Editor's note:

This document contains J1939-71 parameters that have been balloted and published, parameters that have been balloted and not yet published, and parameters that have been approved by the task force but not yet balloted or published. The purpose of this document is for review of cross-references in preparation for ballot and publication.

Current Slot Table

Slot Type	User Scaling	User Range	User Offset	User Length	DateMod
Acceleration	1/2048 m/s²	-15.687 to +15.687 m/s²	-15.687 m/s²	2 bytes	5/11/2000
Acceleration	0.1 m/s²	-12.5 to +12.5 m/s²	-12.5 m/s²	1 byte	5/11/2000
Angle/Direction	10^-7 deg/bit	-210 to 211.1008122 deg	-210 deg	4 bytes	
Angle/Direction	.1 sec/bit	-3276.8 to 3148.7 sec	-3,276.8 sec	2 bytes	
Angle/Direction	1/1024 rad	-31.374 to +31.374 rad	-31.374 rad	2 bytes	5/11/2000
Angle/Direction	1/128 deg/bit	-200 to 301.99 deg	-200 deg	2 bytes	
Angle/Direction	1/128 deg/bit	0 to 501.99 deg	0	2 bytes	
Angle/Direction	1 deg/bit	-125 to 125 deg	-125 deg	1 byte	
ASCII,text	ASCII	0 to 255 per byte	0	1 byte	
ASCII,text (ASCII "*")	ASCII	0 to 255 per byte	0	Variable Delimiter	
ASCII,text	ASCII	0 to 255 per byte	0	2 bytes	8/10/2000
ASCII,text characters ("*" delimited)	ASCII	0 to 255 per byte	0	Variable - up to 200	
ASCII,text	ASCII	0 to 255 per byte	0	5 bytes	
ASCII,text	ASCII	0 to 255 per byte	0	7 bytes	
Bit Field	2 states/1 bit	0 to 1	0	1 bit	
Bit Field	4 states/2 bit	0 to 3	0	2 bits	
Bit Field	8 states/3 bit	0 to 7	0	3 bits	
Bit Field	16 states/4 bit	0 to 15	0	4 bits	
Bit Field	32 states/5 bit	0 to 31	0	5 bits	
Bit Field	64 states/6 bit	0 to 63	0	6 bits	
Bit Field	128 states/7 bit	0 to 127	0	7 bits	
Bit Field	256 states/8 bit	0 to 255	0	8 bits	
Brake Applications	1 brake appl/bit	0 to 4,227,858,431 appl	0	4 bytes	
Calendar,days	0.25 days/bit	0 to 62.5 days	0	1 byte	
Calendar,months	1 month/bit	0 to 250 months	0	1 byte	
Calendar,weeks	1 week/bit	-125 to 125 weeks	-125 weeks	1 byte	
Calendar,years	1 year/bit	1985 to 2235 years	1985 years	1 byte	
Control byte	1 count	0 to 255	0	1 byte	
Count	1 turn/bit	-32 to 31 turns	-32 turns	6 bits	5/11/2000
Count	1 count	0 to 250	0	1 byte	8/10/2000
Count	1 count	0 to 255	0	1 byte	8/10/2000
Count	1 Count/bit	0 to 64,255 counts	0	2 bytes	
Dielectricity	0.1/bit	0 to 25.0	0	1 byte	
Distance	100 nm/bit	-209.7152 m to 211.3929215 m	-209.7152 m	4 bytes	8/10/2000
Distance	0.1 mm/bit	-3,200 to 3,225.5 mm	-3,200 mm	2 bytes	
Distance	0.1 mm/bit	0 to 6,425.5 mm	0	2 bytes	

