

Introduction

External CAN bus

The CAN bus that connects to the CAN interface for bodywork equipment is called the external CAN bus below.

CAN interface

The interface with the bodywork consists of a number of connectors which have been prepared with signals and functions. In vehicles equipped with the optional preparation bodywork control unit (BWS), this interface includes a CAN connection for bodywork equipment, connector C259, pins 20 and 21.

More information on connections is found under Connections.

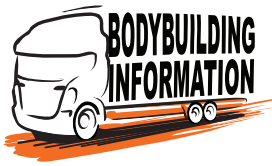
Bodywork control unit BWS

The bodywork control unit transmits CAN messages from the internal CAN network of the vehicle to the CAN interface for forwarding to the CAN network of the bodywork equipment. The bodywork control unit receives a number of defined messages used to activate bodywork functions in the vehicle from the bodywork equipment CAN network.

The protocol used is based on SAE J1939.

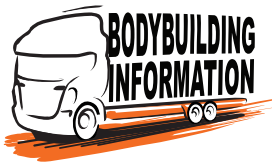
- A summary of the available CAN messages in the external CAN bus is contained under the heading Summary of CAN messages. This also lists the vehicles (chassis serial numbers) for which the various messages are applicable.
- Detailed information about each CAN message is contained under the heading Detailed description of CAN messages.
- Detailed requirements for CAN communication with the bodywork control unit in the external CAN bus are contained under the heading Requirements for CAN communication with the vehicle.

Abbreviation	Designation
ABS	Anti-lock Brake System
AICC	Adaptive Cruise Control
APS	Air Processing System
BAM	Broadcast Announce Message
BMS	Brake Management System
BWS	Body Work System
CAN	Controller Area Network
COO	Coordinator
CUV	Control Unit Visibility
EEC	Electronic Engine Control
ECU	Electronic Control Unit
EMS	Engine Management System
EOBD	Emission related On-Board Diagnostic
GMS	Gearbox Management System
HPI	High Pressure Injection
ICL	Instrument Cluster System
LAS	Locking and Alarm System
LHD	Left Hand Drive
OBD	On-Board Diagnostic
PGN	Parameter Group Number
PTO	Power Take-Off
RET	Retarder
SMS	Suspension Management System
TCO	Tachograph
TP.CM	Transport Protocol Connection Management



CAN interface for bodywork

Abbreviation	Designation
TP.DT	Transport Protocol Data Transfer
RTI	Road Transport Informatics System
RHD	Right Hand Drive
VIS	Visibility System



Summary of CAN messages

Explanation

The following is a summary of the messages which the CAN interface for the bodywork equipment supports, including the date of their introduction.

In addition to the PGNs specified in SAE J1939-71 (Vehicle Application Layer), there are a number of PGNs specified by Scania.

The last two characters in the identifier indicate which control unit sends the message. See the Source addresses table.

CAN messages sent to the vehicle

The bodywork control unit receives the CAN messages on the external CAN bus. These messages are used to activate bodywork functions in the vehicle.

Vehicle production period

Production site	Chassis serial number
	2005-10-21 -
Södertälje	2 011 987 -
Zwolle	5 133 666 -
Angers	9 104 286 -

Message to vehicle	Identifier (Hex)	Source address	Specification
Scania Bodywork Control Message 1	0C ^a FF F8 XX ^b	X	Scania
Scania Bodywork Control Message 2	0C ^a FF F9 XX ^b	X	Scania

a. Recommended values may vary depending on the bodybuilder's own prioritisation on the external CAN bus.

b. Optional according to the SAE J1939 standard, but do not use the address 2E (Hex), which is the source address for the bodywork control unit.

The following CAN messages can be received by vehicles manufactured from October 2008 onwards:

Message to vehicle	Identifier (Hex)	Source address	Specification
Scania Bodywork Control Message 3	0C ^a FF E6 XX ^b	XX	Scania

a. Recommended values may vary depending on the bodybuilder's own prioritisation on the external CAN bus.

b. Optional according to the SAE J1939 standard, but do not use the address 2E (Hex), which is the source address for the bodywork control unit.

CAN message sent from the vehicle

The bodywork control unit sends the Software Identification message to the external CAN bus to identify the CAN interface version. It is important to identify the version which is applicable to the vehicle in order to interpret the CAN messages which are sent from the vehicle and to know which commands can be sent to the vehicle.

Vehicle production period

Production site	Chassis serial number
	2005-10-21 -
Södertälje	2 011 987 -
Zwolle	5 133 666 -
Angers	9 104 286 -

Message to vehicle	Identifier (Hex)	Source address	Specification
Software identification	18 FE DA 2E	BWS	SAE J1939-71

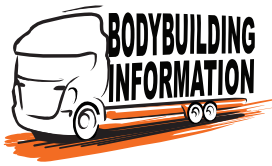
Vehicle production period

Production site	Chassis serial number
	2005-01-21 -
Södertälje	2 006 429 -
Zwolle	5 117 958 -
Angers	9 097 244 -

Message to vehicle	Identifier (Hex)	Source address	Specification	Remarks
EEC1	0C F0 04 00	EMS	SAE J1939-71	
EEC2	0C F0 03 00	EMS	SAE J1939-71	
Engine Temperature	18 FE EE 00	EMS	SAE J1939-71	
Engine Hours, Revolutions	18 FE E5 00	EMS	SAE J1939-71	

Message to vehicle	Identifier (Hex)	Source address	Specification	Remarks
Fuel Consumption	18 FE E9 00	EMS	SAE J1939-71	
Fuel Economy	18 FE F2 00	EMS	SAE J1939-71	
CC/Vehicle speed	18 FE F1 00	EMS	SAE J1939-71	
Inlet/Exhaust cond.	18 FE F6 00	EMS	SAE J1939-71	
BAM-E	18 EC FF 00	EMS	SAE J1939-71	
Engine Configuration Messages	18 EB FF 00	EMS	SAE J1939-71	
ETC1	0C F0 02 03		SAE J1939-71	Only sent if the vehicle has Opticruise or an Allison automatic gearbox
ETC2	18 F0 05 03		SAE J1939-71	
Transmission fluid	18 FE F8 03		SAE J1939-71	Only sent if the vehicle has an Allison gearbox

Message to vehicle	Identifier (Hex)	Source address	Specification	Remarks
ERC1-RD	18 F0 00 10	RET	SAE J1939-71	Only sent if the vehicle has a Retarder or an Allison automatic gearbox
EAC1-K	18 F0 06 27	COO	SAE J1939-71	
Ambient Conditions	18 FE F5 27	COO	SAE J1939-71	
Dash Display	18 FE FC 27	COO	SAE J1939-71	
Engine Fluid Level/Pressure	18 FE EF 27	COO	SAE J1939-71	
Supply Pressure	18 FE AE 30	APS	SAE J1939-71	
Vehicle Weight	18 FE EA 2F	SMS	SAE J1939-71	Only sent if the vehicle has SMS and is equipped with pressure sensors in the bellows
TCO1	0C FE 6C EE	TCO	SAE J1939-71	
High Resolution Vehicle Distance	18 FE C1 EE	TCO	SAE J1939-71	
Illumination	18 D0 FF 17	ICL	SAE J1939-71	
Time/Date	18 FE E6 17	ICL	SAE J1939-71	



CAN interface for bodywork

Message to vehicle	Identifier (Hex)	Source address	Specification	Remarks
EBC1	18 F0 01 0B	BMS	SAE J1939-71	
EBC4 Wheel Brake Lining Remaining	1C FE AC 0B	BMS	SAE J1939-71	Only sent if the vehicle has EBS
DM1	18 FE CA XX ^a	Varies	SAE J1939-73	

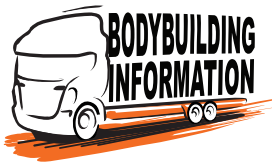
a. XX (Hex) varies depending on which control unit sends the message.

The CAN messages can be sent by vehicles with the following chassis serial numbers, see following table:

Vehicle production period

Production site	Chassis serial number
	2005-10-21 -
Södertälje	2 011 987 -
Zwolle	5 133 666 -
Angers	9 104 286 -

Message to vehicle	Identifier (Hex)	Source address	Specification	Remarks
DLN2-Proprietary	0C FF 81 00	EMS	Scania	
Transmission Proprietary 2	18 FF A1 03	GMS	Scania	Only sent if the vehicle has Opticruise or a manual gearbox
Retarder fluids	18 FE FB 10	GMS	SAE J1939-71	Only sent if the vehicle has an Allison gearbox
Transmission Proprietary/DLN5	18 FF A0 27	COO	Scania	
Coordinator General Information	0C FF B0 27	COO	Scania	
Coordinator General Information2	0C FF AF 27	COO	Scania	
PTO information	18 FF 90 27	COO	Scania	Only sent if the vehicle has a power take-off
CUV information	18 FF B1 1E	VIS	Scania	
Alarm status proprietary	18 FF B4 1D	LAS	Scania	Only sent if the vehicle has an alarm system (LAS)



CAN interface for bodywork

The CAN messages can be sent by vehicles with the following chassis serial numbers, see following table:

Vehicle production period

Production site	Chassis serial number
	2007-02-28 -
Södertälje	2 024 649 -
Zwolle	5 169 578 -
Angers	9 118 703 -

Message to vehicle	Identifier (Hex)	Source address	Specification	Remarks
Scania bodywork status message1	0C FF E8 2E	BWS	Scania	
ETC7	18 FE 4A 03	GMS	SAE J1939-71	Only sent if the vehicle has an Allison gear-box

The following CAN messages can be sent by vehicles manufactured from September 2008 onwards:

Message to vehicle	Identifier (Hex)	Source address	Specification	Remarks
Air supply pressure	18 FE AE 30	APS	SAE J1939-71	
Air suspension control 1	0C FE 5A 27	COO	SAE J1939-71	
Cab information proprietary 1	18 FF 96 17	ICL	Scania	
Crash occurred	18 FF FD 64	CSS	Scania	
DLN5	18 FF A0 27	COO	Scania	
DLN8	18 FF 88 00	EMS	Scania	
EBC2 Wheel speed proprietary	0C FF 19 0B	BMS	Scania	
EBC5	18 FD C4 0B	BMS	SAE J1939-71	
ETC1 - CV	0C F0 02 43	GMS	SAE J1939-71	ZF torque converter
Engine Configuration Messages	18 EC FF 00	EMS	SAE J1939-71	
Transmission Control 1	0C 01 FF 05	COO	SAE J1939-71	
Transmission Proprietary 2 - AWD	18 FF A1 04	AWD	Scania	AWD equipped
Transport Protocol - ConnectionManagement	18 EC FF 00	EMS	SAE J1939-71	
Transport Protocol - Data Transfer	18 EB FF 00	EMS	SAE J1939-71	
Vehicle Weight - ICL	18 FE EA 17	ICL	SAE J1939-71	

Detailed description of CAN messages

Explanation

The following tables use the concepts below.

For the content of messages with PGNs specified in SAE J1939:

- Not defined (not defined in SAE J1939)
- Not used (defined in SAE J1939, but not used by Scania)

For the content of messages with PGNs specified by Scania:

- Not defined (not defined by Scania)

CAN messages sent to the vehicle

Scania Bodywork Control Message 1

Identifier: 0C FF F8 XX

Transmission interval: 50 ms

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Message configuration version	01h		0 to 250	
2	1	2	Engine control mode				
			Engine speed control disabled	00			C
			Engine speed control 1	01			
			Engine speed control 2	10			
			Not available or not installed	11			
	3..4		Not defined				
	5	2	Requested governor				
			Normal governor	00			
			Stiff governor	01			
			Error indicator	10			
			Not available or not installed	11			
	7	2	Accelerator pedal disable				
			Accelerator pedal not disabled	00			
			Accelerator pedal disabled	01			
			Error indicator	10			
			Not available	11			
3	1	6	Requested engine speed		0.125 r/min	0 to 8 031.875 r/min	B
			Error indicator	FExxh			
			Not available	FExxh			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
5			Not defined				
6	1	2	Retardate				A
			Retardation not requested	00			
			Retardation requested	01			
			Error indicator	10			
			Not available or not installed	11			
	3	2	Accelerate				A
			"Accelerate" not requested	00			
			"Accelerate" requested	01			
			Error indicator	10			
			Not available or not installed	11			
	5	2	Resume				A
			"Resume" not requested	00			
			"Resume" requested	01			
			Error indicator	10			
			Not available or not installed	11			
	7..8		Not defined				
7..8			Not defined				

A: Active when Engine Speed Control 1 is selected.

B: Active when Engine Speed Control 2 is selected.

C: For version 1 of the external CAN interface Engine control mode must be set to 00b in a number of samples when switching between Engine Speed Control 1 and 2. It is not necessary from version 2 onwards.

