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

Part 2:

**Application layer for brakes and running
gear**

AMENDMENT 1

*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*

AMENDEMENT 1

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Foreword

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Amendment 1 to ISO 11992-2:2003 was prepared by Technical Committee ISO/TC 22, *Road vehicles*, Subcommittee SC 3, *Electrical and electronic equipment*.

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

Part 2: Application layer for brakes and running gear

AMENDMENT 1

Page iv, Foreword, 7th paragraph

Replace the list of parts with the following.

- *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: Diagnostics*

Page 1, Clause 2

Replace the entire list of normative references with the following new list.

ISO 11898 (all parts), *Road vehicles — Controller area network (CAN)*

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

Page 5, 6.2, 5th paragraph, 2nd sentence

Delete the following sentence: “To avoid any transmission conflict during the dynamic address assignment phase (power-up), the PDU 2 type message shall have even PS (GE) in the predecessor transmission direction and odd PS (GE) in the successor transmission direction.”

Page 8, 6.3, Figure 9

Replace the existing figure with the following new figure.

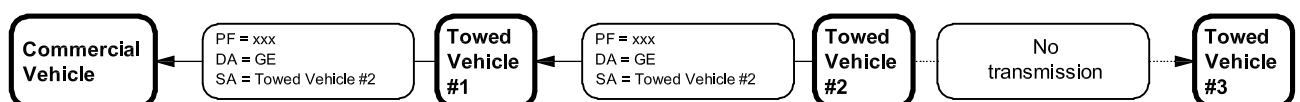


Figure 9 — Example of PDU 2 type message from towed vehicle #2

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Page 18, 6.4.2.2.33

Add the following note at the end of 6.4.2.2.33.

NOTE The amber warning signal request is regarded as providing the same information as the yellow warning signal, activated by the trailer on pin 5 of the electric connector conforming to ISO 7638, as specified in UNECE Regulation 13.

Page 19, 6.4.2.2.36

Replace the entire subclause with the following new subclause.

6.4.2.2.36 VDC active

VDC (Vehicle Dynamic Control) means an electronic vehicle stability function which is a function within the braking system and reacts to stabilise the vehicle during dynamic manoeuvres. VDC includes Roll Over Prevention (ROP) and/or Yaw Control (YC).

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.

NOTE 1 In UNECE Regulation No. 13, Roll Over Prevention is referred to as Roll-Over Control and Yaw Control is referred to as Directional Control.

NOTE 2 Active does not mean “installed” or “enabled”, but indicates an actual VDC situation.

- 00 — VDC passive, but installed
- 01 — VDC active
- Type: Measured

Page 19

Insert the following new subclauses immediately after 6.4.2.2.40, including the new Table 7 and the new Figure 11.

6.4.2.2.41 Relative brake demand value for front or left vehicle side

The requested percentage of the service brake demand value which has to be applied to the steering axle wheels in case of a drawbar trailer or to the wheels on the left side of the vehicle in case of a semi trailer. This signal supports the trailer stabilisation in case of a trailer instability by the towing vehicle by means of requesting a selective brake force distribution.

- Data length: 1 byte
- Resolution: 0,4 %/bit gain, 0 % offset
- Data range: 0 % to 100 %
- Type: Status

6.4.2.2.42 Relative brake demand value for rear or right vehicle side

The requested percentage of the service brake demand value which has to be applied to the wheels of the rear axle(s) in case of a drawbar trailer or to the wheels on the right side of the vehicle in case of a semi trailer. This signal supports the trailer stabilisation in case of a trailer instability by the towing vehicle by means of requesting a selective brake force distribution.

Data length: 1 byte
 Resolution: 0,4 %/bit gain, 0 % offset
 Data range: 0 % to 100 %
 Type: Status

6.4.2.2.43 Support of side or axle wise brake force distribution

Indicates whether the function of an axle wise brake force distribution (in case of a drawbar trailer) or a side wise brake force distribution (in case of a semi trailer) is enabled.

00 — Side/axle wise brake force distribution disabled
 01 — Side/axle wise brake force distribution enabled
 Type: Measured

6.4.2.2.44 Lateral acceleration

Indicates a lateral acceleration of the vehicle. A positive lateral acceleration signal results when the vehicle is accelerated to the left.

Data length: 1 byte
 Resolution: 1/10 m/s²/bit gain, -12,5 m/s² offset
 Data range: -12,5 m/s² to 12,5 m/s²
 Type: Measured

6.4.2.2.45 Stop lamps request

Request from the towed vehicle to the commercial vehicle to illuminate the stop lamps.

00 — No request to illuminate stop lamps
 01 — Request to illuminate stop lamps
 Type: Status

6.4.2.2.46 Braking via electric control line supported

Indicates whether the towed vehicle supports braking via the electric control.

00 — Braking via electric control line not supported
 01 — Braking via electric control line supported
 Type: Measured

6.4.2.2.47 Geometric data index

Serves as an index counter.

