126-DRI-10-003
SAFETY COMPLIANCE TESTING FOR FMVSS 126
Electronic Stability Control Systems

Honda of America Manufacturing, Inc
2010 Honda Accord
NHTSA No. CA5307

DYNAMIC RESEARCH, INC.
355 Van Ness Avenue, STE 200
Torrance, California 90501

29 November, 2010

Final Report

Prepared Under Contract No.: DTNH22-08-D-00098

U. S. DEPARTMENT OF TRANSPORTATION
National Highway Traffic Safety Administration
Enforcement
Office of Vehicle Safety Compliance
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Washington, DC 20590

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16. Abstract A test was conducted on a 2010 Honda Accord , NHTSA No. CA5307, in accordance with the specifications of the Office of Vehicle Safety Compliance Test Procedure No. TP-126-02 for the determination of FMVSS 126 compliance. Test failures identified were as follows: None			
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1.0 PURPOSE OF COMPLIANCE TEST

The purpose of this test is to determine if the test vehicle, a 2010 Honda Accord, meets the minimum equipment and performance requirements stated in Federal Motor Vehicle Safety Standard (FMVSS) 126, "Electronic Stability Control Systems."

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS

Testing of the 2010 Honda Accord was conducted at Dynamic Research, Inc (DRI) in accordance with NHTSA TP-126-02, dated November 19, 2008.

The vehicle was inspected to ensure it was equipped with an ESC system that:

- Augments vehicle directional stability by applying and adjusting brake torques individually at each wheel to induce a correcting yaw moment to a vehicle;
- Is computer controlled with the computer using a closed-loop algorithm to limit vehicle oversteer and to limit vehicle understeer;
- Has a means to determine the vehicle's yaw rate and to estimate its side slip or side slip derivative with respect to time;
- Has a means to monitor driver steering inputs;
- Has an algorithm to determine the need, and a means to modify engine torque, as necessary, to assist the driver in maintaining control of the vehicle; and
- Is operational over the full speed range of the vehicle (except at vehicle speeds less than 20 km/h (12.4 mph), when being driven in reverse, or during system initialization).

The vehicle was subjected to a 0.7 Hz Sine with Dwell steering maneuver to ensure that it would meet the stability and responsiveness requirements of the standard as follows:

- At 1.0 second after completion of a required Sine with Dwell steering input, the yaw rate of the vehicle must not exceed 35 percent of the first peak value of yaw rate recorded after the steering wheel angle changes sign (between first and second peaks during the same test run).

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS (CONTINUED)

- At 1.75 seconds after completion of a required Sine with Dwell steering input, the yaw rate of the vehicle must not exceed 20 percent of the first peak value of yaw rate recorded after the steering wheel angle changes sign (between first and second peaks during the same test run).

- The lateral displacement of the vehicle center of gravity with respect to its initial straight path must be at least 1.83 m (6 feet) (for vehicles with a GVWR of 3,500kg (7,716 lb) or less) when computed 1.07 seconds after the Beginning of Steer (BOS) at the specified steering wheel angles.

System malfunction simulations were executed to verify vehicle could identify and indicate a malfunction.

The vehicle's ESC System appears to meet the performance and equipment requirements as required by FMVSS 126. The test results are summarized on the following summary sheet.

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS (CONTD)

Data Summary Sheet (Page 1 of 2)

Vehicle: *2010 Honda Accord*

NHTSA No. *CA5307* VIN: *1HGCP2F80AA083721*

Vehicle Type: *Passenger Car* Manufacture Date: *1/10*

Laboratory: *Dynamic Research, Inc.*

REQUIREMENTS:	**PASS/FAIL**
ESC Equipment and Operational Characteristics (Data Sheet 2)	
The vehicle is to be equipped with an ESC system that meets the equipment and operational characteristics requirements. (S126, S5.1, S5.6)	***PASS***
ESC Malfunction Telltale (Data Sheet 3)	
Vehicle is equipped with a telltale that indicates one or more ESC system malfunctions. (S126, S5.3)	***PASS***
"ESC Off" and other System Controls and Telltale (Data Sheet 3,4)	
Vehicle is equipped with an ESC off telltale indicating the vehicle has been put into a mode that renders the ESC system unable to satisfy the performance requirements of the standard, if such a mode exists. (S5.5.1)	***PASS***
If provided, off control and other system controls as well as the ESC off telltale meets the operational requirements (S126, S5.4, S5.4.1,S5.4.2, S5.5.4, and S5.5.9)	***PASS***

2.0 TEST PROCEDURE AND DISCUSSION OF RESULTS (CONTD)

Data Summary Sheet (Page 2 of 2)

REQUIREMENTS:	PASS/FAIL
Vehicle Lateral Stability (Data Sheet 8)	
Yaw Rate Ratio at 1 second after COS is less than 35% of peak value. (S126, S5.2.1)	***PASS***
Yaw Rate Ratio at 1.75 seconds after COS is less than 20% of peak value. (S126, S5.2.2)	***PASS***
Vehicle Responsiveness (Data Sheet 8)	
Lateral displacement at 1.07 seconds after BOS is at least 1.83 m (6 feet) for vehicles with a GVWR of 3,500kg (7,716 lb) or less, and 1.52 m (5 feet) for vehicles with a GVWR greater than 3,500 Kg (7,716 lb). (S126, S5.2.3)	***PASS***
ESC Malfunction Warning (Data Sheet 9)	
Warning is provided to driver after malfunction occurrence. (S126. S5.3)	***PASS***
Malfunction telltale stayed illuminated as long as malfunction existed and must extinguish after malfunction was corrected. (S126, S5.3.7)	***PASS***

3.0 TEST DATA

Data Sheet 1 (Page 1 of 2)

TEST VEHICLE INSPECTION AND TEST PREPARATION

Vehicle: *2010 Honda Accord Passenger Car*

NHTSA No. *CA5307* Data Sheet Completion Date: *2/19/2010*

VIN *1HGCP2F80AA083721* Manufacture Date: *1/10*

GVWR (kg): *2010* Front GAWR (kg): *1090* Rear GAWR (kg): *935*

Seating Positions Front: *2* Mid: Rear: *3*

Odometer reading at time of inspection: *19 miles (30.4 km)*

DESIGNATED TIRE SIZE(S) FROM VEHICLE LABELING:

Front axle: *P225/50 R17* Rear axle: *P225/50 R17*

INSTALLED TIRE SIZE(S) ON VEHICLE (from tire sidewall)

		Front Axle		Rear Axle
	Tire Manufacturer:	*Michelin*		*Michelin*
	Tire Model:	*Pilot HXMXM4*		*Pilot HXMXM4*
	Tire Size:	*P225/50 R17*		*P225/50 R17*
TIN	Left Front:	*B90A VJLX 0210*	Right Front:	*B90A VJLX 0210*
	Left Rear:	*B90A VJLX 0210*	Right Rear:	*B90A VJLX 0210*

Are installed tire sizes same as labeled tire sizes? *Yes*
If no, contact COTR for further guidance

DRIVE CONFIGURATION(S):(mark all that apply)

[X] Two Wheel Drive (2WD) [X] Front Wheel Drive [ ] Rear Wheel Drive

[ ] All Wheel Drive (AWD)

[ ] Four Wheel Drive Automatic - differential no locked full time (4WD Automatic)

[ ] Four Wheel Drive (High Gear Locked Differential 4WD HGLD)

[ ] Four Wheel Drive Low Gear (4WD Low)

[ ] Other (Describe)

3.0 TEST DATA (CONTD)

Data Sheet 1 (Page 2 of 2)
TEST VEHICLE INSPECTION AND TEST PREPARATION

DRIVE CONFIGURATIONS AND MODES: (ex. default, performance, off)

(For each of the vehicle's drive configurations identify available operating modes)

Drive Configuration: *Front Wheel Drive - Default*
Mode: *Default - ESC on*
Drive Configuration: _____
Mode: _____
Drive Configuration: _____
Mode: _____

VEHICLE STABILITY SYSTEMS (Check applicable technologies):

List other systems:

- [X] ESC
- [X] Traction Control
- [ ] Roll Stability Control
- [ ] Active Suspension
- [X] Electronic Throttle Control
- [ ] Active Steering
- [X] ABS

REMARKS:

RECORDED BY: *J Lenkeit* DATE RECORDED: *2/19/2010*
APPROVED BY: *B Kebschull* DATE APPROVED: *2/22/2010*

3.0 TEST DATA (CONTD)

Data Sheet 2 (Page 1 of 2)
ESC SYSTEM HARDWARE AND OPERATIONAL CHARACTERISTICS

Vehicle: *2010 Honda Accord Passenger Car*

NHTSA No *CA5307* Data Sheet Completion Date: *3/2/2010*

ESC SYSTEM IDENTIFICATION

Manufacturer/Model *Nissin Kogyo C0, Ltd/NK21V*

ESC SYSTEM HARDWARE (Check applicable hardware)

[X] Electronic Control Unit	[X] Hydraulic Control Unit
[X] Wheel Speed Sensors	[X] Steering Angle Sensor
[X] Yaw Rate Sensor	[X] Lateral Acceleration Sensor

List other Components: _____

ESC OPERATIONAL CHARACTERISTICS

System is capable of generating brake torque at each wheel — [X] Yes (Pass) / [ ] No (Fail)
List and describe Components: *Brake control modulator - controls pressure to each wheel independently*

System is capable of determining yaw rate — [X] Yes (Pass) / [ ] No (Fail)
List and describe Components: *Yaw Rate Sensor*

System is capable of monitoring driver steering input — [X] Yes (Pass) / [ ] No (Fail)
List and describe Components: *Steering Wheel Sensor*

System is capable of estimating side slip or side slip derivative — [X] Yes (Pass) / [ ] No (Fail)
List and describe Components: *VSA Modulator (ESC Computer) collects actual vehicle data as follows: Vehicle speed from wheel speed sensor; Steering angle from steering angle sensor; Lateral acceleration and Yaw rate from yaw rate – lateral acceleration sensor.*
Vehicle side slip derivative (with respect to time) is calculated from these signals.

3.0 TEST DATA (CONTD)

Data Sheet 2 (Page 2 of 2)
ESC SYSTEM HARDWARE AND OPERATIONAL CHARACTERISTICS

ESC OPERATIONAL CHARACTERISTICS (continued)

System is capable of modifying engine torque during ESC activation. Method used to modify torque: *Engine torque is modified by modifying ignition timing and/or fuel delivery.*

X Yes (Pass)
___ No (Fail)

System is capable of activation at speeds of 20 km/h (12.4 mph) and higher

Speed system becomes active: *15 km/h*

X Yes (Pass)
___ No (Fail)

System is capable of activation during the following driving phases:

- acceleration
- braking
- coasting
- during activation of ABS or traction control

X Yes (Pass)
___ No (Fail)

Driving phases during which ESC is capable of activation:
Acceleration, Deceleration, Coasting, ABS operation, Traction control operation. Not reverse driving

Vehicle manufacturer submitted documentation explaining how the ESC mitigates understeer

X Yes (Pass)
___ No (Fail)

DATA INDICATES COMPLIANCE: **X** Yes (Pass)
___ No (Fail)

REMARKS:

RECORDED BY: *P Broen* DATE RECORDED: *3/2/2010*
APPROVED BY: *J Lenkeit* DATE APPROVED: *3/8/2010*

3.0 TEST DATA (CONTD)

Data Sheet 3 (Page 1 of 2)
ESC MALFUNCTION AND OFF TELLTALES

Vehicle: *2010 Honda Accord Passenger Car*

NHTSA No. *CA5307* Data Sheet completion date: *3/5/2010*

ESC Malfunction Telltale

Vehicle is equipped with malfunction telltale? *Yes*

Telltale Location: *Instrument Cluster, lower center of tachometer (Fig 5.6).*

Telltale Color: *Amber*

Telltale symbol or abbreviation used

or **ESC**

[ ] Vehicle uses this symbol

[ ] Vehicle uses this abbreviation

[X] Neither symbol or abbreviation is used

If different than identified above, make note of any message, symbol or abbreviation used.

Two telltales illuminated simultaneously indicate a system malfunction. The first telltale "VSA" is the Vehicle Stability Assist indicator and the second is the VSA activation indicator represented by a triangle with an exclamation point inside (see Figure 5.6)

Is telltale part of a common space? *No*

Is telltale also used to indicate activation of the ESC system? *Yes*

If yes explain telltale operation during ESC activation:

The VSA activation indicator (triangle with exclamation) comes on during ESC activation

3.0 TEST DATA (CONTD)

Data Sheet 3 (Page 2 of 2)
ESC MALFUNCTION AND OFF TELLTALES

"ESC OFF" Telltale (if provided)

Vehicle is equipped with "ESC OFF" telltale? *Yes*

Is "ESC Off" telltale combined with "ESC Malfunction" telltale utilizing a two part telltale? *No*

Telltale Location: *Instrument Cluster, lower center of tachometer (Fig 5.6).*

Telltale Color: *Amber*

Telltale symbol or abbreviation used

or **ESC OFF**

- [ ] Vehicle uses this symbol
- [ ] Vehicle uses this abbreviation
- [x] Neither symbol or abbreviation is used

If different than identified above, make note of any message, symbol or abbreviation used. *The VSA activation indicator (triangle with exclamation point) comes on when the VSA system is turned off.*

Is telltale part of a common space? *No*

DATA INDICATES COMPLIANCE ***Yes***

(Vehicle is compliant if equipped with a malfunction telltale)

Remarks:

RECORDED BY:	*P Broen*	DATE RECORDED:	*3/5/2010*
APPROVED BY:	*J Lenkeit*	DATE APPROVED:	*3/12/2010*

3.0 TEST DATA (CONTD)

Data Sheet 4 (Page 1 of 3)
ESC AND ANCILLARY SYSTEM CONTROLS

Vehicle: *2010 Honda Accord Passenger Car*

NHTSA No. *CA5307* Data Sheet completion date: *3/4/2010*

"ESC OFF" Controls Identification and Operational Check:

Is the vehicle equipped with a control or controls whose purpose is to deactivate the ESC system or place the ESC system in a mode or modes that may no longer satisfy the performance requirements of the standard? **X** Yes ___ No

Type of control or controls provided? (mark all that apply)

- [X] Dedicated "ESC Off" Control
- [ ] Multi-functional control with an "ESC Off" mode
- [ ] Other (describe)

Identify each control location, labeling and selectable modes.