Scania Bodywork Control Message 2

Identifier: 0C FF F9 XX

Transmission interval: 100 ms

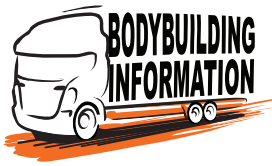
Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Message configuration version	02h		0 to 250	A
2	1	2	Increased idle speed switch 1 (ISSW1)				B
			ISSW1 not demanded	00			
			ISSW1 demanded	01			
			Error indicator	10			
			Not available or not installed	11			
	3	2	Increased idle speed switch 2 (ISSW2)				C
			ISSW2 not demanded	00			
			ISSW2 demanded	01			
			Error indicator	10			
			Not available or not installed	11			
	5..8		Not defined				
3	1	2	Second vehicle speed limiter				
			Speed limit not requested	00			
			Speed limit requested	01			
			Error indicator	10			
			Not available or not installed	11			
	3..4		Not defined				
	5	2	Torque limit 1				
			Torque limit 1 not requested	00			
			Torque limit 1 requested	01			
			Error indicator	10			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Not available or not installed	11			
	7	2	Torque limit 2				
			Torque limit 2 not requested	00			
			Torque limit 2 requested	01			
			Error indicator	10			
			Not available or not installed	11			
4	1	2	Engine start				
			Engine start not requested	00			
			Engine start requested	01			
			Error indicator	10			
			Not available or not installed	11			
			Not defined				
	3..4		Monitored engine stop				
	5	2	Monitored engine stop not requested	00			
			Monitored engine stop requested	01			
			Error indicator	10			
			Not available or not installed	11			
	7..8		Not defined				
5	1	2	PTO1/external equipment 1 activation				
			External equipment 1 not requested	00			
			External equipment 1 requested	01			
			Error indicator	10			
			Not available or not installed	11			
	3	2	PTO2/external equipment 2 activation				
			External equipment 2 not requested	00			
			External equipment 2 requested	01			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Error indicator	10			
			Not available or not installed	11			
	5	2	PTO3/external equipment 3 activation				
			External equipment 3 not requested	00			
			External equipment 3 requested	01			
			Error indicator	10			
			Not available or not installed	11			
	7..8		Not defined				
6	1	2	Horn activation				
			Horn not requested	00			
			Horn requested	01			
			Error indicator	10			
			Not available or not installed	11			
	3	2	Main beam activation				
			Main beam not requested	00			
			Main beam requested	01			
			Error indicator	10			
			Not available or not installed	11			
	5	2	Hazard lamp activation				
			Hazard lamp not requested	00			
			Hazard lamp requested	01			
			Main beam requested	10			
			Not available or not installed	11			
	7	2	Buzzer activation				
			Buzzer not requested	00			
			Buzzer requested	01			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Main beam requested	10			
			Not available or not installed	11			
			Wiper activation				
7	1	2	Wiper not requested	00			
			Wiper requested	01			
			Main beam requested	10			
			Not available or not installed	11			
	3	2	Work light control				D
			Work light off requested	00			
			Work light on requested	01			
			Error indicator	10			
			Not available or not installed	11			
	5	2	Constant engine speed limit request				E
			Engine speed limit not requested	00			
			Engine speed limit requested	01			
			Reserved	10			
			Take no action	11			
	7	2	Automatic neutral request			0 - 3	F
			Automatic neutral not requested	00			
			Automatic neutral requested	01			
			Reserved	10			
			Not available	11			
8			Not defined				

A: Enter the correct version of the message here.



CAN interface for bodywork

B: Used to activate the Limited hand throttle and Pre-defined (locked) engine speed functions.

C: Used to activate the Raised idling speed and Pre-defined (locked) engine speed functions.

D: Only applicable if the CAN interface version is 2 or higher. Version number can be read from the CAN message Software Identification. Note: Byte 1, Message Configuration Version, must be set to 02h so that the control unit can interpret the Work light control command.

E: Only applicable if the CAN interface version is 3 or higher.

F: Only applicable if the CAN interface version is 4 or higher.

Scania Bodywork Control Message 3

Identifier: 0C FF E6 XX

Transmission interval: 100 ms

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Message configuration version	01h	1	0 to 250	A
2	1	2	Driver information request 1		1		B
			Driver information not requested	00			
			Driver information requested	01			
			Error indicator	10			
			Not available or not installed	11			
	3	2	Driver information request 2		1		B
			Driver information not requested	00			
			Driver information requested	01			
			Error indicator	10			
			Not available or not installed	11			
	5	2	Driver information request 3		1		B
			Driver information not requested	00			
			Driver information requested	01			
			Error indicator	10			
			Not available or not installed	11			
	7	2	Driver information request 4				B
			Driver information not requested	00			
			Driver information requested	01			
			Error indicator	10			
			Not available or not installed	11			
3	1	2	Driver information request 5		1		B

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Driver information not requested	00			
			Driver information requested	01			
			Error indicator	10			
			Not available or not installed	11			
	3	2	Driver information request 6		1		B
			Driver information not requested	00			
			Driver information requested	01			
			Error indicator	10			
			Not available or not installed	11			
	5	2	Driver information request 7		1		B
			Driver information not requested	00			
			Driver information requested	01			
			Error indicator	10			
			Not available or not installed	11			
	7	2	Driver information request 8				B
			Driver information not requested	00			
			Driver information requested	01			
			Error indicator	10			
			Not available or not installed	11			
4	2	2	Driver information request 9		1		B
			Driver information not requested	00			
			Driver information requested	01			
			Error indicator	10			
			Not available or not installed	11			
	3	2	Driver information request 10		1		B
			Driver information not requested	00			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Driver information requested	01			
			Error indicator	10			
			Not available or not installed	11			
5	1	16	Requested vehicle speed limit		0.00390625	0 - 250.996	C
			No request	0xFB00			
			Error indicator	0xFExx			
			Not available or not installed	0xFFxx			
7..8			Not defined				

A: Enter the correct version of the message here. This is version 1.

B: Signal which activates indicator lamps for bodywork functions or sound in the instrument cluster.

C: Part of UF 117 Third speed limiter.

CAN messages sent from the vehicle

Software identification

Identifier: 18 FE DA 2E

Transmission interval: 1,000 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Number of software identification fields	01h			A
			Error	FEh			
			Not available	FFh			
1	1	8	Software identification		ASCII		B
3	1	8	Delimiter	2 Ah			C
4..8			Not defined				

A: Only one identifier is used.

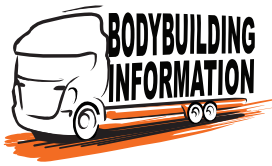
B: Note: The identifier only indicates, in ASCII format, the CAN interface version, not the software. Example: 31h=ASCII "1".

C: The message ends with the ASCII character for "*".

Chassis serial numbers for the different versions of the external CAN interface:

Vehicle production period for version 1:

Production site	Chassis serial number
	<i>2005-10-13 - 2007-02-27</i>
Södertälje	2 011 780 - 2 024 648
Zwolle	5 133 079 - 5 168 577
Angers	9 104 037 - 9 118 702



CAN interface for bodywork

Vehicle production period for version 2:

Production site	Chassis serial number
	<i>2007-02-28 -</i>
Södertälje	2 024 649 -
Zwolle	5 169 578 -
Angers	9 118 703 -

Scania bodywork status message 1

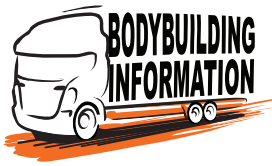
Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	2	EXT active				
			EXT not active	00			
			EXT active	01			
	3..8		Not defined				
2	1	3	Torque limiter				
			Torque limiter disabled	000			
			Torque limit 1	001			
			Torque limit 2	010			
			Torque limit 3	011			
			Not available or not installed	111			
3	1	2	Vehicle speed limiter				
			Vehicle speed limiter 1	00			
			Vehicle speed limiter 2	01			
	3..8		Not defined				
4..8			Not defined				

Air Supply Pressure

Identifier: 18 FE AE 30

Transmission interval: 1,000 ms

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Pneumatic supply pressure		8	0 to 2000 kPa	A
			Error indicator	FE			
			Not available	FF			
2	1	8	Parking and/or trailer air pressure		8	0 to 2000 kPa	
			Error indicator	FE			
			Not available	FF			
3	1	8	Service brake air pressure, circuit1		8	0 to 2000 kPa	
			Error indicator	FE			
			Not available	FF			
4	1	8	Service brake air pressure, circuit2		8	0 to 2000 kPa	B
			Error indicator	FE			
			Not available	FF			
5	1	8	Auxiliary equipment supply pressure		8	0 to 2000 kPa	
			Error indicator	FE			
			Not available	FF			
6	1	8	Air suspension supply pressure		8	0 to 2000 kPa	
			Error indicator	FE			
			Not available	FF			
7	1	2	Air compressor status		1		
			Compressor not active	00			
			Compressor active	01			
			Error	10			



CAN interface for bodywork

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Not available	11			

A: Only received for advanced APS.

B: Rear circuit.

Air Suspension Control 1

Identifier: 0C FE 5A 27

Transmission interval: 100 ms

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	4	Nominal level front axle			0 to 15	
			Level not specified	0000			
			Normal level 1	0001			
			Normal level 2	0010			
			Normal level 3	0011			
			Preset level	0100			
			Customer level	0101			
			Upper level	0110			
			Lower level	0111			
			Error	1110			
			Not available	1111			
	5	4	Nominal level rear axle			0 to 15	
			Level not specified	0000			
			Normal level 1	0001			
			Normal level 2	0010			
			Normal level 3	0011			
			Preset level	0100			
			Customer level	0101			
			Upper level	0110			
			Lower level	0111			
			Error	1110			
			Not available	1111			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note			
2	1	2	Below nominal level front axle			0 to 3				
			Not below	00						
			Below	01						
			Error	10						
			Not available	11						
			3	2	Below nominal level rear axle			0 to 3		
					Not below	00				
					Error	01				
Below	10									
			Not available	11						
			5	2	Above nominal level front axle			0 to 3		
					Not above	00				
					Above	01				
Error	10									
			Not available	11						
			7	2	Above nominal level rear axle			0 to 3		
					Not above	00				
					Above	01				
Error	10									
			Not available	11						
			3	1	2	Lowering control mode front axle			0 to 3	
						Lowering not active	00			
						Lowering active	01			
Error	10									
			Not available	11						
			3	2	Lowering control mode rear axle			0 to 3		

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Lowering not active	00			
			Lowering active	01			
			Error	10			
			Not available	11			
	5	2	Lifting control mode front axle			0 to 3	
			Lifting not active	00			
			Lifting active	01			
			Error	10			
			Not available	11			
	7	2	Lifting control mode rear axle			0 to 3	
			Lifting not active	00			
			Lifting active	01			
			Error	10			
			Not available	11			
4	1	4	Kneeling information			0 to 15	
			Kneeling not active	0000			
			Kneeling active	0001			
			Kneeling level reached	0010			
			Lifting active	0011			
			Kneeling aborted	0100			
			Error	1110			
			Not available	1111			
	5	4	Level control mode			0 to 15	
			Normal operation	0000			
			Traction help (Load transfer)	0001			
			Load fixing	0010			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Pressure ratio 1	0011			
			Pressure ratio 2	0100			
			Optimum traction 1	0101			
			Optimum traction 2	0110			
			Traction help (Reduce)	0111			
			Exhausting below function	1000			
			Air suspension control prohibited	1001			
			Error	1110			
			Not available	1111			
5	1	2	Security device			0 to 3	
			Not active	00			
			Active	01			
			Error	10			
			Not available	11			
	3	2	Vehicle motion inhibit			0 to 3	
			Vehicle may not be moved	00			
			Vehicle may be moved	01			
			Error	10			
			Not available	11			
	5	2	Door release			0 to 3	
			Doors may not be opened	00			
			Doors may be opened	01			
			Error	10			
			Not available	11			
	7	2	Lift axle 1 position			0 to 3	
			Lift axle pos down_tag axle laden	00			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Lift axle pos up_tag axle unladen	01			
			Error	10			
			Not available	11			
6	1	2	Front axle in bumper range			0 to 3	
			Actual level above bumper range	00			
			Actual level within bumper range	01			
			Error	10			
			Not available	11			
	3	2	Rear axle in bumper range			0 to 3	
			Actual level above bumper range	00			
			Actual level within bumper range	01			
			Error	10			
			Not available	11			
	5..6		Not defined				
	7	2	Lift axle 2 position			0 to 3	
			Lift axle pos down_tag axle laden	00			
			Lift axle pos up_tag axle unladen	01			
			Error	10			
			Not available	11			
7	1	2	Suspension remote control 1			0 to 3	
			Not active	00			
			Active	01			
			Error	10			
			Not available	11			
	3	2	Suspension remote control 2				
			Not active	00			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Active	01			
			Error	10			
			Not available	11			
	5..8		Not defined				
8	1	4	Suspension control refusal information			0 to 15	
			Actual request not refused	0000			
			Axle load limit reached (Load transfer)	0001			
			Would exceed load limit (Tag axle)	0010			
			Bogie differential not locked	0011			
			Above speed limit	0100			
			Below speed limit	0101			
			General reject req denied	0110			
			Reserved	1110			
			Not available	1111			
	5..8		Not defined				

