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**Road vehicles — Interchange of digital  
information on electrical connections  
between towing and towed vehicles —**

**Part 2:  
Application layer for brakes and  
running gear**

*Véhicules routiers — Échange d'informations numériques sur  
les connexions électriques entre véhicules tracteurs et véhicules  
tractés —*

*Partie 2: Couche d'application pour les équipements de freinage et les  
organes de roulement*



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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

This third edition cancels and replaces the second edition (ISO 11992-2:2003), which has been technically revised. It also replaces ISO 11992-2:2003/Amd 1:2007.

ISO 11992 consists of the following parts, under the general title *Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles*:

- *Part 1: Physical and data-link layers*
- *Part 2: Application layer for brakes and running gear*
- *Part 3: Application layer for equipment other than brakes and running gear*
- *Part 4: Diagnostic communication*

## Introduction

This part of ISO 11992 has been established in order to define the data interchange between a commercial vehicle and its towed vehicle(s), including the communication between towed vehicles, using a Controller Area Network (CAN) serial data link as specified in ISO 11992-1 for control and status data related to electronically controlled braking and running gear applications.

It is subject to additions which will become necessary in order to keep pace with experience and technical advances. Care has been taken to ensure that these additions can be introduced in a compatible way, and care will have to be taken in the future so that such additions remain compatible with the previous versions. In particular, it can become necessary to standardize new parameters and parameter groups. ISO members can request that such new parameters and parameter groups are to be included in the future editions of ISO 11992.

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# Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles —

## Part 2: Application layer for brakes and running gear

### 1 Scope

This part of ISO 11992 specifies the parameters and messages for electronically controlled braking systems, including anti-lock braking systems (ABS) and vehicle dynamics control systems (VDC), as well as for running gear equipment (i.e. systems for steering, suspension, and tyres), to ensure that the data communication interchange of information between road vehicles with a maximum authorized total mass greater than 3 500 kg and their towed vehicles, including the communication between (several) towed vehicles, on a dedicated network. It does not include any other communication on that network that is not related to the communication between those vehicles.

### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7638 (all parts), *Road vehicles — Connectors for the electrical connection of towing and towed vehicles*

ISO 11898-1, *Road vehicles — Controller area network (CAN) — Part 1: Data link layer and physical signalling*

ISO 11992-1, *Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles — Part 1: Physical and data-link layers*

ISO 11992-4, *Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles — Part 4: Diagnostic communication*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 11898-1, ISO 11992-1, and the following apply.

#### 3.1

##### **anti-lock braking system**

##### **ABS**

control function which automatically modulates the pressure producing the braking forces at the wheels to limit the degree of wheel slip, or a system that provides an anti-lock braking function

#### 3.2

##### **anti-spin regulation**

##### **ASR**

control function which automatically modulates the engine torque or the pressure producing the braking forces at the wheels to limit the degree of wheel spin, or a system that provides an anti-spin control

**3.3**

**center-axle trailer**

towed vehicle equipped with a rigid towing device, and in which the axle(s) is (are) positioned close to the centre of gravity of the vehicle

**3.4**

**commercial vehicle**

motor vehicle which, on account of its design and appointments, is used mainly for conveying goods and which can also tow a trailer

**3.5**

**converter dolly**

dolly unit that couples to a semi-trailer with a fifth-wheel coupling and thereby “converts” the semi-trailer to a full trailer

**3.6**

**electronic braking system**

**EBS**

braking system in which control is generated and processed as an electrical signal in the control transmission

**3.7**

**electronic control unit**

**ECU**

electronic item consisting of a combination of basic parts, subassemblies, and assemblies packaged together as a physically independent entity

**3.8**

**full trailer**

towed vehicle equipped with a towing device which can move vertically (in relation to the trailer), and in which the axle(s) is (are) positioned less close to the centre of gravity of the vehicle

**3.9**

**gateway**

unit connecting different networks or parts of one network and performing any necessary protocol translation

**3.10**

**link trailer**

towed vehicle with a fifth-wheel coupling, designed for towing a semi-trailer

**3.11**

**network segment**

part of a network that is within the domain of a single link layer

**3.12**

**node**

device capable of sending or receiving data whose identification will be unambiguous for authentication purposes

**3.13**

**running rear equipment**

**RGE**

equipment of a vehicle, including steering, suspension, and tyres

**3.14**

**roll-over prevention/protection**

**ROP**

control function to prevent roll-over situations of a vehicle

Note 1 to entry: ROP is part of a *VDC* (3.20) function.

Note 2 to entry: In UNECE Regulation No. 13, roll-over prevention is referred to as “roll-over control”.

### 3.15

#### **semi-trailer**

trailer which is designed to be coupled to a semi-trailer towing vehicle and to impose a substantial part of its total weight on the towing vehicle

### 3.16

#### **towed vehicle**

non-power-driven road vehicle which, on account of its design and appointments, is used to transport persons or goods and is intended to be towed by a motor vehicle

### 3.17

#### **towing full trailer**

towed vehicle equipped with a towing device which can move vertically (in relation to the trailer), and in which the axle(s) is (are) positioned less close to the centre of gravity of the vehicle that is capable of towing another vehicle

### 3.18

#### **towing semi-trailer**

trailer which is designed to be coupled to a semi-trailer towing vehicle and to impose a substantial part of its total weight on the towing vehicle that is capable of towing another vehicle

### 3.19

#### **towing vehicle**

motor vehicle or non-power-driven vehicle which tows a succeeding vehicle

### 3.20

#### **vehicle dynamic control**

#### **VDC**

control function as part of the braking system that reacts to stabilize the vehicle during dynamic manoeuvres

Note 1 to entry: VDC has the possible sub-functions *ROP* (3.14) and *YC* (3.21).

### 3.21

#### **yaw control**

#### **YC**

control function to reduce an unwanted lateral movement of a vehicle

Note 1 to entry: Yaw control is part of a *VDC* (3.20) function.

Note 2 to entry: In UNECE Regulation No. 13, YC is referred to as “directional control”.

## 4 Symbols and abbreviated terms

|        |                                 |
|--------|---------------------------------|
| CAN    | Controller Area Network         |
| CAN-ID | CAN identifier                  |
| DA     | destination address             |
| DLC    | data length code                |
| DP     | data page                       |
| EDP    | extended data page              |
| GE     | group extension                 |
| LSB    | least significant byte (or bit) |
| MSB    | most significant byte (or bit)  |
| P      | priority                        |
| PDU    | Protocol Data Unit              |
| PF     | PDU format                      |
| PGN    | parameter group number          |
| PS     | PDU specific                    |
| SA     | source address                  |
| TOS    | type of service                 |
| UTC    | Universal Time Coordinate       |

## 5 General Specifications

The data link shall be in accordance with ISO 11898-1. The physical layer shall be in accordance with ISO 11992-1.

Appropriate PDUs are specified to structure the communication between the towing and towed vehicles' interface(s). These PDUs shall be transmitted between the electronic devices (nodes) at the towing vehicle and each towed vehicle, as defined in the following sections.

Each node at a vehicle shall provide logical separation between the network segments and any in-vehicle networks and act as a gateway to forward the messages, as specified in the following sections.

Any combination of new and old towing and towed vehicles is allowed. Multiple towed vehicles can be connected in any combination. The network shall be capable of addressing any towed vehicle, including dollies. The truck operator can disconnect and connect towed vehicles at any time and any order, and the network shall adjust and respond accordingly.

## 6 Application layer

### 6.1 Protocol Data Unit (PDU) specification

#### 6.1.1 General

The application layer provides a string of information that is assembled as a PDU. The PDU provides a framework for organizing the information sent by means of CAN data frames.

All transmitted CAN data frames shall use the extended data frame format with a 29-bit CAN-ID as defined in ISO 11898-1. The PDU framework for the normal and diagnostic communications between the commercial vehicles and towed vehicles is the same as defined in Reference [1] and is specified in 6.1.2. Diagnostic communication between the towed vehicles shall use the subnet addressing PDU format as specified in 6.1.3.

#### 6.1.2 PDU format for normal communication and diagnostic communication (PDU1 and PDU2)

The PDU1 and PDU2 shall consist of the following fields as shown in Figure 1:

- a 29-bit CAN-ID with the subfields priority (P), extended data page (EDP), data page (DP), PDU format (PF), PDU specific (PS) [which can be a destination address (DA) or a group extension (GE)], and source address (SA);
- a 64-bit data field.

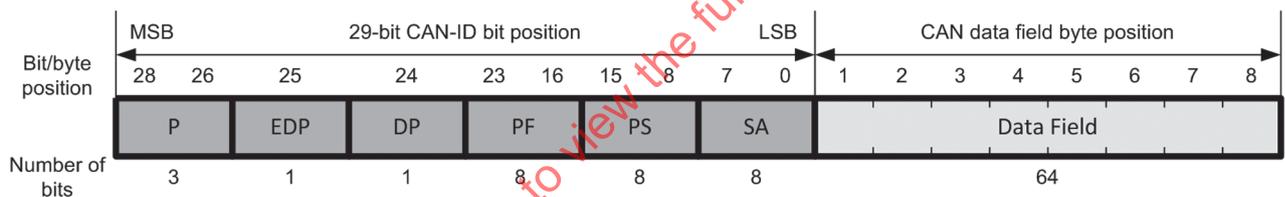


Figure 1 — PDU1 and PDU2 structure

Depending on the contents of the subfields, the PDUs are classified as PDU1 or PDU2 frames as given in the following definitions.

#### 6.1.3 PDU format for subnet addressing communication (PDU3)

The PDU3 shall consist of the following fields as shown in Figure 2:

- a 29-bit CAN-ID with the subfields priority (P), extended data page (EDP), data page (DP), type of service (TOS), destination address (DA) and source address (SA);
- a 64-bit data field.

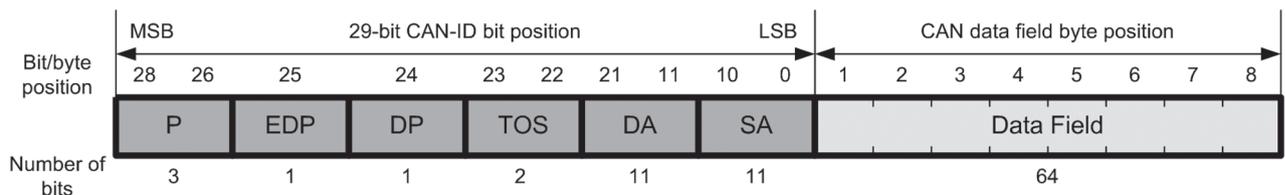


Figure 2 — PDU3 structure

The fields P, EDP, and DP shall be used as given in the following definitions. All other fields shall be used as defined in ISO 11992-4.

**6.1.4 Priority (P)**

This 3-bit subfield shall be used to optimize the PDU frame latency for transmission onto the bus only and shall have no other specific meaning. It shall not be used for message validation on the receiver side and should be globally masked off by the receiver (ignored). The priority of any PDU can be set from highest, 0<sub>10</sub> (000<sub>2</sub>), to lowest, 7<sub>10</sub> (111<sub>2</sub>), and will use the following default values.

- The default for all control-oriented PDUs shall be 3<sub>10</sub> (011<sub>2</sub>).
- The default of all other informational PDUs shall be 6<sub>10</sub> (110<sub>2</sub>).
- The default for diagnostic PDUs shall be 7<sub>10</sub> (111<sub>2</sub>).

**6.1.5 Extended data page (EDP)**

This 1-bit subfield shall be used in conjunction with the DP subfield to select an auxiliary range of PGNs or to select subnet addressing diagnostic messages. The definition of a PGN is given in 6.2. The definition of CAN frames for subnet addressing diagnostic messages is given in 6.6.

**6.1.6 Data page (DP)**

This 1-bit subfield shall be used in conjunction with the EDP subfield to select an auxiliary range of PGNs or to select subnet addressing diagnostic messages. The definition of a PGN is given in 6.2. The definition of CAN frames for subnet addressing diagnostic messages is given in 6.6.

**6.1.7 PDU format (PF)**

This 8-bit subfield shall determine the PDU format and the transmission method as specified in Table 1.

- If the value of the PDU format field is below 240, then the PDU format is of type PDU1 and the PDU-specific field contains a destination address.
- If the value of the PDU format field is 240 to 255, then the PDU format is of type PDU2 and the PDU-specific field contains a group extension.

**Table 1 — PDU definition**

| PF value   | PDU format | PS | Transmission method  |
|------------|------------|----|--|
| 0 to 239   | PDU1       | DA | This PDU 1 format shall be used for messages to be sent directly to either a specific or a global destination. |
| 240 to 255 | PDU2       | GE | This PDU 2 format shall only be used to communicate global (broadcast) messages.                               |

**6.1.8 PDU specific (PS)**

**6.1.8.1 General**

This 8-bit subfield shall depend on the PDU format. For a PDU1 format, the PDU specific (PS) subfield is a destination address (DA), for a PDU2 format, the PS subfield is a group extension (GE) (see Table 1).

**6.1.8.2 Destination address (DA)**

The DA shall contain the specific address of the towing or towed vehicle to which the PDU is being sent. If the global destination address (255<sub>10</sub> = FF<sub>16</sub>) is sent, all nodes shall process the PDU.

### 6.1.8.3 Group extension (GE)

The GE in conjunction with the four least significant bits of the PF subfield shall be used as part of the specific PGN.

### 6.1.9 Source address (SA)

This 8-bit subfield shall provide the source address (SA) of the node that transmits the PDU. Therefore the SA subfield ensures that the CAN-ID is unique on all network segments.

### 6.1.10 Data field

All CAN data frames shall use a data field length of 8 byte, i.e. DLC = 8. If less than 8 byte are required by the defined PGN, all non-used bits shall be transmitted with all bits set to "1".

## 6.2 Parameter group number (PGN)

This 24-bit number shall be used in all cases where a group of parameters assembled in the PDU1 or PDU2 data field needs to be identified. A PGN is built from the CAN-ID subfields EDP, DP, PF, and PS as specified in [Figure 3](#) and is used to identify or label a group of parameters. It is independent of the remaining fields of the CAN-ID.

The upper bits 18 to 23 are reserved and shall always be set to zero (0). For a PDU1 message, i.e. if the PS field is a DA, the least significant byte (LSB) of the PGN shall always be set to zero (0).

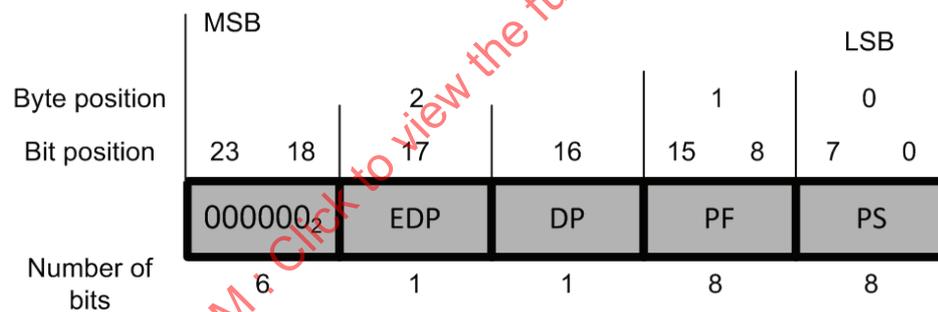


Figure 3 — PGN subfield definition

**NOTE** To reduce the effort of exchanging PDUs between the ISO 11992-2 communication and any in-vehicle network, the PGNs within this International Standard are harmonized with those used in SAE J1939.

**EXAMPLE** For a message with CAN-ID 18FEC920<sub>16</sub> (PDU2 format), the subfields are P = 110<sub>2</sub>, EDP = 0<sub>2</sub>, DP = 0<sub>2</sub>, PF = FE<sub>16</sub>, PS = C9<sub>16</sub>, and SA = 20<sub>16</sub>. The corresponding PGN is 00FEC9<sub>16</sub> (65225<sub>10</sub>).

## 6.3 Address assignment

### 6.3.1 Address usage

A road train consists of one truck (commercial vehicle) and one or more trailer(s) (towed vehicles). Dollies within the road train shall be treated as additional towed vehicles (see [Figure 4](#)).

The commercial vehicle is the towing vehicle of towed vehicle #1; towed vehicle #1 is the towing vehicle of towed vehicle #2; and so on.



Each towed vehicle's node shall use the general initialization message received at the towing vehicle's network interface to determine its own address. It shall use the successor's address of that message's SA as its own address. This requires that a towed vehicle's node shall be capable of

- identifying its predecessor by the SA of the general initialization message,
- assigning its own address based on the predecessors address, and
- identifying the potential receiver(s) by the destination address and by the message type.

An assigned address shall be valid as long as the towed vehicle is powered and no message from the predecessor with a different SA is received. If a different SA is received, the assignment procedure shall be restarted.

To provide the address assignment for itself and for possible successors, a node shall be capable of continuously sending the general initialization message with its dynamically assigned own SA as illustrated in Figure 5.

This addressing method allows the towed vehicle's node to communicate and to identify its presence to its predecessor immediately after power-up. This means that several towed vehicles can use the same address until the address assignment procedure is completed. Continuous sending of the general initialization message is necessary to allow immediate towed vehicle address assignment at any time a towed vehicle should be connected.

