

REPORT NUMBER: NCAP305I-MGA-2012-003

**NEW CAR ASSESSMENT PROGRAM (NCAP)
FMVSS No. 305 Indicant Test**

**HONDA MOTOR CO., LTD
2012 HONDA CIVIC IMA 4-DR HYBRID SEDAN
NHTSA NUMBER: MC5302**

**MGA RESEARCH CORPORATION
5000 Warren Road
Burlington, WI 53105**



Test Date: February 14, 2012

Report Date: March 22, 2012

FINAL REPORT

**U.S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Office of Crashworthiness Standards
Mail Code: NVS-111
1200 New Jersey Ave, SE
Room W43-410
Washington, DC 20590**

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Approval Date: March 22, 2012

FINAL REPORT ACCEPTANCE BY OVSC:

Division Chief, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

COTR, New Car Assessment Program
NHTSA, Office of Crashworthiness Standards

Date: _____

Technical Report Documentation Page

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		13. Type of Report and Period Covered Final Test Report February 14 to March 22, 2012			
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16. Abstract An FMVSS No. 305 Indicant test, in conjunction with an NCAP side pole barrier impact test was conducted on the subject 2012 Honda Civic IMA 4-Dr Hybrid Sedan in accordance with the specifications of the applicable Office of Crashworthiness Standards Test Procedures for the generation of consumer information for the New Car Assessment Program (NCAP). No test failures were reported.					
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SECTION 1

PURPOSE OF TEST

An FMVSS No. 305 Indicant test, in conjunction with an NCAP side pole barrier impact test was conducted on the subject 2012 Honda Civic IMA 4-Dr Hybrid Sedan.

The Indicant test was conducted in accordance with the Office of Crashworthiness Standards Laboratory Test Procedure, dated January 31, 2012 to determine compliance to the requirements of Federal Motor Vehicle Safety Standard (FMVSS) No. 305, "Electric-Powered Vehicles: Electrolyte Spillage and Electrical Shock Protection" for the purpose of providing consumer information.

This FMVSS No. 305 Indicant test is part of the FY12 New Car Assessment Program Test Program, sponsored by the National Highway Traffic Safety Administration (NHTSA), under contract DTNH22-09-D-00124.

SECTION 2

SUMMARY OF TEST RESULTS

A NCAP side pole barrier impact test was performed by MGA Research Corporation on a 2012 Honda Civic IMA 4-Dr Hybrid Sedan on February 14, 2012. Electrical isolation measurements were taken immediately post-impact and observations were made related to electrolyte spillage and battery retention. A static rollover was subsequently performed on the subject vehicle and electrical isolation measurements were taken at each stage of the rollover.

Based on the test results, the 2012 Honda Civic IMA 4-Dr Hybrid Sedan appears to meet the requirements for electrolyte spillage, electrical isolation, and battery retention during FMVSS No. 305 Indicant testing.

Data sheets, along with pre-test and post-test photographs of the test vehicle, are included in this report to document the test.

TEST NOTES

None

MGA does not endorse or certify products. The manufacturer's name appears solely for identification purposes.

SECTION 3
DATA SHEETS

DATA SHEET NO. 1
TEST VEHICLE SPECIFICATIONS

Test Vehicle: 2012 Honda Civic IMA 4-Dr Hybrid Sedan NHTSA No. MC5302

TEST VEHICLE INFORMATION

Year/Make/Model/Body Style	2012 Honda Civic IMA 4-Dr Hybrid Sedan
NHTSA No.	MC5302
Color	Polished Metal
Odometer Reading	125 miles

DATA FROM CERTIFICATION LABEL

Manufactured By	Honda Motor Co., Ltd	GVWR (kg)	1740
Date of Manufacture	09/'11	GAWR Front (kg)	910
VIN:	JHMF84F25CS002922	GAWR Rear (kg)	840

ELECTRIC VEHICLE PROPULSION SYSTEM

Type of Electric Vehicle (Electric/Hybrid):	Gas-Electric Hybrid
Electric Energy Storage/Device:	Lithium-Ion (Li-Ion) Battery
Nominal Voltage (V):	144.0 V
Is this vehicle equipped with an Automatic Propulsion Battery Disconnect?	No
Physical Location of the High Voltage Source Automatic Disconnect:	Not Applicable
Auxiliary Battery Type:	Lead-Acid Battery

ELECTRIC ENERGY STORAGE CONVERSION/DEVICE SYSTEM DATA (COTR SUPPLIED)

Electrolyte Fluid Type:	LiPF6 and Carbonic Acid Esters Solution	
Electrolyte Fluid Specific Gravity:	1.2 g/cm ³	
Electrolyte Kinematic Viscosity (centistokes):	2.9cSt (25°C)	
Electrolyte Fluid Color:	Clear	
Electric Energy Storage/Conversion System Coolant Type, Color, Specific Gravity (if applicable):	Air cooling	
Location of Battery Modules:	☐	Inside Passenger Compartment
	☒	Outside Passenger Compartment
	The high voltage battery is mounted behind the rear seat back.	

DATA SHEET NO. 1
TEST VEHICLE SPECIFICATIONS

Test Vehicle: 2012 Honda Civic IMA 4-Dr Hybrid Sedan NHTSA No. MC5302

ELECTRIC ENERGY STORAGE CONVERSION/DEVICE STATE OF CHARGE

<i>For all battery types:</i>	
Voltage range corresponding to useable energy of the battery:	
Minimum State of Charge:	
Maximum State of Charge:	
95% of Maximum State of Charge:	
Test Voltage - No less than 95% of maximum State of Charge:	
<i>For batteries that are rechargeable ONLY by an energy source on the vehicle:</i>	
Voltage range corresponding to useable energy of the battery:	
Minimum State of Charge:	108 V
Maximum State of Charge:	172 V
Test Voltage – Maximum practicable State of Charge within Normal Operating Range:	148.6 V

**DATA SHEET 2
PRE-IMPACT DATA**

Test Vehicle: 2012 Honda Civic IMA 4-Dr Hybrid Sedan NHTSA No. MC5302

VEHICLE CHASSIS GROUND POINT(S) LOCATION(S)

Details of Vehicle Chassis Ground Point(s) & Location(s)	Vehicle ground bolt is on the right hand side, behind the rear seat back.
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ELECTRIC ENERGY STORAGE/CONVERSION TEST POINTS

Details of Electric Energy Storage/Conversion System Test Points:	Motor ECU Connector C Points 6 & 7
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DATA SHEET 3
PRE-IMPACT ELECTRIC ISOLATION MEASUREMENTS & CALCULATIONS

Test Vehicle: 2012 Honda Civic IMA 4-Dr Hybrid Sedan NHTSA No. MC5302

VOLTMETER INFORMATION

Make:	Fluke
Model:	177
Serial Number:	17210161
Internal Impedance Value (MΩ):	> 10 MΩ < 100 pF
Resolution (V):	.001 Volts
Last Calibration Date:	10/31/2011

ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM VOLTAGE

Measurement shall be made with Energy Storage/Conversion System connected to the vehicle propulsion system, and the vehicle in the "ready-to-drive" (propulsion system energized) position.

