



Economic and Social Council

Distr.: General
23 December 2021

Original: English

Economic Commission for Europe

Inland Transport Committee

World Forum for Harmonization of Vehicle Regulations

186th session

Geneva, 8-11 March 2022

Item 4.8.5 of the provisional agenda

1958 Agreement:

Consideration of draft amendments to existing

UN Regulations submitted by GRSG

Proposal for Supplement 1 to the original version of UN Regulation No. 160 (Event Data Recorder (EDR))

Submitted by the Working Party on General Safety Provisions *

The text reproduced below was adopted by the Working Party on General Safety Provisions (GRSG) at its 122nd session (ECE/TRANS/WP.29/GRSG/101, para. 109). It is based on ECE/TRANS/WP.29/GRSG/2021/33. It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Administrative Committee (AC.1) for consideration at their March 2022 sessions.

* In accordance with the programme of work of the Inland Transport Committee for 2022 as outlined in proposed programme budget for 2022 (A/76/6 (part V sect. 20) para 20.76), the World Forum will develop, harmonize and update UN Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

Paragraph 1.3., amend to read:

- "1.3. The following data elements are excluded from the scope: VIN, associated vehicle details, location/positioning data, information of the driver, date, and time of an event."

Paragraphs 2.1, 2.14, 2.15, 2.29. and 2.52., amend to read:

- "2.1. "Anti-lock braking *activity*" means the anti-lock brake system is actively controlling the vehicle's brakes.
- 2.14. "*Ignition cycle, crash*" means the number (count) of power mode cycles as determined by the EDR ECU at the time when the crash event occurred since the first use of the EDR.
- 2.15. "*Ignition cycle download*" means the number (count) power mode cycles as determined by the EDR ECU at the time when the data was downloaded since the first use of the EDR.
- 2.29. "*Rollover*" means any vehicle rotation of 90 degrees or more about any true longitudinal or lateral axis.
- 2.52. "*X-direction*" means in the direction of the vehicle's X-axis, which is parallel to the vehicle's longitudinal centreline. The X-direction is positive in the direction of forward vehicle travel."

Paragraph 5.3.2., amend to read:

- "5.3.2. Conditions for triggering locking of data
- In the circumstances provided below, the memory for the event shall be locked to prevent any future overwriting of the data by subsequent events."

Annex 4. Table1, amend to read:

Data elements and format ¹

¹ Format requirements specified below are minimum requirements and manufacturers can exceed them.

"Table 1

<i>Data element</i>	<i>Condition for requirement²</i>	<i>Recording interval/time³ (relative to time zero)</i>	<i>Data sample rate (samples per second)</i>	<i>Minimum range⁴</i>	<i>Accuracy⁵</i>	<i>Resolution⁴</i>	<i>Event(s) recorded for⁶</i>
Delta-V, longitudinal	Mandatory - not required if longitudinal acceleration recorded at ≥ 500 Hz with sufficient range and resolution to calculate delta-v with required accuracy	0 to 250 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	100	-100 km/h to + 100 km/h.	$\pm 10\%$	1 km/h.	Planar
Maximum delta-V, longitudinal	Mandatory - not required if longitudinal acceleration recorded at ≥ 500 Hz	0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A	-100 km/h to + 100 km/h.	$\pm 10\%$	1 km/h.	Planar
Time, maximum delta-V, longitudinal	Mandatory - not required if longitudinal acceleration recorded at ≥ 500 Hz	0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A	0–300 ms, or 0- End of Event Time plus 30 ms, whichever is shorter.	± 3 ms	2.5 ms.	Planar
Speed, vehicle indicated	Mandatory	-5.0 to 0 sec	2	0 km/h to 250 km/h	± 1 km/h	1 km/h.	Planar VRU Rollover
Engine throttle, % full (or accelerator pedal, % full)	Mandatory	-5.0 to 0 sec	2	0 to 100%	$\pm 5\%$	1%	Planar Rollover VRU
Service brake, on/off	Mandatory	-5.0 to 0 sec	2	On or Off	N/A	On or Off.	Planar VRU Rollover

² "Mandatory" is subject to the conditions detailed in Section 1.

³ Pre-crash data and crash data are asynchronous. The sample time accuracy requirement for pre-crash time is -0.1 to 1.0 sec (e.g., T = -1 would need to occur between -1.1 and 0 seconds.)

⁴ For data elements with system states, the term "engaged" also means "actively controlling" or "actively intervening" and "non-engaged" also means "on but not controlling". Likewise, "off" also means "deactivated".