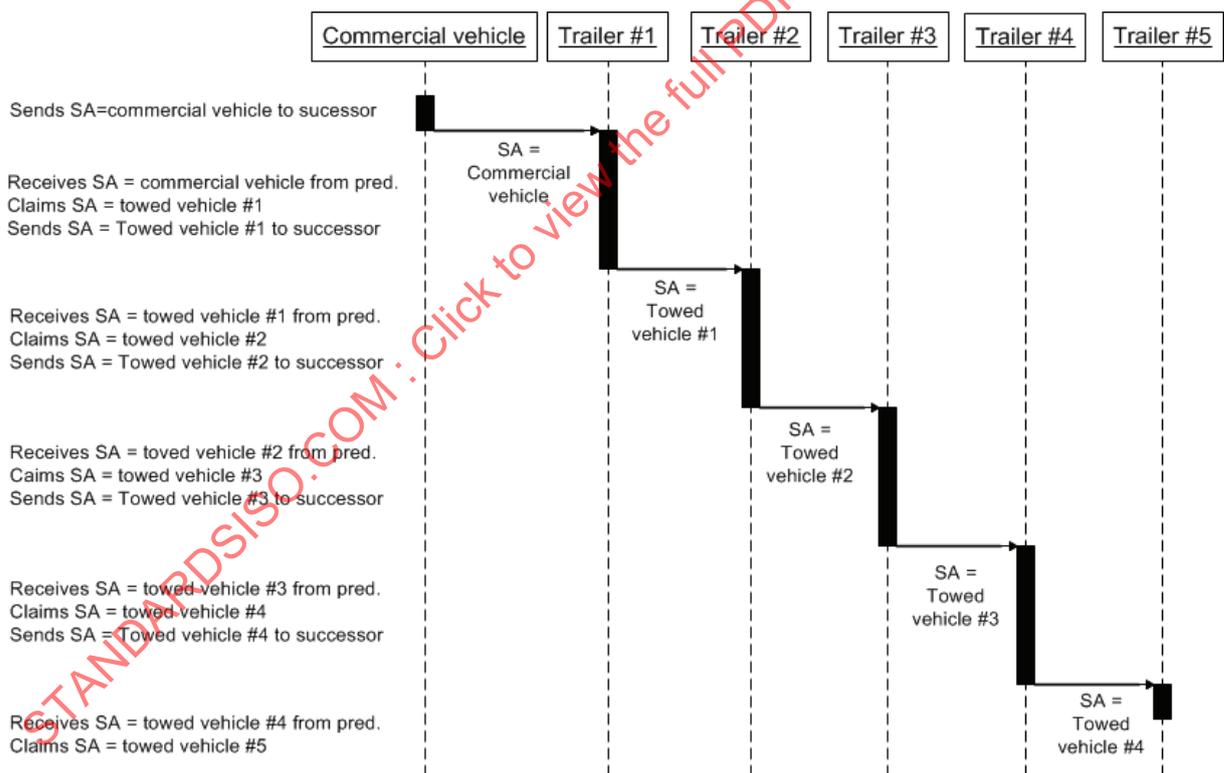


Figure 5 — Address assignment procedure

## 6.4 Message routing

If a vehicle has no provision for a successor, the message routing function is not required by the vehicle's node.

To allow communication between the towing and towed vehicles, a node shall be capable of

- receiving messages from its predecessor and successor within the road train,

- identifying receiver(s) by the destination address (PDU 1 type messages) or the PDU format (PDU 2 type messages),
- routing all applicable messages from its predecessor(s) to its successor(s) within the road train by sending them with the unchanged SA and DA to its successor within a maximal delay time of  $t_d = 13$  ms, and
- routing all applicable messages from its successor(s) to its predecessor(s) within the road train by sending them with the unchanged SA and DA to its predecessor within a maximal delay time of  $t_d = 13$  ms.

A towed vehicle node shall not route messages to its successor or predecessor within the road train

- if the SA of a message received from its predecessor corresponds to a road train position closer or equal to its own from the commercial vehicle or
- if the SA of a message received from its successor corresponds to a road train position more distant or equal to its own from the commercial vehicle.

EXAMPLE [Figure 6](#) shows some examples of the message flow between vehicles.

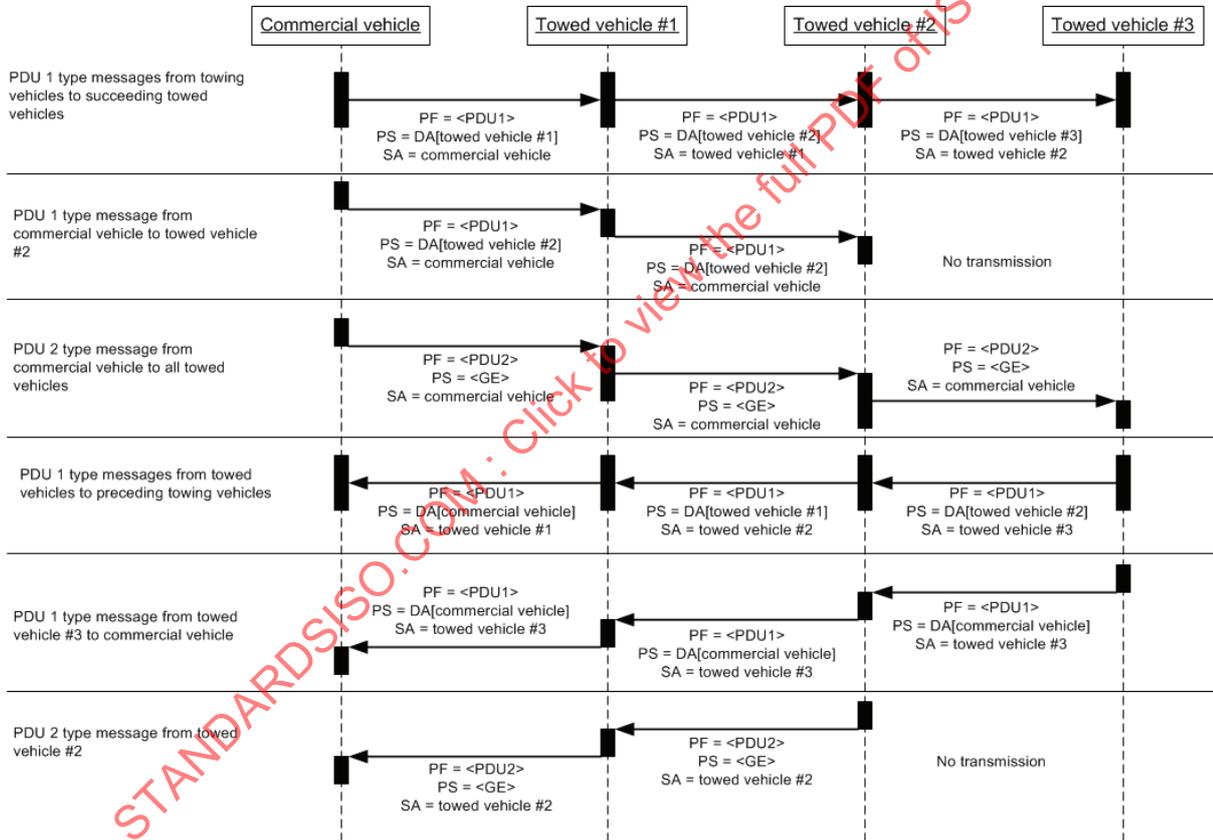


Figure 6 — Example of the message flow between vehicles

## 6.5 Parameters

### 6.5.1 Generic data ranges

Each defined parameter shall comply with one of the defined parameter types.

- [Table 3](#) specifies the ranges used to determine the validity of the transmitted signals.
- [Table 4](#) specifies the ranges used to denote the status of a discrete parameter.

— [Table 5](#) specifies the ranges used to denote the status of a control mode command.

The values in the range “error indicator” provide a means for a module to immediately indicate that valid parameter data are not currently available, owing to some type of error in the sensor, subsystem, or module. Additional information about the failure can be obtained using the diagnostic communication.

The values in the range “not available” provide a means for a module to transmit a parameter that is not available or not supported in that module. This value does not replace the “error indicator”.

The values in the range “not requested” provide a means for a device to transmit a command message and identify those parameters where no response is expected from the receiving device.

The values in the range of “special function” are reserved for the definition of parameter-specific functionalities.

For some parameters, non-generic definitions are given in the following sections. These are not defined here. Examples are encoded table values, where each value is assigned to one specific meaning.

After power-on, a node shall internally set the “availability bits” of the received parameters as “not available” and operate with the default values until valid data are received. When transmitting, undefined bytes shall be sent as 255<sub>10</sub> (FF<sub>16</sub>) and undefined bits shall be sent as “1”.

If a failure of a function or device prevents the transmission of valid data for a parameter, the error indicator, as specified in [Table 3](#), [Table 4](#), or [Table 5](#), shall be used in place of that parameter data. However, if the measured or calculated data has yielded a value that is valid yet exceeds the defined parameter range, the error indicator shall not be used. The data shall be transmitted using the appropriate minimum or maximum parameter value.

A 2-byte (16-bit) parameter shall be sent (least significant byte first, most significant byte second).

**Table 3 — Transmitted signal ranges**

| Range name                     | 1 byte   | 2 byte  |
|--------------------------------|--|---|
| valid signal                   | 0 <sub>10</sub> to 250 <sub>10</sub><br>0 <sub>16</sub> to FA <sub>16</sub>    | 0 <sub>10</sub> to 64255 <sub>10</sub><br>0 <sub>16</sub> to FAF <sub>16</sub>        |
| reserved for future indicators | 251 <sub>10</sub> to 253 <sub>10</sub><br>FB <sub>16</sub> to FD <sub>16</sub> | 64256 <sub>10</sub> to 65023 <sub>10</sub><br>FB00 <sub>16</sub> to FDF <sub>16</sub> |
| error indicator                | 254 <sub>10</sub><br>FE <sub>16</sub>  | 65024 <sub>10</sub> to 65279 <sub>10</sub><br>FE00 <sub>16</sub> to FEF <sub>16</sub> |
| not available or not requested | 255 <sub>10</sub><br>FF <sub>16</sub>  | 65280 <sub>10</sub> to 65535 <sub>10</sub><br>FF00 <sub>16</sub> to FFF <sub>16</sub> |

**Table 4 — Transmitted values for discrete parameters (measured)**

| Range name                            | Transmitted value |
|---------------------------------------|-------------------|
| disabled (off, passive, insufficient) | 00 <sub>2</sub>   |
| enabled (on, active, sufficient)      | 01 <sub>2</sub>   |
| error indicator                       | 10 <sub>2</sub>   |
| not available or not installed        | 11 <sub>2</sub>   |

**Table 5 — Transmitted values for control requests (status)**

| Range name  | Transmitted value |
|---|-------------------|
| command to disable function (turn off, etc.)        | 00 <sub>2</sub>   |
| command to enable function (turn on, etc.)          | 01 <sub>2</sub>   |
| special function (parameter specific)               | 10 <sub>2</sub>   |
| don't care/take no action (leave function as it is) | 11 <sub>2</sub>   |

### 6.5.2 General parameter specification

A description of each parameter is given in [6.5.3](#), [6.5.4](#), and [6.5.5](#). The description includes data length, data type, resolution, and range for reference.

The type of data shall also be identified for each parameter. Data can be either status or measured.

- Status data specifies a command requesting an action to be performed by the receiving node. Examples of status-type data are “service brake demand value” and “ride height request”.
- Measured data conveys the current value of a parameter as measured or observed by the transmitting node to determine the condition of the defined parameter. Examples of measured-type data are “wheel-based vehicle speed” and “lift axle 1 position”. Note that a measured-type parameter can indicate the condition of the defined parameter, even if no measurement has been taken. For example, the measured-type parameter can indicate that a solenoid has been activated, even if no measurement has been taken to ensure the solenoid accomplished its function.

For each parameter, the attributes given in [Table 6](#) shall apply.

**Table 6 — Attribute definition**

| Attribute       | Definition  |
|-----------------|---|
| data length     | required number of bits/bytes of the parameter            |
| resolution      | weight of a bit in physical unit                          |
| offset          | value of the binary value 0 (zero) in physical unit       |
| data range      | physical range of data that the parameter is able to hold |
| operating range | physical range of data that can be used                   |
| type            | type of data as specified in this section                 |

The PGN reference attribute is informative. The PGN parameters are specified in [6.6](#).

### 6.5.3 System independent parameters

#### 6.5.3.1 Tyre/wheel identification

This parameter shall indicate the identification number of the tyre or wheel. The identification number shall specify the tyre or wheel position on each axle (bit 1 to bit 4) and the number of axles starting from the front of the respective towed vehicle (bit 5 to bit 8) (see [Figure 7](#)).

The tyre/wheel identification shall only be used as complementary information in conjunction with all the tyre, wheel, or wheel-end related information in the PGN's message and shall be ignored if those parameters are not supported. The identification number “0” shall be used if the position of the tyre, wheel, wheel-end, or axle cannot be identified. [Table 7](#) specifies the parameter description.

**Table 7 — Specification of the parameter “tyre/wheel identification”**

| Attribute  | Value   |
|--|---|
| data length  | 1 byte  |
| resolution   | encoded table value   |
|  | bit 1 to bit 4  |
|  | 0000 <sub>2</sub> - wheel position undefined                    |
|  | 0001 <sub>2</sub> to 1111 <sub>2</sub> - wheel position 1 to 15 |
|  | bit 5 to bit 8  |
| 0000 <sub>2</sub> - axle position undefined                    |   |
| 0001 <sub>2</sub> to 1111 <sub>2</sub> - axle position 1 to 15 |   |
| type   | measured  |

#### Assignment rules

- The tyre/wheel identification shall be assigned sequentially from the vehicle’s centre line, starting from “9” incrementing on the right side and from “7” decrementing on the left side, in the normal direction of travel. “8” is used for the one wheel on the centre line as illustrated in [Figure 7](#).
- It is assumed that each wheel rim has one and only one tyre.
- In situations when the number of wheels on each wheel-end cannot be identified, or the wheel-end alone is to be identified, the parameters shall be identified using the default wheel position 7 left and 9 right in the normal direction of travel.
- In cases when the wheel definition is shared, within the same PGN, with another parameter or parameters, the wheel-end can be specified as a wheel position 1 to 7 on the left-hand side or 9 to 15 on the right-hand side, as required by the other parameter or parameters.
- In situations when more than 15 axles are present on the vehicle, the first 15 axles shall be identified using this procedure; the additional axles shall then be identified with the axle identification “0” together with the respective wheel identification.

NOTE Due to the parameter definition, there is an ambiguity between “parameter not supported” (255<sub>10</sub>) and wheel = 15<sub>10</sub> and axle = 15<sub>10</sub>. As the identification number serves only as complementary information for other parameters, the value of 255<sub>10</sub> identifies only a valid position if those parameters are supported.

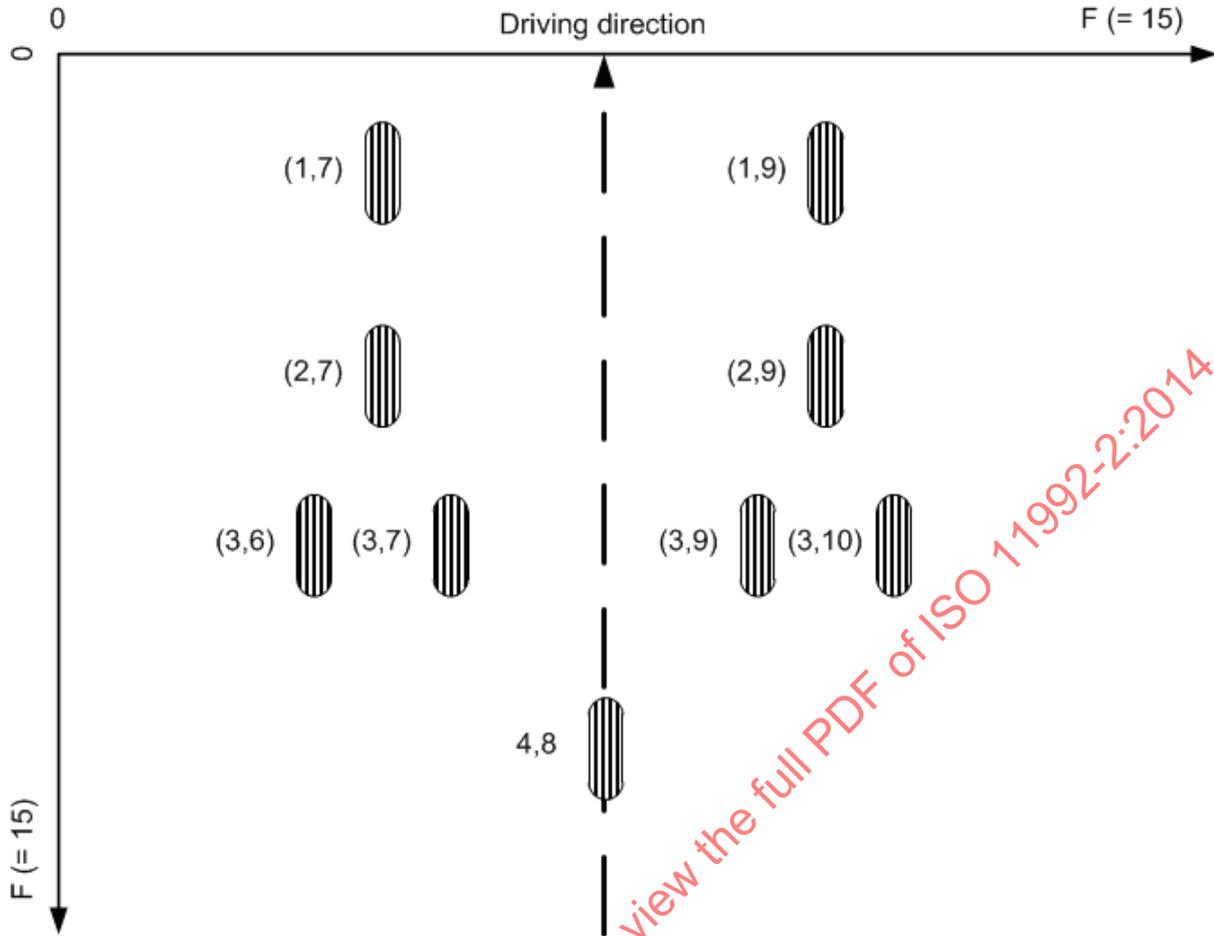


Figure 7 — Tyre/wheel and axle position

6.5.3.2 Seconds

This parameter shall indicate the component “seconds” of the current time of day. This should be reported as the seconds of the current time at UTC; however, it can be reported as the component seconds of the current time at a local time zone. The local hour/minute offset parameters (6.5.3.8 and 6.5.3.9) are used to indicate if the time of day is the current UTC time or a local time zone time. Table 8 specifies the parameter description.

