

Robert Bosch LLC and the manufacturers whose vehicles are accessible using the CDR system. Print the CDR system 03/06/2023 and users to use the latest production release of the Crash Data Retrieval system software when viewing, printing or exporting any retrieved data from within the CDR program. Using the latest version of the CDR software is the best way to ensure that retrieved data has been translated using the most current information provided by the manufacturers of the vehicles supported by this product.

## CDR File Information

User Entered VIN	[REDACTED]
User	HH
Case Number	16058
EDR Data Imaging Date	06/06/2023
Crash Date	03/06/2023
Filename	[REDACTED].ACM.CDRX
Saved on	Tuesday, June 6 2023 at 11:57:59
Imaged with CDR version	Crash Data Retrieval Tool 23.1
Imaged with Software Licensed to (Company Name)	[REDACTED]
Reported with CDR version	Crash Data Retrieval Tool 23.1
Reported with Software Licensed to (Company Name)	[REDACTED]
EDR Device Type	Airbag Control Module
Event(s) recovered	Record 1

## Comments

No comments entered.

## Data Limitations

### AIRBAG CONTROL MODULE (ACM) DATA LIMITATIONS:

#### General Information:

These limitations are intended to assist you in reading the event data that has been imaged from the vehicle's Airbag Control Module (ACM). They are not intended to provide specific information regarding the interpretation of this data. Event data should be examined in conjunction with other available physical evidence from the vehicle and scene.

**Note:** The ACM's current DTC status will be altered if the ACM is powered-up without the vehicle periphery connected. This situation might occur when the CDR tool is connected directly to the ACM (e.g. for bench top imaging). It will not affect the stored EDR data, but may result in additional DTCs within the ACM.

**Note:** During bench top imaging, make sure the ACM is not moved, tilted or turned over while connected to and powered by the CDR Interface Module. Also, after a CDR imaging process, wait one minute after power is removed from the ACM before attempting to move the module. Not following these general ACM guidelines for bench top imaging could cause new events to be recorded in the ACM.

#### Recorded Crash Events:

This ACM is capable of recording up to 6 deployment events of front, side, rear or rollover events within its memory. Each record contains 5 seconds of pre-crash data and at least 300ms of post-crash data. Deployment events are locked into memory and cannot be overwritten. Non-deployment events can be overwritten by subsequent deployment or non-deployment events. The oldest non-deployment event will be overwritten first. Some ACMs stop over-writing of older non-deployment events by more recent non-deployment events after a certain number of events (more than 1000). Under these conditions, the storage of deployment events is still available. The event counter is incremented for each event and stored within the data record.

Deployment events are recorded, when a non-reversible restraint system was commanded to deploy. Recording of non-deployment events requires a minimum delta-V of 8km/h within a 150ms period in either longitudinal or lateral direction. Reversible restraint systems (e.g. active headrests) that have been commanded to deploy also trigger recording of a non-deployment event. Time Zero of an event is determined by the ACM's algorithms based on the acceleration and/or pressure sensors or a deployment command. Post-crash data (e.g. deployment time of restraint systems) is reported relative to Time Zero.

The ACM supports recording of multiple events. In case of a rapid sequence of events (e.g. a combined frontal and side event), the ACM will record the data within a common EDR entry (a so-called parallel event). In this case, the post-crash data is reported relative to Time Zero of the initial event. If the initial event has already ended and another event happens within a time period of 5s from Time Zero of the initial event, the ACM will record a multi-event consisting of two or more separate EDR entries.

If power to the ACM was lost during an event, all or part of the event data record may not have been recorded.

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The reported data elements may vary by vehicle model, model year or vehicle configuration. Part of the pre-crash data has been transmitted to the ACM by various vehicle control modules via the vehicle's communication network.

Time-continuous pre-crash data is recorded at two samples per second for 5 seconds before Time Zero. The main data elements are:

- Speed Vehicle Indicated: is reported as displayed by the vehicle's instrument cluster. The vehicle speed is evaluated as an average of wheel speeds and transmitted via the vehicle communication network to the ACM. Its data accuracy may be affected by various factors, such as significant changes in tire size from the factory settings, wheel lock-up or slip.
- Accelerator Pedal: is the ratio of the accelerator pedal's position compared to the fully depressed position (in percent). The pedal position sensor is wired to the Engine Control Module.
- Service Brake Activation: is the status of the brake pedal switch. The switch is wired to the Engine Control Module.
- Engine RPM (Combustion Engine): as reported by the Engine Control Module.
- Steering Input: as reported by the wheel angle sensor.
- ABS Activity: as reported by the Electronic Stability Control Module.
- Stability Control: as reported by the Electronic Stability Control Module. For this element the state "commanded off" is recorded if the stability control function was deactivated by the driver or if the sport modus was activated.

The pre-crash status is recorded 1 second before. The main data elements are:

- Safety Belt Status: as evaluated by the belt-switches that are wired to the ACM.
- Seat Track Position Switch: as evaluated by the seat track position sensors that are wired to the ACM.
- Airbag Warning Lamp, Status: as commanded by the ACM.
- Occupant Size Classification, Front Passenger: as reported by the occupant classification system.
- Frontal Airbag Disable Indicator Status: as commanded by the ACM.

Pre-crash and post-crash data are recorded asynchronously. The data element "Time from Last Speed Data Sample (Pre-crash) to Time Zero" indicates the time delay between the most recent pre-crash data sample and Time Zero (0 to 500ms).