If voltage measurement is not at the voltage or within the normal operating voltage range specified by the manufacturer, the battery must be charged.

Vb (V):	148.6
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ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM TO VEHICLE CHASSIS

Vehicle chassis point(s) determined and supplied to contractor by COTR.

V1 (V):	65.1
V2 (V):	68.3

**ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM TO
VEHICLE CHASSIS ACROSS RESISTOR**

The known resistance Ro (in ohms) should be approximately 500 times the normal operating voltage of the vehicle (in volts) per SAE J1766.

Ro (Ω):	75500
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V1' (V) Pre-Impact:	10.5
V2' (V) Pre-Impact:	9.4

DATA SHEET 3 (CONTINUED)
PRE-IMPACT ELECTRICAL ISOLATION MEASUREMENTS & CALCULATIONS

Test Vehicle: 2012 Honda Civic IMA 4-Dr Hybrid Sedan NHTSA No. MC5302

ELECTRICAL ISOLATION MEASUREMENT

Note: If measured voltage is zero and results in a division by zero, record "Zero Volts". This "zero voltage" condition is considered as being compliant.

V1' (V):	10.5
$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$	
Ri1 (Ω):	804498
V2' (V):	9.4
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$	
Ri2 (Ω):	923995
Ri = The lesser of Ri1 and Ri2	
Ri Pre-Test ((Ω):	804498
Ri/Vb (Ω/V):	5414
Minimum Electrical Isolation Value is 500 Ω/V	

Is the measured Electrical Isolation Value:	Yes, Pass	No, Fail
≥500 Ω/V without electrical isolation monitoring	X	
≥100 Ω/V with electrical isolation monitoring		

DATA SHEET 4 POST-IMPACT DATA

Test Vehicle: 2012 Honda Civic IMA 4-Dr Hybrid Sedan NHTSA No. MC5302

VOLTMETER INFORMATION

Make:	Fluke
Model:	177
Serial Number:	17210161
Internal Impedance Value (MΩ):	> 10 MΩ < 100 pF
Nominal Propulsion Battery Voltage (Vb) (V):	148.6

ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM VOLTAGE LOCATION OF MEASUREMENT

Measurement is made from the side of the automatic disconnect connected to the electric powertrain.

Vb (V):	148.6
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ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM VOLTAGE

V1 =	68.3	V	Impact Time:	0	Minutes	54	s
V2 =	63.5	V	Impact Time:	1	Minutes	0	s
V1' =	9.6	V	Impact Time:	1	Minutes	13	s
V2' =	10.4	V	Impact Time:	1	Minutes	31	s

ELECTRICAL ISOLATION MEASUREMENT

Note: If measured voltage is zero and results in a division by zero, record "Zero Volts". This "zero voltage" condition is considered as being compliant.

$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$							
Ri1 =	890858	Ω	Impact Time:	0	Minutes	54	s
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$							
Ri2 =	800110	Ω	Impact Time:	1	Minutes	0	s
Ri = The lesser of Ri1 and Ri2							
Ri =	800110	Ω	Impact Time:	0	Minutes	54	s
Ri/Vb = electrical Isolation Value/Nominal Battery Voltage							
Minimum Electrical Value is 500 Ω/V							
Ri/Vb =	5384	Ω/V	Impact Time:	0	Minutes	54	s

Is the measured Electrical Isolation Value:	Yes, Pass	No, Fail
≥500 Ω/V without electrical isolation monitoring	X	
≥100 Ω/V with electrical isolation monitoring		

DATA SHEET 4 (CONTINUED)
POST-IMPACT DATA

Test Vehicle: 2012 Honda Civic IMA 4-Dr Hybrid Sedan NHTSA No. MC5302

ELECTRIC ENERGY STORAGE/CONVERSION DEVICE

	Inside Passenger Compartment	Outside Passenger Compartment
Location of Electric Energy Storage/Conversion Device:		X

	Yes, Pass	No, Fail
All Components of Electrical Energy Storage/Conversion Device remained attached to the vehicle with at least one mounting location.	X	

Describe Electric Energy Storage/Conversion Device movement within the passenger compartment [Supply photographs as appropriate]:
Not Applicable

	Yes, Fail	No, Pass
Has the Electric Energy Storage/Conversion Device moved within the passenger compartment?		X

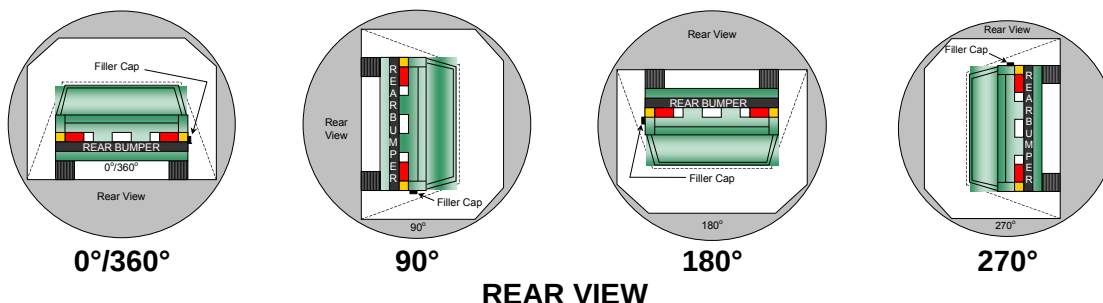
Describe intrusion of an outside Electric Energy Storage/Conversion Device into the passenger compartment [Supply photographs as appropriate]:
No Intrusion

	Yes, Fail	No, Pass
Has an outside Electric Energy Storage/Conversion Device intruded into the passenger compartment?		X

	Yes, Fail	No, Pass
Is Electric Energy Storage/Conversion Device electrolyte spillage visible in the passenger compartment?		X

DATA SHEET 5 **STATIC ROLLOVER TEST DATA**

Test Vehicle: 2012 Honda Civic IMA 4-Dr Hybrid Sedan NHTSA No. MC5302



DETERMINATION OF ELECTRIC ENERGY STORAGE/CONVERSION DEVICE ELECTROLYTE COLLECTION TIME PERIOD

Rollover Stage	Rotation Time (spec. 1-3 min)				FMVSS 301 Hold Time		Total Time				Next Whole Minute Interval	
0° - 90°	1	minutes	58	seconds	5	minutes	6	minutes	58	seconds	7	minutes
90° - 180°	1	minutes	51	seconds	5	minutes	6	minutes	51	seconds	7	minutes
180° - 270°	1	minutes	47	seconds	5	minutes	6	minutes	47	seconds	7	minutes
270° - 360°	1	minutes	56	seconds	5	minutes	6	minutes	56	seconds	7	minutes

