

REPORT NUMBER: NCAP305I-MGA-2013-001

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

**HONDA MFG. OF INDIANA, LLC
2013 Acura ILX Hybrid 4-Dr Sedan
NHTSA NUMBER: HD5302**

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



Test Date: October 18, 2012

Report Date: November 20, 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: November 20, 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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16. Abstract An FMVSS No. 305 Indicant test, in conjunction with an NCAP side moving deformable barrier (MDB) impact test was conducted on the subject 2013 Acura ILX Hybrid 4-Dr 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 moving deformable barrier (MDB) impact test was conducted on the subject 2013 Acura ILX Hybrid 4-Dr 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 FY13 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 side moving deformable barrier (MDB) impact test was performed by MGA Research Corporation on a 2013 Acura ILX Hybrid 4-Dr Sedan on October 18, 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 2013 Acura ILX Hybrid 4-Dr 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: 2013 Acura ILX Hybrid 4-Dr Sedan

NHTSA No. HD5302

TEST VEHICLE INFORMATION

Year/Make/Model/Body Style	2013 Acura ILX Hybrid 4-Dr Sedan
NHTSA No.	HD5302
Color	Silver Moon
Odometer Reading	63 miles

DATA FROM CERTIFICATION LABEL

Manufactured By	HONDA MFG. OF INDIANA, LLC	GVWR (kg)	1800
Date of Manufacture	08/'12	GAWR Front (kg)	970
VIN:	19VDE3F38DE301319	GAWR Rear (kg)	890

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 Automatic Propulsion Battery Disconnect:	N/A
Auxiliary Battery Type:	Lead-Acid Battery

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

Electrolyte Fluid Type:	LiPF6 + Carbonic Acid Esters Solution
Electrolyte Fluid Specific Gravity:	1.2/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):	None (Air Cooled System)
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: 2013 Acura ILX Hybrid 4-Dr Sedan

NHTSA No. HD5302

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:	144.0 V
Maximum State of Charge:	172.0 V
Test Voltage – Maximum practicable State of Charge within Normal Operating Range:	148.1 V

**DATA SHEET 2
PRE-IMPACT DATA**

Test Vehicle: 2013 Acura ILX Hybrid 4-Dr Sedan

NHTSA No. HD5302

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: 2013 Acura ILX Hybrid 4-Dr Sedan

NHTSA No. HD5302

VOLTMETER INFORMATION

Make:	Fluke
Model:	177
Serial Number:	17210161
Internal Impedance Value (MΩ):	> 10 MΩ < 100 pF
Resolution (V):	.001 Volts
Last Calibration Date:	06/29/2012

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):	148.1
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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):	115.6
V2 (V):	89.2

**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):	77500
---------	-------

V1' (V) Pre-Impact:	19.9
V2' (V) Pre-Impact:	21.0

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

Test Vehicle: 2013 Acura ILX Hybrid 4-Dr Sedan

NHTSA No. HD5302

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):	19.9
$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$	
Ri1 (Ω):	660287
V2' (V):	21.0
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$	
Ri2 (Ω):	577872
Ri = The lesser of Ri1 and Ri2	
Ri Pre-Test (Ω):	577872
Ri/Vb (Ω/V):	3902
Minimum Electrical Isolation Value is 500 Ω/V	

Is the measured Electrical Isolation Value:	Yes, Pass	No, Fail
$\geq 500 \Omega/V$ without electrical isolation monitoring	X	
$\geq 100 \Omega/V$ with electrical isolation monitoring		

**DATA SHEET 4
POST-IMPACT DATA**

Test Vehicle: 2013 Acura ILX Hybrid 4-Dr Sedan

NHTSA No. HD5302

VOLTMETER INFORMATION

Make:	Fluke
Model:	177
Serial Number:	17210161
Internal Impedance Value (MΩ):	> 10 MΩ < 100 pF
Nominal Propulsion Battery Voltage (Vb) (V):	148.1

**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):	148.0
---------	-------

ELECTRIC ENERGY STORAGE/CONVERSION SYSTEM VOLTAGE

V1 =	96.5	V	Impact Time:	1	Minutes	36	s
V2 =	68.0	V	Impact Time:	2	Minutes	4	s
V1' =	20.8	V	Impact Time:	1	Minutes	40	s
V2' =	20.4	V	Impact Time:	2	Minutes	14	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 =	480809	Ω	Impact Time:	1	Minutes	36	s
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$							
Ri2 =	437457	Ω	Impact Time:	2	Minutes	4	s
Ri = The lesser of Ri1 and Ri2							
Ri =	437457	Ω	Impact Time:	2	Minutes	4	s
Ri/Vb = electrical Isolation Value/Nominal Battery Voltage							
Minimum Electrical Value is 500 Ω/V							
Ri/Vb =	2954	Ω/V	Impact Time:	2	Minutes	4	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: 2013 Acura ILX Hybrid 4-Dr Sedan

NHTSA No. HD5302

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

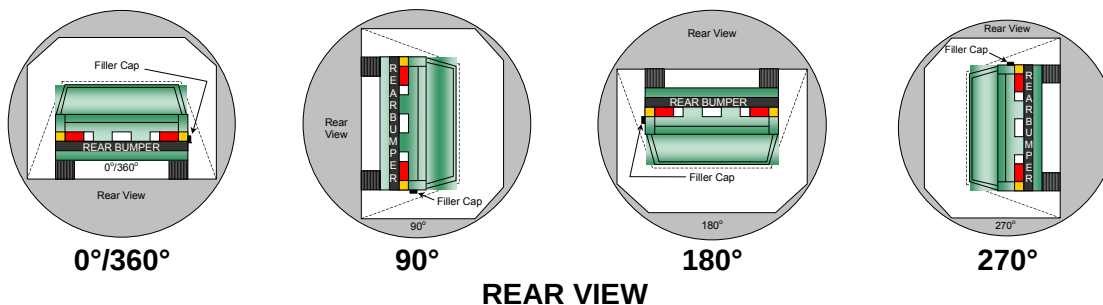
	Yes, Fail	No, Pass
Has an outside Electric Energy Storage/Conversion Device intruded into the passenger compartment?		X

	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: 2013 Acura ILX Hybrid 4-Dr Sedan

NHTSA No. HD5302



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	53	seconds	5	minutes	6	Minutes	53	seconds	7	minutes
90° - 180°	1	minutes	51	seconds	5	minutes	6	minutes	51	seconds	7	minutes
180° - 270°	1	Minutes	48	seconds	5	minutes	6	minutes	48	seconds	7	minutes
270° - 360°	1	minutes	50	seconds	5	minutes	6	minutes	50	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: 2013 Acura ILX Hybrid 4-Dr Sedan

