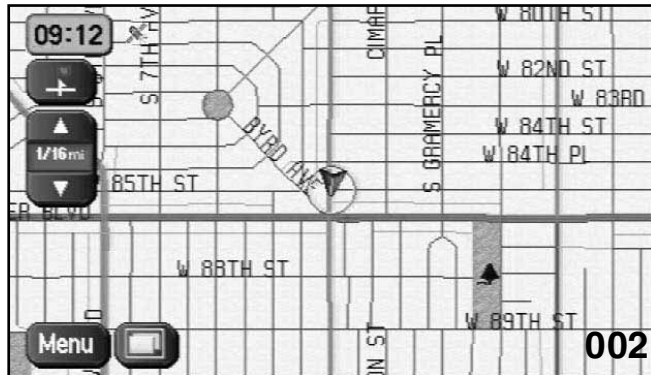


Supplemental Information

Supplemental Information

Audio and Navigation Systems

Subaru Tribeca and Legacy Navigation System (2006)



MAP SCREEN

The Subaru Navigation System has been designed as an integral part of the vehicle from the beginning of vehicle design. This has provided a means of enhancing two way communications between the vehicle operator or navigator and onboard vehicle systems.

Onboard vehicle systems and features include:

- Navigation
- Rear seat entertainment
- Fuel consumption and economy
- Maintenance reminders
- Calculator
- Customization of Navigation display during Navigational and Non Navigational displays
- Calendar
- Customization of the security and keyless entry system
- Customization of adjustable passenger compartment audible and visual features.

Navigation Components

Components of the Navigation include, Navigation Computer, Navigation Display, GPS antenna, remote buttons and DVD Rom.



UNDER DRIVER SEAT

The Navigation Computer is located under the driver seat and is protected by metal guards and a door that protects the front.



DOOR CLOSED



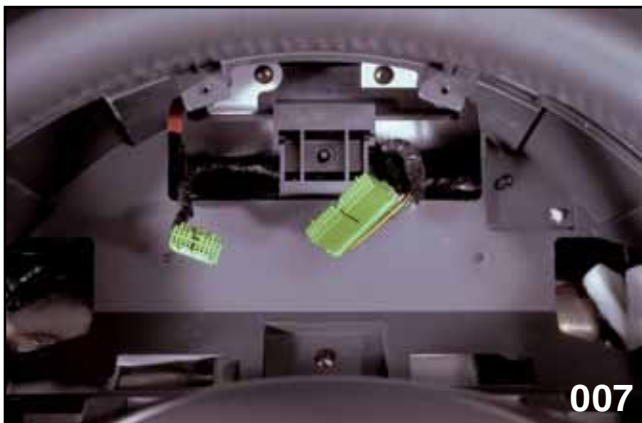
DOOR OPENED

The door must be opened to access the drive for the DVD ROM and reset button. (Do not install or remove a DVD ROM while the vehicle is motion)

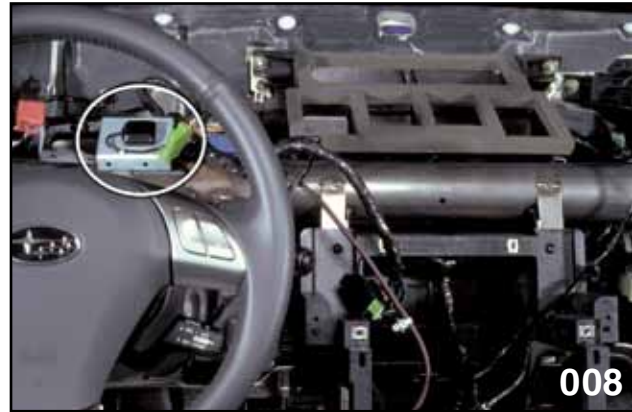


NAVIGATION DISPLAY

The Navigation display is a Liquid Crystal Diode type display that provides touch screen control and communicates Navigation and vehicle information to the driver and front seat passenger.



ANTENNA LOCATION



ANTENNA CIRCLED

The GPS antenna is located behind the combination and provides satellite signal inputs to the Navigation Computer.



REMOTE BUTTONS

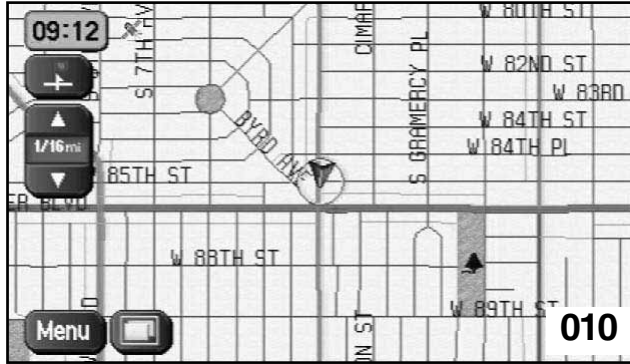
The remote buttons are located on the dash above the radio controls and are used to control many of the Navigation and on board features.

The Subaru Navigation system operates from software contained in either of two DVD Roms. The two DVD Roms are described as East or West, containing navigation software for either the east or west sections of the United States and Canada.

Navigation Operation

Map Screen

Pressing the map button will display the map screen.



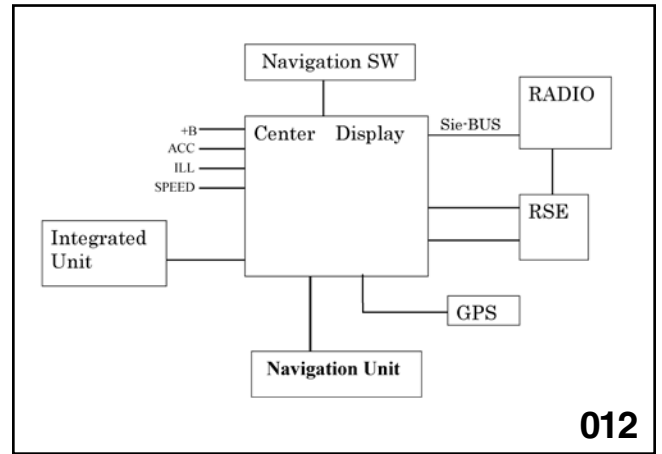
MAP SCREEN

Pressing the menu button on either the Navigation Display or the remote button will display:



NAVIGATION MENU

- Destination entry
- Navigation set up
- Stored Locations
- Route options
- Language set up



SCHEMATIC

Tribeca Rear Entertainment System



HEADLINER INTERIOR

The monitor and player are mounted in the roof to offer visibility to all 2nd and 3rd seat passengers.



DVD PLAYER

The rear seat entertainment system consists of the 9 inch QVGA (Quarter Video Graphics Array) monitor and DVD player, external inputs, remote control and head phones.

The Quarter Video Graphics Array (QVGA) provides a display screen with 320 x 240 resolution (240 x 320 in portrait mode). The QVGA term has been established because the display provides 25% of original VGA displays.



NAVIGATION DISPLAY

The driver and front seat passenger can view the rear entertainment system through the Navigation Display provided the vehicle is not in motion and the parking brake is set. (Ignition on-Parking brake set-Rear seat entertainment-auxiliary button pushed-Audio button pushed)



REMOTE BUTTONS

Any time the display is changed for viewing vehicle information or navigational display viewing, the audio button will require pushing to return to viewing of the rear entertainment system.

Control for the rear entertainment system is provided only through the use of the remote control. The remote control is powered by one 3 volt CR2025 battery. Headphones can be used when the driver has turned off the Rear seat entertainment-auxiliary input into the radio or desires to listen to the radio.



