



COLLISION INDUSTRY
CONFERENCE



Technical Committee
“The Skinny on Scanning”

Presented by:
Toby Chess, Co-Chair
Kye Yeung, Co-Chair





What if this car
was in an
accident and the
codes were not
cleared?





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The “Skinny on Scanning”

Technical Committee
Toby Chess & Kye Yeung

But one more tool that is a must, is a



Minimum
For Today,



ements
n Center



SCAN TOOL

RY



Question--Is Scanning New?



No

At first there were few standards and each manufacturer had their own systems and signals. In 1988, the Society of Automotive Engineers (SAE) set a standard connector plug and set of diagnostic test signals. The EPA adapted most of their standards from the SAE on-board diagnostic programs and recommendations. OBD-II is an expanded set of standards and practices developed by SAE and adopted by the EPA and CARB (California Air Resources Board) for implementation by January 1, 1996.



Question: Why is it necessary to have a SCAN tool in a collision center?



Answer: To properly diagnosis and repair the Advanced Driver Assistance Systems (ADAS) that are standard on Today's Automobiles

Advance Driver Assistance Systems described by Wikipedia



Description [\[edit\]](#)

Advanced driver assistance systems (ADAS) are systems developed to automate/adapt/enhance vehicle systems for safety and better driving. Safety features are designed to avoid collisions and accidents by offering technologies that alert the driver to potential problems, or to avoid collisions by implementing safeguards and taking over control of the vehicle. Adaptive features may automate lighting, provide adaptive cruise control, automate braking, incorporate GPS/ traffic warnings, connect to smartphones, alert driver to other cars or dangers, keep the driver in the correct lane, or show what is in blind spots.

There are many forms of ADAS available; some features are built into cars or are available as an add-on package. Also, there are aftermarket solutions available.^[1] ADAS relies on inputs from multiple data sources, including automotive imaging, [LiDAR](#), [radar](#), [image processing](#), [computer vision](#), and [in-car networking](#).^[2] Additional inputs are possible from other sources separate from the primary vehicle platform, such as other vehicles, referred to as [Vehicle-to-vehicle](#) (V2V), or Vehicle-to-Infrastructure (such as mobile telephony or wifi data network) systems.

Advanced driver assistance systems are one of the fastest-growing segments in automotive electronics,^[3] with steadily increasing rates of adoption of industry-wide quality standards, in vehicular safety systems [ISO 26262](#), developing technology specific standards, such as IEEE 2020 for Image Sensor quality^[4] and communications protocols such as the Vehicle Information API.^[5]

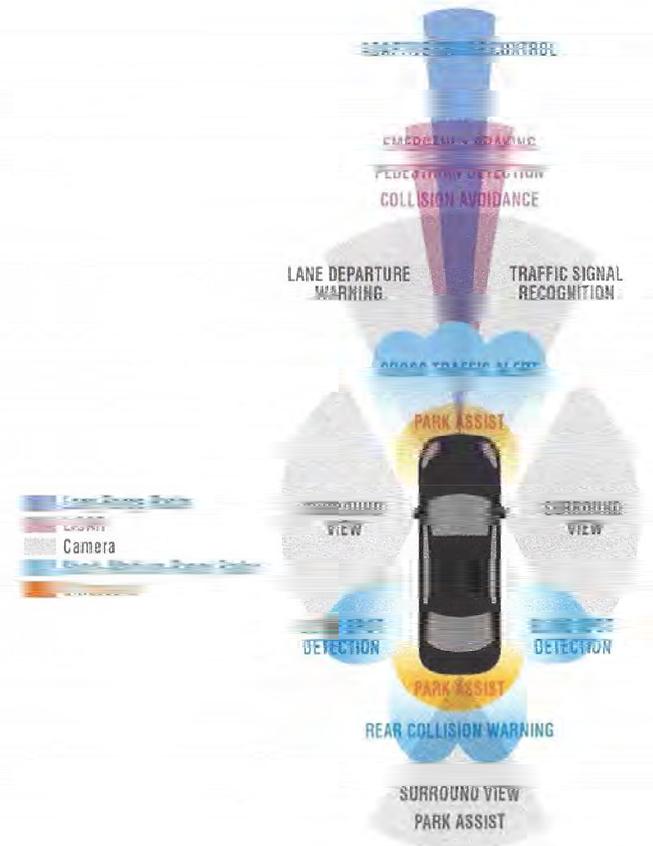
Next-generation ADAS will increasingly leverage wireless network connectivity to offer improved value by using car-to-car (also known as Vehicle to Vehicle, or V2V) and car-to-infrastructure (also known as Vehicle to Infrastructure, or V2X) data

Safety System Alignment™ Overview

HUNTER
Engineering Company

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- Many vehicles are now equipped with Advanced Driver Assistance Systems (ADAS)
- Many require a reset:
 - After wheel alignment
 - Part replacement
 - Windshield replacement
 - Other changes to the direction of travel of the vehicle
- Reset may involve a short drive



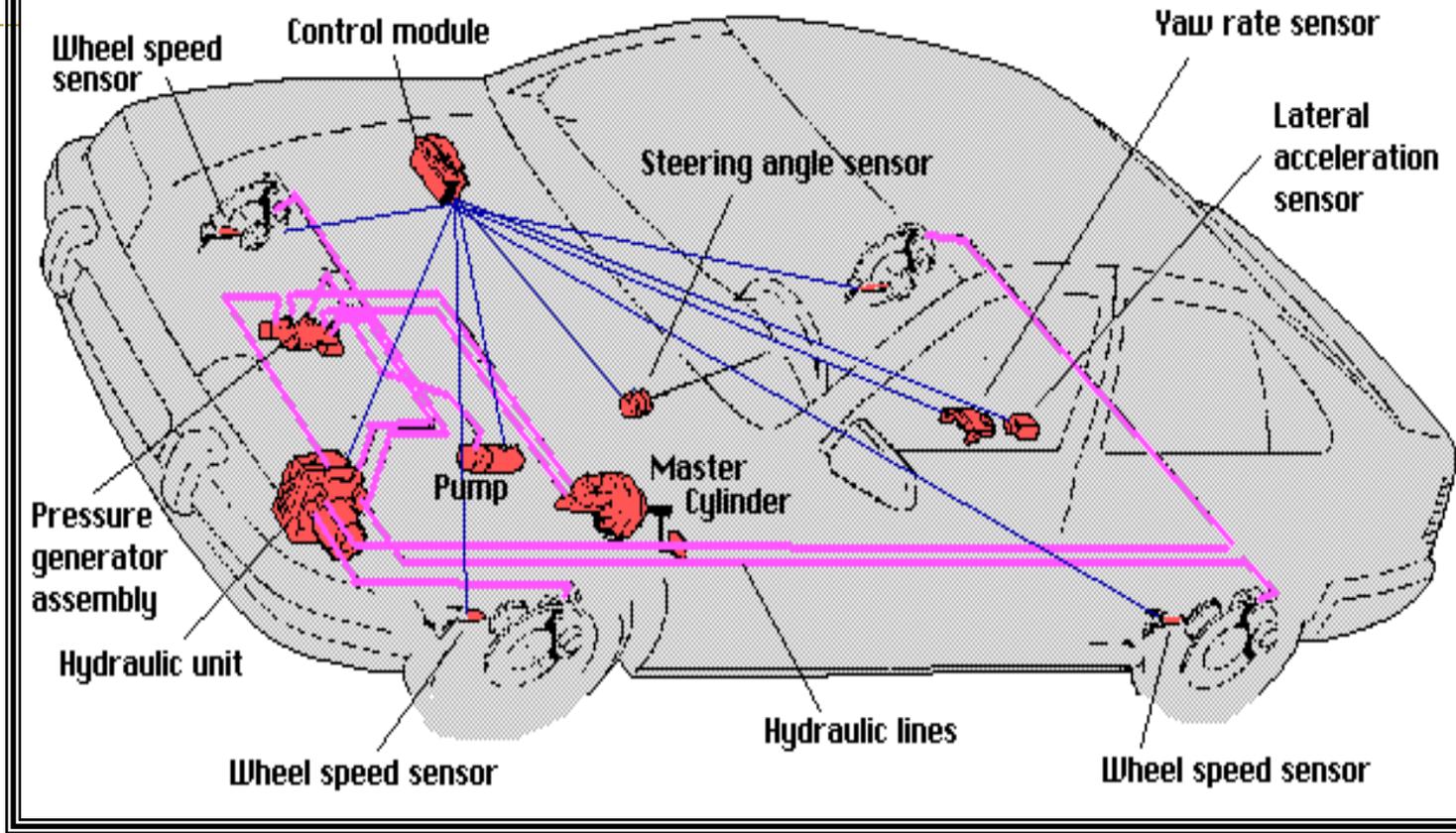
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Typical Malfunction Lights on Today's Automobiles