Table 8 — Specification of the parameter “seconds”

| Attribute       | Value          |
|-----------------|----------------|
| data length     | 1 byte         |
| resolution      | 0,25 s/bit     |
| offset          | 0 s            |
| data range      | 0 s to 62,5 s  |
| operating range | 0 s to 59,75 s |
| type            | measured       |

6.5.3.3 Minutes

This parameter shall indicate the component “minutes” of the current time of day. This should be reported as the minutes of the current time at UTC; however, it can be reported as the component minutes of the current time at a local time zone. The local hour/minute offset parameters (6.5.3.8 and 6.5.3.9) are used

to indicate if the time of day is the current UTC time or a local time zone time. [Table 9](#) specifies the parameter description.

**Table 9 — Specification of the parameter “minutes”**

| Attribute       | Value            |
|-----------------|------------------|
| data length     | 1 byte           |
| resolution      | 1 min/bit        |
| offset          | 0 min            |
| data range      | 0 min to 250 min |
| operating range | 0 min to 59 min  |
| type            | measured         |

#### 6.5.3.4 Hours

This parameter shall indicate the component “hour” of the current time of day. This should be reported as the hours of the current time at UTC; however, it can be reported as the component hours of the current time at a local time zone. The local hour/minute offset parameters ([6.5.3.8](#) and [6.5.3.9](#)) are used to indicate if the time of day is the current UTC time or a local time zone time. [Table 10](#) specifies the parameter description.

**Table 10 — Specification of the parameter “hours”**

| Attribute       | Value        |
|-----------------|--------------|
| data length     | 1 byte       |
| resolution      | 1 h/bit      |
| offset          | 0 h          |
| data range      | 0 h to 250 h |
| operating range | 0 h to 23 h  |
| type            | measured     |

#### 6.5.3.5 Day

This parameter shall indicate the component “day” of the current time of day. This should be reported as the day of the current time at UTC; however, it can be reported as the component day of the current time at a local time zone. The local hour/minute offset parameters ([6.5.3.8](#) and [6.5.3.9](#)) are used to indicate if the time of day is the current UTC time or a local time zone time. [Table 11](#) specifies the parameter description.

**Table 11 — Specification of the parameter “day”**

| Attribute       | Value                  |
|-----------------|------------------------|
| data length     | 1 byte                 |
| resolution      | 0,25 day/bit           |
| offset          | 0 day                  |
| data range      | 0 day to 62,50 days    |
| operating range | 0,25 day to 31,75 days |
| type            | measured               |

NOTE A value of 0 for the day is null. The values 1, 2, 3, and 4 indicate the first day of a month; the values 5, 6, 7, and 8 indicate the second day of the month, etc.

6.5.3.6 Month

This parameter shall indicate the component “month” of the current time of day. This should be reported as the month of the current time at UTC; however, it can be reported as the component month of the current time at a local time zone. The local hour/minute offset parameters (6.5.3.8 and 6.5.3.9) are used to indicate if the time of day is the current UTC time or a local time zone time. Table 12 specifies the parameter description.

Table 12 — Specification of the parameter “month”

| Attribute       | Value          |
|-----------------|----------------|
| data length     | 1 byte         |
| resolution      | 1 mo/bit       |
| offset          | 0 mo           |
| data range      | 0 mo to 250 mo |
| operating range | 1 mo to 12 mo  |
| type            | measured       |

NOTE A value of 0 is null. A value of 1 identifies January, 2 identifies February, etc.

6.5.3.7 Year

This parameter shall indicate the component “year” of the current time of day. This should be reported as the year of the current time at UTC; however, it can be reported as the component year of the current time at a local time zone. The local hour/minute offset parameters (6.5.3.8, 6.5.3.9) are used to indicate if the time of day is the current UTC time or a local time zone time. Table 13 specifies the parameter description.

Table 13 — Specification of the parameter “year”

| Attribute       | Value            |
|-----------------|------------------|
| data length     | 1 byte           |
| resolution      | 1 y/bit          |
| offset          | 1985 y           |
| data range      | 1985 y to 2235 y |
| operating range | 1985 y to 2235 y |
| type            | measured         |

NOTE A value of 0 identifies year 1985, 1 identifies year 1986, etc.

6.5.3.8 Local minute offset

This parameter shall indicate the component “minute” of the offset between the UTC time and date and a local time zone time and date and is defined as the number of minutes to add to the UTC time and date to convert it into the time and date of a local time zone.

- The local offset is a positive value for time zones east of the prime meridian to the international date line.
- The local offset is a negative value for time zones west of the prime meridian to the international date line.

The local minute offset is only applicable when the time and date parameters are reported as UTC time and date. Table 14 specifies the parameter description.

**Table 14 — Specification of the parameter “local minute offset”**

| Attribute       | Value               |
|-----------------|---------------------|
| data length     | 1 byte              |
| resolution      | 1 min/bit           |
| offset          | -125 min            |
| data range      | -125 min to 125 min |
| operating range | -59 min to 59 min   |
| type            | measured            |

### 6.5.3.9 Local hour offset

This parameter shall indicate the component “hour” of the offset between the UTC time and date and a local time zone time and date and is defined as the number of hours to add to the UTC time and date to convert it into the time and date of a local time zone.

- The local offset is a positive value for time zones east of the prime meridian to the international date line.
- The local offset is a negative value for time zones west of the prime meridian to the international date line.

The local hour offset is only applicable when the time and date parameters are reported as UTC time and date. [Table 15](#) specifies the parameter description.

**Table 15 — Specification of the parameter “local hour offset”**

| Attribute       | Value           |
|-----------------|-----------------|
| data length     | 1 byte          |
| resolution      | 1 h/bit         |
| offset          | -125 h          |
| data range      | -125 h to 125 h |
| operating range | -23 h to 23 h   |
| type            | measured        |

### 6.5.3.10 Identification data index

This parameter shall be used as an index to an array of identification data as defined by the parameter “identification data content” ([6.5.3.11](#)) and shall not be used without that context. [Table 16](#) specifies the parameter description.

**Table 16 — Specification of the parameter “identification data index”**

| Attribute       | Value    |
|-----------------|----------|
| data length     | 1 byte   |
| resolution      | 1/bit    |
| offset          | 0        |
| data range      | 0 to 250 |
| operating range | 0 to 250 |
| type            | measured |

**6.5.3.11 Identification data content**

This parameter shall be interpreted as an array of identification data that is indexed by the parameter “identification data index” (6.5.3.10). Table 17 and Table 18 specify the parameter description.

**Table 17 — Specification of the parameter “identification data”**

| Attribute       | Value    |
|-----------------|----------|
| data length     | 1 byte   |
| resolution      | 1/bit    |
| offset          | 0        |
| data range      | 0 to 250 |
| operating range | 0 to 250 |
| type            | measured |

**Table 18 — Specification of the parameter “identification data content”**

| Index     | Attribute            | Value                         |
|-----------|----------------------|-------------------------------|
| 0 to 16   | parameter            | VIN                           |
|           | content              | vehicle identification number |
|           | resolution           | ASCII                         |
|           | data range           | ASCII                         |
| 17 to 250 | reserved by document |                               |

**6.5.4 Parameters for braking systems**

**6.5.4.1 Park brake demand relative pressure**

This parameter shall command the requested brake pressure for the parking brake as a percentage of the maximum pressure. Table 19 specifies the parameter description.

**Table 19 — Specification of the parameter “park brake demand relative pressure”**

| Attribute       | Value        |
|-----------------|--------------|
| data length     | 1 byte       |
| resolution      | 0,4 %/bit    |
| offset          | 0 %          |
| data range      | 0 % to 100 % |
| operating range | 0 % to 100 % |
| type            | status       |

**6.5.4.2 Retarder demand relative torque**

This parameter shall command the requested torque of the retarder on the towed vehicle(s) as a percentage of the absolute peak torque of the retarder. Table 20 specifies the parameter description.

**Table 20 — Specification of the parameter “retarder demand relative torque”**

| Attribute       | Value           |
|-----------------|-----------------|
| data length     | 1 byte          |
| resolution      | 1 %/bit         |
| offset          | -125 %          |
| data range      | -125 % to 125 % |
| operating range | -125 % to 0 %   |
| type            | status          |

In the definition of power train speed/torque, the retarder torque reaction is a deceleration specified by a negative signed parameter.

EXAMPLE Given a retarder demand relative torque = 75 % × the absolute peak torque of the retarder, calculation steps are the following.

- a) First step [Data Content (DC) of Retarder Demand Value (RDV)]

$$DC = \frac{RDV - \text{Offset}}{\text{Resolution}} = \frac{-75 \% - (-125 \%)}{1 \% / \text{bit}} = 50 \quad (1)$$

- b) Second step [measured Actual Retarder Torque (ART)]

$$DC = \frac{ART - \text{Offset}}{\text{Resolution}} = 50 \quad (2)$$

$$ART = DC * \text{Resolution} + \text{Offset}$$

$$ART = 50 * 1\% + (-125\%)$$

$$ART = 75\%$$

#### 6.5.4.3 Service brake demand pressure

This parameter shall command the requested brake pressure value of the service brake demanded by the driver. [Table 21](#) specifies the parameter description.

**Table 21 — Specification of the parameter “service brake demand pressure”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 2 byte             |
| resolution      | 5/256 kPa/bit      |
| offset          | 0 kPa              |
| data range      | 0 kPa to 1 255 kPa |
| operating range | 0 kPa to 1 255 kPa |
| type            | status             |

NOTE This value can be modified by the coupling force control function, which has been specified by UNECE Regulation No. 13.

#### 6.5.4.4 Braking system wheel-based vehicle speed

This parameter shall indicate the absolute value of the actual speed of the vehicle (i.e. positive values for forward and backward speeds) calculated as the average of the wheel speeds of one axle influenced by slip and filtered by a frequency range of 5 Hz to 20 Hz. [Table 22](#) specifies the parameter description.

**Table 22 — Specification of the parameter “braking system wheel-based vehicle speed”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 2 byte             |
| resolution      | 1/256 km/h/bit     |
| offset          | 0 km/h             |
| data range      | 0 km/h to 250 km/h |
| operating range | 0 km/h to 250 km/h |
| type            | measured           |

#### 6.5.4.5 Retarder reference torque

This parameter shall indicate the 100 % reference value for all the specified indicated retarder torque parameters. It shall be specified only once and shall not change if a different retarder torque map becomes valid. [Table 23](#) specifies the parameter description.

**Table 23 — Specification of the parameter “retarder reference torque”**

| Attribute       | Value             |
|-----------------|-------------------|
| data length     | 2 byte            |
| resolution      | 1 Nm/bit          |
| offset          | 0 Nm              |
| data range      | 0 Nm to 64 255 Nm |
| operating range | 0 Nm to 64 255 Nm |
| type            | measured          |

#### 6.5.4.6 Retarder relative peak torque

This parameter shall indicate the actual torque of the retarder as a negative percentage of the maximum. [Table 24](#) specifies the parameter description.

**Table 24 — Specification of the parameter “retarder relative peak torque”**

| Attribute       | Value           |
|-----------------|-----------------|
| data length     | 1 byte          |
| resolution      | 1 %/bit         |
| offset          | -125 %          |
| data range      | -125 % to 125 % |
| operating range | -125 % to 0 %   |
| type            | measured        |

#### 6.5.4.7 Axle load sum

This parameter shall indicate the sum of the static vertical loads of the vehicle axles. [Table 25](#) specifies the parameter description.

**Table 25 — Specification of the parameter “axle load sum”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 2 byte             |
| resolution      | 2 kg/bit           |
| offset          | 0 kg               |
| data range      | 0 kg to 128 510 kg |
| operating range | 0 kg to 128 510 kg |
| type            | measured           |

#### 6.5.4.8 Pneumatic supply pressure

This parameter shall indicate the actual pneumatic supply pressure of the reservoir of the braking system. [Table 26](#) specifies the parameter description.

**Table 26 — Specification of the parameter “pneumatic supply pressure”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 1 byte             |
| resolution      | 5 kPa/bit          |
| offset          | 0 kPa              |
| data range      | 0 kPa to 1 250 kPa |
| operating range | 0 kPa to 1 250 kPa |
| type            | measured           |

#### 6.5.4.9 Brake lining

This parameter shall indicate the actual relative value of the brake lining of a specific brake. High values indicate new linings, small values indicate worn linings. [Table 27](#) specifies the parameter description.

**Table 27 — Specification of the parameter brake lining”**

| Attribute       | Value        |
|-----------------|--------------|
| data length     | 1 byte       |
| resolution      | 0,4 %/bit    |
| offset          | 0 %          |
| data range      | 0 % to 100 % |
| operating range | 0 % to 100 % |
| type            | measured     |

#### 6.5.4.10 Brake temperature

This parameter shall indicate the actual temperature of a specific brake. [Table 28](#) specifies the parameter description.

**Table 28 — Specification of the parameter “brake temperature”**

| Attribute       | Value            |
|-----------------|------------------|
| data length     | 1 byte           |
| resolution      | 10 °C/bit        |
| offset          | 0 °C             |
| data range      | 0 °C to 2 500 °C |
| operating range | 0 °C to 2 500 °C |
| type            | measured         |

**6.5.4.11 Tyre pressure**

This parameter shall indicate the actual tyre pressure of a specific wheel without any corrections. [Table 29](#) specifies the parameter description.

**Table 29 — Specification of the parameter “tyre pressure”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 1 byte             |
| resolution      | 10 kPa/bit         |
| offset          | 0 kPa              |
| data range      | 0 kPa to 2 500 kPa |
| operating range | 0 kPa to 2 500 kPa |
| type            | measured           |

**6.5.4.12 Vehicle retarder control status**

This parameter shall indicate the current status in all cases the retarder functionality is applied by the driver’s demand or by other systems (e.g. brakes). [Table 30](#) specifies the parameter description.

**Table 30 — Specification of the parameter “vehicle retarder control status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — retarder passive<br>01 <sub>2</sub> — retarder active |
| type        | measured  |

NOTE “Applied” means that the retarder starts to increase its torque and decelerates the vehicle.

**6.5.4.13 Vehicle service brake status**

This parameter shall indicate the current status of the vehicle’s service brake by observing the brake pressure. [Table 31](#) specifies the parameter description.

**Table 31 — Specification of the parameter “vehicle service brake status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — vehicle service brake passive<br>01 <sub>2</sub> — vehicle service brake active |
| type        | measured  |

#### 6.5.4.14 Automatic towed vehicle braking status

This parameter shall indicate the current status of the automatic towed vehicle braking. This function is active when the pneumatic supply is insufficient or not connected. This parameter should be used for driver information. [Table 32](#) specifies the parameter description.

**Table 32 — Specification of the parameter “automatic towed vehicle braking status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — automatic vehicle braking passive<br>01 <sub>2</sub> — automatic vehicle braking active |
| type        | measured  |

NOTE According to Reference [2], the brake pressure in the trailer can be suppressed under certain conditions in case of an automatic braking. This parameter reflects the following different conditions.

- 00<sub>2</sub> — the pneumatic supply is insufficient or not connected, the brake pressure is suppressed.
- 01<sub>2</sub> — the pneumatic supply is insufficient or not connected, the brake pressure is not suppressed, and i.e. the trailer is really braked.
- 11<sub>2</sub> — the pneumatic supply is sufficient and connected, the automatic braking function is not available.

#### 6.5.4.15 Vehicle ABS status

This parameter shall indicate the current status of the anti-lock braking function or system. The signal shall be set active when the ABS starts to modulate the wheel brake pressure and shall be reset to passive when all wheels are in stable condition for a certain time period. The signal can also be set active when driven wheels are in high slip (e.g. caused by the retarder).

In the case of at least one wheel speed error, the error indicator for the parameter shall have priority.

[Table 33](#) specifies the parameter description.

**Table 33 — Specification of the parameter “vehicle ABS status”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — vehicle ABS passive, but installed<br>01 <sub>2</sub> — vehicle ABS active |
| type        | measured   |

NOTE Active does not mean “installed” or “enabled”, but indicates an actual ABS situation.

#### 6.5.4.16 Vehicle electrical supply status

This parameter shall indicate if the current status of the supply voltage is sufficient or insufficient for a proper braking function. This shall also include overvoltage conditions. [Table 34](#) specifies the parameter description.

**Table 34 — Specification of the parameter “vehicle electrical supply status”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — electrical supply insufficient<br>01 <sub>2</sub> — electrical supply sufficient |
| type        | measured   |

**6.5.4.17 Vehicle pneumatic supply status**

This parameter shall indicate if the current status of the pneumatic supply pressure of the reservoir of the braking system is insufficient or sufficient for a proper braking function. [Table 35](#) specifies the parameter description.