Alarm Status Proprietary

Identifier: 18 FF B4 1D

Transmission interval: 1,000 ms

Only sent from BWS when the vehicle is equipped with an LAS alarm system.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Alarm status				
			Alarm unset	0000			
			Alarm set	0001			
			Alarm triggered	0010			
			Silent alarm triggered	0011			
			Alarm set perimeter	0100			
			Ferry mode	0101			
			Alarm unset with XPDR failed	0110			
			Alarm unset with XPDR succeeded	0111			
			Work alert	1000			
			Alarm test	1001			
			Alarm passive set	1010			
			Not defined	1011.. 1101			
			Reserved	1110			
			Don't care/take no action	1111			
	5..8		Not defined				
2..8			Not defined				

Ambient Conditions

Identifier: 18 FE F5 27

Transmission interval: 1,000 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Barometric pressure		0.5 kPa/bit	0 to 125 kPa	
			Error indicator	FE			
			Not available	FF			
2	1	16	Cab interior temperature		0,03125 °C/bit	-273 to +1 735.0 °C	
			Error	FExx			
			Not available	FFxx			
4	1	16	Ambient air temperature		0,03125 °C/bit	-273 to +1 735.0 °C	
			Error	FExx			
			Not available	FFxx			
6	1	8	Air inlet temperature		1	-40 to +210 °C	
			Error	FE			
			Not available	FF			
7	1	16	Road surface temperature		0,03125 °C/bit	-273 to +1 735.0 °C	
			Error	FExx			
			Not available	FFxx			

BAM-E

Identifier: 18 EC FF 00

Transmission interval: 1,000–5,000 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Control byte, broadcast announce message				A
			Error indicator	FE			
			Not available	FF			
2	1	16	Total message size				
			Error indicator	FE _{xx}			
			Not available	FF _{xx}			
4	1	8	Total number of packets				
			Error indicator	FE			
			Not available	FF			
5	1	8	Maximum number of packets				B
			Error indicator	FE			
			Not available	FF			
6	1	24	Parameter group number of the packeted message	0			
			Error indicator	FE _{xxxx}			
			Not available	FF _{xxxx}			

A: Always has the value 32d (BAM).

B: Use the value 0xFF

Cab Illumination Message

Identifier: 18 D0 FF 17

Transmission interval: 100 ms.

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Requested illumination percentage		0.4 %	0-100 %	
			Error	FEh			
			Not available	FFh			
2..8			Not defined				

Cab Information Proprietary 1

Identifier: 18 FF 96 17

Transmission interval: 100 ms

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1..2		Not defined				
	3	2	Seatbelt Reminder		1		
			No seatbelt reminder	00			
			Seatbelt Reminder	01			
			Error	10			
			Not available	11			

Cruise Control/Vehicle Speed

Identifier: 18 FE F1 00

Transmission interval: 100 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	2	Two speed axle switch		1		
			Low speed range	00			
			High speed range	01			
			Error	10			
			Not available	11			
	3	2	Parking brake switch				A
			Parking brake not set	00			
			Parking brake set	01			
			Error indicator	10			
			Not available or not installed	11			
1	5	2	Cruise control pause switch		1		
			Off	00			
			On	01			
			Error indicator	10			
			Take no action				
			Not defined				
2	1	16	Wheel-based vehicle speed		1/256 km/h per bit	0 to 251 km/h	
			Error indicator	FExx			
			Not available	FFxx			

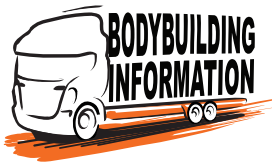
Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
4	1	2	Cruise control active				
			Cruise control switched off	00			
			Cruise control switched on	01			
			Error indicator	10			
			Not available or not installed	11			
	3	2	Cruise control enable switch				
			Cruise control disabled	00			
			Cruise control enabled	01			
			Error indicator	10			
			Not available or not installed	11			
	5	2	Brake switch				
			Brake pedal released	00			
			Brake pedal depressed	01			
			Error indicator	10			
			Not available or not installed	11			
	7	2	Clutch switch				
			Clutch pedal released	00			
			Clutch pedal depressed	01			
			Error indicator	10			
			Not available or not installed	11			
5	1	2	Cruise control set switch				
			Cruise control activator not in the position "set"	00			
			Cruise control activator in position "set"	01			
			Error indicator	10			
			Not available or not installed	11			
	3	2	Cruise control coast (decelerate) switch				

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Cruise control activator not in the position "coast"	00			
			Cruise control activator in the position "coast"	01			
			Error indicator	10			
			Not available or not installed	11			
	5	2	Cruise control resume switch				
			Cruise control activator not in the position "re- sume"	00			
			Cruise control activator in the position "resume"	01			
			Error indicator	10			
			Not available or not installed	11			
	7	2	Cruise control accelerate switch				
			Cruise control activator not in the position "accel- erate"	00			
			Cruise control activator in the position "acceler- ate"	01			
			Error indicator	10			
			Not available or not installed	11			
6	1	8	Cruise control set speed		1 km/h	0 to 250 km/h	
			Error indicator	FEh			
			Not available or not installed	FFh			
7	1	5	PTO state			0 to 31	
			Off/disabled	0000			
			Hold	0001			
			Remote hold	0010			
			Standby	0011			
			Remote standby	0100			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Set	0101			
			Decelerate/coast	0110			
			Resume	0111			
			Accelerate	1000			
			Accelerate override	1001			
			Preprogrammed set speed 1	1010			
			Preprogrammed set speed 2	1011			
			Preprogrammed set speed 3	1100			
			Preprogrammed set speed 4	1101			
			Preprogrammed set speed 5	1110			
			Preprogrammed set speed 6	1111			
			Preprogrammed set speed 7	10000			
			Preprogrammed set speed 8	10001			
			Not available	11111			
	6	3	Cruise control states		1	0 to 7	
			Off/disabled	000			
			Hold	001			
			Accelerate	010			
			Decelerate/coast	011			
			Resume	100			
			Set	101			
			Accelerator override	110			
			Not available	111			
8	1	2	Idle increment switch		1	0 to 3	
			Off	00			
			On	01			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Error	10			
			Not available	11			
8	3	2	Idle decrement switch		1	0 to 3	
			Off	00			
			On	01			
			Error	10			
			Not available	11			
8	5	2	Engine test mode switch		1	0 to 3	
			Off	00			
			On	01			
			Error	10			
			Not available	11			
8	7	2	Engine shutdown override switch			0 to 3	
			Off	00			
			On	01			
			Error	10			
			Not available	11			

A: Information from a pressure sensor on the manual control valve for the parking brake. The parameter "Parking brake not set" is sent when the pressure is more than 6 bar.



Crash Occured

Identifier: 18 FF FD 64

Transmission interval: 1,000 ms

Only sent from BWS if Crash safety system CSS is installed.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1..8			Not used				

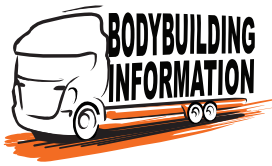
Coordinator General Information

Identifier: 0C FF B0 27

Transmission interval: Normal 200 ms. If certain parameters are modified 10 ms.

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1..3			Not defined				
4	1..2		Not defined				
	3	2	Engine stop switch				
			Engine stop switch not activated	00			
			Engine stop switch activated	01			
			Error	10			
	5	2	Not available	11			
	7	2	Not defined				
			0,8 bar parking brake				
			0,8 bar parking brake not set	00			
			0,8 bar parking brake set	01			
			Error indicator	10			
			Not available or not installed	11			
5	1..6		Not defined				
	7	2	Gearbox in reverse				A
			Gearbox not in reverse	00			
			Gearbox in reverse	01			
6..8			Error	10			
			Not available	11			
			Not defined				



CAN interface for bodywork

A: Information is taken from ETC2 on all gearboxes apart from manual gearboxes without a torque converter.

Coordinator General Information 2

Identifier: 0C FF AF 27

Transmission interval: 1,000 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1..8		Not defined				
2	1	2	Low engine coolant water level				
			Not low engine coolant water level	00			
			Low engine coolant water level	01			
			Error	10			
			Not available	11			
	3..8		Not defined				
3..8			Not defined				

CUV information

Identifier: 18 FF B1 1E

Transmission interval: 1,000 ms

Always sent from BWS.

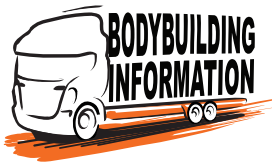
The message should be sent out once every 1,000 ms and when any of the parameters changes, but not more rapidly than 20 ms.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	2	Main beam intended				A
			Off	00			
			On	01			
			Error	10			
			Not available	11			
1	3	2	Dipped beam intended				
			Off	00			
			On	01			
			Error	10			
			Not available	11			
	5..8		Not defined				
2	1	2	Front fog lamp intended				
			Off	00			
			On	01			
			Error	10			
			Not available	11			
2	3	2	Rear fog lamp intended				
			Off	00			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			On	01			
			Error	10			
			Not available	11			
2	5	2	Reverse lamp intended				
			Off	00			
			On	01			
			Error	10			
			Not available	11			
2	7	2	Stop lamp intended				
			Off	00			
			On	01			
			Error	10			
			Not available	11			
			Not defined				
3	1	2	Wiper intended				
			Off	00			
			On	01			
			Error	10			
			Not available	11			
	3..4		Not defined				
3	5	2	Direction indicator lamp status truck left				B
			Off	00			
			On	01			
			Error	10			
			Not available	11			
3	7	2	Direction indicator lamp status truck right				B

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Off	00			
			On	01			
			Error	10			
			Not available	11			
4	1	2	Direction indicator lamp status trailer left				B
			Off	00			
			On	01			
			Error	10			
			Not available	11			
4	3	2	Direction indicator lamp status trailer right				B
			Off	00			
			On	01			
			Error	10			
			Not available	11			
4	5	2	Direction indicator lever status				C
			Direction indicator left activated	00			
			Direction indicator right activated	01			
			Reserved	10			
			Don't care/take no action	11			
4	7	2	Horn Switch State				
			Off	00			
			On	01			
			Error	10			
			Not available	11			
5..6			Not defined				
7	1	6	Work light toggle switch				D

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Off	00			
			On	01			
			Error	10			
			Not available	11			
7	3	2	Work light output status				E
			Off	00			
			On	01			
	7..8		Error	10			
8	1..4		Not available	11			
7	5	2	58				
			Off	00			
			On	01			
			Error	10			
			Not available	11			
			Not defined				
8	5	2	Parking lights				
			Switch not in parking lights position	00			
			Switch in parking lights position	01			
			Error	10			
			Not available	11			
8	7	2	Driving lights				
			Switch not in driving lights position	00			
			Switch in driving lights position	01			
			Error	10			
			Not available	11			



CAN interface for bodywork

- A: Sent as "On" if one of the lamps is activated.
- B: Sent as "Off" if one of the lamps is broken.
- C: Sent if the lever has a normal position or if a fault is detected.
- D: Indicates whether the switch for activating the work light is depressed.
- E: Indicates whether the work light is on or off.

Dash Display

Identifier: 18 FE FC 27

Transmission interval: 1,000 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Washer fluid level		0.4	0 to 100%	
			Error	FE			
			Not available	FF			
2	1	8	Fuel level		0.4 %/bit	0 to 100%	
			Error	FE			
			Not available	FF			
3	1	8	Fuel filter differential pressure		2	0 to 500 kPa	
			Error	FE			
			Not available	FF			
4	1	8	Engine oil filter differential pressure		0.5	0 to 125 kPa	
			Error	FE			
			Not available	FF			
5	1	16	Cargo ambient temperature		0.03125	-273 to +1735 °C	
			Error	FE _{xx}			
			Not available	FF _{xx}			
7	1	8	Fuel level 2		0.4	0 to 100%	
			Error	FE			
			Not available	FE			

DLN2-Proprietary

Identifier: 0C FF 81 00

Transmission interval: 100 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1..2			Not defined				
3	1..4		Not defined				
	5	2	Low engine oil pressure				A
			Not low engine oil pressure	00			
			Low engine oil pressure	01			
			Error	10			
			Not available	11			
	7..8		Not defined				
4	1	2	High engine coolant temp				
			Not high engine coolant temp	00			
			High engine coolant temp	01			
			Error	10			
			Not available	11			
	3..8		Not defined				
5	1	2	Charge 61				
			Generator not charging	00			
			Generator charging	01			
			Error	10			
			Not available	11			
	3	3	Engine control mode				

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Not active	000			
			Hand throttle active (mode 0)	001			
			Limited hand throttle active (mode 1)	010			
			Raised idling speed active (mode 2)	011			
			Predefined engine speed active (mode 3)	100			
			Remote control engine speed active (mode 4)	101			
			Not defined	110			
			Not available	111			
	6..8		Not defined				
6..8			Not defined				

A: Low oil pressure can only be indicated when the engine is running.