ACTUAL TEST VEHICLE ELECTRIC ENERGY STORAGE/CONVERSION DEVICE ELECTROLYTE SPILLAGE

Rollover Stage	Electric Energy Storage/Conversion Device Electrolyte Spillage (L)	Spillage Location
0° to 90°	0	Not Applicable
90° to 180°	0	Not Applicable
180° to 270°	0	Not Applicable
270° to 360°	0	Not Applicable

Total Spillage: 0 L

	Yes, Fail	No, Pass
Is the total spillage of Electric Energy Storage/Conversion Device electrolyte greater than 5.0 Liters?		X
Is Electric Energy Storage/Conversion Device electrolyte spillage visible in the passenger compartment?		X

DATA SHEET 5 (CONTINUED)
STATIC ROLLOVER TEST DATA

Test Vehicle: 2012 Honda Civic IMA 4-Dr Hybrid Sedan NHTSA No. MC5302

VOLTMETER INFORMATION

Make:	Fluke
Model:	177
Serial Number:	17210161
Internal Impedance Value (MΩ):	> 10 MΩ < 100 pF
Nominal Electric Energy Storage/Conversion Device Voltage (Vb) (V):	148.6
Record V1, V2, V1', V2' voltage measurements at the start of each successive increment of 90°, 180°, 270°, and 360° of the static rollover test.	

ELECTRICAL ISOLATION MEASUREMENT

V1 =	0.21	V	0°	Time:		Minutes		s
V1 =	0.24	V	90°	Time:	2	Minutes	5	s
V1 =	0.36	V	180°	Time:	2	Minutes	6	s
V1 =	0.20	V	270°	Time:	1	Minutes	59	s
V1 =	0.18	V	360°	Time:	2	Minutes	7	s
V2 =	0.35	V	0°	Time:		Minutes		s
V2 =	0.30	V	90°	Time:	2	Minutes	17	s
V2 =	0.18	V	180°	Time:	2	Minutes	19	s
V2 =	0.25	V	270°	Time:	2	Minutes	8	s
V2 =	0.22	V	360°	Time:	2	Minutes	20	s
V1' =	0.0	V	0°	Time:		Minutes		s
V1' =	0.0	V	90°	Time:	2	Minutes	11	s
V1' =	0.0	V	180°	Time:	2	Minutes	13	s
V1' =	0.0	V	270°	Time:	2	Minutes	4	s
V1' =	0.0	V	360°	Time:	2	Minutes	13	s
V2' =	0.0	V	0°	Time:		Minutes		s
V2' =	0.0	V	90°	Time:	2	Minutes	23	s
V2' =	0.0	V	180°	Time:	2	Minutes	25	s
V2' =	0.0	V	270°	Time:	2	Minutes	13	s
V2' =	0.0	V	360°	Time:	2	Minutes	25	s
Vb =	148.6	V	0°	Time:		Minutes		s
Vb =	148.6	V	90°	Time:	1	Minutes	58	s
Vb =	148.5	V	180°	Time:	1	Minutes	51	s
Vb =	148.5	V	270°	Time:	1	Minutes	47	s
Vb =	148.5	V	360°	Time:	1	Minutes	56	s

DATA SHEET 5 (CONTINUED)
STATIC ROLLOVER TEST DATA

Test Vehicle: 2012 Honda Civic IMA 4-Dr Hybrid Sedan NHTSA No. MC5302

ELECTRICAL ISOLATION CALCULATION

Note: If measured voltage is zero and results in a division by zero, record "Zero Volts". This "zero voltage" condition is considered as being compliant.

$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$								
Ri1 =	Zero Volts	Ω	0°	Time:		Minutes		s
Ri1 =	Zero Volts	Ω	90°	Time:	2	Minutes	5	s
Ri1 =	Zero Volts	Ω	180°	Time:	2	Minutes	6	s
Ri1 =	Zero Volts	Ω	270°	Time:	1	Minutes	59	s
Ri1 =	Zero Volts	Ω	360°	Time:	2	Minutes	7	s
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$								
Ri2 =	Zero Volts	Ω	0°	Time:		Minutes		s
Ri2 =	Zero Volts	Ω	90°	Time:	2	Minutes	17	s
Ri2 =	Zero Volts	Ω	180°	Time:	2	Minutes	19	s
Ri2 =	Zero Volts	Ω	270°	Time:	2	Minutes	8	s
Ri2 =	Zero Volts	Ω	360°	Time:	2	Minutes	20	s
Ri = The lesser of Ri1 and Ri2								
Ri =	Zero Volts	Ω	0°	Time:		Minutes		s
Ri =	Zero Volts	Ω	90°	Time:	2	Minutes	5	s
Ri =	Zero Volts	Ω	180°	Time:	2	Minutes	6	s
Ri =	Zero Volts	Ω	270°	Time:	1	Minutes	59	s
Ri =	Zero Volts	Ω	360°	Time:	2	Minutes	7	s
Ri/Vb = Electrical Isolation Value/Nominal Battery Voltage Minimum Electrical Isolation Value is 500 Ω /V								
Ri/Vb =	Zero Volts	Ω/V	0°	Time:		Minutes		s
Ri/Vb =	Zero Volts	Ω/V	90°	Time:	2	Minutes	5	s
Ri/Vb =	Zero Volts	Ω/V	180°	Time:	2	Minutes	6	s
Ri/Vb =	Zero Volts	Ω/V	270°	Time:	1	Minutes	59	s
Ri/Vb =	Zero Volts	Ω/V	360°	Time:	2	Minutes	7	s

Is the measured Electrical Isolation Value:	Yes, Pass	No, Fail
≥500 Ω/V without electrical isolation monitoring	X	
≥100 Ω/V with electrical isolation monitoring		