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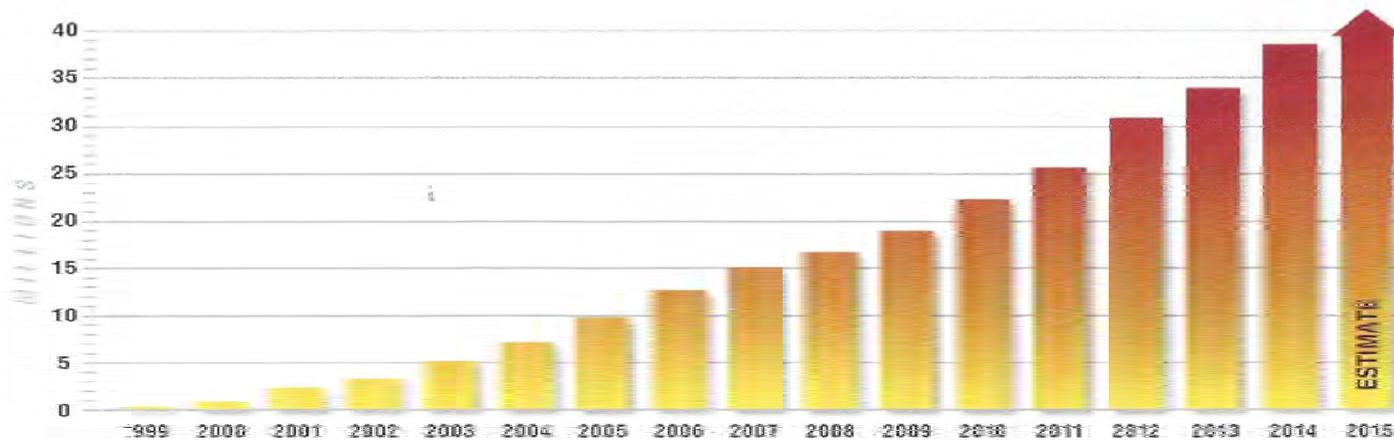
Bosch UDC / Mercedes ESP Stability Control



Over 40 Million Vehicles Require a Steering Angle Sensor Reset After Wheel Alignment

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As of 2012 model year, all new vehicles sold in the U.S.A. are now equipped with Electronic Stability Control. Many will require SAS reset.

Source: Hunter Engineering Company research

What is Electronic Stability Control?



ESC constantly monitoring how the vehicle is responding to the driver and road conditions. If a problem starts to develop, it takes whatever measures that are necessary to bring the vehicle under control. The engine power is reduced letting off of the throttle, retarding the timing and simultaneously applying the brake. All these processes coupled together will counter the forces that are causing the vehicle to lose traction or control. This whole process is accomplished without the driver's input.

Vehicle Without ESC



Vehicle With ESC

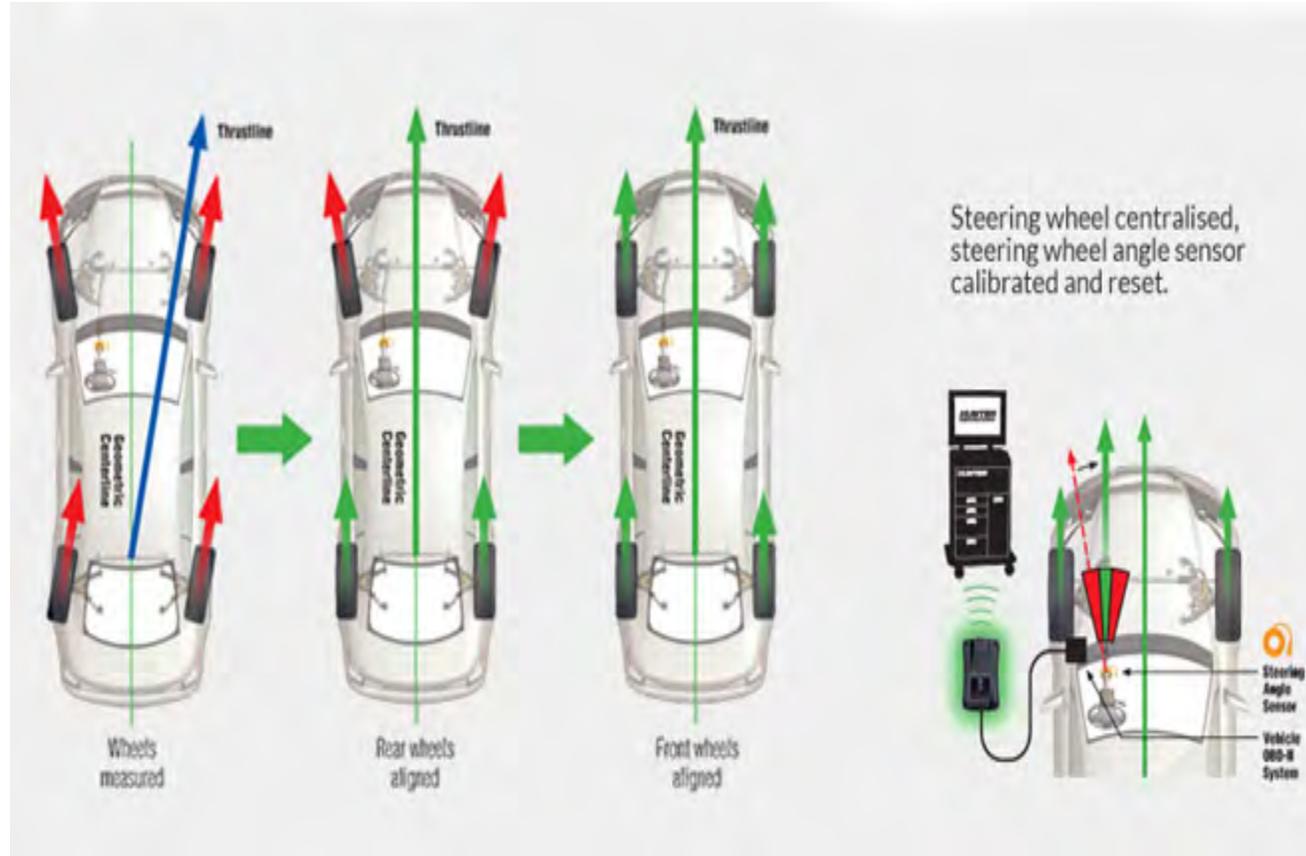


What is this Part?



It is a Steering Angle Sensor. As the steering wheel moves in either direction, the speed and number of Revolutions are transmitted to the vehicle's computer.

Why it is necessary to perform a complete 4 wheel alignment when working on vehicles equipped with ESC.



You are removing a door trim panel for removal access to refinish a scratch on a door. Is it necessary to perform a post scan?



What did Fiat-Chrysler say about Scanning last year?



