IMPORTANT NOTICE: Robert Bosch LLC and the manufacturers whose vehicles are accessible using the CDR System urge end 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	[redacted]
Case Number	[redacted]
EDR Data Imaging Date	[redacted]
Crash Date	[redacted]
Filename	[redacted]
Saved on	[redacted]
Imaged with CDR version	Crash Data Retrieval Tool 19.4
Imaged with Software Licensed to (Company Name)	Connecticut Transportation Institute
Reported with CDR version	Crash Data Retrieval Tool 19.4
Reported with Software Licensed to (Company Name)	Connecticut Transportation Institute
EDR Device Type	Airbag Control Module
Event(s) recovered	Deployment

Comments

No comments entered.

Data Limitations

Recorded Crash Events:

There are two types of recorded crash events. The first is the Non-Deployment Event. A Non-Deployment Event records data but does not deploy the air bag(s). The minimum SDM Recorded Vehicle Velocity Change, that is needed to record a Non-Deployment Event, is five MPH. A Non-Deployment Event may contain Pre-Crash and Crash data. The SDM can store up to one Non-Deployment Event. This event can be overwritten by an event that has a greater SDM recorded vehicle velocity change. This event will be cleared by the SDM, after approximately 250 ignition cycles. This event can be overwritten by a second Deployment Event, referred to as Deployment Event #2, if the Non-Deployment Event is not locked. The data in the Non-Deployment Event file will be locked, if the Non-Deployment Event occurred within five seconds of a Deployment Event. A locked Non Deployment Event cannot be overwritten or cleared by the SDM.

The second type of SDM recorded crash event is the Deployment Event. It also may contain Pre-Crash and Crash data. The SDM can store up to two different Deployment Events. If a second Deployment Event occurs any time after the Deployment Event, the Deployment Event #2 will overwrite any non-locked Non-Deployment Event. Deployment Events cannot be overwritten or cleared by the SDM. Once the SDM has deployed an air bag, the SDM must be replaced.

Data:

-SDM Recorded Vehicle Velocity Change reflects the change in velocity that the sensing system experienced during the recorded portion of the event. SDM Recorded Vehicle Velocity Change is the change in velocity during the recording time and is not the speed the vehicle was traveling before the event, and is also not the Barrier Equivalent Velocity. For Deployment Events, the SDM will record 220 milliseconds of data after Deployment criteria is met and up to 70 milliseconds before Deployment criteria is met. For Non-Deployment Events, the SDM can record up to the first 300 milliseconds of data after algorithm enable. Velocity Change data is displayed in SAE sign convention.

-The CDR tool displays time from Algorithm Enable (AE) to time of Deployment command in a Deployment event and AE to time of maximum SDM recorded vehicle velocity change in a Non-Deployment event. Time from AE begins when the first air bag system enable threshold is met and ends when Deployment command criteria is met or at maximum SDM recorded vehicle velocity change. Air bag systems such as frontal, side, or rollover, may be a source of an enable. The time represented in a CDR report can be that of the enable of one air bag system to the Deployment time of another air bag system.

-Maximum Recorded Vehicle Velocity Change is the maximum square root value of the sum of the squares for the vehicle's combined "X" and "Y" axis change in velocity.

-Event Recording Complete will indicate if data from the recorded event has been fully written to the SDM memory or if it has been interrupted and not fully written.

-SDM Recorded Vehicle Speed accuracy can be affected by various factors, including but not limited to the following:

- -Significant changes in the tire's rolling radius
- -Final drive axle ratio changes
- -Wheel lockup and wheel slip