Distance	0.001 m/bit	0 to 4,211,081.215 m	0	4 bytes	8/10/2000
Distance	0.125 m/bit	-2500 to 5531.875 m	-2500 m	2 bytes	
Distance	1 m/bit	-125 to 125 m	-125 m	1 byte	
Distance	1m/bit	0 to 250 m	0	1 byte	
Distance	5 m/bit	0 to 21,055,406 km	0	4 bytes	
Distance	0.125 km/bit	0 to 526,385,151.9 km	0	4 bytes	
Distance	5 km/bit	-160,635 to 160,640 km	-160,635 km	2 bytes	

Slot Type	User Scaling	User Range	User Offset	User Length	DateMod
Economy,gaseous	1/512 km/kg	0 to 125.5 km/kg	0	2 bytes	
Economy,liquid	1/512 km/L	0 to 125.5 km/L	0	2 bytes	
Electrical Current	0.05 A/bit	-1600 to 1612.75 A	-1600 A	2 bytes	2/10/2000
Electrical Current	1 A/bit	-125 to 125 A	-125 A	1 byte	
Electrical Current	1 A/bit	0 to 250 A	0	1 byte	
Electrical Current	1 A/bit	0 to 64,255 Amps	0	2 bytes	11/9/2000
Electrical Voltage	0.05 V/bit	0 to 3212.75 V	0	2 bytes	
Electrical Voltage	1 V/bit	0 to 64,255 Volts	0	2 bytes	11/9/2000
Energy	1 kWh/bit	0 to 4211081215 kWh	0	4 bytes	11/9/2000
Flow rate,gaseous	0.05 kg/h per bit	0 to 3212.75 kg/h	0	2 bytes	
Flow rate,liquid	0.05 L/h per bit	0 to 3,212.75 L/h	0	2 bytes	
Flow rate,volumetric	0.1 m^3/h per bit	0 to 6425.5 m^3/h	0	2 bytes	
Force	5 N/bit	0 to 321,275 N	0	2 bytes	
Force	10 N/bit	-320,000 to 322,550 N	-320,000 N	2 bytes	8/10/2000
Force	1000 N/bit	-100 kN to 150 kN	-100 kN	1 byte	8/10/2000
Frequency	1/128 Hz/bit	0 to 501.9922875 Hz	0	2 bytes	11/9/2000
Fuel Used,gaseous	0.5 kg/bit	0 to 2,105,540,607.5 kg	0	4 bytes	
Fuel Used,liquid	0.5 L/bit	0 to 2,105,540,607.5 L	0	4 bytes	
Gear Ratio	0.01/bit	0 to 642.55	0	2 bytes	
Gear Value	1 gear value/bit	-125 to 125	-125	1 byte	
Gear Value	1 gear value/bit	0 to 250	0	1 byte	8/2/1999
Governor gain	1/1280 %/rpm per bit	0 to 50.2 %/rpm	0	2 bytes	
Group Function	1 count	0 to 255	0	1 byte	
Identifier,component/ software	1 ID/bit	0 to 250 ID	0	1 byte	
Inertia	0.004 kg-m^2	0 to 257.02 kg-m^2	0	2 bytes	2/10/2000
Kinematic viscosity	1 mm^2/s per bit	0 to 250 mm^2/s	0	1 byte	
Mass,cargo	0.5 kg/bit	0 to 32,127.5 kg	0	2 bytes	
Mass,cargo	2 kg/bit	0 to 128,510 kg	0	2 bytes	
Mass,cargo	10 kg/bit	0 to 642,550 kg	0	2 bytes	
Name (long)	1 count	0 to (2^64 - 1)	0	8 bytes	11/8/2000
Name (short)	1 count	0 to (2^32 - 1)	0	4 bytes	11/8/2000
Percent,position/level	0.0025 %/bit	0 to 160.6375 %	0	2 bytes	
Percent,position/level	0.4 %/bit	0 to 100 %	0	1 byte	
Percent,position/level	0.8 %/bit	-100 to 100 %	-100	1 byte	8/10/2000
Percent,position/level	1 %/bit	-125 to 125 %	-125 %	1 byte	
Percent,position/level	1 %/bit	0 to 250 %	0	1 byte	
Power Factor	1/16384 per bit	-1.00000 to 1.00000	-1	2 bytes	11/9/2000
Power, Apparent	1 VA/bit	-2000000000 to +2211081215 VA	0	4 bytes	11/9/2000
Power, Reactive	1 VAr/bit	-2000000000 to +2211081215 Var	0	4 bytes	11/9/2000
Power, Real	1 W/bit	-2000000000 to +2211081215 Watts	0	4 bytes	11/9/2000
Power, Real	2 W/bit	0 to 128,510 W	0	2 bytes	5/1/1999
Power, Real	0.5 kW/bit	0 to 32,127.5 kW	0	2 bytes	
Pressure	1/128 kPa/bit	-250 kPa TO 251.99 kPa	-250 kPa	2 bytes	