NHTSA No. HD5302

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):	148.1
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 =	118.4	V	0°	Time:		Minutes		s
V1 =	109.8	V	90°	Time:	2	Minutes	22	s
V1 =	120.4	V	180°	Time:	2	Minutes	22	s
V1 =	106.4	V	270°	Time:	2	Minutes	16	s
V1 =	115.2	V	360°	Time:	2	Minutes	12	s
V2 =	120.5	V	0°	Time:		Minutes		s
V2 =	103.2	V	90°	Time:	2	Minutes	30	s
V2 =	119.2	V	180°	Time:	2	Minutes	30	s
V2 =	90.6	V	270°	Time:	2	Minutes	21	s
V2 =	119.0	V	360°	Time:	2	Minutes	20	s
V1' =	1.7	V	0°	Time:		Minutes		s
V1' =	7.4	V	90°	Time:	2	Minutes	45	s
V1' =	10.7	V	180°	Time:	2	Minutes	43	s
V1' =	10.9	V	270°	Time:	2	Minutes	31	s
V1' =	4.3	V	360°	Time:	2	Minutes	32	s
V2' =	6.7	V	0°	Time:		Minutes		s
V2' =	16.1	V	90°	Time:	2	Minutes	58	s
V2' =	5.3	V	180°	Time:	2	Minutes	59	s
V2' =	18.4	V	270°	Time:	2	Minutes	45	s
V2' =	6.7	V	360°	Time:	2	Minutes	46	s
Vb =	148.0	V	0°	Time:		Minutes		s
Vb =	148.0	V	90°	Time:	2	Minutes	15	s
Vb =	148.0	V	180°	Time:	2	Minutes	17	s
Vb =	148.0	V	270°	Time:	2	Minutes	7	s
Vb =	148.0	V	360°	Time:	2	Minutes	10	s

DATA SHEET 5 (CONTINUED)
STATIC ROLLOVER TEST DATA

Test Vehicle: 2013 Acura ILX Hybrid 4-Dr Sedan

NHTSA No. HD5302

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.

$R_{i1} = R_o (1 + V_2/V_1) [(V_1 - V_1')/V_1']$								
R _{i1} =	10734655	Ω	0°	Time:		Minutes		s
R _{i1} =	2080402	Ω	90°	Time:	2	Minutes	22	s
R _{i1} =	1581193	Ω	180°	Time:	2	Minutes	22	s
R _{i1} =	1257197	Ω	270°	Time:	2	Minutes	16	s
R _{i1} =	4063490	Ω	360°	Time:	2	Minutes	12	s
$R_{i2} = R_o (1 + V_1/V_2) [(V_2 - V_2')/V_2']$								
R _{i2} =	2609746	Ω	0°	Time:		Minutes		s
R _{i2} =	865354	Ω	90°	Time:	2	Minutes	30	s
R _{i2} =	3347805	Ω	180°	Time:	2	Minutes	30	s
R _{i2} =	661240	Ω	270°	Time:	2	Minutes	21	s
R _{i2} =	2556505	Ω	360°	Time:	2	Minutes	20	s
R _i = The lesser of R _{i1} and R _{i2}								
R _i =	2609746	Ω	0°	Time:		Minutes		s
R _i =	865354	Ω	90°	Time:	2	Minutes	30	s
R _i =	1581193	Ω	180°	Time:	2	Minutes	22	s
R _i =	661240	Ω	270°	Time:	2	Minutes	21	s
R _i =	256505	Ω	360°	Time:	2	Minutes	20	s
R _i /V _b = Electrical Isolation Value/Nominal Battery Voltage								
Minimum Electrical Isolation Value is 500 Ω /V								
R _i /V _b =	17622	Ω/V	0°	Time:		Minutes		s
R _i /V _b =	5843	Ω/V	90°	Time:	2	Minutes	30	s
R _i /V _b =	10677	Ω/V	180°	Time:	2	Minutes	22	s
R _i /V _b =	4465	Ω/V	270°	Time:	2	Minutes	21	s
R _i /V _b =	17262	Ω/V	360°	Time:	2	Minutes	20	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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PHOTOGRAPH NOT APPLICABLE

No. 001 Auxiliary Power Module Warning Label

PHOTOGRAPH NOT APPLICABLE

No. 002 Power Inverter Warning Label

PHOTOGRAPH NOT APPLICABLE

No. 003 First Responder Warning Label

PHOTOGRAPH NOT APPLICABLE

No. 004 First Responder Warning Location



No. 005 Other Vehicle Label(s) Related to Electrical Propulsion System



No. 005a Other Vehicle Label(s) Related to Electrical Propulsion System



No. 005b Other Vehicle Label(s) Related to Electrical Propulsion System



No. 005c Other Vehicle Label(s) Related to Electrical Propulsion System



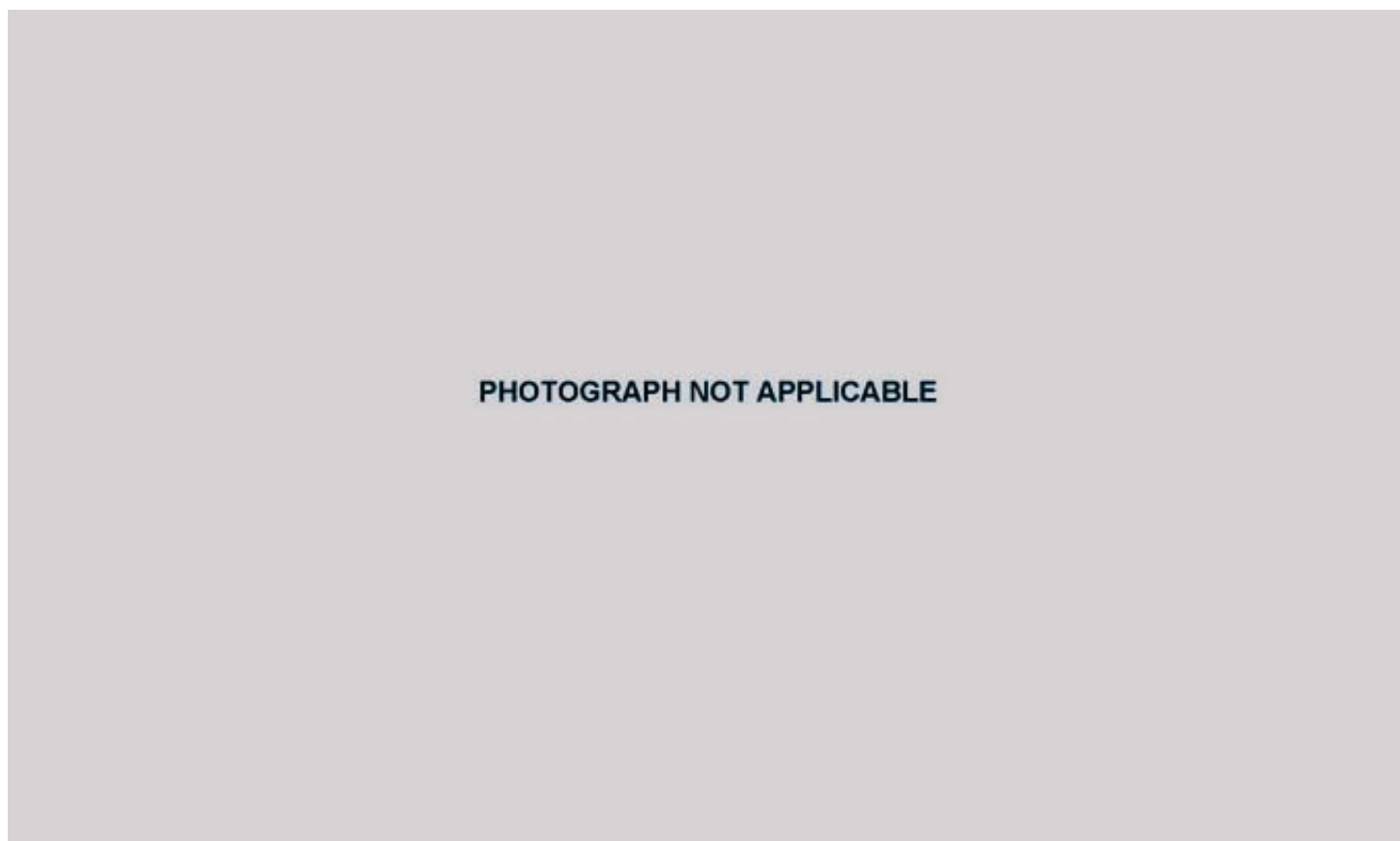
No. 005d Other Vehicle Label(s) Related to Electrical Propulsion System