“Safety and security related systems, such as antilock brakes, supplemental restraint systems (SRS – air bags), occupant restraint controller (ORC), seat belts, active head restraints, forward facing camera and radar, blind spot monitoring, and other automated electronic driver assistance systems, MUST be tested for fault codes (DTCs) that could be active (current) or stored following a collision. Use of the Mopar wiTECH vehicle diagnostic tester is necessary before and after collision repair.”

“Furthermore, voltage loss, collisions, significant vehicle disassembly, interior trim repair or removal, and glass removal and replacement operations could trigger DTCs prior to or during collision repairs, which could result in improper vehicle performance.”

What is American Honda's Scanning Position?



*It is the position of American Honda that **all** vehicles involved in a collision* **must** have the following minimum diagnostic scans, inspections, and/or calibrations done to avoid improper repair:*

A preliminary diagnostic scan during the repair estimation phase to determine what Diagnostic Trouble Codes DTCs may be present, so proper repairs may be included. See Background On Scan Requirements paragraph for more information.

A post repair diagnostic scan to confirm that no DTCs remain.

Any repair that requires disconnection of electrical components in order to perform the repair will require a post-repair diagnostic scan to confirm if the component is reconnected properly and functioning.

Damage that requires body parts replacement will always require a post-repair diagnostic scan

What does the collision need to accomplish before implement scanning?



Implementing regular scanning procedures will require an investment in training and equipment for collision shops. Because of the wide variety of makes and models being serviced, most shops would need to partner with a third-party service provider or possibly work with local dealerships to ensure they can identify and interpret the trouble codes.

Let's take a look at what is stated on Honda Info-Tech about a R&I of a door trim panel.



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Power Window Master Switch

DTC	Description	DTC type
B1125	Driver's power window motor A pulse malfunction	Signal error
B1126	Driver's power window motor B pulse malfunction	Signal error
B1127	Driver's door lock key cylinder switch malfunction	Signal error
B1128	Driver's door lock switch malfunction	Signal error
B1129	Driver's door lock knob switch malfunction	Signal error
B1130	Front passenger's power window motor A pulse malfunction	Signal error
B1131	Front passenger's power window motor B pulse malfunction	Signal error
B1140	Driver's power window position detect circuit malfunction	Signal error
B1142	Door multiplex control unit lost communication with front passenger's power window switch (UART line open)	Loss of communication
B1145	Front passenger's power window position detect circuit malfunction	Signal error
U1280	B-CAN communication bus line error (BUS-OFF)	Loss of communication
U1281	Door multiplex control unit lost communication with MICU (body control module)	Loss of communication
U128D	Door multiplex control unit lost communication with gauge control module	Loss of communication
U1299	Door multiplex control unit lost communication with climate control unit	Loss of communication

Vehicle Example: 2016-17 Honda Civic

Keyless Access Control Unit (Body Control Module)

DTC	Description	DTC type
B1601	Keyless access control unit (body control module) internal (CPU) error	Internal error
B1602	Keyless access control unit (body control module) internal (EEPROM) error	Internal error
B1632	MTR CONT signal error	Signal error
B1640	RF unit not connected	Signal error
B1645	Driver's door LF antenna circuit short	Signal error
B1646	Driver's door LF antenna circuit open	Signal error
B1647	Passenger's door LF antenna circuit Short	Signal error
B1648	Passenger's door LF antenna circuit open	Signal error
B1657	Rear bumper LF antenna circuit short	Signal error
B1658	Rear bumper LF antenna circuit open	Signal error
B1659	Front interior LF antenna circuit short	Signal error
B1660	Front interior LF antenna circuit open	Signal error
B1661	Middle interior antenna circuit shorted	Signal error
B1662	Middle interior antenna circuit opened	Signal error
B1663	Rear interior LF antenna circuit short	Signal error
B1664	Rear interior LF antenna circuit open	Signal error
B1667	Rear shelf LF antenna circuit short	Signal error
B1668	Rear shelf LF antenna circuit open	Signal error
U1280	B-CAN communication bus line error (BUS-OFF)	Loss of communication
U1281	Keyless access control unit (body control module) lost communication with MICU (body control module)	Loss of communication
U128D	Keyless access control unit (body control module) lost communication with gauge control module	Loss of communication

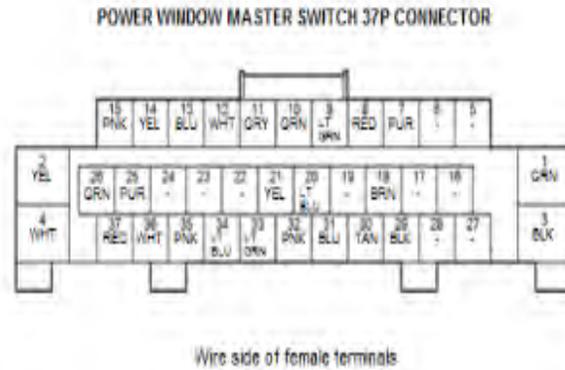
Can a simple door panel repair set DTCs on a Honda/Acura? You betcha!

The charts here show the possible diagnostic trouble codes (DTCs) that can set for power window and keyless access systems

Systems and DTCs vary by model, year and trim level; but this has been true for the past 10-12 years

Stop debating whether to scan and just do it! There are too many variables to establish "lowest common denominator" rules for scanning.

Power Window Master Switch Connector for Inputs and Outputs



Can a simple door panel repair set DTCs on a Honda/Acura? You betcha!

Here is a diagram showing inputs and outputs to a “simple” power window master switch

Chart includes two separate vehicle communication network (serial data) lines, B-CAN (body controller area network) and LIN (local interconnect network) that basically allow one or two wires to share circuit status information with multiple control units to reduce the number of wires needed (and weight) in the harness.

The presence of communication lines in the door increases the possibility and number of DTCs if connectors aren’t connected and fully seated or have bent pins due to rough handling