Post-crash data is recorded after Time Zero up to 300ms. The Vehicle Roll Angle may be recorded for 5 seconds post-crash. The main data elements are:

- Event Type: indicates the event type depending on the algorithm that triggered the recording criteria first (deployment or Delta-V threshold).
- Multi-Event, Number of Events: determines the chronological order of records being part of a multi-event.
- Time from Previous / Initial Event to Current Event: indicates the time difference between records of multi-events.
- Delta-V Longitudinal / Lateral: are recorded every 10ms from Time Zero to 250ms. Delta-V reflects the change in velocity that the ACM experienced during the recorded time period. It does not necessarily correlate with vehicle traveling speed.
- Longitudinal / Lateral / Normal Acceleration: are recorded every 10ms from Time Zero to 250ms (if supported by the ACM). The reported range of acceleration may vary between ACM models. This ACM provides +/- 120g accelerometer range (longitudinal) and +/-120g accelerometer range (lateral).
- Clipping Time, Longitudinal / Lateral Acceleration Sensor: depending on the severity of the event, the measuring range of the longitudinal or lateral accelerometers may be exceeded. The data elements "Clipping Time, Longitudinal / Lateral Acceleration Sensor" indicate the time within an event when the measurement first exceeded the design range of the sensor. As a result, subsequent Delta-V values may be underestimated.
- Vehicle Roll Angle: is recorded every 100ms from 1 second before and up to 5 seconds after Time Zero. Due to mechanical limitations of the roll rate sensor, high accelerations, which can occur during front, side or rear crashes, can disturb the oscillating angular rate sensing element. This results in the roll rate data being temporarily invalid for a short period of time (at or shortly after Time Zero).
- Time to Deployment: indicates the time at which the ACM commanded the deployment of the associated restraint system.
- Time Maximum Delta-V: indicates the time at which the cumulative change in velocity reaches its maximum. For this element it could be possible that the reported time does not correspond to the real time of the maximum delta-v. This discrepancy is caused by a wrong internal resolution and it is fixed from the software version 0170/0370.
- Disposal: indicates whether the ACM commanded the disposal of the propellant from the associated restraint system. "No Disposal" indicates that the restraint system was commanded to deploy for occupant restraint purposes.
- Date and Time at Event: is reported as the date and time of the vehicle's clock at the time of an event. Since the vehicle clock may be adjusted manually, the reported values may not reflect the actual date and time of given event. As with the other data elements reported herein, these parameters should be examined in conjunction with other available physical evidence from the vehicle and scene.
- Complete File Recorded: indicates if the event data has been completely recorded to the ACM's memory or if the recording process has been interrupted before completion.

The status "Data not Available" is reported if the ACM was unable to store the data element (e.g. due to missing communication). "Invalid Data" reported if the ACM was unable to store valid data for the data element (e.g. range exceeded, communication failure, sensor failure).

**Data Sign Convention:**

Data Element Name	Positive Sign Notation Indicates
Longitudinal Acceleration	Forward
Delta-V, Longitudinal	Forward
Maximum Delta-V, Longitudinal	Forward
Lateral Acceleration	Left to Right

 Delta V Lateral	Left to Right	Page 3 of 19	Printed on: Tuesday, June 6 2023 at 11:59:04
Maximum Delta-V, Lateral	Left to Right		
Normal Acceleration	Downward		
Vehicle Roll Angle	Left to Right Rotation		
Steering Input	Righth Turn		

**Hexadecimal Data:**

Data that the vehicle manufacturer has specified for data retrieval is shown in the hexadecimal data section of the CDR report. The hexadecimal data section of the CDR report may contain data that is not translated by the CDR program. The control module contains additional data that is not retrievable by the CDR system.

14001\_VWG4000AL\_r003

**System Status at Event (Record 1, Most Recent)**

Event Counter at Event	1
Event Type	Frontal
Multi-Event, Number of Events	1. Event
Time from Initial Event to Current Event (msec)	Data Not Available
Time from Previous Event to Current Event (msec)	Data Not Available
Vehicle Clock, Date and Time at Event (YYYY-MM-DD, HH:MM:SS)	2023-06-03, 12:16:04
Vehicle Mileage (km)	38,610
Operating Time (min)	156,900
Ignition Cycle at Event (Cycles)	5,405
Ignition Cycle at Download (Cycles)	5,440
Maximum Delta-V, Longitudinal (MPH [km/h])	-8.1 [-13]
Time, Maximum Delta-V, Longitudinal (msec)	40.0
Clipping Time, Longitudinal Acceleration Sensor (msec)	Clipping Not Reached
Maximum Delta-V, Lateral (MPH [km/h])	0.0 [0]
Time, Maximum Delta-V, Lateral (msec)	32.5
Clipping Time, Lateral Acceleration Sensor (msec)	Clipping Not Reached
Time, Maximum Delta-V, Resultant (msec)	40.0
Time from Last Speed Data Sample (Precrash) to Time Zero (msec)	271
Time from Time Zero to Algorithm Start (Front) (msec)	Algorithm Started at Time Zero
Time from Time Zero to Algorithm Start (Side) (msec)	Algorithm Not Started
Time from Time Zero to Algorithm Start (Rear) (msec)	Algorithm Not Started
Time from Time Zero to Deployment (Rollover) (msec)	Algorithm not Deployed
Time from Time Zero to Algorithm Reset (Front) (msec)	83
Time from Time Zero to Algorithm Reset (Side) (msec)	Algorithm Not Reset
Time from Time Zero to Algorithm Reset (Rear) (msec)	Algorithm Not Reset
Time from Time Zero to Algorithm Reset (Rollover) (msec)	Algorithm Not Reset
Vehicle Identification Number (VIN)	[REDACTED]
FAZIT Identification String	8AY-AL113.05.2000040418
Part Number, ACM	1EA959655AF
Software Version, ACM	0366
Serial Number ECU	U133HyE00F8
Production Date, ACM	0D0514
Part Number, ACM Software	-----
Supplier ID, ACM	8AY
Supply Voltage (Before Event) (V)	14.6
Complete File Recorded	Completed Successfully