-Brake Switch Circuit Status indicates the open/closed state of the brake switch circuit.
-Pre-Crash data is recorded asynchronously. The 1.0 second Pre-crash data value (most recent recorded data point) is the data point last sampled before AE. That is to say, the last data point may have been captured just before AE but no more than 1.0 second before AE. All subsequent Pre-crash data values are referenced from this data point.
-Pre-Crash Electronic Data Validity Check Status indicates “Data Invalid” if:
    -The SDM receives a message from the module sending the pre-crash data
    -No data is received from the module with an “invalid” flag sending the pre-crash data
    -No module present to send the pre-crash data
-Pre-crash data associated with this event will always be for the first event even if it is not recorded.
-Driver’s and Passenger’s Belt Switch Circuit Status indicates the status of the seat belt switch circuit.
-The Time Between Non-Deployment to Deployment Events is displayed in seconds. If the time between the two events is greater than five seconds, “N/A” is displayed in place of the time. If the value is negative, then the Deployment Event occurred first. If the value is positive, then the Non-Deployment Event occurred first.
-If power to the SDM is lost during a crash event, all or part of the crash record may not be recorded.
-All data should be examined in conjunction with other available physical evidence from the vehicle and scene.

Data Source:
All SDM recorded data is measured, calculated, and stored internally, except for the following:
-Vehicle Status Data (Pre-Crash) is transmitted to the SDM, by various vehicle control modules, via the vehicle’s communication network.
-The Belt Switch Circuit is wired directly to the SDM.

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 tool.

01013_SDMDS_r006

Multiple Event Data

Associated Events Not Recorded	0
An Event(s) Preceded the Recorded Event(s)	No
An Event(s) was in Between the Recorded Event(s)	No
An Event(s) Followed the Recorded Event(s)	No
The Event(s) Not Recorded was a Deployment Event(s)	No
The Event(s) Not Recorded was a Non-Deployment Event(s)	No

System Status At 1 second

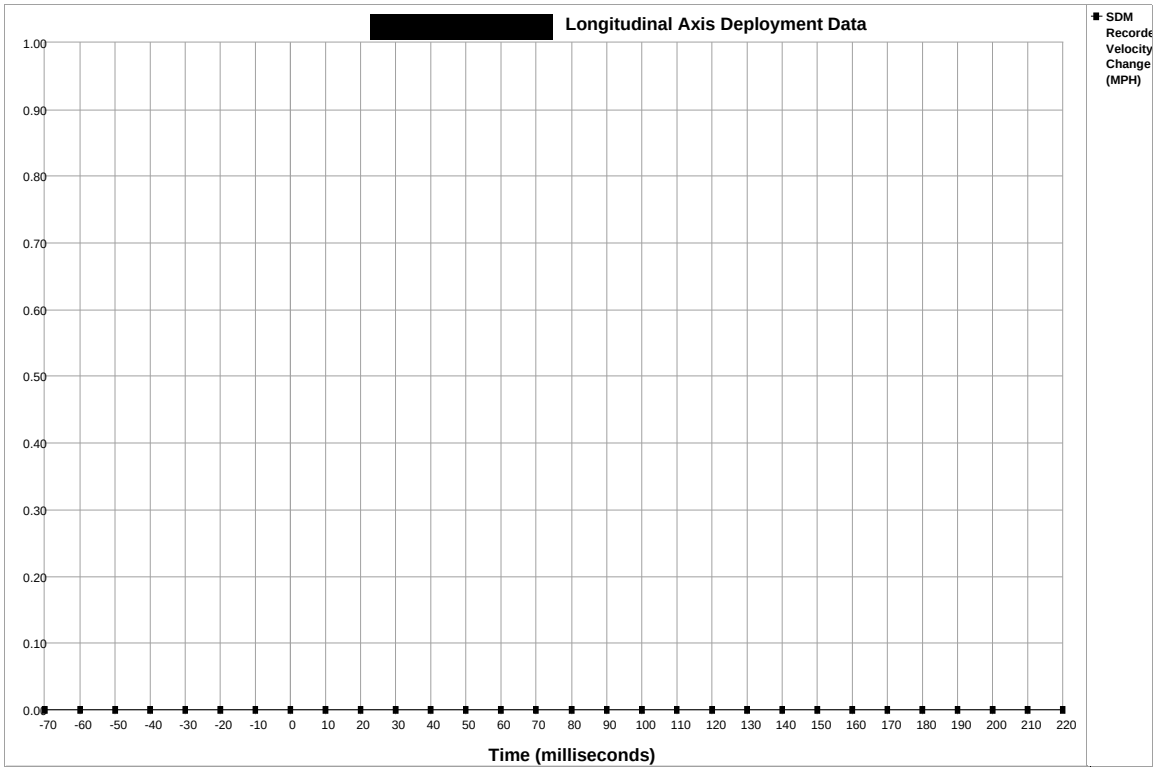
Left Front Door Ajar	No
Right Front Door Ajar	No
Left Rear Door Ajar	No
Right Rear Door Ajar	No