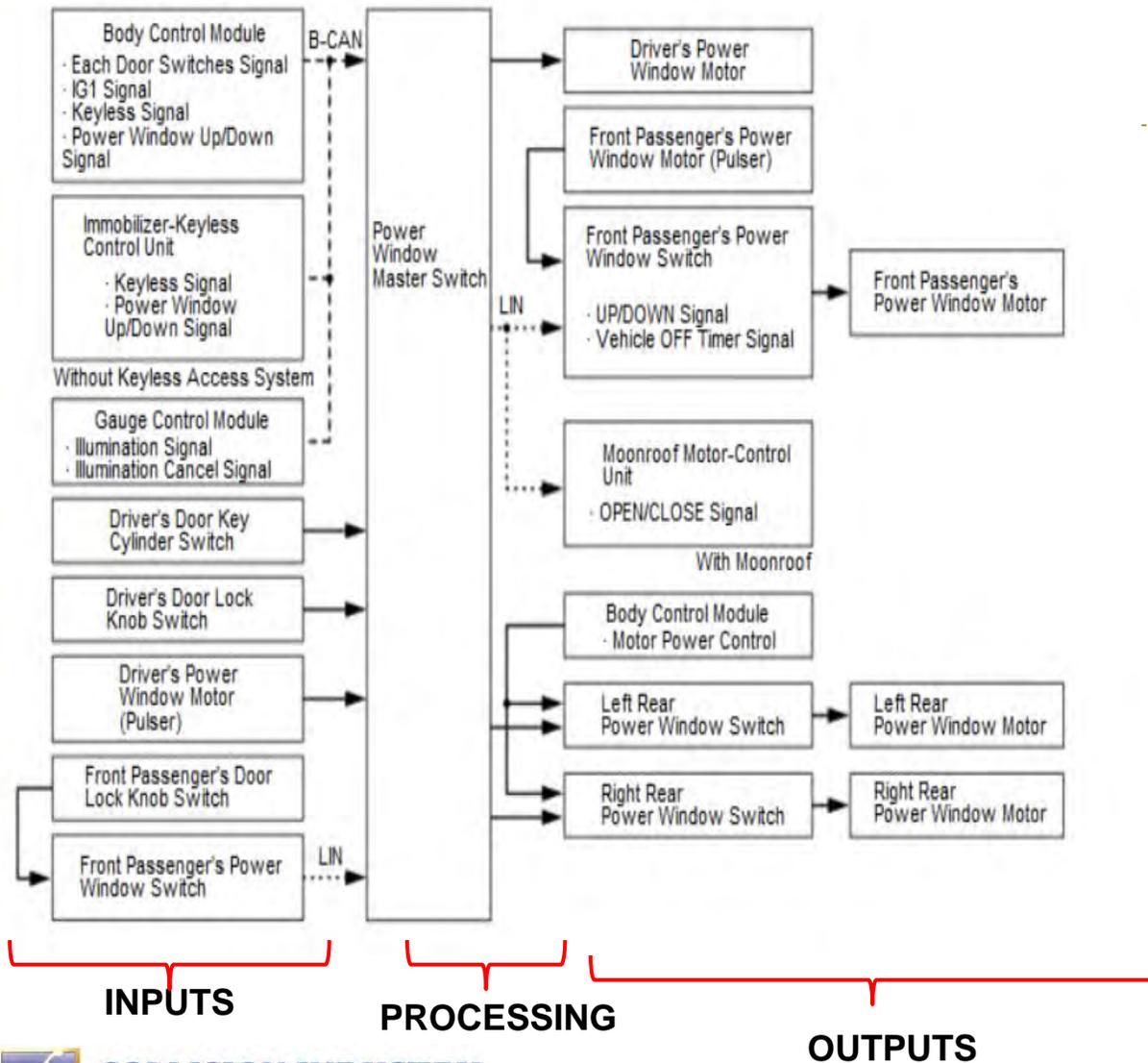
Terminal number	Terminal name	Description	Signal
1	P/W DR MTR DOWN	Drives driver's power window motor	With driver's power window motor DOWN operation: about battery voltage If none of above conditions are met: less than 0.2 V
2	P/W DR MTR UP	Drives driver's power window motor	With driver's power window motor UP operation: about battery voltage If none of above conditions are met: less than 0.2 V
3	GND	Ground for power window master switch	Less than 0.2 V at all times
4	+B P/W DR	Power source for door multiplex control unit	About battery voltage at all times
5	Not used	----	----
6	Not used	----	----
7	DR KEY CLY LOCK	Detects DR KEY CYL LOCK signal	With driver's door key cylinder switch UNLOCK: about battery voltage With driver's door key cylinder switch LOCK: less than 0.2 V
8	DR KEY CLY UNLOCK	Detects DR KEY CYL UNLOCK signal	With driver's door key cylinder switch LOCK: about battery voltage With driver's door key cylinder switch UNLOCK: less than 0.2 V
9	TRUNK OPEN SW(INTR)	Detects TRUNK OPEN SW (INTR) signal	With trunk lid opener switch ON: less than 0.2 V With trunk lid opener switch OFF: about battery voltage
10	MIRROR R COM	Detects MIRROR R COM signal	With vehicle in ON mode and power mirror DOWN or LEFT function: about battery voltage
11	MIRROR R LR	Detects MIRROR R LR signal	With vehicle in ON mode and power mirror DOWN or RIGHT function: about battery voltage
12	MIRROR UD	Detects MIRROR UD signal	With vehicle in ON mode and power mirror UP or LEFT function: about battery voltage
13 ^{*1}	P/W RR L SW RLY UP	Drives left rear power window motor	With left rear power window moving to UP using power window master switch: about battery voltage If none of above conditions are met: less than 0.2 V
14 ^{*1}	P/W RR L SW RLY DOWN	Drives left rear power window motor	With left rear power window moving to DOWN using power window master switch: about battery voltage If none of above conditions are met: less than 0.2 V
15 ^{*2}	H/MIRROR	Outputs H/MIRROR signal	With mirror defogger ON: about battery voltage
16	Not used	----	----
17	Not used	----	----
18	IG2 A/C	IG2 power source	With vehicle in ON mode: about battery voltage
19	Not used	----	----
20	DR SILCON UNLOCK	Detects DR SILCON UNLOCK signal	With driver's door lock knob switch LOCK: about battery voltage With driver's door lock knob switch UNLOCK: less than 0.2 V
21	DR SILCON LOCK	Detects DR SILCON LOCK signal	With driver's door lock knob switch UNLOCK: about battery voltage With driver's door lock knob switch LOCK: less than 0.2 V
22	Not used	----	----
23	Not used	----	----

*1: 4-door

*2: With mirror defogger

Terminal number	Terminal name	Description	Signal
24	Not used	----	----
25 ^{*1}	P/W RR R SW RLY DOWN	Drives right rear power window motor	With right rear power window moving to DOWN using power window master switch: about battery voltage If none of above conditions are met: less than 0.2 V
26 ^{*1}	P/W RR R SW RLY UP	Drives right rear power window motor	With right rear power window moving to UP using power window master switch: about battery voltage If none of above conditions are met: less than 0.2 V
27	Not used	----	----
28	Not used	----	----
29	GND	Ground for power window master switch	Less than 0.2 V at all times
30	P/W SW ILLUMI	Outputs P/W SW ILLUMI signal	With combination light switch PARKING: about battery voltage With combination light switch OFF: less than 0.2 V
31	B-CAN_L	Communication line	----
32	B-CAN_H	Communication line	----
33	P/W DR MTR PLSA	P/W DR MTR PLSA signal	----
34	P/W DR MTR VCC	Outputs P/W DR MTR VCC signal	With door multiplex control unit is wakeup mode: about battery voltage With door multiplex control unit is sleep mode: less than 0.2 V
35	P/W DR MTR PLSB	P/W DR MTR PLSB signal	----
36	LIN(P/M)	Communication line	----
37	+B BACK UP	Power source for power window master switch	About battery voltage at all times

4-door



Can a simple door panel repair set DTCs on a Honda/Acura?

Chart here shows the Inputs and Outputs of the power window master switch, which is an electronic control unit (ECU) or "computer" with inputs, processing, and outputs

Stop debating whether to scan and just do it! There are too many variables to establish "lowest common denominator: rules for scanning.

2012 Ford Raptor



Antenna



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AirPro Diagnostics Scan Report



Request Details	
Request ID	2781
Scan Type	Quick Scan
Warning Indicators	
Other Indicators	test
Problem Desc	test
Notes	Toby Chess
Completed	Wednesday, March 15, 2017 5:18:23 PM

Repair Details	
Repair Status	Invoiced
Shop RO Number	test toby
Insurance Co	AAA Hawaii
Airbags Deployed	No
Created By	Olsen, Chuck (AirPro Diagnostics)

Vehicle Details	
VIN	1FTFR1R69CFB10424
Make	Ford
Model	F150
Year	2012
Transmission	Automatic
Odometer	116,822

Technician Notes
<p>Shop reports: No visible damage, No warning lamps or symptoms reported.</p> <p>Performed all System Scan</p> <ul style="list-style-type: none"> - 1 non-related fault was reported ← - See recommendations in report <p>Recommendations:</p> <ul style="list-style-type: none"> - Reconnect for completion scan after repairs are complete - Perform applicable zero-point calibrations - Clear all codes set by repair process - Re-check all systems functions - Perform system re-initializations <p>Generic Powertrain No diagnostic codes retrieved</p> <p>Accessory Protocol Interface Module CAN 14229 No diagnostic codes retrieved</p> <p>Audio Control Module MCAN 14229 No diagnostic codes retrieved</p> <p>Anti-Lock Brake/Traction Control CAN No diagnostic codes retrieved</p> <p>Airbag CAN 14229 No diagnostic codes retrieved</p> <p>Body Control Module CAN 14229</p>