- Data length: 1 byte
- Resolution: see Table 7
- Data range: see Table 7
- Type: Measured

6.4.2.2.48 Geometric data indexed content

Geometric data, the content of this parameter depends on the Geometric data index.

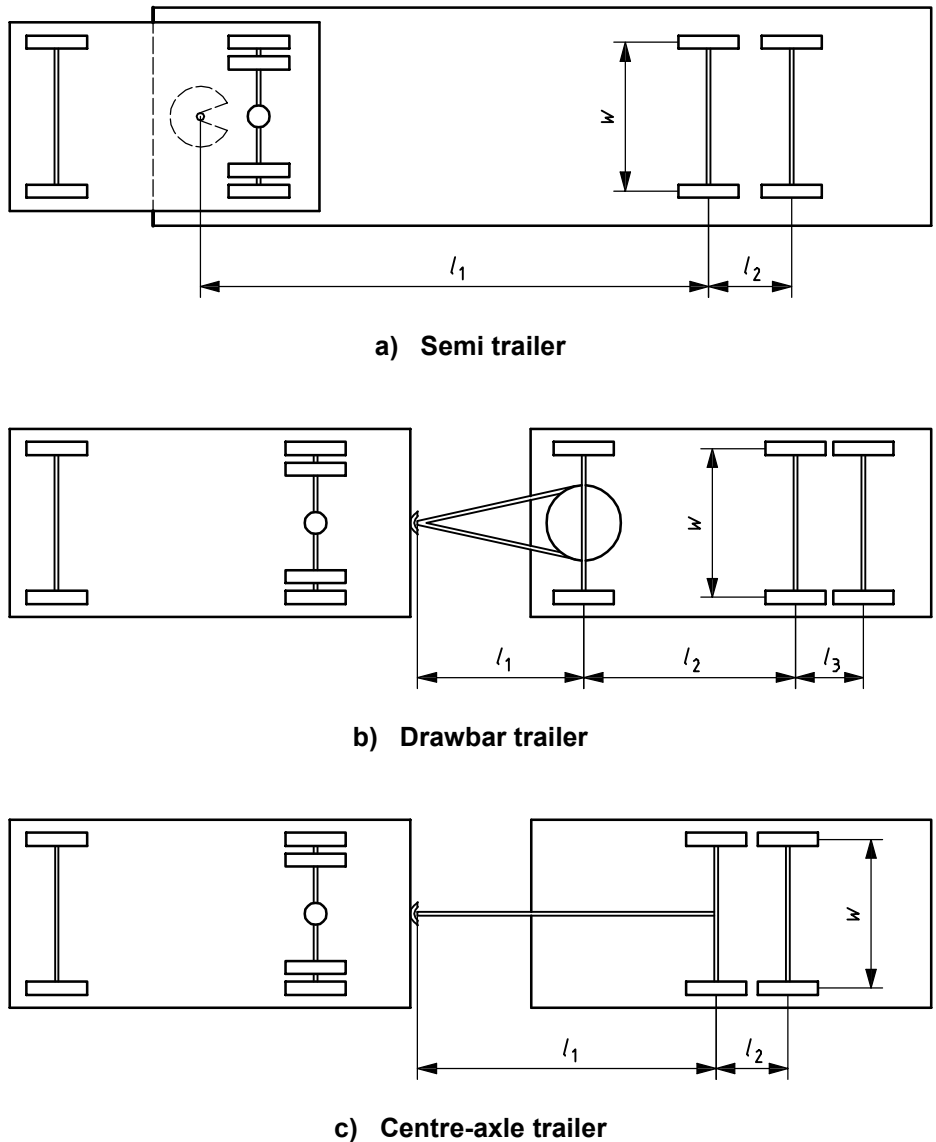
- Data length: 1 byte
- Resolution: see Table 7
- Data range: see Table 7
- Type: Measured

Table 7 — Geometric data

Geometric data index	Geometric data indexed content
0	Type of the towed vehicle Resolution: 1/bit Data range: 0 to 250 Type: 0 Semi trailer 1 Centre-axle trailer 2 Drawbar trailer 3 Dolly 4 to 250 Not defined NOTE Information about “normal trailer” or “dolly” is also available in EBS 22.
1	Length between coupling point and middle of the first axle (see Figure 11) Resolution: 0,1 m/bit Data range: 0 m to 25 m
2	Track width (see Figure 11) Resolution: 10 mm/bit Data range: 0 mm to 2 500 mm
3	Total number of axles Resolution: 1/bit Data range: 0 to 250
4	Number of front axles (only in case of drawbar trailers, i.e. Type = 2) Resolution: 1/bit Data range: 0 to 250

Table 7 (continued)