APPENDIX A
PHOTOGRAPHS

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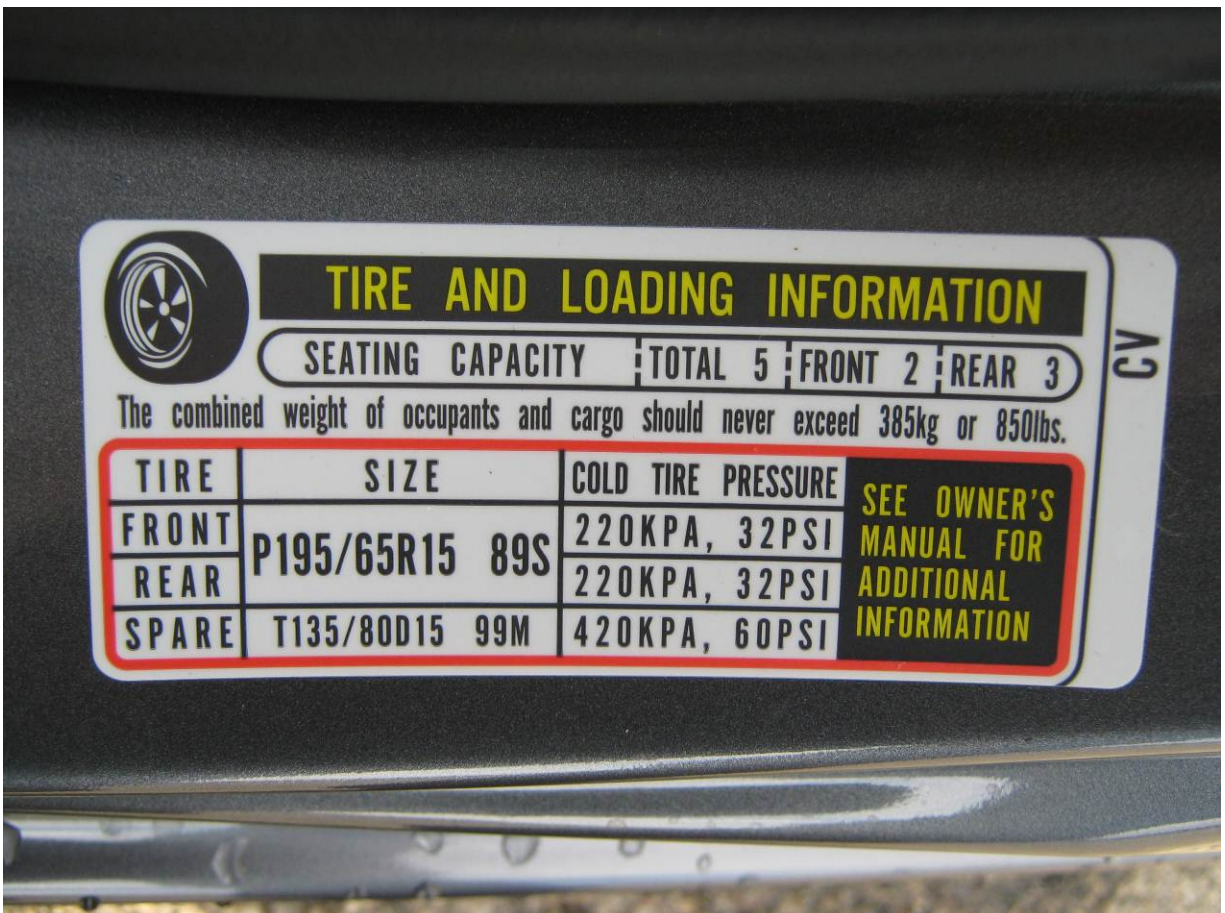
As Delivered Right Front ¾ View of Test Vehicle



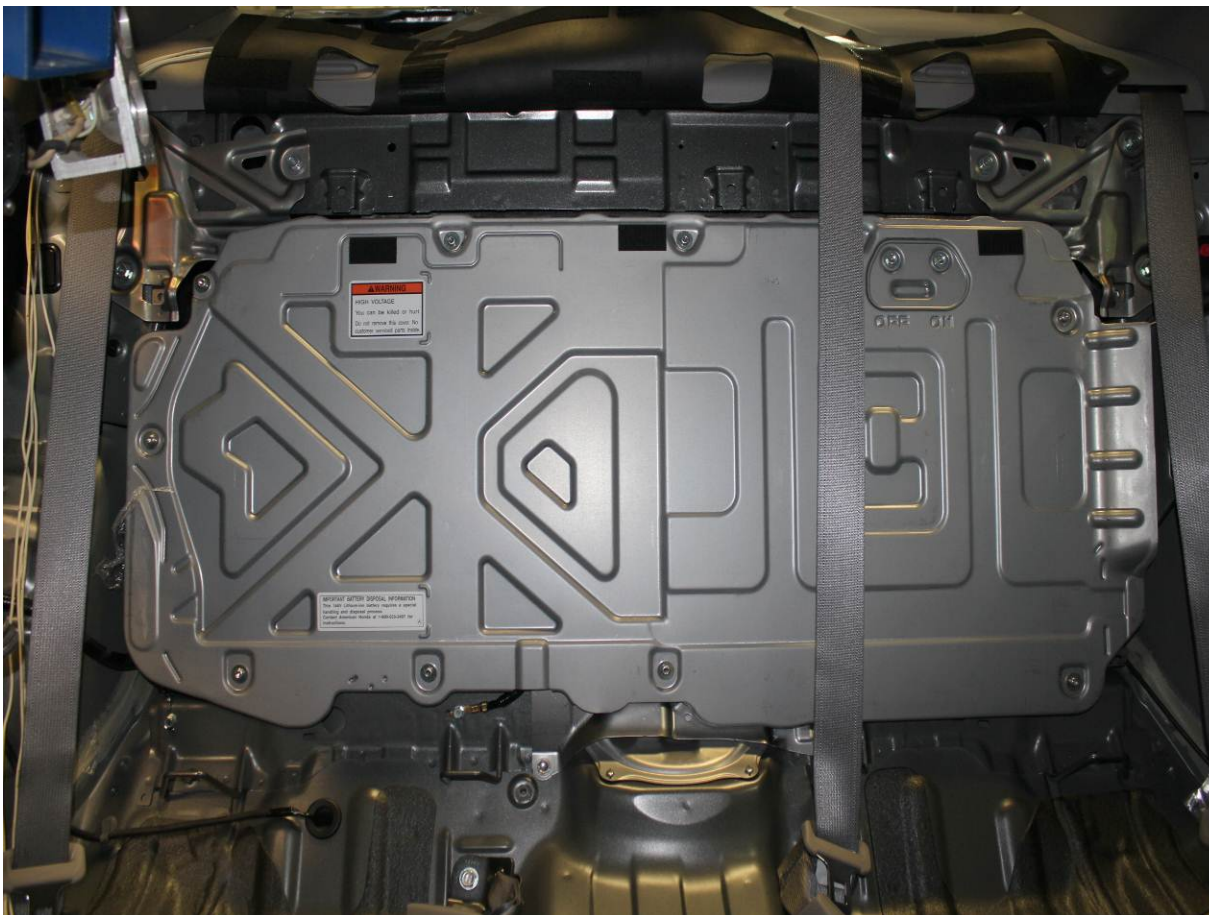
As Delivered Left Rear ¾ View of Test Vehicle



