United Nations ECE/TRANS/WP.29/2012/113

Economic and Social Council

Distr.: General
18 July 2012

Original: English

Economic Commission for Europe

Inland Transport Committee

World Forum for Harmonization of Vehicle Regulations

158th session
Geneva, 13-16 November 2012
Item 13.2 of the provisional agenda
Consideration and vote by AC.3 of draft global technical regulations and/or draft amendments to established global technical regulations

Proposal for Amendment 1 to gtr No. 5 (Worldwide Harmonized Heavy Duty On-Board Diagnosis Systems (OBD))

Submitted by the Working Party on Pollution and Energy*

The text reproduced below was adopted by the Working Party on Pollution and Energy (GRPE) at its sixty-fourth session (ECE/TRANS/WP.29/GRPE/64, para. 40). It is based on ECE/TRANS/WP.29/GRPE/2012/12/Rev.1, as amended by paragraph 40 of the report (ECE/TRANS/WP.29/GRPE/64). It is submitted to the World Forum for Harmonization of Vehicle Regulations (WP.29) and to the Executive Committee AC.3 for consideration.

* In accordance with the programme of work of the Inland Transport Committee for 2010–2014 (ECE/TRANS/208, para. 106 and ECE/TRANS/2010/8, programme activity 02.4), the World Forum will develop, harmonize and update Regulations in order to enhance the performance of vehicles. The present document is submitted in conformity with that mandate.

Please recycle

The text of the regulation (part B)

Module A

Paragraph 4.4.1., amend to read:

"4.4.1. Access to OBD information

…

Access to OBD information shall be provided using, at least one of the following series of standards mentioned in Annex 1:

(a) ISO 27145 with ISO 15765-4 (CAN-based)

(b) ISO 27145 with ISO 13400 (TCP/IP-based)

(c) SAE J1939-71 and SAE J1939-73

A Contracting Party may decide if and when to require only the use of ISO 27145[5].

Manufacturers shall use appropriate ISO or SAE-defined fault codes (for example, P0xxx, P2xxx) whenever possible. If such identification is not possible, the manufacturer may use diagnostic trouble codes according to the relevant clauses in ISO 27145 or SAE J1939. The fault codes must be fully accessible by standardized diagnostic equipment complying with the provisions of this Module.

The manufacturer shall provide the ISO or SAE standardization body through the appropriate ISO or SAE process with emission-related diagnostic data not specified by ISO 27145 or SAE J1939 but related to this Module."

Paragraph 9., amend to read:

"9. ANNEXES

Annex 1 contains the references to the industry standards that are to be used in accordance to the provisions of this gtr to provide the serial communications interface to the vehicle/engine. There are two allowed solutions identified:

(a) ISO 27145 with either ISO 15765-4 (CAN based) with either ISO 15765-4 (CAN based) or with ISO 13400 (TCP/IP based)

(b) SAE J1939-73.

In addition there are other ISO or SAE standards that are applicable in accordance with the provisions of this gtr."

Module A, Annex 1, paragraph 2.1.2.1.1., amend to read:

"REFERENCE STANDARD DOCUMENTS

ISO 27145 and those specifications included by reference therein to accomplish the WWH-OBD requirements, with either:

(a) ISO 15765-4:2005 "Road vehicles - Diagnostics on Controller Area Network (CAN) - Part 4: Requirements for emissions-related systems" and those specifications included by reference therein to accomplish the WWH-OBD requirements, or

[5] See also paragraph 6.2. in part A.

(b) ISO 13400:20xx "…(TCP/IP)…" and those specifications included by reference therein to accomplish the WWH-OBD requirements.

J1939-73 "APPLICATION LAYER – DIAGNOSTICS", dated on year 2006, and those specifications included by reference therein to accomplish the WWH-OBD requirements.

Reference by this gtr to ISO 27145 means reference to those standards and those specifications included by reference therein to accomplish the WWH-OBD requirements:

(a) ISO 27145-1 Road vehicles — Implementation of WWH-OBD communication requirements - Part 1 — General Information and use case definitions;

(b) ISO 27145-2 Road vehicles — Implementation of WWH-OBD communication requirements — Part 2 — Common emissions-related data dictionary;

(c) ISO 27145-3 Road vehicles — Implementation of WWH-OBD communication requirements — Part 3 — Common message dictionary;

(d) ISO 27145-4 Road vehicles — Implementation of WWH-OBD communication requirements — Part 4 — Connection between vehicle and test equipment.