Slot Type	User Scaling	User Range	User Offset	User Length	DateMod
Pressure	0.05 kPa/bit	0 to 12.5 kPa	0	1 byte	
Pressure	0.1 kPa/bit	0 to 6,425.5 kPa	0	2 bytes	
Pressure	0.125 kPa/bit	0 to +8031.875 kPa (0 to 1164.62 psi)	0	2 bytes	
Pressure	0.5 kPa/bit	0 to 125 kPa	0	1 byte	
Pressure	0.5 kPa/bit	0 to 32,127.5 kPa	0	2 bytes	
Pressure	2 kPa/bit	0 to 500 kPa	0	1 byte	
Pressure	2 kPa/bit	0 to 128,510 kPa	0	2 bytes	11/11/1999
Pressure	1/256 MPa/bit	0 to 251 Mpa	0	2 bytes	
Pressure	4 kPa/bit	0 to 1000 kPa	0	1 byte	
Pressure	5 kPa/bit	0 to 1,250 kPa	0	1 byte	
Pressure	5 kPa/bit	0 to 321,275 kPa	0	2 bytes	8/10/2000
Pressure	8 kPa/bit	0 to 2,000 kPa	0	1 byte	
Pressure	16 kPa/bit	0 to 4000 kPa	0	1 byte	
Pressure	100 kPa/bit	0 to 25 MPa	0	1 byte	
Pressure Rate Change	0.1 Pa/s/bit	0 Pa/s to 6425.5 Pa/s	0	2 bytes	
Proprietary Data	Manuf Determined	Manuf Determined	Manuf Determined	64 to 14,280 bits	11/8/2000
Ratio	0.001/bit	0 to 64.255	0	2 bytes	
Ratio	0.1/bit	0 to 25.0	0	1 byte	
Ratio	1/bit	0 to 250	0	1 byte	
Record	1 record/bit	0 to 250 records	0	1 byte	
Revolutions	1000 r/bit	0 to 4,211,081,215,000 r	0	4 bytes	
Road Curvature	1/128 1/km/bit	-250 to 250 1/km	-250 1/km	2 bytes	
Source Address	1 source address/bit	0 to 255	0	1 byte	7/29/1999
Specific Gravity	0.0001/bit	0 to 6.4255	0	2 bytes	
Specific Gravity	0.0001/bit	0 to 6.4255	0	2 bytes	
Specific Resistance	0.1Mohm*m/bit	0 to 25 Mohm*m	0	1 byte	
Step	1 step/bit	0 to 250 steps	0	1 byte	
Temperature	0.03125 deg C/bit	-273 to 1735 deg C	-273 deg C	2 bytes	
Temperature	1 deg C/bit	-40 to 210 deg C	-40 deg C	1 byte	
Time	0.01ms/bit	0 to 642.55 ms	0	2 bytes	
Time	1ms/bit	0 to 64.255 s	0	2 bytes	8/10/2000
Time	0.1 s/bit	0 to 25 s	0	1 byte	
Time	0.25 s/bit	0 to 62.5 s	0	1 byte	
Time	1 s/bit	0 to 64,255 s	0	2 bytes	
Time	1 s/bit	0 to 4,211,081,215 s	0	4 bytes	
Time	1 min/bit	-125 to 125 mins	-125 mins	1 byte	7/29/1999
Time	1 min/bit	0 to 250 mins	0	1 byte	
Time	0.05 hr/bit	0 to 210,554,060.75 hr	0	4 bytes	
Time	1 hr/bit	-32,127 to 32,128 hr	-32,127 hr	2 bytes	
Time	1 hr/bit	-125 to 125 hr	-125 hr	1 byte	
Time	1 hr/bit	0 to 250 hr	0	1 byte	
Torque	1 Nm/bit	-32,000 to 32,255 Nm	-32,000 Nm	2 bytes	
Torque	1 Nm/bit	0 to 64,255 Nm	0	2 bytes	
Torque	2 Nm/bit	0 to 128,510 Nm	0	2 bytes	7/29/1999
Torque	30 Nm/bit	0 to 7500 Nm	0	1 byte	8/10/2000