Vehicle's Certification Label



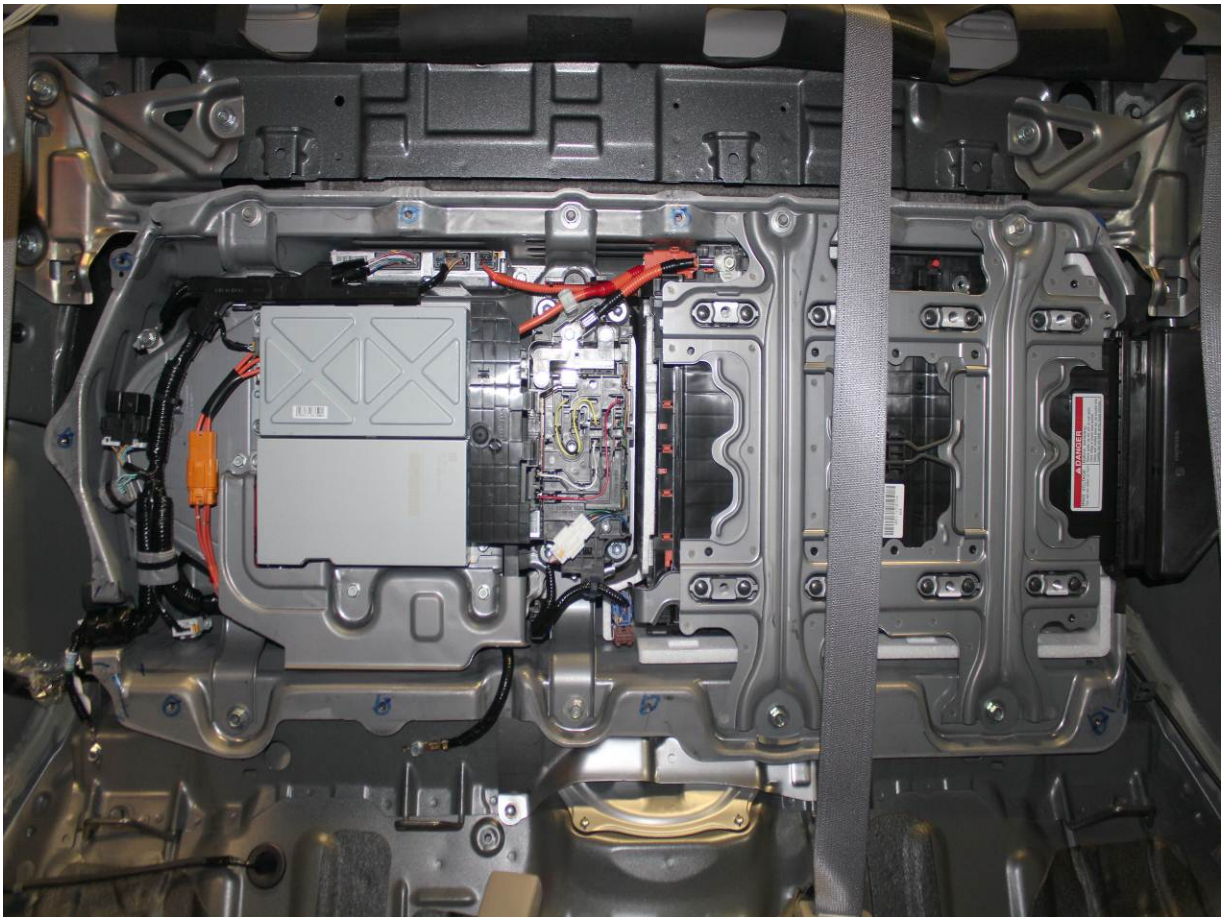
Vehicle's Tire Information Placard or Label



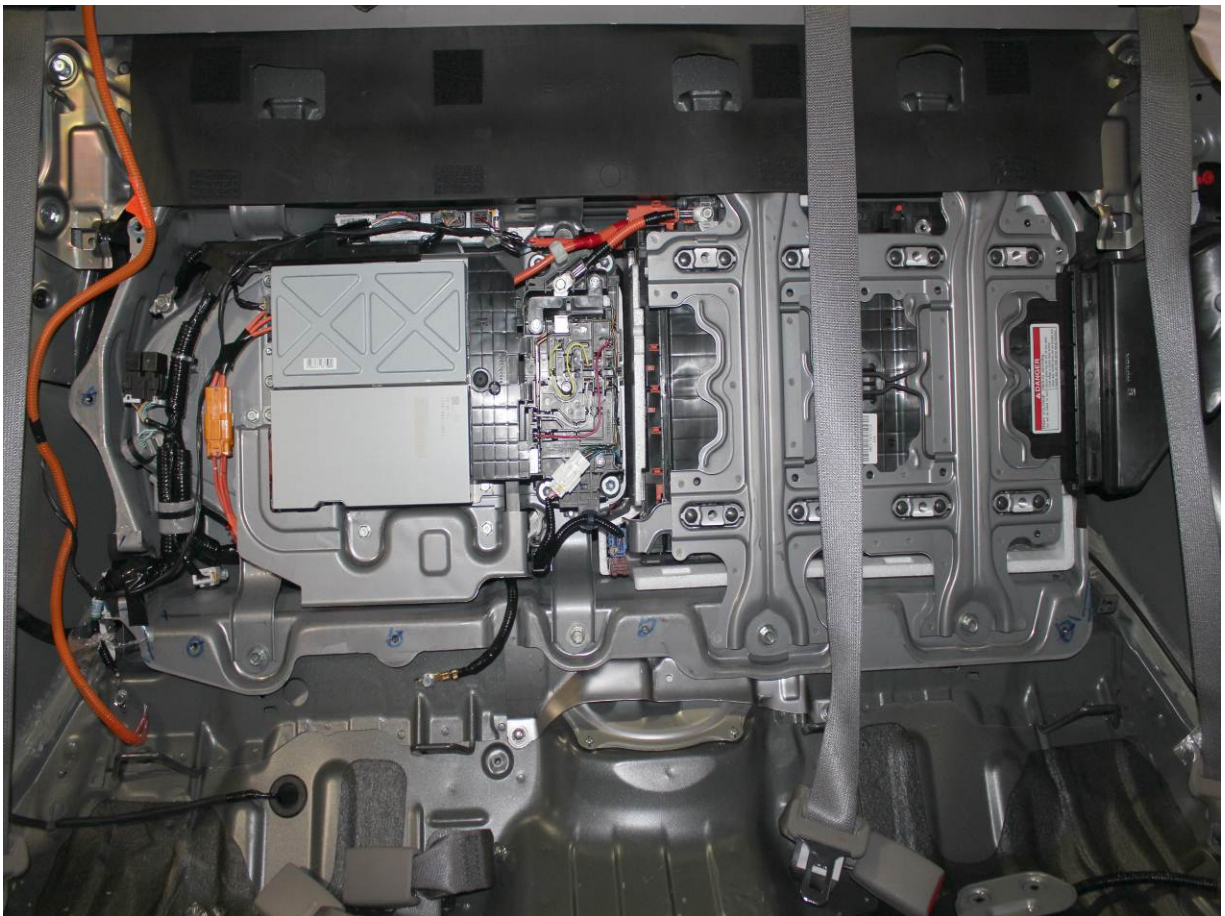
Pre-Test View of Electric Energy Storage/Conversion System