Geometric data index	Geometric data indexed content
5	Number of lift axles Resolution: 1/bit Data range: 0 to 250
6	Position (axle number) of lift axle 1 Resolution: 1/bit Data range: 0 axle position cannot be identified 1 to 250 axle position
7	Position (axle number) of lift axle 2 Resolution: 1/bit Data range: 0 axle position cannot be identified 1 to 250 axle position
8	Position (axle number) of lift axle 3 Resolution: 1/bit Data range: 0 axle position cannot be identified 1 to 250 axle position
9	Position (axle number) of lift axle 4 Resolution: 1/bit Data range: 0 axle position cannot be identified 1 to 250 axle position
10	Position (axle number) of lift axle 5 Resolution: 1/bit Data range: 0 axle position cannot be identified 1 to 250 axle position
11	Wheel base: first axle to second axle (see Figure 11) Resolution: 0,1 m/bit Data range: 0 m to 25 m
12	Wheel base: second axle to third axle (see Figure 11) Resolution: 0,1 m/bit Data range: 0 m to 25 m
13 to 29	Wheel base: (Geometric data index - 10) axle to (Geometric data index - 9) axle Resolution: 0,1 m/bit Data range: 0 m to 25 m
30 to 250	Not defined



Key

- w track width
- l_1 length between coupling point and middle of the first axle
- l_2 distance between first axle and second axle in wheel base
- l_3 distance between second axle and third axle in wheel base

Figure 11 — Vehicle dimensions

6.4.2.2.49 Brake cylinder pressure first axle, left wheel

Actual pressure of the wheel-brake actuator at the left wheel of the first axle.

NOTE In the case of a drawbar trailer, “first axle” means the steering axle.

- Data length: 1 byte
- Resolution: 5 kPa/bit gain, 0 kPa offset
- Data range: 0 kPa to 1250 kPa
- Type: Measured

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6.4.2.2.50 Brake cylinder pressure first axle, right wheel

Actual pressure of the wheel-brake actuator at the right wheel of the first axle.

NOTE In the case of a drawbar trailer, "first axle" means the steering axle.

Data length: 1 byte
 Resolution: 5 kPa/bit gain, 0 kPa offset
 Data range: 0 kPa to 1250 kPa
 Type: Measured

6.4.2.2.51 Brake cylinder pressure second axle, left wheel

Actual pressure of the wheel-brake actuator at the left wheel of the second axle.

Data length: 1 byte
 Resolution: 5 kPa/bit gain, 0 kPa offset
 Data range: 0 kPa to 1250 kPa
 Type: Measured

6.4.2.2.52 Brake cylinder pressure second axle, right wheel

Actual pressure of the wheel-brake actuator at the right wheel of the second axle.

Data length: 1 byte
 Resolution: 5 kPa/bit gain, 0 kPa offset
 Data range: 0 kPa to 1250 kPa
 Type: Measured

6.4.2.2.53 Brake cylinder pressure third axle, left wheel

Actual pressure of the wheel-brake actuator at the left wheel of the third axle.

Data length: 1 byte
 Resolution: 5 kPa/bit gain, 0 kPa offset
 Data range: 0 kPa to 1250 kPa
 Type: Measured

6.4.2.2.54 Brake cylinder pressure third axle, right wheel

Actual pressure of the wheel-brake actuator at the right wheel of the third axle.

Data length: 1 byte
 Resolution: 5 kPa/bit gain, 0 kPa offset
 Data range: 0 kPa to 1250 kPa
 Type: Measured

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6.4.2.2.55 Wheel speed first axle, left wheel

Unfiltered and unbalanced speed of the left wheel on the first axle.

NOTE 1 In the case of a drawbar trailer, "first axle" means the steering axle.

NOTE 2 In the case of a semi trailer, the first non-lifting axle equipped with wheel speed measuring sensors is used. Both sensors are on the same axle.

Data length: 2 bytes
Resolution: 1/256 km/h/bit gain, 0 km/h offset
Data range: 0 km/h to 250 km/h
Type: Measured

6.4.2.2.56 Wheel speed first axle, right wheel

Unfiltered and unbalanced speed of the right wheel on the first axle.

NOTE 1 In the case of a drawbar trailer, "first axle" means the steering axle.

NOTE 2 In the case of a semi trailer, the first non-lifting axle equipped with wheel speed measuring sensors is used. Both sensors are on the same axle.

Data length: 2 bytes
Resolution: 1/256 km/h/bit gain, 0 km/h offset
Data range: 0 km/h to 250 km/h
Type: Measured

6.4.2.2.57 ROP system enabled/disabled

Signal which indicates that the Roll Over Prevention (ROP) system is enabled or disabled.

NOTE In UNECE Regulation No. 13, Roll Over Prevention is referred to as Roll-Over Control.

00 — ROP system disabled
01 — ROP system enabled
Type: Measured

6.4.2.2.58 YC system enabled/disabled

Signal which indicates that the Yaw Control (YC) system is enabled or disabled.

NOTE In UNECE Regulation No. 13, Yaw Control is referred to as Directional Control.

00 — YC system disabled
01 — YC system enabled
Type: Measured

6.4.2.2.59 Enable/disable trailer ROP system

Command signal to enable/disable the trailer Roll Over Prevention (ROP) system.

NOTE In UNECE Regulation No. 13, Roll Over Prevention is referred to as Roll-Over Control.