DLN5-Proprietary

Identifier: 18 FF A0 27

Transmission interval: 50 ms

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	2	Split low switch		1		A
			Not active	00			
			Active	01			
			Error	10			
			Not available	11			
	3	2	Range low switch				
			Not active	00			
			Active	01			
			Error	10			
			Not available	11			
	5..8		Not defined				
3	1	8	Clutch pedal position		0,4	0 to 100	
			Error	FE			
			Not available	FF			
4..8			Not defined				

A: Only sent if the vehicle is equipped with manual gearbox.

DLN8-Proprietary

Identifier: 18 FF 88 00

Transmission interval: 1,000 ms

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1..2			Not defined				
3	1	16	Applied vehicle speed limit proprietary		1/256 km/h per bit	0 to 250,996 km/h	A
			Error				
			Not available				
6..8			Not defined				

A: The signal is only applicable in combination with Coordinator 7 (COO7). If COO7 is not used, the signal Maximum vehicle speed limit 0 in message DLN7 will be used instead.

DM1

Identifier: 18 FE CA XX

Transmission interval: 1,000 ms

XX (source address) varies depending on which control unit sends the message. See the Source addresses table.

BMS (source address 0B) uses the parameters in EBC1 to provide information about yellow and red status for lamps.

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1..2		Not used				
	3	2	Amber warning lamp status				
			Lamp off	00			
			Lamp on	01			
			Reserved	10			
			Don't care/take no action	11			
	5	2	Red stop lamp status				
			Lamp off	00			
			Lamp on	01			
			Reserved	10			
			Don't care/take no action	11			
	7..8		Not used				
2..3			Not used				
7..8			Not defined				

EAC1-K

Identifier: 18 F0 06 27

Transmission interval: 500 ms

Always sent from BWS. When no differential lock is installed, the message contains no information.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Location		1	0 to 255	A
			Axle1 tire1	0000			
			Axle1 tire2	0001			
			Axle1	1111			
			Axle2 tire1	10000			
			Axle2 tire2	10001			
			Axle2 tire3	10010			
			Axle2 tire4	10011			
			Axle2	11111			
			Axle3 tire1	100000			
			Axle3 tire2	100001			
			Axle3 tire3	100010			
			Axle3 tire4	100011			
			Axle 3	101111			
			Axle4 tire1	110000			
			Axle4 tire2	110001			
			Axle4 tire3	110010			
			Axle4 tire4	110011			
			Axle4	111111			
			Error	FE			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Not available	FF			
2	1	2	Front axle 1				
			Differential lock disengaged	00			
			Differential lock engaged	01			
			Error	10			
			Not available	11			
	3	2	Front axle 2				
			Differential lock disengaged	00			
			Differential lock engaged	01			
			Error	10			
			Not available	11			
	5	2	Rear axle 1				
			Differential lock disengaged	00			
			Differential lock engaged	01			
			Error	10			
			Not available	11			
	7	2	Rear axle 2				
			Differential lock disengaged	00			
			Differential lock engaged	01			
			Error	10			
			Not available	11			
3	1	2	Central				
			Differential lock disengaged	00			
			Differential lock engaged	01			
			Error	10			
			Not available	11			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
	3	2	Central front				
			Differential lock disengaged	00			
			Differential lock engaged	01			
			Error	10			
			Not available	11			
	5	2	Central rear				
			Differential lock disengaged	00			
			Differential lock engaged	01			
			Error	10			
			Not available	11			
	7..8		Not defined				
4	1	2	Front axle group engagement status		1		
			Front axle group disengaged	00			
			Front axle group engaged	01			
			Reserved	10			
			Take no action	11			
	3	2	Rear axle group engagement status				
			Rear axle group disengaged	00			
			Rear axle group engaged	01			
			Reserved	10			
			Take no action	11			
	5..8		Not defined				
5..8			Not defined				

A: Bitmapped

EBC1

Identifier: 18 F0 01 0B

Transmission interval: 100 ms and if there is a change in the condition of the EBS brake switch parameter.

Always sent from BWS.

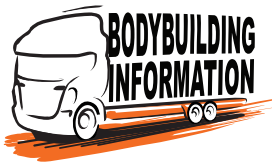
When no ABS or EBS system is installed, only the parameter Brake pedal position is sent.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	2	ASR engine control active				
			ASR engine control passive but installed	00			
			ASR engine control active	01			
			Not available	11			B
	3	2	ASR brake control active				
			ASR brake control passive but installed	00			
			ASR brake control active	01			
			Not available	11			B
	5	2	Anti-lock braking (ABS) active				
			ABS passive but installed	00			
			ABS active	01			
			Not available	11			
	7	2	EBS brake switch				
			Brake pedal is not being pressed	00			
			Brake pedal is being pressed	01			
			Error	10			
			Not available	11			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note			
2	1	8	Brake pedal position		0.4 %/bit	0 to 100 %				
			Error indicator	FE						
			Not available	FF						
3	1	2	ABS offroad switch				A			
			ABS offroad switch passive	00						
			ABS offroad switch active	01						
			Not available	11			C			
	3	2	ASR offroad switch				A			
			ASR offroad switch passive	00						
			ASR offroad switch active	01						
			Not available	11						
	5	2	ASR hill holder switch							
			ASR hill holder switch passive	00						
			ASR hill holder switch active	01						
			Error	10						
			Not available	11						
			7	2	Traction control override switch					
					Off	00				
					On	01				
Error	10									
			Not available	11						
			4	1	2	Accelerator interlock switch				
						Off	00			
						On	01			
Error	10									
			Not available	11						

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
	3	2	Engine derate switch				
			Off	00			
			On	01			
			Error	10			
			Not available	11			
	5	2	Auxiliary engine shutdown switch				
			Off	00			
			On	01			
			Error	10			
			Not available	11			
	7	2	Remote accelerator enable switch				
			Off	00			
			On	01			
			Error	10			
			Not available	11			
5	1	8	Engine retarder selection				
			Error	10			
			Not available	11			
6	1	2	ABS fully operational				
			ABS not fully operational	00			
			ABS fully operational	01			
	3	2	EBS red warning state				D
			Off	00			
			On	01			
	5	2	ABS/EBS amber warning state				
			Off	00			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			On	01			
			Take no action	11			
	7	2	ATC/ASR Lamp state (Powered vehicle)				
			Off	00			
			On	01			
			Reserved	10			
			Take no action	11			
7	1	8	Source adress of controlling device for brake control			0 to 250	E
			Reserved	FEh			
			Take no action	FFh			
8	1..2		Not defined				
	3	2	Halt brake switch				
			Halt brake switch passive	00			
			Halt brake switch active	01			
			Error	10			
			Not available	11			
	5	2	Trailer ABS status				
			Trlr ABS Stts Infrmtn Avlbl Bt Nt Actv	00			
			Trailer ABS active	01			
			Reserved	10			
			Trlr ABS Stts Infrmtn Nt Avlbl Prmtr N	11			
	7	2	Tractor mounted trailer ABS warning signal				
			Off	00			
			On	01			
			Reserved	10			



CAN interface for bodywork

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Take no action	11			

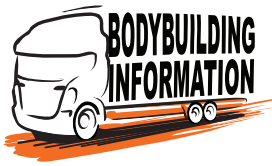
A: Describes the function, not the switch position. 00 when the function is inactive, 01 when it is active.

B: Only sent when ASR is not installed.

C: Only sent when ABS off-road is not installed.

D: Only sent if EBS fitted.

E: For ACS use.



EBC2 Wheel Speed Proprietary

Identifier: 0C FF 19 0B

Transmission interval: 50 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1..8			Not used				

EBC4 Wheel Brake Lining Remaining Information

Identifier: 1C FE AC 0B

Transmission interval: 5,000 ms

Only sent from BWS if the vehicle is equipped with EBS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Brake lining remaining, front axle left		0.4 %/bit	0 to 100 %	A
			Error	FEh			
			Not available	FFh			
2	1	8	Brake lining remaining, front axle right		0.4 %/bit	0 to 100 %	A
			Error	FEh			
			Not available	FFh			
3	1	8	Brake lining remaining, rear axle #1 left		0.4 %/bit	0 to 100 %	B
			Error	FEh			
			Not available	FFh			
4	1	8	Brake lining remaining, rear axle #1 right		0.4 %/bit	0 to 100 %	B
			Error	FEh			
			Not available	FFh			
5	1	8	Brake lining remaining, rear axle #2 left		0.4 %/bit	0 to 100 %	C
			Error	FEh			
			Not available	FFh			
6	1	8	Brake lining remaining, rear axle #2 right		0.4 %/bit	0 to 100 %	C
			Error	FEh			
			Not available	FFh			
7	1	8	Brake lining remaining, rear axle #3 left		0.4 %/bit		D
			Error				

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Not available				
8	1	8	Brake lining remaining, rear axle #3 right		0.4 %/bit		D
			Error				
			Not available				

A: The first axle of the vehicle.

B: The second axle of the vehicle.

C: The third axle of the vehicle.

D: The fourth axle of the vehicle.

The axles are counted from the front end of the vehicle.

EBC5

Identifier: 18 FD C4 0B

Transmission interval: 100 ms

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	2	Brake temperature warning	00	1		
			Not active	01			
			Active	10			
			Error	11			
			Not available				
	3	3	Halt brake mode		1	0 to 7	
			Inactive	0000			
			Active	0001			
			Active but not working properly	0010			
			Reserved	0100			
			Take no action	0111			
	6	3	Hill holder mode		1	0 to 7	
			Inactive	0000			
			Active	0001			
			Active but will change to inactive in a short time	0010			
			Reserved	0100			
			Take no action	0111			
2	1	2	Foundation brake use		1		A
			Foundation brakes not in use	00			
			Foundation brakes in use	01			
			Reserved	10			
			Take no action	11			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
	3	2	XBR system state		1		
			Any external brake demand will be accepted	00			
			Only external brake demand of highest XBR Priority (00) will be accepted (e.g. because the temperature limit of the brake system is exceeded)	01			
			No external brake demand will be accepted (e.g. because of fault in brake system)	10			
			Take no action	11			
	5	4	XBR active control mode				
			No brake demand being executed (default mode)	0000			
			Driver's brake demand being executed, no external brake demand	0001			
			Addition mode of XBR acceleration control being executed maximum mode of XBR acceleration control being executed	0010			
			Maximum mode of XBR acceleration control being executed	0011			
			1110 Reserved for SAE assignment	0100			
			Take no action	1111			
3	1	8	XBR acceleration limit		0.1	-10 to +10 m/s ²	
			Reserved	FE			
			Take no action	FF			
4..8			Not used				

A: Sent when XBR is installed for AICC use.

EEC1

Identifier: 0C F0 04 00

Transmission interval: 20 ms

Always sent to BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	4	Engine and retarder torque mode				A
			Low idle governor	0000			
			Accelerator pedal	0001			
			Cruise control	0010			
			PTO governor	0011			
			Road speed governing	0100			
			ASR control	0101			
			Transmission control	0110			
			Not used	0111			
			Torque limiting	1000			
			High speed governor	1001			
			Not used	1010			
			Not used	1011			
			Not defined	1100			
			Not used	1101			
			Other	1110			
			Not available	1111			
	5	4	Actual engine - percent torque high resolution		0.125	0 to 0.875 %	B
			Not available	1000			
			Not available	1001			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Not available	1010			
			Not available	1011			
			Not available	1100			
			Not available	1101			
			Not available	1110			
			Not available	1111			
2	1	8	Drivers demand engine - percent torque		1 %	-125 % to +125 %	
			Error indicator	FEh			
			Not available	FFh			
3	1	8	Actual engine - percent torque		1 %	-125 % to +125 %	
			Error indicator	FEh			
			Not available	FFh			
4	1	16	Engine speed		0.125 r/min	0 to 8 031.875 r/min	
			Error indicator	FExxh			
			Not available	FFxxh			
6	1	8	Source address of controlling device for engine control		1	0 to 250	
			Error	FE			
			Take no action	FF			
7	1	4	Engine starter mode				
			Start not reqd	0000	1	0 to 15	
			Starter active gear not engaged	0001			
			Starter active gear engaged	0010			
			Strt fnshd strtr nt actv aftr hvng bn a	0011			
			Strtr inhbt d to eng already running	0100			
			Strtr inhbt d to eng nt ready for start	0101			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Strtr inhbt d to drv in enggd othr trns	0110			
			Strtr inhbt d to active immobilizer	0111			
			Strtr inhbt d due to starter overtemp	1000			
			1011 reserved	1001			
			Starter inhibited reason unknown	1100			
			Error	1110			
			Not available	1111			
	5..8		Not defined				
8	1	8	Engine demand - percent torque		1	-125 to 125 %	
			Error	FE			
			Not available	FF			

A: The message Not available is only sent when the engine is not running.