No. 006 Manual High Voltage Service Disconnect in Place



No. 007 Manual High Voltage Service Disconnect Removed



No. 008 Manual High Voltage Service Disconnect Removed



No. 009 Pre-Impact View of Propulsion Battery



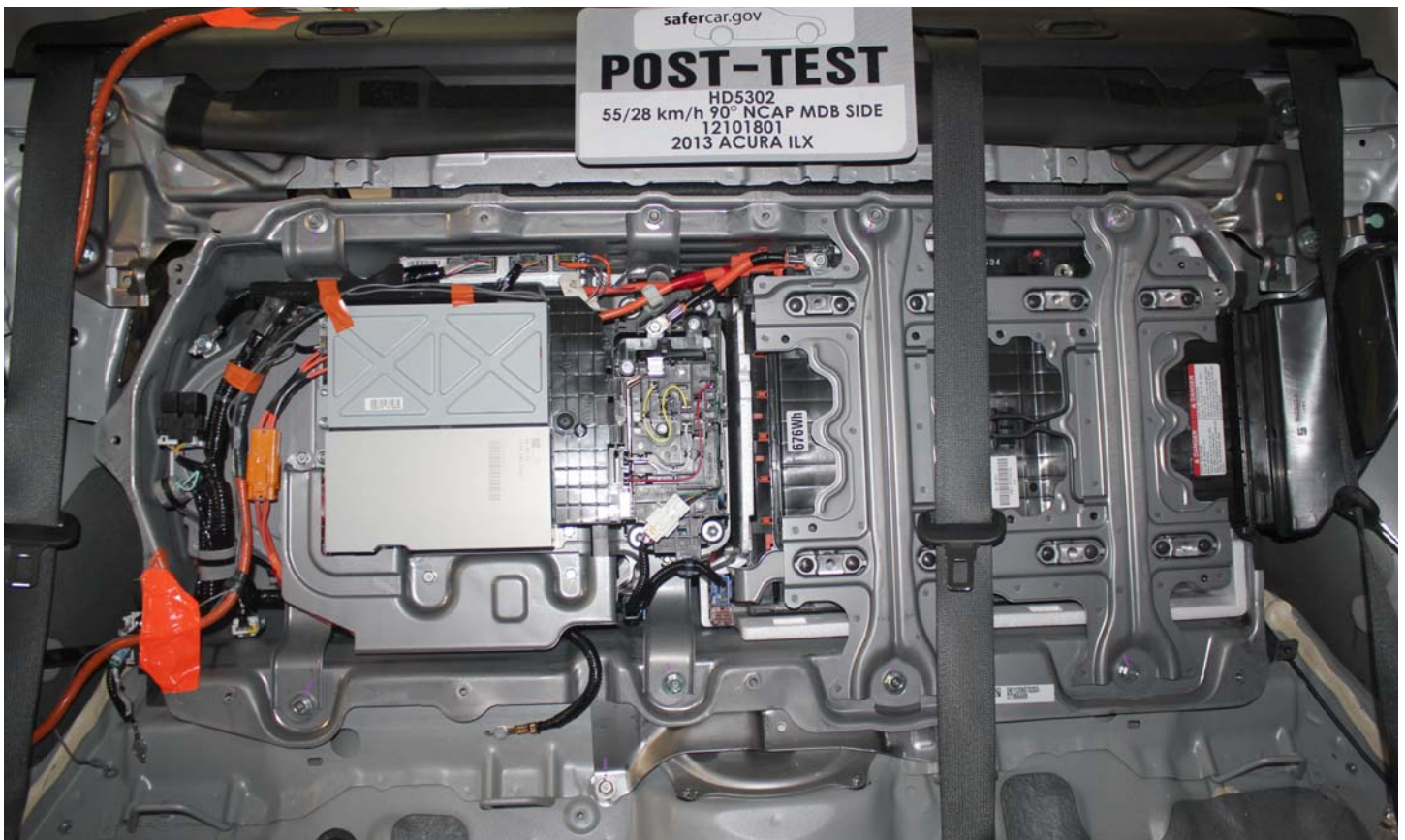
No. 010 Post-Impact Front View of Propulsion Battery