- 00 — Disable trailer ROP system
 - 01 — Enable trailer ROP system
- Type: Status

6.4.2.2.60 Enable/disable trailer YC system

Command signal to enable/disable the trailer Yaw Control (YC) system.

NOTE In UNECE Regulation No. 13, Yaw Control is referred to as Directional Control.

- 00 — Disable trailer YC system
 - 01 — Enable trailer YC system
- Type: Status

Page 28, Table 7

Renumber the existing Table 7 as "Table 8".

Page 28

Insert the following new subclauses immediately after 6.4.2.3.36.

6.4.2.3.37 Axle Load

Static vertical load of a vehicle axle identified by tyre/wheel identification.

- Data length: 2 bytes
- Resolution: 0,5 kg/bit gain, 0 kg offset
- Data range: 0 kg to 32127,5 kg
- Type: Measured

6.4.2.3.38 Seconds

Part of a parameter used to represent time.

- Data length: 1 byte
- Resolution: 0,25 s/bit, 0 offset
- Data range: 0 s to 59,75 s
- Type: Measured

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6.4.2.3.39 Minutes

Part of a parameter used to represent time.

Data length:	1 byte
Resolution:	1 min/bit, 0 offset
Data range:	0 min to 59 min
Type:	Measured

6.4.2.3.40 Hours

Part of a parameter used to represent time.

Data length:	1 byte
Resolution:	1 h/bit, 0 offset
Data range:	0 h to 23 h
Type:	Measured

6.4.2.3.41 Day

Part of a parameter used to represent a calendar date.

Data length:	1 byte
Resolution:	0.25 days/bit, 0 offset
Data range:	0 day to 31,75 days
Type:	Measured

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

NOTE 2 This parameter does not influence or change the hours parameter above.

6.4.2.3.42 Month

Part of a parameter used to represent a calendar date.

Data length:	1 byte
Resolution:	1 month/bit, 0 offset
Data range:	1 month to 12 months
Type:	Measured

NOTE A value of 0 for the month is null. The value 1 identifies January; 2 identifies February, etc.

6.4.2.3.43 Year

Part of a parameter used to represent a calendar year.

Data length:	1 byte
Resolution:	1 year/bit, 1 985 years offset
Data range:	1 985 years to 2 235 years
Type:	Measured

NOTE A value of 0 for the year identifies the year 1985; a value of 1 identifies 1986, etc.

6.4.2.3.44 Local Minute Offset

Local offset in minutes from a reference time.

Data length:	1 byte
Resolution:	1 min/bit, –125 min offset
Data range:	–59 min to 59 min
Type:	Measured

6.4.2.3.45 Local Hour Offset

Local offset in hours from a reference time.

Data length:	1 byte
Resolution:	1 h/bit, –125 h offset
Data range:	–24 h to 23 h
Type:	Measured

Page 28, 6.5

Replace the whole of 6.5, including the tables, with the following new subclause.

6.5 Messages**6.5.1 General**

The following specifies the messages for use on the electrical connection between towing and towed vehicles.

All undefined bits shall be transmitted with a value of “1”. All undefined bits shall be treated as “don’t care” (either masked out or ignored). This permits them to be defined and used in the future without causing any incompatibilities.

A message 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.

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The first stands for the transmission direction:

- towing to towed vehicle: 1
- towed to towing vehicle: 2

The second is the message number.

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 lowest 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 lowest transmission repetition time, shall be sent continuously.

For PDU 1 type and PDU 2 type messages, see Tables 9 and 10.

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 RGE 11 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 EBS 11 and EBS 21 are to be transmitted only between two directly coupled vehicles for optimal brake control between these two units. Since EBS 21 also contains information that is relevant to the commercial vehicle (warning information to the driver) this information is also mapped into the message EBS 22.

Table 9 — PDU 1 type messages

Repetition time	Data specification	P	R	DP	PF	PS	PGN	Remarks
< 100 ms	Electronic brake #1/1 - EBS 11	3	0	0	2	DA	000200 ₁₆	
< 100 ms	Electronic brake #2/1 - EBS 21	3	0	0	3	DA	000300 ₁₆	
≥ 100 ms	Running gear #1/1 - RGE 11	6	0	0	228	DA	00E400 ₁₆	
≥ 100 ms	Running gear #2/1 - RGE 21	6	0	0	229	DA	00E500 ₁₆	

Table 10 — PDU 2 type messages

Repetition time	Data specification	P	R	DP	PF	PS (GE)	PGN	Remarks
≥ 100 ms	Electronic brake #1/2 - EBS 12	6	0	0	254	201	00FEC9 ₁₆	
≥ 100 ms	Electronic brake #2/2 - EBS 22	6	0	0	254	196	00FEC4 ₁₆	
≥ 100 ms	Electronic brake #2/3 - EBS 23	6	0	0	254	198	00FEC6 ₁₆	
≥ 1000 ms	Electronic brake #2/4 - EBS 24	6	0	0	253	154	00FD9A ₁₆	Added in this amendment
≥ 50 ms	Electronic brake #2/5 - EBS 25	6	0	0	240	32	00F020 ₁₆	Added in this amendment
≥ 10 ms	Electronic brake #2/6 - EBS 26	3	0	0	240	31	00F01F ₁₆	Added in this amendment
≥ 100 ms	Running gear #2/2 - RGE 22	6	0	0	254	92	00FE5C ₁₆	
≥ 1000 ms	Running gear #2/3 - RGE 23	6	0	0	254	94	00FE5E ₁₆	
≥ 1000 ms	Time/Date #1/1 - TD 11	6	0	0	254	230	00FEE6 ₁₆	Added in this amendment

Table 11 defines the messages to be used for diagnostic purposes. The implementation of the diagnostic services is specified in ISO 11992-4.