Post-Test View of Electric Energy Storage/Conversion System



Pre-Test View of Electric Energy Storage/Conversion System (Cover Removed)



Post-Test View of Electric Energy Storage/Conversion System (Cover Removed)



Pre-Test View of Electric Propulsion Drive



Post-Test View of Electric Propulsion Drive



Pre-Test View of Vehicle's Passenger Compartment Adjacent to Electric Energy Storage/Conversion System



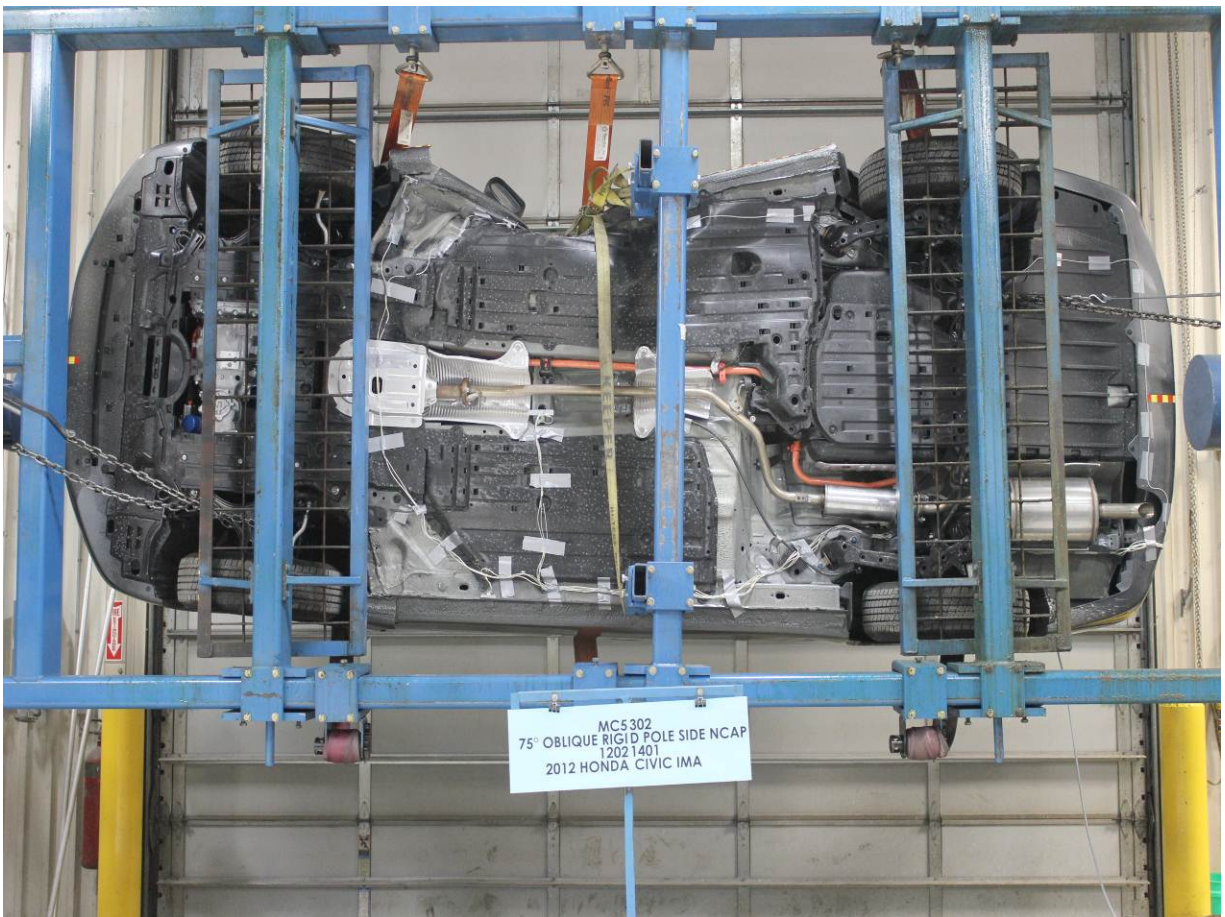
Post-Test View of Vehicle's Passenger Compartment Adjacent to Electric Energy Storage/Conversion System



