

Changes to legislation: There are currently no known outstanding effects for the
Commission Regulation (EC) No 692/2008, Division 3.. (See end of Document for details)

ANNEX XI

ON-BOARD DIAGNOSTICS (OBD) FOR MOTOR VEHICLES

Appendix 1

FUNCTIONAL ASPECTS OF ON-BOARD DIAGNOSTIC (OBD) SYSTEMS

3. IN-USE PERFORMANCE

3.1. General Requirements

3.1.1. Each monitor of the OBD system shall be executed at least once per driving cycle in which the monitoring conditions as specified in section 3.2 are met. Manufacturers may not use the calculated ratio (or any element thereof) or any other indication of monitor frequency as a monitoring condition for any monitor.

3.1.2. The in-use performance ratio (IUPR) of a specific monitor M of the OBD system referred to in Article 5(3) shall be:

$$IUPR_M = \text{Numerator}_M / \text{Denominator}_M$$

3.1.3. Comparison of Numerator and Denominator gives an indication of how often a specific monitor is operating relative to vehicle operation. To ensure all manufacturers are tracking $IUPR_M$ in the same manner, detailed requirements are given for defining and incrementing these counters.

3.1.4. If, according to the requirements of this Annex, the vehicle is equipped with a specific monitor M, $IUPR_M$ shall be greater or equal to the following minimum values:

- (i) 0,260 for secondary air system monitors and other cold start related monitors
- (ii) 0,520 for evaporative emission purge control monitors
- (iii) 0,336 for all other monitors

3.1.5. Vehicles shall comply with the requirements of section 3.1.4 for a mileage of at least 160 000 km. By way of derogation, vehicles type approved, registered, sold or entered into service before the relevant dates given in Article 10(4), (5) of Regulation (EC) No 715/2007, shall have an $IUPR_M$ greater or equal 0,1 for all monitors M. [F¹For new type approvals and new vehicles the monitor required by point 2.9 of this Annex shall have an IUPR greater or equal to 0,1 until three years after the dates specified in Article 10(4) and (5) of Regulation (EC) No 715/2007 respectively.]

Textual Amendments

- F1** Inserted by Commission Regulation (EU) No 459/2012 of 29 May 2012 amending Regulation (EC) No 715/2007 of the European Parliament and of the Council and Commission Regulation (EC) No 692/2008 as regards emissions from light passenger and commercial vehicles (Euro 6) (Text with EEA relevance).

3.1.6. The requirements of this section are deemed to be met for a particular monitor M, if for all vehicles of a particular OBD family manufactured in a particular calendar year the following statistical conditions hold:

- (a) The average $IUPR_M$ is equal or above the minimum value applicable to the monitor

(b) More than 50 % of all vehicles have an $IUPR_M$ equal or above the minimum value applicable to the monitor.

[^{F2}3.1.7. The manufacturer shall demonstrate to the approval authority and, upon request, to the Commission that these statistical conditions are satisfied for all monitors required to be reported by the OBD system according to point 3.6 of this Appendix not later than 18 months after the entry onto the market of the first vehicle type with IUPR in an OBD family and every 18 months thereafter. For this purpose, for OBD families consisting of more than 1 000 registrations in the Union, that are subject to sampling within the sampling period, the process described in Annex II shall be used without prejudice to the provisions of point 3.1.9 of this Appendix.

In addition to the requirements set out in Annex II and regardless of the result of the audit described in Section 2 of Annex II, the authority granting the approval shall apply the in-service conformity check for IUPR described in Appendix 1 to Annex II in an appropriate number of randomly determined cases. ‘In an appropriate number of randomly determined cases’ means, that this measure has a dissuasive effect on non-compliance with the requirements of Section 3 of this Annex or the provision of manipulated, false or non-representative data for the audit. If no special circumstances apply and can be demonstrated by the type-approval authorities, random application of the in-service conformity check to 5 % of the type approved OBD families shall be considered as sufficient for compliance with this requirement. For this purpose, type-approval authorities may find arrangements with the manufacturer for the reduction of double testing of a given OBD family as long as these arrangements do not harm the dissuasive effect of the type-approval authority’s own in-service conformity check on non-compliance with the requirements of Section 3 of this Annex. Data collected by Member States during surveillance testing programmes may be used for in-service conformity checks. Upon request, type-approval authorities shall provide data on the audits and random in-service conformity checks performed, including the methodology used for identifying those cases, which are made subject to the random in-service conformity check, to the Commission and other type-approval authorities.

Textual Amendments

F2 Substituted by [Commission Regulation \(EU\) No 566/2011 of 8 June 2011 amending Regulation \(EC\) No 715/2007 of the European Parliament and of the Council and Commission Regulation \(EC\) No 692/2008 as regards access to vehicle repair and maintenance information \(Text with EEA relevance\)](#).