First Control: Location *Lower left of dash (Fig 5.7)*
Labeling *VSA OFF*
Modes *ESC off/on*

Second Control: Location
Labeling
Modes

Identify standard or default drive configuration *FWD*

Verify standard or default drive configuration selected **X** Yes ___ No

Does the "ESC Off" telltale illuminate upon activation of the dedicated ESC off control or selection of the "ESC Off" mode on the multi-function control?

X Yes ___ No (Fail)

Does the "ESC Off" telltale extinguish when the ignition is cycled from "on" ("Run") to "Lock" or "Off" and then back again to the "On" ("Run") position?

X Yes ___ No (Fail)

If no, describe how the "Off" control functions

3.0 TEST DATA (CONTD)

Data Sheet 4 (Page 2 of 3)
ESC AND ANCILLARY SYSTEM CONTROLS

If a multi-function control is provided, cycle through each mode setting on the control and record which modes illuminate the "ESC Off" telltale. Also, for those modes that illuminate the ESC Off" telltale identify if the telltale extinguishes upon cycling the ignition system.

Control Mode	"ESC Off" telltale illuminates upon activation of control? (Yes/No)	"ESC Off" telltale extinguishes upon cycling ignition? (Yes/No)
NA		

For each mode that illuminates the "ESC Off" telltale, did the telltale extinguish when the ignition was cycled from "On" ("Run") to "Lock" or "Off" and then back again to the "On" ("Run") position?

__X__ NA ____ Yes ____ No

Other System Controls that have an ancillary effect on ESC Operation:

Is the vehicle equipped with any ancillary controls that upon activation may deactivate the ESC system or place the ESC system in a mode or modes that may no longer satisfy the performance requirements of the standard? ____ Yes __X__ No

Ancillary Control: System *NA*

Control Description _____

Labeling _____

Ancillary Control: System _____

Control Description _____

Labeling _____

Ancillary Control: System _____

Control Description _____

Labeling _____

3.0 TEST DATA (CONTD)

Data Sheet 4 (Page 3 of 3)
ESC AND ANCILLARY SYSTEM CONTROLS

Activate each control listed above and record whether the control illuminates the "ESC Off" telltale. Also, record warnings or messages provided regarding the ESC system.

Ancillary Control	Control Activates "ESC Off" Telltale? (Yes/No)	Warnings or Messages Provided
NA		

For those controls that illuminate the "ESC Off" telltale above identify if the "ESC Off" telltale extinguishes upon cycling the ignition system.

Ancillary Control	"ESC Off" telltale extinguishes upon cycling ignition? (Yes/No)
NA	

For each control that illuminates the "ESC Off" telltale, did the telltale extinguish when the ignition is cycled from "On" ("Run") to "Lock" or "Off" and then back again to the "On" ("Run") position? If activating the control places the vehicle into a low-range four-wheel drive configuration designed for low-speed, off–road driving, the ESC system may remain turned off after the ignition has been cycled off and then back on and therefore the "ESC Off" telltale may not extinguish.

X Yes ____ No (Fail)

DATA INDICATES COMPLIANCE: PASS

Remarks:

RECORDED BY: *P Broen* DATE RECORDED: *3/4/2010*

APPROVED BY: *J Lenkeit* DATE APPROVED: *3/12/2010*

3.0 TEST DATA (CONTD)

Data Sheet 5 (Page 1 of 3)
TEST TRACK AND VEHICLE DATA

Vehicle: *2010 Honda Accord Passenger Car*

NHTSA No. *CA5307* Data Sheet completion date: *3/3/2010*

Test Track Requirements: Test surface slope (0-1%): *0.5%*

Peak Friction Coefficient (at least 0.9) *0.93*

Test track data meets requirements: *Yes* If no, explain:

Full Fluid Levels: Fuel *Yes* Other Fluids *Yes* (specify)

Coolant *Yes* *Oil, Washer, transmission, brakes*

Tire Pressures:

Required; Front Axle *220* KPA Rear Axle *220* KPA

Actual; LF *220* KPA RF *220* KPA

LR *220* KPA RR *220* KPA

Vehicle Dimensions: Front Track Width *157.8* cm Wheelbase *279.9* cm

Rear Track Width *157.8* cm

Vehicle Weight Ratings: GAWR Front *1090.0* KG GAWR Rear *935.0* KG

Unloaded Vehicle Weight (UVW):

Front Axle *930.8* KG Left Front *474.0* KG Right Front *456.8* KG

Rear Axle *608.3* KG Left Rear *302.1* KG Right Rear *306.2* KG

Total UVW *1539.1* KG

Baseline Weight and Outrigger Selection (only for MPVs, Trucks, Buses)

Calculated baseline weight (UVW + 73kg) *1612.1* KG

Outrigger size required ("Standard" or "Heavy") *None*

Standard - Baseline weight under 2772 kg (6000 lb)
Heavy - Baseline weight equal to or greater than 2772 kg (6000 lb)

3.0 TEST DATA (CONTD)

Data Sheet 5 (Page 2 of 3)
TEST TRACK AND VEHICLE DATA

UVW with Outriggers: (only for MPVs, Trucks, Buses)

Front axle *NA* KG Left front *NA* KG Right front *NA* KG

Rear axle *NA* KG Left rear *NA* KG Right rear *NA* KG

Total UVW with outriggers *NA* KG

Loaded Vehicle Weight w/Driver and Instrumentation (no Ballast)

Front axle *996.5* KG Left front *519.8* KG Right front *476.7* KG

Rear axle *681.8* KG Left rear *341.6* KG Right rear *340.2* KG

Vehicle Weight *1678.3* KG

Ballast Required =

[Total UVW with Outriggers (if applicable)]		+ *168*	KG	- [Loaded Weight w/Driver and Instrumentation)]	
= *1539.1*	KG	+ *168*	KG	- 1678.3	KG

= *28.8* KG

Total Loaded Vehicle Weight w/Driver and Instrumentation and Ballast

Front axle *1011.1* KG Left front *524.8* KG Right front *486.3* KG

Rear axle *698.1* KG Left rear *345.2* KG Right rear *352.9* KG

Total UVW *1709.2* KG

3.0 TEST DATA (CONTD)

Data Sheet 5 (Page 3 of 3)
TEST TRACK AND VEHICLE DATA

Center of Gravity and Inertial Sensing System Location at Loaded Vehicle Condition:

x-distance (longitudinal)	Point of reference is the front axle centerline. (Positive from front axle toward rear of vehicle.)
y-distance (lateral)	Point of reference is the vehicle centerline. (Positive from the center toward the right.)
z-distance (vertical)	Point of reference is the ground plane. (Positive from the ground up.)

Locations:

	Center of Gravity				Inertial Sensing System			
x-distance	*45.0*	in	*114.3*	cm	*69.7*	in	*177.0*	cm
y-distance	*-0.6*	in	*-1.5*	cm	*-0.2*	in	*-0.5*	cm
z-distance	*22.2*	in	*56.4*	cm	*10.0*	in	*25.4*	cm
Roof Height					*58.452*	in	*148.5*	cm
Distance between ultrasonic sensors					*90.5*	in	*229.9*	cm

Remarks*: Ballast consisted of barbell weights positioned on rear passenger floor*

RECORDED BY: *B. Kebschull* DATE RECORDED: *3/3/2010*
APPROVED BY: *J Lenkeit* DATE APPROVED: *3/5/2010*

3.0 TEST DATA (CONTD)

Data Sheet 6 (Page 1 of 3)
BRAKE AND TIRE CONDITIONING

Vehicle: *2010 Honda Accord Passenger Car*

NHTSA No. *CA5307*

Measured tire pressure: LF *240* KPA RF *233* KPA

LR *234* KPA RR *243* KPA

Wind Speed *1.5* m/s (10 m/sec (22 mph) max for passenger cars; 5m/sec (11 mph) max for MPVs and trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) *19* °C

Brake Conditioning Time: *10:25:00 AM* Date: *3/3/2010*

56 km/h (35 mph) Brake Stops

Number of stops executed (10 required) *10* Stops

Observed deceleration rate range (.5g target) *0.45 - 0.55* g

72 km/h (45 mph) Brake Stops

Number of stops executed (3 required) *3* Stops

Number of stops ABS activated (3 required) *3* Stops

Observed deceleration rate range *0.85 - 0.95* g

72 km/h (45 mph) Brake Cool Down Period

Duration of cool down period (5 minutes min.) *5* Minutes

3.0 TEST DATA (CONTD)

Data Sheet 6 (Page 2 of 3)
BRAKE AND TIRE CONDITIONING

Tire Conditioning series No. 1 Time: *11:00:00 AM* Date: *3/3/2010*

Measured cold tire pressure LF *243* KPA RF *248* KPA

LR *242* KPA RR *238* KPA

Wind Speed *0.7* m/s (10 m/sec (22 mph) max for passenger cars; 5m/sec (11 mph) max for MPVs and trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) *20.5*°C

30 meter (100 ft) Diameter Circle Maneuver				
Test Run	Steering Direction	Target Lateral Acceleration (g)	Observed Lateral Acceleration (g)	Observed Vehicle Speed (Km/h)
1-3	Clockwise	0.5 – 0.6	*0.5 - 0.6*	*32.8 - 33.6*
4-6	Counterclockwise	0.5 – 0.6	*0.5 - 0.6*	*32.0 - 33.6*

5-1 Hz Cycle Sinusoidal Steering Maneuver to Determine Steering Wheel Angle for 0.5-0.6 g Lateral Acceleration					
Test Run	Data File	Vehicle Speed Km/h(mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1	3	56 ± 2 (35 ± 1)	*60*	0.5 - 0.6	*0.44*
2	4	56 ± 2 (35 ± 1)	*80*	0.5 - 0.6	*0.54*
3		56 ± 2 (35 ± 1)		0.5 - 0.6	
4		56 ± 2 (35 ± 1)		0.5 - 0.6	

Steering wheel angle that corresponds to a peak 0.5-0.6 g lateral acceleration:
80 **degrees**

10-1 Hz Cycle Sinusoidal Steering Maneuver					
Test Run	Data File	Vehicle Speed Km/h (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1-3	*5-7*	56 ± 2 (35 ± 1)	*80* (cycles 1-10)	0.5 - 0.6	*0.54*
4	*8*	56 ± 2 (35 ± 1)	*80* (cycles 1-9)	0.5 - 0.6	*0.54*
			160 (cycle10)*	NA	*0.80*

* The steering wheel angle used for cycle 10 should be twice the angle used for cycles 1-9

3.0 TEST DATA (CONTD)

Data Sheet 6 (Page 3 of 3)
BRAKE AND TIRE CONDITIONING

Tire Conditioning series No. 2 Time: *12:38:00 PM* Date: *3/3/2010*

Measured cold tire pressure LF *249* KPA RF *254* KPA

LR *246* KPA RR *244* KPA

Wind Speed *1.7* m/s (10 m/sec (22 mph) max for passenger cars; 5m/sec (11 mph) max for MPVs and trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) *19.8* °C

30 meter (100 ft) Diameter Circle Maneuver				
Test Run	Steering Direction	Target Lateral Acceleration (g)	Observed Lateral Acceleration (g)	Observed Vehicle Speed (Km/h)
1-3	Clockwise	0.5 - 0.6	*0.5-0.6*	*32.8 - 33.6*
4-6	Counterclockwise	0.5 - 0.6	*0.5-0.6*	*32.8 - 33.6*

Steering wheel angle that corresponds to a peak 0.5-0.6 g lateral acceleration:

80 **degrees**

10-1 Hz Cycle Sinusoidal Steering Maneuver					
Test Run	Data File	Vehicle Speed Km/h (mph)	Steering Wheel Angle (degrees)	Target Peak Lateral Acceleration (g)	Observed Peak Lateral Acceleration (g)
1-3	*17-19*	56 ± 2 (35 ± 1)	*80* (cycles 1-10)	0.5 - 0.6	*0.54*
4	*20*	56 ± 2 (35 ± 1)	*80* (cycles 1-9)	0.5 - 0.6	*0.54*
			160 (cycle 10)*	NA	*0.80*

* The steering wheel angle used for cycle 10 should be twice the angle used for cycles 1-9

Remarks:

RECORDED BY: *B. Kebschull* DATE RECORDED: *3/3/2010*

APPROVED BY: *J Lenkeit* DATE APPROVED: *3/12/2010*

3.0 TEST DATA (CONTD)

Data Sheet 7 (Page 1 of 2)
SLOWLY INCREASING STEER (SIS) MANEUVER

Vehicle: *2010 Honda Accord Passenger Car*

NHTSA No. *CA5307*

Measured tire pressure: LF *244* KPA RF *242* KPA
LR *249* KPA RR *240* KPA

Wind Speed *0.9* m/s

(10 m/sec (22 mph) max for passenger cars; 5m/sec (11 mph) max for MPVs and trucks)

Ambient Temperature (7°C (45°F) - 40°C (104°F)) *20.2* °C

Selected drive configuration *Default (FWD)*

Selected Mode: *Default ESC on*

Preliminary Left Steer Maneuver:

Lateral Acceleration measured at 30 degrees steering wheel angle

$a_{y,30degrees}$ = *0.35* g

Assuming a linear relationship the following ratio should be used to calculate the steering wheel angle at 0.55g:

$$\frac{30\,\text{degrees}}{a_{\text{y,30 degrees}}} = \frac{\delta_{SIS}}{0.55\,\text{g}}$$

δ_{sis} = *47.1* degrees (@.55g)