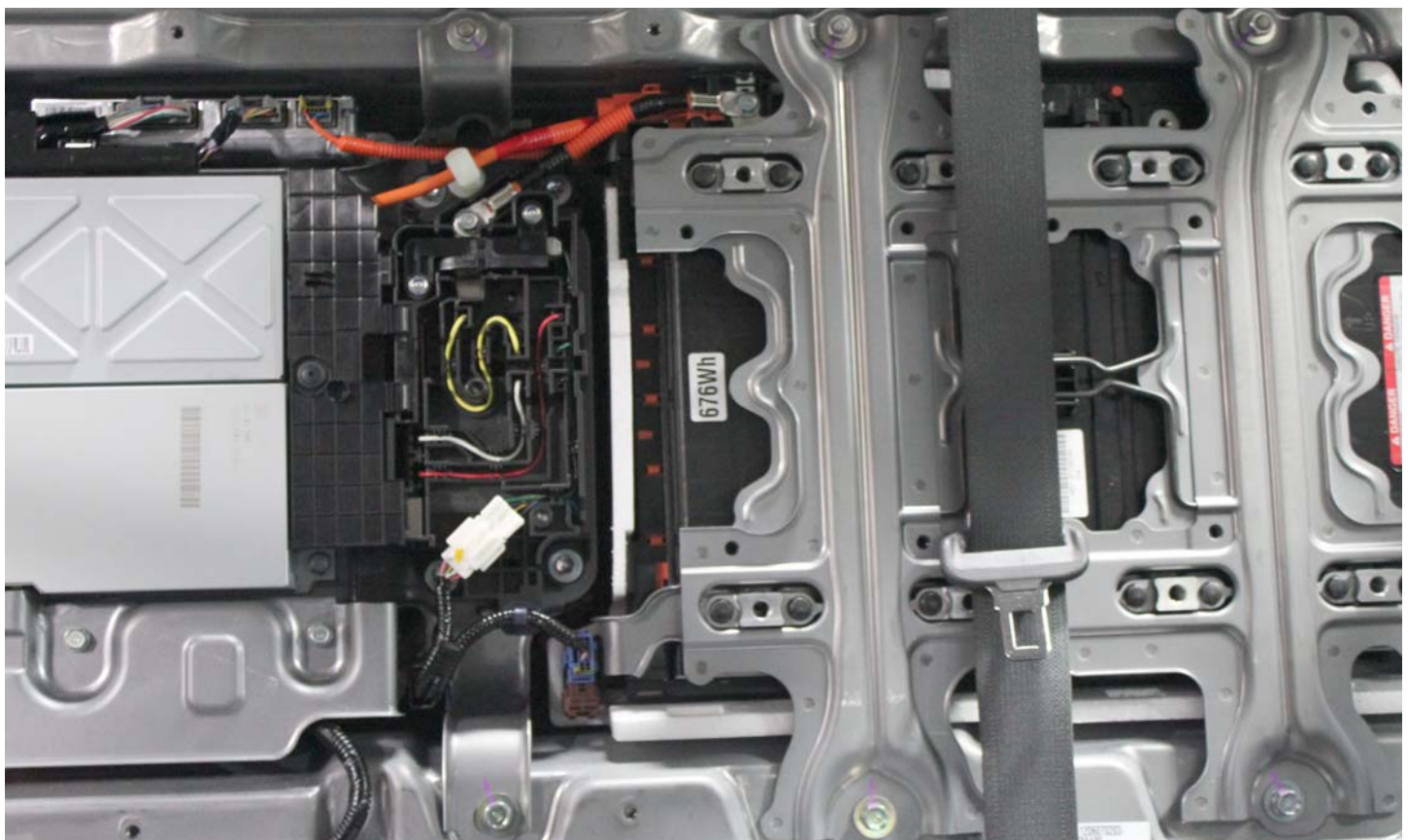
No. 011 Post-Impact Rear View of Propulsion Battery



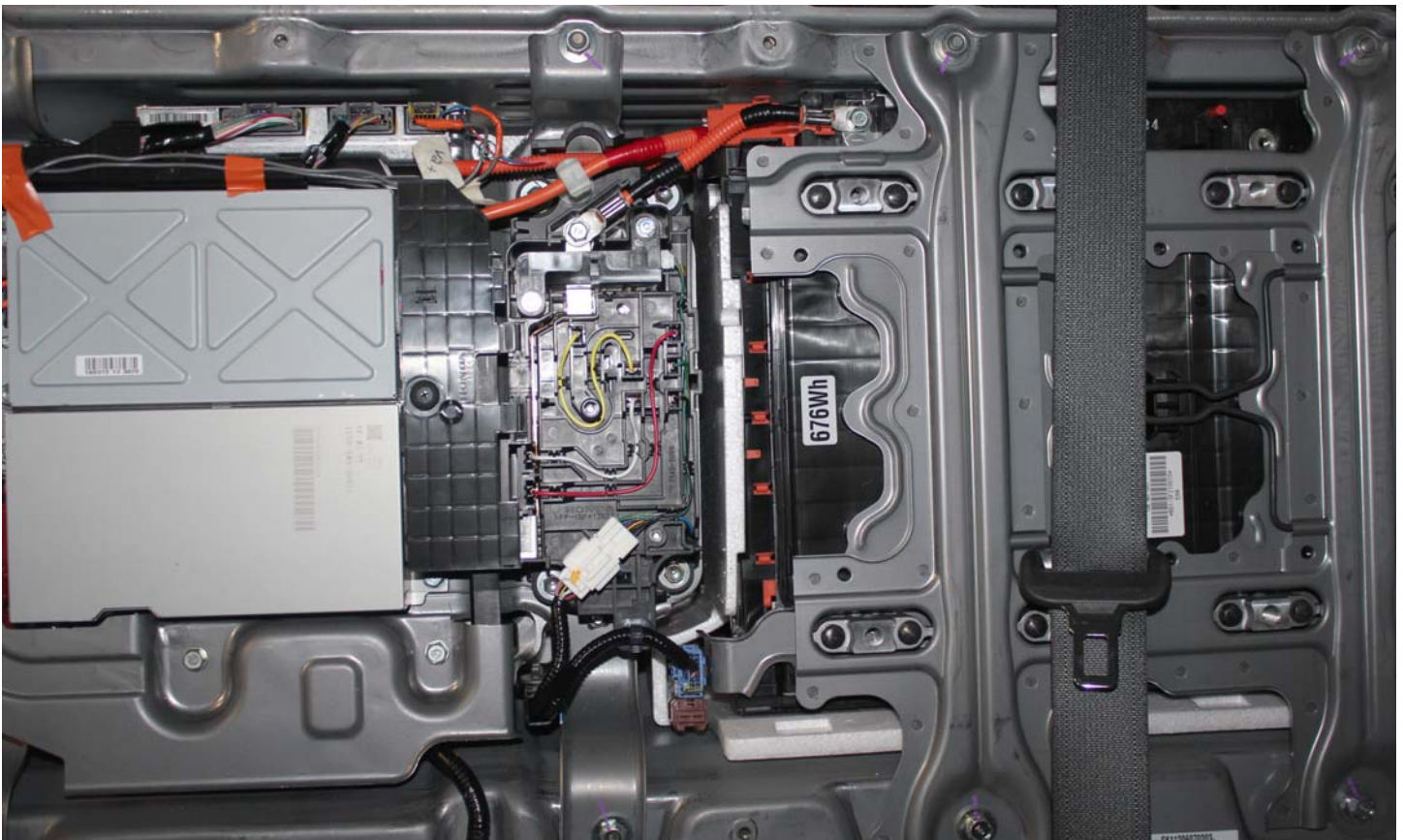
No. 012 Pre-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules



