Daimler AG
Daimler Buses - EvoBus GmbH
MAN Truck & Bus AG
Scania AB

Scania CV
Volvo Truck Corporation
Volvo Bus Corporation
Renault Trucks

Iveco SpA
DAF Trucks N.V.
VDL Bus & Coach B.V.

FMS-Standard description

Version 03

14.09.2012

General annotations

- Data might be not available during ignition off / main switch off
- Most of the values are reliable after ca. 10 seconds after “ignition on”. *
- Physical Layer according to ISO 11898 (250kb/s)
- Application Layer according SAE J1939/ 71
- Data Link Layer according SAE J1939/ 21
- If there is a discrepancy between definitions in this document and the SAE, the SAE documents are valid only except broadcast for PGN 0x00FE6B (Driver ID), PGN 0x00FE70 (Combination Vehicle Weight), and for PGN 0x00FEE6 (Time/Date)
- The priority/source address of each OEM is different.
- If the information is delivered the function/data has to be delivered according FMS-standard definition.
- The description of the connector(s) can be downloaded in the download area of FMS-Standard (Bus and Truck)
- If the information is not available the function/data has to be sent as not available according to SAE
- “not used for (Bus) FMS-standard” means that there might be data sent according SAE but are not used in (Bus) FMS-standard interface. If no information is sent, then it has to be sent as “not available” (don’t care).
- “reserved for (Bus) FMS-standard” means that as long as there is no definition it is sent “FF (not available)”
- The accuracy/interpretation of signals might differ depending on vehicle brand/models *.
- (Bus) FMS-Standard is designed for Diesel engines. If it is used in vehicles with other engine types (e.g. dual engine) the information delivered might be different:*

* Details can be obtained from the OEM

History

Truck	Bus
Changes / Addition toVers. 01.00 Oct. 2009 • added history • change of DaimlerChrysler to Daimler • added Renault Trucks • update General Annotation • added description acc. SAE (based on Jan 2008 version) • deleted SAE ref as no longer valid • added additional comments • correction of PGNs (dez) in Example for BAM • added Priority to Example for BAM • added 2.2 Example SW Identification for buses and/or trucks • added Overview Messages	**Changes / Addition to Vers. 00.01:** • added Driver Identification DI • added Fuel Economy LFE • added Tell Tale Status TTS • added Example Tell Tale Status • added Overview Messages • added description acc. SAE J 1939 to the PGN´s • added additional comments to the PGN´s
Changes / Addition to Vers. 02.00 Sept. 2010 • update History • added 1.14 Ambient Conditions: AMB • added 1.15 Driver's Identification: DI • added 1.16 Fuel Economy: LFE • added 1.2 EEC2: Engine Percent Load At Current Speed • added 1.17 PTO Drive Engagement: PTODE • added 1.18 High Resolution Fuel Consumption (Liquid): HRLFC • update 3. Overview Messages •	**Changes / Addition to Vers. 00.02 dated 07.07.2009** • Page 36: Remark for accelerator position: "Daimler calculate from torque demand" deleted
Changes / Additions to Vers. 02.00 Nov. 2010 • some editorial corrections	

Version 03 dated 12.03.2012 **One document for Bus and Truck FMS-Standard**	**Version 03 dated 12.03.2012** **One document for Bus and Truck FMS-Standard**
Truck and Bus: • update History • update company names • update General Annotation • added SPN 513 Actual Engine – Percent Torque • added High Resolution Fuel Consumption (Liquid) HRLFC • added Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Level • added FMS Tell Tale Status : FMS1 • update example tell tale status • additions to additional comments • update Overview messages **Truck section:** • added Combination Vehicle Weight: CVW • added Electronic Retarder Controller 1: ERC1 • added 1.22 Air Supply Pressure : AIR1 • update 3. Overview Messages	**Truck and Bus:** • update History • update company names • update General Annotation • added SPN 513 Actual Engine – Percent Torque • added High Resolution Fuel Consumption (Liquid) HRLFC • added Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Level • added FMS Tell Tale Status : FMS1 • update example tell tale status • additions to additional comments • update Overview messages **Bus section:** • connector description in separate file

1 Parameters for FMS gateway (according SAE J1939)

always MSB (Most Significant BIT) First

1.1 Parameters for Bus and Truck FMS-Standard

1.1.1 Fuel Consumption: LFC

0x00FEE9								PGN Hex
65,257								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
				8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	Bit No
Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Engine total fuel used 0,5 L / Bit gain 0 L offset SPN 250	Engine total fuel used 0,5 L / Bit gain 0 L offset SPN 250	Engine total fuel used 0,5 L / Bit gain 0 L offset SPN 250	Engine total fuel used 0,5 L / Bit gain 0 L offset SPN 250	Name values values values SPN

Description acc. SAE J 1939:

Total Fuel Used: Accumulated amount of fuel used during vehicle operation.

Additional comment:

Calculated values given as indications, not as contractual values.

Might be set to “not available” if the High Resolution Fuel Consumption is available

The mentioned resolution is not related to the accuracy of the signal

1.1.2 Dash Display: DD

0x00FEFC								PGN Hex
65,276								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
	8 7 6 5 4 3 2 1							Bit No
Not used for (Bus) FMS-Standard	Fuel Level 1 0,4 % / Bit gain 0 % offset SPN 96	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Name values values values SPN

Description acc. SAE J 1939:

Fuel Level: Ratio of volume of fuel to the total volume of fuel storage container.
When Fuel Level 2 (SPN 38) is not used, Fuel Level 1 represents the total fuel in all fuel storage containers.
When Fuel Level 2 is used, Fuel Level 1 represents the fuel level in the primary or left-side fuel storage container.

Additional comment:

The mentioned resolution is not related to the accuracy of the signal

1.1.3 Electronic Engine Controller #1: EEC1

0x00F004								PGN Hex
61,444								PGN
20 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
		8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1				Bit No
Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Actual Engine – Percent Torque 1 % / Bit -125 % offset SPN 513	Engine speed 0.125 rpm / Bit gain 0 rpm offset SPN 190	Engine speed 0.125 rpm / Bit gain 0 rpm offset SPN 190	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Name Name values values values SPN

Description acc. SAE J 1939:

Actual Engine – Percent Torque: The calculated output torque of the engine. The data is transmitted in indicated torque as a percent of reference engine torque (see the engine configuration message, PGN 65251).
The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction.

Engine Speed: Actual engine speed which is calculated over a minimum crankshaft angle of 720 degrees divided by the number of cylinders.

Additional comment:

The mentioned resolution is not related to the accuracy of the signal

1.1.4 Engine Hours, Revolutions: HOURS

0x00FEE5								PGN Hex
65,253								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1					Bit No
Engine total hours of Operation 0.05 h / Bit gain 0 h offset SPN 247	Engine total hours of Operation 0.05 h / Bit gain 0 h offset SPN 247	Engine total hours of Operation 0.05 h / Bit gain 0 h offset SPN 247	Engine total hours of Operation 0.05 h / Bit gain 0 h offset SPN 247	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Name values values values SPN

Description acc. SAE J 1939:

Engine total hours of Operation: Accumulated time of operation of engine.

Additional comment:

The mentioned resolution is not related to the accuracy of the signal

Counter is Engine running dependant

1.1.5 Vehicle Identification: VI

0x00FEEC								PGN Hex
65,260								PGN
10.000 ms								Rep. Rate
Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Byte No
								Bit No
Vehicle identification number **ASCII** **up to 200 characters** *** = Delimiter** **SPN 237**	**Vehicle identification number** **ASCII** **up to 200 characters** *** = Delimiter** **SPN 237**	**Vehicle identification number** **ASCII** **up to 200 characters** *** = Delimiter** **SPN 237**	**Vehicle identification number** **ASCII** **up to 200 characters** *** = Delimiter** **SPN 237**	**Vehicle identification number** **ASCII** **up to 200 characters** *** = Delimiter** **SPN 237**	**Vehicle identification number** **ASCII** **up to 200 characters** *** = Delimiter** **SPN 237**	**Vehicle identification number** **ASCII** **up to 200 characters** *** = Delimiter** **SPN 237**	**Vehicle identification number** **ASCII** **up to 200 characters** *** = Delimiter** **SPN 237**	Name values values values SPN

Description acc. SAE J 1939:
Vehicle identification number: Vehicle Identification Number (VIN) as assigned by the vehicle manufacturer. NOTE The ASCII character "*" is reserved as a delimiter.