The following Society of Automotive Engineers (SAE) documents are incorporated by reference into this Regulation:

(a) SAE J2403 "Medium/Heavy-Duty E/E Systems Diagnosis Nomenclature", August 2004;(b) SAE J1939-13 "Off-Board Diagnostic Connector", dated on March 2004."

Module B

Paragraph 3.24., amend to read:

"3.24. "*Readiness*" means a status indicating whether a monitor or a group of monitors have run since the last erasing by an external request or command (for example through an OBD scan-tool)."

Paragraph 4.2.2.1., amend to read:

"4.2.2.1. Exception to component monitoring

Monitoring of electrical circuit failures, and to the extent feasible, functionality, and rationality failures of the engine system shall not be required if all the following conditions are met:

(a) The failure results in an emission increase of any pollutant of less than 50 per cent of the regulated emission limit, and

(b) The failure does not cause any emission to exceed the regulated emission limit[8], and

(c) The failure does not affect a component or system enabling the proper performance of the OBD system, and

[8] The measured value shall be considered taking into account the relevant precision tolerance of the test-cell system and the increased variability in the test results due to the malfunction.

(d) The failure does not substantially delay or affect the ability of the emission control system to operate as originally designed (for example a breakdown of the reagent heating system under cold conditions cannot be considered as an exception).

Determination of the emissions impact shall be performed on a stabilized engine system in an engine dynamometer test cell, according to the demonstration procedures of this module.

When such a demonstration would not be conclusive regarding criterion (d), the manufacturer shall submit to the approval authority appropriate design elements such as good engineering practice, technical considerations, simulation, test results, etc."

Paragraph 4.2.3., amend to read:

"4.2.3. Monitoring frequency

…

At the request of the manufacturer, the certification authority may approve monitors that do not run continuously, the manufacturer shall clearly inform the certification authority and describe the conditions under which the monitor runs and justify the proposal by appropriate design elements (such as good engineering practice).

The monitors shall run during the applicable OBD test-cycle as specified in paragraph 7.2.2.

A monitor shall be regarded as running continuously, if it samples at a rate not less than twice per second and concludes the presence or the absence of the failure relevant to that monitor within 15 seconds. If a computer input or output component is sampled less frequently than twice per second for engine control purpose, a monitor shall also be regarded as running continuously, if the system concludes the presence or the absence of the failure relevant to that monitor each time sampling occurs.

…"

Paragraph 4.3., correct to read:

"4.3. Requirements for recording OBD information

…

In case a malfunction with the previously active status occurs again, that malfunction may at the choice of manufacturer be directly given the "Pending DTC " and "confirmed and active DTC" status without having been given the "potential DTC" status. If that malfunction is given the potential status, it shall also keep the previously active status during the time it is not yet confirmed or active.

…"

Paragraph 4.6.1, amend to read:

"4.6.1. MI specification

The malfunction indicator shall be a visual signal that is perceptible under all lighting conditions. The malfunction indicator shall comprise a yellow or amber (as defined in Annex 5 to UNECE Regulation No. 6) warning signal identified by the 0640 symbol in accordance with ISO standard 7000:2004."

Paragraph 4.6.3.1.4.., amend to read:

"4.6.3.1.4. …

The "short-MI" shall be deactivated if the malfunction is not detected during 3 subsequent sequential operating sequences following the operating sequence when the monitor has concluded the absence of the considered malfunction and the MI is not activated due to another Class A or B malfunction.

Figures 1, 4 and 4bis in Annex 2 illustrate respectively the short and continuous MI deactivation in different use-cases."

Paragraph 4.6.4., amend to read (inserting also footnote 9):

"4.6.4. MI activation at key-on/engine-off

The MI activation at key-on/engine-off shall consist of two sequences separated by a 5 seconds MI off:

(a) The first sequence is designed to provide an indication of the MI functionality and the readiness of the monitored components;

(b) The second sequence is designed to provide an indication of the presence of a malfunction.

The second sequence is repeated until engine is started[9] (engine-on) or the key set on key-off position.