INFRARED

Sound from the rear entertainment system is projected to the rear of the vehicle through an infrared LED assemble (The headphones must be in the line of sight of the monitor and player assembly)

Activates rear inputs

Turns on DVD or CD

Turns display off (not sound-if sound is being broadcasted over audio system)

Activates DVD player menu

Push to Enter / Cursor Control

Only for use on DVD or Cd's written with these options

Overall Audio Subtitles

Language

Chapter Search

Only for use on DVD or Cd's written with these options

- Brightness
- Color
- Contrast

- Controls
- Zoom
- Portrait
- Landscape

Servicing Battery CR2025 (3 volt)

REMOTE CONTROL

Electrical Systems Operation & Diagnosis Module (602)

Vehicle Information

If the ignition is turned off while the rear entertainment system is being used for DVD viewing, the DVD will restart at the stopping point once the ignition is turned back on, however, the remote control must be used to activate the monitor by pressing the DVD button. If the sound was being broadcast over the vehicles sound system, the DVD will self start with the monitor off. If the audio was only available through the head phones then the remote must be used to start the DVD (Pressing the DVD button on the remote).

Pressing the info button will display last viewed of four possible information and customizing sources.



REMOTE BUTTONS

- Fuel economy
- Travel log
- Virtual Gauges
- Calculator
- SET

NOTES:

Legacy Audio System (2005-2009)



BEAUTY SHOT

The 2005~2009 Legacy/Outback models are available with one of 3 types of audio packages. The owners manual provides detailed operating instructions for each type. The 3 types of audio packages are identified as type A, B or C. Each progressive letter providing a higher level of capabilities.



REAR VIEW OF RADIO

All 3 types are controlled through the Audio/HVAC control panel.



REAR VIEW OF CONTROL PANEL

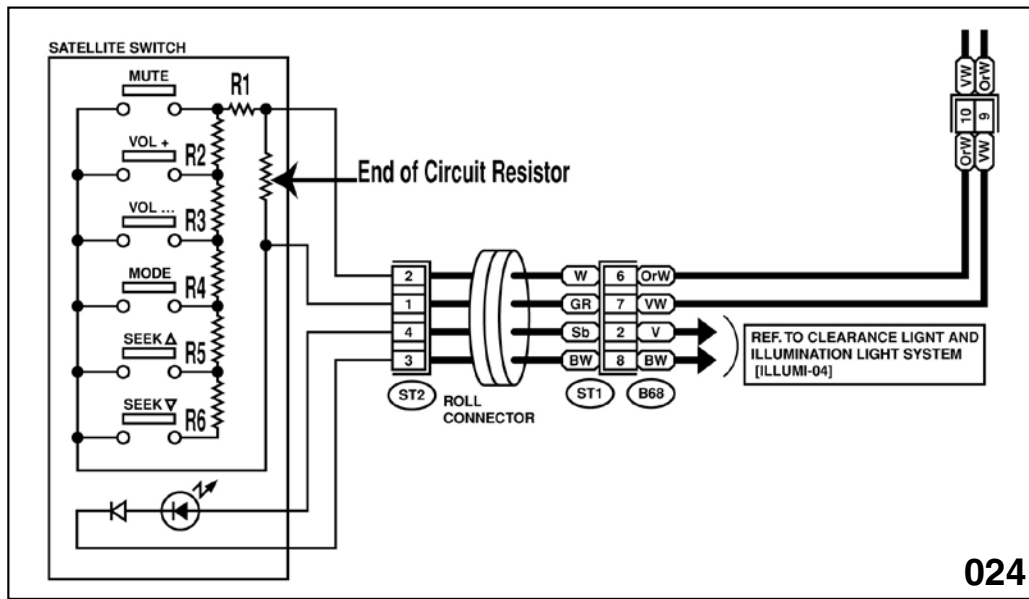
This panel carries the desired input signals from the driver to the audio unit.



FRONT VIEW OF RADIO CONTROL PANEL

The panel also carries the HVAC signals (Automatic A/C models) from the control panel, through the radio and out to the HVAC actuators. (Manual HVAC uses a cable for temperature control.)

Satellite Audio Controls



AUDIO WIRING

Control	Total Circuit Resistance
Mute	22.3
Volume -	88.5
Volume+	192.2
Mode	335.5
Seek	602
Seek	1.142K
End of Circuit Resistance	4.68K

The satellite audio controls located on the steering wheel pad function by varying the resistance between the 2 wires that lead from the radio chassis to the satellite audio control assemble.

The “end of circuit resistor” will send a high resistance value (approximately. 4.6 k ohms) to the radio when no switches are closed maintaining the last set radio condition. Operating any of the switches creates a parallel circuit, effecting the total circuit resistance.

The different resistance values operate the radio and only one control signal can be sent to the radio at a time.

For example:

R4 = 360 Ω End of circuit resistance = 4680 Ω

$$RT = \frac{R1 \times R2}{R1 + R2}$$

$$RT = \frac{4680 \times 360}{4680 + 360}$$

$$RT = \frac{1684800}{5040}$$

$$RT = 334.29$$

2008 Navigation Impreza

Note: 2009 Forester utilizes the same type of system



NAVIGATION SCREEN STARTING UP



NAVIGATION SCREEN DISPLAYING SUBARU LOGO

The navigation system built by Kenwood contains the display, controls, audio unit and navigation computer. The system will display the Subaru logo at each engine start and then proceed to the start up screen.



RADIO WITHOUT NAVIGATION



AGREE SCREEN

The operation of the navigation system and the info display is the same as past models. (Except the controls are all located on the Navigation unit.)



INFO DISPLAY MAIN SCREEN



SET FUNCTIONS



TILT / EJECT SCREEN

The display of the Navi/Audio unit has a tilt function that allows the screen to be adjusted to 4 positions to allow for glare.



CD / DVD DRAWER

Changing of the CDs is accomplished by pressing the DVD/CD button. This will tilt the display almost 90 degrees to allow for installing or removing music CDs or DVDs. (DVDs will only display while the vehicle is not moving.)

Pressing the map button will tilt the display 90 degrees and automatically eject the currently installed Map disc.

A navigation system software disc (shipped with the vehicle) must be installed before the controls of the Navi/Audio system will be displayed.

Press and **HOLD** the tilt button to open the unit for software installation.



MAP DVD DRAWER

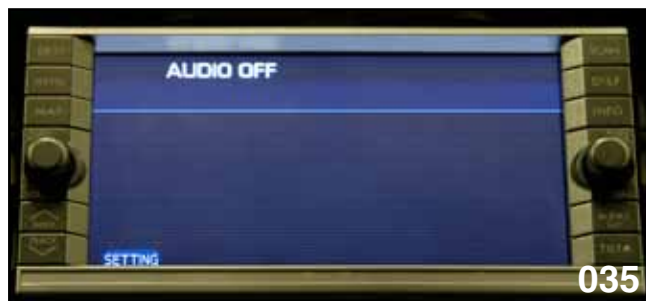


SHOWING SENSITIVITY IF OBSTRUCTED TO CLOSE

The word “close” on the now vertical panel of the display indicates that the close control is located on the now horizontal panel of the display. Pushing the button will close the display to the last tilt setting. The display close operation is load sensitive and will stop the close function if the display panel is obstructed.

Navigation Diagnosis (2008)

The Navi/Audio Unit contains a built in diagnosis system. Start the engine and press the agree button on the startup screen.



AUDIO OFF SCREEN

Next press the {Audio/Sat} button and turn the audio off.

NOTE: ALL OTHER FUNCTIONS MUST ALSO BE OFF.

Next tap the screen on the LEFT side and then the RIGHT.



PROCESS OF ACTIVATING DIAGNOSTIC MODE

THERE MUST BE A TOTAL OF SIX (6) ALTERNATING TAPS TO ACTIVATE DIAGNOSTIC MODE.