**Table 35 — Specification of the parameter “vehicle pneumatic supply status”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — vehicle pneumatic supply insufficient<br>01 <sub>2</sub> — vehicle pneumatic supply sufficient |
| type        | measured   |

**6.5.4.18 Spring brake installation status**

This parameter shall indicate if the vehicle is equipped with one or more axles fitted with spring brakes. [Table 36](#) specifies the parameter description.

**Table 36 — Specification of the parameter “spring brake installation status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — vehicle without spring brakes<br>01 <sub>2</sub> — vehicle with spring brakes |
| type        | measured  |

**6.5.4.19 Electrical load proportional function installation status**

This parameter shall indicate if the vehicle is equipped with an electrical load proportional function. [Table 37](#) specifies the parameter description.

**Table 37 — Specification of the parameter “electrical load proportional function installation status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — vehicle without electrical load proportional function<br>01 <sub>2</sub> — vehicle with electrical load proportional function |
| type        | measured  |

**6.5.4.20 Load proportional function installation status**

This parameter shall indicate if the vehicle is equipped with a load proportional function. [Table 38](#) specifies the parameter description.

**Table 38 — Specification of the parameter “load proportional function installation status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — vehicle without load proportional function<br>01 <sub>2</sub> — vehicle with load proportional function |
| type        | measured  |

**6.5.4.21 ABS off-road request**

This parameter shall command the requested operating mode for the ABS off-road function. This parameter shall be independent of the current ABS control situation. [Table 39](#) specifies the parameter description.

**Table 39 — Specification of the parameter “ABS off-road request”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — ABS off-road request off<br>01 <sub>2</sub> — ABS off-road request on |
| type        | status  |

**6.5.4.22 ASR brake control status**

This parameter shall indicate the current status of the ASR brake control function. ASR active shall indicate that the ASR function actually controls the wheel brake pressure at one or more wheels of the driven axles and does not indicate “installed” or “enabled”. [Table 40](#) specifies the parameter description.

**Table 40 — Specification of the parameter “ASR brake control status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — ASR brake control passive<br>01 <sub>2</sub> — ASR brake control active |
| type        | measured  |

**6.5.4.23 ASR engine control status**

This parameter shall indicate the current status of the ASR engine control function. ASR active shall indicate that the ASR function tries to control the engine torque and does not indicate “installed” or “enabled”. This status shall be independent of other control commands influencing the engine torque (e.g. transmission control requests), which can have higher priority. [Table 41](#) specifies the parameter description.

**Table 41 — Specification of the parameter “ASR engine control status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — ASR engine control passive<br>01 <sub>2</sub> — ASR engine control active |
| type        | measured  |

#### 6.5.4.24 Pneumatic control line status

This parameter shall indicate that the towing vehicle has a pneumatic control line for the towed vehicle service braking system. [Table 42](#) specifies the parameter description.

**Table 42 — Specification of the parameter “pneumatic control line status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — vehicle without pneumatic control line<br>01 <sub>2</sub> — vehicle with pneumatic control line |
| type        | measured  |

#### 6.5.4.25 Two electrical circuits brake demand status

This parameter shall indicate that the service brake demand value sent by the towing vehicle can be generated by one or two independent electrical braking circuits. [Table 43](#) specifies the parameter description.

**Table 43 — Specification of the parameter “two electrical circuits brake demand status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — one electrical braking circuit available<br>01 <sub>2</sub> — two electrical braking circuits available |
| type        | measured  |

#### 6.5.4.26 Tyre pressure status

This parameter shall indicate the current status of the tyre pressure. An insufficient tyre pressure shall be indicated, if the pressure is outside of a pressure range recommended by the tyre or vehicle manufacturer, to ensure an optimized operation with regard to the fuel consumption of the vehicle and life time of the tyre. [Table 44](#) specifies the parameter description.

**Table 44 — Specification of the parameter “tyre pressure status”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — tyre pressure insufficient<br>01 <sub>2</sub> — tyre pressure sufficient |
| type        | measured   |

#### 6.5.4.27 Brake lining status

This parameter shall indicate the current status of the brake linings. An insufficient brake lining status shall be indicated if the linings are worn out. [Table 45](#) specifies the parameter description.

**Table 45 — Specification of the parameter “brake lining status”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — brake linings insufficient<br>01 <sub>2</sub> — brake linings sufficient |
| type        | measured   |

#### 6.5.4.28 Brake temperature status

This parameter shall indicate the current status of the temperature of the brakes. A brake temperature out of range value shall be indicated if the brake temperature is higher than a specific level for proper operation. [Table 46](#) specifies the parameter description.

**Table 46 — Specification of the parameter “brake temperature status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — brake temperature out of range<br>01 <sub>2</sub> — brake temperature inside normal range |
| type        | measured  |

#### 6.5.4.29 Brake light switch

This parameter shall indicate that the brake pedal is currently being pressed. [Table 47](#) specifies the parameter description.

**Table 47 — Specification of the parameter “brake light switch”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — brake light switch off<br>01 <sub>2</sub> — brake light switch on |
| type        | measured  |

#### 6.5.4.30 Vehicle type

This parameter shall indicate if a vehicle is a converter dolly or a towing or towed vehicle. [Table 48](#) specifies the parameter description.

**Table 48 — Specification of the parameter “vehicle type”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — towing or towed vehicle<br>01 <sub>2</sub> — converter dolly axle |
| type        | measured  |

NOTE This parameter definition is redundant to the definitions given in the parameter “geometric data indexed content” ([6.5.4.47](#)) and is kept for backward compatibility.

#### 6.5.4.31 Red warning signal request

This parameter shall command the request from a towed vehicle to the commercial vehicle to activate the red warning signal, which indicates certain specified failures within the braking equipment of the towed vehicle. [Table 49](#) specifies the parameter description.

**Table 49 — Specification of the parameter “red warning signal request”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — red warning signal off<br>01 <sub>2</sub> — red warning signal on |
| type        | status  |

**6.5.4.32 Amber warning signal request**

This parameter shall command the request from a towed vehicle to the commercial vehicle to activate the amber warning signal, which indicates certain specified events within the braking equipment of the towed vehicle. A flashing warning signal can be used to signal fault conditions that are related to non-braking systems, e.g. auxiliary equipment. It shall not be used to signal braking system-relevant faults or status. [Table 50](#) specifies the parameter description.

**Table 50 — Specification of the parameter “amber warning signal request”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — amber warning signal off<br>01 <sub>2</sub> — amber warning signal on<br>10 <sub>2</sub> — amber warning signal flashing |
| type        | status   |

The amber warning signal request shall be regarded as providing the same information as the yellow warning signal, activated by the trailer on pin five of the electric connector conforming to ISO 7638, as specified in UNECE Regulation 13.

Implementation of a flashing signal is left open to the vehicle integrator of the commercial vehicle. As a recommendation, a frequency of about 1 to 1,5 Hz should be used.

**6.5.4.33 Electrical supply of non-braking systems status**

This parameter shall indicate the current status of the supply voltage of non-braking systems. [Table 51](#) specifies the parameter description.

**Table 51 — Specification of the parameter “electrical supply of non-braking systems status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — supply of non-braking systems off<br>01 <sub>2</sub> — supply of non-braking systems on |
| type        | measured  |

**6.5.4.34 Loading ramp approach assistance status**

This parameter shall indicate whether the loading ramp approach assistance is activated. The loading ramp approach assistance measures the distance to the loading ramp while reversing and applies the vehicle brakes accordingly. [Table 52](#) specifies the parameter description.

**Table 52 — Specification of the parameter “loading ramp approach assistance status”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — loading ramp approach assistance not active<br>01 <sub>2</sub> — loading ramp approach assistance active |
| type        | measured   |

#### 6.5.4.35 VDC active

This parameter shall indicate the current status of the VDC function. Active means that VDC actually controls the engine torque (in the case of a commercial vehicle) or the wheel brake pressure at one or more wheels and does not mean “installed” or “enabled”. The parameter “VDC active” shall only be set to active when a vehicle stability function event occurs where the intent is to impact on vehicle stability. Interventions by the vehicle stability function in any process designed to determine the physical characteristics of the vehicle are not considered to be “VDC active” events. [Table 53](#) specifies the parameter description.

**Table 53 — Specification of the parameter “VDC active”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — VDC passive<br>01 <sub>2</sub> — VDC active |
| type        | measured  |

UNECE Regulation 13 requires that a VDC active state shall be present to the commercial vehicle from all towed vehicles. As this parameter is mapped to a message that is only sent between directly coupled vehicles, each towing vehicle shall combine the sources, i.e. the local control system and the parameter received from the successor, and forward a VDC active if set from at least one source.

#### 6.5.4.36 Road curvature

This parameter shall indicate the estimated value for the current road curvature. Positive values shall be used for left-hand curves. [Table 54](#) specifies the parameter description.

**Table 54 — Specification of the parameter “road curvature”**

| Attribute       | Value   |
|-----------------|---|
| data length     | 2 byte  |
| resolution      | 1/128 km <sup>-1</sup> /bit                   |
| offset          | -250 km <sup>-1</sup>                         |
| data range      | -250 km <sup>-1</sup> to 250 km <sup>-1</sup> |
| operating range | -250 km <sup>-1</sup> to 250 km <sup>-1</sup> |
| type            | measured                                      |

#### 6.5.4.37 Wheel speed difference main axle

This parameter shall indicate the difference between the wheel speed on the right side and on the left side of the main axle, calculated as  $V_{difference} = V_{right} - V_{left}$  and filtered by a frequency range of 5 Hz to 20 Hz. [Table 55](#) specifies the parameter description.

**Table 55 — Specification of the parameter “wheel speed difference main axle”**

| Attribute       | Value                 |
|-----------------|-----------------------|
| data length     | 2 byte                |
| resolution      | 1/256 km/h/bit        |
| offset          | -125 km/h             |
| data range      | -125 km/h to 125 km/h |
| operating range | -125 km/h to 125 km/h |
| type            | measured              |

**6.5.4.38 Supply line braking**

This parameter commands a request from the towed vehicle to be braked by the commercial vehicle by means of venting the pneumatic supply line. [Table 56](#) specifies the parameter description.

**Table 56 — Specification of the parameter “supply line braking”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — supply line braking not requested<br>01 <sub>2</sub> — supply line braking requested |
| type        | status   |

**6.5.4.39 Spring brake status**

This parameter shall indicate the current status of the vehicle spring brake(s). [Table 57](#) specifies the parameter description.

**Table 57 — Specification of the parameter “spring brake status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — spring brake is released (is not braking the vehicle)<br>01 <sub>2</sub> — spring brake is engaged (is braking the vehicle) |
| type        | measured  |

**6.5.4.40 Relative brake demand for front or left vehicle side**

This parameter shall command the requested percentage of the service brake demand value which has to be applied to the steering axle wheels or to the wheels on the left-hand side of the vehicle. If brake force distribution is supported, full trailers shall support axle-wise distribution and semi-trailers shall support side-wise distribution. [Table 58](#) specifies the parameter description.

**Table 58 — Specification of the parameter “relative brake demand for front or left vehicle side”**

| Attribute       | Value        |
|-----------------|--------------|
| data length     | 1 byte       |
| resolution      | 0,4 %/bit    |
| offset          | 0 %          |
| data range      | 0 % to 100 % |
| operating range | 0 % to 100 % |
| type            | status       |

#### 6.5.4.41 Relative brake demand for rear or right vehicle side

This parameter shall command the requested percentage of the service brake demand value which has to be applied to the wheels of the rear axle(s) or to the wheels on the right-hand side of the vehicle. If brake force distribution is supported, full trailers shall support axle-wise distribution and semi-trailers shall support side-wise distribution. [Table 59](#) specifies the parameter description.

**Table 59 — Specification of the parameter “relative brake demand for rear or right vehicle side”**

| Attribute       | Value        |
|-----------------|--------------|
| data length     | 1 byte       |
| resolution      | 0,4 %/bit    |
| offset          | 0 %          |
| data range      | 0 % to 100 % |
| operating range | 0 % to 100 % |
| type            | status       |

#### 6.5.4.42 Support of side- or axle-wise brake force distribution

This parameter shall indicate whether the functionality of an axle- or side-wise brake force distribution is enabled. If brake force distribution is supported, full trailers shall support axle-wise distribution and semi-trailer shall support side-wise distribution. [Table 60](#) specifies the parameter description.

**Table 60 — Specification of the parameter “support of side- or axle-wise brake force distribution”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — side- or axle-wise brake force distribution disabled<br>01 <sub>2</sub> — side- or axle-wise brake force distribution enabled |
| type        | measured  |

#### 6.5.4.43 Lateral acceleration

This parameter shall indicate the actual lateral acceleration of the vehicle. A positive lateral acceleration value shall be used when the vehicle is accelerated to the left. [Table 61](#) specifies the parameter description.

**Table 61 — Specification of the parameter “lateral acceleration”**

| Attribute       | Value   |
|-----------------|---|
| data length     | 1 byte  |
| resolution      | 1/10 m/s <sup>2</sup> /bit                      |
| offset          | -12,5 m/s <sup>2</sup>                          |
| data range      | -12,5 m/s <sup>2</sup> to 12,5 m/s <sup>2</sup> |
| operating range | -12,5 m/s <sup>2</sup> to 12,5 m/s <sup>2</sup> |
| type            | measured  |

#### 6.5.4.44 Stop lamps request

This parameter shall command the request from the towed vehicle to the commercial vehicle to illuminate the stop lamps. [Table 62](#) specifies the parameter description.

**Table 62 — Specification of the parameter “stop lamps request”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — stop lamps illumination not request<br>01 <sub>2</sub> — stop lamps illumination requested |
| type        | status   |

**6.5.4.45 Braking via electric control line support**

This parameter shall indicate whether the vehicle supports braking via the electrical control or not. [Table 63](#) specifies the parameter description.

**Table 63 — Specification of the parameter “braking via electrical control line support”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — braking via electrical control line not supported<br>01 <sub>2</sub> — braking via electrical control line supported |
| type        | measured   |

**6.5.4.46 Geometric data index**

This parameter shall be used as an index to an array of geometric data as defined by the parameter “geometric data indexed content” ([6.5.4.47](#)) and shall not be used without that context. [Table 64](#) specifies the parameter description.

**Table 64 — Specification of the parameter “geometric data index”**

| Attribute   | Value   |
|-------------|---|
| data length | 1 byte  |
| data range  | enumeration as given in <a href="#">Table 66</a> , column index |
| type        | measured  |

**6.5.4.47 Geometric data indexed content**

This parameter shall be interpreted as an array of geometric data indexed by the parameter “geometric data index” ([6.5.4.46](#)). [Table 65](#) and [Table 66](#) specify the parameter description. Vehicle geometrical data and keys are defined in [Annex A](#).

**Table 65 — Specification of the parameter “geometric data indexed content”**

| Attribute   | Value                                    |
|-------------|--|
| data length | 1 byte                                   |
| data range  | as specified in <a href="#">Table 66</a> |
| type        | measured                                 |

Table 66 — Content specification of the parameter “geometric data indexed content”

| Index | Attribute       | Value   |
|-------|-----------------|---|
| 0     | parameter       | extended vehicle type   |
|       | content         | indicates the type of the towed vehicle   |
|       | data range      | 0 to 250  |
|       | operating range | 0 — semi-trailer<br>1 — centre-axle trailer<br>2 — full trailer<br>3 — converter dolly<br>4 — link trailer<br>5 — towing semi-trailer<br>6 — towing centre-axle trailer<br>7 — towing full trailer<br>8 to 249 — reserved by document<br>250 — unknown vehicle type |
| 1     | parameter       | length, $l_1$   |
|       | content         | length between the coupling point and the middle of the first axle  |
|       | resolution      | 0,1 m/bit   |
|       | offset          | 0 m   |
|       | data range      | 0 m to 25,0 m   |
|       | operating range | 0 m to 25,0 m   |
| 2     | parameter       | track width, $w$  |
|       | content         | distance between the centre of the wheels at the same axle  |
|       | resolution      | 10 mm/bit   |
|       | offset          | 0 mm to 2 500 mm  |
|       | data range      | 0 mm to 2 500 mm  |
|       | operating range | 0 mm to 2 500 mm  |
| 3     | parameter       | axle count  |
|       | content         | total number of axles   |
|       | resolution      | 1/bit   |
|       | offset          | 0   |
|       | data range      | 0 to 250  |
|       | operating range | 1 to 250  |
| 4     | parameter       | front axle count  |
|       | content         | total number of axles attached to the drawbar,<br>applicable in the case of full trailers   |
|       | resolution      | 1/bit   |
|       | offset          | 0   |
|       | data range      | 0 to 250  |
|       | operating range | 1 to 250, 0 indicates “no front axle”   |
| 5     | parameter       | lift axle count   |
|       | content         | total number of liftable axles  |
|       | resolution      | 1/bit   |
|       | offset          | 0   |
|       | data range      | 0 to 250  |
|       | operating range | 1 to 250, 0 indicates “no liftable axle”  |