Annotations:

1) If the Vehicle ID is up to 8 Bytes (including) then it is broadcasted with PGN 00FEEC containing the vehicle ID and filled with “FF” at the unused bytes.
2) If the Vehicle ID contains more than 8 Bytes then a TP.CM (PGN 00EC00) with a minimum of two TP.DT (PGN 00EB00) will be used.

Information might be a sub-set of the full VIN. ie: only last 8 bytes are sent
see example 2.1

Additional comment:

1.1.6 FMS-standard Interface Identity / Capabilities: FMS

0x00FDD1								PGN Hex
64,977								PGN
10.000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1				Bit No
Reserved for (Bus) FMS-Standard	SW-version supported Version number in the format ab.cd where this byte represents “a” ASCII SPN 2806	SW-version supported Version number in the format ab.cd where this byte represents “b” ASCII SPN 2806	SW-version supported Version number in the format ab.cd where this byte represents “c” ASCII SPN 2806	SW-version supported Version number in the format ab.cd where this byte represents “d” ASCII SPN 2806	Reserved for (Bus) FMS-Standard	Reserved for (Bus) FMS-Standard	Reserved for (Bus) FMS-Standard	Name values values values values values SPN
Requests supported 00 = request is not supported 01= request is supported 10 = reserved 11 = don´t care SPN 2805								Name values values values values values values SPN
Diagnostics supported 00 = diagnostics is not supported 01 = diagnostics is supported 10 = reserved 11 = don´t care SPN 2804								Name values values values values values values SPN

Description acc. SAE J 1939:

Information which specifies the capabilities of the Fleet Management System (FMS) - standard interface device.
This PGN typically is sourced from the network interconnect FMS - standard interface device.
Requests supported: Status signal which indicates if the FMS Vehicle Interface (FMS Gateway) will respond to requests from the FMS device for the PGNs listed in the FMS Interface Specification.
This mode is to support FMS gateway devices that only operate in a 'Request' mode.
The FMS PGNs may also be broadcast periodically in this mode.
The FMS Gateway will NOT support the requests for information not included in the FMS Interface Specification onto the vehicle network..
Diagnostics supported: Status signal which indicates if the FMS Vehicle Interface (FMS Gateway) supports the handling of diagnostic messages from the vehicle network onto the FMS network.
The FMS gateway does NOT support the re-broadcast of diagnostics messages present on the vehicle network.
If this 'FMS-standard Diagnostics Supported' feature is supported by the FMS Gateway, the FMS Gateway will support the requests for diagnostics information (from the FMS device) onto the vehicle network and pass the responses onto the FMS network.
Note: This feature of the FMS Gateway is independent of the 'FMS-standard Requests Supported'. The FMS Gateway may support diagnostics without supporting the 'FMS-standard Requests Supported' function, or visa-versa..
FMS-standard SW-version supported: Information that identifies which issue level of the FMS-standard document the software included in the FMS gateway supports. Four bytes, representing ab.cd type revision level identification.
Version number in the format ab.cd where byte2 and 3 represent the version number for trucks “ab” (ASCII)
Byte 4 and 5 represent the version for buses and coaches “cd”(ASCII)
“00” represents “not supported”
For example, FMS-standard version 02.06 means the fms gateway supports version 02 of truck fms-standard and version 06 of bus fms-standard.

Additional comment:

See example 2.2

1.1.7 High Resolution Vehicle Distance: VDHR

0x00FEC1								PGN Hex
65,217								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1					Bit No
High resolution total vehicle distance 5 m / Bit gain 0 m offset SPN 917	High resolution total vehicle distance 5 m / Bit gain 0 m offset SPN 917	High resolution total vehicle distance 5 m / Bit gain 0 m offset SPN 917	High resolution total vehicle distance 5 m / Bit gain 0 m offset SPN 917	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Name values values values values SPN

Description acc. SAE J 1939:

High resolution total vehicle distance: Accumulated distance travelled by the vehicle during its operation.

Additional comment:

The mentioned resolution is not related to the accuracy of the signal

1.1.8 Tachograph : TCO1

0x00FE6C								PGN Hex
65,132								PGN
20 ms/ 50 ms								Rep. Rate
Data Byte 1	**Data Byte 2**	**Data Byte 3**	**Data Byte 4**	**Data Byte 5**	**Data Byte 6**	**Data Byte 7**	**Data Byte 8**	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1			8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	Bit No.
Vehicle motion 00 = Vehicle motion not detected 01 = vehicle motion detected SPN 1611	Vehicle Overspeed 00 = No overspeed 01 = Overspeed SPN 1614	Not used for (Bus) FMS-Standard could be sent as "not available" or "don´t care"	Direction indicator 00 = Forward 01 = Reverse SPN 1619	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Tachogr. vehicle speed 1/256 km/h Bit gain 0 km/h offset SPN 1624	Tachogr. Vehicle speed 1/256 km/h Bit gain 0 km/h offset SPN 1624	Name values values values values SPN
Driv. 2 working state 000 = Rest 001 = Driver available 010 = Work 011 = Drive 110 = Error 111 = not available SPN 1613	Driver 1 card 00 = Card not present 01= Card present SPN 1615	Driver 2 card 00 = Card not present 01= Card present SPN 1616	Tachgraph performance 00 = Normal performance 01 = Performance analysis SPN 1620					Name values values values values values values values SPN
Driv. 1 working state 000 = Rest 001 = Driver available 010 = Work 011 = Drive 110 = Error 111 = not available SPN 1612	Driv. 1 time rel states 0000 = normal 0001 = 15 min bef. 4 ½ h 0010 = 4 ½ h reached 0011 = 15 min bef. 9 h 0100 = 9 h reached 0101 = 15 min bef. 16 h 0110 = 16h reached 1110 = Error 1111 = not available SPN 1617	Driv 2 time rel. states 0000 = normal 0001 = 15 min bef. 4 ½ h 0010 = 4 ½ h reached 0011 = 15 min before 9 h 0100 = 9 h reached 0101 = 15 min bef. 16 h 0110 = 16h reached 1110 = Error 1111 = not available SPN 1618	Handling information 00 = no handling information 01 = handling information SPN 1621					Name values values values values values values values values values SPN
			System event 00 = no tachogr. Event 01 = tachogr. Event SPN 1622					Name values values SPN

Description acc. SAE J 1939:

Vehicle motion: Indicates whether motion of the vehicle is detected or not.
Driver 2 Working State: State of work of the driver.
Driver 1 Working State: State of work of the driver.
Vehicle Overspeed: Indicates whether the vehicle is exceeding the legal speed limit set in the tachograph.
Driver 1 Card: Indicates the presence of a driver card.
Driver 1 Time Related Status: Indicates if the driver approaches or exceeds working time limits (or other limits).
Driver 2 Card: Indicates the presence of a driver card.
Driver 2 Time Related Status: Indicates if the driver approaches or exceeds working time limits (or other limits).
Direction Indicator: Indicates the direction of the vehicle.
Tachograph Performance: Indicates the tachograph performance; including electronic or mechanical analysis, instrument analysis, speed sensor analysis, mass storage analysis, and printer analysis.
Handling Information: Indicates that handling information is present. Information could include 'no printer paper', 'no driver card', etc.
System Event: Indicates that a tachograph event has occurred. This may include power supply interruption, interruption of the speed sensor, incorrect data on the driver card, driving without a driver card, illegal removal of a driver card, insertion of a driver card during driving, and time adjustment.
Tachograph Vehicle Speed: Speed of the vehicle registered by the tachograph.

Additional comment:

Tachograph vehicle speed might differ from the wheel based speed

The availability of the value direction indicator (SPN 1619) is tachograph dependant.
At the issuing date of this document the tachographs are not supporting this value.

Only available if a digital tachograph is present

1.1.9 Engine Temperature 1: ET1

0x00FEEE								PGN Hex
65,262								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1								Bit No
Engine coolant temperature 1 °C / Bit gain - 40 °C offset SPN 110	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Name values values values SPN

Description acc. SAE J 1939:

Engine Coolant Temperature: Temperature of liquid found in engine cooling system.