Note: When the vehicle is placed into reverse gear the radio volume is automatically turned down.



DEALER DIAG MENU SCREEN

The Dealer Diagnostic Menu will now activate.
Next press {Vehicle Signal Info.}

NOTE: Diagnostic information is currently only available in Vehicle Signal Info. And Connection info.

Vehicle Signal Info. Provides the status of the connections between the Navi/Audio Unit and:

Controller Area Network Signals

- CAN
- BCU - (BIU)
- METER - (Combination Meter)
- AIR-Con - (Air Conditioning)

Vehicle Signals:

- Illumination Control
- Speed Signal
- Reverse
- Ignition
- Parking (Brake)



VEHICLE SIGNAL INFO. SCREEN

Pressing Menu will take you back to the Dealer Diagnostic Menu.

Press {Connection Info.}



CONNECTION INFO. SCREEN

The only current connection is the Aux Input.

Press {Menu} to go back to the Dealer Diagnostic Menu.

Press {Exit} to return to normal operation.

2010 Navigation System



AUDIO/NAVIGATION SYSTEM

The 2010 Audio/Navigation System is now wired to the BIU using Universal Asynchronous Receiver and Transmitter circuitry (UART) and is not capable of displaying vehicle information or allowing the BIU settings to be made through the Navigation display.



NAVIGATION DVD DRIVE COVER



EJECT NAVIGATION DVD CONTROL

The eject control is located under the cover and to the right of the drive.



INSTALLING NAVIGATION DVD

Movie DVDs can be installed in the CD drive. Movies can only be viewed at the Navigation display while the vehicle is stationary.



NAVIGATION SYSTEM AND RADIO ON BENCH REAR VIEW

Seven (7) connectors

One (1) ground connector

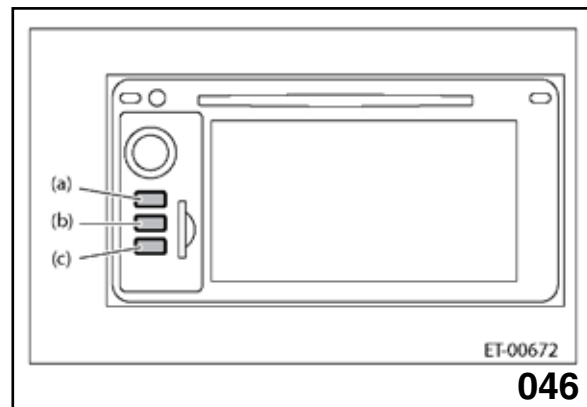
One (1) antenna pig tail (The pig tail is attached to the dash frame and must be released before removing the Navigation system and radio from the vehicle).

2012 Audio and Navigation

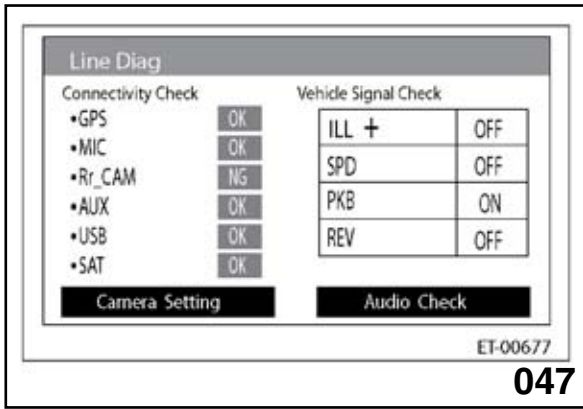


SD MEMORY CARD FUJITSU-TEN UNIT

Insert SD Card with the label facing the left side. Make sure SD Card locks in. The SD Card is programed with the Navigation Map Data. The SD Card must be in place for the Navigation System to operate.



DIAGNOSTIC MODE ACTIVATION



DIAGNOSTIC SCREEN

With the ignition ON and audio OFF, press and hold button (c) for 3 seconds or more while pressing the buttons (a) and (b).

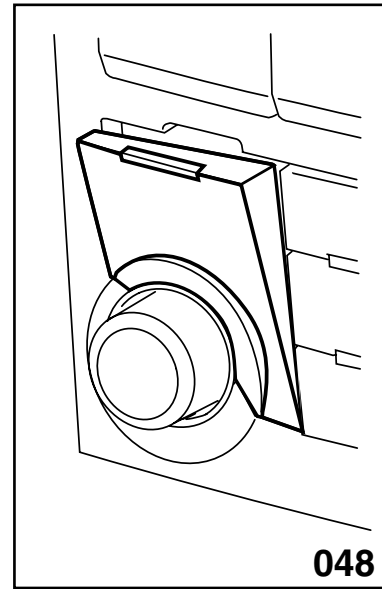
Note: *Diagnostic mode can be cancelled by pressing the button (a) for 3 seconds or more, or turning the ignition OFF.*

Note: *Ejecting the SD Card without following proper procedures may corrupt SD Card.*

NOTE: *Diagnostic mode activation for all audio systems can be found in the “Entertainment ET” section of the Subaru Service Manual.*

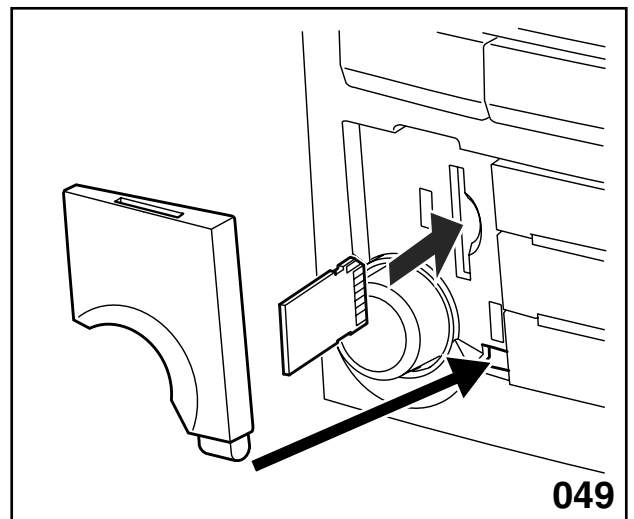
2013 Legacy/Outback

SD card location on applicable 2013 Legacy/Outback models.



SD Card Location

Note: See Subaru Owners Manual for details.