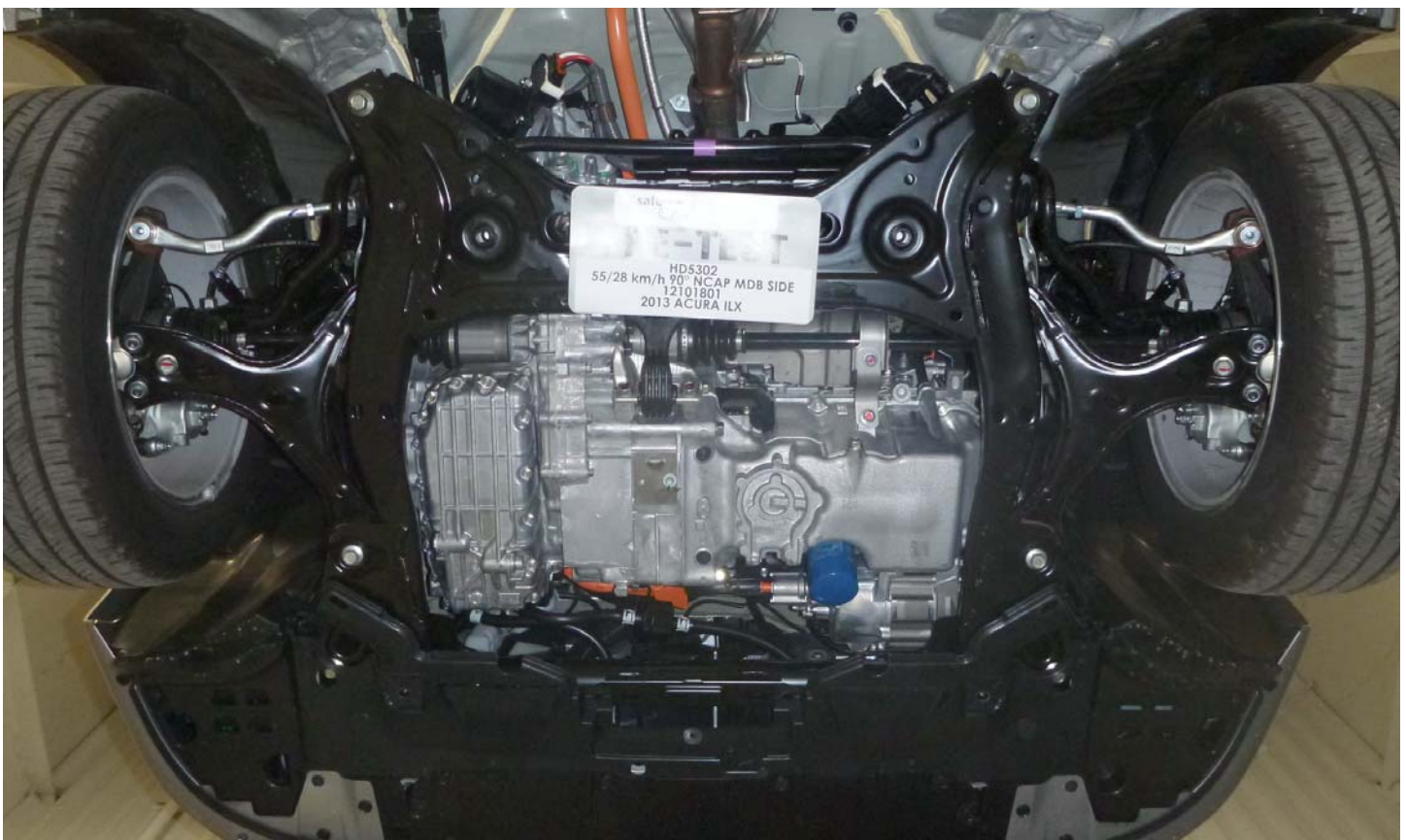
No. 013 Post-Impact View of Battery Box(s) or Container(s) Which Holds Individual Battery Modules



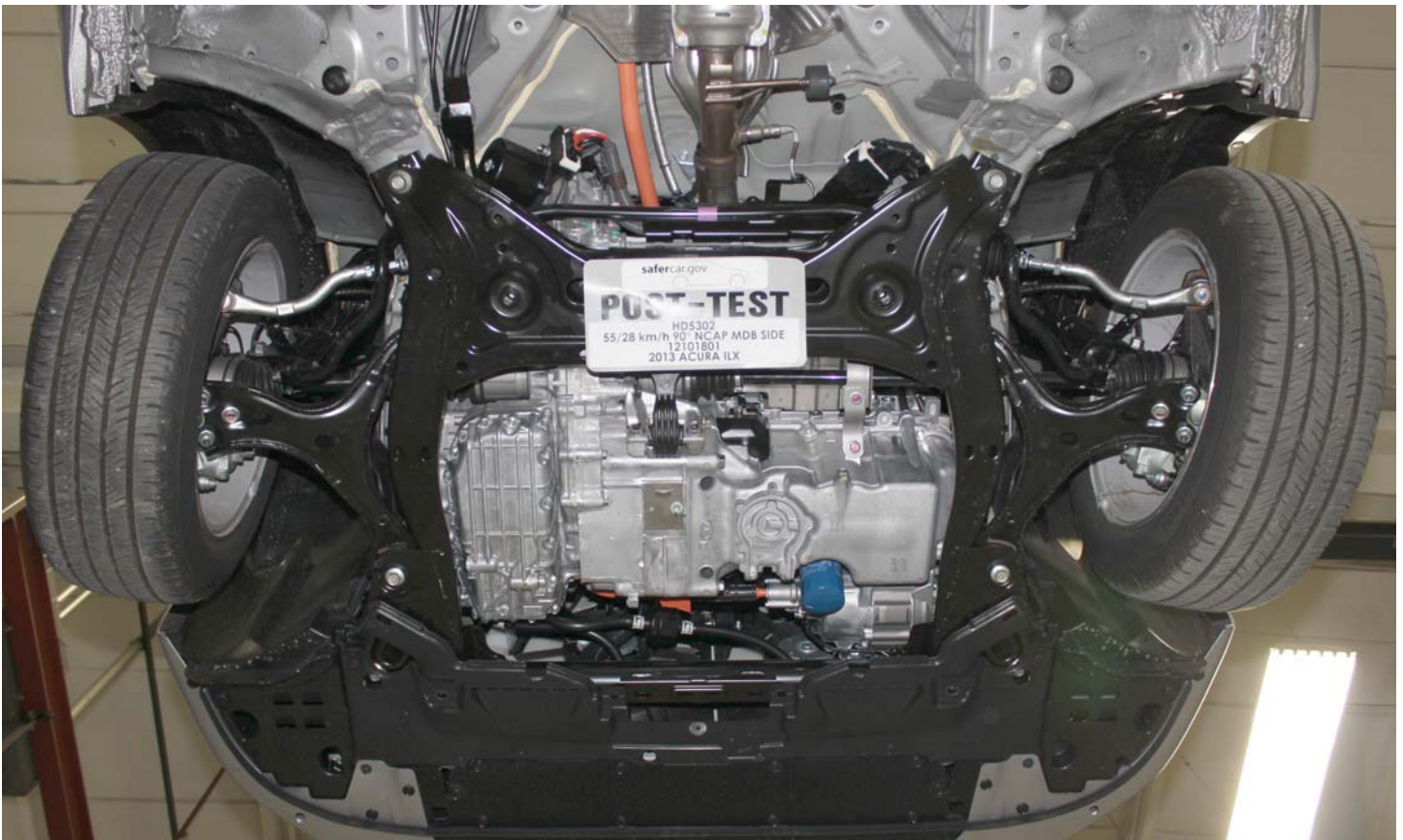
No. 014 Pre-Impact View of Propulsion Battery Module(s)