δ_{sis} = *50* degrees (rounded)

Steering Wheel Angle at Corrected 0.3g Lateral Acceleration:

Maneuver	Initial Steer Direction	Time Clock (5 min max between runs)	Steering Wheel Angle to nearest 0.1° (degrees)	Data Run	Good/NG
1	Left	*11:45:00 AM*	*28.7*	*11*	*Good*
2	Left	*11:49:00 AM*	*28.7*	*12*	*Good*
3	Left	*11:55:00 AM*	*29.0*	*13*	*Good*
4	Left				
5	Left				
1	Right	*12:00:00 PM*	*28.1*	*14*	*Good*
2	Right	*12:03:00 PM*	*28.7*	*15*	*Good*
3	Right	*12:08:00 PM*	*28.2*	*16*	*Good*
4	Right				
5	Right				

3.0 TEST DATA (CONTD)

Data Sheet 7 (Page 2 of 2)
SLOWLY INCREASING STEER (SIS) MANEUVER

Average Overall Steering Wheel Angle:

$$\delta_{0.3\ g,\ overall} = (\left| \delta_{0.3\ g,\ left\ (1)} \right| + \left| \delta_{0.3\ g,\ left\ (2)} \right| + \left| \delta_{0.3\ g,\ left\ (3)} \right| + \delta_{0.3\ g,\ right\ (1)} + \delta_{0.3\ g,\ right\ (2)} + \delta_{0.3\ g,\ right\ (3)}) / 6$$

$\delta_{0.3\ g,\ overall}$ = *28.6* degrees

[to nearest 0.1 degree]

Remarks:

RECORDED BY: *B. Kebschull* DATE RECORDED: *3/3/2010*
APPROVED BY: *J Lenkeit* DATE APPROVED: *3/12/2010*

3.0 TEST DATA (CONTD)

Data Sheet 8 (Page 1 of 3)
VEHICLE LATERAL STABILITY AND RESPONSIVENESS

Vehicle: *2010 Honda Accord Passenger Car*

NHTSA No. *CA5307* Data sheet completion date: *3/3/2010*

Tire conditioning completed	[X] Yes	[ ] No
ESC system is enabled	[X] Yes	[ ] No
On track calibration checks have been completed	[X] Yes	[ ] No
On track static data file for each sensor obtained	[X] Yes	[ ] No

Selected Drive Configuration: *Default (FWD)*

Selected Mode: *Default - ESC on*

Overall steering wheel angle ($\delta_{0.3\ g,\ overall}$) *28.6* degrees

Lateral Stability Test Series No. 1 – Counterclockwise Initial Steer Direction

Maneuver #	Clock Time (1.5 – 5.0 min max between runs)	Commanded Steering Wheel Angle[1]		Yaw Rates (degrees/sec)			YRR at 1.0 sec after COS [≤ 35%]		YRR at 1.75 sec after COS [≤ 20%]	
		Scalar (* $\delta_{0.3\ g}$)	Angle (degrees)	$\dot{\psi}_{Peak}$	$\dot{\psi}_{1.0sec}$	$\dot{\psi}_{1.75sec}$	%	Pass/Fail	%	Pass/Fail
22	12:56 PM	1.5	43.0	12.89	-0.19	-0.17	-1.51	PASS	-1.33	PASS
23	12:59 PM	2.0	57.2	16.64	-0.46	-0.41	-2.75	PASS	-2.47	PASS
24	1:04 PM	2.5	72.1	20.98	-0.14	-0.18	-0.68	PASS	-0.84	PASS
25	1:06 PM	3.0	86.2	24.97	-0.19	-0.19	-0.78	PASS	-0.75	PASS
26	1:10 PM	3.5	99.9	29.66	-0.20	-0.20	-0.66	PASS	-0.69	PASS
27	1:13 PM	4.0	114.0	35.07	-0.51	-0.31	-1.45	PASS	-0.89	PASS
28	1:16 PM	4.5	129.1	39.21	0.02	0.02	0.05	PASS	0.04	PASS
29	1:21 PM	5.0	143.0	43.41	0.03	-0.02	0.07	PASS	-0.05	PASS
30	1:24 PM	5.5	157.1	45.08	0.04	-0.08	0.09	PASS	-0.18	PASS
31	1:27 PM	6.0	171.9	48.87	0.00	-0.18	-0.01	PASS	-0.36	PASS
32	1:29 PM	6.5	186.0	51.41	-0.09	-0.18	-0.18	PASS	-0.35	PASS
33	1:32 PM	7.0	199.9	53.68	-0.12	-0.04	-0.22	PASS	-0.08	PASS
34	1:37 PM	7.5	213.8	54.04	0.07	-0.10	0.14	PASS	-0.19	PASS
35	1:39 PM	8.0	228.9	55.42	0.06	-0.19	0.10	PASS	-0.35	PASS
36	1:41 PM	8.5	242.7	57.51	0.55	-0.11	0.96	PASS	-0.19	PASS
37	1:44 PM	9.0	256.6	58.94	0.16	-0.11	0.28	PASS	-0.19	PASS
38	1:49 PM	-	269.7	58.11	0.01	-0.22	0.01	PASS	-0.38	PASS

1. Maneuver execution should continue until a steering wheel angle magnitude factor of $6.5*\delta_{0.3\ g,\ overall}$ or 270 degrees is utilized, whichever is greater provided the calculated magnitude of $6.5*\delta_{0.3\ g,\ overall}$ is less than or equal to 300 degrees. If $6.5*\delta_{0.3\ g,\ overall}$ is less than 270 degrees maneuver execution should continue by increasing the steering wheel angle magnitude by multiples of $0.5*\delta_{0.3\ g,\ overall}$ without exceeding the 270 degree steering wheel angle.

3.0 TEST DATA (CONTD)

DATA SHEET 8 (2 of 3)
VEHICLE LATERAL STABILITY AND RESPONSIVENESS

LATERAL STABILITY TEST SERIES NO. 2 – Clockwise Initial Steer Direction

Maneuver #	Clock Time (1.5 – 5.0 min max between runs)	Commanded Steering Wheel Angle[1]		Yaw Rates (degrees/sec)			YRR at 1.0 sec after COS [≤ 35%]		YRR at 1.75 sec after COS [≤ 20%]	
		Scalar (* $\delta_{0.3\,g}$)	Angle (degrees)	$\dot{\psi}_{Peak}$	$\dot{\psi}_{1.0sec}$	$\dot{\psi}_{1.75sec}$	%	Pass/Fail	%	Pass/Fail
39	1:52 PM	1.5	43.7	-13.29	0.09	0.10	-0.68	PASS	-0.72	PASS
40	1:55 PM	2.0	57.7	-17.84	0.05	0.00	-0.30	PASS	0.03	PASS
41	1:58 PM	2.5	72.6	-22.36	0.17	0.00	-0.77	PASS	0.00	PASS
42	2:01 PM	3.0	86.7	-26.16	0.27	0.24	-1.03	PASS	-0.92	PASS
43	2:04 PM	3.5	100.7	-30.69	0.23	0.16	-0.76	PASS	-0.52	PASS
44	2:08 PM	4.0	114.6	-36.43	0.12	-0.02	-0.34	PASS	0.06	PASS
46	2:12 PM	4.5	129.8	-40.53	0.11	0.06	-0.27	PASS	-0.14	PASS
47	2:15 PM	5.0	143.9	-45.49	0.15	-0.02	-0.32	PASS	0.04	PASS
48	2:17 PM	5.5	157.9	-49.50	0.15	-0.02	-0.31	PASS	0.04	PASS
49	2:21 PM	6.0	172.8	-54.02	0.00	-0.09	0.00	PASS	0.16	PASS
50	2:24 PM	6.5	186.8	-56.81	-0.24	0.02	0.42	PASS	-0.04	PASS
51	2:27 PM	7.0	200.8	-60.01	-0.61	-0.11	1.02	PASS	0.18	PASS
52	2:31 PM	7.5	214.9	-62.32	2.01	-0.12	-3.23	PASS	0.20	PASS
53	2:35 PM	8.0	230.0	-64.31	4.54	0.17	-7.07	PASS	-0.27	PASS
54	2:39 PM	8.5	243.9	-66.63	2.84	0.02	-4.26	PASS	-0.03	PASS
55	2:43 PM	9.0	257.8	-67.45	4.34	0.10	-6.43	PASS	-0.14	PASS
56	2:48 PM	-	270.6	-68.99	5.43	0.06	-7.87	PASS	-0.08	PASS

1. Maneuver execution should continue until a steering wheel angle magnitude factor of 6.5*$\delta_{0.3\,g,\,overall}$ or 270 degrees is utilized, whichever is greater provided the calculated 6.5*$\delta_{0.3\,g,\,overall}$ is less than or equal to 300 degrees. If 6.5*$\delta_{0.3\,g,\,overall}$ is less than 270 degrees maneuver execution should continue by increasing the steering wheel angle magnitude by multiples of 0.5*$\delta_{0.3\,g,\,overall}$ without exceeding the 270 degree steering wheel angle.

During execution of the Sine with Dwell maneuvers were any of the following events observed?

Rim-to-pavement contact	[ ] Yes	[X] No
Tire debeading	[ ] Yes	[X] No
Loss of pavement contact of vehicle tires	[ ] Yes	[X] No
Did the test driver experience any vehicle loss of control or spinout?	[ ] Yes	[X] No

If "Yes" explain the event and consult with the COTR.

3.0 TEST DATA (CONTD)

DATA SHEET 8 (3 of 3)
VEHICLE LATERAL STABILITY AND RESPONSIVENESS

Responsiveness – Lateral Displacement

Maneuver #	Initial Steer Direction	Commanded Steering Wheel Angle ($5.0*\delta_{0.3\ g,\ overall}$ or greater)		Calculated Lateral Displacement[1]	
		Scalar $*\delta_{0.3\ g}$	Angle (degrees)	Distance (m)	Pass/Fail
29	Counter Clockwise	5.0	143.0	-3.2	*PASS*
30	Counter Clockwise	5.5	157.1	-3.2	*PASS*
31	Counter Clockwise	6.0	171.9	-3.3	*PASS*
32	Counter Clockwise	6.5	186.0	-3.4	*PASS*
33	Counter Clockwise	7.0	199.9	-3.4	*PASS*
34	Counter Clockwise	7.5	213.8	-3.4	*PASS*
35	Counter Clockwise	8.0	228.9	-3.3	*PASS*
36	Counter Clockwise	8.5	242.7	-3.4	*PASS*
37	Counter Clockwise	9.0	256.6	-3.4	*PASS*
38	Counter Clockwise	-	269.7	-3.4	*PASS*
47	Clockwise	5.0	143.9	3.0	*PASS*
48	Clockwise	5.5	157.9	3.1	*PASS*
49	Clockwise	6.0	172.8	3.2	*PASS*
50	Clockwise	6.5	186.8	3.3	*PASS*
51	Clockwise	7.0	200.8	3.3	*PASS*
52	Clockwise	7.5	214.9	3.3	*PASS*
53	Clockwise	8.0	230.0	3.4	*PASS*
54	Clockwise	8.5	243.9	3.4	*PASS*
55	Clockwise	9.0	257.8	3.4	*PASS*
56	Clockwise	-	270.6	3.4	*PASS*

1. Lateral displacement should be $\geq$ 1.83 m (6 ft) for vehicle with a GVWR of 3,500 kg (7,716 lb) or less; and $\geq$ 1.52 m (5 ft) for vehicles with GVWR greater than 3,500 kg (7,716 lb).

DATA INDICATES COMPLIANCE: ☑ PASS ☐ FAIL

Remarks:

RECORDED BY: *B. Kebschull* DATE RECORDED: *3/3/2010*

APPROVED BY: *J Lenkeit* DATE APPROVED: *3/12/2010*

3.0 TEST DATA (CONTD)

Data Sheet 9 (Page 1 of 2)
MALFUNCTION WARNING TESTS

Vehicle: *2010 Honda Accord Passenger Car*

NHTSA No. *CA5307* Data Sheet Completion Date: *3/3/2010*

TEST 1

MALFUNCTION SIMULATION: Describe method of malfunction simulation

Disconnected Left front wheel speed sensor

MALFUNCTION TELLTALE ILLUMINATION:

Telltale illuminates and remains illuminated after ignition locking system is activated and if necessary the vehicle is driven at least 2 minutes.

[X] Yes [ ] No

Time for telltale to illuminate after ignition system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5mph) is reached.

0 Seconds (must be within 2 minutes) [X] Pass [ ] Fail

ESC SYSTEM RESTORATION

Telltale extinguishes after ignition locking system is activated and if necessary the vehicle is driven at least 2 minutes.

[X] Yes [ ] No

Time for telltale to extinguish after ignition system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5mph) is reached.

0 Seconds (must be within 2 minutes) [X] Pass [ ] Fail

TEST 1 DATA INDICATES COMPLIANCE: *PASS*

Remarks: *Both the "VSA" telltale and the triangle (with a "!" inside it) telltale illuminated immediately upon ignition after the malfunction was caused. The ABS telltale illuminated as well. When the ESC system was restored, both telltales immediately extinguished upon ignition. No driving was required.*

RECORDED BY: *B. Kebschull* DATE RECORDED: *3/3/2010*

APPROVED BY: *J Lenkeit* DATE APPROVED *3/8/2010*

3.0 TEST DATA (CONTD)

Data Sheet 9 (Page 2 of 2)
MALFUNCTION WARNING TESTS

Vehicle: *2010 Honda Accord Passenger Car*

NHTSA No. *CA5307* Data Sheet Completion Date: *3/3/2010*

TEST 2

MALFUNCTION SIMULATION: Describe method of malfunction simulation

Disconnected steering angle sensor.

MALFUNCTION TELLTALE ILLUMINATION:

Telltale illuminates and remains illuminated after ignition locking system is activated and if necessary the vehicle is driven at least 2 minutes.

[X] Yes [ ] No

Time for telltale to illuminate after ignition system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5mph) is reached.