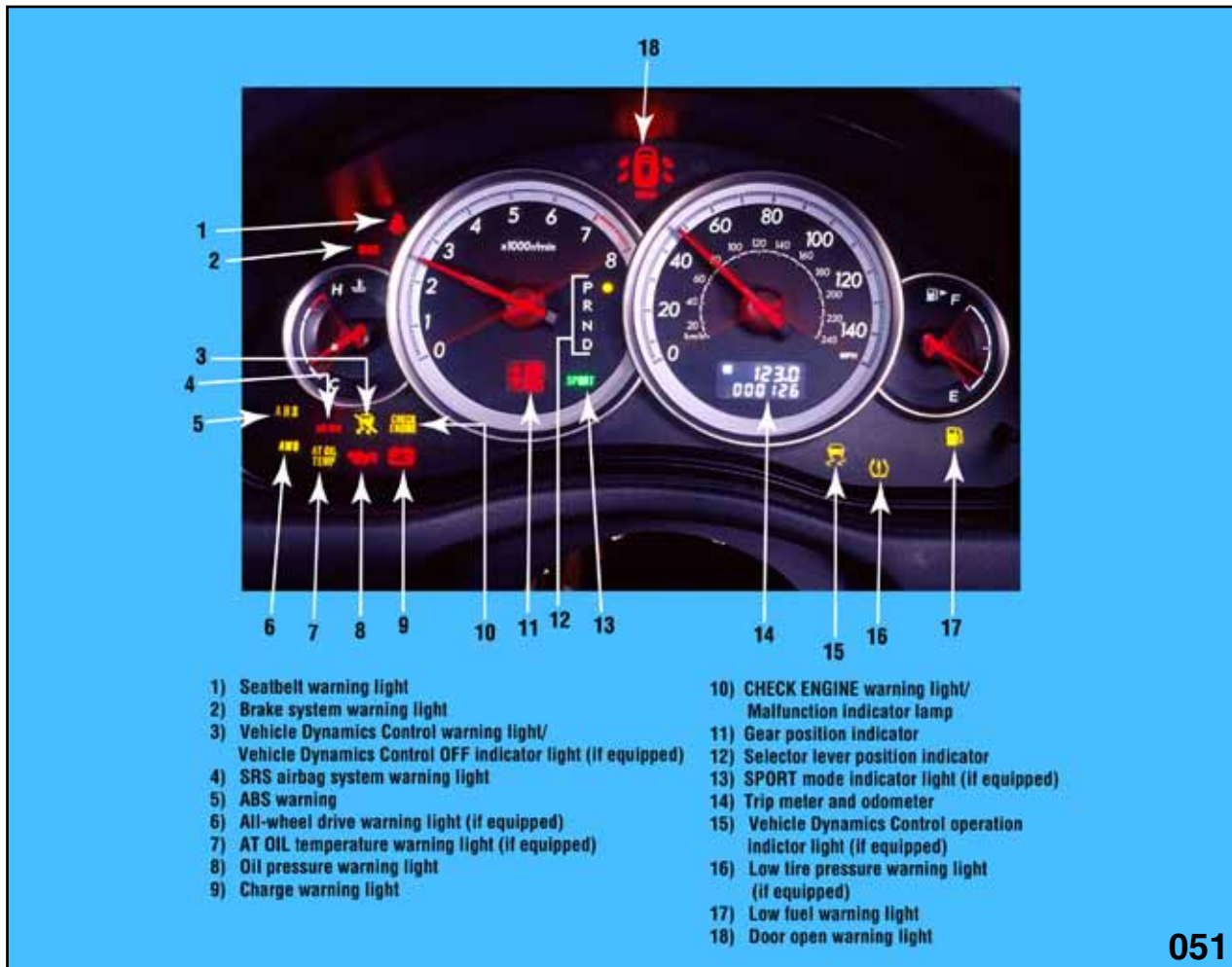


SD Car Slot and Door

Note: Follow the directions on the navigation display to correctly remove the SD card.

Combination Meters

(Legacy 2005)



COMBINATION METER (Example)

Turning the ignition key to the run position starts the light check cycle and activates the sweep of all gauge needles. Pushing the Trip Meter stalk with the ignition off will illuminate the Trip Meter display and activate the Fuel Gauge to show the actual fuel level.

Electrical Systems Operation & Diagnosis Module (602)



S-ON

The Combination Meter can be adjusted to delete the sweep function of the gauges and the sequential illumination. Turn the ignition key to the accessory position. Push the Trip Meter stalk 2 times from the “B” Trip Meter or 3 pushes of the Trip Meter stalk from the “A” Trip Meter. When the “S-On” appears in the Trip Meter display push and hold the Trip Meter stalk for 2 seconds until the “S-Off” is displayed.



S-OFF

This feature can be used to turn the gauge sweep off of all Legacy models. The GT models can be adjusted to turn the gradual illumination off. Push the Trip Meter stalk again while the status of the gauge sweep is being displayed and the display will change to “I-on.”

Push and hold the Trip Meter stalk for 2 seconds until the display changes to “I-off.” Follow the same procedure to turn the gauge sweep and sequential illumination back on. In each case the current status will be displayed. To change it push and hold the Trip Meter stalk for at least 2 seconds. Pushing less than 2 seconds will advance the display to the next item.



D CHECK CONNECTOR SIDE VIEW

The Combination Meter can be forced into a D check procedure. A set of one pole white connectors (2005MY only) are located on the left side of the dash, near and above the hood release handle.



D CHECK CONNECTOR SIDE VIEW

Plug the two white pole connectors together and turn the ignition to the run position.

Electrical Systems Operation & Diagnosis Module (602)



GAUGE SWEEP

While the gauges are sweeping, push the Trip Meter stalk 2 times. The D check will now begin. All lights, gauges, beeps and displays will turn on and off. This will allow for a visual and audible check of all Combination Meter devices.

After the initial sweep the combination meter can be controlled to advance in the D check, one step at a time.

Push the trip meter stalk at the end of the initial sweep. This will allow only certain items to be checked.

Continue pressing the stalk as each item is checked, until all items have been inspected.



MANUAL ADVANCE

Pushing Trip Meter Stalk 1 time will activate the Trip Meter to display trouble codes. Push the Trip Meter Stalk to advance the code display. The codes will be displayed in the following order on the list below.

ECM → TCM → ABS/VDC

This must be done when the Combination Meter is not performing a D check.

NOTES:

Subaru Tribeca Combination Meter



DASH

The Sweep and sequential illumination of the Combination Meter can be turned on and off.

- Ignition key to accessory
- Press the Trip Meter stalk 3 times (or until the “S” appears in the Trip Meter display).
- Press and hold the Trip Meter for more than 2 seconds to change the “I” or “S” setting.

“S-On” indicates the sweep function is on.
“S-off” indicates the sweep function is off.

“I-on” indicates the sequential illumination is on. “I-off” indicates the sequential illumination is off.

The Combination Meter D check procedure is accomplished by performing the following steps: **(begin the first push of the Trip Meter stalk before the sweep function ends)**

- Ignition off
- Ignition on, small light (parking lights from the head light switch) on.
- Push Trip Meter 3 times
- Small light off
- Push Trip Meter 3 times
- Small light on
- Push Trip Meter 3 times

DTCs can be viewed on the Trip Meter by following the steps above but push the Trip Meter 4 times in each step instead of 3 times.

Toggle through the DTCs by pressing the Trip Meter stalk. The first set of codes will be for the engine, followed by the transmission DTCs. The ABS codes C- - - will be viewed on the Trip Meter display, however, the new ABS/HCU does not communicate DTCs to the Combination Meter.

Combination Meter D Check

Procedure of change over to DIAG mode.

Note: The number of times you push the Trip Meter Knob on the combination Meter is different between the “DTC reading mode” and the “self diagnosis mode”

- 1) Within 3 second after the IG switch turned on, turn the illumination switch on, then perform the following steps 2 to 4 within the followed 10 seconds.
- 2) Push the “trip knob” 3 times while illumination switch ON.
- 3) Turn the illumination switch off, then push the trip knob 4 times. (3 times for Self diagnosis mode)
- 4) Turn the illumination switch ON again, push the trip knob 4 times. (3 times for self diagnosis mode)

Now, the mode was changed to DTC Reading mode or Self diagnosis mode of the combination meter.

Note: The white diagnostic connector at the fuse-box under the instrumental panel is eliminated.



NATURALLY ASPIRATED MODEL COMBINATION METER

2008 and newer Impreza models are equipped with a sequential sweep and WRX models are equipped with sequential illumination. The combination meter has an available D check procedure. Turbo models are equipped with a temperature gauge and the Naturally Aspirated models are equipped with a temperature warning light.

Temperature warning light logic

< 50°C (122°F)	Blue
113°C (235°F)	Red Blink
120°C (248°F)	Red On

The Red indicator will turn off after the temperature has dropped to 111°C (232°F). The light will change to blue after the temperature has dropped to 45°C (113°F). (BIU controlled)

Note: This temperature warning light logic is applicable for 2009 and newer Forester models.