Table 11 — Diagnostic messages

Repetition time	Data specification	P	R	DP	PF	PS (GE)	PGN	Remarks
≥ 100 ms	Diagnostic Channel, physical addressing	7	0	0	206	DA	00CE00 ₁₆	Added in this amendment
≥ 100 ms	Diagnostic Channel, functional addressing	7	0	0	205	DA	00CD00 ₁₆	Added in this amendment

6.5.2 Message specifications, transmission direction from towing to towed vehicle

6.5.2.1 Towing vehicle message, electronic brake system #1/1, EBS 11

This message is specified as the standard initialization message for address assignment of the receiving vehicle. Sending of this message is required.

Transmission repetition time:	10 ms ± 1 ms
Data length:	8 bytes
Data page:	0
PDU format:	2
PDU specific:	address of the successor
Default priority:	3

Byte	1	Towing vehicle system status 1	Bits	1 to 2	Vehicle ABS active/passive	
			Bits	3 to 4	Vehicle retarder control active/passive	
			Bits	5 to 6	ASR brake control active/passive	
			Bits	7 to 8	ASR engine control active/passive	
Byte	2	Towing vehicle system status 2	Bits	1 to 2	Brake light switch	
			Bits	3 to 4	Vehicle type	
			Bits	5 to 6	VDC active	Added
			Bits	7 to 8	Not defined	
Bytes	3 to 4	Service brake demand value				
Byte	5	Park brake demand value				
Byte	6	Retarder demand value				
Byte	7	Relative brake demand value for front or left vehicle side				Added
Byte	8	Relative brake demand value for rear or right vehicle side				Added

6.5.2.2 Towing vehicle message, electronic brake system #1/2, EBS 12

Sending of this message is required.

Transmission repetition time:	100 ms ± 10 ms
Data length:	8 bytes
Data page:	0
PDU format:	254
PDU specific:	201
Default priority:	6

Byte	1	Towing vehicle system status 3	Bits	1 to 2	Vehicle retarder control active/passive	
			Bits	3 to 4	ROP system enabled/disabled	Added
			Bits	5 to 6	YC system enabled/disabled	Added
			Bits	7 to 8	Not defined	
Byte	2	Towing vehicle system status 4	Bits	1 to 2	Enable/disable trailer ROP system	Added
			Bits	3 to 4	Enable/disable trailer YC system	Added
			Bits	5 to 8	Not defined	
Byte	3	Towing vehicle recognition 1	Bits	1 to 2	Two electrical circuits brake demand value	
			Bits	3 to 4	ABS off-road request	
			Bits	5 to 6	Pneumatic control line	
			Bits	7 to 8	Not defined	
Byte	4	Towing vehicle recognition 2			Not defined	
Bytes	5 to 6	Road curvature				
Bytes	7 to 8	Wheel based vehicle speed				Added

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6.5.2.3 Towing vehicle message, running gear equipment #1/1, RGE 11

Transmission repetition time: 100 ms ± 10 ms

Data length: 8 bytes

Data page: 0

PDU format: 228

PDU specific: Destination address

Default priority: 6

Byte 1	Towing vehicle running gear functions 1	Bits 1 to 2	Ride height request
		Bits 3 to 4	Level change request, front axle
		Bits 5 to 6	Level change request, rear axle
		Bits 7 to 8	Traction help request
Byte 2	Towing vehicle running gear functions 2	Bits 1 to 2	Lift axle 1 position request
		Bits 3 to 4	Lift axle 2 position request
		Bits 5 to 6	Steering axle locking request
		Bits 7 to 8	Ramp level request
Byte 3	Towing vehicle running gear functions 3	Bits 1 to 2	Level control request
		Bits 3 to 4	Ramp level storage request
		Bits 5 to 6	Stop level change request
		Bits 7 to 8	Not defined
Bytes 4 to 5	Driven axle load		
Byte 6	Parking and trailer air pressure		
Byte 7	Auxiliary equipment supply pressure		
Byte 8	Not defined		

6.5.2.4 Towing vehicle message, Time/Date #1/1, TD 11

Transmission repetition time: 1000 ms ± 100 ms

Data length: 8 bytes

Data page: 0

PDU format: 254

PDU specific: 230

Default priority: 6

Byte	1	Seconds	Added
Byte	2	Minutes	Added
Byte	3	Hours	Added
Byte	4	Month	Added
Byte	5	Day	Added
Byte	6	Year	Added
Byte	7	Local Minute Offset	Added
Byte	8	Local Hour Offset	Added

6.5.3 Message specifications, transmission direction from towed to towing vehicle

6.5.3.1 Towed vehicle message, electronic brake system #2/1, EBS 21

Sending this message is required.