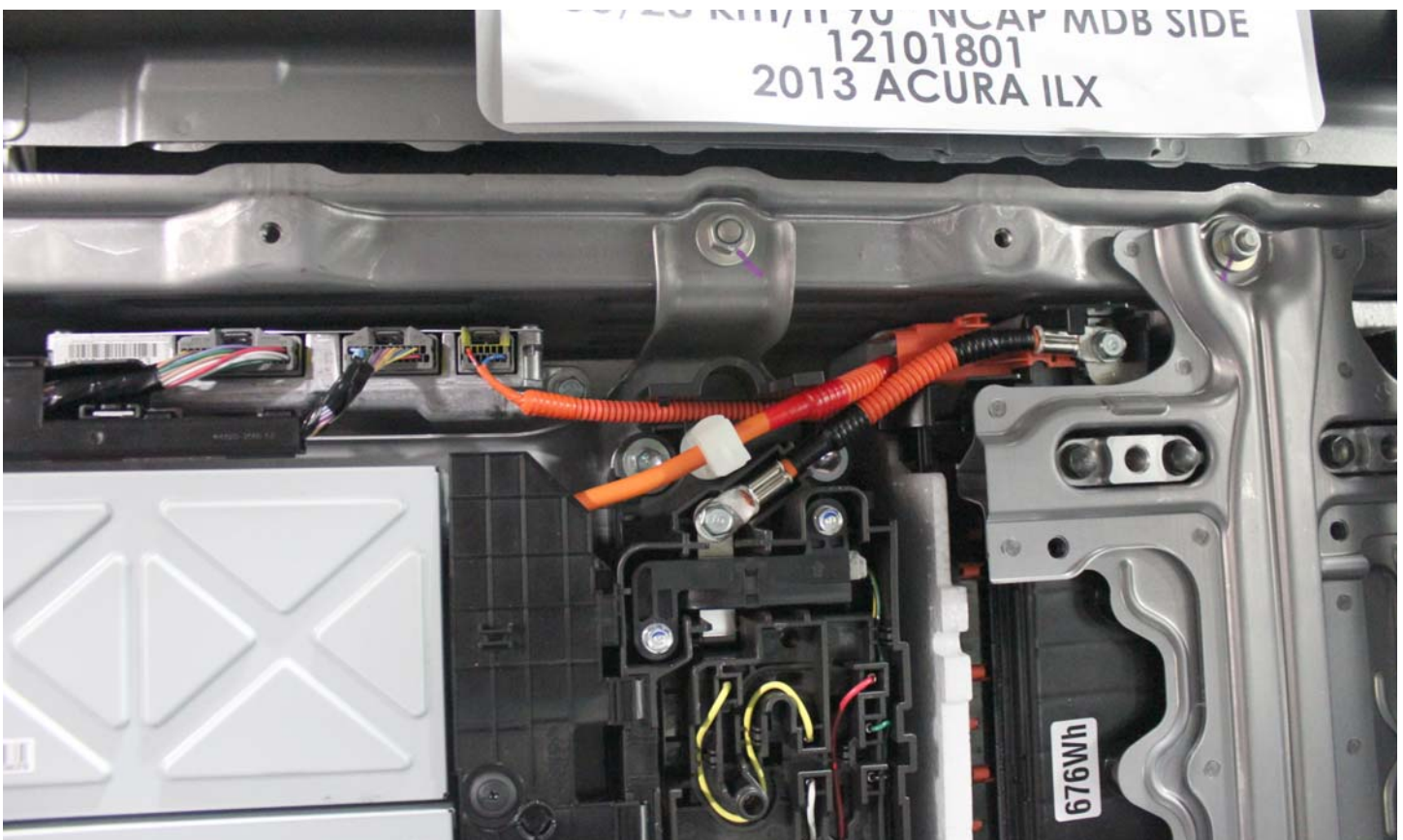
No. 015 Post-Impact View of Propulsion Battery Module(s)



No. 016 Pre-Impact View of Electric Propulsion Drive



No. 017 Post-Impact View of Electric Propulsion Drive



No. 018 Pre-Impact View of High Voltage Interconnect(s)



No. 019 Pre-Impact View Propulsion Battery Venting System(s)



No. 019a Pre-Impact View Propulsion Battery Venting System(s)



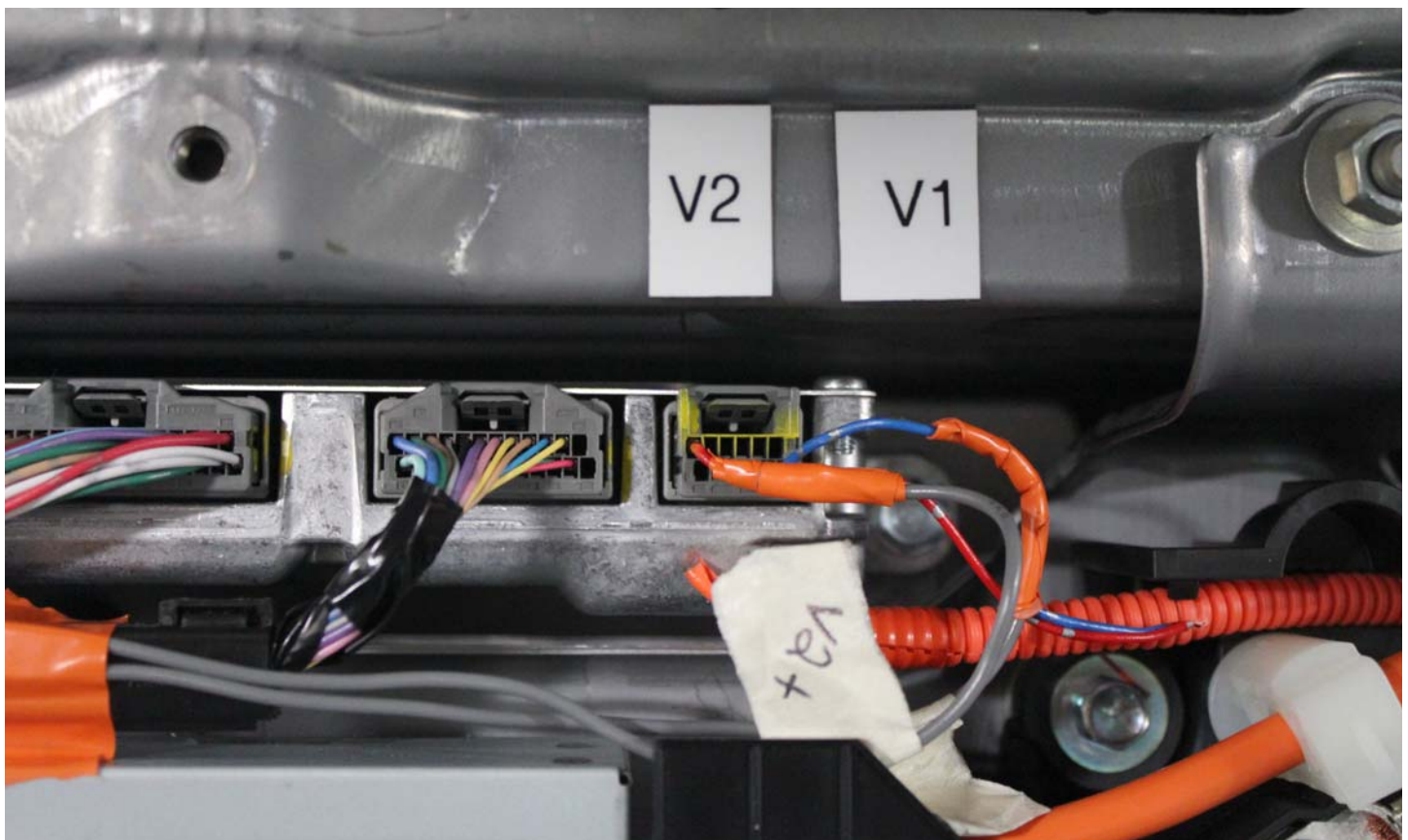
No. 020 Pre-Impact View of Other Visible Electric Propulsion Components