**Deployment Command Data (Record 1, Most Recent)**

Pretensioner, Time to 1st Stage Deployment, Driver (msec)	Not Deployed
Belt-Load Limiter, Time to Deployment, Driver (msec)	Not Deployed
Sill-End Pretensioner, Time to Deployment, Driver (msec)	Not Deployed
Frontal Airbag, Time to 1st Stage Deployment, Driver (msec)	Not Deployed
Frontal Airbag, Time to 2nd Stage Deployment, Driver (msec)	Not Deployed
Frontal Airbag, 2nd Stage Disposal, Driver	Not Deployed
Frontal Airbag, Time to 3rd Stage (Vent) Deployment, Driver (msec)	Not Deployed
Frontal Airbag, 3rd Stage (Vent) Disposal, Driver	Not Deployed
Knee Airbag, Time to Deployment, Driver (msec)	Not Deployed
Side Airbag, Time to 1st Stage Deployment, Driver (msec)	Not Deployed
Side Curtain/Tube Airbag, Time to Deployment, Driver Side (msec)	Not Deployed
Pretensioner, Time to 1st Stage Deployment, Front Passenger (msec)	Not Deployed
Belt-Load Limiter, Time to Deployment, Front Passenger (msec)	Not Deployed
Sill-End Pretensioner, Time to Deployment, Front Passenger (msec)	Not Deployed
Frontal Airbag, Time to 1st Stage Deployment, Front Passenger (msec)	Not Deployed
Frontal Airbag, Time to 2nd Stage Deployment, Front Passenger (msec)	Not Deployed
Frontal Airbag, 2nd Stage Disposal, Front Passenger	Not Deployed
Frontal Airbag, Time to 3rd Stage (Vent) Deployment, Front Passenger (msec)	Not Deployed
Frontal Airbag, 3rd Stage (Vent) Disposal, Front Passenger	Not Deployed
Knee Airbag, Time to Deployment, Front Passenger (msec)	Not Deployed
Side Airbag, Time to 1st Stage Deployment, Front Passenger (msec)	Not Deployed
Side Curtain/Tube Airbag, Time to Deployment, Passenger Side (msec)	Not Deployed
Pretensioner, Time to 1st Stage Deployment, 2nd Row, Driver Side (msec)	Not Deployed
Pretensioner, Time to 1st Stage Deployment, 2nd Row, Passenger Side (msec)	Not Deployed
Side Airbag, Time to 1st Stage Deployment, 2nd Row, Driver Side (msec)	Not Deployed
Side Airbag, Time to 1st Stage Deployment, 2nd Row, Passenger Side (msec)	Not Deployed
Rollover Protection System, Time to Deployment, Driver (msec)	Not Deployed
Rollover Protection System, Time to Deployment, Passenger (msec)	Not Deployed
Battery Disconnect, Time to Deployment (msec)	Not Deployed
High-Voltage Battery Deactivation, Time to Deployment (msec)	Not Deployed

**Pre-Crash Data -1 Sec (Record 1, Most Recent)**

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Safety Belt Status, Driver	Belted
Seat Track Position Switch Status, Driver	Data Not Available
Occupant Size Classification, Driver	Data Not Available
Safety Belt Status, Front Passenger	Not Belted
Seat Track Position Switch Status, Front Passenger	Data Not Available
Occupant Size Classification, Front Passenger	Data Not Available
Frontal Airbag Disable Indicator Status, Passenger	Off
Airbag Warning Lamp, Status	Off
Frontal Airbag Suppression Switch Status, Front Passenger	Not Suppressed