AirPro Diagnostics Scan Report

No diagnostic codes retrieved

Digital Signal Processor MCAN 14229

No diagnostic codes retrieved

Driver Seat Module MCAN

No diagnostic codes retrieved

Driver Climate Seat Module MCAN

No diagnostic codes retrieved

Enhanced Powertrain CAN

No diagnostic codes retrieved

Front Display Interface Module MCAN

No diagnostic codes retrieved

Front Control Interface Module MCAN 14229

No diagnostic codes retrieved

HVAC MCAN 14229

B1086 Exterior Antenna Circuit Short to Ground

- This code was cleared and did not return during scan



Instrument Cluster CAN 14229

No diagnostic codes retrieved

OCS Module CAN 14229

No diagnostic codes retrieved

Power Running Boards MCAN

No diagnostic codes retrieved

Steering Column Control Module CAN 14229

No diagnostic codes retrieved

Tire Pressure Monitor System MCAN 14229

No diagnostic codes retrieved

Transfer Case Control Module CAN

No diagnostic codes retrieved

Trailer Brake Control CAN

No diagnostic codes retrieved



WIFI unit being hooked up to the vehicle that will be scanned.



AirPro Diagnostics Scan Report



Request Details	
Request ID	2822
Scan Type	Inspection Scan
Warning Indicators	None
Other Indicators	
Problem Desc	Bumper Repair
Notes	Demo Test
Completed	Friday, March 17, 2017 2:30:11 PM

Repair Details	
Repair Status	Active
Shop RO Number	Toby Dmo
Insurance Co	AAA Hawaii
Airbags Deployed	No
Created By	Olsen, Chuck (AirPro Diagnostics)

Vehicle Details	
VIN	4T1BD1FK8GU196917
Make	Toyota
Model	Camry Hybrid
Year	2016
Transmission	AUTOMATIC
Odometer	6,511

Technician Notes

Shop reports: Rear bumper damage , No warning lamps are or other symptoms reported.

Performed all System Scan

- 2 faults were reported
- Blind spot monitor not detected
- Occupant detection zero-point calibration needed after repairs

Recommendations:

- See code and communication recommendations
- Reconnect for completion scan after repairs are complete
- Clear all codes set by repair process
- Perform applicable zero-point calibrations
- Perform system re-initializations
- Re-check all systems functions

Generic Powertrain

No diagnostic codes retrieved

Enhanced Powertrain CAN

No diagnostic codes retrieved

ABS CAN

No diagnostic codes retrieved

Airbag SRS CAN

No diagnostic codes retrieved

Air Conditioning CAN

Printed: 3/17/2017 6:43:35 PM UTC

Request ID: 2822

Page: 1



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AirPro Diagnostics Scan Report

No diagnostic codes retrieved

CCS CAN

P0441 Evaporative Emission Control System Incorrect Purge Flow
P0455 Evaporative Emission Control System Pressure Sensor Leak Detected (Gross Leak)

- Inspect evaporate emissions canister or connections for damage
- Inspect Gas Cap
- Codes cleared during testing

OCC - Occupant Detect

No diagnostic codes retrieved

Seat weight reading is -1.07 KG

Driver Door Motor CAN

No diagnostic codes retrieved

Passenger Door Motor CAN

No diagnostic codes retrieved

EMPS CAN

No diagnostic codes retrieved

Main Body CAN

No diagnostic codes retrieved

Combination Meter CAN

No diagnostic codes retrieved

Blind Spot Monitor Master CAN

No response from module

- No communication with module
- inspect system for connection issues or if vehicle is equipped

Blind Spot Monitor Slave CAN

No response from module

- No communication with module
- inspect system for connection issues or if vehicle is equipped

Hybrid Control CAN

No diagnostic codes retrieved

Navigation CAN

No diagnostic codes retrieved

Slide Roof CAN

No diagnostic codes retrieved

Master Switch CAN

No diagnostic codes retrieved

SMART Key CAN

No diagnostic codes retrieved

PM1 Gateway CAN

No diagnostic codes retrieved

Power Source Control CAN

Printed: 3/17/2017 6:43:35 PM UTC

Request ID: 2822

Page: 2 of 2

Right rear radar module is not connected.



After health scan has been performed and the rear radar module was not working, the technician hooked the unit back up.



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COLLISION REPAIR INFORMATION

FOR THE COLLISION REPAIR PROFESSIONAL

TITLE: SRS OCCUPANT CLASSIFICATION SYSTEM INITIALIZATION
SECTION: ELECTRICAL BULLETIN # 177
MODELS: ALL EQUIPPED TOYOTA, LEXUS, and SCION MODELS
DATE: MARCH 2010

Models equipped with a Supplemental Restraint System (SRS) Occupant Classification System (OCS) will enable or disable the passenger front and side airbags based on seat occupancy, passenger weight, and seat belt latch engagement.

If an equipped vehicle sustains collision damage, or if the front passenger seat or any of the OCS components are serviced, the SRS Malfunction Indicator Light (MIL) may illuminate setting a Diagnostic Trouble Code (DTC).

NOTE:

It is necessary to diagnose and repair the root cause of a SRS or OCS DTC before initializing the OCS system. If SRS and OCS DTC's are not cleared the system may not operate properly.

Be sure to check and clear DTC's and perform OCS initialization per repair manual instructions with a Techstream Special Service Tool (SST) or capable diagnostic tester.



Any of the following conditions could set a DTC, illuminate the SRS MIL, or cause the PASSENGER AIRBAG light to indicate incorrectly, regardless of occupancy:

- The OCS Electronic Control Unit (ECU) is replaced
- Accessories such as a seatback tray are installed on the passenger seat
- The passenger seat is removed and replaced or reinstalled
- The vehicle is involved in an accident or collision

Model-specific repair manuals can be accessed through the Technical Information System (TIS) www.techinfo.toyota.com.

PLEASE ROUTE THIS BULLETIN TO YOUR COLLISION REPAIR CENTER
MANAGER AND COLLISION REPAIR TECHNICIANS



A post scan was performed and the radar module was now sending back a signal.



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AirPro Diagnostics Scan Report



Request Details	
Request ID	2825
Scan Type	Completion Scan
Warning Indicators	None
Other Indicators	
Problem Desc	Repairs complete from rear bumper damage, reconnected rear electrical connector
Notes	
Completed	Friday, March 17, 2017 2:40:16 PM

Repair Details	
Repair Status	Active
Shop RO Number	Toby Dmo
Insurance Co	AAA Hawaii
Airbags Deployed	No
Created By	Olsen, Chuck (AirPro Diagnostics)

Vehicle Details	
VIN	4T1BD1FK8GU19691
Make	Toyota
Model	Camry Hybrid
Year	2016
Transmission	AUTOMATIC
Odometer	6,511

Technician Notes

Shop reports: Rear Bumper repair, rear harness connection repair ,all repairs complete, No warning lamps or symptoms reported.

The following systems were scanned, codes cleared, systems re-initialized and re-scanned.