Pre-Crash Data

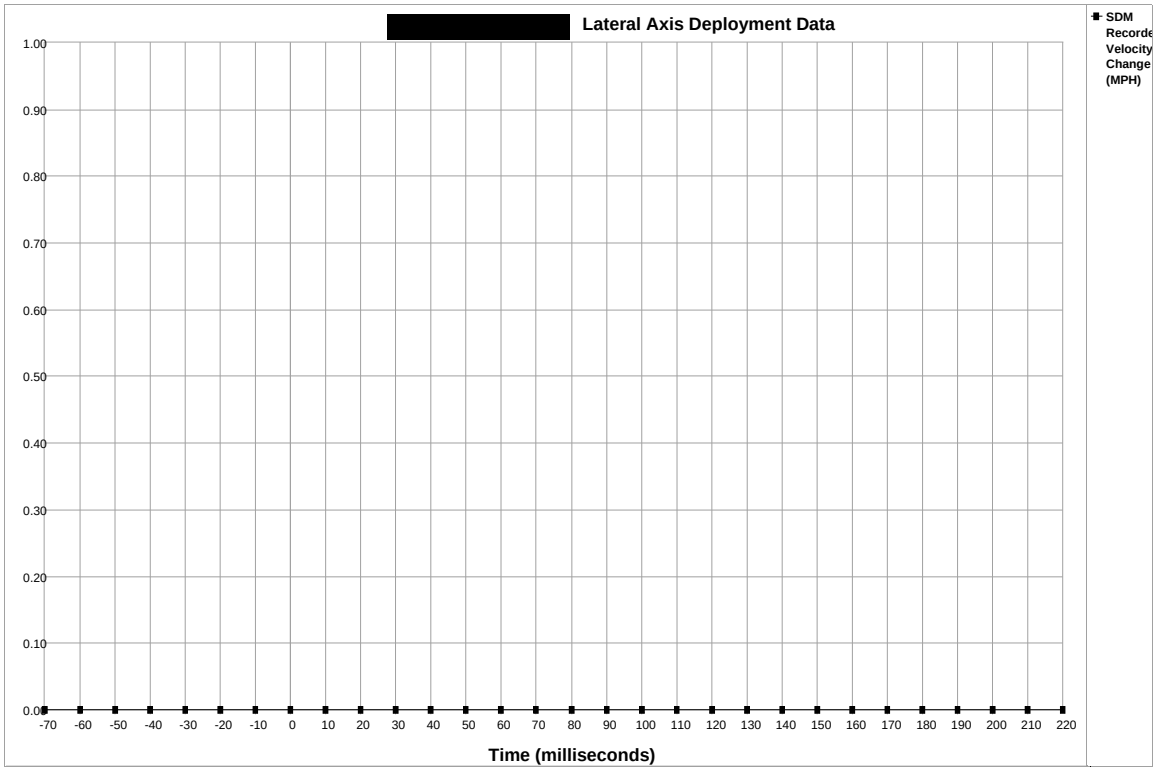
Parameter	-5 sec	-4 sec	-3 sec	-2 sec	-1 sec
Vehicle Speed (MPH)	78	78	77	77	76
Engine Speed (RPM)	2176	2176	2176	2112	2048
Percent Throttle	22	22	22	22	0
Brake Switch Circuit State	OFF	OFF	OFF	OFF	OFF