Transmission repetition time: 10 ms ± 1 ms
 Data length: 8 bytes
 Data page: 0
 PDU format: 3
 PDU specific: Address of the predecessor
 Default priority: 3

Byte	1	Towed vehicle system status 1	Bits	1 to 2	Vehicle ABS active/passive	
			Bits	3 to 4	Vehicle retarder control active/passive	
			Bits	5 to 6	Vehicle service brake active/passive	
			Bits	7 to 8	Automatic towed vehicle braking active/passive	
Byte	2	Towed vehicle system status 2	Bits	1 to 2	VDC active	
			Bits	3 to 4	Support of side or axle wise brake force distribution	Added
			Bits	5 to 8	Not defined	
Bytes	3 to 4	Wheel based vehicle speed				
Byte	5	Actual percentage of retarder peak torque				
Bytes	6 to 7	Wheel speed difference main axle				
Byte	8	Lateral acceleration			Added	

6.5.3.2 Towed vehicle message, electronic brake system #2/2, EBS 22

Sending this message is required.

Transmission repetition time: 100 ms ± 10 ms
 Data length: 8 bytes
 Data page: 0
 PDU format: 254
 PDU specific: 196
 Default priority: 6

Byte 1	Towed vehicle system status 1 (Warning information to the commercial vehicle).	Bits 1 to 2	Vehicle ABS active/passive	
		Bits 3 to 4	Vehicle retarder control active/passive	
		Bits 5 to 6	Vehicle service brake active/passive	
		Bits 7 to 8	Automatic towed vehicle braking active/passive	
Byte 2	Towed vehicle status 3	Bits 1 to 2	Vehicle electrical supply sufficient/insufficient	
		Bits 3 to 4	Red warning signal request	
		Bits 5 to 6	Amber warning signal request	
		Bits 7 to 8	Electrical supply of non-braking systems	
Byte 3	Towed vehicle recognition 1	Bits 1 to 2	Spring brake installed	
		Bits 3 to 4	Electric load proportional function	
		Bits 5 to 6	Vehicle type	
		Bits 7 to 8	Spring brake engaged	
Byte 4	Towed vehicle status 4	Bits 1 to 2	Loading ramp approach assistance	
		Bits 3 to 4	Supply line braking request	
		Bits 5 to 6	Stop lamps request	Added
		Bits 7 to 8	Braking via electric control line supported	Added
Bytes 5 to 6	Axle load sum			
Bytes 7 to 8	Reference retarder torque			

6.5.3.3 Towed vehicle message, electronic brake system #2/3, EBS 23

Sending this message is required.

Transmission repetition time:	100 ms ± 10 ms
Data length:	8 bytes
Data page:	0
PDU format:	254
PDU specific:	198
Default priority:	6

Byte 1	Towed vehicle system status	Bits 1 to 2	Tyre pressure sufficient/insufficient
		Bits 3 to 4	Brake lining sufficient/insufficient
		Bits 5 to 6	Brake temperature status
		Bits 7 to 8	Vehicle pneumatic supply sufficient/insufficient
Byte 2	Tyre/wheel identification (pressure)		
Byte 3	Tyre/wheel identification (lining)		
Byte 4	Tyre/wheel identification (temperature)		
Byte 5	Tyre pressure		
Byte 6	Brake lining		
Byte 7	Brake temperature		
Byte 8	Pneumatic supply pressure		

NOTE All tyre related parameters shall be interpreted in conjunction with the corresponding tyre/wheel identification.

6.5.3.4 Towed vehicle message, electronic brake system #2/4, EBS 24

Transmission repetition time:	1000 ms ± 100 ms
Data length:	8 bytes
Data page:	0
PDU format:	253
PDU specific:	154
Default priority:	6

Byte 1	Geometric data index	Added
Byte 2	Geometric data indexed content	Added
Bytes 3 to 8	Not defined	

6.5.3.5 Towed vehicle message, electronic brake system #2/5, EBS 25

Sending this message is required.