3.1.8. For the entire test sample of vehicles the manufacturer must report to the relevant authorities all of the in-use performance data to be reported by the OBD system according to point 3.6 of this Appendix in conjunction with an identification of the vehicle being tested and the methodology used for the selection of the tested vehicles from the fleet. Upon request, the type-approval authority granting the approval shall make these data and the results of the statistical evaluation available to the Commission and other approval authorities.]

3.1.9. Public authorities and their delegates may pursue further tests on vehicles or collect appropriate data recorded by vehicles to verify compliance with the requirements of this Annex.

[^{F3}3.1.10. Non-compliance with the requirements of point 3.1.6 established by tests described in points 3.1.7 or 3.1.9 shall be considered as an infringement subject to the penalties set out in Article 13 of Regulation (EC) No 715/2007. This reference does not limit the application of such penalties to other infringements of other provisions of Regulation (EC) No 715/2007 or this Regulation, which do not explicitly refer to Article 13 of Regulation (EC) No 715/2007.]

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Textual Amendments

F3 Inserted by Commission Regulation (EU) No 566/2011 of 8 June 2011 amending Regulation (EC) No 715/2007 of the European Parliament and of the Council and Commission Regulation (EC) No 692/2008 as regards access to vehicle repair and maintenance information (Text with EEA relevance).

3.2. Numerator_M

3.2.1. The numerator of a specific monitor is a counter measuring the number of times a vehicle has been operated such that all monitoring conditions necessary for the specific monitor to detect a malfunction in order to warn the driver, as they have been implemented by the manufacturer, have been encountered. The numerator shall not be incremented more than once per driving cycle, unless there is reasoned technical justification.

3.3. Denominator_M

3.3.1. The purpose of the denominator is to provide a counter indicating the number of vehicle driving events, taking into account special conditions for a specific monitor. The denominator shall be incremented at least once per driving cycle, if during this driving cycle such conditions are met and the general denominator is incremented as specified in section 3.5 unless the denominator is disabled according to section 3.7 of this Appendix.

3.3.2. In addition to the requirements of section 3.3.1:

- (a) Secondary air system monitor denominator(s) shall be incremented if the commanded 'on' operation of the secondary air system occurs for a time greater than or equal to 10 seconds. For purposes of determining this commanded 'on' time, the OBD system may not include time during intrusive operation of the secondary air system solely for the purposes of monitoring;
- (b) Denominators of monitors of systems only active during cold start shall be incremented if the component or strategy is commanded 'on' for a time greater than or equal to 10 seconds;
- (c) The denominator(s) for monitors of Variable Valve Timing (VVT) and/or control systems shall be incremented if the component is commanded to function (e.g., commanded 'on', 'open', 'closed', 'locked', etc.) on two or more occasions during the driving cycle or for a time greater than or equal to 10 seconds, whichever occurs first;
- (d) For the following monitors, the denominator(s) shall be incremented by one if, in addition to meeting the requirements of this section on at least one driving cycle, at least 800 cumulative kilometres of vehicle operation have been experienced since the last time the denominator was incremented:
 - (i) Diesel oxidation catalyst
 - (ii) Diesel particulate filter^[F3];
- (e) ^[F3]Without prejudice to requirements for the increment of denominators of other monitors the denominators of monitors of the following components shall be incremented if and only if the driving cycle started with a cold start:
 - (i) liquid (oil, engine coolant, fuel, SCR reagent) temperature sensors;

- (ii) clean air (ambient air, intake air, charge air, inlet manifold) temperature sensors;
 - (iii) exhaust (EGR recirculation/cooling, exhaust gas turbo-charging, catalyst) temperature sensors;
 - (f) The denominators of monitors of the boost pressure control system shall be incremented if the all of the following conditions are met:
 - (i) the general denominator conditions are fulfilled;
 - (ii) the boost pressure control system is active for a time greater than or equal to 15 seconds.]
- 3.3.3. For hybrid vehicles, vehicles that employ alternative engine start hardware or strategies (e.g. integrated starter and generators), or alternative fuel vehicles (e.g. dedicated, bi-fuel, or dual-fuel applications), the manufacturer may request the approval of the approval authority to use alternative criteria to those set forth in this section for incrementing the denominator. In general, the approval authority shall not approve alternative criteria for vehicles that only employ engine shut off at or near idle/vehicle stop conditions. Approval by the approval authority of the alternative criteria shall be based on the equivalence of the alternative criteria to determine the amount of vehicle operation relative to the measure of conventional vehicle operation in accordance with the criteria in this section.
- 3.4. Ignition Cycle Counter
 - 3.4.1. The ignition cycle counter indicates the number of ignition cycles a vehicle has experienced. The ignition cycle counter may not be incremented more than once per driving cycle.
- 3.5. General Denominator
 - 3.5.1. The general denominator is a counter measuring the number of times a vehicle has been operated. It shall be incremented within 10 seconds, if and only if, the following criteria are satisfied on a single driving cycle:
 - Cumulative time since engine start is greater than or equal to 600 seconds while at an elevation of less than 2 440 m above sea level and at an ambient temperature of greater than or equal to -7°C .,
 - Cumulative vehicle operation at or above 40 km/h occurs for greater than or equal to 300 seconds while at an elevation of less than 2 440 m above sea level and at an ambient temperature of greater than or equal to -7°C .,
 - Continuous vehicle operation at idle (i.e. accelerator pedal released by driver and vehicle speed less than or equal to 1,6 km/h) for greater than or equal to 30 seconds while at an elevation of less than 2 440 m above sea level and at an ambient temperature of greater than or equal to -7°C .
- 3.6. Reporting and increasing counters
 - 3.6.1. The OBD system shall report in accordance with the ISO 15031-5 specifications the ignition cycle counter and general denominator as well as separate numerators and denominators for the following monitors, if their presence on the vehicle is required by this Annex:
 - Catalysts (each bank to be reported separately),