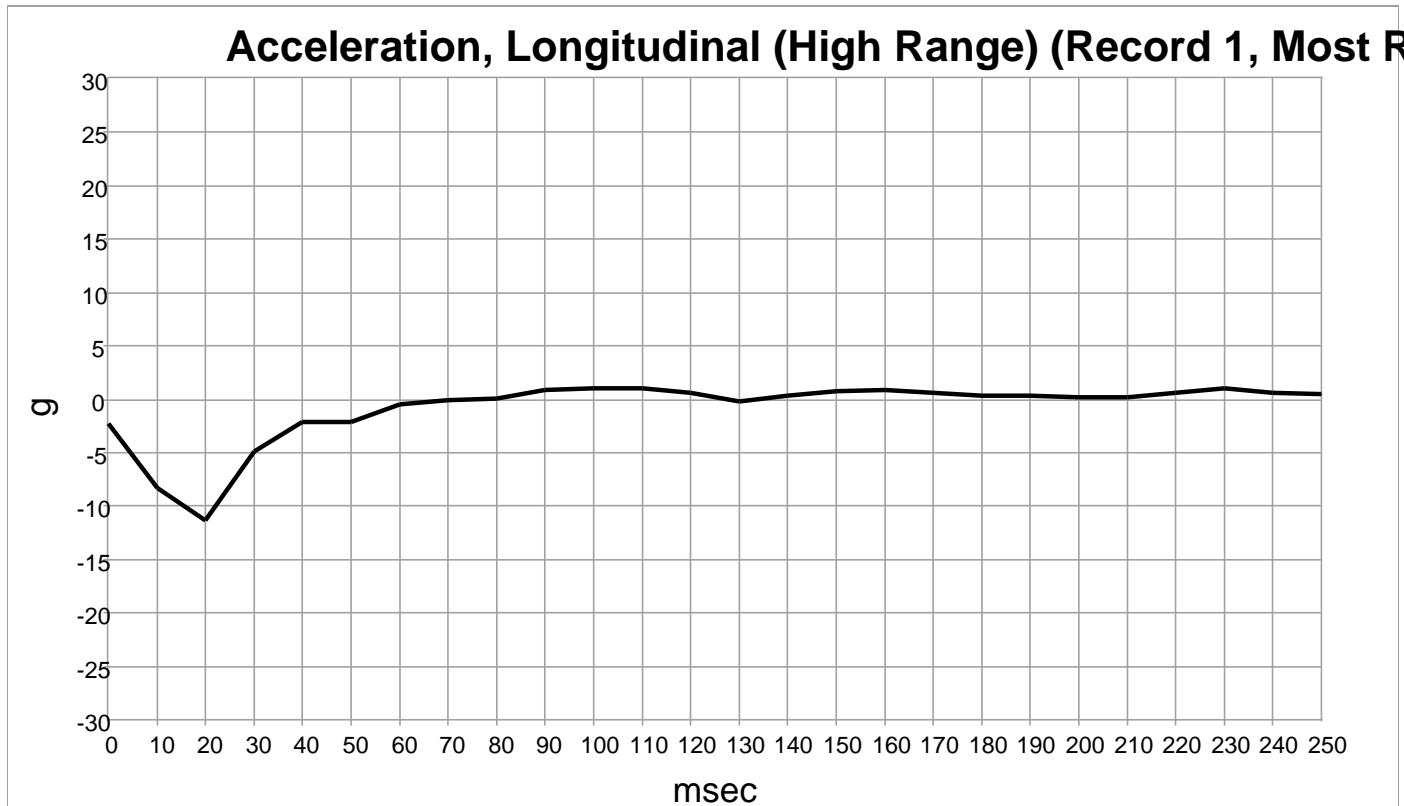
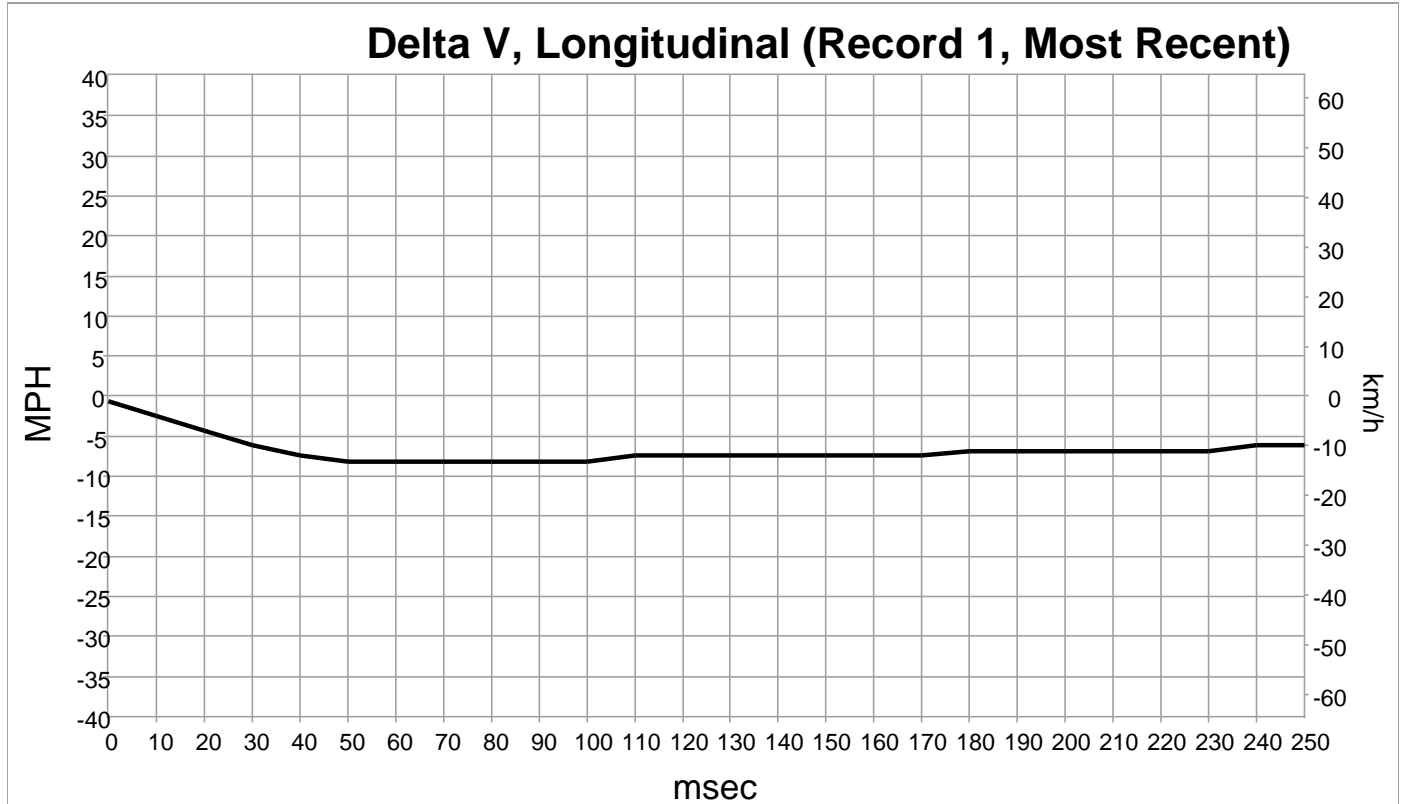
**Pre-Crash Data -5 to 0 sec (Record 1, Most Recent) - Table 1 of 2**