Additional comment:

The mentioned resolution is not related to the accuracy of the signal

1.1.10 Ambient Conditions: AMB

0x00FEF5								PGN Hex
65,269								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
			8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1				Bit No
Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Ambient Air Temperature 0.03125 °C / Bit gain - 273 °C offset SPN 171	Ambient Air Temperature 0.03125 °C / Bit gain - 273 °C offset SPN 171	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Name Name values values values values SPN

Description acc. SAE J 1939:

Ambient Air Temperature: Temperature of air surrounding vehicle.

Additional comment:

The mentioned resolution is not related to the accuracy of the signal

1.1.11 Driver's Identification: DI

0x00FE6B								PGN Hex
65,131								PGN
10000 ms								Rep. Rate
Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Variable 1-n	Byte No
8-1	8 - 1	8 – 1	8-1	8 - 1	8 - 1	8 - 1	8 - 1	Bit No.
Driver 1 identification Driver 2 identification SPN 1625/1626	Driver 1 identification Driver 2 identification SPN 1625/1626	Driver 1 identification Driver 2 identification SPN 1625/1626	Driver 1 identification Driver 2 identification SPN 1625/1626	Driver 1 identification Driver 2 identification SPN 1625/1626	Driver 1 identification Driver 2 identification SPN 1625/1626	Driver 1 identification Driver 2 identification SPN 1625/1626	Driver 1 identification Driver 2 identification SPN 1625/1626	Name Name values values values values SPN

Description acc. SAE J 1939:

Field: a Driver 1 Identification Delimiter (ASCII '*') b Driver 2 Identification Delimiter (ASCII '*')
NOTE - If only driver card 1 is present, only the parameter driver 1 identification and two delimiters shall be transmitted.
If only driver card 2 is present, a delimiter followed by parameter driver 2 identification and the second delimiter shall be transmitted.
If no driver cards are present, only the two delimiters shall be sent."

Additional comment:

The driver ID is only available if a digital tachograph is present.
Driver ID = Issuing member state + CardNumber = 3 + 16 Byte (acc. ISO 16844)
If a driver ID is available the message is sent with a Broadcast Announce Message (BAM)
If no driver cards are present then it is broadcasted with PGN 00FE6B (8Byte) containing two delimiters and filled with “FF” at the unused bytes.

Difference to SAE: broadcast instead of on request

The information is sent by the tachograph. Depending on the tachograph brand the information is not immediately available after insertion of the driver card.

1.1.12 Fuel Economy: LFE

0x00FEF2								PGN Hex
65,266								PGN
100 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1					Bit No.
Fuel Rate 0.05 L/h per bit 0 offset 0 to 3,212.75 L/h SPN 183	Fuel Rate 0.05 L/h per bit 0 offset 0 to 3,212.75 L/h SPN 183	Instantaneous Fuel Economy 1/512 km/L per bit 0 offset 0 to 125,5 km/L SPN 184	Instantaneous Fuel Economy 1/512 km/L per bit 0 offset 0 to 125,5 km/L SPN 184	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Name Name values values values values SPN

Description acc. SAE J 1939:

Fuel rate: Amount of fuel consumed by engine per unit of time

Instantaneous Fuel Economy: Current fuel economy at current vehicle velocity

Additional comment:

Calculated values given as indications, not as contractual values.

The mentioned resolution is not related to the accuracy of the signal

1.1.13 Air Supply Pressure : AIR1

0x00FEAE								PGN Hex
65,198								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
		8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1					Bit No.
Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Service Brake Air Pressure Circuit #1 8 kPa/Bit 0 offset SPN 1087	Service Brake Air Pressure Circuit #2 8 kPa/Bit 0 offset SPN 1088	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Name Name values values values values SPN

Description acc. SAE J 1939:

Service Brake Air Pressure Circuit #1: The pneumatic pressure in the service brake circuit or reservoir #1.
Service Brake Air Pressure Circuit #2: The pneumatic pressure in the service brake circuit or reservoir #2.

Additional comment:

The mentioned resolution is not related to the accuracy of the signal

1.1.14 High Resolution Fuel Consumption (Liquid): HRLFC

0x00FD09								PGN Hex
64,777								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
				Bit 8 - 1	Bit 8 - 1	Bit 8 - 1	Bit 8 - 1	Bit No.
Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	High resolution engine total fuel used 0.001 L/bit 0 offset 0 to 4,211,081.215 L SPN 5054	High resolution engine total fuel used 0.001 L/bit 0 offset 0 to 4,211,081.215 L SPN 5054	High resolution engine total fuel used 0.001 L/bit 0 offset 0 to 4,211,081.215 L SPN 5054	High resolution engine total fuel used 0.001 L/bit 0 offset 0 to 4,211,081.215 L SPN 5054	Name Name values values values values SPN

Description acc. SAE J 1939:

Engine fuel consumption accumulators

High resolution engine total fuel used: Accumulated amount of fuel used during vehicle operation. High resolution used for calculations and fleet management systems.

Additional comment:

Is implemented if technical possible

Calculated values given as indications, not as contractual values.

The mentioned resolution is not related to the accuracy of the signal

1.1.15 Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Information: AT1T1I

0x00FE56								PGN Hex
65,110								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1								Bit No
Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Level 0 % = Empty 100% = Full 0.4 %/bit, 0 offset SPN 1761	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Not used for (Bus) FMS-Standard	Name values values values values values SPN

Description acc. SAE J 1939:

Ratio of volume of diesel exhaust fluid to the total volume of diesel exhaust fluid storage container.

Additional comment:

The mentioned resolution is not related to the accuracy of the signal

1.1.16 FMS Tell Tale Status: FMS1

0x00FD7D								PGN Hex
64,893								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	Bit No.
Telltale Block ID see table for Block ID and Telltale ID 1111 = don't care	Telltale Status 2 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Telltale Status 4 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Telltale Status 6 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Telltale Status 8 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Telltale Status 10 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Telltale Status 12 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Telltale Status 14 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Name values values values values values
Telltale Status 1 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Telltale Status 3 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Telltale Status 5 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Telltale Status 7 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Telltale Status 9 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Telltale Status 11 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Telltale Status 13 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Telltale Status 15 000 = off 001 = Cond. Red 010 = Cond. Yellow 011 = Cond. Info 100–110 = Reserved 111 = not available	Name values values values values values
Not defined (set to "1")	Not defined (set to "1")	Not defined (set to "1")	Not defined (set to "1")	Not defined (set to "1")	Not defined (set to "1")	Not defined (set to "1")	Not defined (set to "1")	Name values values values values values

Table for Telltale status:

Block ID	Telltale Status	Telltale ID	ISO No.	Name	Mandatory Truck only		Block ID	Telltale Status	Telltale ID	ISO No.	Name	Mandatory
0	1	1	27	Cooling air conditioning			2	1	31	2441	Steering failure	
0	2	2	82	High beam, main beam			2	2	32	2461	Height Control (Levelling)	
0	3	3	83	Low beam, dipped beam			2	3	33	2574	Retarder	
0	4	4	84	Turn signals			2	4	34	2596	Engine Emission system failure (Mil indicator)	
0	5	5	85	Hazard warning			2	5	35	2630	ESC indication	
0	6	6	100	Provision for the disabled or handicapped persons			2	6	36	no	Brake lights	
0	7	7	238	Parking Brake	X		2	7	37	no	Articulation	
0	8	8	239	Brake failure/brake system malfunction			2	8	38	no	Stop Request	
0	9	9	242	Hatch open			2	9	39	no	Pram request	
0	10	10	245	Fuel level	X		2	10	40	no	Bus stop brake	
0	11	11	246	Engine coolant temperature	X		2	11	41	2946	AdBlue level	
0	12	12	247	Battery charging condition			2	12	42	no	Raising	
0	13	13	248	Engine oil	X		2	13	43	no	Lowering	
0	14	14	456	Position lights,side lights			2	14	44	no	Kneeling	
0	15	15	633	Front fog light			2	15	45	no	Engine compartment temperature	
1	1	16	634	Rear fog light			3	1	46	no	Auxillary air pressure	
1	2	17	637	Park Heating			3	2	47	2432	Air filter clogged	
1	3	18	640	Engine / Mil indicator	X		3	3	48	2452	Fuel filter differential pressure	
1	4	19	717	Service, call for maintenance			3	4	49	249	Seat belt	
1	5	20	1168	Transmission fluid temperature			3	5	50	no	EBS	
1	6	21	1396	Transmission failure/malfunction			3	6	51	2682	Lane departure indication	
1	7	22	1407	Anti-lock brake system failure			3	7	52	no	Advanced emergency braking system	
1	8	23	1408	Worn brake linings			3	8	53	2681	ACC	
1	9	24	1422	Windscreen washer fluid/windshield washer fluid			3	9	54	no	Trailer connected	
1	10	25	1434	Tire failure/malfunction			3	10	55	2444/2445	ABS Trailer 1,2	
1	11	26	1603	Malfunction/general failure			3	11	56	2108	Airbag	
1	12	27	2426	Engine oil temperature			3	12	57	no	EBS Trailer 1,2	
1	13	28	2427	Engine oil level			3	13	58	no	Tachograph indication	
1	14	29	2429	Engine coolant level			3	14	59	2649	ESC switched off	
1	15	30	2440	Steering fluid level			3	15	60	no	Lane departure warning switched off	