⁵ Accuracy requirement only applies within the range of the physical sensor. If measurements captured by a sensor exceed the design range of the sensor, the reported element shall indicate when the measurement first exceeded the design range of the sensor.

⁶ "Planar" includes triggered events in sections 5.3.1.1, 5.3.1.2, and 5.3.1.3 and "VRU" includes triggered events in section 5.3.1.4.

<i>Data element</i>	<i>Condition for requirement²</i>	<i>Recording interval/time³ (relative to time zero)</i>	<i>Data sample rate (samples per second)</i>	<i>Minimum range⁴</i>	<i>Accuracy⁵</i>	<i>Resolution⁴</i>	<i>Event(s) recorded for⁶</i>
Ignition cycle, crash	Mandatory	-1.0 sec	N/A	0 to 60,000	±1 cycle	1 cycle.	Planar VRU Rollover
Ignition cycle, download	Mandatory	At time of download ⁷	N/A	0 to 60,000	±1 cycle	1 cycle.	Planar VRU Rollover
Safety belt status, driver	Mandatory	-1.0 sec	N/A	Fastened, not fastened	N/A	Fastened, not fastened	Planar Rollover
Air bag warning lamp ⁸	Mandatory	-1.0 sec	N/A	On or Off	N/A	On or Off.	Planar Rollover
Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, driver.	Mandatory	Event	N/A	0 to 250 ms	±2ms	1 ms.	Planar
Frontal air bag deployment, time to deploy, in the case of a single stage air bag, or time to first stage deployment, in the case of a multi-stage air bag, front passenger ⁹ .	Mandatory	Event	N/A	0 to 250 ms	±2 ms	1 ms.	Planar
Multi-event crash, number of events	If Recorded ¹⁰	Event	N/A	1 or more	N/A	1 or more.	Planar VRU Rollover

⁷ The ignition cycle at the time of download is not required to be recorded at the time of the crash but shall be reported during the download process.

⁸ The air bag warning lamp is the readiness indicator specified in national air bag requirements and may also illuminate to indicate a malfunction in another part of the deployable restraint system.

⁹ List this element n times, once for each device.

¹⁰ "If recorded" means if the data is recorded in non-volatile memory for the purpose of subsequent downloading.

<i>Data element</i>	<i>Condition for requirement²</i>	<i>Recording interval/time³ (relative to time zero)</i>	<i>Data sample rate (samples per second)</i>	<i>Minimum range⁴</i>	<i>Accuracy⁵</i>	<i>Resolution⁴</i>	<i>Event(s) recorded for⁶</i>
Time from event 1 to 2	Mandatory	As needed	N/A	0 to 5.0 sec	±0.1 sec	0.1 sec.	Planar Rollover
Complete file recorded	Mandatory	Following other data	N/A	Yes or No	N/A	Yes or No.	Planar VRU Rollover
Lateral acceleration (post-crash)	If Recorded	0–250 ms or 0 to End of Event Time plus 30 ms, whichever is shorter. ¹¹	500	-50 to +50g	+/- 10%	1 g	Planar Rollover
Longitudinal acceleration (post-crash)	If Recorded	0–250 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	500	-50 to +50g	+/- 10%	1 g	Planar
Normal acceleration (post-crash)	If recorded	0 to at least 250 ms ¹¹	10	-5 g to +5 g	± 10%	0.5 g	Rollover
Delta-V, lateral	Mandatory - not required if lateral acceleration recorded at ≥500 Hz and with sufficient range and resolution to calculate delta-v with required accuracy	0–250 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	100	-100 km/h to + 100 km/h.	±10%	1 km/h.	Planar
Maximum delta-V, lateral	Mandatory - not required if lateral acceleration recorded at ≥500 Hz	0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A	-100 km/h to + 100 km/h.	±10%	1 km/h.	Planar

¹¹ For rollover events the time at which the event is determined to have started as defined by the manufacturer.