- No trouble codes returned
- All systems are currently clear
- Performed OEM collision related calibration
- Occupant detection zero-point calibration

Recommendations:

- Set tire pressures to manufacturer specifications
- Perform QC road test and final QC inspections
- If any symptoms or warning lamps return during QC, submit for a follow up scan

Scan results after code clear and re-initializations

Generic Powertrain
No diagnostic codes retrieved

Enhanced Powertrain CAN
No diagnostic codes retrieved

ABS CAN
No diagnostic codes retrieved

Airbag SRS CAN
No diagnostic codes retrieved

Air Conditioning CAN
No diagnostic codes retrieved

CCS CAN
No diagnostic codes retrieved

- codes cleared during inspection scan

OCC - Occupant Detect
No diagnostic codes retrieved

Occupant detection seat weight reading is - 528 KG, Within specifications

Driver Door Motor CAN
No diagnostic codes retrieved

Passenger Door Motor CAN
No diagnostic codes retrieved

EMPS CAN
No diagnostic codes retrieved

Main Body CAN
No diagnostic codes retrieved

Combination Meter CAN
No diagnostic codes retrieved

Blind Spot Monitor Master CAN
No diagnostic codes retrieved

- Communication restored from previous scan

Blind Spot Monitor Slave CAN
No diagnostic codes retrieved

- Communication restored from previous scan

Hybrid Control CAN
No diagnostic codes retrieved

Navigation CAN
No diagnostic codes retrieved

Slide Roof CAN
No diagnostic codes retrieved

Master Switch CAN
No diagnostic codes retrieved

SMART Key CAN
No diagnostic codes retrieved

PM1 Gateway CAN
No diagnostic codes retrieved

Power Source Control CAN
No diagnostic codes retrieved

Tire Pressure Warning System CAN
No diagnostic codes retrieved

Audi Q7 Required ADAS Tools: Over \$18,000 Additional Investment Required

Hunter
Engineering Company

- | | | |
|--|---|---|
|  |  |  |
| Setting Device - Basic Set
(ACC / LDW / NVS)
#VAS6430/1A \$3,652.22 | ACC Laser Unit - VW
(ACC)
#VAS6430/2 \$1,175.68 | ACC Reflector Mirror
(ACC)
#VAS6430/3 \$1,430.93 |

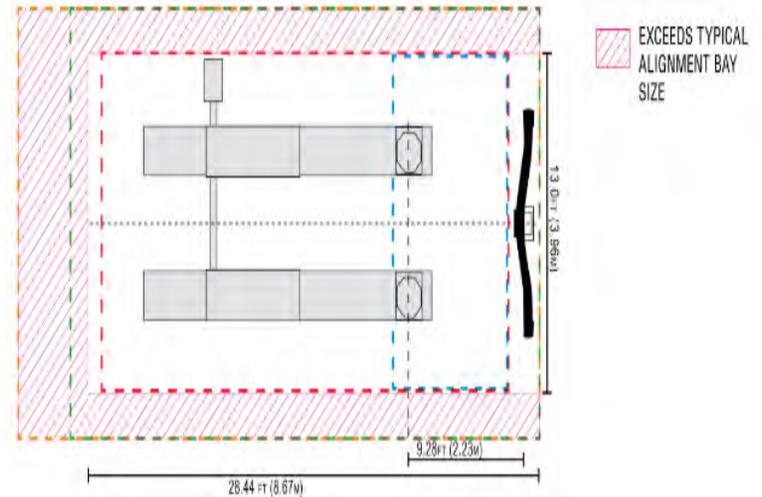
- | | | | |
|--|---|--|--|
|  |  |  |  |
| Calibration Board For Lane
Guard System (LDW)
#VAS6430/4 \$1,422.72 | Night Vision
Calibration Tool (NVS)
#VAS6430/6 \$1,954.30 | Setting Device - Base Frame
(ACC / LDW / NVS)
#VAS6430/8 \$1,321.49 | ADC Adjustment Tool
(ACC)
#VAS6149 \$82.19 |

- | | | | |
|---|---|---|--|
|  |  |  |  |
| ACC Adjuster
(ACC)
#VAS6190/2 \$11.63 | Calibration Tool
(RCS)
#VAS6350A \$2,403.69 | Calibration Tool - Spacing
Laser (RCS)
#VAS6350/2A \$583.79 | Calibration Tool - R8 Wheel
Adapters (RCS)
#VAS6350/5 \$43.43 |

- | | |
|---|---|
|  |  |
| Calibration Tool - Setting
Elements (RCS)
#VAS6350/8 \$303.01 | Professional Diagnostic Laptop with VAS6154 VCI
(ESC / ACC / LDW / NVS / RCS)
#VAS6150D \$3,642.30 |

* Prices obtained from
www.audi.snapon.com

Work Space Requirements for Typical Front Camera Systems



FCA

FIAT CHRYSLER AUTOMOBILES



Chrysler OEM tool wiTECH



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PRE-REPAIR SCAN

Scan Report: 10032016516588-P1

Date/Time: 10/03/16, 09:14 AM, EST

RO Number: 39273

Invoice Number: 6137



2017, Chrysler Pacifica Hybrid Touring

VIN Number: 2C4RC1DG1HR516588

SRS Deployment: No | Odometer: 1,425 mi.

Scan Type: Pre-repair Scan

Master Technician Notes N/A
from Shop Contact:

Service Details

Master Technician: Justin Brown

Time Complete: 08:03 AM

Performed a full vehicle scan (Health Check) with the Wi-Tech Chrysler factory scan tool. 11 faults were reported in 8 modules.

Scan Readings

Integated center stack:
B210D-16 Battery Voltage Low-Circuit Voltage Below Threshold
B21DD-84 System Voltage-Signal Below Allowable Range
Radio frequency hub:
B25A4-00 Front Right Door Handle Sensor
Anti-lock brake system:
U0100-00 Lost Communication With Engine control module/Powertrain control module
U0126-00 Lost Communication With Steering Angle Sensor
U0101-00 Lost Communication with Transmission control module
Electronic shifter module:
U0101-00 Lost Communication with Transmission control module
Driver door module:
U0010-00 CAN Interior Bus

**Internal Failure in pass.
door handle**

Low Voltage Faults



Pre-repair Scan ctd.

Scan Report: 10032016516588-P1

Date/Time: 10/03/16, 09:14 AM, EST

Scan Readings ctd.

Power sliding door module left:
U0422-00 Implausible Data Received From Body Control Module
Power sliding door module right:
U0422-00 Implausible Data Received From Body Control Module
Power lift gate module:
B1975-00 Power Liftgate Latch Cinch - Ratchet Secondary Switch Performance



CONSOLIDATED POST-SCAN Scan Report: 11022016516588-C1 **Date/Time: 11/02/16, 01:57 PM, EST**

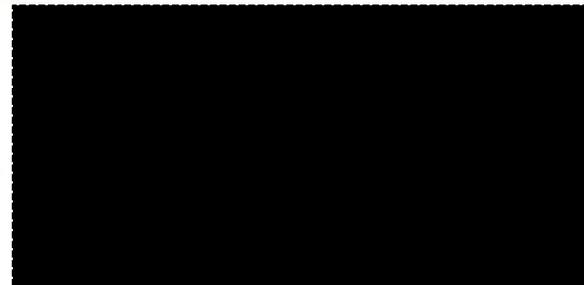
RO Number: **39273**
Invoice Number: 10311

2017, Chrysler Pacifica Hybrid Touring

VIN Number: 2C4RC1DG1HR516588

SRS Deployment: No | Odometer: 1,425 mi.

Scan Type: Consolidated Post-Scan



Point of Impact: **Right Front Fender, Right Side, Right Rear Side, Right Rear**
Shop Notes: Safeco insurance. **key on engine off battery support on. right side impact right side of vehicle was completely apart.**

Master Technician Notes
from Shop Contact:

Service Details Master Technician: Brandon Kirschner Time Complete: 12:02 PM

-  Performed a completion vehicle scan (Health Check) using the Chrysler WiTech scan tool.
- 41 fault codes reported in 14 modules.**
- Cleared fault codes, no fault codes returned.
- Provided fault codes and recommendations.
- Verified operation of Occupant Detection Status**

Scan Readings ctd.