0 Seconds (must be within 2 minutes) [X] Pass [ ] Fail

ESC SYSTEM RESTORATION

Telltale extinguishes after ignition locking system is activated and if necessary the vehicle is driven at least 2 minutes.

[X] Yes [ ] No

Time for telltale to extinguish after ignition system is activated and vehicle speed of 48 ± 8 km/h (30 ± 5mph) is reached.

0 Seconds (must be within 2 minutes) [X] Pass [ ] Fail

TEST 2 DATA INDICATES COMPLIANCE: PASS

Remarks: Both the "VSA" and the triangle with exclamation point telltales illuminated immediately upon ignition. After the system was restored, both telltales extinguished immediately upon ignition. No driving was required.

RECORDED BY: *B Kebschull* DATE RECORDED: 3/3/2010

APPROVED BY: *J Lenkeit* DATE APPROVED *3/8/2010*

4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION (1 OF 2)

TABLE 1. TEST INSTRUMENTATION

Type	Output	Range	Resolution	Accuracy	Specifics	Serial Number	Calibration
Tire Pressure Gauge	Vehicle Tire Pressure	0-100 psi 0-690 kPa	1 psi 6.89 kPa	0.5 psi 3.45 kPa	Ashcroft D1005PS	1039350	By: DRI Date:2/25/10 Due: 2/25/11
Platform Scales	Vehicle Total, Wheel, and Axle Load	8000 lb 35.6 kN	0.5 lb 2.2 N	±1.0% of applied load	Intercomp Model SWII	24032361	By: American Scale Date: 2/25/10 Due: 2/25/11
Automated Steering Machine with Steering Angle Encoder	Handwheel Angle	±800 deg	0.25 deg	±0.25 deg	Heitz Automotive Testing Model: Sprint 3	60304	By: DRI Date: 2/25/10 Due: 2/25/11
Multi-Axis Inertial Sensing System	Longitudinal, Lateral, and Vertical Acceleration Roll, Yaw, and Pitch Rate	Accelerometers: ±2 g Angular Rate Sensors: ±100 deg/s	Accelerometers: ≤10 ug Angular Rate Sensors: ≤0.004 deg/s	Accelerometers: ≤0.05% of full range Angular Rate Sensors: 0.05% of full range	BEI Technologies Model: MotionPAK MP-1	0767	By: Systron Donner Date:11/23/09 Due: 11/23/10
Radar Speed Sensor and Dashboard Display	Vehicle Speed	0-125 mph 0-200 km/h	0.009 mph .014 km/h	±0.25% of full scale	A-DAT Corp. Radar Model: DRS-6 Display Model: RD-2	1400.604	By: DRI Date:3/2/10 Due:3/2/11
Ultrasonic Distance Measuring System	Left and Right Side Vehicle Height	5-24 inches 127-610 mm	0.01 inches .254 mm	±0.25% of maximum distance	Massa Products Corporation Model: M-5000/220	DOT-NHTSA D2646	By: DRI Date:2/26/10 Due: 2/26/11
						DOT-NHTSA D3272	By: DRI Date:2/26/10 Due: 2/26/11

4.0 TEST EQUIPMENT LIST AND CALIBRATION INFORMATION (2 OF 2)

TABLE 1. TEST INSTRUMENTATION (CONTD)

Type	Output	Range	Resolution	Accuracy	Specifics	Serial Number	Calibration
Data Acquisition System [Includes amplification, anti-aliasing, and analog to digital conversion.]	Record Time; Velocity; Distance; Lateral, Longitudinal, and Vertical Accelerations; Roll, Yaw, and Pitch Rates; Steering Wheel Angle.	Sufficient to meet or exceed individual sensors	200 Hz	Sufficient to meet or exceed individual sensors	SoMat eDaq ECPU processor	MSHLB.03-2476	By: DRI Date:2/9/10 Due: 2/9/11
					SoMat High level Board EHLS	MSHLS.03-3182	By: DRI Date: 2/9/10 Due: 2/9/11
Load Cell	Vehicle Brake Pedal Force	0-300 lb 0-1.33 kN	1 lb 4.44 N	±0.05% of full scale	Lebow 3663-300	767	Operationally verified on test date
Coordinate Measurement Machine	Inertial Sensing System Coordinates	0-8 ft 0-2.4 m	±.0020 in. ±.051 mm	±.0020 in. ±.051 mm (Single point articulation accuracy)	Faro Arm Fusion	UO8-05-08-06636	By: Faro Date: 8/18/09 Due: 8/18/10
Outriggers	No output. Safety Item.	NA	NA	NA	DRI manufactured Aluminum meeting the weight and MOI specifications of Docket 2007-27662-11	NA	NA

5.0 PHOTOGRAPHS (1 of 14)

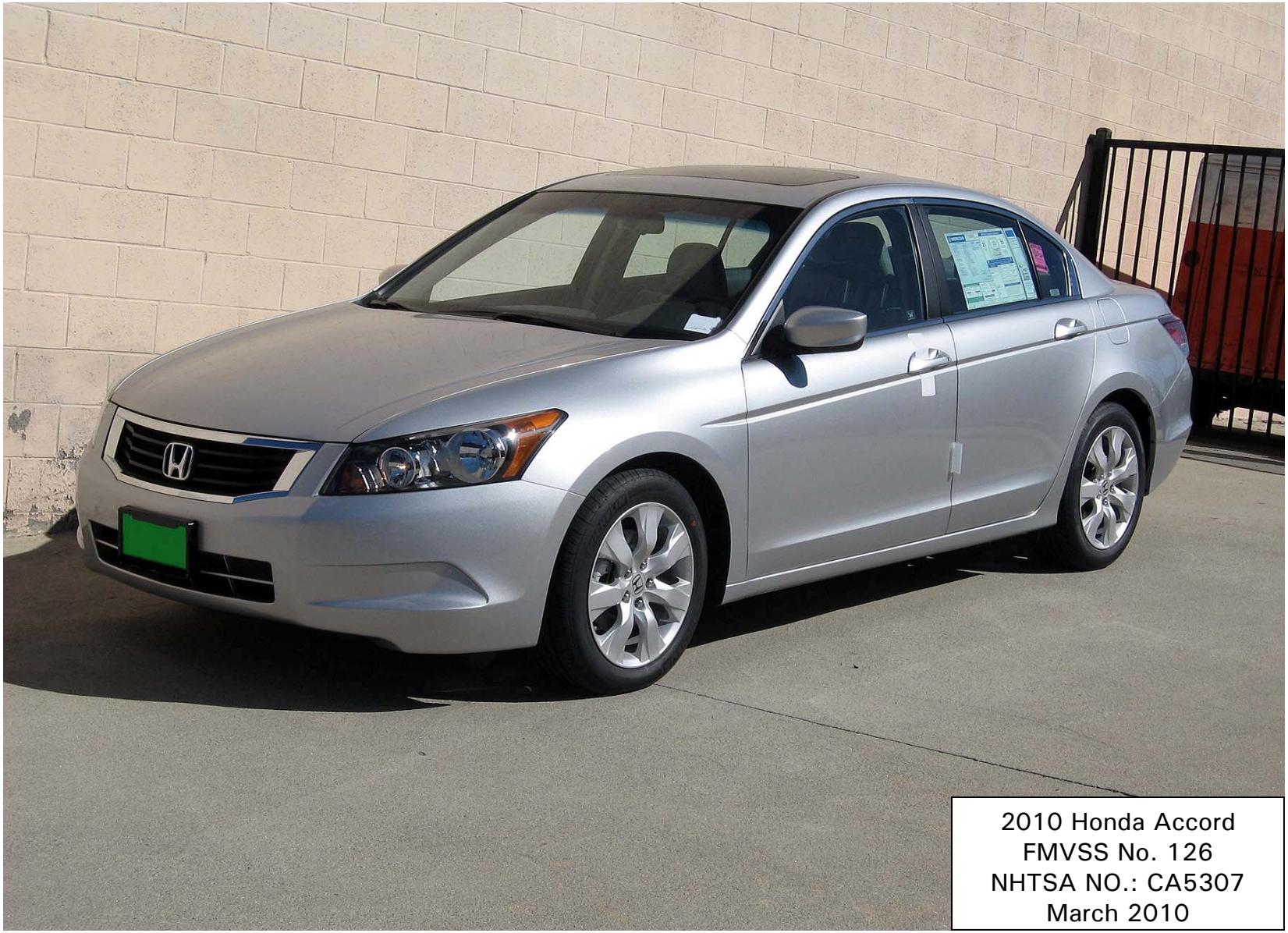


Figure 5.1. Front View of Test Vehicle As-Delivered

5.0 PHOTOGRAPHS (2 of 14)

Figure 5.2. Rear View of Test Vehicle As-Delivered

5.0 PHOTOGRAPHS (3 of 14)

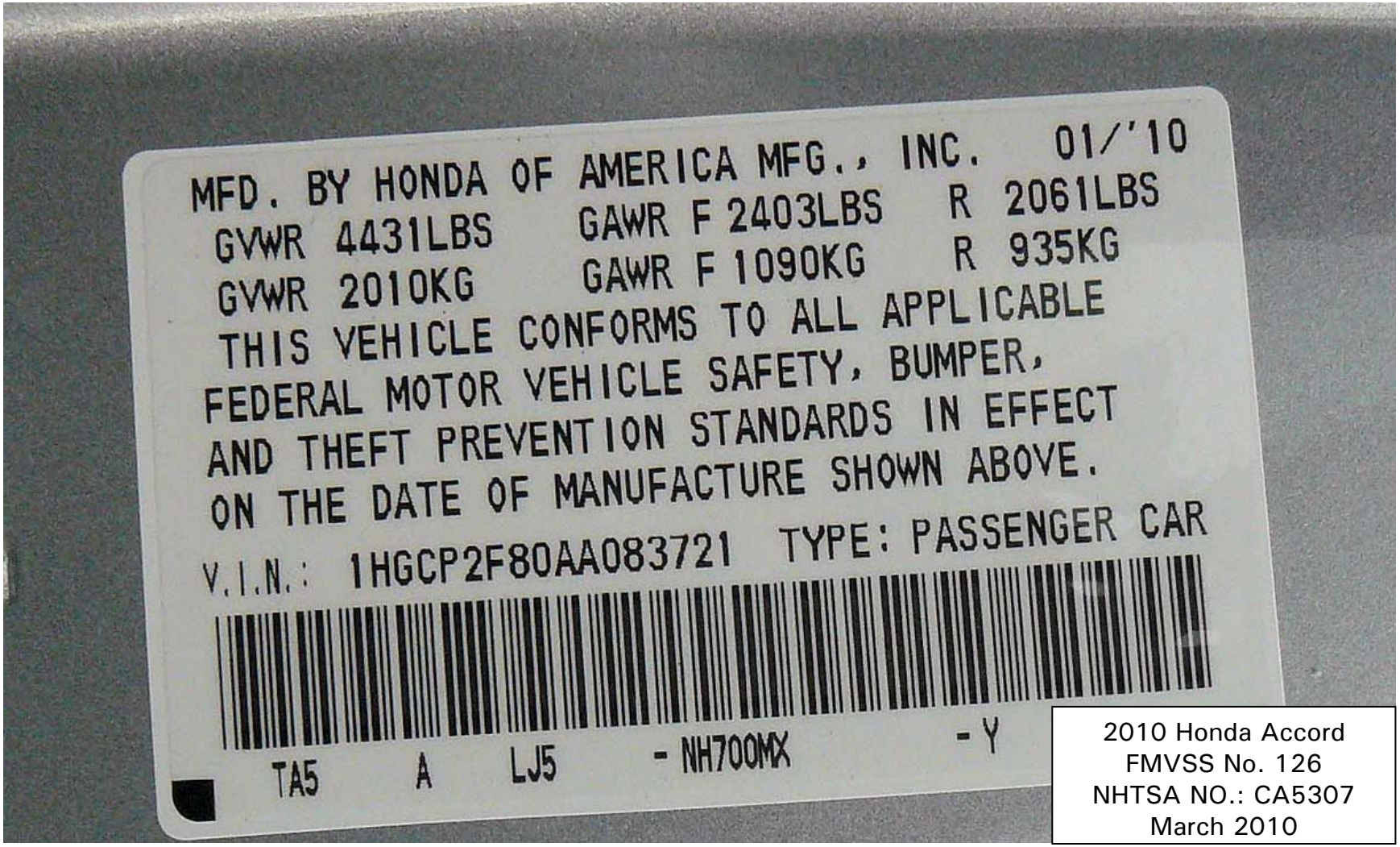


Figure 5.3. Vehicle Certification Label

5.0 PHOTOGRAPHS (4 of 14)

Figure 5.4. Vehicle Placard

5.0 PHOTOGRAPHS (5 of 14)

Figure 5.5. Window Sticker (Monroney Label)

5.0 PHOTOGRAPHS (6 of 14)

Figure 5.6. Telltale for ESC Malfunction and ESC Off

5.0 PHOTOGRAPHS (7 of 14)

Figure 5.7. ESC Off Control Switch

5.0 PHOTOGRAPHS (8 of 14)

Figure 5.8. Front View of Vehicle As-Tested

5.0 PHOTOGRAPHS (9 of 14)

Figure 5.9. Rear View of Vehicle As-Tested

5.0 PHOTOGRAPHS (10 of 14)

Figure 5.10. Ultrasonic Height Sensor Mounted on Left side of Vehicle for Determining Body Roll Angle