2012 Impreza Combination Meter

The Combination Meter checks and customizing features can now be checked and set with the SSMIII. Previous models required manipulation of the headlight switch and trip-meter stalks.



COMBINATION METER



COMBINATION METER FRONT VIEW



COMBINATION METER REAR VIEW

Rear Vision Camera



REAR VISION CAMERA ON BACK GATE

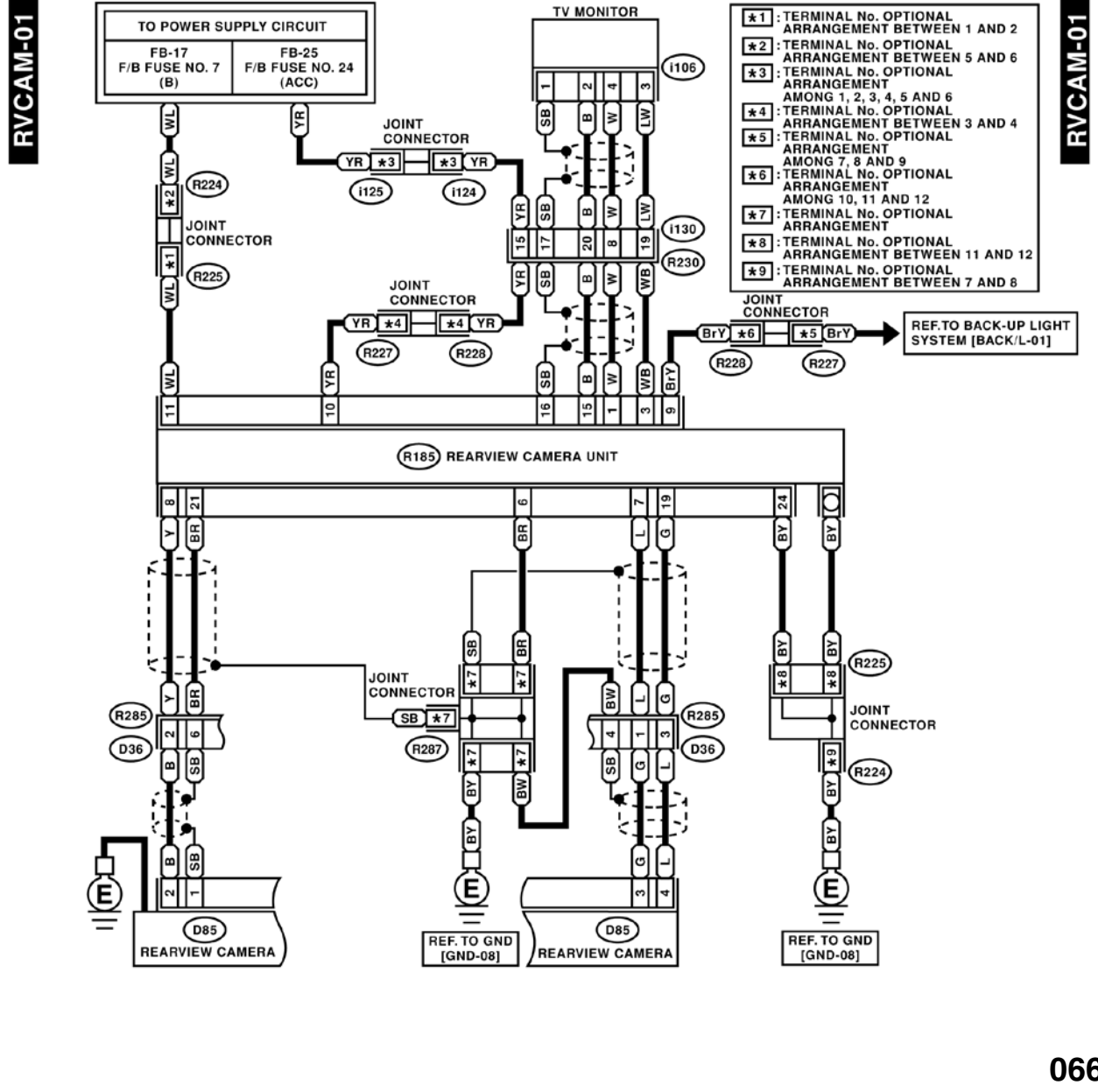


REAR VIEW IMAGE ON LCD SCREEN

A rear vision camera is now standard on all 2007 and newer navigation-equipped models. The system displays an image of behind the vehicle with reference lines to aid in backing up/parking. The image is shown on the high-resolution LCD screen only when the transmission is in reverse. This system will turn the LCD screen on when going into reverse even if the LCD screen has been turned off. This system is factory installed.

37.Rearview Camera System

A: WIRING DIAGRAM



REAR VIEW CAMERA ELECTRICAL SCHEMATIC

Supplemental Information for Keyless Entry Registration of Newer Vehicles

2012 to 2013 Impreza (Immobilizer Type B)



2012 to 2013 Impreza

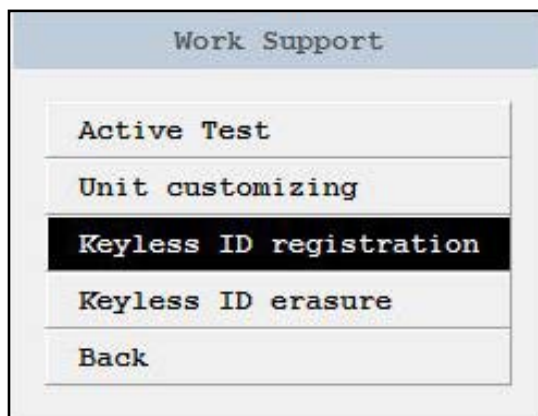
Registration of Keyless Transmitter with Subaru Select Monitor

A maximum of four keyless transmitters can be registered for each individual vehicle. When replacing or adding the keyless transmitter, new registration of each transmitter is necessary.

Turn the ignition switch to OFF.

On the “Main Menu” of the SSMIII, select:

1. All other models
2. Each System Check
3. Integ. unit mode
4. Work Support



5. Press “Keyless ID registration.”



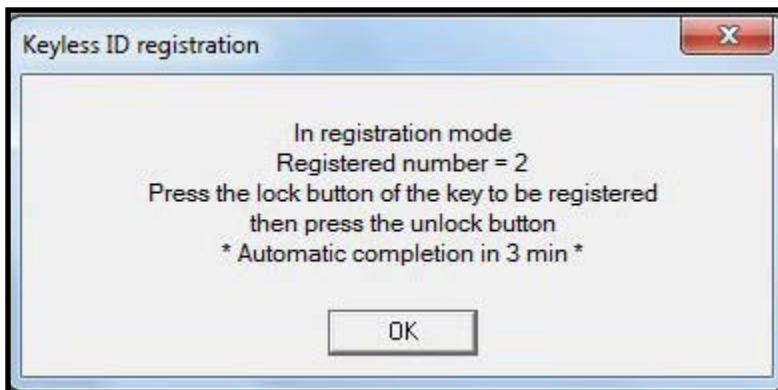
6. Press “YES” after confirming ignition off and key removed.



7. Buzzer sounds once for each key registered.



8. Repeat the registration as many times as desired up to maximum (4).



9. Press "OK" when complete.

BRZ Keyless Entry System {Mechanical Key} Key Registration



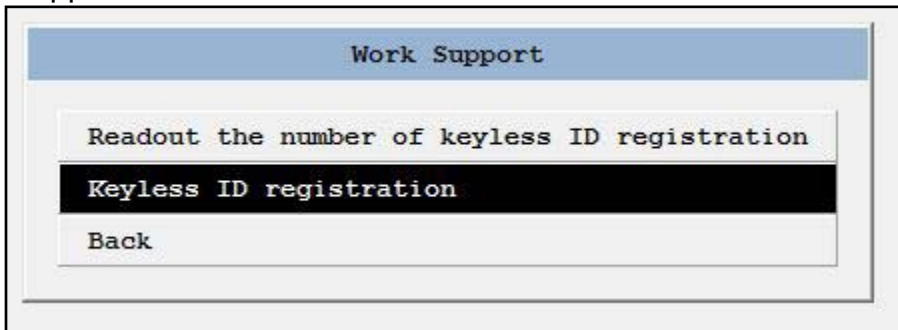
BRZ Mechanical Key

To register a new keyless ID while keeping existing registered codes.