Anti-lock Braking System (ABS) C2222-68 - Improper Power down-event information.
Anti-lock Braking System (ABS) U0125-00 - Lost communication with dynamic sensor.
Anti-lock Braking System (ABS) U0126-00 - Lost communication with Steering Angle Sensor.
Anti-lock Braking System (ABS) U0101-00 - Lost communication with Transmission Control Module.
Electric Shifter Module (ESM) U0101-00 - Lost communication with Transmission Control Module.
Occupant Restraint Controller (ORC) B007F-13 - Passenger seatbelt retractor Pretensioner deployment control - circuit open.
Occupant Restraint Controller (ORC) B007A-13 - Passenger seatbelt retractor Pretensioner deployment control - circuit open.
Occupant Restraint Controller (ORC) B0082-13 - Passenger seatbelt load limiter deployment control- circuit open.
Occupant Restraint Controller (ORC) B2765-13- Right c-pillar impact acceleration sensor-circuit open.
Occupant Restraint Controller (ORC) B2768-13 - Right Impact Pressure Sensor - Circuit Open.
Occupant Restraint Controller (ORC) U11Ed-00 - Lost communication with the right B-pillar impact acceleration sensor.
Drivers Door Module (DDM) U0200-00 - Lost Communication with Passenger Door Module.
Drivers Door Module (DDM) U0010-00 - CAN Interior Bus malfunction.
Passenger Door Module (PDM) U0010-00 - CAN Interior Bus malfunction.
Door Module Right Rear (DMRR) B19E1-2A Sliding door handle switch - stuck.
Passenger Side Door Module Rear (PSDMR) U0422-00- Implausible Data Received U0422-00from Body Control Module.
Passenger Side Door Module Rear (PSDMR) U115D-00 lost communication with Rear Door Control Module.
Memory Seat Module (MSM) B222D-00 ECU unable to configure / configuration not learned.
Memory Seat Module (MSM) U1144-00 Lost communication with power sliding door module-right.
Power Lift Gate Module (PLGM) B1975-00 Power Liftgate Latch Cinch- Ratchet Secondary Switch Performance.
Body Control Module (BCM) U0200-00 - Lost Communication with Passenger Door Module.
Body Control Module (BCM) B2303-13 Wiper park switch input- circuit open.
Body Control Module (BCM) B1636-15 Right high beam control circuit short to battery or open.
Body Control Module (BCM) U1144-00 Lost communication with power sliding door module-right.
Body Control Module (BCM) B162E-15 Right low beam control circuit short to battery or open.
Body Control Module (BCM) B1646-15 Rear right turn lamp control-circuit short to battery or open>
Body Control Module (BCM) B193D-13 Right power sliding door switch-circuit open.
Body Control Module (BCM) P0070-15 Ambient air temperature sensor circuit-circuit short to battery or open.
Radio B2206-00 Current VIN missing/mismatch.
Radio B222C-00 Vehicle configuration not programmed.
Radio U0200-00 Lost communication with passenger door module.
Active Noise Cancellation (ANC) U0200-00 Lost communication with passenger door module.
Active Noise Cancellation (ANC) U0202-00 Lost communication with right rear door module.

POWER SLIDING DOOR LEARN CYCLE

NOTE:

Any time a power sliding door component is removed, replaced, door adjustment is performed or diagnostic trouble codes are addressed and erased, a learn cycle must be performed.

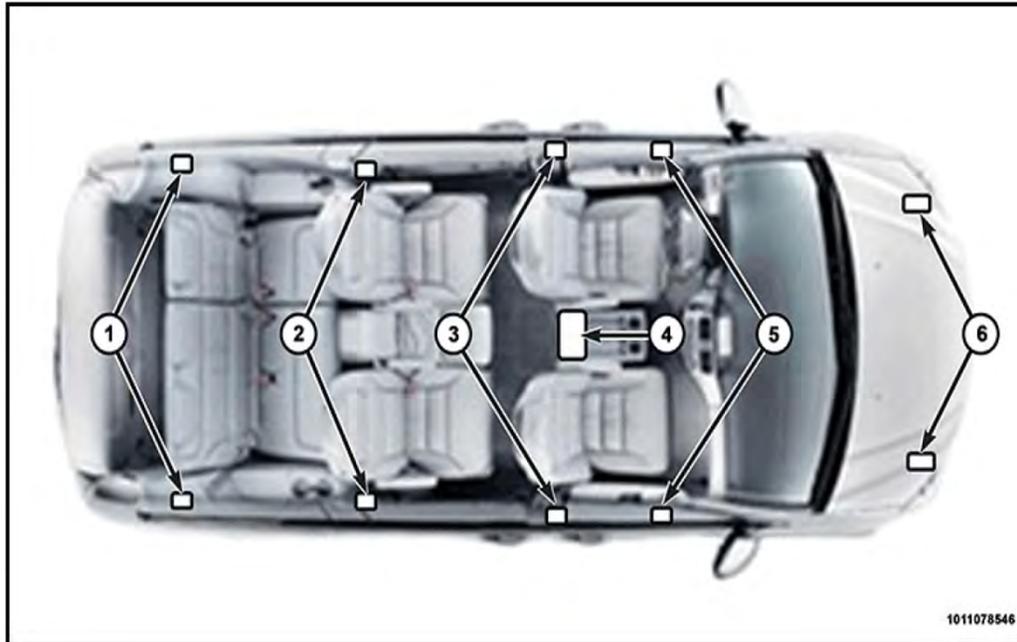
The power sliding door learn cycle enables the power sliding door control module to learn or relearn critical information (travel limits, resistance to door travel, door position, etc.) which allows the system to perform properly and safely. To perform a power sliding door learn cycle do the following:

1. Obtain an appropriate scan tool.
2. Connect the scan tool to the vehicle and check for any power sliding door system stored trouble codes, correct and erase any stored codes.
3. Close effected sliding door.
4. Using the scan tool, select the Power Sliding Door Control Module (PSDM) Menu, More Options, System Tests and select the Open Door Test.
5. Using the scan tool check "routine status" for a pass or fail message. If the Open Door Test did not pass, the scan tool will display the reason to aid in system diagnosis or rerunning the Open Door Test routine.
6. Using the scan tool, select the Power Sliding Door Control Module (PSDM) Menu, More Options, System Tests and select the Close Door Test.
7. Using the scan tool check "routine status" for a pass or fail message. If the Close Door Test did not pass, the scan tool will display the reason to aid in system diagnosis or rerunning the Close Door Test routine.
8. Follow the instructions on the scan tool to complete the test.

Pacifica sliding rear
door Relearn
procedure

DESCRIPTION AND OPERATION

DESCRIPTION



Remote or satellite impact sensors are mounted in various strategic locations of the vehicle. These sensors are mounted remotely from the impact sensor that is internal to the Occupant Restraint Controller (ORC). Sensors at the front of the vehicle provide an additional logic input for use by the Occupant Restraint Controller (ORC) to control the front airbags and the seat belt pretensioners. Sensors on each side of the vehicle provide an additional logic input for use by the ORC to control the side curtain airbags, the seat airbags and the seat belt pretensioners. Two types of sensors are used in this vehicle. They are the acceleration-type and the pressure-type, which are described elsewhere within this service information.

Although the front and side acceleration-type impact sensors are similar in appearance and construction, they may not be interchangeable. The front impact sensors may monitor acceleration forces on a different axis than those monitored by the side impact sensors. Each front sensor is secured with a single screw to its mounting location. Each side sensor is secured with a single nut to its mounting location. The front sensors are located on the back of both the right and left front end module closure panel behind and below the front lamp unit support member in the front of the engine compartment. A side sensor is located on a weld stud within a cavity of each B-pillar and C-pillar and concealed behind the lower B-pillar and C-pillar interior trim (2 and 3). A side sensor is also located on a weld stud within a cavity of each rear quarter panel, below the rear quarter glass (1).