Annotations:

Tell Tale Status:
The Tell Tale Status information is derived from information displayed to the driver's dashboard.
The tell tale number is related to the description in the ISO 7000 document.
The not related to ISO 7000 is stated with "no"
There are three possible conditions stated: Red ("R"), Yellow ("Y"), Info ("I"). The interpretation of the status is manufacturer dependant and might be different.
For details please refer to the manufacturers' document.
The symbols used in the dash display of each manufacturer might vary from ISO symbols.
The lamp characteristic (e.g. flashing) is not reflected in the tell tale information.
The status information is present as long the status is valid.

Additional comment:
Due to the repetition rate of the message, it is not guaranteed to include all intermittent signals.*

Truck only: The message is mandatory – some tell tale status information are not mandatory

see example in 2.3

1.2 Parameters for Truck FMS-Standard

1.2.1 Cruise Control/Vehicle Speed: CCVS

0x00FEF1								PGN Hex
65,265								PGN
100 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1			8 7 6 5 4 3 2 1		Bit No
Not used for FMS-Standard	Wheel based speed 1/256 km/h Bit gain 0 km/h offset SPN 84	Wheel based speed 1/256 km/h Bit gain 0 km/h offset SPN 84	Clutch switch 00 = pedal released 01 = pedal depressed SPN 598	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name values values values SPN
			Brake switch 00 = pedal released 01 = pedal depressed SPN 597			PTO state 00000 = off/disabled 00101 = Set 11111 = not available SPN 976		Name values values values SPN
			Not used for FMS Standard					Name
			Cruise control active 00 = switched off 01 = switched on SPN 595					Name values values values SPN

Description acc. SAE J 1939:

Wheel Based Speed: Speed of the vehicle as calculated from wheel or tailshaft speed.
Clutch Switch: Switch signal which indicates that the clutch pedal is being pressed. It is necessary for a safe drivetrain behaviour that the clutch switch is set before the clutch is opened (cruise control function).
Brake Switch: Switch signal which indicates that the driver operated brake foot pedal is being pressed. This brake foot pedal is controlling the vehicles' service brake (total vehicle braking application, not park brakes). It is necessary for safe drivetrain behaviour that the switch activates before the physical braking components are activated (i.e. Disengage the cruise control function prior to the activation of friction brakes).
Cruise Control Active: Cruise control is switched on. It is not ensured that the engine is controlled by cruise control, as in the case of a large driver's demand the engine is controlled by the driver while cruise control is active (maximum selection of cruise control and driver's demand). The cruise control is set to 0 if a switch off condition occurs.
PTO state: This parameter is used to indicate the current state or mode of operation by the power takeoff (PTO) device. It needs to be ensured that each achieved state information be set up to be conveyed in at least one datalink message before a transition to another state is allowed.
Off/Disabled 00000b — Used to indicate that the PTO enable switch is in the off position.
Set 00101b — Used to indicate that the PTO device is establishing current speed as the operating speed (captured value).

Additional comment:

The cruise control conditions might vary on different brands.

Wheel based speed might vary from tacho speed.

The PTO state might be different over the brands (not comparable) due to different internal topology

Either SPN 3948 (PTO DE) or SPN 976 (CCVS) is sent. PTO DE message is preferred

The clutch switch information is depending on the gear box type *

The mentioned resolution is not related to the accuracy of the signal

1.2.2 Electronic Engine Controller #2: EEC2

0x00F003								PGN Hex
61,443								PGN
50 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1						Bit No
Not used for FMS-Standard	Accelerator pedal position 1 0,4 % / Bit gain 0 % offset SPN 91	Engine Percent Load At Current Speed 1 % / bit, 0 offset 0 to 125 % op. range SPN 92	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name values values values SPN

Description acc. SAE J 1939:

Accelerator Pedal Position: The ratio of actual position of the analogue engine speed/torque request input device (such as an accelerator pedal or throttle lever) to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. If an application has only one accelerator control, use SPN 91. For on-highway vehicles, this will typically be the operator's accelerator pedal. Although it is used as an input to determine powertrain demand, it also provides anticipatory information to transmission and ASR algorithms about driver actions.

Engine Percent Load At Current Speed
At Current Speed
The ratio of actual engine percent torque (indicated) to maximum indicated torque available at the current engine speed, clipped to zero torque during engine braking.

Additional comment:

The mentioned resolution is not related to the accuracy of the signal

1.2.3 Vehicle Weight: VW

0x00FEEA								PGN Hex
65,258								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1						Bit No
Axle location Bit-mapped position number counting front to back facing forward F = not available SPN 928	Axle weight 0.5 kg / Bit gain 0 kg offset SPN 582	Axle weight 0.5 kg / Bit gain 0 kg offset SPN 582	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name values values values values values values SPN
Tire location Bit-mapped counting left to right facing forward F = not available SPN 928								Name values values values values values values values SPN

Description acc. SAE J 1939:

Axle / Tire Location: To identify to which of several similar devices (such as tires or fuel tanks) the information applies.
The low order 4 bits represent a position number, counting left to right when facing in the direction of normal vehicle travel (forward).
The high order 4 bits represent a position number, counting front to back on the vehicle.
The value 0xFF indicates not available.
It is recommended that output devices add 1 to the position number (range 1 to 15, not 0 to 14) for use by drivers and service technicians.
Examples: Tire pressure for location 0x00 would be left front tire.
Tire pressure for location 0x23 would be right outside rear rear on a 3-axle tractor with dual axle per side (3rd axle, 4th tire)
Axel weight: Total mass imposed by the tires on the road surface at the specified axle.

Additional Comment:

The repetition rate for this PGN is 1000ms and contains information about one axle.

If there are more axles available the information will be updated with each repetition (e.g. information about 3 axles will have a repetition of 3000 ms for each axle).

Please refer to the OEM documentation for more detailed information.

1.2.4 Service Information: SERV

0x00FEC0								PGN Hex
65,216								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1						Bit No
Not used for FMS-Standard	Service distance 5 km / Bit gain -160 635 km offset SPN 914	Service distance 5 km / Bit gain -160 635 km offset SPN 914	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name values values values SPN

Description acc. SAE J 1939:

Service distance: The distance which can be travelled by the vehicle before the next service inspection is required. A negative distance is transmitted if the service inspection has been passed. The component that requires service is identified by the service component identification (see SPN 911-913, 1379, and 1584)

Additional comment:

1.2.5 PTO Drive Engagement: PTODE

0x00FDA4								PGN Hex
64,932								PGN
100 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
						8 7 6 5 4 3 2 1		Bit No.
Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	At least one PTO engaged 00 No PTO drive is engaged 01 At least one PTO drive is engaged 10 Error 11 Not available SPN 3948	Not used for FMS-Standard	Name Name values values values values values values values values SPN
						Not used for FMS-Standard		

Description acc. SAE J 1939:

Information relating to the request for engagement, consent for engagement, and status of engagement of various specific physical PTO drives.

This message may be broadcast by one or all controllers involved in the enabling of a given PTO drive

At least one PTO engaged: Indicates that at least one PTO is engaged

Note: This parameter should only be sent by the controller that has knowledge of all PTO drives on the vehicle (e.g, the FMS gateway).

