

Draft justification for proposed change to the UNECE Regulation 13 from Bollenarth Svensson, VBG

A. PROPOSAL

Insert new paragraphs 2.39. and 2.40., to read:

2.39. “Brake electric/electronic interface” means the part of a separable electrical/electronic connection between the towing vehicle and the towed vehicle which is dedicated to the braking system. It may be embodied as the ISO7638 connector or as ~~and is~~ part of an automated or automatic connector

2.40. “Automated Connector” means a system through which the electrical connection, or the electric and pneumatic connection, between the towing vehicle and towed vehicle is made automatically without direct intervention of a human operator.

B. JUSTIFICATION

The current document contains proposals that concern the interface that has hitherto been handled through a dedicated standardized connector, ISO7638. This has been some guaranty that the important brake related signals are correctly connected using a manual procedure. The standardized connector does not lend itself to automatic procedures. The interface has not been considered in need for a separate definition. Through the introduction of automated connector systems the interface per se is not physically defined through the ISO7638 connector. An automated connector will perform the connection and disconnection in the same way each time and the risk of mal-connection is hence eliminated. This the fundamental assumption that makes the deviation from ISO7638 connector legitimate.

As just stated the automated connection shall be done the same way each time. Hence a definition of an automated connector is needed. An automated process is never random and thus the connection will be established in the same way each time.

GRRF ACV Informal Working Group - Input – P. Jennison 29.05.2012

Draft justification for the proposed amendments to paragraph 5.1.3.6., including a general introduction.

Amend paragraph 5.1.3.6. to read:

5.1.3.6. a) The electric control line shall conform to ISO 11992-1 and 11992-2:2003 including its amendment 1:2007 and be a point-to-point type using :

- i) the seven pin connector according to ISO 7638-1 or 7638-2:2003 or,
- ii) in the case of systems where the connection of the electric control line is automated, the automated connector shall provide as a minimum the same number of pins [with the same electrical conductivity properties and electrical functionality] as the above mentioned ISO 7638 connector and meet the requirements specified in Annex 22 of this Regulation.

b) The data contacts of the ISO 7368 connector shall be used to transfer information exclusively for braking (including ABS) and running gear (steering, tyres and suspension) functions as specified in ISO 11992-2:2003 including its Amd.1:2007. The braking functions have priority and shall be maintained in the normal and failed modes. The transmission of running gear information shall not delay braking functions.

c) The power supply, provided by the ISO 7638 connector, shall be used exclusively for braking and running gear functions and that required for the transfer of trailer related information not transmitted via the electric control line. However, in all cases the provisions of Paragraph 5.2.2.18. of this Regulation shall apply. The power supply for all other functions shall use other measures.

Justification:

Introduction:

The connection of a trailer to a towing vehicle is a hazardous process in involving a person (usually the driver) in the manual connection of air pipes and electrical wiring, in addition to the mechanical connection. Automated coupling systems are designed to reduce/remove this risk. For the optimal control of the braking of towing vehicle and trailer combinations the electrical interface is specified as an ISO 7638 connector with the interchange of electronic information conforming to ISO 11992. However, the ISO 7638 connector is not an optimal design for an automated connection and, therefore, it is necessary to amend the electrical control line requirements to allow alternative means of making the electrical connection between towing vehicle and trailer.

The objective of this proposed amendment is, therefore, to allow automated coupling systems while retaining all the requirements related to the use of the ISO 7638 connector and ISO 11992 for data transfer.

Additional requirements specific to an automated coupling system are contained in a new Annex 22.

Paragraph 5.1.3.6.:

For clarity the existing paragraph is sub-divided into 3 parts – a, b and c. The parts “b” and “c” are without change. Part “a” is re-structured so that the existing requirements are retained without change in “i” and the requirements for an automated coupling system, as an alternative, are specified in “ii”.

The requirements in “ii” with regard to the minimum number of pins and the ability to transfer data as per ISO 11992 are identical to “i”. Reference to the new Annex 22 is made with regard to additional specific requirements for an automated coupling system.

By making this amendment and a similar one in the “vehicles of category O” section, and by making reference to the new Annex 22, the number of changes in the regulation text is minimised.

The actual physical layout of the automated connector with regard to the electrical pins and the air connections, together with any alignment structures for the 2 halves of the connector, is not specified. At this stage of the development process it is not deemed appropriate to specify such an interface as it could be design restrictive, although at a later stage it may be appropriate to introduce an ISO standard.

The use of parts a, b and c, and i and ii means that it is not necessary to re-number a significant number of existing paragraphs.

Input from J. Stokreef – The Netherlands

Draft justification for par. 5.2.1.23 and 5.2.2.17

Amend paragraph 5.2.1.23. to read:

5.2.1.23. Power driven vehicles authorized to tow a trailer equipped with an anti-lock system shall also be equipped with a special electrical connector, conforming to ISO 7638:2003, for the electric control transmission.

Alternatively [or in addition], in the case of systems where the connection of the electric control line is automated, the automated connector shall meet the requirements specified in Annex 22 of this Regulation.

Justification: To make the use of automated connections possible, the automated connector is added as an alternative to the ISO 7638 connector together with a reference to the corresponding requirements in the new Annex 22. The requirements are stipulated in Annex 22 to avoid too much new text in the main body of the regulation.