System Status At Deployment

SIR Warning Lamp Status	OFF
SIR Warning Lamp ON/OFF Time Continuously (seconds)	655350
Number of Ignition Cycles SIR Warning Lamp was ON/OFF Continuously	11404
Ignition Cycles At Investigation	22047
Ignition Cycles At Event	22046
Ignition Cycles Since DTCs Were Last Cleared	255
Driver's Belt Switch Circuit Status	BUCKLED
Passenger's Belt Switch Circuit Status	UNBUCKLED
Driver Seat Position Switch Circuit Status	Rearward
Passenger Seat Position Switch Circuit Status	Rearward
Automatic Passenger SIR Suppression System Status at AE	Air Bag Suppressed
Rollover Sensor Status	Rollover Event
Number of Consecutive Error Free Messages Received From Rollover Sensor	Last 8 Consecutive Messages Were Error Free
SDM Synchronization Counter	27924
Side Air Bag(s) Were First Commanded to Deploy Due to Side Impact Event	No
Side Air Bag(s) Were First Commanded to Deploy Due to Rollover Event	Yes
Driver 1st Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Driver 2nd Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Passenger 1st Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Passenger 2nd Stage Time From Algorithm Enable to Deployment Command Criteria Met (msec)	N/A
Driver Thorax/Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	318.75
Passenger Thorax/Curtain Time From Algorithm Enable to Deployment Command Criteria Met (msec)	318.75
Driver 1st Stage Deployment Loop Commanded	No
Driver 2nd Stage Deployment Loop Commanded	No
Driver Side Deployment Loop Commanded	No
Driver Pretensioner Deployment Loop Commanded	Yes
Driver Roof Rail/Head Curtain Loop Commanded (If Equipped)	Yes
Supplemental Deployment Loop #1 Commanded (If Equipped)	No
Passenger 1st Stage Deployment Loop Commanded	No
Passenger 2nd Stage Deployment Loop Commanded	No
Passenger Side Deployment Loop Commanded	No
Passenger Pretensioner Deployment Loop Commanded	Yes
Passenger Roof Rail/Head Curtain Loop Commanded (If Equipped)	Yes
Supplemental Deployment Loop #2 Commanded (If Equipped)	No
Second Row Left Side Deployment Loop Commanded	No
Second Row Left Pretensioner Deployment Loop Commanded (If Equipped)	No
Supplemental Deployment Loop #3 Commanded (If Equipped)	No
Second Row Right Side Deployment Loop Commanded (If Equipped)	No
Second Row Right Pretensioner Deployment Loop Commanded	No
Supplemental Deployment Loop #4 Commanded (If Equipped)	No
Second Row Center Pretensioner Deployment Loop Commanded	No
Diagnostic Trouble Codes at Event, fault number: 1	N/A
Diagnostic Trouble Codes at Event, fault number: 2	N/A
Diagnostic Trouble Codes at Event, fault number: 3	N/A
Diagnostic Trouble Codes at Event, fault number: 4	N/A
Diagnostic Trouble Codes at Event, fault number: 5	N/A
Diagnostic Trouble Codes at Event, fault number: 6	N/A
Diagnostic Trouble Codes at Event, fault number: 7	N/A
Diagnostic Trouble Codes at Event, fault number: 8	N/A
Diagnostic Trouble Codes at Event, fault number: 9	N/A
Crash Record Locked	Yes
Vehicle Event Data (Pre-Crash) Associated With This Event	Yes
Event Recording Complete	Yes



Time (milliseconds)	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70
SDM Longitudinal Axis Recorded Velocity Change (MPH)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time (milliseconds)	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220
SDM Longitudinal Axis Recorded Velocity Change (MPH)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00



Time (milliseconds)	-70	-60	-50	-40	-30	-20	-10	0	10	20	30	40	50	60	70
SDM Lateral Axis Recorded Velocity Change (MPH)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Time (milliseconds)	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220
SDM Lateral Axis Recorded Velocity Change (MPH)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Hexadecimal Data