Individual PTO drive controllers should broadcast this parameter as "not available".

Additional comment:

Either SPN 3948 (PTO DE) or SPN 976 (CCVS) is sent. PTO DE message is preferred

1.2.6 Combination Vehicle Weight: CVW

0x00FE70								PGN Hex
65,136								PGN
10 000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
		8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1					Bit No.
Not used for FMS-Standard	Not used for FMS-Standard	Gross Combination Vehicle Weight 10 kg/bit 0 offset 0 to 642,550 kg SPN 1760	Gross Combination Vehicle Weight 10 kg/bit 0 offset 0 to 642,550 kg SPN 1760	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Name Name values values values values values SPN

Description acc. SAE J 1939:

The total weight of the truck and all attached trailers.

Additional comment:

1.2.7 Electronic Retarder Controller 1: ERC1

0x00F000								PGN Hex
61,440								PGN
100 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1					8 7 6 5 4 3 2 1		Bit No
Retarder Torque Mode 16 states/4 bit, 0 offset SPN 900	Actual Retarder - Percent Torque 1 %/bit, -125 % offset SPN 520	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Not used for FMS-Standard	Retarder Selection, non-engine 0.4 %/bit, 0 % offset SPN 1716	Not used for FMS-Standard	Name values values values SPN
Not used for FMS-Standard								

Description acc. SAE J 1939:

Retarder Torque Mode: State signal which indicates which retarder torque mode is currently generating, limiting, or controlling the torque.
Note that the modes are not in prioritized order. Not all modes may be relevant for a given device. Some devices may not implement all functions.
Mode 0000b means “No request”: retarder torque = 0 (no braking). See Appendix D in SAE documentation
Modes 0001b to 1110b indicate that there is either a torque request or the identified function is currently controlling the retarder:
retarder torque may range from 0 (no braking) to the upper limit.

Actual Retarder - Percent Torque: Actual braking torque of the retarder as a percent of retarder configuration reference torque SPN 556.

Retarder Selection, non-engine: The “Retarder Selection, non-engine” is the position of the driver’s selector for retarders that are not part of the engine system, expressed as percent and determined by the ratio of current position to the maximum possible position. The physical device may be a lever, rotary dial, combination of switches, or other device that the driver can use to select the type or amount of retardation needed.

Additional comment:

For SPN 1716: The value is related to the driver’s selection of a retarder (engine and/or drive line).

1.3 Parameters for Bus FMS-Standard

1.3.1 Cruise Control/Vehicle Speed: CCVS

0x00FEF1								PGN Hex
65,265								PGN
100 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1					Bit No
Not used in Bus FMS-Standard	Wheel based speed 1/256 km/h Bit gain 0 km/h offset SPN 84	Wheel based speed 1/256 km/h Bit gain 0 km/h offset SPN 84	Clutch switch 00 = pedal released 01 = pedal pressed SPN 598	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Name values values values values SPN
Parking Brake Switch 00 = Parking brake not set 01 = Parking brake set SPN 70			Brake switch 00 = pedal released 01 = pedal depressed SPN 597					Name values values values values values SPN
			Not used in Bus FMS-Standard					
			Cruise control active 00 = switched off 01 = switched on SPN 595					Name values values values values SPN

Description acc. SAE J 1939:

Parking Brake Switch: Switch signal which indicates when the parking brake is set. In general the switch actuated by the operator's park brake control, whether a pedal, lever or other control mechanism.
Wheel Based Speed: Speed of the vehicle as calculated from wheel or tailshaft speed.
Clutch Switch: Switch signal which indicates that the clutch pedal is being pressed. It is necessary for a safe drivetrain behaviour that the clutch switch is set before the clutch is opened (cruise control function).
Brake Switch: Switch signal which indicates that the driver operated brake foot pedal is being pressed. This brake foot pedal is controlling the vehicles' service brake (total vehicle braking application, not park brakes). It is necessary for safe drivetrain behaviour that the switch activates before the physical braking components are activated (i.e. Disengage the cruise control function prior to the activation of friction brakes).
Cruise Control Active: Cruise control is switched on. It is not ensured that the engine is controlled by cruise control, as in the case of a large driver's demand the engine is controlled by the driver while cruise control is active (maximum selection of cruise control and driver's demand). The cruise control is set to 0 if a switch off condition occurs.

Additional comment:

The cruise control conditions might vary on different brands.

Wheel based speed might vary from tacho speed.

The clutch switch information is depending on the gear box type *

The mentioned resolution is not related to the accuracy of the signal

1.3.2 Electronic Engine Controller #2 : EEC2

0x00F003								PGN Hex
61,443								PGN
50 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
	8 7 6 5 4 3 2 1							Bit No
Not used in Bus FMS-Standard	Accelerator pedal position 0,4 % / Bit gain 0 % offset SPN 91	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Name Name values values values values SPN

Description acc. SAE J 1939:

Accelerator Pedal Position: The ratio of actual position of the analogue engine speed/torque request input device (such as an accelerator pedal or throttle lever) to the maximum position of the input device. This parameter is intended for the primary accelerator control in an application. If an application has only one accelerator control, use SPN 91. For on-highway vehicles, this will typically be the operator's accelerator pedal. Although it is used as an input to determine powertrain demand, it also provides anticipatory information to transmission and ASR algorithms about driver actions.

Additional comment:

The mentioned resolution is not related to the accuracy of the signal

1.3.3 Door Control 1: DC1

0x00FE4E								PGN Hex
65,102								PGN
100 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1								Bit No.
Status 2 of doors 00 = all bus doors disabled 01 = at least 1 bus door enabled 10 = error 11 = not avialable SPN 3411	Not used in Bus-FMS-Standard	Not used in Bus-FMS-Standard	Not used in Bus-FMS-Standard	Not used in Bus-FMS-Standard	Not used in Bus-FMS-Standard	Not used in Bus-FMS-Standard	Not used in Bus-FMS-Standard	Name values values values values values values values values SPN
Ramp/Wheel chairlift 00 = inside bus 01 = outside bus 10 = Error 11 = not available SPN 1820								Name values values values values values values SPN
Position of doors 0000 = at least 1 door is open 0001 = closing last door 0010 = all doors closed 0011-1101 not defined 1110 = Error 1111 = not avialable SPN 1821								Name values values values values values values values values SPN

Description acc. SAE J 1939:

Status 2 of doors: Composite indication of all bus door statuses. Enabled means the bus doors are able to be automatically opened or closed..
Ramp/Wheel Chair Lift Position: Signal which indicates the actual position of the ramp / wheel chair lift.
Position of Doors: Signal which indicates the actual position of the doors.

Additional comment:

For the door configuration please contact the manufacturer of the vehicle

1.3.4 Door Control 2: DC2

0x00FDA5								PGN Hex
64,933								PGN
100 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	Bit No.
Lock Status Door 2 00 = Unlocked 01 = Locked 10 = Error 11 = Not available SPN 3415	Open Status Door 3 00 = Closed 01 = Open 10 = Error 11 = Not available SPN 3419	Enable Status Door 4 00 = Disabled 01 = Enabled 10 = Error 11 = Not available SPN 3423	Lock Status Door 6 00 = Unlocked 01 = Locked 10 = Error 11 = Not available SPN 3427	Open Status Door 7 00 = Closed 01 = Open 10 = Error 11 = Not available SPN 3431	Enable Status Door 8 00 = Disabled 01 = Enabled 10 = Error 11 = Not available SPN 3435	Lock Status Door 10 00 = Unlocked 01 = Locked 10 = Error 11 = Not available SPN 3439	Not defined	Name values values values values values SPN
Enable Status Door 1 00 = Disabled 01 = Enabled 10 = Error 11 = Not available SPN 3414	Lock Status Door 3 00 = Unlocked 01 = Locked 10 = Error 11 = Not available SPN 3418	Open Status Door 4 00 = Closed 01 = Open 10 = Error 11 = Not available SPN 3422	Enable Status Door 5 00 = Disabled 01 = Enabled 10 = Error 11 = Not available SPN 3426	Lock Status Door 7 00 = Unlocked 01 = Locked 10 = Error 11 = Not available SPN 3430	Open Status Door 8 00 = Closed 01 = Open 10 = Error 11 = Not available SPN 3434	Enable Status Door 9 00 = Disabled 01 = Enabled 10 = Error 11 = Not available SPN 3438	Not defined	Name values values values values values SPN
Open Status Door 1 00 = Closed 01 = Open 10 = Error 11 = Not available SPN 3413	Enable Status Door 2 00 = Disabled 01 = Enabled 10 = Error 11 = Not available SPN 3417	Lock Status Door 4 00 = Unlocked 01 = Locked 10 = Error 11 = Not available SPN 3421	Open Status Door 5 00 = Closed 01 = Open 10 = Error 11 = Not available SPN 3425	Enable Status Door 6 00 = Disabled 01 = Enabled 10 = Error 11 = Not available SPN 3429	Lock Status Door 8 00 = Unlocked 01 = Locked 10 = Error 11 = Not available SPN 3433	Open Status Door 9 00 = Closed 01 = Open 10 = Error 11 = Not available SPN 3437	Enable Status Door 10 00 = Disabled 01 = Enabled 10 = Error 11 = Not available SPN 3441	Name values values values values values SPN
Lock Status Door 1 00 = Unlocked 01 = Locked 10 = Error 11 = Not available SPN 3412	Open Status Door 2 00 = Closed 01 = Open 10 = Error 11 = Not available SPN 3416	Enable Status Door 3 00 = Disabled 01 = Enabled 10 = Error 11 = Not available SPN 3420	Lock Status Door 5 00 = Unlocked 01 = Locked 10 = Error 11 = Not available SPN 3424	Open Status Door 6 00 = Closed 01 = Open 10 = Error 11 = Not available SPN 3428	Enable Status Door 7 00 = Disabled 01 = Enabled 10 = Error 11 = Not available SPN 3432	Lock Status Door 9 00 = Unlocked 01 = Locked 10 = Error 11 = Not available SPN 3436	Open Status Door 10 00 = Closed 01 = Open 10 = Error 11 = Not available SPN 3440	Name values values values values values SPN

Remark: **Lock Status:** **locked** -> doors cannot be operated by the driver or a passenger
unlocked -> door may be operated by the driver or a passenger
Enable Status: **disabled** -> door cannot be opened by a passenger
enabled -> door can be opened by a passenger
Open Status: **closed** -> door is completely closed
open -> door is not completely closed

Additional comment:
For the door configuration please contact the manufacturer of the vehicle

1.3.5 Time / Date : TD

0x00FEE6								PGN Hex
65,254								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte	Data Byte	Byte No
8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1	8 7 6 5 4 3 2 1			Bit No.
Seconds 0.25 s/Bit 0 Offset SPN 959	Minutes 1 min /Bit 0 offset SPN 960	Hours 1 hr/Bit 0 offset SPN 961	Month 1 month/Bit 0 offset SPN 963	Day 0.25 day/Bit 0 offset SPN 962	Year 1 year/Bit 1985 years offset SPN 964	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Name values values values values SPN

Description acc. SAE J 1939:

Seconds: Part of a parameter used to represent time.
Minutes: Part of a parameter used to represent time.
Hours: Part of a parameter used to represent time.
Month: Part of a parameter used to represent a calendar date.
NOTE - A value of 0 for the month is null. The value 1 identifies January; 2 identifies February; etc.
Day: Part of a parameter used to represent a calendar date.
NOTE - A value of 0 for the date is null. The values 1, 2, 3, and 4 are used to identify the first day of the month; 5, 6, 7, and 8 identify the second day of the month; etc.
Year: Part of a parameter used to represent a calendar date.
NOTE - A value of 0 for the year identifies the year 1985; a value of 1 identifies 1986; etc.

Additional comment:

Difference to SAE: broadcast instead of on request

Time base is OEM dependant *

1.3.6 Alternator Speed : AS

0x00FED5								PGN Hex
65,237								PGN
1000 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
		8 7 6 5 4 3 2 1						Bit No.
Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Alternator Status 4 00 = not charging 01 = charging 10 = error 11 = not available SPN 3356	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Name values values values values values SPN
		Alternator Status 3 00 = not charging 01 = charging 10 = error 11 = not available SPN 3355						Name values values values values values SPN
		Alternator Status 2 00 = not charging 01 = charging 10 = error 11 = not available SPN 3354						Name values values values values values SPN
		Alternator Status 1 00 = not charging 01 = charging 10 = error 11 = not available SPN 3353						Name values values values values values SPN

Description acc. SAE J 1939:

Actual alternator 1-4 status

1.3.7 Electronic Transmission Controller 2 : ETC2

0x00F005								PGN Hex
61,445								PGN
100 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 7 6 5 4 3 2 1			8 7 6 5 4 3 2 1					Bit No.
Selected Gear 1 gear value/Bit -125 offset negative gear are reverse gears 00000000 = neutral 11111011 = park SPN 524	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Current Gear 1 gear value/Bit -125 offset negative gear are reverse gears 00000000 = neutral 11111011 = park SPN 523	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Not used in Bus FMS-Standard	Name values values values values values values values SPN

Description acc. SAE J 1939:

Selected Gear: The gear that the transmission will attempt to achieve during the current shift if a shift is in progress, or the next shift if one is pending (i.e., waiting for torque reduction to initiate the shift).

Current Gear : The gear currently engaged in the transmission or the last gear engaged while the transmission is in the process of shifting to the new or selected gear. Transitions toward a destination gear will not be indicated. Once the selected gear has been engaged then Current Gear will reflect that gear.

Additional comment:

The signal might have limited resolution for gearboxes without electronic control units *

1.3.8 Air Suspension Control 4 : ASC4

0x00FE58								PGN Hex
65,112								PGN
100 ms								Rep. Rate
Data Byte 1	Data Byte 2	Data Byte 3	Data Byte 4	Data Byte 5	Data Byte 6	Data Byte 7	Data Byte 8	Byte No
8 - 1	8 - 1	8 - 1	8 - 1	8 - 1	8 - 1	8- 1	8 - 1	Bit No.
Bellow Pressure Front Axle Left 0.1 kPa/Bit 0 offset SPN 1725	Bellow Pressure Front Axle Left 0.1 kPa/Bit 0 offset SPN 1725	Bellow Pressure Front Axle Right 0.1 kPa/Bit 0 offset SPN 1726	Bellow Pressure Front Axle Right 0.1 kPa/Bit 0 offset SPN 1726	Bellow Pressure Rear Axle Left 0.1 kPa/Bit 0 offset SPN 1727	Bellow Pressure Rear Axle Left 0.1 kPa/Bit 0 offset SPN 1727	Bellow Pressure Rear Axle Right 0.1 kPa/Bit 0 offset SPN 1728	Bellow Pressure Rear Axle Right 0.1 kPa/Bit 0 offset SPN 1728	Name Name values values values values SPN

Description acc. SAE J 1939:

Used for bellow pressure information

Additional comment:

The configuration is manufacturer dependant.*

The mentioned resolution is not related to the accuracy of the signal

2 Examples

2.1 Broadcast Announce Message (BAM) for Vehicle ID longer than 8 Byte

Transport Protocol – Connection Management (TP.CM)

0x00ECFF								PGN Hex
60,671								PGN
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte No
								Bit No
Control byte should be filled with (20_{16})	Total message size, number of bytes	Total message size, number of bytes	Total number of packets	Reserved should be filled with FF_{16}	Parameter Group Number of packeted message	Parameter Group Number of packeted message	Parameter Group Number of packeted message	Name values values values SPN

Transport Protocol – Data Transfer (TP.DT)

0x00EBFF								PGN Hex
60,415								PGN
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8	Byte No
								Bit No
Sequence Number	Packetized Data	Packetized Data	Packetized Data	Packetized Data	Packetized Data	Packetized Data	Packetized Data	Name values values values SPN

In the situation shown in Figure 1, a node indicates to the network that it is about to transfer a multipacket message utilizing the service of the transport protocol.
In this example, the PGN $00FEEC_{16}$ (Vehicle Identification) is being broadcasted to the network.
The length of the Vehicle ID in this example is 17.
The unused bytes in the last TP.DT are filled with FF_{16}.
The originating node first transmits a TP.CM Broadcast Announce Message (BAM) followed by the data packets.
No acknowledgment is performed by any of the responders.