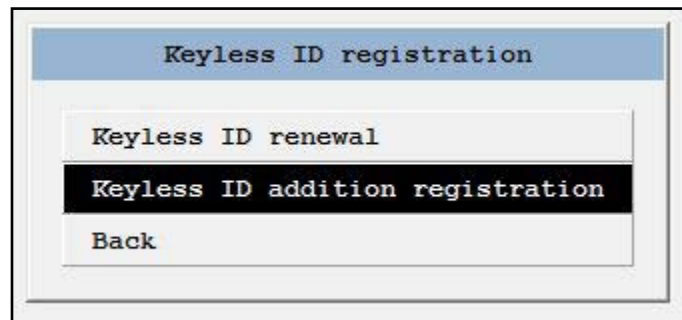
A maximum of six keyless transmitters can be registered for each individual vehicle. If the number of registered codes exceeds 6, the first registered code is erased.

On the “Main Menu” of the SSMIII, select:

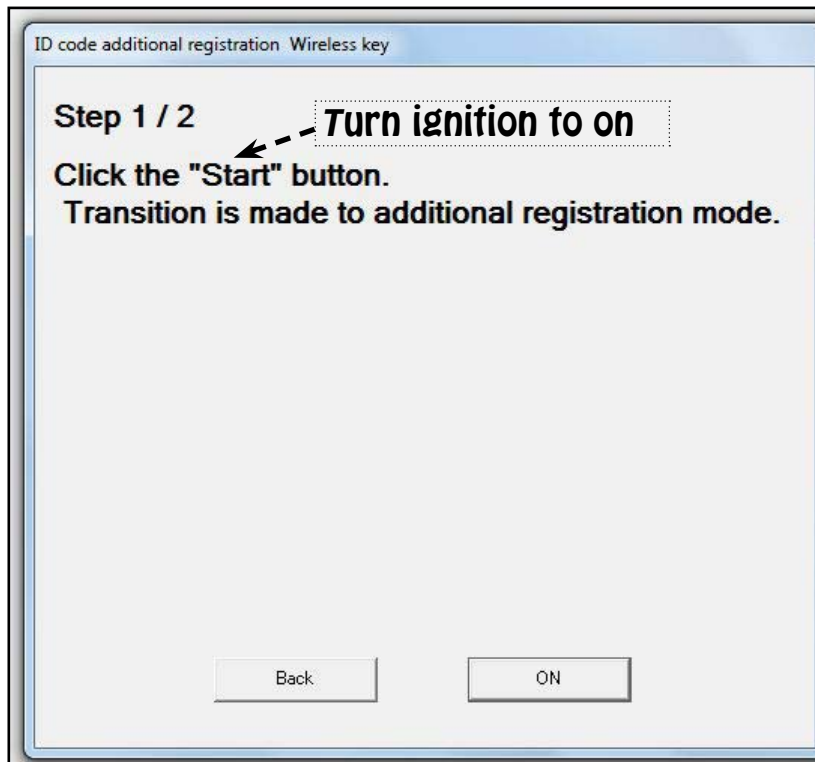
1. Inspection of BRZ
2. Each System Check
3. Keyless Unit mode
4. Work Support



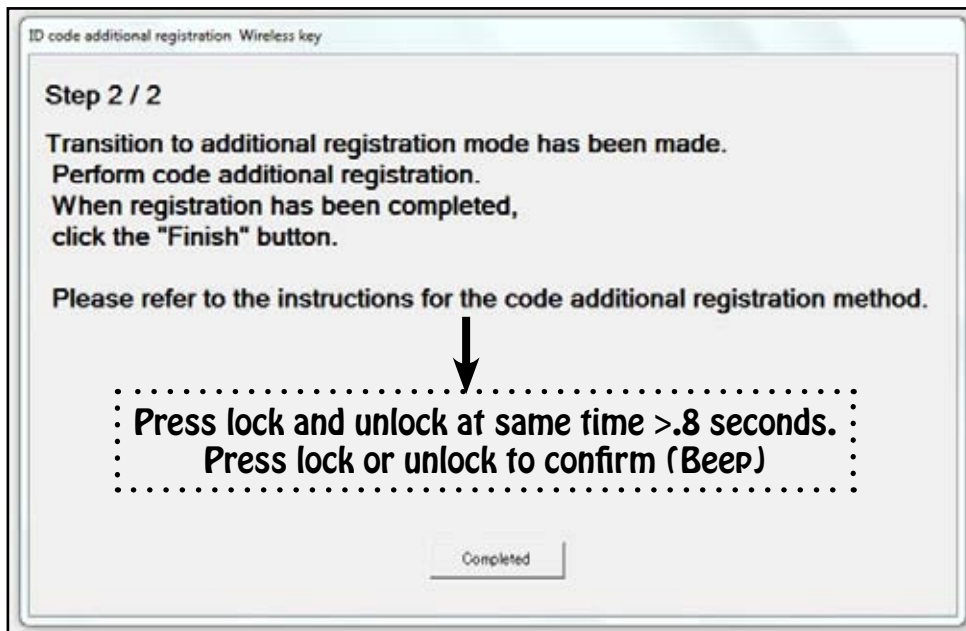
5. Press “Keyless ID registration”



6. Press “Keyless ID addition registration”



7. Start means to turn ignition on. Press "ON".



8. Repeat the registration as many times as desired up to maximum (6). Press "Completed" when done.

BRZ with Keyless Access and Push Button Start (KAC)



BRZ (KAC)

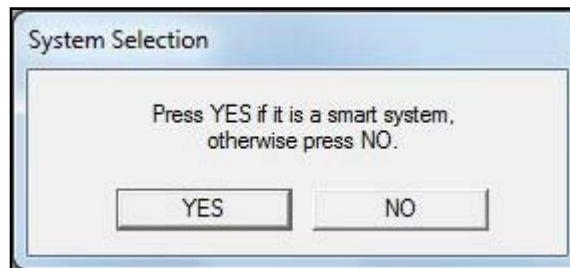
Key Registration (Additional key ID registration)

A maximum of seven keyless transmitters can be registered for each individual vehicle.