Pacifica SRS Acceleration and Pressure sensor locations

Audi Q7 Required ADAS Tools: Over \$18,000 Additional Investment Required

Hunter
Engineering Company



* Prices obtained from www.audi.snapon.com

But on the other end of the spectrum sits OEMs like Audi. Resetting an Audi Q7's advanced driver assistance systems — an OEM requirement after any wheel alignment — could demand up to \$18,000 worth of equipment (but no test drive), Silver said. (And if it's needed after a wheel alignment on an undamaged car, it's a safe bet it'll be required for a variety of collision repair scenarios.) "Those items are a large investment," Silver said. It's not something that can easily be recouped by one of Hunter's tire shop customers who only charges \$100-\$200 for a wheel alignment

Windshields

Windshields are specialized to vehicle models and options. When replacing the windshield glass of a vehicle equipped with cameras, radar or any other safety or convenience options, it has to be the proper replacement glass. There are differences in tint, borders, brackets and connectors for electronic components. A difference in design or shading can render sensors and radar unreliable or inoperable. To ensure the correct replacement glass is installed, provide the vehicle's VIN number when ordering parts. Always check with the OEM for guidelines on replacing with aftermarket or OEM glass. The OEM's are branding everything! The manufacturer brand is applied to windshields, back-glass and even headlamps. You will need to know if and when an aftermarket product would be appropriate.





2016 Hyundai Equus		Base Price *
<input type="radio"/>	5.0L GDI V8 Signature 4-Door RWD Sedan Automatic	\$61,500
<input type="radio"/>	5.0L GDI V8 Ultimate 4-Door RWD Sedan Automatic	\$68,750

BUILD THIS TRIM

* Base Price excludes destination and handling charges

Front and rear parking assistance sensors - 4 bodycolor sensors on front and rear bumpers

Tinted glass - Solar control - Windshield shade band

Hydrophobic glass (water repelling) - Front door windows only

Acoustic laminated glass - Noise reducing (windshield; front doors; rear doors)

Wipers - Front windshield, 2-speed with variable intermittent, speed sensitive

Wipers - Rain-sensing, automatic

Auto-defogging windshield with humidity sensor

Windshield-wiper deicer

Multi-view camera system

Forward-view cornering camera - Triple section view when moving forward slowly with feature off switch

STD	STD
NA	STD
NA	STD

CHAT NOW



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The Acura Head-Up Display is available on some of Acura's vehicles, including the RLX full-size [luxury sedan](#). The Head-Up Display projects an image onto the windshield containing important vehicle information such as speed, allowing the driver to keep their eyes on the road. The system can be adjusted for brightness and position, or can be completely shut off. Along with the speedometer the display can also show a tachometer, a compass, turn-by-turn directions from the navigation system, the status of the Adaptive Cruise Control and Lane Keeping Assist systems, or a power distribution monitor

Aftermarket Replacement Windshield May Cause Honda Sensing Systems to Work Abnormally

AFFECTED VEHICLES

All models with Honda Sensing systems

EDITOR’S NOTE: This article replaces “Aftermarket Replacement Windshield May Cause Advanced Safety and Driver Assist Systems to Work Abnormally,” posted in **October 2014**.

Replacing a windshield on a vehicle equipped with any of these Honda Sensing systems?

- Adaptive Cruise Control (ACC)
- Collision Mitigation Braking System (CMBS)
- Forward Collision Warning (FCW)
- Lane Departure Warning (LDW)
- Lane Keeping Assist System (LKAS)
- Road Departure Mitigation (RDM)

Make sure it’s an OEM replacement windshield. Depending on the model and trim level, these systems either use a camera that’s mounted behind the rearview mirror or a combination of that camera and a radar unit mounted behind the front bumper or grille. Installing an aftermarket windshield may cause these systems to work abnormally (the camera won’t aim).

We also point this out in the owner’s manual.

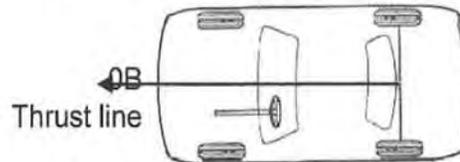


Importance of Thrust Line Reference

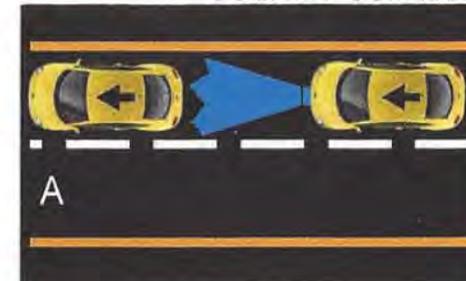
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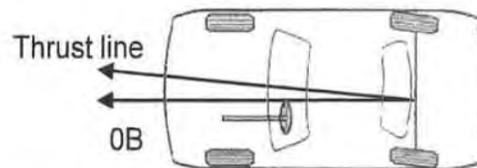
Vehicle with perfect alignment



OB (centerline) and thrust line are equal if the rear toe is set perfectly. The vehicle travels in the same direction as the radar (A).

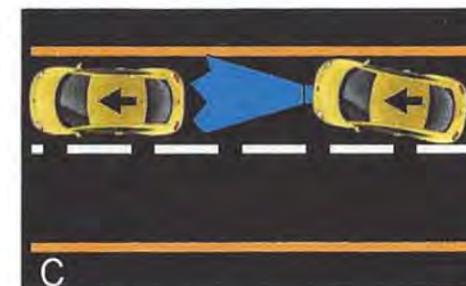
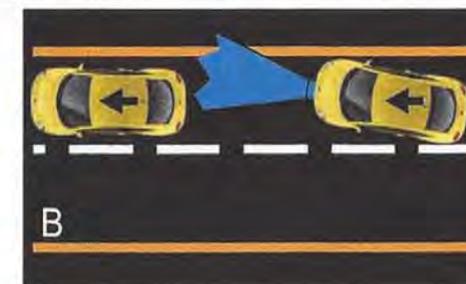


Vehicle with rear toe setting not perfect



If OB is different from thrust line, the vehicle will not move down the road in the same direction as OB, but the radar will be aimed at OB (B).

If the radar is compensated for by thrust angle, and the distance between the radar assy and the thrust line, then the radar will always aim in the direction of travel (C).





PropertyCasualty360.com is where buyers and sellers have access to breaking insurance news, industry research, compliance and legal updates, training and education, technology developments, data and trends, and more. The site combines the established knowledge resources and news reporting capabilities from the experts at [National Underwriter Professional Network](#) with proprietary market data and relevant content aggregated from across the Web to create one distinct and vital information source for all P&C professionals.

The malfunction indicator lamp is the little light that shines on the dash in the shape of an engine, or text such as “Service engine soon,” to alert of an issue requiring attention. It is one of a host of dashboard indicator lamps in modern automobiles that can include the shape of an oil can, wiper blades, “ABS,” “SRS” plus dozens more possible configurations depending on the vehicle. Some vehicles display text to describe a problem. As important as these indicators are, a warning lamp only tells so much. While the presence of a dashboard light tells you there is a problem, the absence of one doesn't mean no issues exist

Summary of Current Problem with ADAS Calibrations



- Calibration is often required after a wheel alignment, making it a common service need.
- Too many unique procedures and fixtures required (80 and counting).
- Required test drive criteria may be impractical or impossible in some locations or weather/road conditions.
- Cost of fixtures, OEM scan tools, training, and bay space required makes this cost-prohibitive for many shops.
- Increased costs will be passed along to consumers and insurance companies.
- Unless OEMs have reason to change, the number of these procedures will soon explode.
- Overly complex calibration procedures will likely result in erroneous or unperformed calibrations, leading to unsafe vehicles.

Want more information on scanning? Check out these web sites.



SCRS.com

**SCRS -- 2016 OEM Collision Repair
Technology Summit - *Restoring Vehicle
Functionality through Electronic
Technology and Diagnostics***

I-CAR.com

**VT117L01 Vehicle Technology Trends and
Diagnostics Overview**

AMIONLINE.org

**Management's Guide to:
Scanning & New Technology**



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