Transmission repetition time:	50 ms ± 5 ms
Data length:	8 bytes
Data page:	0
PDU format:	254
PDU specific:	173
Default priority:	6

Byte	1	Brake cylinder pressure first axle, left wheel			Added
Byte	2	Brake cylinder pressure first axle, right wheel			Added
Byte	3	Brake cylinder pressure second axle, left wheel			Added
Byte	4	Brake cylinder pressure second axle, right wheel			Added
Byte	5	Brake cylinder pressure third axle, left wheel			Added
Byte	6	Brake cylinder pressure third axle, right wheel			Added
Byte	7	Towed vehicle status 5	Bits 1 to 2	ROP system enabled/disabled	Added
			Bits 3 to 4	YC system enabled/disabled	Added
			Bits 5 to 8	Not defined	
Byte	8	Not defined			

6.5.3.6 Towed vehicle message, electronic brake system #2/6, EBS 26

Transmission repetition time:	10 ms ± 1 ms
Data length:	8 bytes
Data page:	0
PDU format:	254
PDU specific:	110
Default priority:	3

Bytes	1 to 2	Wheel speed first axle, left wheel		Added
Bytes	3 to 4	Wheel speed first axle, right wheel		Added
Bytes	5 to 8	Not defined		

6.5.3.7 Towed vehicle message, running gear equipment #2/1, RGE 21

Transmission repetition time: 100 ms ± 10 ms
 Data length: 8 bytes
 Data page: 0
 PDU format: 229
 PDU specific: Address of the commercial vehicle
 Default priority: 6

Byte 1	Towed vehicle running gear function 1	Bits 1 to 2	Levelling control system, ride height level
		Bits 3 to 4	Level control
		Bits 5 to 6	Traction help
		Bits 7 to 8	Ramp level position
Byte 2	Towed vehicle running gear function 2	Bits 1 to 2	Lift axle 1 position
		Bits 3 to 4	Lift axle 2 position
		Bits 5 to 6	Steering axle locking
		Bits 7 to 8	Not defined
Byte 3	Towed vehicle running gear function 3	Bits 1 to 2	Not defined
		Bits 3 to 4	Ramp level storage
		Bits 5 to 6	Level change, front axle
		Bits 7 to 8	Level change, rear axle
Byte 4	Towed vehicle running gear function 4	Bits 1 to 2	Stop level change acknowledge
		Bits 3 to 4	Normal level
		Bits 5 to 6	Ramp level
		Bits 7 to 8	Not defined
Bytes 5 to 6	Nominal vehicle body level, front axle		
Bytes 7 to 8	Nominal vehicle body level, rear axle		

6.5.3.8 Towed vehicle message, running gear equipment #2/2, RGE 22

Transmission repetition time: 100 ms ± 10 ms
 Data length: 8 bytes
 Data page: 0
 PDU format: 254
 PDU specific: 92
 Default priority: 6

Bytes	1 to 2	Relative vehicle body level, front axle	
Bytes	3 to 4	Relative vehicle body level, rear axle	
Byte	5	Tyre/Wheel identification	Added
Bytes	6 to 7	Axle load	Added
Byte	8	Not defined	

NOTE The parameter "Axle load" shall be interpreted in conjunction with the tyre/wheel identification.

6.5.3.9 Towed vehicle message, running gear equipment #2/3, RGE 23

This message shall transmit the parameters alternating for all tyres.

Transmission repetition time:	1 000 ms ± 100 ms
Data length:	8 bytes
Data page:	0
PDU format:	254
PDU specific:	94
Default priority:	6

Byte	1	Tyre/wheel identification		
Bytes	2 to 3	Tyre temperature		
Bytes	4 to 5	Air leakage detection		
Byte	6	Towed vehicle running gear function 5	Bits	1 to 3 Tyre pressure threshold detection
			Bits	4 to 5 Tyre module power supply
			Bits	6 to 8 Not defined
Bytes	7 to 8	Not defined		

NOTE All tyre related parameters are interpreted in conjunction with the corresponding tyre/wheel identification.

page 37, Figure 11

Renumber the existing Figure 11 as "Figure 12".

page 38, Figure 12

Renumber the existing Figure 12 as "Figure 13".

Insert the following new annex between Annex A and the Bibliography.

Annex B (informative) Message flow

The flow of messages as defined in this part of ISO 11992 is described in Table B.1.

Table B.1 — Description of message flow

	Tractor		Trailer #1		Trailer #2		Trailer #3		Trailer #4		Trailer #5		
Address	20		C8		C0		B8		B0		A8	Identifier	Comment
EBS 11 10 ms	S ^a	→	R ^b	→	R	→	R	→	R	→	R	0C 02 C8 20 0C 02 C0 C8 0C 02 B8 C0 0C 02 B0 B8 0C 02 A8 B0	only sent between directly coupled vehicles
EBS 12 100 ms	S	→	R/G ^c	→	R/G	→	R/G	→	R/G	→	R	18 FE C9 20 18 FE C9 C8 18 FE C9 C0 18 FE C9 B8 18 FE C9 B0	

Table B.1 (continued)