Table 66 (continued)

| Index          | Attribute       | Value   |
|----------------|-----------------|---|
| 6<br>to<br>10  | parameter       | lift axle n position  |
|                | content         | position (axle number) of lift axle 1 to 5,<br>with axle number (m) counting from the front to the rear and starting with 1   |
|                | resolution      | 1/bit   |
|                | offset          | 0   |
|                | data range      | 0 to 250  |
|                | operating range | 1 to 250, 0 indicates "no liftable axle"  |
| 11<br>to<br>29 | parameter       | wheel base m  |
|                | content         | Wheel base of axle (m) to axle (m+1),<br>with axle index m = 1 to 19 counting from the front to the rear  |
|                | resolution      | 0,1 m/bit   |
|                | offset          | 0 m   |
|                | data range      | 0 m to 25,0 m   |
|                | operating range | 0 m to 25,0 m   |
| 30             | parameter       | coupling point distance, $l_{cc}$   |
|                | content         | distance between the first coupling point and the second coupling, applicable<br>in the case of a towing trailer or converter dolly   |
|                | resolution      | 0,1 m/bit   |
|                | offset          | 0 m   |
|                | data range      | 0 m to 25,0 m   |
|                | operating range | 0 m to 25,0 m   |
| 31             | parameter       | vehicle length, $l_{tot}$   |
|                | content         | total length of towed vehicle   |
|                | resolution      | 0,1 m/bit   |
|                | offset          | 0 m   |
|                | data range      | 0 m to 25,0 m   |
|                | operating range | 0 m to 25,0 m   |
| 32             | parameter       | coupling height 1, $h_1$  |
|                | content         | nominal coupling height over ground for the first coupling point for an<br>unloaded towed vehicle   |
|                | resolution      | 0,02 m/bit  |
|                | offset          | 0 m   |
|                | data range      | 0 m to 25,0 m   |
|                | operating range | 0 m to 5,0 m  |
| 33             | parameter       | coupling height 2, $h_2$  |
|                | content         | nominal coupling height over ground for the second coupling point for an<br>unloaded towing vehicle<br><br>applicable in the case of a converter dolly, link trailer or towing semi-trailer<br>data is dynamic and shall indicate the current coupling point height |
|                | resolution      | 0,02 m/bit  |
|                | offset          | 0 m   |
|                | data range      | 0 m to 25,0 m   |
|                | operating range | 0 m to 5,0 m  |

Table 66 (continued)

| Index           | Attribute       | Value  |
|-----------------|-----------------|--|
| 34              | parameter       | loading height rear, $h_3$   |
|                 | content         | height over ground for the floor inside the towed vehicle at the rear end of the floor<br>not applicable in the case of a converter dolly  |
|                 | resolution      | 0,02 m/bit   |
|                 | offset          | 0 m  |
|                 | data range      | 0 m to 25,0 m  |
|                 | operating range | 0 m to 5,0 m   |
| 35              | parameter       | loading height front, $h_4$  |
|                 | content         | height over ground for the floor inside the towed vehicle at the front end of the floor<br>applicable in the case of a centre-axle, full or towing full trailer  |
|                 | resolution      | 0,02 m/bit   |
|                 | offset          | 0 m  |
|                 | data range      | 0 m to 2,0 m   |
|                 | operating range | 0 m to 5,0 m   |
| 36              | parameter       | total height over ground front   |
|                 | content         | total height over ground of the towed vehicle at the front of the towed vehicle<br>applicable in the case of a centre-axle, full or towing full trailer  |
|                 | resolution      | 0,02 m/bit   |
|                 | offset          | 0 m  |
|                 | data range      | 0 m to 25,0 m  |
|                 | operating range | 0 m to 5,0 m   |
| 37              | parameter       | chassis height, $h_6$  |
|                 | content         | height from the bottommost point of the chassis to the topmost point of the towed vehicle at the front of the towed vehicle<br>applicable in the case of a semi-trailer or towing semi-trailer   |
|                 | resolution      | 0,02 m/bit   |
|                 | offset          | 0 m  |
|                 | data range      | 0 m to 25,0 m  |
|                 | operating range | 0 m to 5,0 m   |
| 38              | parameter       | vehicle height rear, $h_7$   |
|                 | content         | total height over ground of the towed vehicle at the rear of the towed vehicle (not in the case of a converter dolly)<br>for a towing semi-trailer, this refers to the rear end of the cargo put directly on the towing semi-trailer; this data is dynamic and shall indicate the current rear total height. |
|                 | resolution      | 0,02 m/bit   |
|                 | offset          | 0 m  |
|                 | data range      | 0 m to 25,0 m  |
|                 | operating range | 0 m to 5,0 m   |
| 39<br>to<br>250 |                 | reserved by document   |

NOTE Information about “normal trailer” or “converter dolly” is also available with the parameter “vehicle type” (6.5.4.30) and is supported for backward compatibility.

**6.5.4.48 Brake cylinder pressure first axle, left wheel**

This parameter shall indicate the actual pressure of the wheel-brake actuator at the left wheel of the first axle. In the case of a full trailer, “first axle” means the steering axle. [Table 67](#) specifies the parameter description.

**Table 67 — Specification of the parameter “brake cylinder pressure first axle, left wheel”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 1 byte             |
| resolution      | 5 kPa/bit          |
| offset          | 0 kPa              |
| data range      | 0 kPa to 1 250 kPa |
| operating range | 0 kPa to 1 250 kPa |
| type            | measured           |

**6.5.4.49 Brake cylinder pressure first axle, right wheel**

This parameter shall indicate the actual pressure of the wheel-brake actuator at the right wheel of the first axle. In the case of a full trailer, “first axle” means the steering axle. [Table 68](#) specifies the parameter description.

**Table 68 — Specification of the parameter “brake cylinder pressure first axle, right wheel”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 1 byte             |
| resolution      | 5 kPa/bit          |
| offset          | 0 kPa              |
| data range      | 0 kPa to 1 250 kPa |
| operating range | 0 kPa to 1 250 kPa |
| type            | measured           |

**6.5.4.50 Brake cylinder pressure second axle, left wheel**

This parameter shall indicate the actual pressure of the wheel-brake actuator at the left wheel of the second axle. [Table 69](#) specifies the parameter description.

**Table 69 — Specification of the parameter “brake cylinder pressure second axle, left wheel”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 1 byte             |
| resolution      | 5 kPa/bit          |
| offset          | 0 kPa              |
| data range      | 0 kPa to 1 250 kPa |
| operating range | 0 kPa to 1 250 kPa |
| type            | measured           |

**6.5.4.51 Brake cylinder pressure second axle, right wheel**

This parameter shall indicate the actual pressure of the wheel-brake actuator at the right wheel of the second axle. [Table 70](#) specifies the parameter description.

**Table 70 — Specification of the parameter “brake cylinder pressure second axle, right wheel”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 1 byte             |
| resolution      | 5 kPa/bit          |
| offset          | 0 kPa              |
| data range      | 0 kPa to 1 250 kPa |
| operating range | 0 kPa to 1 250 kPa |
| type            | measured           |

**6.5.4.52 Brake cylinder pressure third axle, left wheel**

This parameter shall indicate the actual pressure of the wheel-brake actuator at the left wheel of the third axle. [Table 71](#) specifies the parameter description.

**Table 71 — Specification of the parameter “brake cylinder pressure third axle, left wheel”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 1 byte             |
| resolution      | 5 kPa/bit          |
| offset          | 0 kPa              |
| data range      | 0 kPa to 1 250 kPa |
| operating range | 0 kPa to 1 250 kPa |
| type            | measured           |

**6.5.4.53 Brake cylinder pressure third axle, right wheel**

This parameter shall indicate the actual pressure of the wheel-brake actuator at the right wheel of the third axle. [Table 72](#) specifies the parameter description.

**Table 72 — Specification of the parameter “brake cylinder pressure third axle, right wheel”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 1 byte             |
| resolution      | 5 kPa/bit          |
| offset          | 0 kPa              |
| data range      | 0 kPa to 1 250 kPa |
| operating range | 0 kPa to 1 250 kPa |
| type            | measured           |

**6.5.4.54 Wheel speed first axle, left wheel**

This parameter shall indicate the unbalanced and unfiltered speed of the left wheel on the first axle. The definition of axle positions shall be as follows:

- In the case of a full trailer, the first axle shall be the steering axle.
- In the case of a semi-trailer, the first non-lifting axle equipped with the wheel speed measuring sensors shall be used. Both sensors shall be on the same axle.

[Table 73](#) specifies the parameter description.

**Table 73 — Specification of the parameter “wheel speed first axle, left wheel”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 2 byte             |
| resolution      | 1/256 km/h/bit     |
| offset          | 0 km/h             |
| data range      | 0 km/h to 250 km/h |
| operating range | 0 km/h to 250 km/h |
| type            | measured           |

**6.5.4.55 Wheel speed first axle, right wheel**

This parameter shall indicate the unbalanced and unfiltered speed of the left wheel on the first axle. The definition of axle positions shall be as follows.

- In the case of a full trailer, the first axle shall be the steering axle.
- In the case of a semi-trailer, the first non-lifting axle equipped with wheel speed measuring sensors shall be used. Both sensors shall be on the same axle.

[Table 74](#) specifies the parameter description.

**Table 74 — Specification of the parameter “wheel speed first axle, right wheel”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 2 byte             |
| resolution      | 1/256 km/h/bit     |
| offset          | 0 km/h             |
| data range      | 0 km/h to 250 km/h |
| operating range | 0 km/h to 250 km/h |
| type            | measured           |

**6.5.4.56 ROP system status**

This parameter shall indicate whether the ROP system is currently enabled or disabled. [Table 75](#) specifies the parameter description.

**Table 75 — Specification of the parameter “ROP system status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — ROP system disabled<br>01 <sub>2</sub> — ROP system enabled |
| type        | measured  |

**6.5.4.57 YC system status**

This parameter shall indicate whether the YC system is currently enabled or disabled. [Table 76](#) specifies the parameter description.

**Table 76 — Specification of the parameter “YC system status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — YC system disabled<br>01 <sub>2</sub> — YC system enabled |
| type        | measured  |

**6.5.4.58 Trailer ROP system request**

This parameter shall command the request to enable or disable the trailer ROP system. [Table 77](#) specifies the parameter description.

**Table 77 — Specification of the parameter “trailer ROP system request”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — disable trailer ROP system<br>01 <sub>2</sub> — enable trailer ROP system |
| type        | status  |

**6.5.4.59 Trailer YC system request**

This parameter shall command the request to enable or disable the trailer YC system. [Table 78](#) specifies the parameter description.

**Table 78 — Specification of the parameter “trailer YC system request”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — disable trailer YC system<br>01 <sub>2</sub> — enable trailer YC system |
| type        | status  |

**6.5.4.60 Vehicle combination ABS status**

This parameter shall indicate the current status of the anti-lock braking function or system including the status of additional towed vehicles. The parameter shall be set active if there is an ABS-related fault condition detected at the local vehicle or any of the towed vehicles and shall also consider the status of the trailer detection specified in [6.5.4.61](#). [Table 79](#) specifies the parameter description.

**Table 79 — Specification of the parameter “vehicle combination ABS status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — no ABS-related fault condition detected up to the end of the vehicle combination (i.e. all ABS systems from this to the last trailer are fully operational)<br>01 <sub>2</sub> — ABS-related fault condition detected in the vehicle combination (i.e. either in this or in one of the following trailers or a following trailer without ABS detected)<br>10 <sub>2</sub> — ABS status unclear (i.e. no ABS fault set but one of the following trailers does not have a trailer detection therefore there should be an undetected additional trailer) |
| type        | measured  |

6.5.4.61 Towed vehicle detection status

This parameter shall be provided by any towed vehicle and shall indicate

- if an additional towed vehicle has been detected (parameter “vehicle status”),
- which type of brake system has been detected at that vehicle (parameter “brake system type”),
- if that vehicle is equipped with a CAN communication link (parameter “CAN interface available”), and
- if that vehicle is able to detect an additional trailer (trailer detection support).

Table 80 specifies the parameter description.

**Table 80 — Specification of the parameter “towed vehicle detection status”**

| Attribute         | Value   |   |                   |                         |                           |  |
|-------------------|---|---|-------------------|-------------------------|---------------------------|--|
| data length       | 4 bit   |   |                   |                         |                           |  |
|                   | Value   | vehicle status                                  | Brake system type | CAN interface available | Trailer detection support |  |
| data range        | 0000 <sub>2</sub>                             | detected  | none              | n/a                     | n/a                       |  |
|                   | 0001 <sub>2</sub>                             | detected  | ABS               | no                      | no                        |  |
|                   | 0010 <sub>2</sub>                             | detected  | ABS               | no                      | yes                       |  |
|                   | 0011 <sub>2</sub>                             | detected  | ABS               | yes                     | no                        |  |
|                   | 0100 <sub>2</sub>                             | detected  | ABS               | yes                     | yes                       |  |
|                   | 0101 <sub>2</sub>                             | detected  | EBS               | yes                     | no                        |  |
|                   | 0110 <sub>2</sub>                             | detected  | EBS               | yes                     | yes                       |  |
|                   | 0111 <sub>2</sub>                             | reserved by document                            |                   |                         |                           |  |
|                   | 1000 <sub>2</sub>                             | not detected                                    | n/a               | n/a                     | n/a                       |  |
|                   | 1001 <sub>2</sub>                             | reserved by document                            |                   |                         |                           |  |
|                   | 1010 <sub>2</sub>                             | reserved by document                            |                   |                         |                           |  |
|                   | 1011 <sub>2</sub>                             | reserved by document                            |                   |                         |                           |  |
|                   | 1100 <sub>2</sub>                             | reserved by document                            |                   |                         |                           |  |
|                   | 1101 <sub>2</sub>                             | reserved by document                            |                   |                         |                           |  |
|                   | 1110 <sub>2</sub>                             | error indicator, trailer detection not possible |                   |                         |                           |  |
| 1111 <sub>2</sub> | not available, no trailer detection installed |   |                   |                         |                           |  |
| type              | measured                                      |   |                   |                         |                           |  |

6.5.4.62 Reverse gear status

This parameter shall indicate if the reverse gear at the gearshift box of the commercial vehicle is engaged or not. Table 81 specifies the parameter description.

**Table 81 — Specification of the parameter “reverse gear status”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — reverse gear not engaged<br>01 <sub>2</sub> — reverse gear engaged |
| type        | measured   |

#### 6.5.4.63 External brake request status

This parameter shall indicate if a brake request neither from EBS nor from VDC/ROP/YC is currently active. [Table 82](#) specifies the parameter description.

**Table 82 — Specification of the parameter “external brake request status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — no external brake request active<br>01 <sub>2</sub> — external brake request active |
| type        | measured  |

NOTE The parameter can be used to inform the driver of an active brake request (e.g. ramp approach system). Within the truck there is a similar parameter XBR defined with the same functionality.

#### 6.5.4.64 Emergency braking status

This parameter shall indicate if there is an active emergency braking request at the commercial vehicle. [Table 83](#) specifies the parameter description.

**Table 83 — Specification of the parameter “emergency braking status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — no emergency braking active<br>01 <sub>2</sub> — emergency braking active |
| type        | measured  |

NOTE The conditions for activation are specified in Reference [2].

### 6.5.5 Parameters for running gear equipment

#### 6.5.5.1 Driven axle load (commercial vehicle)

This parameter shall indicate the current static vertical load on the driven axle of the commercial vehicle. In case the vehicle is equipped with more than one driven axle, the value of the axle with the highest vertical load shall be transmitted. [Table 84](#) specifies the parameter description.

**Table 84 — Specification of the parameter “driven axle load (commercial vehicle)”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 2 byte             |
| resolution      | 2 kg/bit           |
| offset          | 0 kg               |
| data range      | 0 kg to 128 510 kg |
| operating range | 0 kg to 128 510 kg |
| type            | measured           |

#### 6.5.5.2 Nominal vehicle body level, front axle

This parameter shall indicate the current nominal vehicle body height. In cases when controlled by “level change request, front axle” (see [6.5.5.8](#)), this value shall be the current vehicle body height at the front axle referred to ground level. [Table 85](#) specifies the parameter description.

**Table 85 — Specification of the parameter “nominal vehicle body level, front axle”**

| Attribute       | Value             |
|-----------------|-------------------|
| data length     | 2 byte            |
| resolution      | 1 mm/bit          |
| offset          | 0 mm              |
| data range      | 0 mm to 64 255 mm |
| operating range | 0 mm to 64 255 mm |
| type            | measured          |

**6.5.5.3 Nominal vehicle body level, rear axle**

This parameter shall indicate the current nominal vehicle body height. In cases when controlled by “level change request, rear axle” (see 6.5.5.9), this value shall be the current vehicle body height at the rear axle referred to ground level. Table 86 specifies the parameter description.

**Table 86 — Specification of the parameter “nominal vehicle body level, rear axle”**

| Attribute       | Value             |
|-----------------|-------------------|
| data length     | 2 byte            |
| resolution      | 1 mm/bit          |
| offset          | 0 mm              |
| data range      | 0 mm to 64 255 mm |
| operating range | 0 mm to 64 255 mm |
| type            | measured          |

**6.5.5.4 Relative vehicle body level, front axle**

This parameter shall indicate the current nominal vehicle body height. In cases when controlled by “level change request, front axle” (see 6.5.5.8), this value shall be the current vehicle body height at the front axle referred to the ride height normal level 1. Table 87 specifies the parameter description.

**Table 87 — Specification of the parameter “relative vehicle body level, front axle”**

| Attribute       | Value                   |
|-----------------|-------------------------|
| data length     | 2 byte                  |
| resolution      | 1 mm/bit                |
| offset          | -32 000 mm              |
| data range      | -32 000 mm to 32 255 mm |
| operating range | -32 000 mm to 32 255 mm |
| type            | measured                |

**6.5.5.5 Relative vehicle body level, rear axle**

This parameter shall indicate the current nominal vehicle body height. In cases when controlled by “level change request, rear axle” (see 6.5.5.9), this value shall be the current vehicle body height at the rear axle referred to ride height normal level 1. Table 88 specifies the parameter description.