1. Prepare all electrical key transmitter sub-assemblies to be registered and place them outside vehicle.
2. Hold 1 registered key transmitter sub-assembly inside vehicle.
3. While holding transmitter turn ignition switch "ON".
4. Turn on SSMIII

On the "Main Menu" of the SSMIII, select:

5. Main Menu
6. Inspection of BRZ
7. Immobilizer



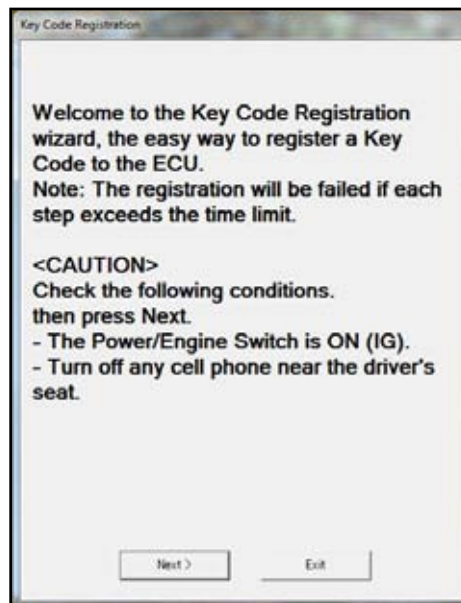
8. Press "YES"



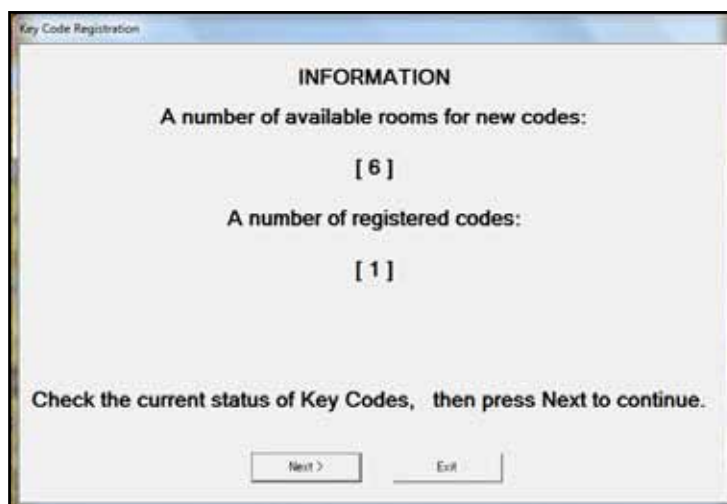
9. Press "OK"



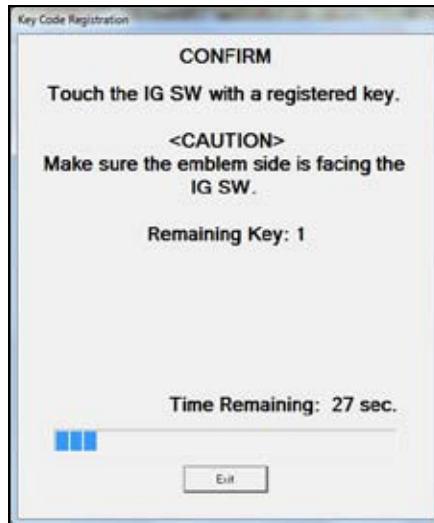
10. Press "Key Registration"



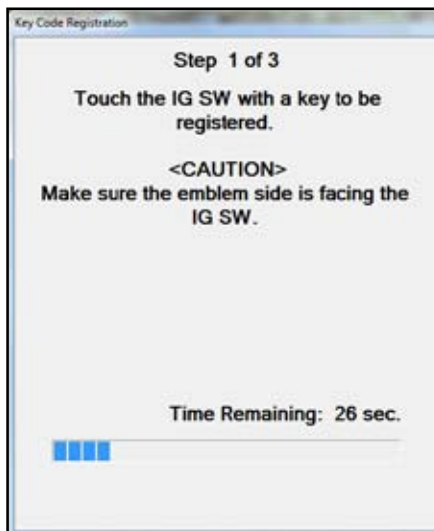
11. Press "Next"



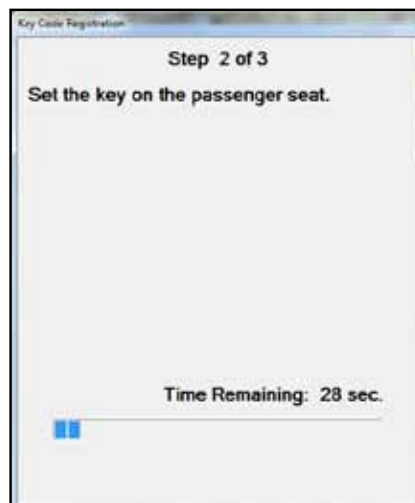
12. Press "Next"



13. Key Code Registration Confirm: Hold a registered key to the Start Switch (SW).



14. Verification of unregistered key: Hold the unregistered key to the Start Switch (SW).



15. Confirm a Beep after this step.

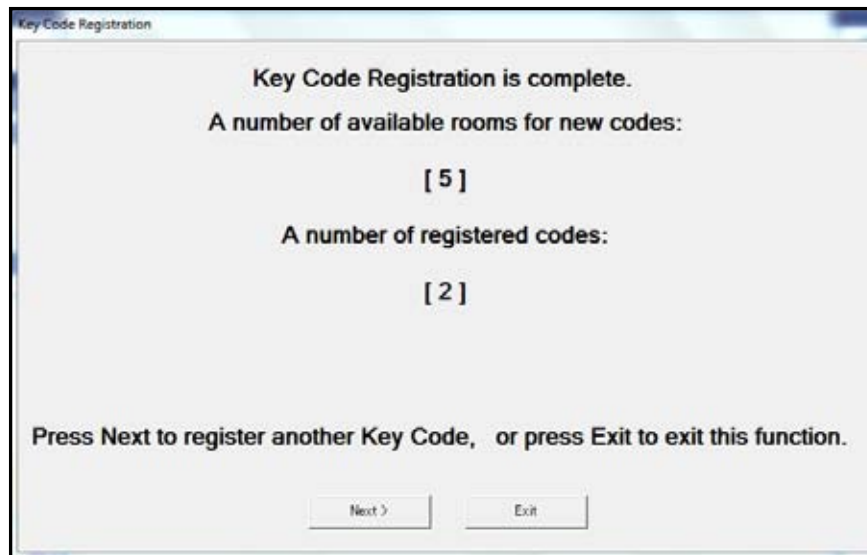
Electrical Systems Operation & Diagnosis Module (602)

Note: Remove each key from vehicle as it is registered before bringing the next key to be registered into the vehicle.

Repeat the registration as many time as desired up to the maximum (7).



16. Press "Register" when done with all keys.



17. Press "Next"

Legacy and Outback Keyless Access and Push Button Start (KAC)



Legacy / Outback Key (KAC)

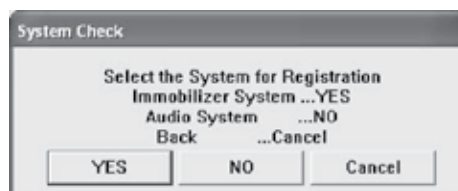
Key Registration (Additional key ID registration)

A maximum of seven keyless transmitters can be registered for each individual vehicle.

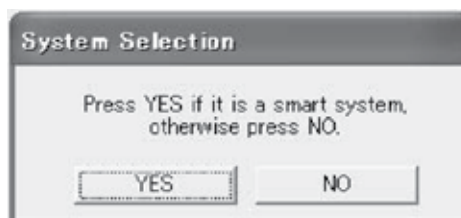
1. Prepare all electrical key transmitter sub-assemblies to be registered and place them outside vehicle.
2. Hold 1 registered key transmitter sub-assembly inside vehicle.
3. While holding transmitter turn ignition switch "ON".
4. Turn on SSMIII

On the "Main Menu" of the SSMIII, select:

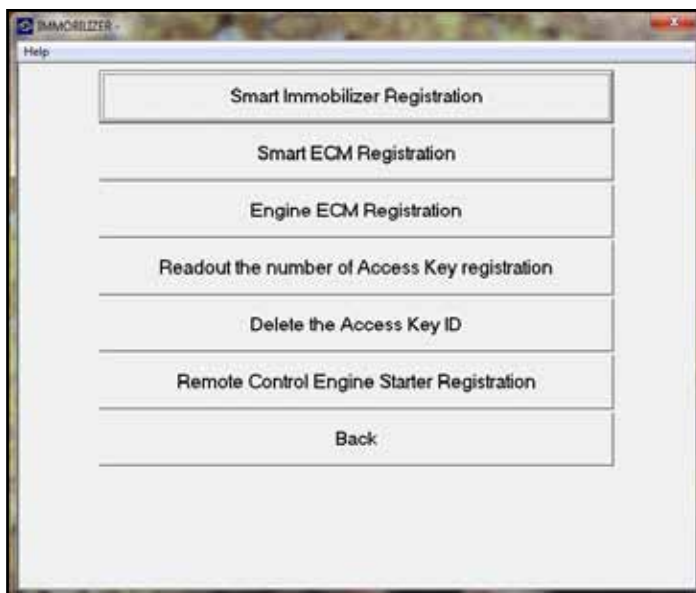
5. Main Menu
6. All other models
7. Immobilizer