Vehicle at 90 Degrees on Static Rollover Device



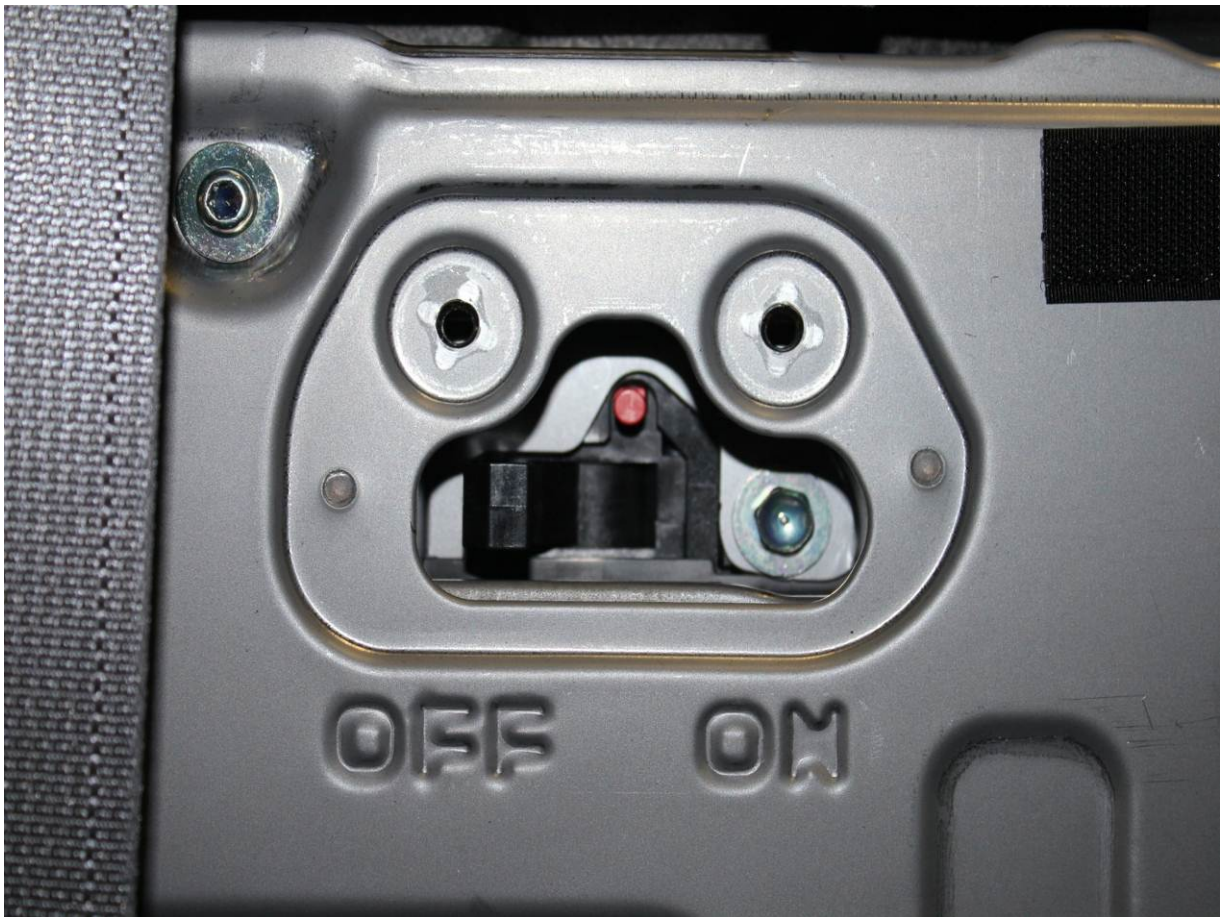
Vehicle at 180 Degrees on Static Rollover Device