**Table 88 — Specification of the parameter “relative vehicle body level, rear axle”**

| Attribute       | Value                   |
|-----------------|-------------------------|
| data length     | 2 byte                  |
| resolution      | 1 mm/bit                |
| offset          | -32 000 mm              |
| data range      | -32 000 mm to 32 255 mm |
| operating range | -32 000 mm to 32 255 mm |
| type            | measured                |

#### 6.5.5.6 Level control request

This parameter shall command a request to enable or disable the automatic level control. A request to enable or to disable the level control shall be sent in five successive messages followed by messages with “level control request” set to “take no action”. Less than five messages are allowed if the receiver acknowledges through “level control” (see 6.5.5.7). [Table 89](#) specifies the parameter description.

**Table 89 — Specification of the parameter “level control request”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — level control disabled<br>01 <sub>2</sub> — level control enabled<br>11 <sub>2</sub> — take no action |
| type        | status  |

#### 6.5.5.7 Level control status

This parameter shall indicate the current status of the level control function. [Table 90](#) specifies the parameter description.

**Table 90 — Specification of the parameter “level control status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — level control disabled<br>01 <sub>2</sub> — level control enabled |
| type        | measured  |

#### 6.5.5.8 Level change request, front axle

This parameter shall command a request to control the body height for the front axle [lifting (up)/lowering (down)]. This value of the parameter shall be sent as long as the lifting/lowering procedure lasts. [Table 91](#) specifies the parameter description.

**Table 91 — Specification of the parameter “level change request, front axle”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — vehicle body up (lifting)<br>01 <sub>2</sub> — vehicle body down (lowering)<br>11 <sub>2</sub> — take no action |
| type        | status  |

**6.5.5.9 Level change request, rear axle**

This parameter shall command a request to control the body height for the rear axle [lifting (up)/lowering (down)]. This value of the parameter shall be sent as long as the lifting/lowering procedure lasts. [Table 92](#) specifies the parameter description.

**Table 92 — Specification of the parameter “level change request, rear axle”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — vehicle body up (lifting)<br>01 <sub>2</sub> — vehicle body down (lowering)<br>11 <sub>2</sub> — take no action |
| type        | status  |

**6.5.5.10 Level change status, front axle**

This parameter shall indicate the current status of the level change of the body height at the front axle due to any external control request. [Table 93](#) specifies the parameter description.

**Table 93 — Specification of the parameter “level change status, front axle”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — vehicle body lifting/lowering not active<br>01 <sub>2</sub> — vehicle body lifting/lowering active |
| type        | Measured   |

**6.5.5.11 Level change status, rear axle**

This parameter shall indicate the current status of the level change of the body height at the rear axle due to any external control request. [Table 94](#) specifies the parameter description.

**Table 94 — Specification of the parameter “level change status, rear axle”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — vehicle body lifting/lowering not active<br>01 <sub>2</sub> — vehicle body lifting/lowering active |
| type        | measured   |

**6.5.5.12 Lift axle 1 position request**

This parameter shall command a request to control the position of the first lift axle or the load condition of the first tag axle. [Table 95](#) specifies the parameter description. Numbering of lift axles shall start from the front axle position.

A command to control the lift axle position/tag axle load condition shall be sent in five successive messages followed by messages with “lift axle position request” set to “take no action”. Less than five messages are allowed if the receiver acknowledges via “Lift axle 1 position” (see [6.5.5.17](#)).

**Table 95 — Specification of the parameter “lift axle 1 position request”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — lift axle position down/tag axle laden<br>01 <sub>2</sub> — lift axle position up/tag axle unladen<br>11 <sub>2</sub> — take no action |
| type        | status   |

**6.5.5.13 Lift axle 2 position request**

This parameter shall command a request to control the position of the second lift axle or the load condition of the second tag axle. [Table 96](#) specifies the parameter description. The numbering of the lift axles shall start from the front axle position.

A command to control the lift axle position/tag axle load condition shall be sent in five successive messages followed by messages with “lift axle position request” set to “take no action”. Less than five messages are allowed if the receiver acknowledges via “Lift axle 2 position” (see [6.5.5.18](#)).

**Table 96 — Specification of the parameter “lift axle 2 position request”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — lift axle position down/tag axle laden<br>01 <sub>2</sub> — lift axle position up/tag axle unladen<br>11 <sub>2</sub> — take no action |
| type        | status   |

**6.5.5.14 Lift axle 3 position request**

This parameter shall command a request to control the position of the third lift axle or the load condition of the third tag axle. [Table 97](#) specifies the parameter description. The numbering of the lift axles shall start from the front axle position.

A command to control the lift axle position/tag axle load condition shall be sent in five successive messages followed by messages with “lift axle position request” set to “take no action”. Less than five messages are allowed if the receiver acknowledges via “Lift axle 3 position” (see [6.5.5.19](#)).

**Table 97 — Specification of the parameter “lift axle 3 position request”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — lift axle position down/tag axle laden<br>01 <sub>2</sub> — lift axle position up/tag axle unladen<br>11 <sub>2</sub> — take no action |
| type        | status   |

**6.5.5.15 Lift axle 4 position request**

This parameter shall command a request to control the position of the fourth lift axle or the load condition of the fourth tag axle. [Table 98](#) specifies the parameter description. The numbering of the lift axles shall start from the front axle position.

A command to control the lift axle position/tag axle load condition shall be sent in five successive messages followed by messages with “lift axle position request” set to “take no action”. Less than five messages are allowed if the receiver acknowledges via “Lift axle 4 position” (see [6.5.5.20](#)).

**Table 98 — Specification of the parameter “lift axle 4 position request”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — lift axle position down/tag axle laden<br>01 <sub>2</sub> — lift axle position up/tag axle unladen<br>11 <sub>2</sub> — take no action |
| type        | status   |

**6.5.5.16 Lift axle 5 position request**

This parameter shall command a request to control the position of the fifth lift axle or the load condition of the fifth tag axle. [Table 99](#) specifies the parameter description. The numbering of the lift axles shall start from the front axle position.

A command to control the lift axle position/tag axle load condition shall be sent in five successive messages followed by messages with “lift axle position request” set to “take no action”. Less than five messages are allowed if the receiver acknowledges via “Lift axle 5 position” (see [6.5.5.21](#)).

**Table 99 — Specification of the parameter “lift axle 5 position request”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — lift axle position down/tag axle laden<br>01 <sub>2</sub> — lift axle position up/tag axle unladen<br>11 <sub>2</sub> — take no action |
| type        | status   |

**6.5.5.17 Lift axle 1 position**

This parameter shall indicate the position of the first lift axle or the load condition of the first tag axle. [Table 100](#) specifies the parameter description. The numbering of the lift axles shall start from the front axle position.

**Table 100 — Specification of the parameter “lift axle 1 position”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — lift axle position down/tag axle laden<br>01 <sub>2</sub> — lift axle position up/tag axle unladen |
| type        | measured   |

**6.5.5.18 Lift axle 2 position**

This parameter shall indicate the position of the second lift axle or the load condition of the second tag axle. [Table 101](#) specifies the parameter description. The numbering of the lift axles shall start from the front axle position.

**Table 101 — Specification of the parameter “lift axle 2 position”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — lift axle position down/tag axle laden<br>01 <sub>2</sub> — lift axle position up/tag axle unladen |
| type        | measured   |

### 6.5.5.19 Lift axle 3 position

This parameter shall indicate the position of the third lift axle or the load condition of the third tag axle. [Table 102](#) specifies the parameter description. The numbering of the lift axles shall start from the front axle position.

**Table 102 — Specification of the parameter “lift axle 3 position”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — lift axle position down/tag axle laden<br>01 <sub>2</sub> — lift axle position up/tag axle unladen |
| type        | measured   |

### 6.5.5.20 Lift axle 4 position

This parameter shall indicate the position of the fourth lift axle or the load condition of the fourth tag axle. [Table 103](#) specifies the parameter description. The numbering of lift axles shall start from the front axle position.

**Table 103 — Specification of the parameter “lift axle 4 position”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — lift axle position down/tag axle laden<br>01 <sub>2</sub> — lift axle position up/tag axle unladen |
| type        | measured   |

### 6.5.5.21 Lift axle 5 position

This parameter shall indicate the position of the fifth lift axle or the load condition of the fifth tag axle. [Table 104](#) specifies the parameter description. The numbering of the lift axles shall start from the front axle position.

**Table 104 — Specification of the parameter “lift axle 5 position”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — lift axle position down/tag axle laden<br>01 <sub>2</sub> — lift axle position up/tag axle unladen |
| type        | measured   |

### 6.5.5.22 Steering axle locking request

This parameter shall command a request to lock the steering axle. [Table 105](#) specifies the parameter description.

A command to lock or unlock the steering axle shall be sent in five successive messages followed by messages with “steering axle locking request” set to “take no action”. Less than five messages are allowed if the receiver acknowledges via “steering axle locking” (see [6.5.5.23](#)).

**Table 105 — Specification of the parameter “steering axle locking request”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — unlock steering axle<br>01 <sub>2</sub> — lock steering axle<br>11 <sub>2</sub> — take no action |
| type        | status   |

**6.5.5.23 Steering axle locking status**

This parameter shall indicate the current steering axle locking status. [Table 106](#) specifies the parameter description.

**Table 106 — Specification of the parameter steering axle locking status**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — steering axle unlocked<br>01 <sub>2</sub> — steering axle locked |
| type        | measured   |

**6.5.5.24 Traction help (load transfer) request**

This parameter shall command a request to control the lift axle position or tag axle load condition to transfer more load on the driven axle of the commercial vehicle. [Table 107](#) specifies the parameter description.

A request to switch the traction help on or off shall be sent in five successive messages followed by messages with “traction help request” set to “take no action”. Less than five messages are allowed if the receiver acknowledges through “traction help” (see [6.5.5.25](#)).

**Table 107 — Specification of the parameter “traction help (load transfer) request”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — traction help not requested<br>01 <sub>2</sub> — traction help requested<br>11 <sub>2</sub> — take no action |
| type        | status   |

**6.5.5.25 Traction help (load transfer) status**

This parameter shall indicate the current status of the traction help function. [Table 108](#) specifies the parameter description.

**Table 108 — Specification of the parameter “traction help (load transfer) status”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — traction help (load transfer) inactive<br>01 <sub>2</sub> — traction help (load transfer) active |
| type        | measured   |

### 6.5.5.26 Ride height request

This parameter shall command a request to activate a normal ride body height. The normal levels 1 and 2 shall be trailer-specific body heights. [Table 109](#) specifies the parameter description.

A request to activate a normal level shall be sent in five successive messages followed by messages with “ride height request” set to “take no action”. Less than five messages are allowed if the receiver already acknowledges through “levelling control system, ride height level” (see [6.5.5.27](#)).

**Table 109 — Specification of the parameter “ride high request”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — normal level 1 requested<br>01 <sub>2</sub> — normal level 2 requested<br>11 <sub>2</sub> — take no action |
| type        | status   |

### 6.5.5.27 Ride height level

This parameter shall indicate the current body height position status of the vehicle as a response to the “ride height request”. [Table 110](#) specifies the parameter description.

**Table 110 — Specification of the parameter “ride height level”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — vehicle body not at requested normal level<br>01 <sub>2</sub> — vehicle body at requested normal level |
| type        | measured   |

### 6.5.5.28 Normal level

This parameter shall indicate the current state of the body height normal positions independent of a specific level request. [Table 111](#) specifies the parameter description.

In the case when there's no corresponding body height position, the value “not available” shall be transmitted.

**Table 111 — Specification of the parameter “normal level status”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — vehicle body height at normal level 1<br>01 <sub>2</sub> — vehicle body height at normal level 2<br>11 <sub>2</sub> — not available, unknown body height level |
| type        | measured   |

### 6.5.5.29 Ramp level request

This parameter shall command a request to control the body height to a level programmed and memorized in the levelling control system. [Table 112](#) specifies the parameter description.

A request to activate one ramp level shall be sent in five successive messages followed by messages with “ramp level request” set to “take no action”. Less than five messages are allowed if the receiver acknowledges through “ramp level” (see [6.5.5.30](#)).

**Table 112 — Specification of the parameter “ramp level request”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — ramp level 1 requested<br>01 <sub>2</sub> — ramp level 2 requested<br>11 <sub>2</sub> — take no action |
| type        | status   |

**6.5.5.30 Ramp level**

This parameter shall indicate the current status of the body height as a response to the “ramp level request” (see 6.5.5.29). [Table 113](#) specifies the parameter description.

**Table 113 — Specification of the parameter “ramp level status”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — vehicle body not at the requested ramp level<br>01 <sub>2</sub> — vehicle body at the requested ramp level |
| type        | measured   |

**6.5.5.31 Ramp level position**

This parameter shall indicate the current state of the body height ramp level positions independent of a specific level request. [Table 114](#) specifies the parameter description.

In cases when there is no corresponding body height position, the value “not available” shall be transmitted.

**Table 114 — Specification of the parameter “ramp level status”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — vehicle body height at ramp level 1<br>01 <sub>2</sub> — vehicle body height at ramp level 2<br>11 <sub>2</sub> — not available, unknown body height level |
| type        | measured   |

**6.5.5.32 Ramp level storage request**

This parameter shall command a request to store the current body height as the newly programmed and memorized ramp levels 1 or 2 in the levelling control system. [Table 115](#) specifies the parameter description.

A request to store a ramp level shall be sent in five successive messages followed by messages with “ramp level storage request” set to “take no action”. Less than five messages are allowed if the receiver acknowledges through “ramp level storage” (see 6.5.5.33).

**Table 115 — Specification of the parameter “ramp level storage request”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — store ramp level 1 request<br>01 <sub>2</sub> — store ramp level 2 request<br>11 <sub>2</sub> — take no action |
| type        | status   |

### 6.5.5.33 Ramp level storage status

This parameter shall indicate the current status of the ramp level storage in the levelling control system as a response to the “ramp level storage request”. [Table 116](#) specifies the parameter description.

**Table 116 — Specification of the parameter “ramp level storage status”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — no new ramp level stored<br>01 <sub>2</sub> — new ramp level stored |
| type        | measured  |

### 6.5.5.34 Stop level change request

This parameter shall command to immediately stop any change of the actual body height level. This request shall be sent until the receiver acknowledges via “stop acknowledge” (see [6.5.5.35](#)). [Table 117](#) specifies the parameter description.

**Table 117 — Specification of the parameter “stop level change request”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — no stop request<br>01 <sub>2</sub> — stop requested<br>11 <sub>2</sub> — take no action |
| type        | status  |

### 6.5.5.35 Stop level change request acknowledge

This parameter shall indicate the current status of the levelling control system as a response to the “Stop level change request”. [Table 118](#) specifies the parameter description.

**Table 118 — Specification of the parameter “stop level change request acknowledge”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — no stop request<br>01 <sub>2</sub> — stop request accepted |
| type        | measured   |

### 6.5.5.36 Parking and trailer air pressure

This parameter shall indicate the current pneumatic pressure on the circuit or reservoir for the parking brake and the trailer supply. [Table 119](#) specifies the parameter description.

**Table 119 — Specification of the parameter “parking and trailer air pressure”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 1 byte             |
| resolution      | 8 kPa/bit          |
| offset          | 0 kPa              |
| data range      | 0 kPa to 2 000 kPa |
| operating range | 0 kPa to 2 000 kPa |
| type            | measured           |

**6.5.5.37 Auxiliary equipment supply pressure**

This parameter shall indicate the current pneumatic pressure in the auxiliary equipment supply circuit. [Table 120](#) specifies the parameter description.

**Table 120 — Specification of the parameter “auxiliary equipment supply pressure”**

| Attribute       | Value              |
|-----------------|--------------------|
| data length     | 1 byte             |
| resolution      | 8 kPa/bit          |
| offset          | 0 kPa              |
| data range      | 0 kPa to 2 000 kPa |
| operating range | 0 kPa to 2 000 kPa |
| type            | measured           |

**6.5.5.38 Tyre pressure threshold detection**

This parameter shall indicate the pressure level of one specific tyre. This parameter is used in conjunction with the tyre/wheel identification. [Table 121](#) specifies the parameter description. The levels specified in [Table 121](#) shall represent the different pressure conditions of the tyre as specified in [Table 122](#).

**Table 121 — Specification of the parameter “tyre pressure threshold detection status”**

| Attribute   | Value  |
|-------------|--|
| data length | 3 bit  |
| data range  | 000 <sub>2</sub> — extreme over pressure<br>001 <sub>2</sub> — over pressure<br>010 <sub>2</sub> — no warning pressure<br>011 <sub>2</sub> — under pressure<br>100 <sub>2</sub> — extreme under pressure<br>101 <sub>2</sub> — not defined<br>110 <sub>2</sub> — error indicator<br>111 <sub>2</sub> — not available |
| type        | measured   |

**Table 122 — Specification of the pressure conditions of the tyre**

| Value                  | Description  |
|------------------------|--|
| extreme over pressure  | The tyre pressure is at a level where the safety of the vehicle can be jeopardized.          |
| over pressure          | The tyre pressure is higher than the pressure specified by the vehicle or tyre manufacturer. |
| no warning pressure    | The tyre pressure is within the thresholds specified by the vehicle or tyre manufacturer.    |
| under pressure         | The tyre pressure is lower than the pressure specified by the vehicle or tyre manufacturer.  |
| extreme under pressure | The tyre pressure is at a level where the safety of the vehicle can be jeopardized.          |

### 6.5.5.39 Air leakage detection

This parameter shall indicate the current air leakage (pressure loss) of a tyre. This parameter is used in conjunction with the tyre/wheel identification. [Table 123](#) specifies the parameter description.