Time (sec)	Engine RPM (Combustion Engine) (RPM)	ABS Activity	Stability Control	Steering Input (deg)	Speed, Vehicle Indicated (MPH [km/h])	Accelerator Pedal (%)	Service Brake Activation	Engine RPM, Electrical Engine 1 (RPM)
-5.0	Invalid Data	No ABS Activity	No ESC Activity	12	12 [19]	0	Off	Data Not Available
-4.5	Invalid Data	No ABS Activity	No ESC Activity	14	10 [16]	0	Off	Data Not Available
-4.0	Invalid Data	No ABS Activity	No ESC Activity	18	9 [14]	0	Off	Data Not Available
-3.5	Invalid Data	No ABS Activity	No ESC Activity	18	7 [11]	0	Off	Data Not Available
-3.0	Invalid Data	No ABS Activity	No ESC Activity	18	6 [9]	0	Off	Data Not Available
-2.5	Invalid Data	No ABS Activity	No ESC Activity	18	5 [8]	0	Off	Data Not Available
-2.0	Invalid Data	No ABS Activity	No ESC Activity	16	4 [7]	0	Off	Data Not Available
-1.5	Invalid Data	No ABS Activity	No ESC Activity	16	4 [6]	0	Off	Data Not Available
-1.0	Invalid Data	No ABS Activity	No ESC Activity	14	4 [6]	30	Off	Data Not Available
-0.5	Invalid Data	No ABS Activity	No ESC Activity	0	6 [9]	90	Off	Data Not Available
0.0	Invalid Data	No ABS Activity	No ESC Activity	0	11 [18]	100	Off	Data Not Available