At the request of the manufacturer, this activation may only occur once during an operating sequence (e.g. in case of start-stop systems)."

Footnotes 9 to 15 (former), renumber as 10 to 16.

Paragraph 4.6.4.2., amend to read:

"4.6.4.2. Presence / absence of a malfunction

Following the sequence described in paragraph 4.6.4.1., the MI shall indicate the presence of a malfunction by a series of flashes or a continuous illumination, depending on the applicable activation mode, as described in the following paragraphs, or absence of a malfunction by a series of single flashes. When applicable, each flash consists of a 1 s MI-on followed by a 1 s MI-off, and the series of flashes will be followed by a period of 4 seconds with the MI off.

…"

Paragraph 4.7.1.5., divide in paragraphs 4.7.1.5. and 4.7.1.5.1. and amend to read:

"4.7.1.5. Readiness

With the exceptions specified in paragraphs 4.7.1.5.1., 4.7.1.5.2. and 4.7.1.5.3., a readiness shall be set to "complete" when a monitor or a group of monitors addressed by this status have run and concluded the presence (that means stored a confirmed and active DTC) or the absence of the failure relevant to that monitor since the last erasing by request of an external OBD scan-tool.

[9] An engine may be considered started during the cranking phase.

Readiness shall be set to "not complete" by erasing the fault code memory (see paragraph 4.7.4.) by request of an external scan-tool.

Normal engine shutdown shall not cause the readiness to change.

4.7.1.5.1. The manufacturer may request, subject to approval by the certification authority, that the ready status for a monitor be set to indicate "complete" without the monitor having run and concluded the presence or the absence of the failure relevant to that monitor if monitoring is disabled for a multiple number of operating sequences due to the continued presence of extreme operating conditions (e.g. cold ambient temperatures, high altitudes). Any such request must specify the conditions for monitoring system disablement and the number of operating sequences that would pass without monitor completion before ready status would be indicated as "complete"."

Insert new paragraphs 4.7.1.5.2 and 4.7.1.5.3., to read:

"4.7.1.5.2. Monitors subject to readiness

Readiness shall be supported for each of the monitors or groups of monitors that are identified in this module and that are required when and by referring to this module, with the exception of appendices 11 and 12 of Annex 3.

4.7.1.5.3. Readiness for continuous monitors

Readiness of each of the monitors or groups of monitors, that are identified in Appendices 1, 7 and 10 of Annex 3 to this module and that are considered by this module as running continuously, shall always indicate "complete"."

Paragraph 5.2.2., amend to read:

"5.2.2. Ambient temperature and altitude conditions

Manufacturers may request approval to disable OBD system monitors:

(a) At ambient engine start temperatures below 266 K (-7 degrees Celsius or 20 degrees Fahrenheit) in the case where the coolant temperature has not reached a minimum temperature of at least 333 K (60 degrees Celsius or 140 degrees Fahrenheit), or

(b) At ambient temperatures above 308 K (35 degrees Celsius or 95 degrees Fahrenheit), or

(c) At elevations above 2,500 meters (8,202 feet) above sea level.

A manufacturer may also request approval to disable OBD system monitors related to SCR system at ambient temperatures below 266 K (-7 degrees Celsius or 20 degrees Fahrenheit) in the case of frozen regent.

A manufacturer may further request approval that an OBD system monitor be temporarily disabled at other ambient temperatures and altitude conditions upon determining that the manufacturer has demonstrated with data and/or an engineering evaluation that misdiagnosis would occur at the ambient temperatures because of its effect on the component itself (e.g. component freezing effect on the compatibility with sensor tolerances).

Note: …"

Paragraph 6.3.2.1., divide in paragraphs 6.3.2.1. and 6.3.2.1.1 and amend to read:

"6.3.2.1. Procedure for qualifying a deteriorated component used to demonstrate the detection of classes A and B1 malfunctions

6.3.2.1.1. Emission threshold monitoring

In the case the malfunction selected by the certification authority results in tailpipe emissions that may exceed an OBD threshold limit, the manufacturer shall demonstrate by an emission test according to paragraph 7. that the deteriorated component or device does not result in the relevant emission exceeding its OTL by more than 20 per cent."