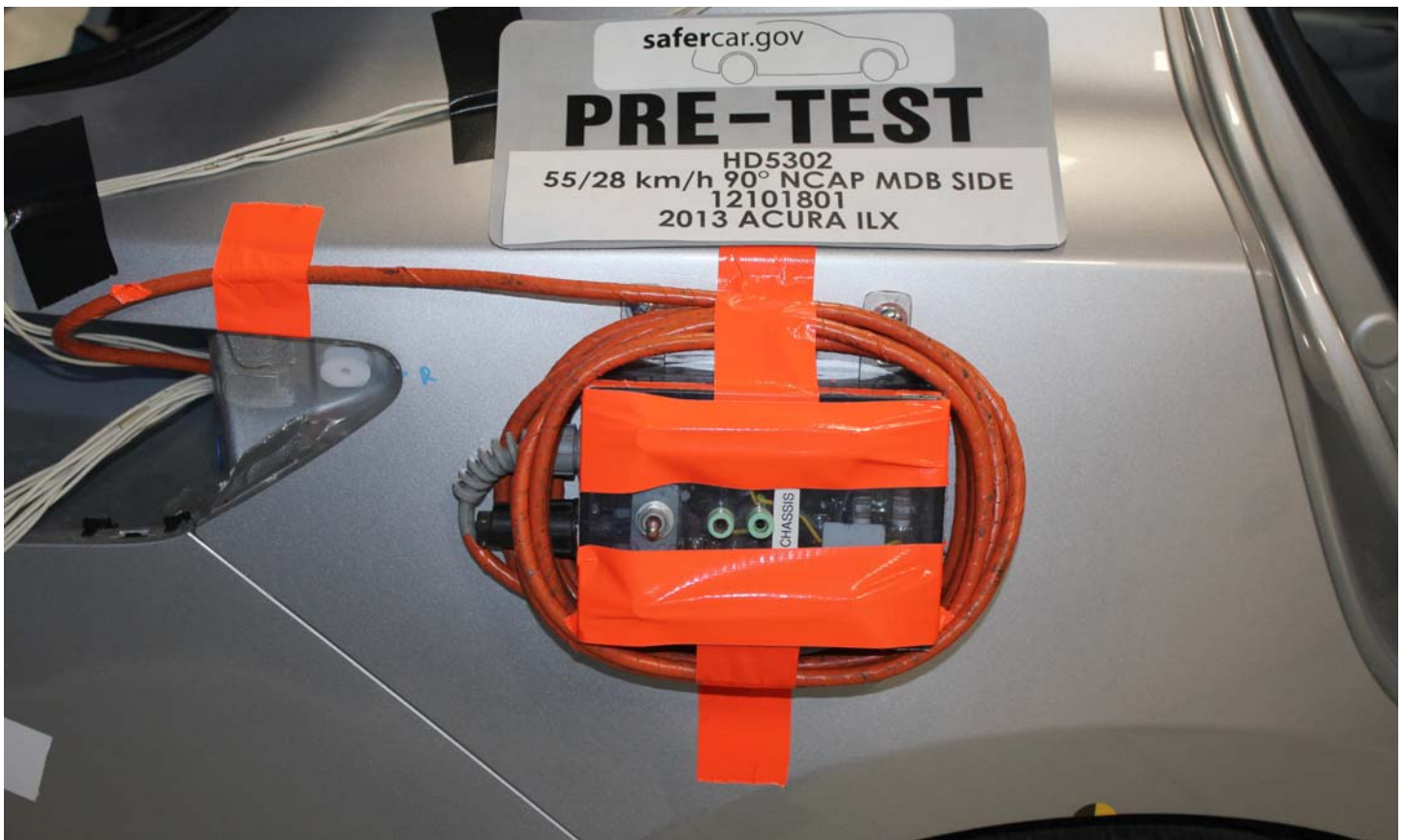
No. 021 Pre-Impact View of Ground Lead Attached



No. 022 Pre-Impact View of High Voltage Leads Attached



No. 023 Pre-Impact Close-Up View of High Voltage Leads Attached



No. 024 Pre-Impact View of Installed Impact Interface Port



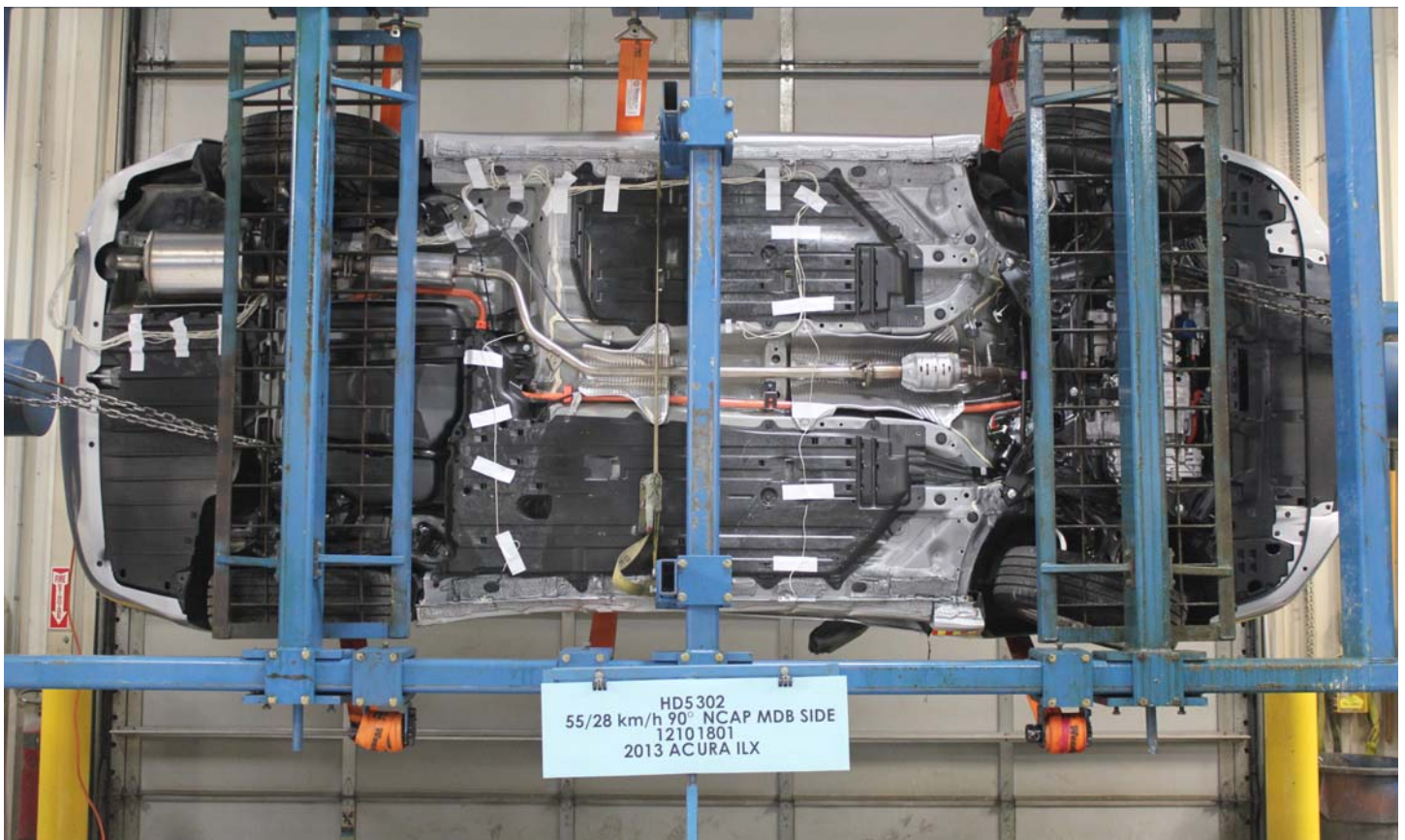
No. 025 Post-Impact View of Installed Impact Interface Port