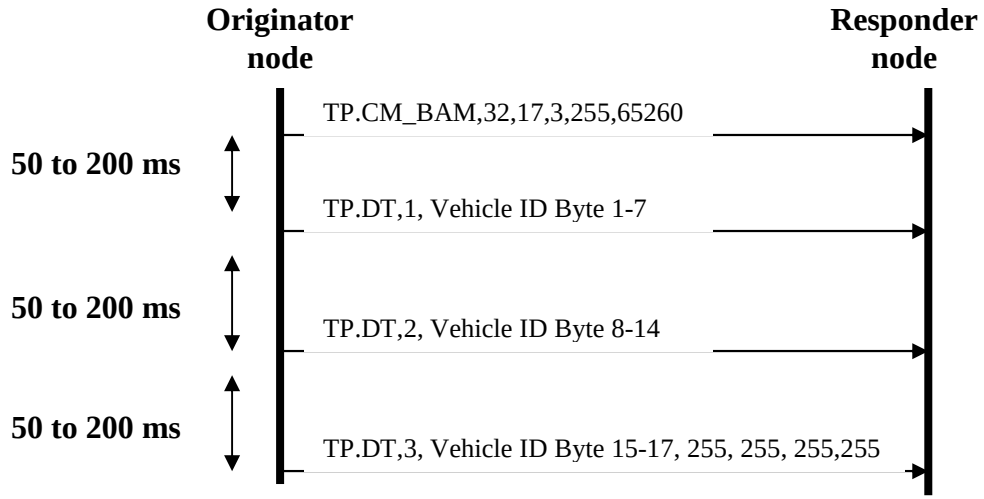

Figure 1

Time (ms)	ID	DLC	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0	PR EC FF SA $_{16}$	8	20 $_{16}$	11 $_{16}$	00 $_{16}$	03 $_{16}$	FF $_{16}$	EC $_{16}$	FE $_{16}$	00 $_{16}$
50	PR EB FF SA $_{16}$	8	01 $_{16}$	Vehicle ID byte 1 – 7						
100	PR EB FF SA $_{16}$	8	02 $_{16}$	Vehicle ID byte 8 – 14						
150	PR EB FF SA $_{16}$	8	03 $_{16}$	Vehicle ID byte 15	Vehicle ID byte 16	Vehicle ID byte 17	FF $_{16}$	FF $_{16}$	FF $_{16}$	FF $_{16}$

PR is Priority (to be masked)
SA is Source Address (to be masked)

2.2 Example SW Identification for buses and/or trucks

	ID	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
Supporting Bus-FMS-Standard Version 01	0x00FD D1 $_{16}$	X0 $_{16}$	30 $_{16}$	30 $_{16}$	30 $_{16}$	31 $_{16}$	FF $_{16}$	FF $_{16}$	FF $_{16}$
Supporting Truck-FMS-Standard Version 02	0x00FD D1 $_{16}$	X0 $_{16}$	30 $_{16}$	32 $_{16}$	30 $_{16}$	30 $_{16}$	FF $_{16}$	FF $_{16}$	FF $_{16}$
Supporting Bus FMS-Standard Version 03 and Truck FMS-Standard Version 03	0x00FD D1 $_{16}$	X0 $_{16}$	30 $_{16}$	33 $_{16}$	30 $_{16}$	33 $_{16}$	FF $_{16}$	FF $_{16}$	FF $_{16}$

Remark: **Byte 2 – Byte 5 are ASCII** **X=reserved and set to F_{16}**

30_{16} = “0” ASCII
31_{16} = “1” ASCII
32_{16} = “2” ASCII
33_{16} = “3” ASCII

2.3 Example FMS Tell Tale Status

ID	Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	Byte 7	Byte 8
0x00FD7D $_{16}$	**B0 $_{16}$**	**FF $_{16}$**	**FF $_{16}$**	**9F $_{16}$**	**FA $_{16}$**	**A8 $_{16}$**	**9B $_{16}$**	**FF $_{16}$**
TTS	Block ID = 0 Status 1 = Info	Status 2 = not av. Status 3 = not av.	Status 4= not av. Status 5= not av.	Status 6= not av. Status 7= Red	Status 8= Yellow Status 9= not av.	Status 10= off Status 11= Yellow	Status 12= Info Status 13= Red	Status 14= not av. Status 15= not av.
0x00FD7D $_{16}$	**F1 $_{16}$**	**8F $_{16}$**	**AF $_{16}$**	**B8 $_{16}$**	**FB $_{16}$**	**88 $_{16}$**	**AA $_{16}$**	**BB $_{16}$**
TTS	Block ID = 1 Status 1 = not av.	Status 2 = not av. Status 3 = off	Status 4= not av. Status 5= Yellow	Status 6= off Status 7= Info	Status 8= Info Status 9= not av.	Status 10= off Status 11= off	Status 12= Yellow Status 13= Yellow	Status 14= Info Status 15= Info
0x00FD7D $_{16}$	**A2 $_{16}$**	**F8 $_{16}$**	**88 $_{16}$**	**FF $_{16}$**	**FF $_{16}$**	**AF $_{16}$**	**FF $_{16}$**	**FF $_{16}$**
TTS	Block ID = 2 Status 1 = Yellow	Status 2 = off Status 3 = not av.	Status 4= off Status 5= off	Status 6= not av. Status 7= not av.	Status 8= not av. Status 9= not av.	Status 10= not av. Status 11= Yellow	Status 12= not av. Status 13= not av.	Status 14= not av. Status 15= not av.
0x00FD7D $_{16}$	**F3 $_{16}$**	**BB $_{16}$**	**88 $_{16}$**	**88 $_{16}$**	**8B $_{16}$**	**88 $_{16}$**	**88 $_{16}$**	**88 $_{16}$**
TTS	Block ID = 3 Status 1 = not av.	Status 2 = Info Status 3 = Info	Status 4= off Status 5= off	Status 6= off Status 7= off	Status 8= Info Status 9= off	Status 10= off Status 11= off	Status 12= off Status 13= off	Status 14= off Status 15= off

Remark: **The repetition rate of the PGN is 1000ms which means that the complete "Tell Tale" Msg. (four Blocks) is sent every 4000 ms**

Due to the repetition rate of the message, it is not guaranteed to include all intermittent signals.*

not av. = not available

Block ID	Status No	Status	Name		Block ID	Status No	Status	Name
0	1	Info	Cooling air conditioning		2	1	Yellow	Steering failure
0	2	Not av.	High beam, main beam		2	2	Off	Height Control (Levelling)
0	3	Not av.	Low beam, dipped beam		2	3	Not av.	Retarder
0	4	Not av.	Turn signals		2	4	Off	Engine Emission system failure (Mil indicator)
0	5	Not av.	Hazard warning		2	5	Off	ESC indication
0	6	Not av.	Provision for the disabled or handicapped persons		2	6	Not av.	Brake lights
0	7	Red	Parking Brake		2	7	Not av.	Articulation
0	8	Yellow	Brake failure/brake system malfunction		2	8	Not av.	Stop Request
0	9	Not av.	Hatch open		2	9	Not av.	Pram request
0	10	Off	Fuel level		2	10	Not av.	Bus stop brake
0	11	Yellow	Engine coolant temperature		2	11	Yellow	AdBlue level
0	12	Info	Battery charging condition		2	12	Not av.	Rasing
0	13	Red	Engine oil		2	13	Not av.	Lowering
0	14	Not av.	Position lights,side lights		2	14	Not av.	Kneeling
0	15	Not av.	Front fog light		2	15	Not av.	Engine compartment temperature
1	1	Not av.	Rear fog light		3	1	Not av.	Auxillary air pressure
1	2	Not av.	Park Heating		3	2	Info	Air filter clogged
1	3	Off	Engine		3	3	Info	Fuel filter differential pressure
1	4	Not av.	Service, call for maintenance		3	4	Off	Seat belt
1	5	Yellow	Transmission fluid temperature		3	5	Off	EBS
1	6	Off	Transmission failure/malfunction		3	6	Off	Lane departure indication
1	7	Info	Anti-lock brake system failure		3	7	Off	Advanced emergency braking system
1	8	Info	Worn brake linings		3	8	Info	ACC
1	9	Not av.	Windscreen washer fluid/windshield washer fluid		3	9	Off	Trailer connected
1	10	Off	Tire failure/malfunction		3	10	Off	ABS Trailer 1,2
1	11	Off	Malfunction/general failure		3	11	Off	Airbag
1	12	Yellow	Engine oil temperature		3	12	Off	EBS Trailer 1,2
1	13	Yellow	Engine oil level		3	13	Off	Tachograph indication
1	14	Info	Engine coolant level		3	14	Off	ESC switched off
1	15	Info	Steering fluid level		3	15	Off	Lane departure warning switched off