5.0 PHOTOGRAPHS (11 of 14)

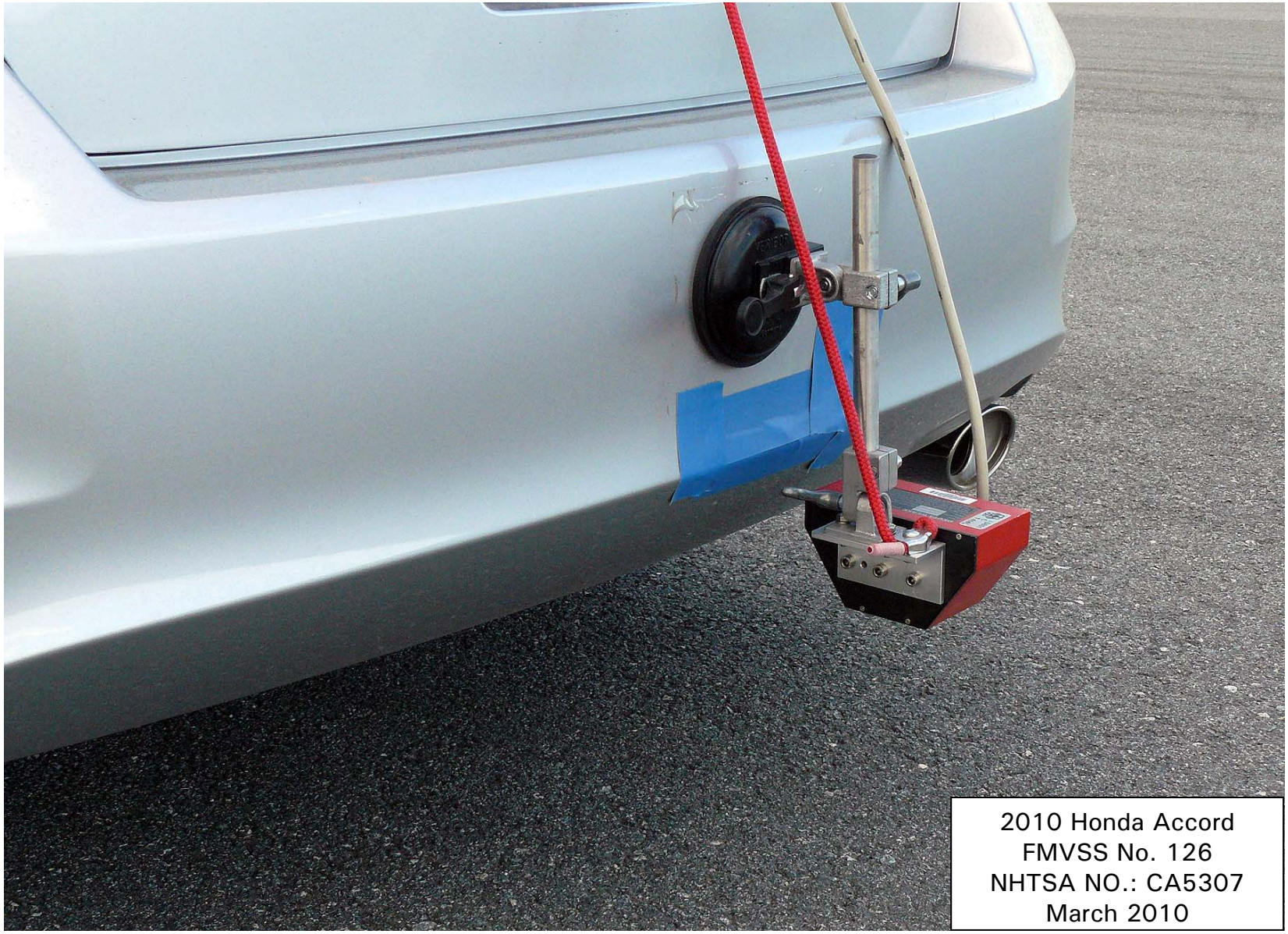


Figure 5.11. Speed Sensor Mounted on Rear Bumper

5.0 PHOTOGRAPHS (12 of 14)

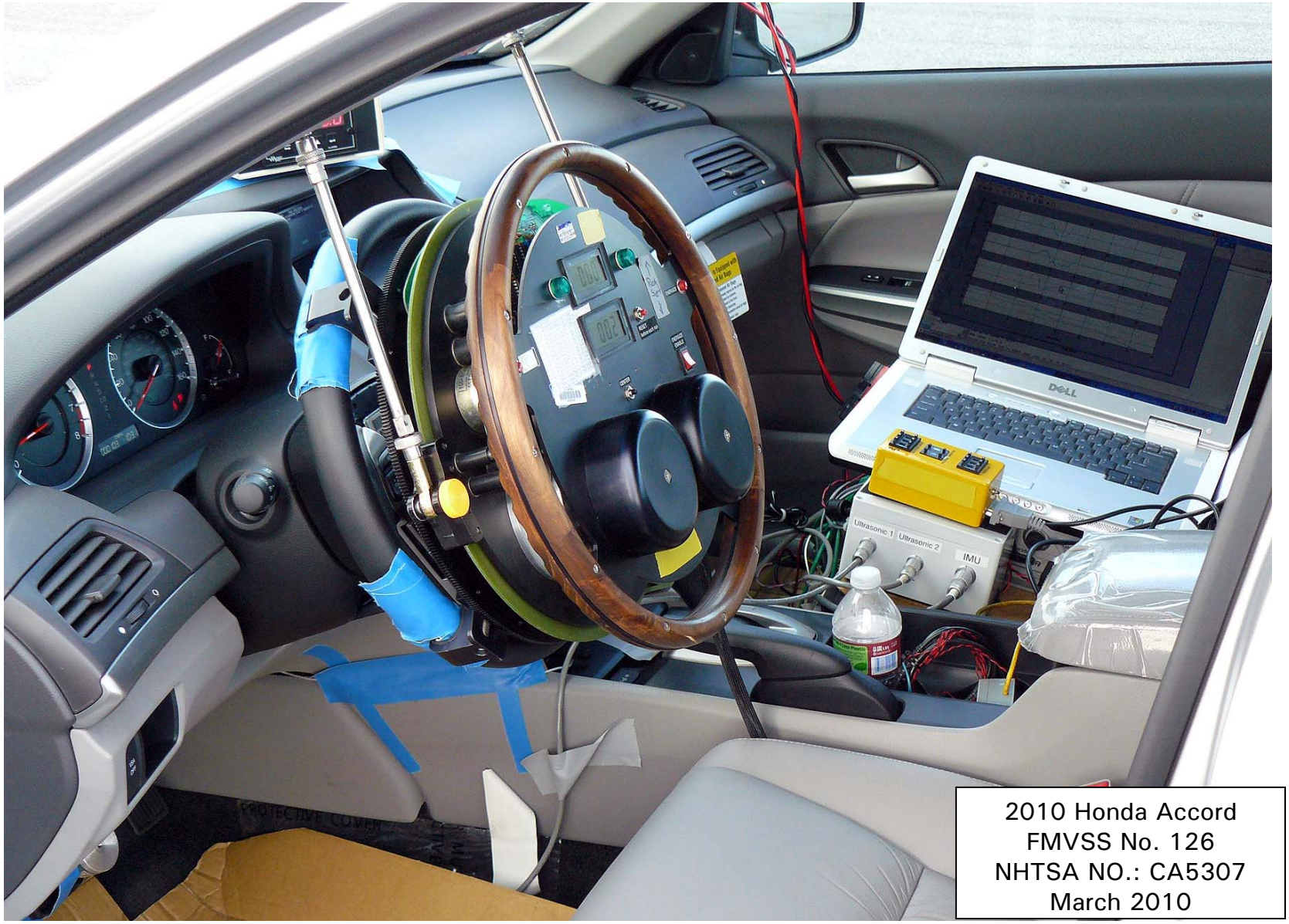


Figure 5.12. Steering Controller and Data Acquisition Computer

5.0 PHOTOGRAPHS (13 of 14)

Figure 5.13. Inertial Measurement Unit Mounted in Vehicle

5.0 PHOTOGRAPHS (14 of 14)

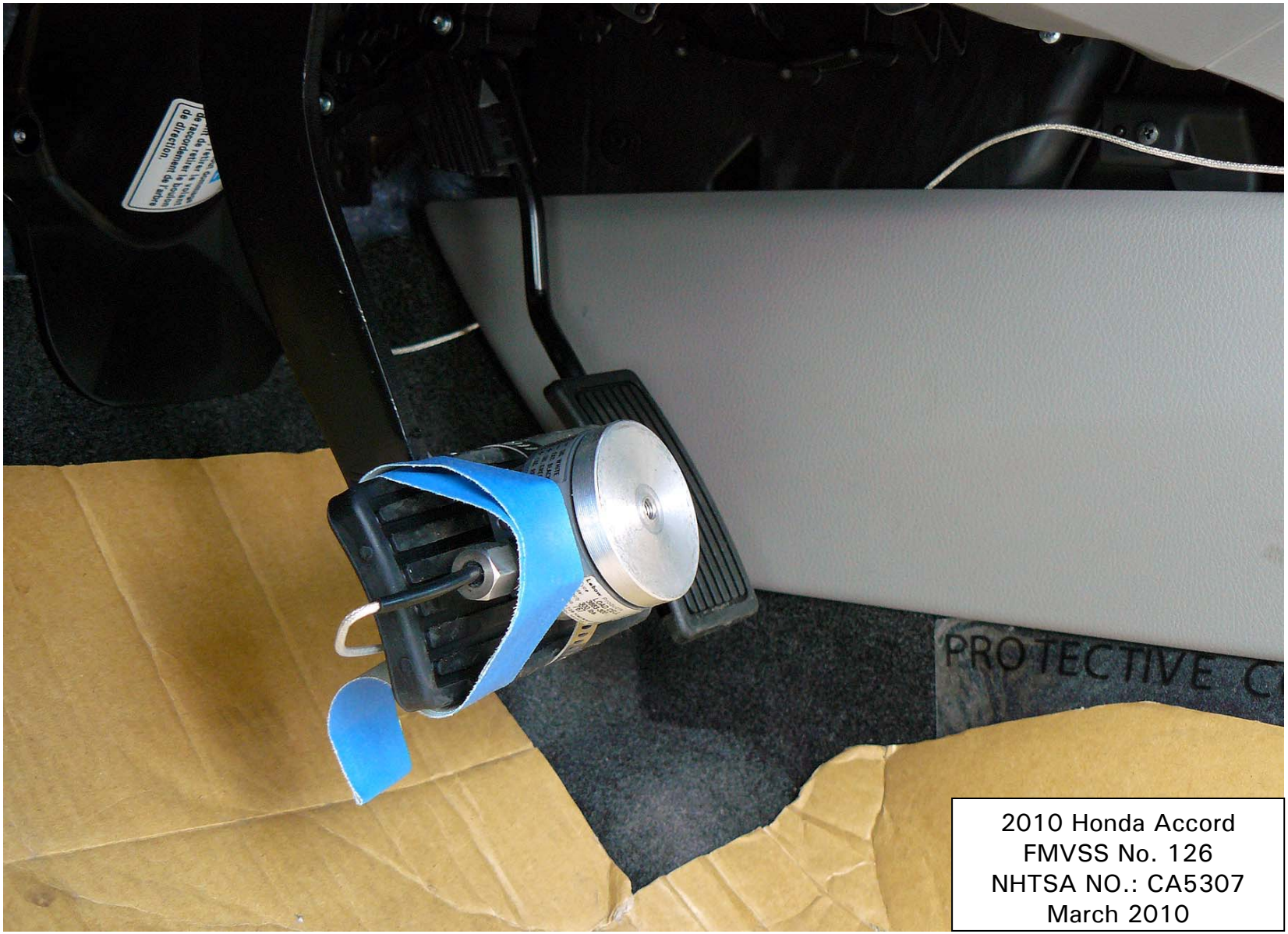


Figure 5.14. Brake Pedal Load Cell

6.0 DATA PLOTS (1 of 4)

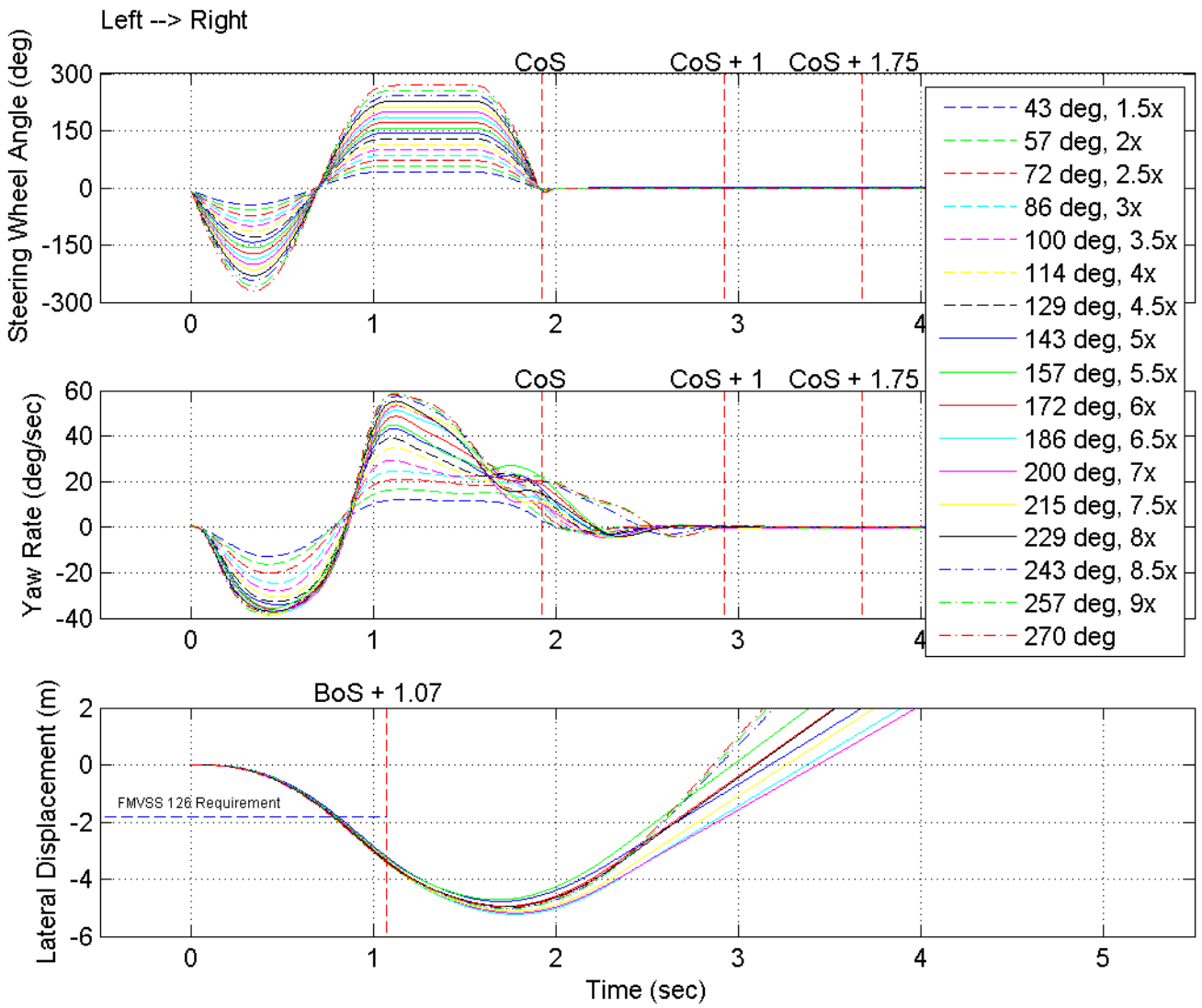


Figure 6.1. Steering Wheel Angle, Yaw Rate and Lateral Displacement for L-R Series