PHOTOGRAPH NOT APPLICABLE

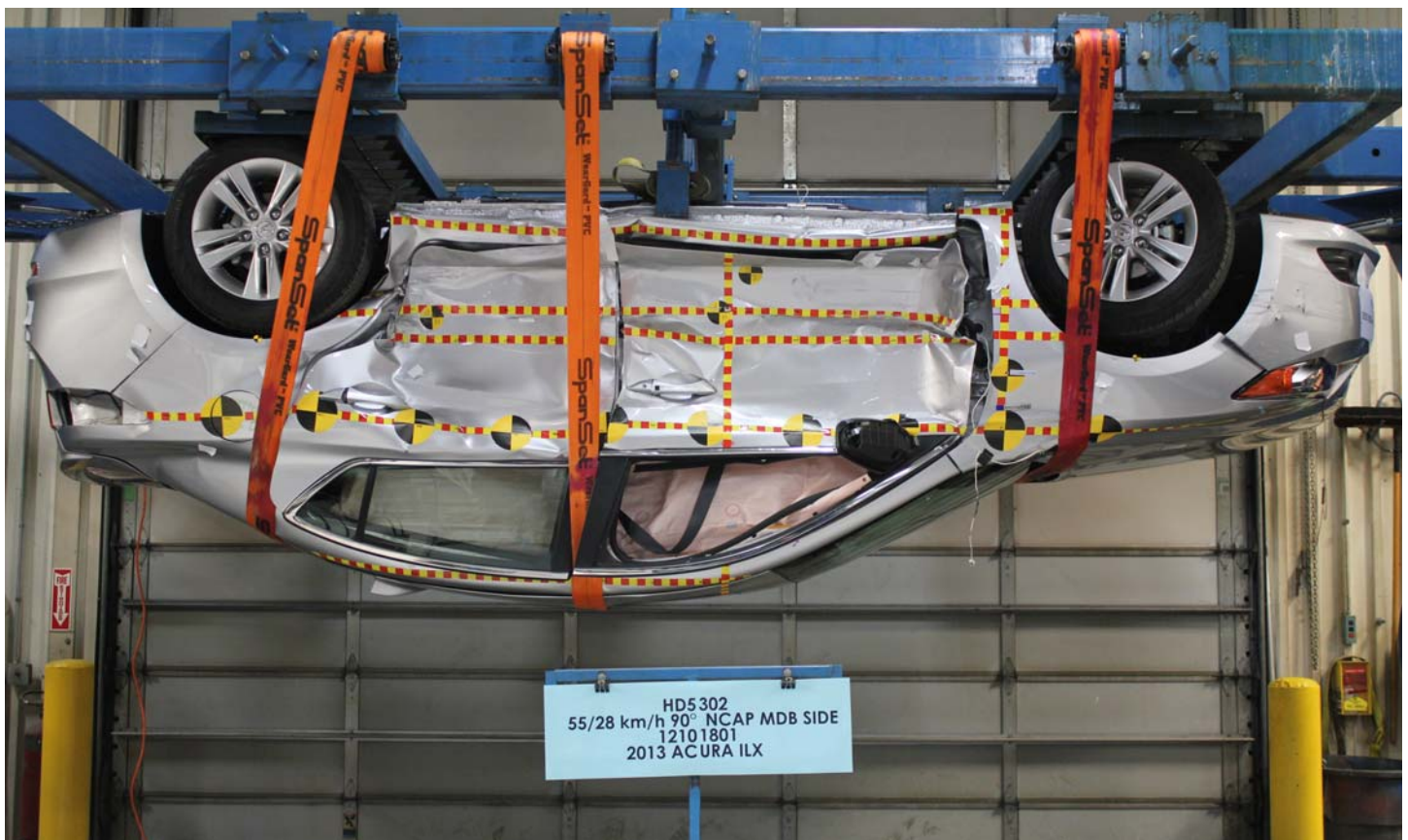
No. 026 Pre-Impact View of Other Test Devices

PHOTOGRAPH NOT APPLICABLE

No. 027 Post-Impact View of Other Test Devices



No. 028 FMVSS No. 305 Static Rollover at 90°



No. 029 FMVSS No. 305 Static Rollover at 180°



No. 030 FMVSS No. 305 Static Rollover at 270°



No. 031 FMVSS No. 305 Static Rollover at 360°



No. 032 Pre-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery



No. 033 Post-Impact View of the Vehicle Passenger Compartment Adjacent to Propulsion Battery

PHOTOGRAPH NOT APPLICABLE

No. 034 Post-Impact Propulsion Battery System Mounting and-or Intrusion Failure(s)

PHOTOGRAPH NOT APPLICABLE

No. 035 Post-Impact View of Battery Component Intrusion

PHOTOGRAPH NOT APPLICABLE

No. 036 Post-Impact View of Battery Module Movement or Retention Loss

PHOTOGRAPH NOT APPLICABLE

No. 037 Post-Impact View of Propulsion Battery Electrolyte Spillage Location

PHOTOGRAPH NOT APPLICABLE

No. 038 Post-Test View of Propulsion Battery Electrolyte Spillage Location



No. 039 As Delivered Right Front $\frac{3}{4}$ View of Impact Vehicle



No. 040 As Delivered Left Rear ¾ View of Impact Vehicle



No. 041 Vehicle's Certification Label



No. 042 Vehicle's Tire Information Placard