	Tractor		Trailer #1		Trailer #2		Trailer #3		Trailer #4		Trailer #5			
Address	20		C8		C0		B8		B0		A8	Identifier	Comment	
RGE 11 100 ms	S	→	R									18 E4 C8 20		
	S	→	G	→	R							18 E4 C0 20		
	S	→	G	→	G	→	R					18 E4 B8 20		
	S	→	G	→	G	→	G	→	R			18 E4 B0 20		
	S	→	G	→	G	→	G	→	G	→	R	18 E4 A8 20		
			S	→	R								18 E4 C0 C8	
			S	→	G	→	R						18 E4 B8 C8	
			S	→	G	→	G	→	R				18 E4 B0 C8	
			S	→	G	→	G	→	G	→	R		18 E4 A8 C8	
					S	→	R						18 E4 B8 C0	
					S	→	G	→	R				18 E4 B0 C0	
					S	→	G	→	G	→	R		18 E4 A8 C0	
							S	→	R				18 E4 B0 B8	
							S	→	G	→	R		18 E4 A8 B8	
								S	→	R		18 E4 A8 B0		
	S	→	R/G	→	R/G	→	R/G	→	R/G	→	R	18 E4 FF 20		
			S	→	R/G	→	R/G	→	R/G	→	R	18 E4 FF C8	to be sent to global, but RGE11 direction only from towing to towed vehicle	
					S	→	R/G	→	R/G	→	R	18 E4 FF C0		
							S	→	R/G	→	R	18 E4 FF B8		
									S	→	R	18 E4 FF B0		
TD 11 1 000 ms	S	→	R/G	→	R/G	→	R/G	→	R/G	→	R	18 FE E6 20		
EBS 21 10 ms	R	←	S									0C 03 20 C8	only sent between directly coupled vehicles	
			R	←	S							0C 03 C8 C0		
					R	←	S					0C 03 C0 B8		
							R	←	S			0C 03 B8 B0		
EBS 22 100 ms												0C 03 B0 A8		
	R	←	S									18 FE C4 C8		
	R	←	G/R	←	S							18 FE C4 C0		
	R	←	G/R	←	G/R	←	S					18 FE C4 B8		
	R	←	G/R	←	G/R	←	G/R	←	S			18 FE C4 B0		
												18 FE C4 A8		
EBS 23 100 ms	R	←	S									18 FE C6 C8		
	R	←	G/R	←	S							18 FE C6 C0		
	R	←	G/R	←	G/R	←	S					18 FE C6 B8		
	R	←	G/R	←	G/R	←	G/R	←	S			18 FE C6 B0		
	R	←	G/R	←	G/R	←	G/R	←	G/R	←	S	18 FE C6 A8		

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Table B.1 (continued)

	Tractor		Trailer #1		Trailer #2		Trailer #3		Trailer #4		Trailer #5		
Address	20		C8		C0		B8		B0		A8	Identifier	Comment
EBS 24 1 000 ms	R	←	S									18 FD 9A C8	
	R	←	G/R	←	S							18 FD 9A C0	
	R	←	G/R	←	G/R	←	S					18 FD 9A B8	
	R	←	G/R	←	G/R	←	G/R	←	S			18 FD 9A B0	
	R	←	G/R	←	G/R	←	G/R	←	G/R	←	S	18 FD 9A A8	
EBS 25 50 ms	R	←	S									18 F0 20 C8	
	R	←	G/R	←	S							18 F0 20 C0	
	R	←	G/R	←	G/R	←	S					18 F0 20 B8	
	R	←	G/R	←	G/R	←	G/R	←	S			18 F0 20 B0	
	R	←	G/R	←	G/R	←	G/R	←	G/R	←	S	18 F0 20 A8	
EBS 26 10 ms	R	←	S									0C F0 1F C8	
	R	←	G/R	←	S							0C F0 1F C0	
	R	←	G/R	←	G/R	←	S					0C F0 1F B8	
	R	←	G/R	←	G/R	←	G/R	←	S			0C F0 1F B0	
	R	←	G/R	←	G/R	←	G/R	←	G/R	←	S	0C F0 1F A8	
RGE 21 100 ms	R	←	S									18 E5 20 C8	
	R	←	G	←	S							18 E5 20 C0	
	R	←	G	←	G	←	S					18 E5 20 B8	
	R	←	G	←	G	←	G	←	S			18 E5 20 B0	
	R	←	G	←	G	←	G	←	G	←	S	18 E5 20 A8	
RGE 22 100 ms	R	←	S									18 FE 5C C8	
	R	←	G/R	←	S							18 FE 5C C0	
	R	←	G/R	←	G/R	←	S					18 FE 5C B8	
	R	←	G/R	←	G/R	←	G/R	←	S			18 FE 5C B0	
	R	←	G/R	←	G/R	←	G/R	←	G/R	←	S	18 FE 5C A8	
RGE 23 1 000 ms	R	←	S									18 FE 5E C8	
	R	←	G/R	←	S							18 FE 5E C0	
	R	←	G/R	←	G/R	←	S					18 FE 5E B8	
	R	←	G/R	←	G/R	←	G/R	←	S			18 FE 5E B0	
	R	←	G/R	←	G/R	←	G/R	←	G/R	←	S	18 FE 5E A8	

^a S = sender.
^b R = receiver.
^c G = gateway (forwards messages).

Page 41, Bibliography

Add the following to the list of bibliographical references.

- [2] ISO 7638 (all parts), *Road vehicles — Connectors for the electrical connection of towing and towed vehicles*
- [3] ISO 11992-4, *Road vehicles — Interchange of digital information on electrical connections between towing and towed vehicles — Part 4: Diagnostics*

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