6.0 DATA PLOTS (2 of 4)

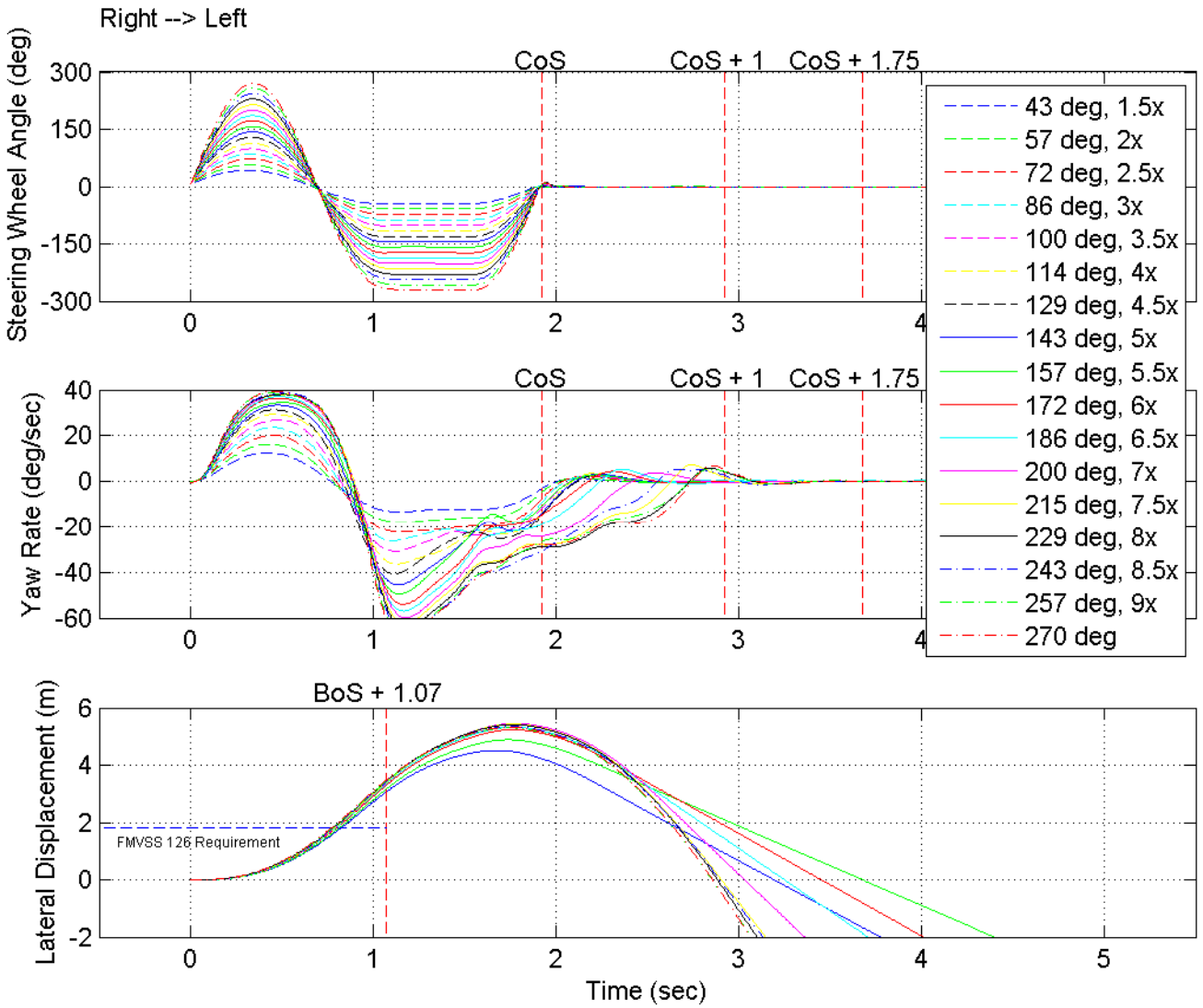


Figure 6.2. Steering Wheel Angle, Yaw Rate and Lateral Displacement for R-L Series

6.0 DATA PLOTS (3 of 4)

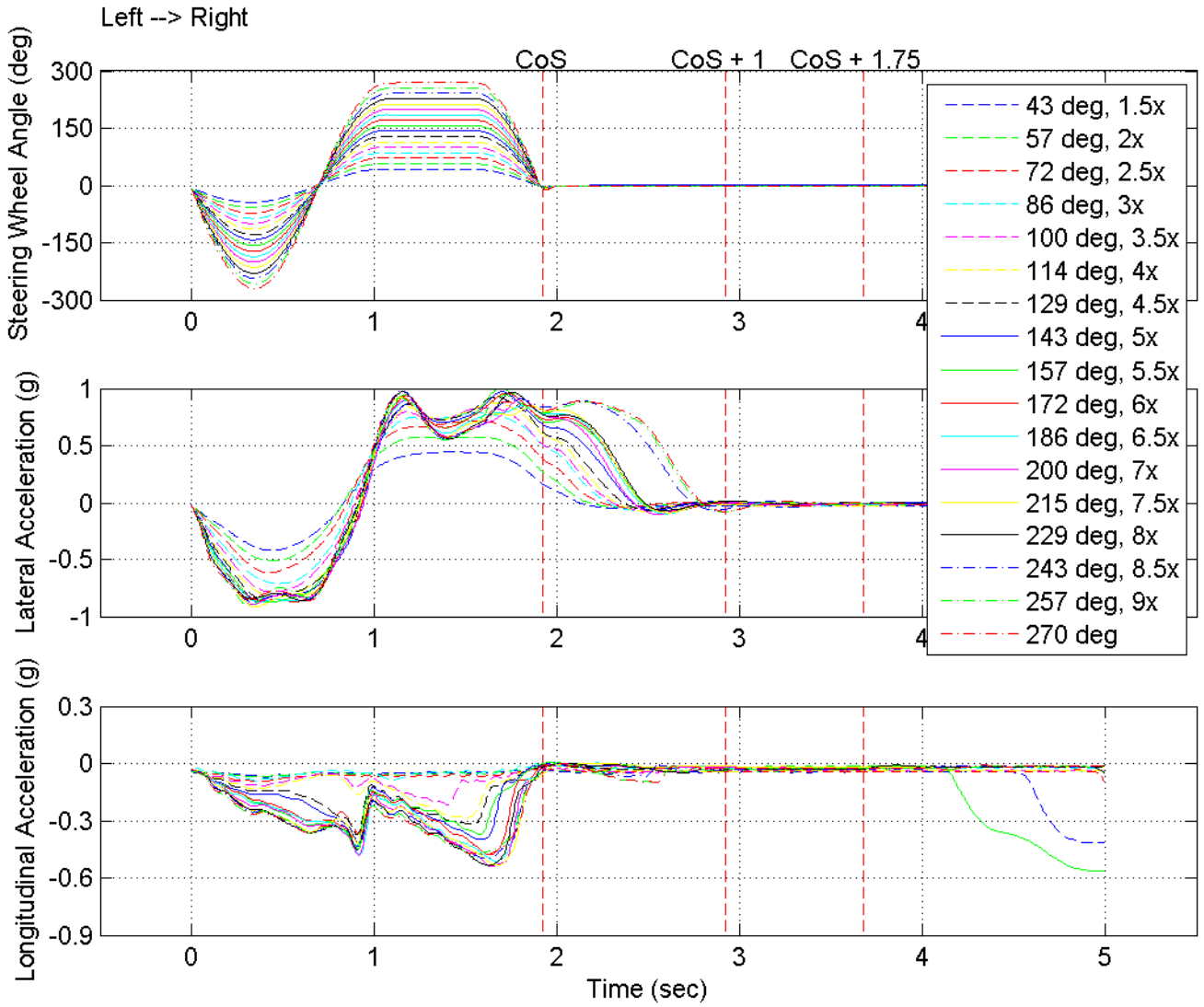


Figure 6.3. Steering Wheel Angle, Lateral Acceleration and Longitudinal Acceleration for L-R Series

6.0 DATA PLOTS (4 of 4)

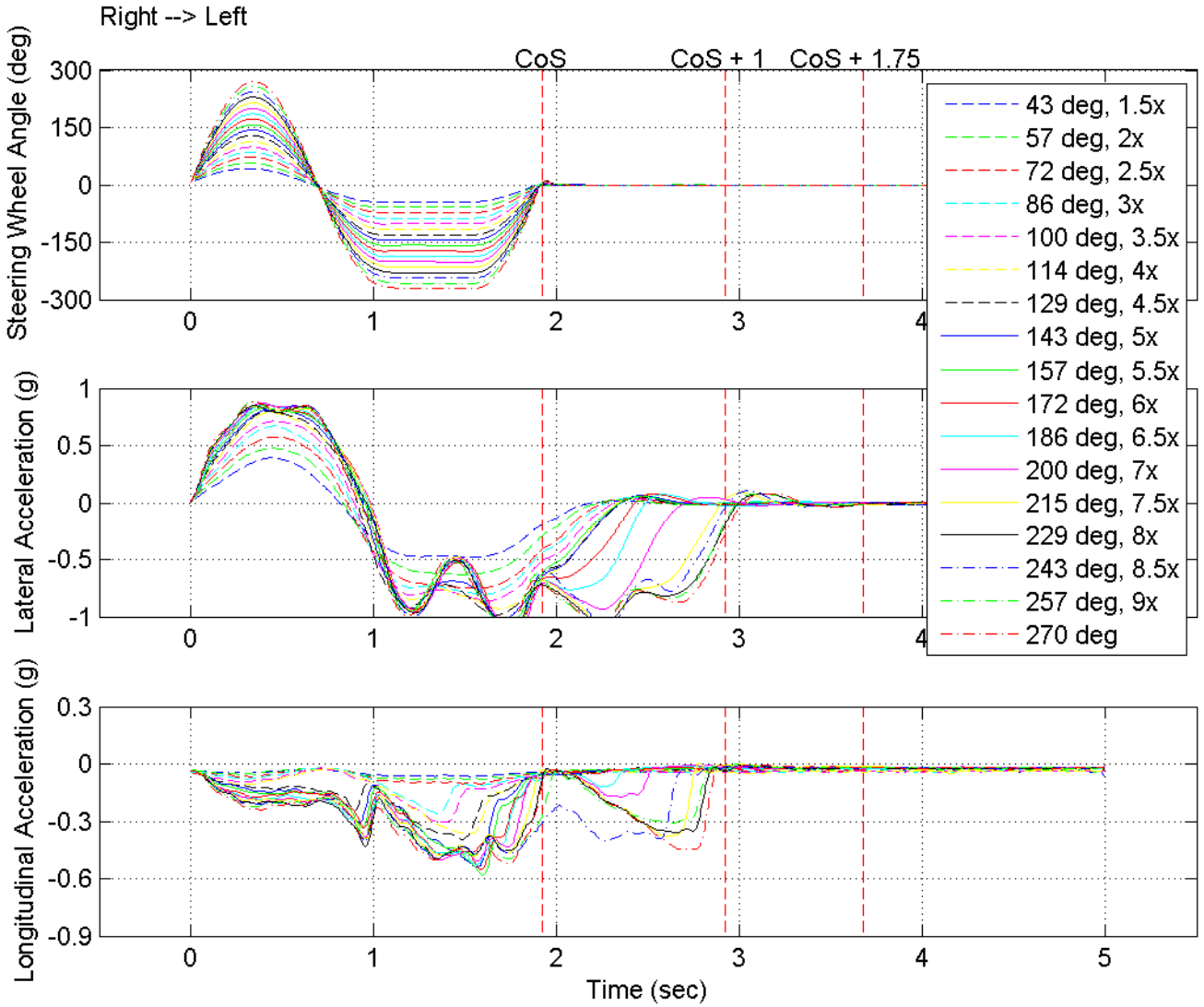
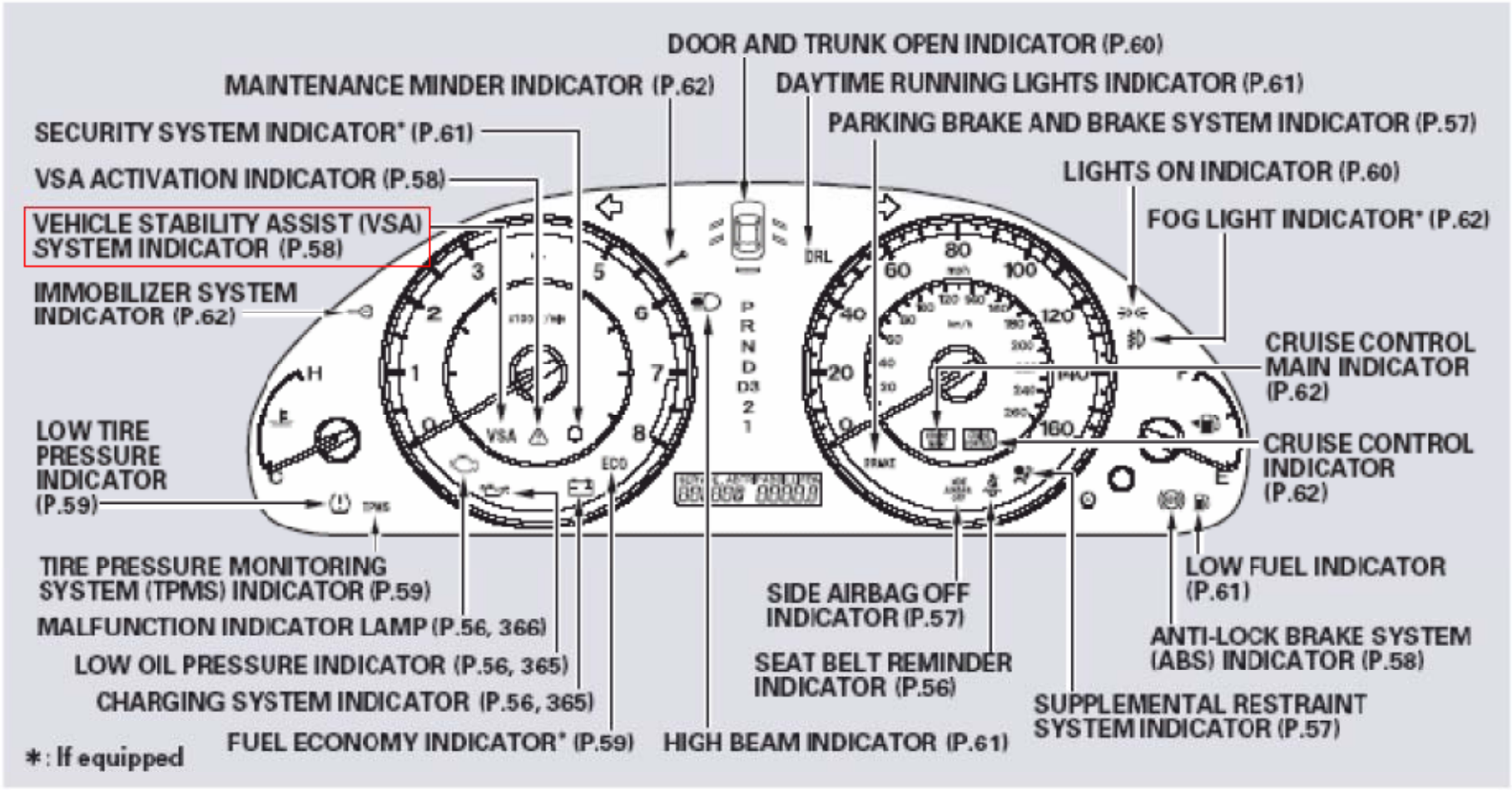