**Pre-Crash Data -5 to 0 sec (Record 1, Most Recent) - Table 2 of 2**

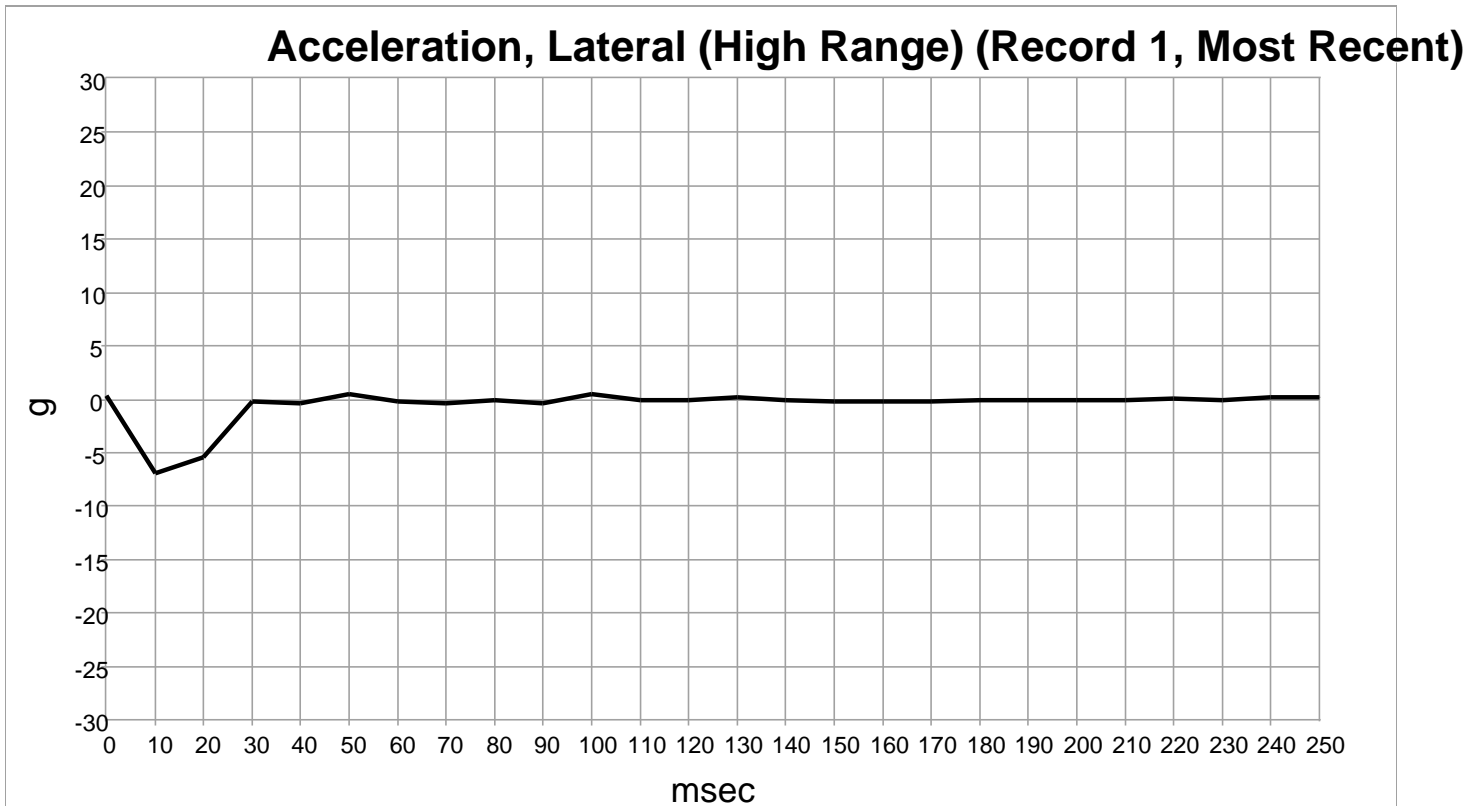
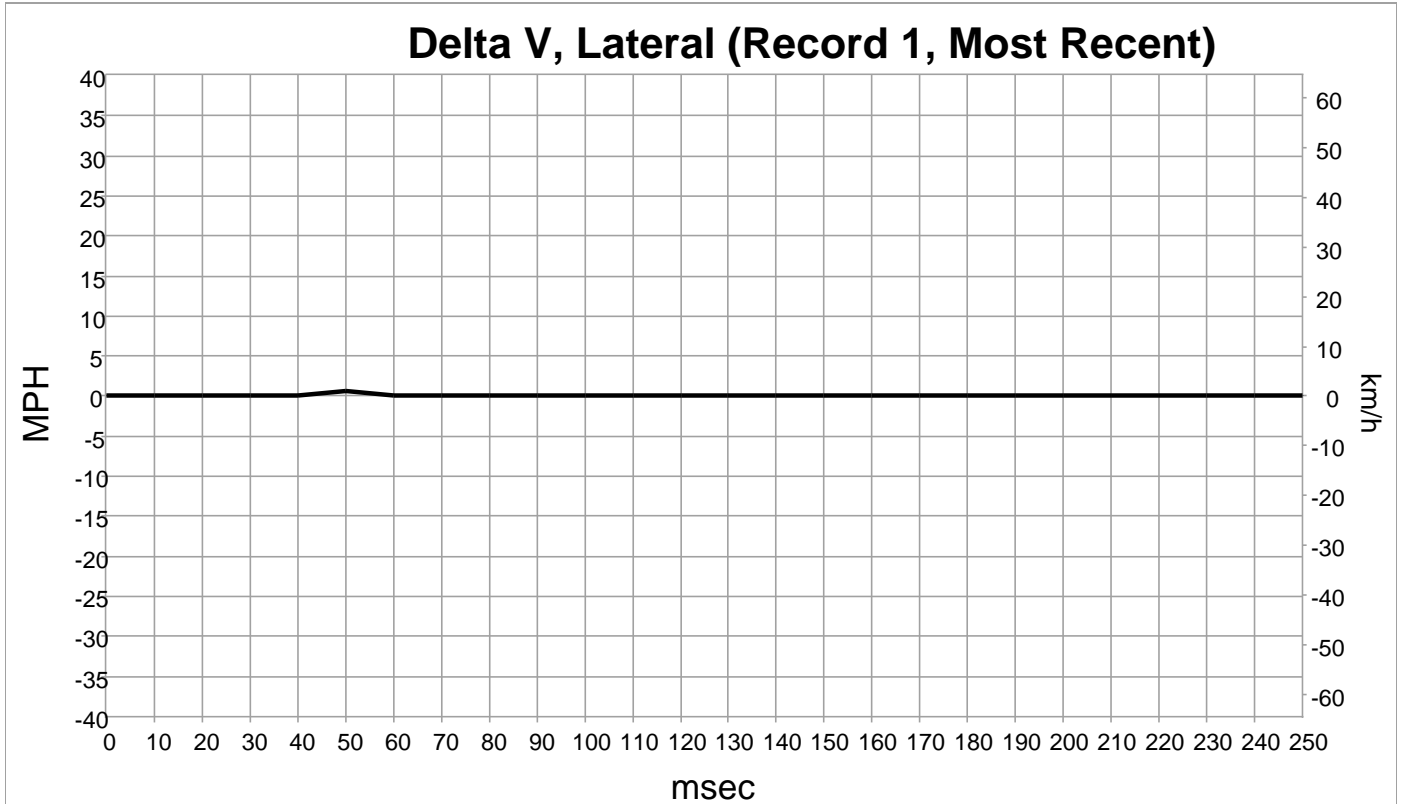
<b>Time (sec)</b>	<b>Engine RPM, Electrical Engine 2 (RPM)</b>	<b>Qualifyier Stability Control Function</b>
-5.0	Data Not Available	ESP System no Failure
-4.5	Data Not Available	ESP System no Failure
-4.0	Data Not Available	ESP System no Failure
-3.5	Data Not Available	ESP System no Failure
-3.0	Data Not Available	ESP System no Failure
-2.5	Data Not Available	ESP System no Failure
-2.0	Data Not Available	ESP System no Failure
-1.5	Data Not Available	ESP System no Failure
-1.0	Data Not Available	ESP System no Failure
-0.5	Data Not Available	ESP System no Failure
0.0	Data Not Available	ESP System no Failure





