



Verizon Telematics Technical Information Bulletin

HARD BRAKE & HARD ACCELERATION

Purpose

The main purpose of the hard brake and hard acceleration feature is to provide users the ability to detect driver behavior patterns which can be addressed in order to reduce fuel usage and maintenance costs, and improve fleet safety.

Hard Brake – How it works on the 5500 hardware

Verizon Telematics defines a hard brake event as a sudden decrease in speed greater than a minimum threshold as configured on the 5500 unit, causing excessive force when stopping or slowing the vehicle down. The minimum thresholds that the Verizon Telematics 5500 unit will send for hard braking events are:

Light and Medium Duty vehicles: 8.77 MPH/s | 14.11 KPH/s (0.40g)

Heavy vehicles: 4.82 MPH/s | 7.76 KPH/s (0.22g)

The maximum threshold for hard braking detection is 21.93 MPH/s | 35.29 KPH/s. Events above this threshold will still be captured by the Verizon Telematics 5500, however, regardless of the severity above this level the events will show 21.93 | 35.29 as the severity.

Hard Acceleration – How it works on 5500 Hardware

Verizon Telematics defines a hard acceleration event as a sudden increase in speed greater than a minimum threshold as configured on the 5500 unit, causing excessive force on take-off or acceleration. The minimum thresholds for hard acceleration are:

Light and Medium vehicles: 7.90 MPH/s | 12.71 KPH/s (0.36g)

Heavy vehicles: 4.82 MPH/s | 7.76 KPH/s (0.22g)

The maximum threshold for hard acceleration detection is 17.55 MPH/s | 28.24 KPH/s. Events above this threshold will still be captured by the Verizon Telematics 5500, however, regardless of the severity above this level the events will show 17.55 | 28.24 as the severity.

In both cases, braking and acceleration, the 5500 hardware will send every braking or acceleration event over the designated thresholds. Please see the Suggested Settings section below to learn more about how the Verizon Telematics software allows additional filtering of this data.

Algorithm

Verizon Telematics 5500 units detect a hard brake or acceleration by reading the vehicle speed on the vehicle bus and using the difference of speed in a given amount of time. Here are some examples:

Speed 1 (Vss1)	Speed 2 (Vss2) MPH	Difference in Time (Δt)	Acceleration/Deceleration
0 MPH	5 MPH	1 s	5 MPH/s (0.23g)
20 MPH	5 MPH	2 s	-7.5 MPH/s (0.34g)
60 MPH	55 MPH	0.5 s	-10 MPH/s (0.45g)

Speed 1 (Vss1)	Speed 2 (Vss2) KPH	Difference in Time (Δt)	Acceleration/Deceleration
0 KPH	8.05 KPH	1 s	8.05 KPH/s (0.23g)
38.19 KPH	8.05 KPH	2 s	-12.07 KPH/s (0.34g)
96.56 KPH	88.51 KPH	0.5 s	-16.09 KPH/s (0.45g)

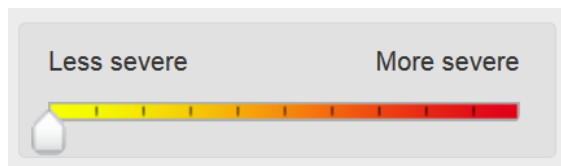
In the examples above it can be seen that the vehicle speed values read from the vehicle bus can be obtained at different time intervals, but the calculations performed always take the time interval from the speed samples into account.

Suggested Settings – How it works in the Verizon Telematics software

The user interface provides a way to trigger notifications or generate a report based on the relative severity of a hard brake or hard acceleration event. The scale used to measure this is defined as:

Less Severe: the system is more sensitive which will cause a greater number of hard brake and/or hard acceleration instances to be reported, i.e. reporting less severe events.

More Severe: the system is less sensitive which will cause a lower number of hard brake and/or hard acceleration instances to be reported, e.g. only reporting the more severe events.



It is important to consider that every vehicle needs its own set of parameters depending on its engine, load, type of fuel, vehicle weight and other parameters which influence the vehicle's handling.

Hard Braking											
Hard Braking - Light Duty											
Slider Position	0	1	2	3	4	5	6	7	8	9	10
MPH/s	8.77	10.09	11.40	12.72	14.04	15.35	16.67	17.98	19.30	20.61	21.03
KPH/s	14.11	16.24	18.35	20.47	22.6	24.70	26.83	28.94	31.06	33.17	35.29
Gs	0.40	0.46	0.52	0.58	0.64	0.70	0.76	0.82	0.88	0.94	1.0

Hard Braking - Heavy Duty											
Slider Position	0	1	2	3	4	5	6	7	8	9	10
MPH/s	4.82	6.54	8.25	9.96	11.67	13.38	15.09	16.80	18.51	20.22	21.93
KPH/s	7.76	10.53	13.28	16.03	18.78	21.53	24.29	27.04	29.79	32.54	35.29
Gs	0.22	0.298	0.376	0.454	0.532	0.61	0.688	0.766	0.844	0.922	1.0

Hard Acceleration											
Hard Acceleration - Light Duty											
Slider Position	0	1	2	3	4	5	6	7	8	9	10
MPH/s	7.90	8.87	9.83	10.80	11.76	12.73	13.69	14.66	15.62	16.59	17.55
KPH/s	12.71	14.27	15.82	17.38	18.93	20.49	22.03	23.59	25.14	26.7	28.24
Gs	0.36	0.40	0.45	0.49	0.54	0.58	0.62	0.67	0.71	0.76	0.80

Hard Acceleration - Heavy Duty											
Slider Position	0	1	2	3	4	5	6	7	8	9	10
MPH/s	4.82	6.09	7.37	8.64	9.91	11.19	12.46	13.73	15.00	16.28	17.55
KPH/s	7.76	9.8	11.86	13.9	15.95	18.01	20.05	22.1	24.14	26.2	28.24
Gs	0.22	0.28	0.34	0.39	0.45	0.51	0.57	0.63	0.68	0.74	0.80

We recommend initially setting the report on slider position 2 and then re-adjusting as needed. The slider 2 position corresponds to hard brake event thresholds of 8.25 MPH/s | 13.28 KPH/s (0.376g) for Heavy vehicles and 11.40 MPH/s | 18.35 kPH/s (0.52g) for Light vehicles. For hard acceleration, this corresponds to thresholds of 7.37 MPH/s | 11.86 KPH/s (0.34g) for Heavy vehicles and 9.83 MPH/s | 15.82 KPH/s (0.45g) for Light vehicles. The slider positions, when chosen, will show results at the value in the table and all those greater.

We expect the user to evaluate different settings for their vehicles to determine the optimum setting for their business needs.

Note

We leave it to the user to evaluate for each case if excessive usage of brakes is decreasing their life cycle and if excessive acceleration is decreasing Fuel Consumption performance based on the driver's behavior.

If a unit is installed in a vehicle which does not report speed through the diagnostic unit, the hard brake and hard acceleration feature will not create alerts.

To learn more about Verizon Telematics, please contact TrackNet our Platinum Partner at 866.654.2226 or email TrackNet@tracknetonline.com