B: Bit pattern 1000-1111 = Not available

EEC2

Identifier: 0C F0 03 00

Transmission interval: 50 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	2	Accelerator pedal low idle switch				
			Accelerator pedal not in low idle condition	00			
			Accelerator pedal in low idle condition	01			
			Error indicator	10			
			Not available	11			
	3	2	Accelerator pedal kickdown switch				
			Kickdown passive	00			
			Kickdown active	01			
			Error indicator	10			
			Not available	11			
	5	2	Road speed limit status				
			Active	00			
			Not active	01			
	7	2	Accelerator pedal 2 low idle switch				
			Accel pedal not in low idle condition	00			
			Accel pedal in low idle condition	01			
			Error	10			
			Not available	11			
2	1	8	Accelerator pedal position				
			Error indicator	FE	0.4 %	0 to 100 %	

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Not available	FF			
3	1	8	Percent load at current speed		1 %	0 to 125 %	
			Error indicator	FE			
			Not available	FF			
4	1	8	Remote accelerator pedal position		0.4 %	0 to 100 %	
			Error indicator	FE			
			Not available	FF			
5	1	8	Accelerator pedal position 2		0.4 %	0 to 100 %	
6	1	2	Vehicle acceleration rate limit status				
			Limit not active	00			
			Limit active	01			
			Reserved	10			
			Not available	11			
	3..8		Not defined				
7	1..4		Not used				
	5..8		Not defined				
8			Not used				

Engine Configuration Messages

Identifier: 18 EB FF 00

Transmission interval: 100 ms until the whole message is sent in one BAM cycle.

The PGN for engine configuration in J1939 is 00 FE E3.

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	16	Engine speed at idle, point 1		0.125 r/min	0 to 8 031.875 r/min	
			Error indicator	FExx			
			Not available	FFxx			
3	1	8	Percent torque at idle, point 1		1 %	-125 % to +125 %	
			Error indicator	FE			
			Not available	FE			
4	1	16	Engine speed at point 2		0.125 r/min	0 to 8 031.875 r/min	
			Error indicator	FExx			
			Not available	FFxx			
6	1	8	Percent torque at point 2		1 %	-125 % to +125 %	
			Error indicator	FE			
			Not available	FE			
7	1	16	Engine speed at point 3		0.125 r/min	0 to 8 031.875 r/min	
			Error indicator	FExx			
			Not available	FFxx			
9	1	8	Percent torque at point 3		1 %	-125 % to +125 %	
			Error indicator	FE			
			Not available	FF			
10	1	16	Engine speed at point 4		0.125 r/min	0 to 8 031.875 r/min	

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Error indicator	FExx			
			Not available	FFxx			
12	1	8	Percent torque at point 4		1 %	-125 % to +125 %	
			Error indicator	FE			
			Not available	FF			
13	1	16	Engine speed at point 5		0.125 r/min	0 to 8 031.875 r/min	
			Error indicator	FExx			
			Not available	FFxx			
15	1	8	Percent torque at point 5		1 %	-125 % to +125 %	
			Error indicator	FE			
			Not available	FF			
16	1	16	Engine speed at high idle, point 6		0.125 r/min	0 to 8 031.875 r/min	
			Error indicator	FExx			
			Not available	FFxx			
20	1	16	Reference engine torque		1 Nm	0 to 64 255 Nm	
			Error indicator	FExx			
			Not available	FFxx			
22	1	16	Maximum momentary engine override speed, point 7		0.125 r/min	0 to 8 031.875 r/min	
			Error indicator	FExx			
			Not available	FFxx			
24	1	8	Maximum momentary over-ride time limit		0.1 s	0 to 25 s	
			Error indicator	FE			
			Not available	FF			
26	1	8	Requested speed control range upper limit		10 r/min	0 to 2 500r/min	
			Error indicator	FE			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Not available	FF			
27	1	8	Requested torque control range lower limit		1 %	-125 to +125 %	
			Error indicator	FE			
			Not available	FF			
28	1	8	Requested torque control range upper limit		1 %	-125 to +125 %	
			Error indicator	FE			
			Not available	FF			
29..34			Not used				

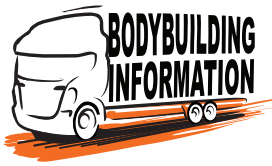
Engine Fluid Level/Pressure 1

Identifier: 18 FE EF 27

Transmission interval: 500 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Fuel delivery pressure		4	0 to 1 000 kPa	
			Error	FExx			
			Not available	FFxx			
2	1	8	Extended crankcase blowby pressure		0.05	0 to 125 kPa	
			Error	FE			
			Not available	FF			
3	1	8	Engine oil level		0.4	0 to 100 %	
			Error	FE			
			Not available	FF			
4	1	8	Engine oil pressure		4 kPa	0 to 1 000 kPa	
			Error indicator	FE			
			Not available	FF			
5	1	16	Crankcase pressure		0.0078125	-250 to 251.99 kPa	
			Error	FExx			
			Not available	FFxx			
7	1	8	Coolant pressure		2	0 to 500 kPa	
			Error	FExx			
			Not available	FFxx			
8	1	8	Coolant level		0.4 %	0 to 100 %	A
			Error indicator	FE			



CAN interface for bodywork

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Not available	FF			

A: Level only sent as 0% or 80%.

Engine Hours, Revolutions

Identifier: 18 FE E5 00

Transmission interval: 1,000 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	32	Total engine hours		0.05 h/bit	0 to 210 554 060.75 h	
			Error	FEh			
			Not available	FFh			
5..8			Not used				

Engine Temperature

Identifier: 18 FE EE 00

Transmission interval: 1,000 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Engine coolant temperature		1 °C	-40 to +210 °C	
			Error indicator	FE			
			Not available	FF			
2	1	8	Fuel temperature		1 °C	-40 to +210 °C	A
			Error indicator	FE			
			Not available	FF			
3	1	16	Engine oil temperature		0.03125	-273 to +1735 °C	
			Error	FExx			
			Not available	FFxx			
5	1	16	Turbo oil temperature		0.03125	-273 to +1735 °C	
			Error	FExx			
			Not available	FFxx			
7	1	8	Engine intercooler temp		1 °C	-40 to +210 °C	
			Error	FE			
			Not available	FF			
8	1	8	Engine intercooler thermostat opening		0.4 %	0 to 100%	
			Error	FE			
			Not available	FF			

A: Only sent if the vehicle has HPI unit injectors.

ERC1-RD

Identifier: 18 F0 00 10

Transmission interval: 100 ms

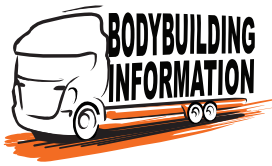
Sent from BWS if a retarder or an Allison automatic gearbox is installed.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	4	Engine and retarder torque mode				
			No request (default mode)	0000			
			Operator selection	0001			A
			Cruise control	0010			
			PTO governor	0011			
			Road speed governing	0100			
			ASR control	0101			
			Transmission control	0110			
			ABS control	0111			
			Torque limiting	1000			
			High speed governor	1001			
			Brake system	1010			
			Remote accelerator	1011			
			Not defined	1100			
			White smoke limiting	1101			
			Other	1110			
			Not available	1111			B
	5	2	Retarder enable - brake assist switch				
			Retarder - brake assist disabled	00			
			Retarder - brake assist enabled	01			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Error indicator	10			
			Not available or not installed	11			
	7..8		Not used				
2	1	8	Actual retarder - percent torque		1 %/bit	-125 % to 0 %	D
			Error indicator	FE			
			Not available	FF			
3	1	8	Intended retarder percent torque		1 %/bit 125 % offset	-125% to 125%	
			Error indicator	FEh			
			Not available	FFh			
4	1..2		Not used				
	3..8		Not defined				
	3	2	Retarder requesting brake light				
			Not active	00			
			Active	01			
			Reserved	10			
			Don't care/take no action	11			
			Not defined				
5	1	8	Source address of controlling device for retarder control		1/bit	0 to 253	C
			Reserved	FEh			
			Don't care/take no action	FFh			
6..8			Not used				

A: Retarder lever

B: When no external unit is controlling the retarder.



CAN interface for bodywork

C: Source address #10 is sent when the retarder is not being controlled by an external ECU.

D: 0% retarder not braking, <0% retarder braking.

ETC1 - T

Identifier: 0C F0 02 03

Transmission interval: 10 ms.

Note: Sent at a transmission interval of 16 ms if the vehicle is fitted with an Allison automatic gearbox.

Only sent from BWS if the vehicle has Opticruise or an Allison automatic gearbox.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note					
1	1	2	Driveline engaged									
			Driveline disengaged	00								
			Driveline engaged	01								
			Error indicator	10								
			Not available or not installed	11								
			3	2	Torque converter lockup engaged				A			
					Torque converter lockup disengaged	00						
					Torque converter lockup engaged	01						
Reserved	10											
			Don't care/take no action	11								
			5	2	Shift in progress							
					Shift is not in progress	00						
					Shift in progress	01						
Error indicator	10											
			Not available or not installed	11								
			7..8		Not defined							
					2	1	16	Output shaft speed		0.125 r/min	0 to 8 031.875 r/min	
								Error indicator	FExx			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Not available	FFxx			
4	1	8	Percent clutch slip		0.4%	0 to 100%	
			Error	FE			
			Not available	FF			
5	1	2	Momentary engine overspeed enable				
			Momentary engine overspeed is disabled	00			
			Momentary engine overspeed is enabled	01			
			Reserved	10			
			Take no action	11			
	3	2	Progressive shift disable		0.125 r/min	0 to 8 031.875 r/min	
			Progressive shift is not disabled	00			
			Progressive shift is disabled	01			
			Reserved	10			
			Take no action	11			
	5..8		Not defined				
6	1	16	Input shaft speed		0.125 r/min	0 to 8 031.875 r/min	A
			Error indicator	FExx			
			Not available	FFxx			
8	1	8	Source address of controlling device for transmission control		1	0 to 255	
			Error	FE			
			Take no action	FF			

A: Only if the vehicle has an Allison automatic gearbox.

ETC1 - CV

Identifier: 0C F0 02 43

Transmission interval: 10 ms

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note	
1	1	2	Driveline engaged	00				
			Driveline disengaged	01				
			Driveline engaged	10				
			Error indicator	11				
				Not available or not installed				
	3	2	Torque converter lockup engaged					
			Torque converter lockup disengaged	00				
			Torque converter lockup engaged	01				
			Reserved	10				
			Don't care/take no action	11				
5	2	Shift in progress						
		Shift is not in progress	00					
		Shift in progress	01					
		Error indicator	10					
		Not available or not installed	11					
7.8			Not defined					
2	1	16	Output shaft speed		0.125 r/min	0 to 8 031.875 r/min		
			Error indicator	FExx				
			Not available	FFxx				
4	1	8	Percent clutch slip		0.4%	0 to 100%		
			Error	FE				
			Not available	FF				

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
5	1	2	Momentary engine overspeed enable				
			Momentary engine overspeed is disabled	00			
				Momentary engine overspeed is enabled	01		
				Reserved	10		
				Take no action	11		
	3	2	Progressive shift disable		0.125 r/min	0 to 8 031.875 r/min	
			Progressive shift is not disabled	00			
				Progressive shift is disabled	01		
				Reserved	10		
				Take no action	11		
	5..8		Not defined				
6	1	16	Input shaft speed		0.125 r/min	0 to 8 031.875 r/min	
			Error indicator	FExx			
			Not available	FFxx			
8	1	8	Source address of controlling device for transmission control		1	0 to 255	
			Error	FE			
			Take no action	FF			

ETC2

Identifier: 18 F0 05 03

Transmission interval: 100 ms

Always sent from BWS. When the vehicle has a manual gearbox, the message has no content.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Selected gear, - rev, + forw, 0 neut, 126 park		1 gear	-125 to +125	
			Reserved	FE			
			Don't care/take no action	FF			
2	1	16	Actual gear ratio		0.001	0 to 64.255	
			Error indicator	FExx			
			Not available	FFxx			
4	1	8	Current gear, - rev, + forw, 0 neut, 126 park		1 gear	-125 to +125	
			Error indicator	FE			
			Not available	FF			
5	1	16	Transmission requested range		ASCII	0 to 255	A
			Reserved	FExx			
			Don't care/take no action	FExx			
7	1	16	Transmission current range		ASCII	0 to 255	A
			Reserved	FExx			
			Don't care/take no action	FExx			

A: Only sent if the vehicle has an Allison gearbox.