**Longitudinal Crash Pulse (Record 1, Most Recent)**

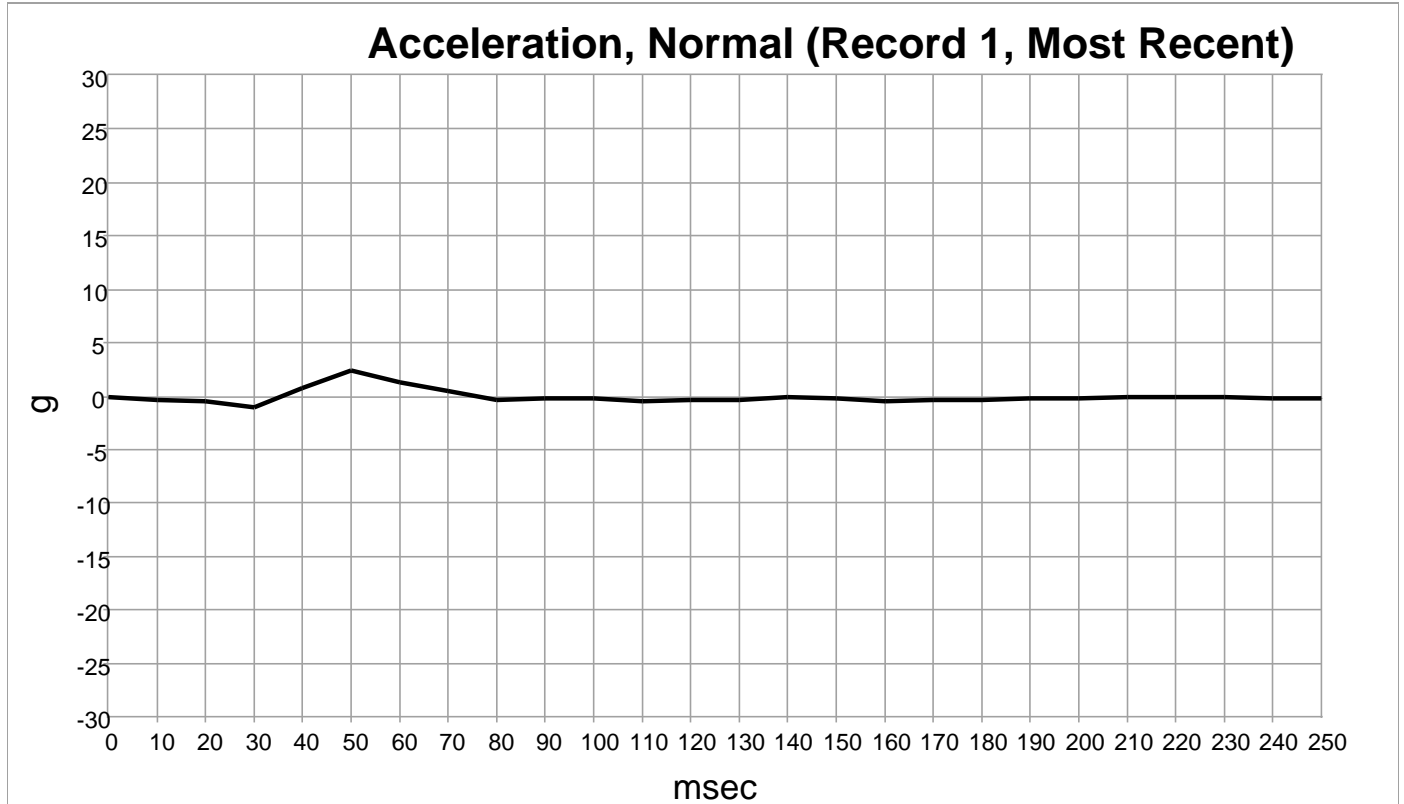
<b>Time (msec)</b>	<b>Delta-V, Longitudinal (MPH [km/h])</b>	<b>Longitudinal Acceleration High Range (g)</b>
0	-0.6 [-1]	-2.25
10	-2.5 [-4]	-8.25
20	-4.3 [-7]	-11.31
30	-6.2 [-10]	-4.94
40	-7.5 [-12]	-2.06
50	-8.1 [-13]	-2.13
60	-8.1 [-13]	-0.50
70	-8.1 [-13]	-0.13
80	-8.1 [-13]	0.06
90	-8.1 [-13]	0.88
100	-8.1 [-13]	1.00
110	-7.5 [-12]	1.06
120	-7.5 [-12]	0.63
130	-7.5 [-12]	-0.19
140	-7.5 [-12]	0.31
150	-7.5 [-12]	0.81
160	-7.5 [-12]	0.88
170	-7.5 [-12]	0.56
180	-6.8 [-11]	0.31
190	-6.8 [-11]	0.31
200	-6.8 [-11]	0.25
210	-6.8 [-11]	0.25
220	-6.8 [-11]	0.56
230	-6.8 [-11]	1.00
240	-6.2 [-10]	0.63
250	-6.2 [-10]	0.50



**Lateral Crash Pulse (Record 1, Most Recent)**

<b>Time (msec)</b>	<b>Delta-V, Lateral (MPH [km/h])</b>	<b>Lateral Acceleration High Range (g)</b>
0	0.0 [0]	0.38
10	0.0 [0]	-6.88
20	0.0 [0]	-5.44
30	0.0 [0]	-0.25
40	0.0 [0]	-0.38
50	0.6 [1]	0.44
60	0.0 [0]	-0.25
70	0.0 [0]	-0.31
80	0.0 [0]	-0.13
90	0.0 [0]	-0.38
100	0.0 [0]	0.44
110	0.0 [0]	-0.13
120	0.0 [0]	-0.13
130	0.0 [0]	0.19
140	0.0 [0]	-0.13
150	0.0 [0]	-0.19
160	0.0 [0]	-0.19
170	0.0 [0]	-0.19
180	0.0 [0]	-0.13
190	0.0 [0]	-0.13
200	0.0 [0]	0.00
210	0.0 [0]	-0.06
220	0.0 [0]	0.06
230	0.0 [0]	0.00
240	0.0 [0]	0.19
250	0.0 [0]	0.19