Vehicle at 270 Degrees on Static Rollover Device



Vehicle at 360 Degrees on Static Rollover Device



Manual High Voltage Service Disconnect



High Voltage Warning Label



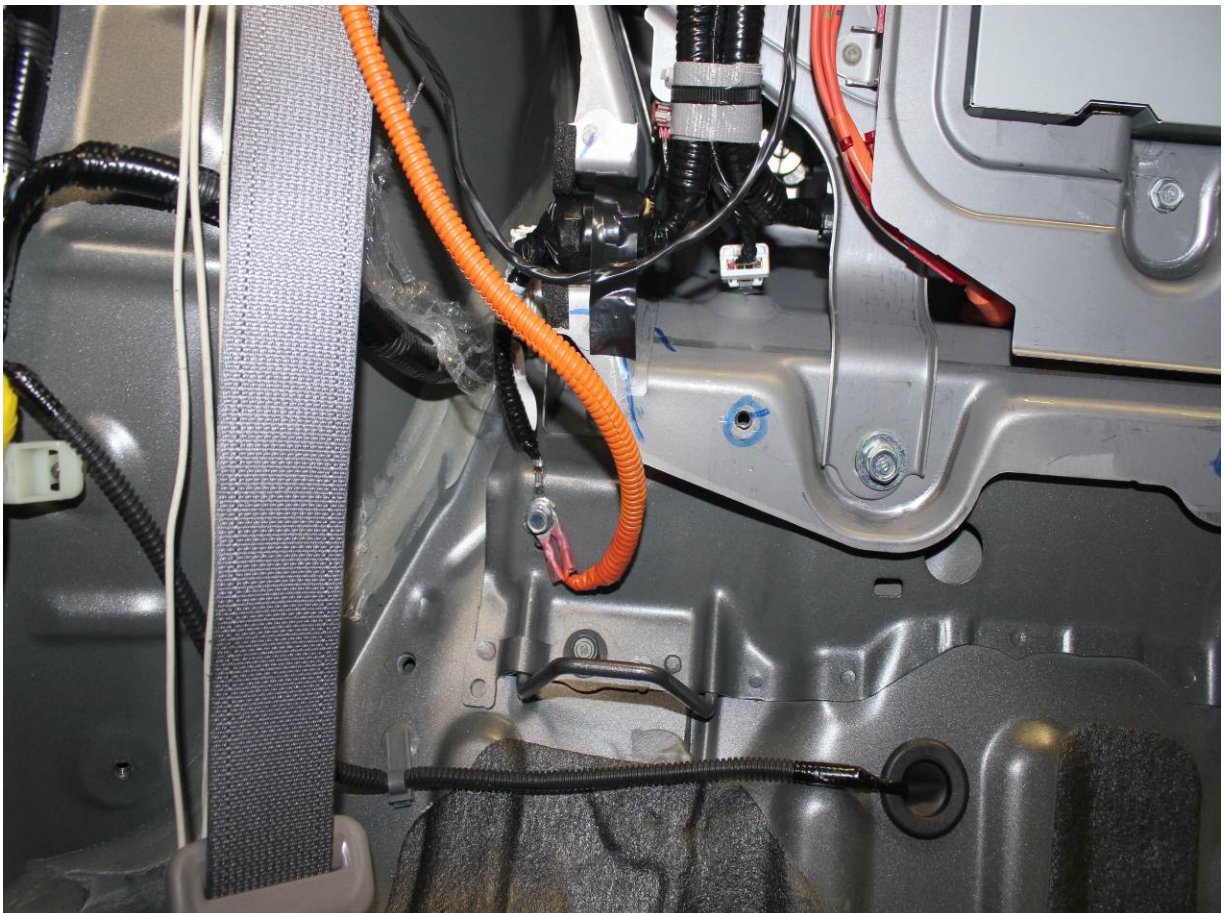
High Voltage Warning Label



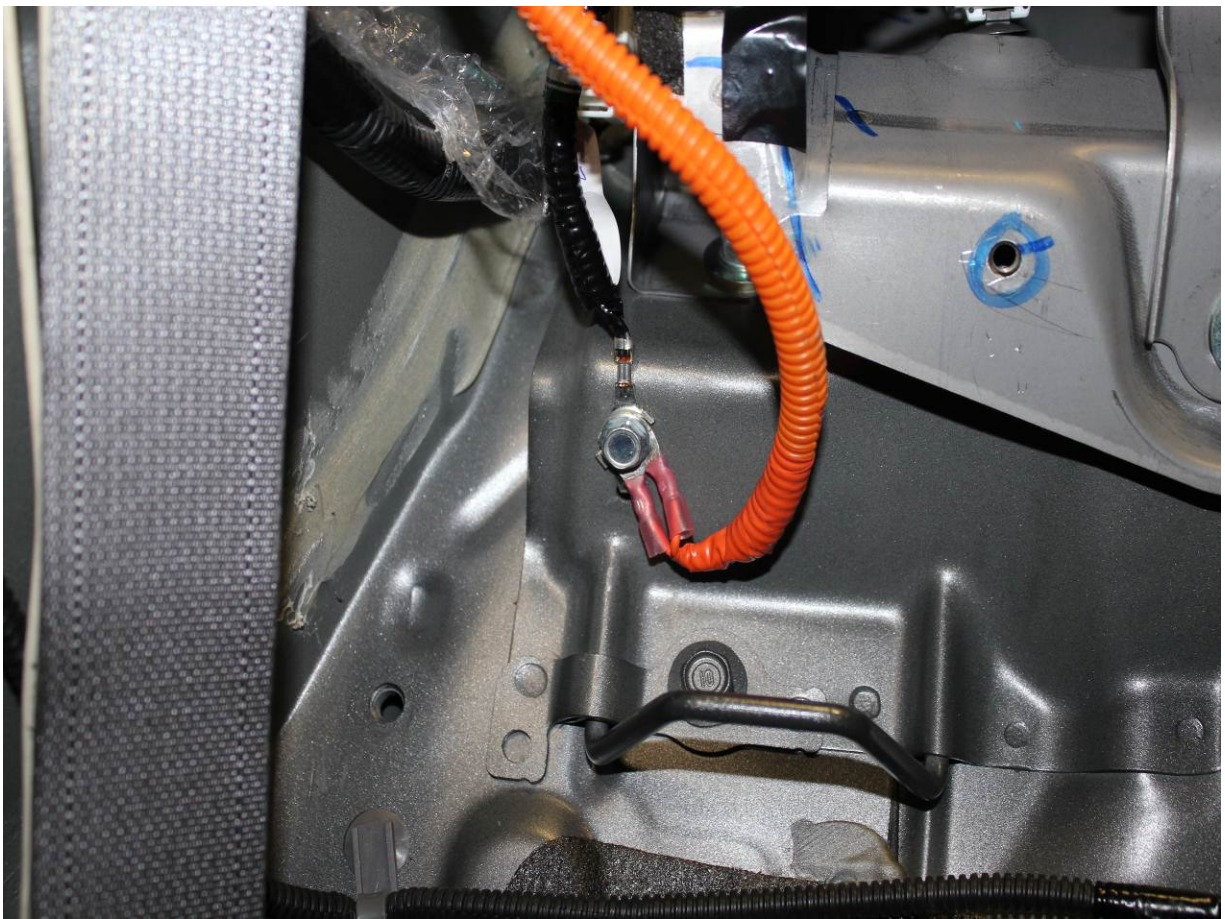
High Voltage Warning Label



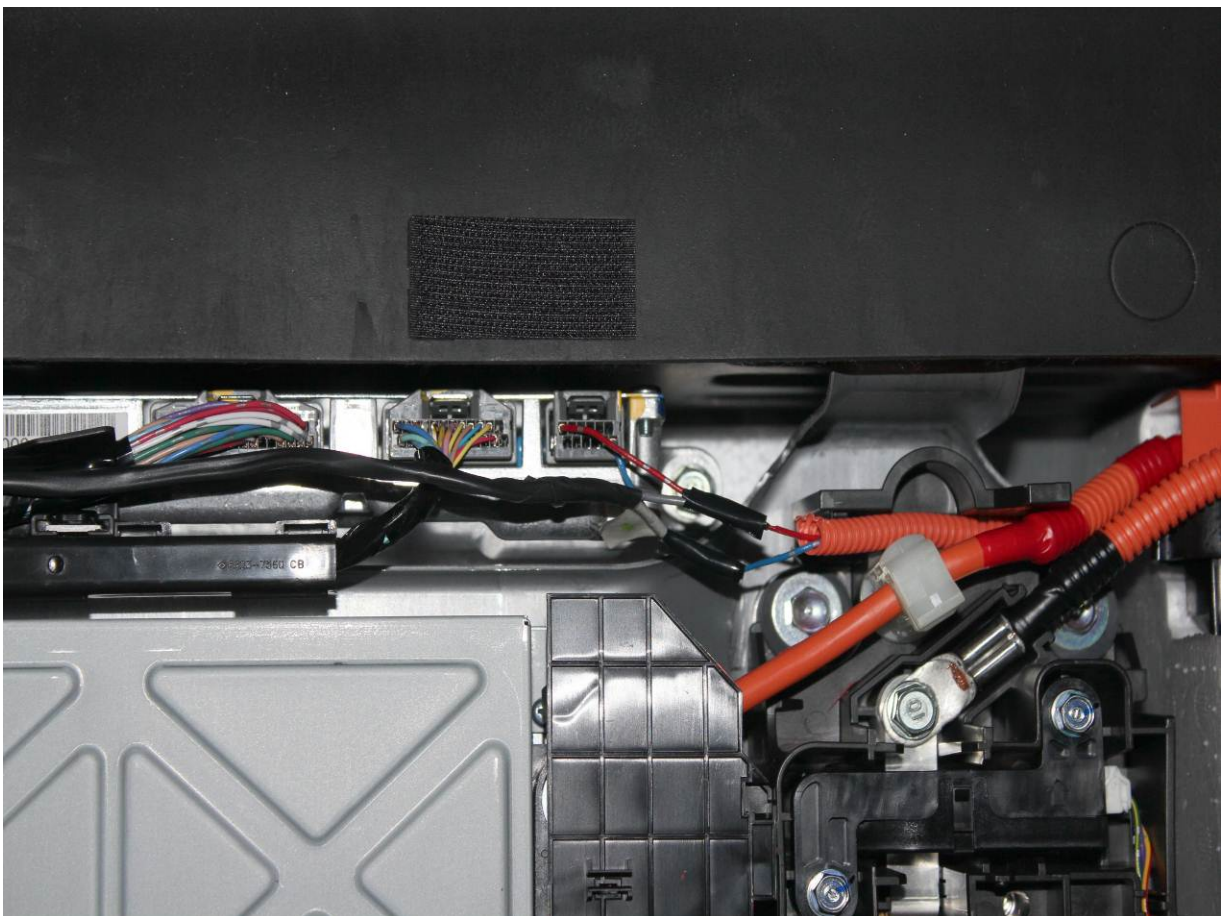
High Voltage Warning Label



Ground Location of Leads Attached



Ground Location of Leads Attached Close-up View



High Voltage/Close-up of Leads Attached