ETC7

Identifier: 18 FE 4A03

Transmission interval: 100 ms

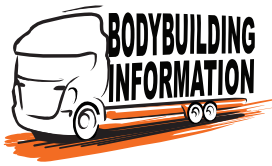
Only sent from BWS when the vehicle is equipped with an Allison automatic gear-box.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	2	Transmission current range display blank state				
			Not blanked	00			
			Blanked	01			
			Error	10			
			Not available	11			
	3	2	Transmission service indicator				
			Transmission service indicator is off	00			
			Transmission service indicator is on	01			
			Transmission service indicator is flashing	10			
			Not available	11			
	5	2	Transmission requested range display blank state				
			Inactive	00			
			Active	01			
			Error	10			
			Not available	11			
	7	2	Transmission requested range display flash state				
			Inactive	00			
			Active	01			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Error	10			
			Not available	11			
2	1	2	Transmisson ready for brake release				
			Trans not ready for brake release	00			
			Trans ready for brake release	01			
			Reserved	10			
			Take no action	11			
	3	2	Active shift console indicator				
			Inactive	00			
			Active	01			
			Not available	11			
	5	2	Transmission engine crank enable				
			Cranking disabled	00			
			Cranking disabled	01			
			Not available	11			
	7	2	Shift inhibit indicator				
			Inactive	00			
			Active	01			
			Error	10			
			Not available	11			
3	1	2	Transmission mode 1 indicator				
			Inactive	00			
			Active	01			
			Error	10			
			Not available	11			
	3	2	Transmission mode 2 indicator				

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Inactive	00			
			Active	01			
			Error	10			
			Not available	11			
	5	2	Transmission mode 3 indicator				
			Inactive	00			
			Active	01			
			Error	10			
			Not available	11			
	7	2	Transmission mode 4 indicator				
			Inactive	00			
			Active	01			
			Error	10			
			Not available	11			
4	1	8	Transmission requested gear feedback		1 gear 125 offset	-125 to +125	
5	1	2	Transmission mode 5 indicator				
			Trans mode 5 not active	00			
			Trans mode 5 active	01			
			Error	10			
			Not available	11			
	3	2	Transmission mode 6 indicator				
			Trans mode 6 not active	00			
			Trans mode 6 active	01			
			Error	10			
			Not available	11			
	5	2	Transmission mode 7 indicator				

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Trans mode 7 not active	00			
			Trans mode 7 active	01			
			Error	10			
			Not available	11			
	7	2	Transmission mode 8 indicator				
			Trans mode 8 not active	00			
			Trans mode 8 active	01			
			Error	10			
			Not available	11			
6	1	2	Transmission reverse gear shift inhibit status				
			Reverse gear shifts are currently allowed	00			
			Reverse gear shifts are currently inhibited	01			
			Error	10			
			Not available	11			
	3..8		Not defined				
7..8			Not defined				



Fuel Consumption

Identifier: 18 FE E9 00

Transmission interval: 1,000 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1..4			Not used				
5	1	32	Total fuel used		0.5 l/bit	0 to 2 105 540 607.5 l	
			Error	FExxxxxxh			
			Not available	FFxxxxxxh			

Fuel Economy

Identifier: 18 FE F2 00

Transmission interval: 100 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	16	Fuel rate		0.05 l/h per bit	0 to 3 212.75 l/h	
			Error	FExxh			
			Not available	FFxxh			
3	1	16	Instantaneous fuel economy		1/512 km/l per bit	0 to 125.5 km/l	
			Error	FExxh			
			Not available	FFxxh			
5	1	16	Average fuel economy		1/512 km/l per bit	0 to 125.5 km/l	
			Error	FExxh			
			Not available	FFxxh			
7	1	8	Throttle position		0.4 %	0 to 100 %	
			Error	FExxh			
			Not available	FFxxh			

High Resolution Vehicle Distance

Identifier: 18 FE C1 EE

Transmission interval: 1,000 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	32	High resolution total vehicle distance		5 m/bit	0 to 21 055 406 km	
			Error	FExxxxxxh			
			Not available	FFxxxxxxh			
5	1	32	High resolution trip distance		5 m/bit	0 to 21 055 406 km	A
			Error	FExxxxxxh			
			Not available	FFxxxxxxh			

A: Sent when the vehicle is equipped with a tachograph.

Inlet/Exhaust Conditions

Identifier: 18 FE F6 00

Transmission interval: 500 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1			Not used				
2	1	8	Boost pressure		2 kPA	0 to 500 kPa	
			Error indicator	FE			
			Not available	FF			
3	1	8	Intake manifold temperature		1 °C	-40 to +210 °C	
			Error indicator	FE			
			Not available	FF			
4..8			Not used	FF			

PTO information Proprietary

Identifier: 18 FF 90 27

Transmission interval: 250 ms

Only sent from BWS when power take-off (PTO) is installed.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note	
1	1	2	PTO-ED 1					
			Not engaged	00				
			Engaged	01				
			Error	10				
				Error	11			
	3	2	2	PTO-ED 2				
				Not engaged	00			
				Engaged	01			
Error				10				
				Error	11			
	5..8		Not defined					
2	1	2	PTO-EK 1					
			Not engaged	00				
			Engaged	01				
			Error	10				
				Error	11			
	3	2	2	PTO-EK 2				
				Not engaged	00			
				Engaged	01			
				Error	10			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
	5..8		Error	11			
3	1	2	PTO-EG 1				
			Not engaged	00			
			Engaged	01			
			Error	10			
			Error	11			
			Not defined				
	3	2	PTO-EG 2				
			Not engaged	00			
			Engaged	01			
			Error	10			
			Error	11			
	5..8		Not defined				
4	1	2	PTO-AWD 1				
			Not engaged	00			
			Engaged	01			
			Error	10			
			Not available	11			
	3	2	PTO-AWD 2				
			Not engaged	00			
			Engaged	01			
			Error	10			
			Not available	11			
	5..8		Not defined				
5..6			Not defined				
7	1	2	PTO engaged				A

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			PTO not engaged	00			
			PTO engaged	01			
			Error	10			
			Not available	11			
	3	2	PTO-split shaft				
			Not engaged	00			
			Engaged	01			
			Error	10			
			Not available	11			
	5..8		Not defined				
8	1	4	PTO clutch activation request				
			Reserved	1110			
			Take no action	1111			
	5..8		Not defined				

A: OR logic for all power take-offs.

Retarder Fluids

Identifier: 18 FE FB 10

Transmission interval: 1,000 ms

Sent from BWS when an Allison automatic gearbox is installed.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Hydraulic retarder pressure		16	0 to 4000 kPa	
			Error	FE			
			Not available	FF			
2	1	8	Hydraulic retarder oil temperature		1 °C	-40 to +210 °C	
			Error indicator	FEh			
			Not available	FFh			
3..8			Not defined				

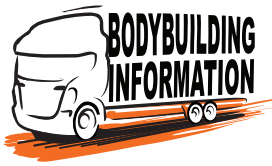
Supply Pressure

Identifier: 18 FE AE 30

Transmission interval: 1,000 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Pneumatic supply pressure		8 kPa/bit	0 to 2 000 kPa	
			Error	FEh			
			Not available	FFh			
2	1	8	Parking and/or trailer air pressure		8 kPa/bit	0 to 2 000 kPa	
			Error	FEh			
			Not available	FFh			
3	1	8	Service brake air pressure, circuit 1		8 kPa/bit	0 to 2 000 kPa	
			Error	FEh			
			Not available	FFh			
4	1	8	Service brake air pressure, circuit 2		8 kPa/bit	0 to 2 000 kPa	
			Error	FEh			
			Not available	FFh			
5..6			Not used				
7..8			Not defined				
7	1	2	Air compressor status				
			Compressor not active	00			
			Compressor active	01			
			Error	10			
			Not available	11			
	3	6	Not defined				



CAN interface for bodywork

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
8			Not defined				

TCO1

Identifier: 0C FE 6C EE

Transmission interval: 20 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note			
1	1	3	Driver 1 working state	000						
			Rest	001						
			Availability	010						
			Work	011						
			Drive	100						
			101 reserved	101						
			Error	110						
			Not available	111						
			4	3	Driver 2 working state					
					Rest	000				
Availability	001									
Work	010									
Drive	011									
101 reserved	100									
Error	110									
Not available	111									
7	2	Drive recognize								
		Vehicle not in motion	00							
		Vehicle in motion	01							
		Error	10							

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Not available	11			
2	1	4	Driver 1 time related states				A
			Normal/no limits reached	0000			
			15 minutes before 4½h	0001			
			4½h reached	0010			
			15 minutes before 9h	0011			
			9h reached	0100			
			15 minutes before 16h	0101			
			16h reached	0110			
			1100 reserved	0111			
			Other	1101			
			Error	1110			
			Not available	1111			
	5	2	Driver card, driver 1				A
			Driver card not present	00			
			Driver card present	01			
			Error	10			
			Not available	11			
	7	2	Overspeed				A
			No overspeed	00			
			Overspeed	01			
			Error	10			
			Not available	11			
3	1	4	Driver 2 time related states				A
			Normal/no limits reached	0000			
			15 minutes before 4½h	0001			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			4½h reached	0010			
			15 minutes before 9h	0011			
			9h reached	0100			
			15 minutes before 16h	0101			
			16h reached	0110			
			1100 reserved	0111			
			Other	1101			
			Error	1110			
			Not available	1111			
	5	2	Driver card, driver 2				
			Driver card not present	00			
			Driver card present	01			
			Error	10			
			Not available	11			
	7..8		Not defined				
4	1	2	System event				
			No system event	00			
			System event	01			
			Error	10			
			Not available	11			
	3	2	Handling information				
			No handling information	00			
			Handling information	01			
			Error	10			
			Not available	11			
	5	2	System performance				

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			No system performance	00			
			System performance	01			
			Error	10			
			Not available	11			
	7	2	Direction indicator				A
			Forward	00			
			Reverse	01			
			Error	10			
			Not available	11			
5	1	6	Tachograph output shaft speed		0.125 r/min per bit	0 to 8031.75 r/min	
			Error	FExx			
			Not available	FFxx			
7	1	16	Tachograph vehicle speed		1/256 kph per bit	0 to 250.996 kph	B
			Error	FExx			
			Not available	FFxx			

A: This parameter is not sent if the vehicle has an analogue tachograph.

B: This is the primary source of vehicle speed.

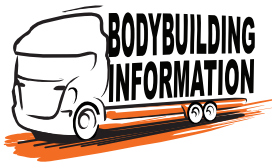
Time/Date

Identifier: 18 FE E6 17

Transmission interval: 1,000 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Seconds		0.25 s/bit	0 to 62.5 s	
			Error	FEh			
			Not available	FFh			
2	1	8	Minutes		1 min/bit	0 to 250 min	
			Error	FEh			
			Not available	FFh			
3	1	8	Hours		1 h/bit	0 to 250 h	
			Error	FEh			
			Not available	FFh			
4	1	8	Month		1 month/bit	0 to 250 month	
			Error	FEh			
			Not available	FFh			
5	1	8	Day		0.25 day/bit	0 to 62.5 day	
			Error	FEh			
			Not available	FFh			
6	1	8	Year		1 Year/bit	1 985 to 2 235Offset + 1985 years	
			Error	FEh			
			Not available	FFh			
7	1	8	Local minute offset		1 min/bit	-125 to 125 minOffset - 125 min	
			Error	FEh			
			Not available	FFh			



CAN interface for bodywork

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Error	FEh			
			Not available	FFh			
8	1	8	Local hour offset		1 h/bit	-125 to 125 hOffset - 125 h	
			Error	FEh			
			Not available	FFh			

Transmission Control 1 (TC1)

Identifier: 0C 01 FF 05

Transmission interval: 50 ms

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note	
1	1	2	Gear shift inhibit request					
			Gear shifts are allowed	00				
			Gear shifts are inhibited	01				
			Reserved	10				
				Take no action	11			
	3	2	Torque converter lockup disable request					
			Allow torque convertor lockup	00				
			Disable torque convertor lockup	01				
			Reserved	10				
				Take no action	11			
	5	2	Disengage driveline request					
			Allow driveline engagement	00				
			Disengage driveline	01				
			Reserved	10				
				Take no action	11			
	7	2	Transmission reverse gear shift inhibit request					
Allow reverse gear shift			00					
Inhibit reverse gear shift			01					
Reserved			10	0,4 %	0 - 100 %			
			Take no action	11				
2	1	8	Requested percent clutch slip					
			Reserved	FE				