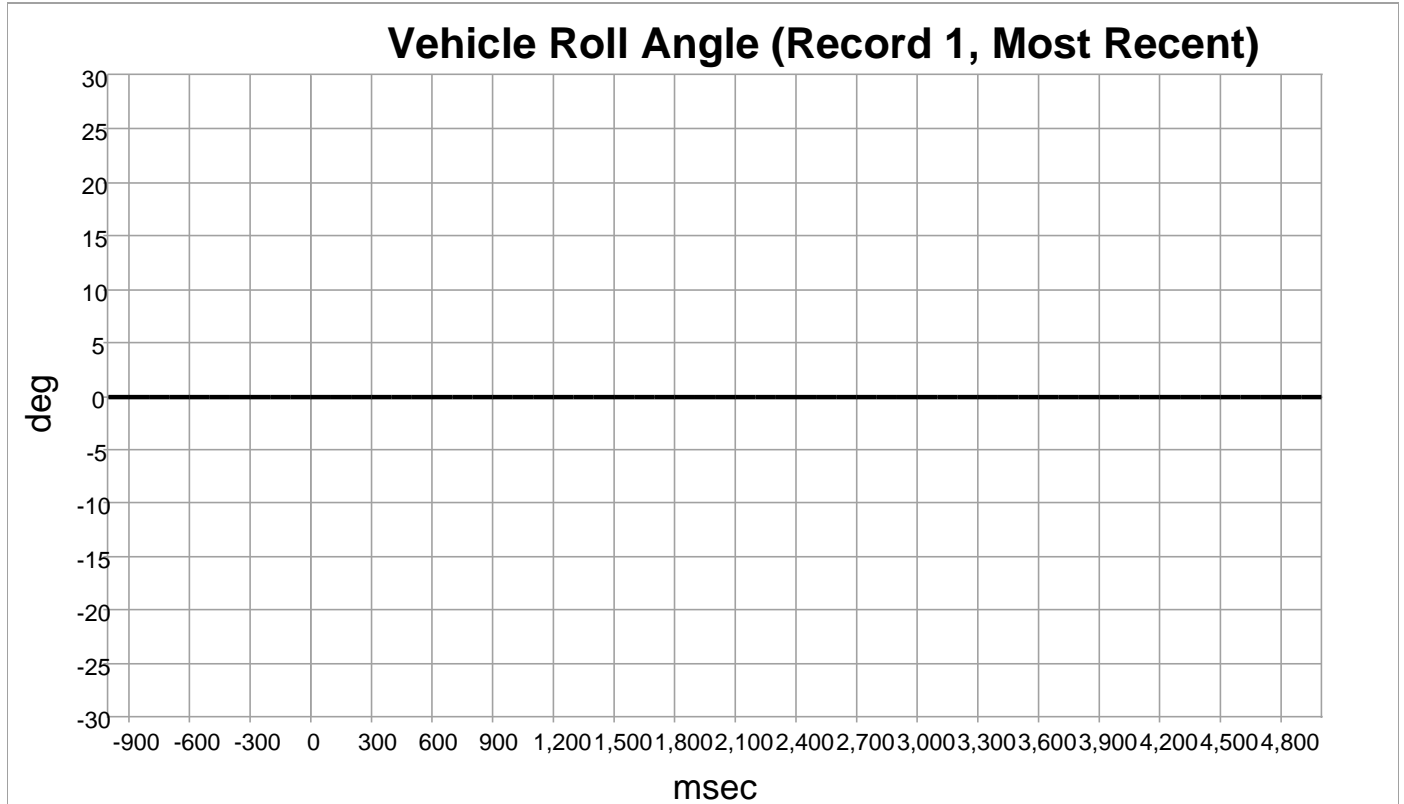
**Normal Acceleration (Record 1, Most Recent)**



Time (msec)	Normal Acceleration (g)
0	0.0
10	-0.4
20	-0.5
30	-1.0
40	0.8
50	2.4
60	1.3
70	0.5
80	-0.3
90	-0.2
100	-0.2
110	-0.5
120	-0.4
130	-0.3
140	-0.1
150	-0.2
160	-0.5
170	-0.3
180	-0.3
190	-0.2
200	-0.2
210	-0.1
220	-0.1
230	-0.1
240	-0.2

<b>Time (msec)</b>	<b>Normal Acceleration (g)</b>
250	-0.2

**Vehicle Roll Angle (Record 1, Most Recent)**



Time (msec)	Vehicle Roll Angle (deg)
-1000	0
-900	0
-800	0
-700	0
-600	0
-500	0
-400	0
-300	0
-200	0
-100	0
0	0
100	0
200	0
300	0
400	0
500	0
600	0
700	0
800	0
900	0
1000	0
1100	0
1200	0
1300	0
1400	0

<b>Time (msec)</b>	<b>Vehicle Roll Angle (deg)</b>
1500	0
1600	0
1700	0
1800	0
1900	0
2000	0
2100	0
2200	0
2300	0
2400	0
2500	0
2600	0
2700	0
2800	0
2900	0
3000	0
3100	0
3200	0
3300	0
3400	0
3500	0
3600	0
3700	0
3800	0
3900	0
4000	0
4100	0
4200	0
4300	0
4400	0
4500	0
4600	0
4700	0
4800	0
4900	0
5000	0



**Hexadecimal Data**

```
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FA11 03 00 07
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    19 02 17 80 25 7D 4F 7D DF 7F E6 7F D9 80 2B 7F
    E6 7F E0 7F F2 7F D9 80 2B 7F F2 7F F2 80 12 7F
    F2 7F EC 7F EC 7F EC 7F F2 7F F2 7F FF 7F F9 80
    05 7F FF 80 12 80 12 00 17 64 19 02 17 7F 1E 7C
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    00 3E FF FF 00 3F FF FF 00 41 FF FF 00 42 FF FF
    00 43 FF FF 00 47 01 00 48 FF 00 49 FF 00 4B 00
    00 4C 00 00 4D 00 00 4E FF 00 4F FF 00 51 00 00
    5B 13 10 0E 0B 09 08 07 06 06 09 12 00 5C 00 00
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    2D 2D 2D 2D 2D 2D 2D 2D 2D 2D 03 E5 31 45 41
    39 35 39 36 35 35 41 46 03 E8 A5 03 E9 15 1D 03
    EA 15 40 03 EB 7B 03 EC 06 03 ED 03 03 EE 0C 03
    EF 10 03 F0 04 03 F1 0F 15 03 F2 02 64 E4 03 F3
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FA14 00 00
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Geschwindigkeit

Gaspedal

Lenkrad

[REDACTED]

FA15 00 00

FA16 00 00

FA17 00 00

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