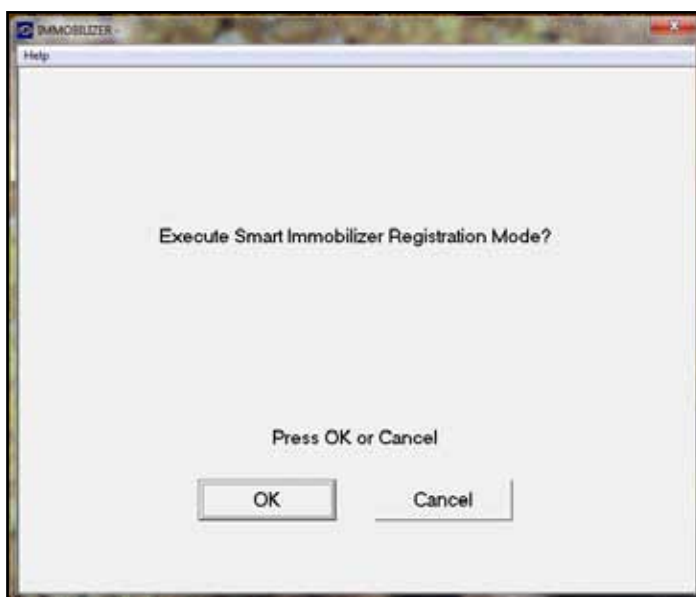
8. Press "Yes".



9. Press "Yes".



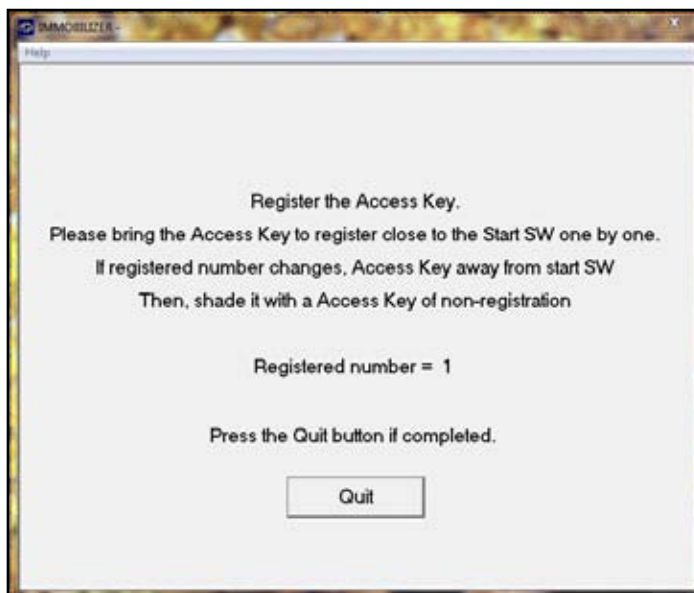
10. Press "Smart Immobilizer Registration?"



11. Press "OK?"



12. Key Code Registration Confirm: Hold a registered key to the Start Switch (SW).



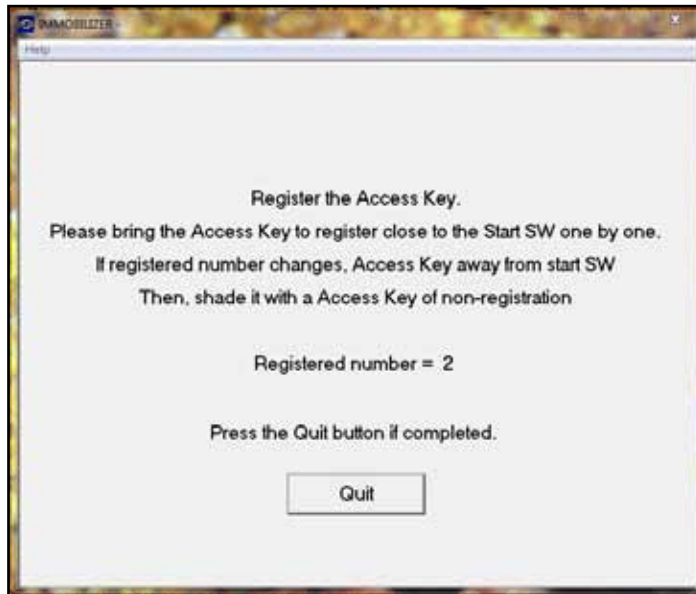
13. Verification of unregistered key: Hold the unregistered key to the Start Switch (SW).

Electrical Systems Operation & Diagnosis Module (602)

Note: Keep key inside of vehicle for 10 seconds before proceeding to next key.

Remove each key from vehicle as it is registered before bringing the next key to be registered into the vehicle.

Repeat the registration as many time as desired up to the maximum (7).

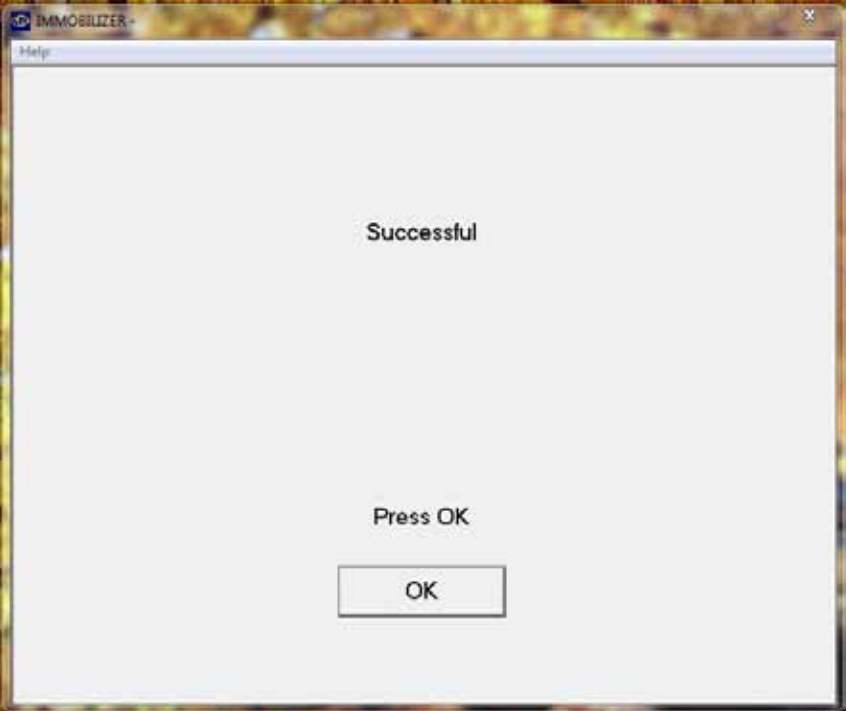


14. Registered number will increase as each key is added, a buzzer will also sound twice after each key is added.

Press "Quit" when done.



15. Hold up a newly registered key to the Start Switch (SW).



16. Press "Ok."



SUBARU
MASTER TECHNICIANS
Quality driven. Technician powered.™



MSA5P0135C