Figure 6.4. Steering Wheel Angle, Lateral Acceleration and Longitudinal Acceleration for R-L Series

7.0 OTHER DOCUMENTATION

7.1 OWNER'S MANUAL PAGES
7.2 VEHICLE ARRIVAL CONDITION REPORT
7.3 VEHICLE COMPLETION CONDITION REPORT
7.4 SINE WITH DWELL TEST RESULTS
7.5 SLOWLY INCREASING STEER TEST RESULTS
7.6 INERTIAL SENSING SYSTEM LOCATION COORDINATES

7.1 OWNER'S MANUAL PAGES



The U.S. instrument panel is shown. Differences for the Canadian models are noted in the text.

55

Instrument Panel Indicators

Anti-lock Brake System (ABS) Indicator

This indicator normally comes on for a few seconds when you turn the ignition switch to the ON (II) position. If it comes on at any other time, there is a problem with the ABS. If this happens, have your vehicle checked at a dealer. With this indicator on, your vehicle still has normal braking ability but no anti-lock function. For more information, see page 287.

Vehicle Stability Assist (VSA) System Indicator

This indicator normally comes on for a few seconds when you turn the ignition switch to the ON (II) position.

If it comes on and stays on at any other time, or if it does not come on when you turn the ignition switch to the ON (II) position, there is a problem with the VSA system. Take your vehicle to a dealer to have it checked. Without VSA, your vehicle still has normal driving ability, but will not have VSA traction and stability enhancement. See page 289 for more information on the VSA system.

VSA Activation Indicator

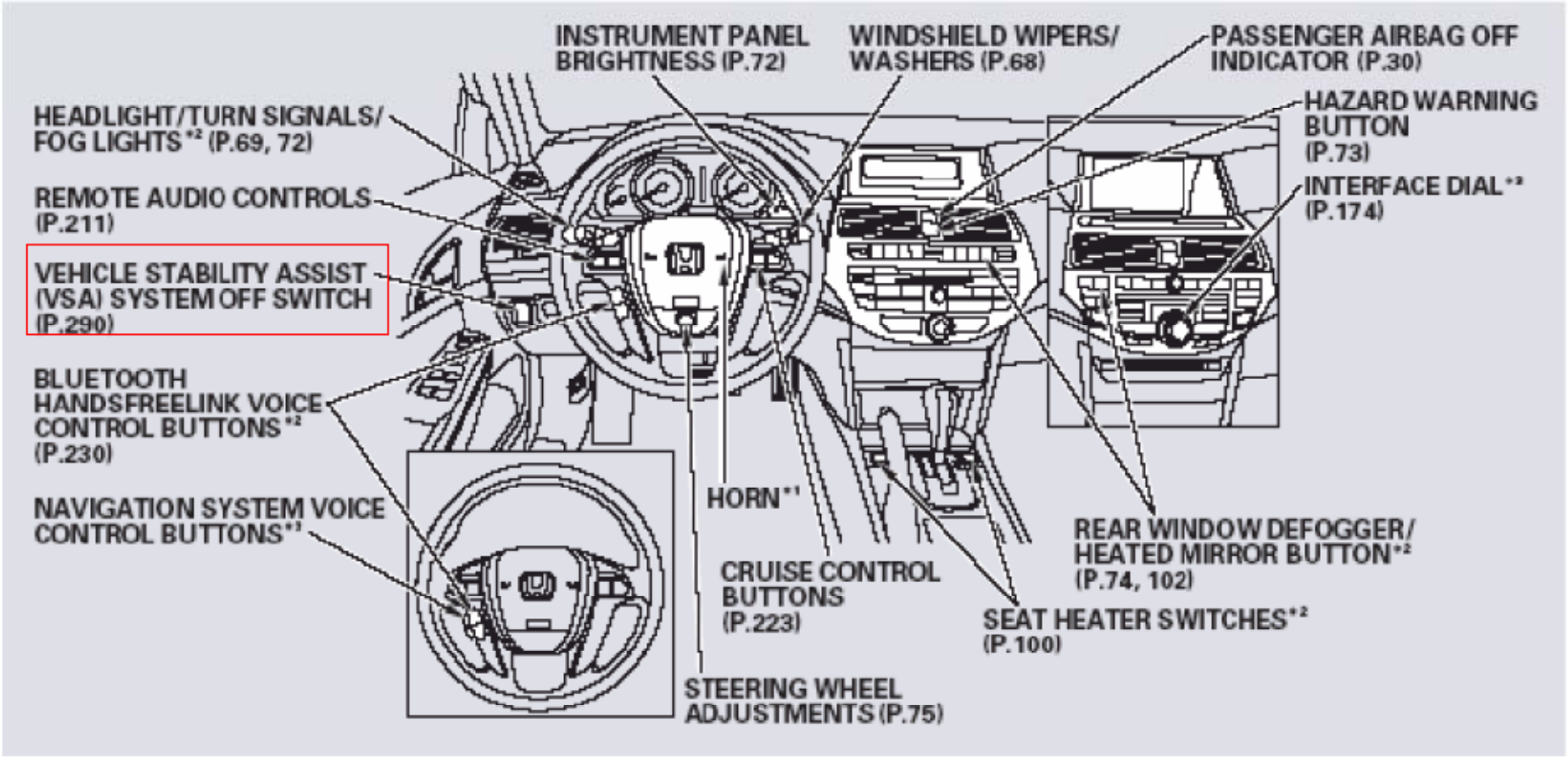
This indicator has three functions:

1. It comes on as a reminder that you have turned off the vehicle stability assist (VSA) system.
2. It flashes when VSA is active (see page 289).
3. It comes on along with the VSA system indicator if there is a problem with the VSA system.

This indicator normally comes on for a few seconds when you turn the ignition switch to the ON (II) position. For more information, see page 289 .

7.1 OWNER'S MANUAL PAGES

Controls Near the Steering Wheel



*1: To use the horn, press the center pad of the steering wheel.
*2: If equipped
*3: Only on vehicles equipped with navigation system, refer to the navigation system manual.

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Vehicle Stability Assist (VSA®), aka Electronic Stability Control (ESC), System

The vehicle stability assist (VSA) system helps to stabilize the vehicle during cornering if the vehicle turns more or less than desired. It also assists you in maintaining traction while accelerating on loose or slippery road surfaces. It does this by regulating the engine's output and by selectively applying the brakes.

When VSA activates, you may notice that the engine does not respond to the accelerator in the same way it does at other times. There may also be some noise from the VSA hydraulic system. You will also see the VSA activation indicator blink.

The VSA system cannot enhance the vehicle's driving stability in all situations and does not control your vehicle's entire braking system. It is still your responsibility to drive and corner at reasonable speeds and to leave a sufficient margin of safety.

VSA Activation Indicator

When VSA activates, you will see the VSA activation indicator blink.

Vehicle Stability Assist (VSA) System Indicator

If this indicator comes on while driving, pull to the side of the road when it is safe, and turn off the engine. Reset the system by restarting the engine. If the VSA system indicator stays on or comes back on while driving, have the VSA system inspected by your dealer.

NOTE: The main function of the VSA system is generally known as Electronic Stability Control (ESC). The system also includes a traction control function.

If the indicator does not come on when the ignition switch is turned to the ON (II) position, there may be a problem with the VSA system. Have your dealer inspect your vehicle as soon as possible.

If the low tire pressure indicator or TPMS indicator comes on, the VSA system automatically turns on even if the VSA system is turned off by pressing the VSA OFF switch (see page 290). If this happens, you cannot turn the VSA system off by pressing the VSA OFF switch again.

Without VSA, your vehicle will have normal braking and cornering ability, but it will not have VSA traction and stability enhancement.

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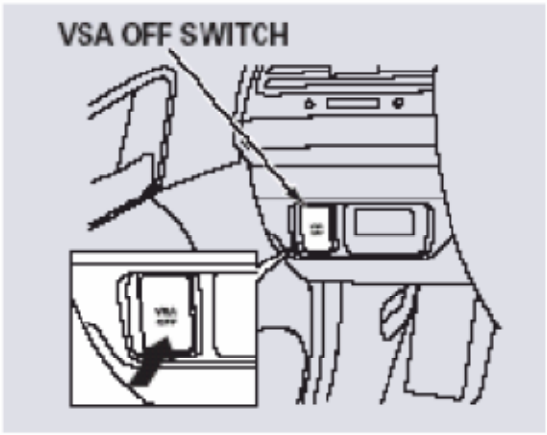
Vehicle Stability Assist (VSA®), aka Electronic Stability Control (ESC), System

VSA OFF Switch



This switch is under the driver's side vent. To turn the VSA system on and off, press and hold it until you hear a beep.

When VSA is off, the VSA activation indicator comes on as a reminder. Press and hold the switch again. It turns the system back on.

VSA is turned on every time you start the engine, even if you turned it off the last time you drove the vehicle.

In certain unusual conditions when your vehicle gets stuck in shallow mud or fresh snow, it may be easier to free it with the VSA temporarily switched off. When the VSA system is off, the traction control system is also off. You should only attempt to free your vehicle with the VSA off if you are not able to free it when the VSA is on.

Immediately after freeing your vehicle, be sure to switch the VSA on again. We do not recommend driving your vehicle with the VSA and traction control systems switched off.

VSA and Tire Sizes

Driving with varying tire or wheel sizes may cause the VSA to malfunction. When replacing tires, make sure they are of the same size and type as your original tires (see page 344).

If you install winter tires, make sure they are the same size as those that were originally supplied with your vehicle. Exercise the same caution during winter driving as you would if your vehicle was not equipped with VSA.

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7.2 VEHICLE ARRIVAL CONDITION REPORT

CONTRACT NO.: DTNH22-08-D-00098
DATE:

From: *Automotive Allies*

To: Dynamic Research, Inc

Purpose ☒ Initial Receipt
☐ Received via Transfer
☐ Present Vehicle Condition

Vehicle VIN: *1HGCP2F80AA083721* NHTSA NO.: *CA5307*
Model Year: *2010* Odometer Reading: *19* Miles
Make *Honda* Body Style: *Passenger Car*
Model: *Accord* Body Color: *Silver*
Manufacture Date: *1/10* Dealer: *Automotive Allies*
GVWR (kg/lb) *2010/4431* Price: *Leased*

☒ All options listed on the "Window Sticker" are present on the test vehicle

☒ Tires and wheel rims are new and the same as listed

☒ There are no dents or other interior or exterior flaws

☒ The vehicle has been properly prepared and is in running condition

☒ The glove box contains an owner's manual, warranty document, consumer information, and extra set of keys

☒ Proper fuel filler cap is supplied on the test vehicle

☒ Place vehicle in storage area

☒ Inspect the vehicle's interior and exterior, including all windows, seats, doors, etc., to confirm that each system is complete and functional per the manufacturer's specifications. Any damage, misadjustment, or other unusual condition that could influence the test program or test results shall be recorded. Report any abnormal condition to the NHTSA COTR before beginning any test.