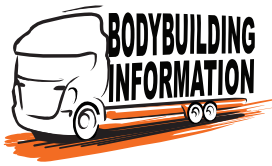
Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Take no action	FF			
3	1	8	Requested gear		1	- 125 - 125	
			Reserved	111101			
			Reverse selector pos	11110111			
			Ps unknown and or no buttons pressed	11100000			
			Prss of mmntry btn t rslet crrent pos	11100001			
			Btwn rvrs and prk shift selector poss	11100010			
			Btwn ntrl and rvrs shft selector poss	11100011			
			Btwn drv and ntrl shift selector poss	11100100			
			Btwn D1 and drive shift selector poss	11100101			
			Between D2 and D1 shift selector poss	11100110			
			Between D3 and D2 shift selector poss	11100111			
			Between D4 and D3 shift selector poss	11101000			
			Between D5 and D4 shift selector poss	11101001			
			Between D6 and D5 shift selector poss	11101010			
			Between D7 and D6 shift selector poss	11101011			
			Btwn two forward shift selector poss	11101100			
			Btwn two reverse shift selector poss	11101101			
			Between two shift selector poss	11101110			
			D77th frwr slctr ps rfrncd frm drive	11101111			
			D66th frwr slctr ps rfrncd frm drive	11110000			
			D55th frwr slctr ps rfrncd frm drive	11110001			
			D44th frwr slctr ps rfrncd frm drive	11110010			
			D33rd frwr slctr ps rfrncd frm drive	11110011			
			D22nd frwr slctr ps rfrncd frm drive	11110100			
			D11st frwr slctr ps rfrncd frm drive	11110101			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Downshift 2 gears from current pos	11110110			
			Downshift 1 gear from current pos	11110111			
			Upshift 2 gears from current pos	11111000			
			Upshift 1 gear from current pos	11111001			
			Forward low pos	11111010			
			Park pos	11111011			
			Forward drive pos	11111100			
			Hold current gear	11111101			
4	1	2	Disengage diff lock request: Front axle 1				
			Engage diff lock	00			
			Disengage diff lock	01			
			Reserved	10			
			Take no action	11			
	3	2	Disengage diff lock request: Front axle 2				
			Engage diff lock	00			
			Disengage diff lock	01			
			Reserved	10			
			Take no action	11			
	5	2	Disengage diff lock request: Rear axle 1				
			Engage diff lock	00			
			Disengage diff lock	01			
			Reserved	10			
			Take no action	11			
	7	2	Disengage diff lock request: Rear axle 2				
			Engage diff lock	00			
			Disengage diff lock	01			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Reserved	10			
			Take no action	11			
5	1	2	Disengage diff lock request: Central				
			Engage diff lock	00			
			Disengage diff lock	01			
			Reserved	10			
			Take no action	11			
	3	2	Disengage diff lock request: Central front				
			Engage diff lock	00			
			Disengage diff lock	01			
			Reserved	10			
			Take no action	11			
	5	2	Disengage diff lock request: Central rear				
			Engage diff lock	00			
			Disengage diff lock	01			
			Reserved	10			
			Take no action	11			
	7..8		Not used				
6	1	2	Trans mode 1				
			Disable	00			
			Enable	01			
			Reserved	10			
			Take no action	11			
	3	2	Trans mode 2				
			Disable	00			
			Enable	01			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Reserved	10			
			Take no action	11			
	5	2	Trans mode 3				
			Disable	00			
			Enable	01			
			Reserved	10			
			Take no action	11			
	7	2	Trans mode 4				
			Disable	00			
			Enable	01			
			Reserved	10			
			Take no action	11			
7	1..2		Not used				
	3	4	Transmission requested launch gear				
			No specific launch gear requested; use default launch gear	0000			
			Launch the vehicle in 1st gear	0001			
			Launch the vehicle in 2nd gear	0010			
			Launch the vehicle in 3rd gear	0011			
			Launch the vehicle in 4th gear	0100			
			Launch the vehicle in 5th gear	0101			
			Launch the vehicle in 6th gear	0110			
			Launch the vehicle in 7th gear	0111			
			Launch the vehicle in 8th gear	1000			
			Launch the vehicle in Reverse 1	1001			
			Launch the vehicle in Reverse 2	1010			

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Launch the vehicle in Reverse 3	1011			
			Launch the vehicle in Reverse 4	1100			
			Reserved	1101			
			Error	1110			
			Not available	1111			
	7	2	Trns shft slctor display mode switch				
			Off	00			
			On	01			
			Error	10			
			Not available	11			
8	1	2	Transmission mode 5				
			Disable	00			
			Enable	01			
			Reserved	10			
			Take no action	11			
	3	2	Transmission mode 6				
			Disable	00			
			Enable	01			
			Reserved	10			
			Take no action	11			
	5	2	Transmission mode 7				
			Disable	00			
			Enable	01			
			Reserved	10			
			Take no action	11			
	7	2	Transmission mode 8				



CAN interface for bodywork

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Disable	00			
			Enable	01			
			Reserved	10			
			Take no action	11			

Transmission Fluids

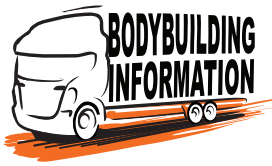
Identifier: 18 FE F8 03

Transmission interval: 1,000 ms

Sent from BWS when an Allison automatic gearbox is installed.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Clutch press		16	0 to 4000 kPa	
			Error	FE			
			Not available	FF			
2	1	8	Transmission oil level		0.4	0 to 100 %	
			Error	FE			
			Not available	FF			
3	1	8	Transmission filter differential pressure		2	0 to 500 kPa	
			Error	FE			
			Not available	FF			
4	1	8	Transmission oil pressure		16	0 to 4000 kPa	
			Error	FE			
			Not available	FF			
5	1	16	Transmission oil temperature		0.03125 °C	-273 to 1735.0 °C	
			Error	FE _{xx}			
			Not available	FE _{xx}			
7	1	8	Transmission oil level high/low		0.5L/bit,-61.5 offset	-61.5 - 62.5 L	
			Error	FE			
			Not available	FE			
8	1	4	Transmission oil level countdown timer		16 states/4 bit, 0 offset	0 - 15	

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Less than 1 minute	0000			
			One minute	0001			
			Two minutes	0010			
			Three minutes	0011			
			Four minutes	0100			
			Five minutes	0101			
			Six minutes	0110			
			Seven minutes	0111			
			Eight minutes	1000			
			Nine minutes	1001			
			Ten minutes	1010			
			Eleven minutes	1011			
			Twelve minutes	1100			
			Thirteen minutes	1101			
			Error	1110			
			Not available	1111			
	5	4	Transmission oil level measurement		16 states/4 bit, 0 offset	0 - 15	
			Cndtns vld fr trns ol lvl measurement	0000			
			Cndtns nt vld stt ing tmr still cntng dw	0001			
			Conditions not valid trans in gear	0010			
			Cndtns nt vld trans fluid temp too low	0011			
			Cndtns nt vld trns fluid temp too high	0100			
			Cndtns nt vld vhel mvng otpt shft spd t	0101			
			Cndtions not valid vehicle not level	0110			
			Cnditions not valid eng speed too low	0111			



CAN interface for bodywork

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			Cndtions not valid eng speed too high	1000			
			Not defined	1100			
			Conditions not valid other	1101			
			Error	1110			
			Not available	1111			

Transmission Proprietary/DLN5

Identifier: 18 FF A0 27

Transmission interval: 50 ms

Always sent from BWS.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	2	Split switch				A
			Low	00			
			High	01			
			Error	10			
			Not available	11			
	3	2	Range switch				A
			Low	00			
			High	01			
			Error	10			
			Not available	11			
	5..8		Not defined				
2	1..8		Not defined				
3	1	8	Clutch pedal position		0.4%/bit	0 to 100 %	
			Error	FEh			
			Not available	FFh			
4..8			Not defined				

A: Only contains information if a manual gearbox is installed.

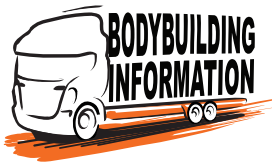
Transmission Proprietary 2 - T

Identifier: 18 FF A1 03

Transmission interval: 250 ms

Only sent from BWS if the vehicle has a manual gearbox or Opticruise

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	2	Low split				A
			Not in low split	00			
			In low split	01			
			Error	10			
			Not available	11			
	3..4		Not defined				
	5	2	Neutral				B
			Not in neutral	00			
			In neutral	01			
			Error	10			
			Not available	11			
	7..8		Not defined				
3	1..4		Not defined				
3	5	2	Low range				
			Not in high range	00			
			In high range	01			
			Error	10			
			Not available	11			
	7	2	High range				
			Not in high range	00			



CAN interface for bodywork

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
			In high range	01			
			Error	10			
			Not available	11			
4..8			Not defined				

A: Only contains information if a manual gearbox is installed.

B: Only sent in vehicles equipped with Scania GZ gearbox.

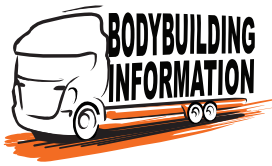
Transmission Proprietary 2 - AWD

Identifier: 18 FF A1 04

Transmission interval: 100 ms

Only sent from BWS if the vehicle has a manual gearbox or Opticruise

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1..4		Not used				
	5	2	Neutral				A
			Not in neutral	00			
			In neutral	01			
			Error	10			
			Not available	11			
	7..8		Not defined				
2			Not used				
3	1..4		Not used				
	5	2	Low range				
			Not in low range	00			
			In low range	01			
			Error	10			
			Not available	11			
	7	2	High range				
			Not in high range	00			
			In high range	01			
			Error	10			
			Not available	11			
4..6			Not used				



CAN interface for bodywork

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
7..8			Not defined				

A: Only sent in vehicles equipped with Scania GZ gearbox.

Vehicle Weight

Identifier: 18 FE EA 2F

Transmission interval: 100 ms

Only sent from BWS if the air suspension system SMS is installed equipped with pressure sensors in the bellows.

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Axle location		Bit-mapped		A
			Error	FEh			
			Not available	FFh			
2	1	16	Axle weight		0.5 kg/bit	0 to 3 2127.5 kg	B
			Error	FExxh			
			Not available	FFxxh			
4	1	16	Trailer weight		2 kg/bit	0 to 12 8510 kg	
			Error	FExxh			
			Not available	FFxxh			
6	1	16	Cargo weight		2 kg/bit	0 to 12 8510 kg	
			Error	FExxh			
			Not available	FFxxh			
8			Not defined				

A: Indicates the axle to which the message refers, counted from the front of the vehicle to the rear. The numbering starts at 0.

B: The weight on the road surface at the axle specified by Byte 1, Axle Location.

Vehicle Weight

Identifier: 18 FE EA 17

Transmission interval: 100 ms

Byte	Bit	Length	Explanation	State	Resolution	Limits	Note
1	1	8	Axle location		1	0 - 255	
			Error	FE			
			Not available	FF			
2	1	16	Axle weight		0.5 kg/bit	0 to 3 2127.5 kg	
			Error	FE _{xx}			
			Not available	FF _{xx}			
4	1	16	Trailer weight		2 kg/bit	0 to 12 8510 kg	
			Error	FE _{xx}			
			Not available	FF _{xx}			
6	1	16	Cargo weight		2 kg/bit	0 to 12 8510 kg	
			Error	FE _{xx}			
			Not available	FF _{xx}			
8			Not defined				

Requirements for CAN communication with the vehicle

Explanation

This section lists the requirements for CAN communication with the bodywork control unit on the external CAN bus.

SAE J1939 forms the basis of the protocol. Large parts of SAE J1939 are not implemented. These parts are SAE J1939-81 (Network Management), main part of SAE J1939-73 (Diagnostics) and parts of SAE J1939-21 (Data Link Layer).

SAE J1939-81 Network Management

The address space in a Scania vehicle is static. Because of this there is no need for the Network Management described in SAE J1939-81.

- Fixed addressing is used in accordance with Preferred addresses for Industry group 0, Global and Industry group 1, On-highway Equipment.
- Source addresses for equipment which does not normally belong to the vehicle follow the requirements in J1939, ISO 11992 or OBD/EOBD.

SAE J1939-73 Diagnostics

The only PGN used by Scania is DM1, Diagnostic Message 1 (PGN 00FECA). This message is sent continuously by all control units in the vehicle to signal that communication is working correctly and is also used to send the status for displaying warning lamps. Fault codes in accordance with SAE J1939-71 are not used.

SAE J1939-21 Data Link Layer

SAE J1939-21 defines five message types:

- Commands - Not supported.
- Requests - Not supported.
- Broadcast/Response - All available information is sent periodically.
- Acknowledgement - Not supported.
- Group Functions - Proprietary messages and Multipacket messages, TP.CM, TP.DT, are supported.

Note:

According to section 5.2.1 SAE J1939-21, Revised Version July 1998, priority bits in message identifiers must be filtered out and ignored by the receivers.