3 Overview Messages

			(signal) name	Mandatory	rep. rate	remarks / comments	
page	PGN	SPN	e.g. milage, fuel consumption	Truck only	in ms		
Truck AND Bus Section			Truck AND Bus Section	Truck AND Bus Section		Truck AND Bus Section Truck AND Bus Section	Truck AND Bus Section Truck AND Bus Section
7	65257	250	Engine total fuel used		1000	4 bytes, 0 to +2 105 540 607,5 L	Might be set to “not available” if SPN 5054 is available
8	65276	96	fuel level 1	X (worldwide)	1000	1 Byte	-
9	61444	513	Actual Engine – Percent Torque	X (worldwide)	20	1 % / Bit, -125 % offset	-
9	61444	190	engine speed	X (worldwide)	20	2 Byte, 0-8031,875 rpm	-
10	65253	247	Engine total hours of Operation	X (worldwide)	1000	4 bytes, 0 to 210 554 060,75 h	Counter is Engine running dependant
11	65260	237	vehicle identification number	X (worldwide)	10000	variable, max 200 char.	Will be sent every 10 sec
12	64977	2806	SW-version supported	X (worldwide)	10000	Indicator for SW version supported	-
12	64977	2804	Diagnostics supported	X (worldwide)	10000	indicator for diagnosis session support	-
12	64977	2805	Requests supported	X (worldwide)	10000	indicator for request supported	-
14	65217	917	High resolution total vehicle distance	X (worldwide)	1000	4 bytes, 0 - 21 055 406 km; without TCO	Resolution may be not within the SAE values
15	65132	1611	Vehicle motion	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
15	65132	1613	driver 2 working state	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
15	65132	1612	driver 1 working state	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
15	65132	1614	Vehicle overspeed		20/50	With digital tachograph	rep. rate tacho dependant
15	65132	1617	Driver 1 time rel. states		20/50	With digital tachograph	rep. rate tacho dependant
15	65132	1618	Driver 2 time rel. states		20/50	With digital tachograph	rep. rate tacho dependant
15	65132	1615	Driver 1 card	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
15	65132	1616	Driver 2 card	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
15	65132	1619	Direction indicator		20/50	With digital tachograph	rep. rate / availability is tachograph dependant.
15	65132	1620	Tachograph performance	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
15	65132	1621	Handling information	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
15	65132	1622	System event	X (EU)	20/50	With digital tachograph	rep. rate tacho dependant
15	65132	1624	Tachograph vehicle speed	X (EU)	20/50	With digital tachograph - 2 bytes	rep. rate tacho dependant/might differ from the wheel based speed
17	65262	110	engine coolant temperature	X (worldwide)	1000	-40°to 210°	-
18	65269	171	Ambient Air Temperature	X (worldwide)	1000	0.03125 ℃ / Bit gain	- 273 ℃ offset
19	65131	1625/1626	Driver 1 / Driver 2 Identification	X (EU)	10000	If a driver ID is available the message is sent with a Broadcast Announce Message (BAM)	Diff. to SAE: broadcast instead of on request
20	65266	183	Fuel rate	X (worldwide)	100	0.05 L/h per bit, 0 to 3,212.75 L/h	Calculated values given as indications, not as contractual
20	65266	184	Instantaneous Fuel Economy	X (worldwide)	100	1/512 km/L per bit, 0 to 125,5 km/L	Calculated values given as indications, not as contractual
21	65198	1087	Service Brake Air Pressure Circuit #1	X (worldwide)	1000	8 kPa/Bit, 0 offset	
21	65198	1088	Service Brake Air Pressure Circuit #2	X (worldwide)	1000	8 kPa/Bit, 0 offset	
22	64777	5054	High resolution engine total fuel used		1000	0.001 L/bit, 0 to 4,211,081.215 L	Is implemented if technical possible
23	65110	1761	Aftertreatment 1 Diesel Exhaust Fluid Tank 1 Level		1000	0.4 %/bit, 0 % offset	
24	64893		FMS Tell Tale Status	X (worldwide ,EU) Not all tell tales	1000		4 blocks => Rep.rate for each tell tale status is 4 sec
Truck only Section			Truck only Section	Truck only Section		Truck only Section Truck only Section	Truck only Section Truck only Section
27	65265	84	wheel based speed		100	may differ from TCO1	-
27	65265	598	clutch switch		100	two bit status	in trucks with automatic gear => send as not available
27	65265	597	Brake switch		100	two bit status	-
27	65265	595	cruise control active		100	two bit status	in trucks with no cruise control => send as not available
27	65265	976	PTO state		100	Either SPN 3948 (PTODE) or SPN 976 is sent	SPN 3948 (PTO DE) message is preferred
29	61443	91	accelerator pedal position 1	X (worldwide)	50	1 Byte	-
29	61443	92	Engine Percent Load At Current Speed	X (worldwide)	50	1 % / bit, 0 to 125 % operational range	-
30	65258	928	Axle location		1000	-	If info of more axles available it will be updated with each repetition
30	65258	928	Tire location		1000	-	-
30	65258	582	Axle weight		1000	-	-
32	65216	914	Service distance		1000	-	-
33	64932	3948	At least one PTO engaged		100	Either SPN 3948 or SPN 976 (CCVS) is sent	SPN 3948 (PTO DE) message is preferred
34	65136	1760	Gross Combination Vehicle Weight		10000	0 to 642,550 kg	Diff. to SAE: broadcast instead of on request
35	61440	900	Retarder Torque Mode		100	16 states/4 bit, 0 offset	-
35	61440	520	Actual Retarder - Percent Torque		100	1 %/bit, -125 % offset	-
35	61440	1716	Retarder Selection, non-engine		100	0.4 %/bit, 0 % offset	The value is related to the drive line retarder

Bus only Section			Bus only Section	Bus only Section		Bus only Section	Bus only Section	Bus only Section	Bus only Section
36	65265	84	wheel based speed		100	may differ from TCO1	-		
36	65265	598	clutch switch		100	two bit status	in trucks with automatic gear => send as not available		
36	65265	597	Brake switch		100	two bit status	-		
36	65265	595	cruise control active		100	two bit status	in trucks with no cruise control => send as not available		
36	65265	70	Parking Brake Switch		100	-	-		
38	61443	91	accelerator pedal position 1		50	1 Byte	-		
39	65102	3411	status 2 of doors		100	-	-		
39	65102	1820	ramp/wheel chairlift status		100	-	-		
39	65102	1821	position of doors		100	-	For door configuration please contact the vehicle manufacturer		
40	64933	3412-3441	status of doors 1 - 10		100	-	For door configuration please contact the vehicle manufacturer		
41	65254	959	Seconds		1000	-	Difference to SAE: broadcast instead of on request		
41	65254	960	Minutes		1000	-	Difference to SAE: broadcast instead of on request		
41	65254	961	Hours		1000	-	Difference to SAE: broadcast instead of on request		
41	65254	963	Month		1000	-	Difference to SAE: broadcast instead of on request		
41	65254	962	Day		1000	-	Difference to SAE: broadcast instead of on request		
41	65254	964	Year		1000	-	Difference to SAE: broadcast instead of on request		
42	65237	3356	Alternator Status 4		1000	-	-		
42	65237	3355	Alternator Status 3		1000	-	-		
42	65237	3354	Alternator Status 2		1000	-	-		
42	65237	3353	Alternator Status 1		1000	-	-		
43	61445	524	Selected Gear		100	-	-		
43	61445	523	Current Gear		100	-	-		
44	65112	1725	Bellow Pressure Front Axle Left		100	-	-		
44	65112	1726	Bellow Pressure Front Axle Right		100	-	-		
44	65112	1727	Bellow Pressure Rear Axle Left		100	-	-		
44	65112	1728	Bellow Pressure Rear Axle Right		100	-	-		