NOTES: *No extra key*

RECORDED BY: *J Lenkeit* DATE RECORDED: *2/19/2010*

APPROVED BY: *B Kebschull* DATE APPROVED: *2/22/2010*

7.3 VEHICLE COMPLETION CONDITION REPORT

CONTRACT NO.: *DTNH22-08-D-00098*
DATE: *3/23/2010*

Vehicle VIN: *1HGCP2F80AA083721* NHTSA NO.: *CA5307*
Model Year: *2010* Odometer Reading: *105* Miles
Make: *Honda* Body Style: *Passenger Car*
Model: *Accord* Body Color: *Silver*
Manufacture Date: Dealer:
GVWR (kg/lb) *2010 (4431)* Price: *Leased*

LIST OF FMVSS TESTS PERFORMED BY THIS LAB: *126*

☒ THERE ARE NO DENTS OR OTHER INTERIOR OR EXTERIOR FLAWS

☒ THE VEHICLE HAS BEEN PROPERLY MAINTAINED AND IS IN RUNNING CONDITION

☒ THE GLOVE BOX CONTAINS AN OWNER'S MANUAL, WARRANTY DOCUMENT, CONSUMER INFORMATION, AND EXTRA SET OF KEYS

☒ PROPER FUEL FILLER CAP IS SUPPLIED ON THE TEST VEHICLE

REMARKS:

Equipment that is no longer on the test vehicle as noted on Vehicle Arrival Condition Report:

Explanation for equipment removal:

Test Vehicle Condition:

As delivered, as new

RECORDED BY: *J Lenkeit* DATE RECORDED: *3/23/2010*

APPROVED BY: *P Broen* DATE APPROVED: *3/23/2010*

7.4 SINE WITH DWELL TEST RESULTS

2010 Honda Accord Passenger Car
NHTSA No.: CA5307
Date of Test : *3/3/2010*
Date Created: *3/3/2010*

Lateral Stability Test Series No. 1 – Counterclockwise Initial Steer Direction

File	SWA @ 5deg Ct	MES	Time @ 5deg	COS	Time @ COS	MOS	Time @ MOS	YRR1	YR1	YRR 1 Ct	YRR 175	YR175	YRR17 5 Ct	2nd Yaw Peak	2nd Yaw Peak Ct	Lat Disp	Lat. Acc. 1.07 s	1st SWA Peak	1st SWA Peak Ct	2nd SWA Mean
	(deg)	(mph)	(s)		(s)		(sec)	(%)	(deg/s)		(%)	(deg/s)		(deg/s)		(ft)	(g)	(deg)		(deg)
22	711	50.31	3.546	1091	5.448	847	4.227	-1.51	-0.19	1291	-1.33	-0.17	1441	12.89	944	-4.08	0.38	43.04	775	42.95
23	709	50.53	3.539	1091	5.446	847	4.226	-2.75	-0.46	1291	-2.47	-0.41	1441	16.64	940	-5.34	0.48	57.16	775	56.94
24	708	50.42	3.533	1090	5.444	846	4.225	-0.68	-0.14	1290	-0.84	-0.18	1440	20.98	938	-6.47	0.57	72.09	775	71.77
25	707	50.42	3.53	1090	5.445	846	4.225	-0.78	-0.19	1290	-0.75	-0.19	1440	24.97	932	-7.70	0.62	86.17	775	85.90
26	707	50.36	3.527	1090	5.444	846	4.224	-0.66	-0.20	1290	-0.69	-0.20	1440	29.66	928	-8.68	0.64	99.94	775	99.70
27	707	50.49	3.526	1090	5.444	846	4.225	-1.45	-0.51	1290	-0.89	-0.31	1440	35.07	931	-9.47	0.64	113.97	775	113.76
28	706	50.28	3.525	1090	5.443	846	4.225	0.05	0.02	1290	0.04	0.02	1440	39.21	927	-9.96	0.68	129.09	775	128.87
29	706	50.53	3.524	1090	5.443	846	4.225	0.07	0.03	1290	-0.05	-0.02	1440	43.41	930	-10.40	0.65	142.97	775	142.87
30	706	50.36	3.523	1090	5.443	847	4.226	0.09	0.04	1290	-0.18	-0.08	1440	45.08	929	-10.57	0.72	157.09	775	156.78
31	706	50.37	3.523	1090	5.443	846	4.225	-0.01	0.00	1290	-0.36	-0.18	1440	48.87	931	-10.82	0.71	171.93	775	171.76
32	706	50.41	3.523	1090	5.443	847	4.226	-0.18	-0.09	1290	-0.35	-0.18	1440	51.41	932	-11.03	0.70	185.98	775	185.76
33	706	50.43	3.522	1090	5.442	847	4.226	-0.22	-0.12	1290	-0.08	-0.04	1440	53.68	933	-11.01	0.71	199.86	775	199.70
34	706	50.4	3.523	1090	5.443	847	4.226	0.14	0.07	1290	-0.19	-0.10	1440	54.04	930	-11.12	0.77	213.78	775	213.73
35	706	50.36	3.523	1090	5.442	847	4.226	0.10	0.06	1290	-0.35	-0.19	1440	55.42	931	-10.95	0.78	228.85	775	228.85
36	706	50.46	3.523	1090	5.443	847	4.227	0.96	0.55	1290	-0.19	-0.11	1440	57.51	933	-11.07	0.80	242.74	775	242.91
37	706	50.39	3.524	1090	5.444	847	4.227	0.28	0.16	1290	-0.19	-0.11	1440	58.94	931	-11.08	0.79	256.64	776	256.84
38	706	50.58	3.523	1090	5.442	847	4.226	0.01	0.01	1290	-0.38	-0.22	1440	58.11	929	-11.07	0.81	269.65	776	269.76

7.4 SINE WITH DWELL TEST RESULTS

NHTSA No.: CA5307
Date of Test : *3/3/2010*
Date Created: *3/3/2010*

Lateral Stability Test Series No. 2 – Clockwise Initial Steer Direction

File	SWA @ 5deg Ct	MES	Time @ 5deg	COS	Time @ COS	MOS	Time @ MOS	YRR1	YR1	YRR 1 Ct	YRR 175	YR175	YRR17 5 Ct	2nd Yaw Peak	2nd Yaw Peak Ct	Lat Disp	Lat. Acc. 1.07 s	1st SWA Peak	1st SWA Peak Ct	2nd SWA Mean
	(deg)	(mph)	(s)		(s)		(sec)	(%)	(deg/s)		(%)	(deg/s)		(deg/s)		(ft)	(g)	(deg)		(deg)
39	710	50.46	3.545	1091	5.446	847	4.228	-0.68	0.09	1291	-0.72	0.10	1441	-13.29	942	4.05	-0.38	43.67	775	43.46
40	709	50.25	3.537	1090	5.445	847	4.226	-0.30	0.05	1290	0.03	0.00	1440	-17.84	942	5.19	-0.47	57.65	775	57.51
41	708	50.48	3.533	1090	5.444	847	4.226	-0.77	0.17	1290	0	0.00	1440	-22.36	940	6.35	-0.55	72.55	775	72.43
42	707	50.36	3.53	1090	5.444	847	4.226	-1.03	0.27	1290	-0.92	0.24	1440	-26.16	931	7.32	-0.59	86.65	775	86.54
43	708	49.42	3.533	1091	5.449	848	4.231	-0.76	0.23	1291	-0.52	0.16	1441	-30.69	934	8.22	-0.61	100.65	776	100.29
44	707	50.51	3.526	1090	5.444	847	4.226	-0.34	0.12	1290	0.06	-0.02	1440	-36.43	934	9.09	-0.62	114.64	775	114.35
46	706	50.4	3.523	1090	5.443	846	4.225	-0.27	0.11	1290	-0.14	0.06	1440	-40.53	932	9.41	-0.69	129.83	775	129.52
47	706	50.33	3.523	1090	5.443	846	4.225	-0.32	0.15	1290	0.04	-0.02	1440	-45.49	935	9.91	-0.63	143.91	775	143.37
48	706	50.39	3.523	1090	5.443	846	4.225	-0.31	0.15	1290	0.04	-0.02	1440	-49.5	936	10.24	-0.59	157.86	775	157.44
49	706	50.45	3.522	1090	5.444	846	4.225	0.00	0.00	1290	0.16	-0.09	1440	-54.02	940	10.65	-0.48	172.84	775	172.33
50	706	50.46	3.522	1090	5.445	847	4.226	0.42	-0.24	1290	-0.04	0.02	1440	-56.81	940	10.82	-0.50	186.84	775	186.40
51	706	50.39	3.522	1090	5.444	847	4.226	1.02	-0.61	1290	0.18	-0.11	1440	-60.01	942	10.96	-0.44	200.84	775	200.22
52	706	50.52	3.522	1090	5.443	846	4.225	-3.23	2.01	1290	0.2	-0.12	1440	-62.32	942	10.99	-0.47	214.94	775	214.08
53	706	50.46	3.522	1090	5.442	847	4.226	-7.07	4.54	1290	-0.27	0.17	1440	-64.31	942	11.10	-0.49	229.98	775	229.15
54	706	50.5	3.523	1090	5.445	847	4.226	-4.26	2.84	1290	-0.03	0.02	1440	-66.63	943	11.12	-0.51	243.94	775	243.15
55	706	50.43	3.523	1091	5.446	847	4.226	-6.43	4.34	1291	-0.14	0.10	1441	-67.45	940	11.16	-0.57	257.78	775	257.24
56	706	50.34	3.523	1090	5.444	847	4.226	-7.87	5.43	1290	-0.08	0.06	1440	-68.99	940	11.28	-0.59	270.62	776	270.24

7.5 SLOWLY INCREASING STEER TEST RESULTS

2010 Honda Accord Passenger Car
NHTSA No.: *CA5307*
Date of Test: *3/3/2010*
Date Created: *3/3/2010*

File	EventPt	DOS	MES (mph)	Mean SPD (mph)	AYcount_3	THETAENCF_3 (deg)	AYCG_CD2_3 (g)	r_squared	ZeroBegin	ZeroEnd
11	623	1	49.737	49.8463	1130	-28.6997	-0.30852	0.982467	423	623
12	700	1	49.857	49.90932	1132	-28.6851	-0.30008	0.998807	500	700
13	700	1	49.954	49.87893	1137	-28.9936	-0.29448	0.997773	500	700
14	722	0	49.979	49.94619	1120	28.12899	0.295936	0.997894	522	722
15	696	0	49.787	49.8006	1132	28.68067	0.30388	0.995064	496	696
16	700	0	49.805	49.92895	1120	28.15335	0.299434	0.998452	500	700
					Averages	28.6	0.300388			

Scalars	Steering Angles (deg)
1.5	43
2.0	57
2.5	72
3.0	86
3.5	100
4.0	114
4.5	129
5.0	143
5.5	157

Scalars	Steering Angles (deg)
6.0	172
6.5	186
7.0	200
7.5	214
8.0	229
8.5	243
9.0	257
9.4	270

7.6 INERTIAL SENSING SYSTEM LOCATION COORDINATES

Vehicle:	**2010 Honda Accord Passenger Car**	NHTSA No.:	CA5307
Wheelbase:	110.2 Inches	Faro Arm S/N:	U08-05-08-06636
Measurement date:	2/26/2010	Certification date:	8/18/2009

CMM Measurements

Coordinate system: SAE (X,Y,Z positive forward, to the right, and downward, respectively)

Origin defined at 48" point on lateral arm of measurement fixture, projected onto the ground plane

	Ref X	Ref Y	Ref Z
M_PLANE001_Ground_Plane	-	-	0.000
M_Line_Y_Axis	-1.538	-3.469	0.000
M_Point_48_Ref	0.000	0.000	-
M_CIRCLE001_I_Left_Rear_Wheel_Axle	-41.989	12.576	-12.618
M_Point_IMU_side	-1.455	46.305	-18.048
M_Point_ROOF	-	-	-58.452
Motion Pak reference point taken from mid height of unit left side			
Motion Pak Width = 3.05" ==> 1/2 W = 1.525			
Motion_PAK_Location	-1.455	47.830	-18.048

Measurement Notes

1. The Faro arm is positioned just to the left of the vehicle, near the rear door.

2. A "centerline jig" is used in the Faro arm measurement. The jig consists of a long beam with a 4 ft lateral arm that is perpendicular to the beam. The jig is placed on the ground underneath the vehicle with the long beam positioned along the centerline of the vehicle, such that the lateral arm extends to the left, slightly forward of the left rear tire. The lateral arm has a marked indentation point which is located 48.00" from the edge of the centerline beam.

3. The Faro arm is used to make the following measurements:
   - Three points on the ground, which establishes the ground plane.
   - Two points along the lateral arm, and projected onto the ground plane. This establishes the y axis.
   - One point at the 48 inch reference point on the lateral arm. This establishes the origin.
   - Three points on the left rear wheel or wheel cover. The Faro arm then computes the center point of the wheel.
   - One point to establish the height of the highest point on the roof of the vehicle.

Coordinate Measurements Calculated for S7D (Matlab Program)

Coordinate system: X,Y,Z positive rearward, to the right, and upward, respectively

Origin defined as follows: X axis: front axle, Y axis: vehicle centerline, Z axis: ground plane

	Ref X	Ref Y	Ref Z
Motion_PAK_Location in S7D (Matlab program) coordinate system	**69.666**	**-0.170**	**18.048**

Calculation Notes:

1. X axis value is the difference between the wheelbase and the calculated distance from the rear axle centerline to the IMU (the value must be positive and less than the wheelbase).

2. Y axis value is -48.00 (the Y axis offset of the measurement origin in the S7D coordinate system) plus the measured Y axis value (a negative value indicates the IMU is to the left of the vehicle centerline, and a positive value indicates it is to the right)

3. Z axis value is from the ground plane up to the center of the IMU (value must be positive).