General guidelines

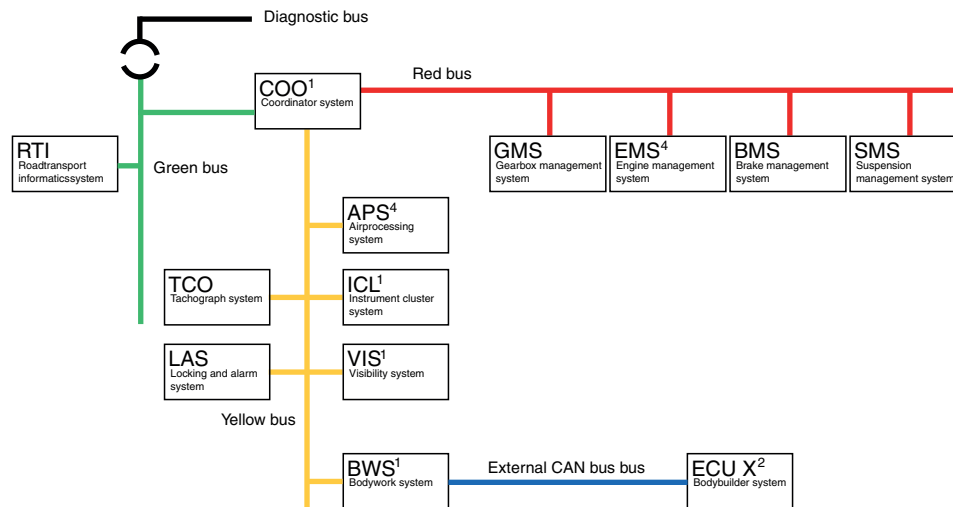
- Control units connected to a CAN bus must be able to handle up to 100% CAN bus load with the correct messages with no significant functional limitations or malfunctions.
- As a rule of thumb, CAN bus load should not exceed 80%.
- Closing control loops over the CAN is not recommended as the guaranteed access time is relatively long and fast control loops require a lot of bandwidth. If closed control loops over the CAN are still required, then they must be fully capable of sending the necessary CAN messages using only half the transmission frequency.

IMPORTANT!

The bodybuilder is responsible for ensuring that the external CAN bus is used correctly.

Location of the external CAN bus in the vehicle's CAN network

The external CAN bus is the bodywork's interface with the vehicle's CAN network. The bodywork control unit sends information from the vehicle's network to the external CAN bus. It is also possible to send information to the bodywork control unit in order to activate bodywork functions in the vehicle. Below is an overview of the CAN network. The number of control units connected to the vehicle's CAN network varies depending on the specification of the vehicle:



1. Control units always accessible in the vehicle's CAN network together with a bodywork control unit.
2. The bodywork control unit in the bodybuilder network, is the interface with the external CAN bus. The control unit in the bodywork CAN network connected to the external CAN bus.

Diagnostic bus:



Green bus:



Yellow bus:



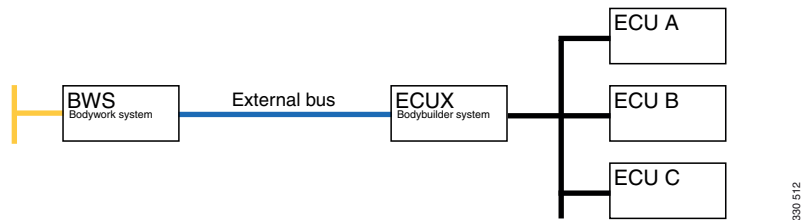
Red bus:



External CAN bus:



It is the responsibility of the bodybuilder to ensure that the bodywork control unit does not receive contradictory commands. If, for example, the bodywork control unit gives a command that sounds the horn, no other control unit that gives commands to the engine may give contradictory commands to the horn. One way of solving this problem is to use a topology as shown in the diagram. Control unit X collects, compares and collates the information before the commands are sent to the bodywork control unit. In this case only two messages - Scania Bodywork Message 1 and 2 - are sent to the bodywork control unit with control unit X as the source address.



Proposed topology to avoid contradictory commands

330 512

Connectors and cables

Scania does not use SAE J1939 connectors. Scania uses twisted pair cables (twisted 40 times per metre) with no shield or sheath. The electrical properties (resistance, impedance, capacitance etc.) are defined in SAE J1939-15 Physical Layer Light. Scania uses a cross-sectional area of 0.75 mm² for cables inside the cab and 1.5 mm² on the frame. CAN connectors (and ECU pins) outside the cab should preferably be gold-plated. The following colours and markings apply to the external CAN bus cables: CAN_H must be blue and CAN_L must be white. In order to avoid misunderstanding it is important that the cables retain their colour for the lifetime of the vehicle. CAN-low must be called (marked) CAN_L and CAN-high must be called (marked) CAN_H.

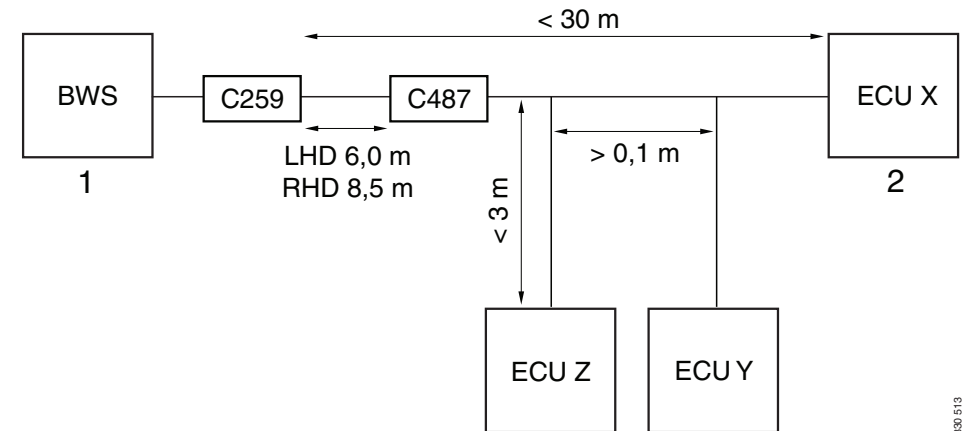
- Connection to the external network inside the cab: CAN_H must be connected to connector C259 pin 21 and CAN_L must be connected to connector C259 pin 20.
- Connection to the external network outside on the frame: CAN_H must be connected to connector C487 pin 6 and CAN_L must be connected to connector C487 pin 7.

Note:

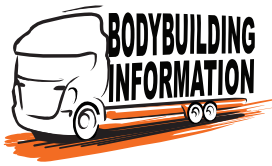
If the connection to the external network is only carried out inside the cab, the factory installed jumper from connector C259 pin 21 and connector C259 pin 20 to connector C494 pin 6 and connector C494 pin 7 must be removed. There will then be no unused and unterminated CAN cabling running from the DIN connectors on the frame (C487-6 and C487-7).

! IMPORTANT!

No other connector or CAN bus may be connected. An incorrect connection could cause the vehicle's normal functions to behave unpredictably. There is a risk that the vehicle will stop and have to be recovered.



1. Bodywork control unit with termination resistors
2. Control unit in the bodywork with termination resistors

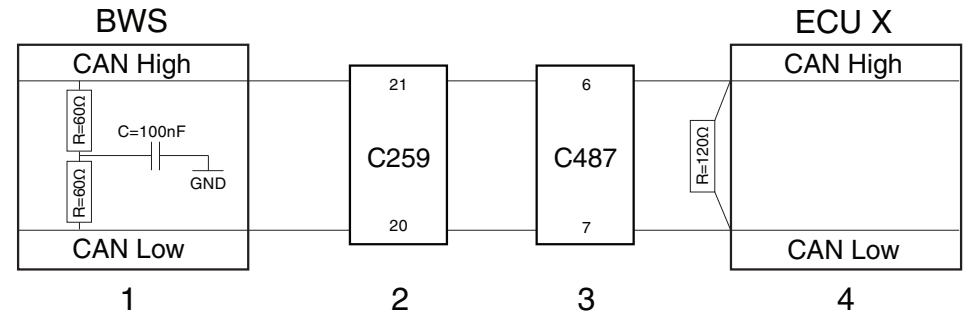


CAN interface for bodywork

The length of the cables must not exceed 30 metres (main cable) between connector C259 in the truck and the control unit with the other termination resistor. If more than one control unit is connected, the length of the cables between the main cable and control unit should not exceed 3 metres. The cables should be as short as possible to minimise the effect of electromagnetic interference. The number of control units in the external CAN network should not exceed 9. The topology is essentially a bus cable with the nodes connected to the CAN bus with at least 0.1 metre between each node. The figure shows the principle of the external CAN network topology.

Termination resistors

The CAN bus cable (main cable) must be connected using a 120 Ohm resistor at each end in accordance with SAE J1939-15 Physical Layer "Light". A split termination resistor (2 resistors and a capacitor) fitted in the bodywork control unit. See the figure below. There must also be a termination resistor in the control unit installed furthest away from the bodywork control unit (see the figure on the previous page). Scania recommends a split termination resistor. If the control unit installed furthest from the bodywork control unit is not equipped with an internal termination resistor, the resistor must be connected as close to the control unit as possible (see figure).



1. Terminated with an internally fitted and split termination resistor
2. Interface for bodybuilder
3. DIN connector on frame
4. Termination resistor fitted in the control unit connector

Source addresses

The bodywork control unit has a non-configurable address and sends messages with the source address 2E (hex). The source addresses in table 1 are used for messages sent from the vehicle's internal CAN bus to the external CAN bus via the bodywork control unit. These addresses must not be used by other control units on the external network. Incorrect use can lead to conflicts and malfunctions in the external network. Table 1 shows only the addresses currently in use, but addresses may be added in the future.

Name	Source address (Hex)
EMS	00
GMS	03
BMS	0B
RET	10
ICL	17
LAS	1D
VIS	1E
COO	27
BWS	2E
SMS	2F
APS	30
TCO	EE

Parameter group numbers

In addition to the parameter group numbers (PGN) specified in SAE J1939-71, there are a number of PGNs specified by Scania. A number of these are used on the external CAN bus. Refer to table 2. These PGNs must not be used for any other purpose.

Table 2: Scania-specified messages on the external CAN bus.		
Name	PGN (Hex)	Standard priority
Alarm Status Proprietary	00 FF B4	6
CUV Information	00 FF B1	6
Cab Information Proprietary 1	00 FF 96	6
Coordinator General Information	00 FF B0	3
Coordinator General Information 2	00 FF AF	3
Crash Occured	00 FF FD	6
DLN2 Proprietary	00 FF 81	6
Transmission Proprietary (DLN5)	00 FF A0	6
DLN8 Proprietary	00 FF 88	6
EBC2 Proprietary	00 FF 19	6
PTO Information	00 FF 90	6
Transmission Proprietary 2 -T	00 FF A1	6
Transmission Proprietary 2 -AWD	00 FF A1	6
Scania Bodywork Control Message 1	00 FF F8	3
Scania Bodywork Control Message 2	00 FF F9	3
Scania Bodywork Control Message 3	00 FF E6	3
Scania Bodywork Status Message 1	00 FF E8	3

Fault validation of communication (Time-Out)

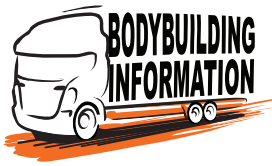
Avoid CAN communication when the starter key is in the lock or radio positions. Also avoid CAN communication when starting up the control units connected to the external CAN bus.

During normal operation, when the starter key is in the drive position, a message should not be validated as missed (time-out) until at least 5 times the message period time. A longer fault validation time is permitted.

During the engine start, when the starter motor is turning, the supply voltage can be extremely low. Because of this, communication from the bodywork control unit cannot be guaranteed during this period. For this reason, no fault codes related to CAN communication with the bodywork control unit are set when the system voltage is under 18 V.

When the starter key is turned to the drive position, the bodywork control unit starts sending messages within 1,000 ms. A message sent from the bodywork control unit cannot be considered missed until after $1,000 \text{ ms} + 5 \times \text{the message period time}$, e.g. if a message has a period of 100 ms it cannot be considered missed until after $1,000 + 5 \times 100 = 1,500 \text{ ms}$. Longer fault validation times are permitted.

When the starter key is turned to the radio or locked positions, the CAN messages cannot expect acknowledgement. No communication from the bodywork control unit can be expected.



Parameter values and status

Parameters in Scania Bodywork Control Message 1 and Scania Bodywork Control Message 2 that are not being used, must be sent as Not Available/Don't Care, FFh/11b.

When there is a validated signal from a sensor, switch or solenoid, the corresponding CAN parameter must contain validated data.

When a fault is detected and validated, Error, FEh/10b must be sent. Until a fault has been validated, the last validated value must be sent. An Error signal may only be sent when the fault code is active.

If a sensor, switch or solenoid is not connected to the ECU, the CAN parameter must contain the status parameter Not available/Don't Care, FFh/11b. This status must also be used when there is a signal which is not yet validated, for example when starting up a control unit.