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- Oxygen/exhaust gas sensors, including secondary oxygen sensors (each sensor to be reported separately),
 - Evaporative system,
 - EGR system,
 - VVT system,
 - Secondary air system,
 - Particulate filter,
 - NO_x aftertreatment system (e.g. NO_x adsorber, NO_x reagent/catalyst system),
 - Boost pressure control system,
- [^{F2}3.6.2. For specific components or systems that have multiple monitors, which are required to be reported by this point (e.g. oxygen sensor bank 1 may have multiple monitors for sensor response or other sensor characteristics), the OBD system shall separately track numerators and denominators for each of the specific monitors except those monitoring for short circuit or open circuit failures and report only the corresponding numerator and denominator for the specific monitor that has the lowest numerical ratio. If two or more specific monitors have identical ratios, the corresponding numerator and denominator for the specific monitor that has the highest denominator shall be reported for the specific component.]
- 3.6.3. All counters, when incremented, shall be incremented by an integer of one.
- 3.6.4. The minimum value of each counter is 0, the maximum value shall not be less than 65 535, notwithstanding any other requirements on standardised storage and reporting of the OBD system.
- 3.6.5. If either the numerator or denominator for a specific monitor reaches its maximum value, both counters for that specific monitor shall be divided by two before being incremented again according to the provisions set in sections 3.2 and 3.3. If the ignition cycle counter or the general denominator reaches its maximum value, the respective counter shall change to zero at its next increment according to the provisions set in sections 3.4 and 3.5, respectively.
- 3.6.6. Each counter shall be reset to zero only when a non-volatile memory reset occurs (e.g. reprogramming event, etc.) or, if the numbers are stored in keep-alive memory (KAM), when KAM is lost due to an interruption in electrical power to the control module (e.g. battery disconnect, etc.).
- 3.6.7. The manufacturer shall take measures to ensure that the values of numerator and denominator can not be reset or modified, except in cases provided for explicitly in this section.
- 3.7. Disablement of Numerators and Denominators and of the General Denominator
- 3.7.1. Within 10 seconds of a malfunction being detected, which disables a monitor required to meet the monitoring conditions of this Annex (i.e. a pending or confirmed code is stored), the OBD system shall disable further incrementing of the corresponding numerator and denominator for each monitor that is disabled. When the malfunction is no longer detected (i.e., the pending code is erased through self-clearing or through a scan tool command), incrementing of all corresponding numerators and denominators shall resume within 10 seconds.
- 3.7.2. Within 10 seconds of the start of a power take-off operation (PTO) operation that disables a monitor required to meet the monitoring conditions of this Annex, the OBD system shall disable further incrementing of the corresponding numerator

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and denominator for each monitor that is disabled. When the PTO operation ends, incrementing of all corresponding numerators and denominators shall resume within 10 seconds.

- 3.7.3. The OBD system shall disable further incrementing of the numerator and denominator of a specific monitor within 10 seconds, if a malfunction of any component used to determine the criteria within the definition of the specific monitor's denominator (i.e. vehicle speed, ambient temperature, elevation, idle operation, engine cold start, or time of operation) has been detected and the corresponding pending fault code has been stored. Incrementing of the numerator and denominator shall resume within 10 seconds when the malfunction is no longer present (e.g. pending code erased through self-clearing or by a scan tool command).
- 3.7.4. The OBD system shall disable further incrementing of the general denominator within 10 seconds, if a malfunction has been detected of any component used to determine whether the criteria in section 3.5 are satisfied (i.e. vehicle speed, ambient temperature, elevation, idle operation, or time of operation) and the corresponding pending fault code has been stored. The general denominator may not be disabled from incrementing for any other condition. Incrementing of the general denominator shall resume within 10 seconds when the malfunction is no longer present (e.g., pending code erased through self-clearing or by a scan tool command).

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