Insert new paragraphs 6.3.2.1.2.and 6.3.2.1.3., to read:

6.3.2.1.2. Performance monitoring

At the request of the manufacturer and with the agreement of the certification authority, in the case of performance monitoring, the OTL may be exceeded by more than 20 per cent. Such request shall be justified on a case by case basis.

6.3.2.1.3. Component monitoring

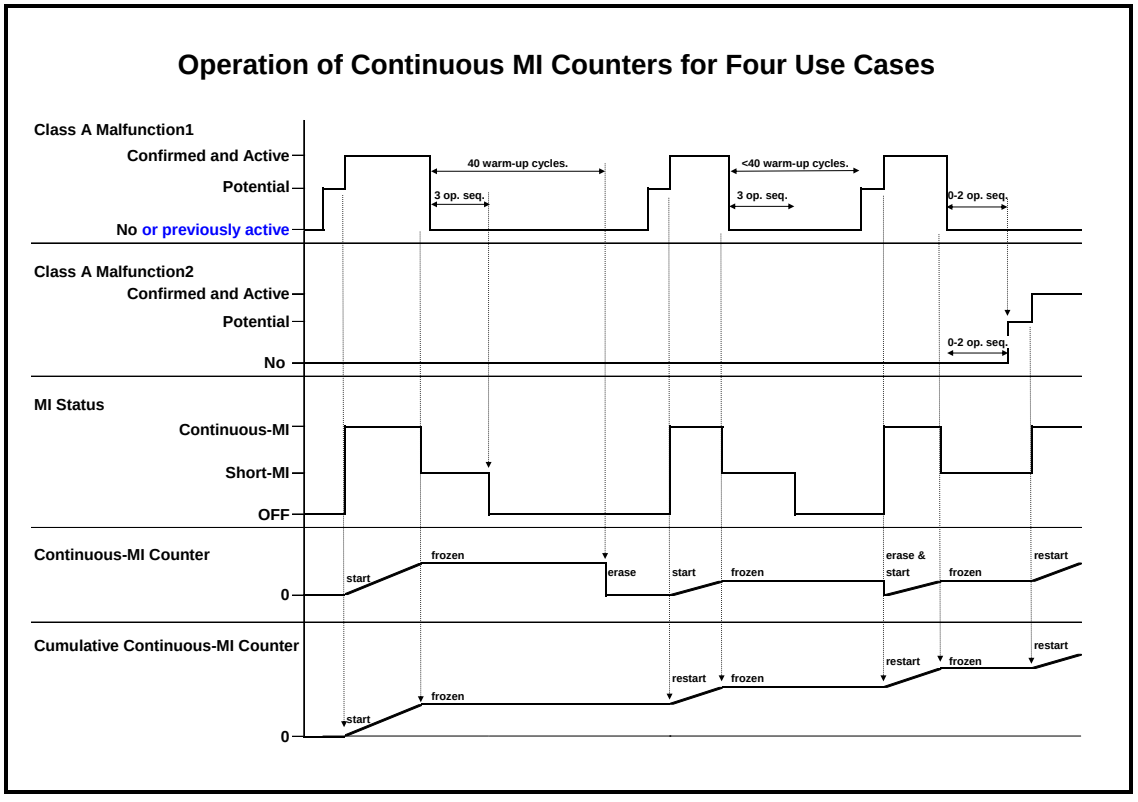
In the case of component monitoring, a deteriorated component is qualified without reference to the OTL."

Module B, Annex 2

Figure 4, amend to read:

"Figure 4

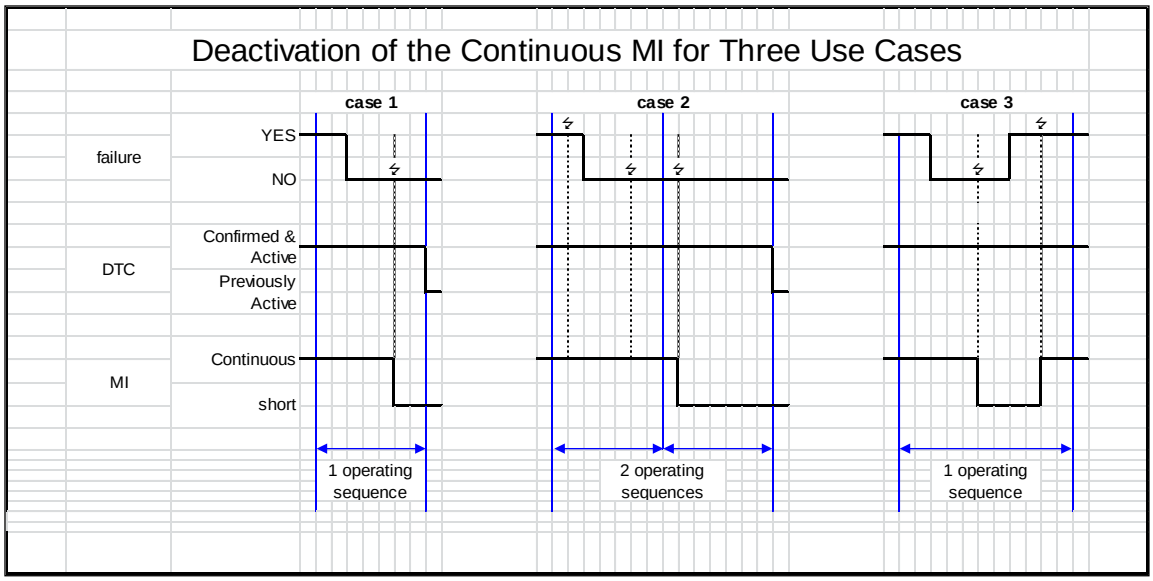
Class A malfunction –activation of the MI and MI counters



Note: Details related to the deactivation of the continuous MI are illustrated in figure 4bis below in the specific case where a potential state is present."

Insert a new figure 4bis, to read:

"Figure 4bis
Illustration of the continuous MI deactivation principle



Notes:

ϟ means the point where monitoring of the concerned malfunction occurs.

M means the operating sequence when the monitor concludes for the first time that a confirmed and active failure is no longer present.

case 1 means the case where the monitor does not conclude the presence of failure during the operating sequence M.

case 2 means the case where the monitor has previously concluded, during the operating sequence M, the presence of the malfunction.

case 3 means the case where the monitor concludes, during the operating sequence M, the presence of the malfunction after having first concluded to its absence."

Module B, Annex 3

Appendix 1, amend to read:

"Electric/ …

Wherever a feedback control loop exists, the OBD system shall monitor the system's ability to maintain feedback control as designed (e.g. to enter feedback control within a manufacturer specified time interval, system fails to maintain feedback control, feedback control has used up all the adjustment allowed by the manufacturer) — component monitoring.

In the case where the control of reagent injection is performed by means of a closed loop system, the monitoring requirements set out in this Appendix shall apply, but the failures detected shall not be classified as class C failures."

Appendix 2, amend to read:

"The OBD system …

The following enhanced monitoring requirements may also be introduced into regional regulation, where determined to be technically feasible by a Contracting Party at the time of introduction of that regulation:

(a) DPF filtering performance: the filtering and continuous regeneration process of the DPF. This requirement would apply to PM emissions only - emission threshold monitoring.

…"

Appendix 6, complete to read:

"The OBD system …

(b) EGR cooler performance: the EGR cooler system's ability to achieve the manufacturer's specified cooling performance - emission threshold monitoring.

(c) EGR low flow[1]: the EGR system's ability to maintain the commanded EGR flow rate, detecting "flow rate too low" conditions — total functional failure or performance monitoring.[2]

(d) EGR cooler undercooling performance[3]: the EGR cooler system's ability to achieve the manufacturer's specified cooling performance — total functional failure monitoring."

Appendix 8, complete to read:

"The OBD system …

(c) Charge air cooling: Charge air cooling system efficiency - emission threshold monitoring.

(d) Turbo under boost[1]: turbo boost system's ability to maintain the commanded boost pressure, detecting "boost pressure too low" conditions — total functional failure or performance monitoring.[2]"

---

[1] This requirement applies in addition to the base requirement (a) of this appendix.

[2] The failures so detected shall not be classified as class C failures.

[3] This requirement applies in addition to the base requirement (c) of this appendix.

[1] This requirement applies in addition to the base requirement (a) of this appendix.

[2] The failures detected shall not be classified as class C failures.