Amend paragraph 5.2.2.17. to read:

5.2.2.17. Trailers equipped with an electric control line and O₃ and O₄ category trailers equipped with an anti-lock system, shall be fitted with a special electrical connector for the braking system and/or anti-lock system, conforming to ISO 7638:2003. **Alternatively [or in addition], in the case of systems where the connection of the electric control line is automated, the automated connector shall meet the requirements specified in Annex 22 of this Regulation.**

Failure warning signals required from the trailer by this Regulation shall be activated via the above connectors. The requirement to be applied to trailers with respect to the transmission of failure warning signals shall be those, as appropriate, which are prescribed for motor vehicles in paragraphs 5.2.1.29.4., 5.2.1.29.5. and 5.2.1.29.6.

Trailers equipped with an ISO 7638:2003 connector as defined above shall be marked in indelible form to indicate the functionality of the braking system when the ISO 7638:2003 connector is connected and disconnected.

The marking is to be positioned so that it is visible when connecting the pneumatic and electrical interface connections.

Justification: As an alternative to the ISO 7638 connector the automated connector is mentioned as well as a reference to the corresponding requirements in the new Annex 22.

Input from Stefan Manz :

Last year statistic says that for semi trailers BPW sold 2.6% 9m cable lenght
96% 12m cable length
1.4% 16m cable length
power supply cables for EBS

Input from Michael Eiermann and José Alguerra

A. Cable Lengths

In our last meeting we discussed the cable lengths according to ISO 11992, which were 15m for the towing vehicle, 7m for the coiled cable and 18m for the towed vehicle.

After some new analysis based on values given by the brake experts and truck & trailer OEMs, we propose to split the allowed 40m available for the whole vehicle combination into **20m for the towing vehicle and 20m for the towed vehicle**.

Please find attached a summary of the result of our analysis (EXCEL-sheet).

As a consequence of that we would propose to amend the text of 2.2, Annex 22 to read:

Annex 22

2.2 Deviating from *maximum cable length specification for manual connectors in 5.1.3.6 of this regulation* the maximum permissible cable lengths for automated connectors shall be:

Towing vehicle l1:	20m from EBS node to automated connector*
Coiled cable l2:	0m
Towed vehicle l3:	20m from automated connector to EBS node*

****Note: EBS node can be e.g. brake ECU or data repeater***

Text proposal for justification:

* 5.1.3.6 stipulates ISO 11992, comprising a split of cable lengths specific for manual operation. Automated systems have not been considered for the time being.

→ this paragraph does not need to be modified for manual connectors

* For automated connectors R13 needs to be amended in terms of the split of cable lengths for vehicles with automated connectors.

* In deviation to R13 paragraph 5.1.3.6. the split of cable lengths needed for automated connectors is 20m for the towing vehicle and 20m for the towed vehicle.

Summary:

- Vehicles with manual connectors have to be conform to 5.1.3.6
- Vehicles with automated connectors have to be conform to Annex 22, paragraph 2.2
- Vehicles with both, manual and automated connectors have to be conform to 5.1.3.6 with their manual and Annex 22, paragraph 2.2 with their automated connectors.

B. 5.1.3.6. Text and Figures

The second matter we want to propose is a modification of 5.1.3.6 and the figures, explaining cable and tube routing.

The current ECE R13 stipulates a point-to-point connection for ABS/EBS. In the foreseen ISO7638 connector all 7 pins were in one common housing. There was no reason to treat pins 6 + 7 different to 1-5.

This is different on vehicles for double mode, manual and automated. In this case a separation of 1-5 from 6 + 7 allows a parallel routing for energy supply, without violating the requirement of point-to-point connection for data bus communication. An amendment of R13 allowing this parallel routing for that vehicles provides a significant advantage compared to current vehicles. This configuration ensures that the ABS is always connected in ACV mode, which is not the case today with manual connectors.

For that reason we propose to amend paragraph 5.1.3.6 of ECE R13 to read:

5.1.3.6.a)

*The electric control line shall conform to ISO 11992-1 and 11992-2:2003 including its amendment 1:2007 and be a point-to-point type **regarding pin 6 and 7 of ISO 7638-1 and 7638-2:2003** using :*

- i) the seven pin connector according to ISO 7638-1 or 7638-2:2003 or,*
- ii) in the case of systems where the connection of the electric control line is automated, the automated connector shall provide as a minimum the same number of pins [with the same electrical conductivity properties and electrical functionality] as the above mentioned ISO 7638 connector and meet the requirements specified in Annex 22 of this Regulation.*

The figures at the end of our proposal would get a modified headline:

I. Automated connection and manual connection equipped vehicles - **Data bus requirements** ***Diagrams for electrical connections show routing of signals of pin 6 and 7 acc. to ISO 7638***

Three legends are still missing today:

Figure E: Pneumatic connection Tractor and Trailer via ACV

Automated connection mode: No coiled cables connected, Connection between tractor and trailer when P4 and P7 are connected (i.e. when fifth wheel coupled)

Figure F: Pneumatic connection Tractor and Trailer via coiled tube

Coiled tubes connected, Line P2 to P6 is not in use

Figure G: Pneumatic connection Tractor and Trailer via coiled tube

Coiled tubes connected, Line P2 to P6 is not in use

Justification

Electrical connection - current situation

According to the current paragraph 5.1.3.6 of R13 the electric control line shall be a point-to-point type. This is a general demand valid for all pins although it is only needed for pins 6 + 7.

Electrical connection – proposed amendment

Signals of pins 1 - 5 of ISO 7638 can be transmitted through both, the ISO7638 connector and the ACV connector at the same time.

This provides a higher level of safety by ensuring that the ABS is always connected in ACV mode, regardless of the human factor.

The problem that was the reason for the development of features like "stoplight-power supply" for trailer is eliminated when ACV is in use.

Examples are given in figures A - C

Pneumatical connection

A parallel pneumatic connection is uncritical and increases system reliability.

Examples are given in figures D - F