$01	B0	5C	00	F2	B8	6F
$02	00	00	00	00	F8	FF
$03	FF	FF	FF	FF	00	00
$04	00	F8	00	00	00	00
$05	3F	0C	00	67	C0	E2
$06	3F	0C	00	67	C0	E2
$07	00	00	C0	00	72	00
$08	00	08	08	50	50	00
$09	04	64	04	64	7F	00
$0A	00	00	00	00	00	00
$0B	00	FE	00	00	FE	00
$12	FF	7F	00	84	40	00
$17	07	07	07	07	00	00
$18	07	07	00	00	00	00
$19	00	07	07	00	00	00
$1A	00	00	00	00	00	00
$1B	01	01	00	00	00	00
$1C	01	01	00	01	00	01
$1D	2B	00	00	00	00	88
$1E	4F	00	00	00	00	88
$1F	7D	7C	0D	0D	FC	F0
$20	20	8C	03	00	00	00
$21	7F	80	7F	7F	80	7F
$22	C0	00	00	00	00	00
$23	80	00	49	00	01	00
$24	FF	FF	56	1F	00	00
$25	82	C0	00	00	00	00
$26	00	37	37	37	37	00
$27	00	01	01	01	01	01
$29	20	21	22	22	22	00
$2A	3D	3E	3E	3F	3F	00
$2B	00	00	00	00	00	80
$2C	01	01	00	01	00	40
$2F	00	00	00	00	00	80
$30	00	00	00	00	00	80
$36	00	00	00	00	00	00
$37	00	FF	00	00	00	00
$38	00	00	00	00	00	00
$39	00	FF	FF	FF	FF	00
$3A	FF	FF	FF	00	00	00
$3B	00	00	00	00	00	00
$3C	00	00	00	00	00	00
$3D	00	00	00	00	00	00
$3E	FF	FF	FF	FF	FF	FF
$3F	FF	FF	FF	FF	FF	FF
$40	FF	FF	FF	FF	FF	FF
$41	FF	FF	FF	FF	FF	FF
$42	FF	FF	FF	FF	FF	FF
$43	FF	FF	FF	FF	FF	FF
$44	FF	FF	FF	FF	FF	FF
$45	FF	FF	FF	FF	FF	FF
$46	FF	FF	FF	FF	FF	FF
$47	FF	FF	FF	FF	FF	FF
$48	FF	FF	FF	00	00	00
$49	00	00	00	00	00	00
$4A	00	00	FF	FF	00	00
$4B	FF	FF	FF	FF	FF	FF
$4C	FF	FF	FF	FF	FF	FF
$4D	00	00	00	00	00	00
$4E	FF	FF	FF	FF	FF	FF
$4F	FF	00	00	00	00	00

```
$50  80 A5 00 00 00 00
$51  18 18 00 00 00 00
$52  00 FF FF 2C 8C 00
$53  FF 56 1E 00 00 00
$54  FF FF FF FF FF FF
$55  FF FF FF FF FF FF
$56  FF FF FF FF FF FF
$57  00 00 00 00 00 00
$58  00 00 00 00 00 00
$59  00 00 00 00 00 00
$5A  00 00 00 00 00 00
$5B  00 00 00 00 00 00
$5C  00 00 00 00 00 00
$5D  00 00 00 00 00 00
$5E  00 00 00 00 00 00
$5F  00 00 00 00 00 00
$60  00 00 00 00 00 00
$61  00 00 00 00 00 00
$62  D0 00 00 50 00 00
$63  00 80 6D 14 9C 00
$64  00 00 00 00 03 03
$65  00 00 00 00 00 00
$66  00 C0 00 00 00 00
$67  00 00 00 00 00 FF
$68  FF 00 00 00 00 00
$70  00 00 00 00 00 00
$71  00 00 00 00 00 00
$72  00 00 00 00 00 00
$73  00 00 00 00 00 00
$74  00 00 00 00 00 00
$75  00 00 00 00 00 00
$76  00 00 00 00 00 00
$77  00 00 00 00 00 00
$78  00 00 00 00 00 00
$79  00 FF 00 00 00 00
$80  00 00
$81  3F 0C 00 67 C0 E2
$82  48 08 EC 58
```

Disclaimer of Liability

The users of the CDR product and reviewers of the CDR reports and exported data shall ensure that data and information supplied is applicable to the vehicle, vehicle's system(s) and the vehicle ECU. Robert Bosch LLC and all its directors, officers, employees and members shall not be liable for damages arising out of or related to incorrect, incomplete or misinterpreted software and/or data. Robert Bosch LLC expressly excludes all liability for incidental, consequential, special or punitive damages arising from or related to the CDR data, CDR software or use thereof.