**Table 123 — Specification of the parameter “air leakage detection”**

| Attribute       | Value                  |
|-----------------|------------------------|
| data length     | 2 byte                 |
| resolution      | 0,1 Pa/s/bit           |
| offset          | 0 Pa/s                 |
| data range      | 0 Pa/s to 6 425,5 Pa/s |
| operating range | 0 Pa/s to 6 425,5 Pa/s |
| type            | measured               |

### 6.5.5.40 Tyre temperature

This parameter shall indicate the current temperature of a tyre. This parameter is used in conjunction with the tyre/wheel identification. [Table 124](#) specifies the parameter description.

**Table 124 — Specification of the parameter “tyre temperature”**

| Attribute       | Value               |
|-----------------|---------------------|
| data length     | 2 byte              |
| resolution      | 0,031 25 °C/bit     |
| offset          | -273 °C             |
| data range      | -273 °C to 1 735 °C |
| operating range | -273 °C to 1 735 °C |
| type            | measured            |

### 6.5.5.41 Tyre module power supply status

This parameter shall indicate the current status of the power supply of the tyre module. It shall indicate whether it is sufficient to achieve the specified performance of the module. This parameter is used in conjunction with the tyre/wheel identification. [Table 125](#) specifies the parameter description.

**Table 125 — Specification of the parameter “tyre module power supply status”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — insufficient power supply<br>01 <sub>2</sub> — sufficient power supply |
| type        | measured   |

### 6.5.5.42 Axle load

This parameter shall indicate the static vertical load of a vehicle axle identified by a tyre/wheel identification parameter (see [6.5.3.1](#)). [Table 126](#) specifies the parameter description.

**Table 126 — Specification of the parameter “axle load”**

| Attribute       | Value               |
|-----------------|---------------------|
| data length     | 2 byte              |
| resolution      | 0,5 kg/bit          |
| offset          | 0 kg                |
| data range      | 0 kg to 32 127,5 kg |
| operating range | 0 kg to 32 127,5 kg |
| type            | measured            |

**6.5.5.43 Axle load calibration data storage request**

This parameter shall command the request to store the following axle load calibration data in the ECU:

- the supplied externally measured axle load;
- the internally measured axle load of the axle identified by the tyre/wheel identification;
- the current date;

There are two types of axle load calibration requests.

- For the first type of calibration (00<sub>2</sub>), the external axle loads are provided and stored one axle at a time.
- For the second type of calibration (01<sub>2</sub>), the towed vehicle is put on a scale for complete vehicles in a sequence where the entire towed vehicle is put on a scale on the first request, all axles except the first axle on the second request, and so on until the last request with only the last axle of the towed vehicle on a scale. In this type of calibration, the tyre/wheel identification is used to identify which axle that is being calibrated indicates the first axle on a scale, and it is assumed that all the following axles are also on a scale. When an entire sequence has been performed, the towed vehicle can calculate the calibration data for each individual axle and store this data just like the first type of calibration.

A request to store the axle load calibration data is acknowledged by “Axle load calibration data storage” (see 6.5.5.44). Table 127 specifies the parameter description.

**Table 127 — Specification of the parameter “axle load calibration data storage request”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — store axle load calibration data using the individual axle scale<br>01 <sub>2</sub> — store axle load calibration data using the vehicle scale sequence<br>11 <sub>2</sub> — take no action |
| type        | measured  |

**6.5.5.44 Axle load calibration data storage status**

This parameter shall indicate the storage status of a new axle load calibration data in the ECU. Each successful axle load calibration data storage request shall be acknowledged with a “new axle load calibration data stored” even though the actual data storage can be postponed until a complete axle calibration sequence has been performed. Table 128 specifies the parameter description.

**Table 128 — Specification of the parameter “axle load calibration data storage status”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — no new axle load calibration data storage request<br>01 <sub>2</sub> — new axle load calibration data stored<br>10 <sub>2</sub> — calibration aborted due to timeout or error<br>11 <sub>2</sub> — axle load calibration not supported |
| type        | measured   |

**6.5.5.45 Axle load measured by external scale**

This parameter shall indicate the static vertical load, measured by an external scale at the time of the axle load calibration, of one or several vehicle axles identified by the tyre/wheel identification and axle load calibration data storage request.

- If the axle load calibration data storage request is “Store axle load calibration data using individual axle scale”, this parameter shall indicate the static vertical load of the vehicle axle identified by the tyre/wheel identification measured by an external scale at the time of the axle load calibration.
- If the axle load calibration data storage request is “Store axle load calibration data using vehicle scale sequence”, this parameter shall indicate the total static vertical load of the vehicle axles starting from the vehicle axle identified by the tyre/wheel identification and all the following vehicle axles until the last vehicle axle measured by an external scale at the time of the axle load calibration.

[Table 129](#) specifies the parameter description.

**Table 129 — Specification of the parameter “axle load measured by external scale”**

| Attribute       | Value             |
|-----------------|-------------------|
| data length     | 2 byte            |
| resolution      | 1 kg/bit          |
| offset          | 0 kg              |
| data range      | 0 kg to 64 255 kg |
| operating range | 0 kg to 64 255 kg |
| type            | measured          |

**6.5.5.46 Axle load measured by towed vehicle**

This parameter shall indicate the static vertical load, measured by the towed vehicle at the time of the axle load calibration, of one or several vehicle axles identified by the tyre/wheel identification and axle load calibration data storage request. [Table 130](#) specifies the parameter description.

**Table 130 — Specification of the parameter “axle load measured by towed vehicle”**

| Attribute       | Value             |
|-----------------|-------------------|
| data length     | 2 byte            |
| resolution      | 1 kg/bit          |
| offset          | 0 kg              |
| data range      | 0 kg to 64 255 kg |
| operating range | 0 kg to 64 255 kg |
| type            | measured          |

**6.5.5.47 Axle load calibration data load level**

This parameter shall indicate the load case the calibration data belongs to. Each axle can be calibrated at one out of the three levels: heavy, medium, and light load. [Table 131](#) specifies the parameter description.

**Table 131 — Specification of the parameter “axle load calibration data load level”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — axle load calibration data for low load<br>01 <sub>2</sub> — axle load calibration data for heavy load<br>10 <sub>2</sub> — axle load calibration data for medium load<br>11 <sub>2</sub> — axle load calibration not supported |
| type        | measured  |

**6.5.5.48 Axle load calibration type**

This parameter shall indicate the type of calibration used. The towed vehicle can choose whether to use or not to use the stored calibration data when calculating the axle load.

- Normally, the towed vehicle does not use the stored calibration data and any external application that wants the calibrated axle loads has to use the stored calibration data to calculate the calibrated axle loads.
- If the towed vehicle has chosen to include the stored calibration data when calculating the axle loads, any external application shall not use the stored calibration data again.

[Table 132](#) specifies the parameter description.

**Table 132 — Specification of the parameter “axle load calibration type”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — stored calibration data used for axle load output (Stored calibration data shall not be used for external compensation.)<br>11 <sub>2</sub> – stored calibration data not used for axle load output (Stored calibration data can be used for external calculation of the calibrated axle loads.) |
| type        | measured   |

**6.5.5.49 Extended ride height and ramp level storage**

This parameter shall indicate whether the towed vehicle supports the storage of four extra drive heights and four extra ramp levels. [Table 133](#) specifies the parameter description.

**Table 133 — Specification of the parameter “extended ride height and ramp level storage”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — extended ride height and ramp level storage supported (Ride height can be stored in all three sets.)<br>01 <sub>2</sub> — extended ride height and ramp level storage supported (Ride height can only be stored in the two extended sets.)<br>11 <sub>2</sub> — extended drive height and ramp level storage not supported |
| type        | measured   |

### 6.5.5.50 Ride height and ramp level set request

This parameter shall command the request for a set of stored ride heights and ramp levels to use in combination with the ride height request, ride height storage request, ramp level request, and ramp level storage request. If extended ride height and ramp level storage is not supported, the default set is used independent of the value of this signal. [Table 134](#) specifies the parameter description.

**Table 134 — Specification of the parameter “ride height and ramp level set request”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — use the extended set 1 of the stored ride heights and ramp levels<br>01 <sub>2</sub> — use the extended set 2 of the stored ride heights and ramp levels<br>11 <sub>2</sub> — use the default set of the stored ride heights and ramp levels |
| type        | status   |

### 6.5.5.51 Ride height storage request

This parameter shall command the request to store the actual body height level as new programmed and memorized ride height 1 or 2 in the requested ride height set in the ECU. A request to store a ride height shall be sent in five successive messages followed by messages with “ride height storage request” set to “take no action”. Less than five messages are allowed if the receiver acknowledges through “ride height level storage”. [Table 135](#) specifies the parameter description.

**Table 135 — Specification of the parameter “ride height storage request”**

| Attribute   | Value  |
|-------------|--|
| data length | 2 bit  |
| data range  | 00 <sub>2</sub> — store ride height 1<br>01 <sub>2</sub> — store ride height 2<br>11 <sub>2</sub> — take no action |
| type        | status   |

### 6.5.5.52 Ride height storage

This parameter shall indicate the current status of the ride high storage in the levelling control system as a response to the “ride high storage request”. [Table 136](#) specifies the parameter description.

**Table 136 — Specification of the parameter “ride height storage”**

| Attribute   | Value   |
|-------------|---|
| data length | 2 bit   |
| data range  | 00 <sub>2</sub> — no new ride height storage request<br>01 <sub>2</sub> — new ride height stored<br>10 <sub>2</sub> — ride height cannot be stored in the requested set |
| type        | measured  |

## 6.6 Messages

### 6.6.1 General

This subclause specifies the PGNs and messages to use on the electrical connection between the towing and towed vehicles.

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All undefined/reserved bits shall be transmitted with a value of “1”. All undefined/reserved bits shall be treated as “don’t care” (either masked out or ignored).

A PGN is described by a short form of the function (e.g. EBS for electronic braking system and RGE for running gear equipment) and two numbers.

The first number stands for the transmission direction,

- “1” for the transmission from the towing to the towed vehicle and
- “2” for the transmission from the towed to the towing vehicle.

The second number is an index number starting with “1”.

For the dynamic address assignment, one of the PDU 1 type messages to be sent from the towing vehicle to the towed vehicle with the smallest transmission repetition time is specified as the standard initialization message. This message, as well as one of the PDU 1 type messages to be sent from a towed vehicle to its predecessor with the smallest transmission repetition time, shall be sent continuously. Details are given in the message specification.

[Tables 137](#) and [138](#) give an overview of the defined PGNs for the PDU 1 and PDU 2 type messages. [Annex B](#) gives an (informative) overview of all the messages.

The messages transmitted on the interface are distinguished by their unique identifier. The transmission repetition times are specified for messages with particular identifiers. For example, if there are three towed vehicles, the towing vehicle has to send one RGE11 message (PDU 1 type) to the first towed vehicle, one to the second and one to the third, each with a repetition time of 100 ms.

The repetition time of PDU 2 type messages is independent of the number of towed vehicles.

The messages EBS11 and EBS21 shall be transmitted only between two directly coupled vehicles for optimal brake control between these two units. Since EBS21 also contains information that is relevant to the commercial vehicle (warning information to the driver), this information is also mapped into the message EBS22.

**Table 137 — Overview of the PDU1 format messages**

| P | EDP | DP | PF  | PS | PGN    | Label                        | Acronym | Rep' time | Remarks                             |
|---|-----|----|-----|----|--------|------------------------------|---------|-----------|-------------------------------------|
| 3 | 0   | 0  | 2   | DA | 512    | electronic brake system #1/1 | EBS11   | 10 ms     |                                     |
| 3 | 0   | 0  | 3   | DA | 768    | electronic brake system #2/1 | EBS21   | 10 ms     |                                     |
| 6 | 0   | 0  | 228 | DA | 58 368 | running gear equipment #1/1  | RGE11   | 100 ms    | replaces GFM 12 of ISO 11992-3:1998 |
| 6 | 0   | 0  | 138 | DA | 35 328 | running gear equipment #1/2  | RGE12   | 1 000 ms  | added with this revision            |
| 6 | 0   | 0  | 229 | DA | 58 624 | running gear equipment #2/1  | RGE21   | 100 ms    | replaces GFM 22 of ISO 11992-3:1998 |
| 6 | 0   | 0  | 137 | DA | 35 072 | running gear equipment #2/4  | RGE24   | 1 000 ms  | added with this revision            |

**Table 138 — Overview of the PDU2 format messages**

| P | EDP | DP | PF  | PS  | PGN    | Label                        | Acronym | Rep' time | Remarks |
|---|-----|----|-----|-----|--------|------------------------------|---------|-----------|---------|
| 6 | 0   | 0  | 254 | 201 | 65 225 | electronic brake system #1/2 | EBS12   | 100 ms    |         |
| 6 | 0   | 0  | 254 | 196 | 65 220 | electronic brake system #2/2 | EBS22   | 100 ms    |         |
| 6 | 0   | 0  | 254 | 198 | 65 222 | electronic brake system #2/3 | EBS23   | 100 ms    |         |
| 6 | 0   | 0  | 253 | 154 | 64 922 | electronic brake system #2/4 | EBS24   | 1 000 ms  |         |
| 6 | 0   | 0  | 240 | 32  | 61 472 | electronic brake system #2/5 | EBS25   | 100 ms    |         |
| 3 | 0   | 0  | 240 | 31  | 61 471 | electronic brake system #2/6 | EBS26   | 10 ms     |         |
| 6 | 0   | 0  | 254 | 92  | 65 116 | running gear equipment #2/2  | RGE22   | 100 ms    |         |
| 6 | 0   | 0  | 254 | 94  | 65 118 | running gear equipment #2/3  | RGE23   | 1 000 ms  |         |
| 6 | 0   | 0  | 254 | 230 | 65 254 | time/date #1/1               | TD11    | 1 000 ms  |         |

NOTE The repetition time of EBS25 was defined as 50 ms in ISO 11992-2:2003, AMD1 and is changed to 100 ms in the third revision.

Additionally, [Table 139](#) gives an overview of the messages defined for the diagnostic communication purposes between the commercial vehicle and any towed vehicle. [Table 140](#) gives an overview of the PDU 3 type messages for the subnet addressing communication purposes between any of the towed vehicles.

Usage and data contents of those messages shall be in accordance with ISO 11992-4.

**Table 139 — Overview of the diagnostic PDUs**

| P | EDP | DP | PF  | PS | PGN    | Label                                    | Acronym | Rep' time | Remarks                                   |
|---|-----|----|-----|----|--------|--|---------|-----------|---|
| 7 | 0   | 0  | 206 | DA | 52 736 | diagnostic channel physical addressing   | DCC11   | n/a       | sent from the towing to the towed vehicle |
| 7 | 0   | 0  | 206 | DA | 52 736 | diagnostic channel physical addressing   | DCC21   | n/a       | sent from the towed to the towing vehicle |
| 7 | 0   | 0  | 205 | DA | 52 480 | diagnostic channel functional addressing | DCC12   | n/a       | sent from the towing to the towed vehicle |
| 7 | 0   | 0  | 205 | DA | 52 480 | diagnostic channel functional addressing | DCC22   | n/a       | sent from the towed to the towing vehicle |

NOTE DCC11 and DCC21 refer to the same PGN as KWP3 in SAE J1939.

NOTE DCC12 and DCC22 refer to the same PGN as KWP4 in SAE J1939.

**Table 140 — Overview of the subnet addressing diagnostic messages**

| P | EDP | DP | - | - | - | Label                                | Acronym | Rep' time | Remarks                                  |
|---|-----|----|---|---|---|--------------------------------------|---------|-----------|--|
| 7 | 1   | 1  | - | - | - | subnet addressing diagnostic channel | DCCX    | n/a       | sent from any towed to any other vehicle |

For each PGN specified in the following subsections, the attribute and message definitions given in [Table 141](#) and [Table 142](#) shall apply.

**Table 141 — PGN attribute definition**

| Attribute                    | Definition   |
|------------------------------|--|
| transmission repetition time | nominal time and tolerance between two subsequently transmitted messages |
| data length                  | number of bytes of the message   |
| extended data page           | value of the parameter EDP specified in 6.1                              |
| data page                    | value of the parameter DP specified in 6.1                               |
| PDU format                   | value of the parameter PF specified in 6.1                               |
| PDU specific                 | value of the parameter PS specified in 6.1                               |
| default priority             | value of the parameter P specified in 6.1                                |
| PGN                          | value of the parameter PGN specified in 6.2                              |

**Table 142 — PGN message definition**

| Column title | Definition  |
|--------------|---|
| byte pos     | byte offset of the specified parameter starting with 1 (one) for the first byte         |
| bit pos      | bit offset of the specified parameter starting with 1 (one) for the LSB                 |
| parameter    | name of the parameter as specified in 6.5   |
| reference    | reference to the subsection number of the specified parameter                           |
| new          | attribute indicating if the parameter has been added with this revision of the document |

### 6.6.2 Message transmission in the case of multiple trailers

If more than one trailer is connected to the commercial vehicle, the number of CAN frames per second needs to be reduced to meet the requirements of the physical data interfaces concerning bus load. In this case, the following restrictions shall apply.