<i>Data element</i>	<i>Condition for requirement²</i>	<i>Recording interval/time³ (relative to time zero)</i>	<i>Data sample rate (samples per second)</i>	<i>Minimum range⁴</i>	<i>Accuracy⁵</i>	<i>Resolution⁴</i>	<i>Event(s) recorded for⁶</i>
Time maximum delta-V, lateral	Mandatory - not required if lateral acceleration recorded at ≥ 500 Hz	0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A	0–300 ms, or 0-End of Event Time plus 30 ms, whichever is shorter.	± 3 ms	2.5 ms.	Planar
Time for maximum delta-V, resultant.	Mandatory - not required if relevant acceleration recorded at ≥ 500 Hz	0–300 ms or 0 to End of Event Time plus 30 ms, whichever is shorter.	N/A	0–300 ms, or 0-End of Event Time plus 30 ms, whichever is shorter.	± 3 ms	2.5 ms.	Planar
Engine rpm	Mandatory	-5.0 to 0 sec	2	0 to 10,000 rpm	± 100 rpm ¹²	100 rpm.	Planar Rollover
Vehicle roll angle	If recorded	0 to at least 250 ms ¹¹	10	-1080 deg to + 1080 deg.	$\pm 10\%$	10 deg.	Rollover
Anti-lock braking system activity	Mandatory	-5.0 to 0 sec	2	Faulted, Non-Engaged, Engaged	N/A	Faulted, Non-Engaged, Engaged	Planar VRU Rollover
Stability control	Mandatory	-5.0 to 0 sec	2	Faulted, On, Off, Engaged	N/A	Faulted, On, Off, Engaged	Planar VRU Rollover
Steering input	Mandatory	-5.0 to 0 sec	2	-250 deg CW to + 250 deg CCW.	$\pm 5\%$	$\pm 1\%$.	Planar Rollover VRU
Safety belt status, front passenger ⁹	Mandatory	-1.0 sec	N/A	Fastened, not fastened	N/A	Fastened, not fastened	Planar Rollover
Passenger air bag suppression status, front ⁹	Mandatory	-1.0 sec	N/A	suppressed or not suppressed	N/A	suppressed or not suppressed	Planar Rollover
Frontal air bag deployment, time to nth stage, driver ¹³ .	Mandatory if fitted with a driver's frontal air bag with a multi-stage inflator.	Event	N/A	0 to 250 ms	± 2 ms	1 ms.	Planar

¹² These elements do not need to meet the accuracy and resolution requirements in specified crash tests

<i>Data element</i>	<i>Condition for requirement²</i>	<i>Recording interval/time³ (relative to time zero)</i>	<i>Data sample rate (samples per second)</i>	<i>Minimum range⁴</i>	<i>Accuracy⁵</i>	<i>Resolution⁴</i>	<i>Event(s) recorded for⁶</i>
Frontal air bag deployment, time to nth stage, front passenger ^{13, 9} .	Mandatory if fitted with a front passenger's frontal air bag with a multi-stage inflator.	Event	N/A	0 to 250 ms	±2 ms	1 ms.	Planar
Side air bag deployment, time to deploy, driver.	Mandatory	Event	N/A	0 to 250 ms	±2 ms	1 ms.	Planar
Side air bag deployment, time to deploy, front passenger.	Mandatory	Event	N/A	0 to 250 ms	±2 ms	1 ms.	Planar
Side curtain/tube air bag deployment, time to deploy, driver side.	Mandatory	Event	N/A	0 to 250 ms	±2 ms	1 ms.	Planar Rollover
Side curtain/tube air bag deployment, time to deploy, passenger side.	Mandatory	Event	N/A	0 to 250 ms	±2 ms	1 ms.	Planar Rollover
Pretensioner deployment, time to fire, driver.	Mandatory	Event	N/A	0 to 250 ms	±2 ms	1 ms.	Planar Rollover
Pretensioner deployment, time to fire, front passenger ⁹ .	Mandatory	Event	N/A	0 to 250 ms	±2 ms	1 ms.	Planar Rollover
Seat track position switch, foremost, status, driver.	Mandatory if fitted and used for deployment decision	-1.0 sec	N/A	Yes or No	N/A	Yes or No.	Planar Rollover
Seat track position switch, foremost, status, front passenger ⁹ .	Mandatory if fitted and used for deployment decision	-1.0 sec	N/A	Yes or No	N/A	Yes or No.	Planar Rollover

<i>Data element</i>	<i>Condition for requirement²</i>	<i>Recording interval/time³ (relative to time zero)</i>	<i>Data sample rate (samples per second)</i>	<i>Minimum range⁴</i>	<i>Accuracy⁵</i>	<i>Resolution⁴</i>	<i>Event(s) recorded for⁶</i>
Occupant size classification, driver	If recorded	-1.0 sec	N/A	5th percentile female or larger.	N/A	Yes or No.	Planar Rollover
Occupant size classification, front passenger ⁹ .	If recorded	-1.0 sec	N/A	6yr old HIII US ATD or Q6 ATD or smaller	N/A	Yes or No.	Planar Rollover

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