- All messages shall be sent with the repetition rate as defined in this International Standard.
- The messages EBS26 shall only be sent in the case of one trailer. If more than one towed vehicle is present, the message EBS26 shall not be sent at all by all towed vehicle.

### 6.6.3 System independent PGNs, transmitted from the towing to the towed vehicle

#### 6.6.3.1 PGN 65254 — TD11 — Time/Date #1/1

If supported, this message should be sent by the commercial vehicle and forwarded by the other towing vehicles. Table 143 specifies the PGN attributes. Table 144 specifies the PGN content.

**Table 143 — PGN 65254 — TDE11 attribute definition**

| Attribute                    | Value                                     |
|------------------------------|---|
| transmission repetition time | 1 000 ms ± 100 ms                         |
| data length                  | 8 byte                                    |
| extended data page           | 0   |
| data page                    | 0   |
| PDU format                   | 254 (PDU2)                                |
| PDU specific                 | GE = 230                                  |
| default priority             | 6   |
| PGN                          | 65254 <sub>10</sub> /00FEE6 <sub>16</sub> |

**Table 144 — PGN 65254 — TDE11 parameter description**

| Byte pos | Bit pos | Parameter           | Reference               | New |
|----------|---------|---------------------|-------------------------|-----|
| 1        |         | seconds             | <a href="#">6.5.3.2</a> |     |
| 2        |         | minutes             | <a href="#">6.5.3.3</a> |     |
| 3        |         | hours               | <a href="#">6.5.3.4</a> |     |
| 4        |         | day                 | <a href="#">6.5.3.5</a> |     |
| 5        |         | month               | <a href="#">6.5.3.6</a> |     |
| 6        |         | year                | <a href="#">6.5.3.7</a> |     |
| 7        |         | local minute offset | <a href="#">6.5.3.8</a> |     |
| 8        |         | local hour offset   | <a href="#">6.5.3.9</a> |     |

#### 6.6.4 Electronic brake system PGNs, transmitted from the towing to the towed vehicle

##### 6.6.4.1 PGN 512 — EBS11 — Electronic brake system #1/1

This PGN shall be sent by the towing vehicle(s) and shall be transmitted between directly coupled vehicles only. This PGN shall be used as the general initialization message for the address assignment at the receiving vehicle's node. [Table 145](#) specifies the PGN attributes. [Table 146](#) specifies the PGN content.

**Table 145 — PGN 511 — EBS11 attribute definition**

| Attribute                    | Value                                   |
|------------------------------|---|
| transmission repetition time | 10 ms ± 1 ms                            |
| data length                  | 8 byte                                  |
| extended data page           | 0                                       |
| data page                    | 0                                       |
| PDU format                   | 2 (PDU1)                                |
| PDU specific                 | DA (address of the successor)           |
| default priority             | 3                                       |
| PGN                          | 512 <sub>10</sub> /000200 <sub>16</sub> |

**Table 146 — PGN 512 — EBS11 parameter description**

| Byte pos | Bit pos | Parameter  | Reference                | New |
|----------|---------|--|--------------------------|-----|
| 1        | 1 to 2  | vehicle ABS status                                   | <a href="#">6.5.4.15</a> |     |
|          | 3 to 4  | vehicle retarder control status                      | <a href="#">6.5.4.12</a> |     |
|          | 5 to 6  | ASR brake control status                             | <a href="#">6.5.4.22</a> |     |
|          | 7 to 8  | ASR engine control status                            | <a href="#">6.5.4.23</a> |     |
| 2        | 1 to 2  | brake light switch                                   | <a href="#">6.5.4.29</a> |     |
|          | 3 to 4  | vehicle type   | <a href="#">6.5.4.30</a> |     |
|          | 5 to 6  | VDC active   | <a href="#">6.5.4.35</a> |     |
|          | 7 to 8  | reserved by document                                 | –                        |     |
| 3 to 4   | –       | service brake demand pressure                        | <a href="#">6.5.4.3</a>  |     |
| 5        | –       | park brake demand relative pressure                  | <a href="#">6.5.4.1</a>  |     |
| 6        | –       | retarder demand relative torque                      | <a href="#">6.5.4.2</a>  |     |
| 7        | –       | relative brake demand for front or left vehicle side | <a href="#">6.5.4.40</a> |     |
| 8        | –       | relative brake demand for rear or right vehicle side | <a href="#">6.5.4.41</a> |     |

6.6.4.2 PGN 65225 — EBS12 – Electronic brake system #1/2

This PGN shall be sent by the towing vehicle(s). [Table 147](#) specifies the PGN attributes. [Table 148](#) specifies the PGN content.

**Table 147 — PGN 65225 — EBS12 attribute definition**

| Attribute                    | Value                                     |
|------------------------------|---|
| transmission repetition time | 100 ms ± 10 ms                            |
| data length                  | 8 byte                                    |
| extended data page           | 0   |
| data page                    | 0   |
| PDU format                   | 254 (PDU2)                                |
| PDU specific                 | GE = 201                                  |
| default priority             | 6   |
| PGN                          | 65225 <sub>10</sub> /00FEC9 <sub>16</sub> |

**Table 148 — PGN 65225 — EBS12 parameter description**

| Byte pos | Bit pos | Parameter                                      | Reference                | New |
|----------|---------|--|--------------------------|-----|
| 1        | 1 to 2  | vehicle retarder control status                | <a href="#">6.5.4.12</a> |     |
|          | 3 to 4  | ROP system status                              | <a href="#">6.5.4.56</a> |     |
|          | 5 to 6  | YC system status                               | <a href="#">6.5.4.57</a> |     |
|          | 7 to 8  | reserved by document                           | -                        |     |
| 2        | 1 to 2  | trailer ROP system request                     | <a href="#">6.5.4.58</a> |     |
|          | 3 to 4  | trailer YC system request                      | <a href="#">6.5.4.59</a> |     |
|          | 5 to 6  | reverse gear status                            | <a href="#">6.5.4.62</a> | X   |
|          | 7 to 8  | emergency braking status                       | <a href="#">6.5.4.64</a> | X   |
| 3        | 1 to 2  | two electrical circuits brake demand status    | <a href="#">6.5.4.25</a> |     |
|          | 3 to 4  | ABS off-road request                           | <a href="#">6.5.4.21</a> |     |
|          | 5 to 6  | pneumatic control line status                  | <a href="#">6.5.4.24</a> |     |
|          | 7 to 8  | load proportional function installation status | <a href="#">6.5.4.20</a> | X   |
| 4        | -       | reserved by document                           | -                        |     |
| 5 to 6   | -       | road curvature                                 | <a href="#">6.5.4.36</a> |     |
| 7 to 8   | -       | braking system wheel-based vehicle speed       | <a href="#">6.5.4.4</a>  |     |

6.6.5 Running gear equipment PGNs, transmitted from the towing to the towed vehicle

6.6.5.1 PGN 58368 — RGE11 — Running gear equipment #1/1

If supported, this PGN should be sent by the towing vehicle(s). It can be sent to each towed vehicle individually and/or to the global address (all towed vehicles). If the global destination address is used, the PGNs shall only be sent to the successor vehicles. [Table 149](#) specifies the PGN attributes. [Table 150](#) specifies the PGN content.

**Table 149 — PGN 58368 — RGE11 attribute definition**

| Attribute                    | Value                                     |
|------------------------------|---|
| transmission repetition time | 100 ms ± 10 ms                            |
| data length                  | 8 byte                                    |
| extended data page           | 0   |
| data page                    | 0   |
| PDU format                   | 228 (PDU1)                                |
| PDU specific                 | DA (address of the towed vehicle)         |
| default priority             | 6   |
| PGN                          | 58368 <sub>10</sub> /00E400 <sub>16</sub> |

**Table 150 — PGN 58368 — RGE11 parameter description**

| Byte pos | Bit pos | Parameter                              | Reference                | New |
|----------|---------|--|--------------------------|-----|
| 1        | 1 to 2  | ride height request                    | <a href="#">6.5.5.26</a> |     |
|          | 3 to 4  | level change request, front axle       | <a href="#">6.5.5.8</a>  |     |
|          | 5 to 6  | level change request, rear axle        | <a href="#">6.5.5.9</a>  |     |
|          | 7 to 8  | traction help (load transfer) request  | <a href="#">6.5.5.24</a> |     |
| 2        | 1 to 2  | lift axle 1 position request           | <a href="#">6.5.5.12</a> |     |
|          | 3 to 4  | lift axle 2 position request           | <a href="#">6.5.5.13</a> |     |
|          | 5 to 6  | steering axle locking request          | <a href="#">6.5.5.22</a> |     |
|          | 7 to 8  | ramp level request                     | <a href="#">6.5.5.29</a> |     |
| 3        | 1 to 2  | level control request                  | <a href="#">6.5.5.6</a>  |     |
|          | 3 to 4  | ramp level storage request             | <a href="#">6.5.5.32</a> |     |
|          | 5 to 6  | stop level change request              | <a href="#">6.5.5.34</a> |     |
|          | 7 to 8  | ride height storage request            | <a href="#">6.5.5.51</a> | X   |
| 4 to 5   | –       | driven axle load (commercial vehicle)  | <a href="#">6.5.5.1</a>  |     |
| 6        | –       | parking and trailer air pressure       | <a href="#">6.5.5.36</a> |     |
| 7        | –       | auxiliary equipment supply pressure    | <a href="#">6.5.5.37</a> |     |
| 8        | 1 to 2  | lift axle 3 position request           | <a href="#">6.5.5.14</a> | X   |
|          | 3 to 4  | lift axle 4 position request           | <a href="#">6.5.5.15</a> | X   |
|          | 5 to 6  | lift axle 5 position request           | <a href="#">6.5.5.16</a> | X   |
|          | 7 to 8  | ride height and ramp level set request | <a href="#">6.5.5.50</a> | X   |

### 6.6.5.2 PGN 35328 — RGE12 — Running gear equipment #1/2

If supported, this PGN should be sent by the towing vehicle(s). The parameter identification data index serves as an index to an array of data transmitted in the parameter identification data content and should continuously cycle through all the supported values, but no specific order of index values shall be assumed on the receiver side.

[Table 151](#) specifies the PGN attributes. [Table 152](#) specifies the PGN content.

Table 151 — PGN 35328 — RGE12 attribute definition

| Attribute                    | Value                                     |
|------------------------------|---|
| transmission repetition time | 100 ms ± 10 ms                            |
| data length                  | 8 byte                                    |
| extended data page           | 0   |
| data page                    | 0   |
| PDU format                   | 138 (PDU1)                                |
| PDU specific                 | DA (address of the towed vehicle)         |
| default priority             | 6   |
| PGN                          | 35328 <sub>10</sub> /008A00 <sub>16</sub> |

Table 152 — PGN 35328 — RGE12 parameter description

| Byte pos | Bit pos | Parameter                                  | Reference                | New |
|----------|---------|--|--------------------------|-----|
| 1        | 1 to 2  | axle load calibration data storage request | <a href="#">6.5.5.43</a> | X   |
|          | 3 to 8  | reserved by document                       | -                        |     |
| 2        | -       | tyre/wheel identification                  | <a href="#">6.5.3.1</a>  | X   |
| 3 to 4   | -       | axle load measured by external scale       | <a href="#">6.5.5.45</a> | X   |
| 5        | -       | identification data index                  | <a href="#">6.5.3.10</a> | X   |
| 6        | -       | identification data content                | <a href="#">6.5.3.11</a> | X   |
| 7 to 8   | -       | reserved by document                       | -                        |     |

It is recommended that this PGN should be transmitted cyclically with the tyre/wheel identification parameters alternating for all tyres, but no specific order of identification values shall be assumed on the receiver side.

#### 6.6.6 System independent PGNs, transmitted from the towed to the towing vehicle

There are currently no PGNs defined within this group.

#### 6.6.7 Electronic brake system PGNs, transmitted from the towed to the towing vehicle

##### 6.6.7.1 PGN 768 — EBS21 — Electronic brake system #2/1

This PGN shall be sent by the towed vehicle(s). [Table 153](#) specifies the PGN attributes. [Table 154](#) specifies the PGN content.

Table 153 — PGN 768 — EBS21 attribute definition

| Attribute                    | Value                                   |
|------------------------------|---|
| transmission repetition time | 10 ms ± 1 ms                            |
| data length                  | 8 byte                                  |
| extended data page           | 0                                       |
| data page                    | 0                                       |
| PDU format                   | 3 (PDU1)                                |
| PDU specific                 | DA (address of the predecessor)         |
| default priority             | 3                                       |
| PGN                          | 768 <sub>10</sub> /000300 <sub>16</sub> |

**Table 154 — PGN 768 — EBS21 parameter description**

| Byte pos | Bit pos | Parameter   | Reference                | New |
|----------|---------|---|--------------------------|-----|
| 1        | 1 to 2  | vehicle ABS status                                    | <a href="#">6.5.4.15</a> |     |
|          | 3 to 4  | vehicle retarder control status                       | <a href="#">6.5.4.12</a> |     |
|          | 5 to 6  | vehicle service brake status                          | <a href="#">6.5.4.13</a> |     |
|          | 7 to 8  | automatic towed vehicle braking status                | <a href="#">6.5.4.14</a> |     |
| 2        | 1 to 2  | VDC active  | <a href="#">6.5.4.35</a> |     |
|          | 3 to 4  | support of side or axle wise brake force distribution | <a href="#">6.5.4.42</a> |     |
|          | 5 to 8  | reserved by document                                  | -                        |     |
| 3 to 4   | -       | braking system wheel-based vehicle speed              | <a href="#">6.5.4.4</a>  |     |
| 5        | -       | retarder relative peak torque                         | <a href="#">6.5.4.6</a>  |     |
| 6 to 7   | -       | wheel speed difference main axle                      | <a href="#">6.5.4.37</a> |     |
| 8        | -       | lateral acceleration                                  | <a href="#">6.5.4.43</a> |     |

**6.6.7.2 PGN 65220 — EBS22 — Electronic brake system #2/2**

This PGN shall be sent by the towed vehicle(s). [Table 155](#) specifies the PGN attributes. [Table 156](#) specifies the PGN content.

**Table 155 — PGN 65220 — EBS22 attribute definition**

| Attribute                    | Value                                     |
|------------------------------|---|
| transmission repetition time | 100 ms ± 10 ms                            |
| data length                  | 8 byte                                    |
| extended data page           | 0   |
| data page                    | 0   |
| PDU format                   | 254 (PDU2)                                |
| PDU specific                 | GE = 196                                  |
| default priority             | 6   |
| PGN                          | 65220 <sub>10</sub> /00FEC4 <sub>16</sub> |

**Table 156 — PGN 65220 — EBS22 parameter description**

| Byte pos | Bit pos | Parameter   | Reference                | New |
|----------|---------|---|--------------------------|-----|
| 1        | 1 to 2  | vehicle ABS status  | <a href="#">6.5.4.15</a> |     |
|          | 3 to 4  | vehicle retarder control status                           | <a href="#">6.5.4.12</a> |     |
|          | 5 to 6  | vehicle service brake status                              | <a href="#">6.5.4.13</a> |     |
|          | 7 to 8  | automatic towed vehicle braking status                    | <a href="#">6.5.4.14</a> |     |
| 2        | 1 to 2  | vehicle electrical supply status                          | <a href="#">6.5.4.16</a> |     |
|          | 3 to 4  | red warning signal request                                | <a href="#">6.5.4.31</a> |     |
|          | 5 to 6  | amber warning signal request                              | <a href="#">6.5.4.32</a> |     |
|          | 7 to 8  | electrical supply of non-braking systems status           | <a href="#">6.5.4.33</a> |     |
| 3        | 1 to 2  | spring brake installation status                          | <a href="#">6.5.4.18</a> |     |
|          | 3 to 4  | electrical load proportional function installation status | <a href="#">6.5.4.19</a> |     |
|          | 5 to 6  | vehicle type  | <a href="#">6.5.4.30</a> |     |
|          | 7 to 8  | spring brake status                                       | <a href="#">6.5.4.39</a> |     |
| 4        | 1 to 2  | loading ramp approach assistance status                   | <a href="#">6.5.4.34</a> |     |
|          | 3 to 4  | supply line braking                                       | <a href="#">6.5.4.38</a> |     |
|          | 5 to 6  | stop lamps request  | <a href="#">6.5.4.44</a> |     |
|          | 7 to 8  | braking via electric control line support                 | <a href="#">6.5.4.45</a> |     |
| 5 to 6   | -       | axle load sum   | <a href="#">6.5.4.7</a>  |     |
| 7 to 8   | -       | retarder reference torque                                 | <a href="#">6.5.4.5</a>  |     |

**6.6.7.3 PGN 65222 — EBS23 — Electronic brake system #2/3**

This PGN shall be sent by the towed vehicle(s). All tyre-related parameters at the data bytes 1, 5, 6, and 7 shall be interpreted in conjunction with the corresponding tyre/wheel identification given in bytes 2, 3, and 4. The tyre/wheel identification shall only be interpreted when the corresponding parameter is supported and has no relevance if the corresponding parameter is not supported. [Table 157](#) specifies the PGN attributes. [Table 158](#) specifies the PGN content.

**Table 157 — PGN 65222 — EBS23 attribute definition**

| Attribute                    | Value                                     |
|------------------------------|---|
| transmission repetition time | 100 ms ± 10 ms                            |
| data length                  | 8 byte                                    |
| extended data page           | 0   |
| data page                    | 0   |
| PDU format                   | 254 (PDU2)                                |
| PDU specific                 | GE = 198                                  |
| default priority             | 6   |
| PGN                          | 65222 <sub>10</sub> /00FEC6 <sub>16</sub> |