Slot Type	User Scaling	User Range	User Offset	User Length	DateMod
Transfer Data	Request Dependent	9 to 1777 bytes of data	Request Dependent	72 to 14,216 bits	11/8/2000
Transport Data	Request Dependent	9 to 1784 bytes of data	Request Dependent	72 to 14,272 bits	11/8/2000
VariantData	VariantDetermined	VariantDetermined	VariantDetermined	4 bytes	8/10/2000
Velocity, linear	0.001 m/s/bit	0 to 64.255 m/s	0 m/s	2 bytes	8/10/2000
Velocity, linear	1/256 km/h/bit	0 to 250.996 km/h	0	2 bytes	
Velocity, linear	1/128 km/h/bit	-250 to 251.992 km/h	-250 km/h	2 bytes	
Velocity, linear	1/16 km/h/bit	-7.8125 to 7.8125 km/h	-7.8125 km/h	1 byte	
Velocity, linear	1 km/h/bit	0 to 250 km/h	0	1 byte	
Velocity, rotational	0.125 rpm/bit	0 to 8,031.875 rpm	0	2 bytes	
Velocity, rotational	0.5 rpm/bit	0 to 32,127.5 rpm	0	2 bytes	
Velocity, rotational	4 rpm/bit	0 to 257,020 rpm	0	2 bytes	
Velocity, rotational	10 rpm/bit	0 to 2,500 rpm	0	1 byte	
Velocity, rotational	32 rpm/bit	0 to 8,000 rpm	0	1 byte	
Velocity,angular	1/8192 rad/s	-3.92 to +3.92 rad/s	-3.92 rad/s	2 bytes	5/11/2000
Volume	0.5 L/bit	0 to 2,105,540,607.5 L	0	4 bytes	

-71   5.2.1.04   *Driver's Demand Engine - Percent Torque*

The requested torque output of the engine by the driver. It is based on input from the following requestors external to the powertrain: operator (via the accelerator pedal), cruise control and/or road speed limit governor. Dynamic commands from internal powertrain functions such as smoke control, low- and high-speed engine governing; ASR and shift control are excluded from this calculation. The data is transmitted in indicated torque as a percent of the reference engine torque. See 5.3.17 for the engine configuration message. Several status bits are defined separately to indicate the request which is currently being honored. This parameter may be used for shift scheduling.

Slot Length: 1 byte

Slot Scaling: 1 %/bit   , -125 %   **Offset**

Slot Range: -125 to 125 %   **Operational Range:** 0 to 125%

SPN Type: Measured

SPN: 512

SPN Supporting Information: spn512obj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61444	Electronic Engine Controller #1 **-** EEC1	-71 5.3.007

Figure 2 and Figure 3 show two typical torque calculations in an engine controller. On the left side of the figures there are single engine controller functions. The output torque signals of these functions are connected in the manner shown. The result is the actual engine percent torque which is realized by the engine.
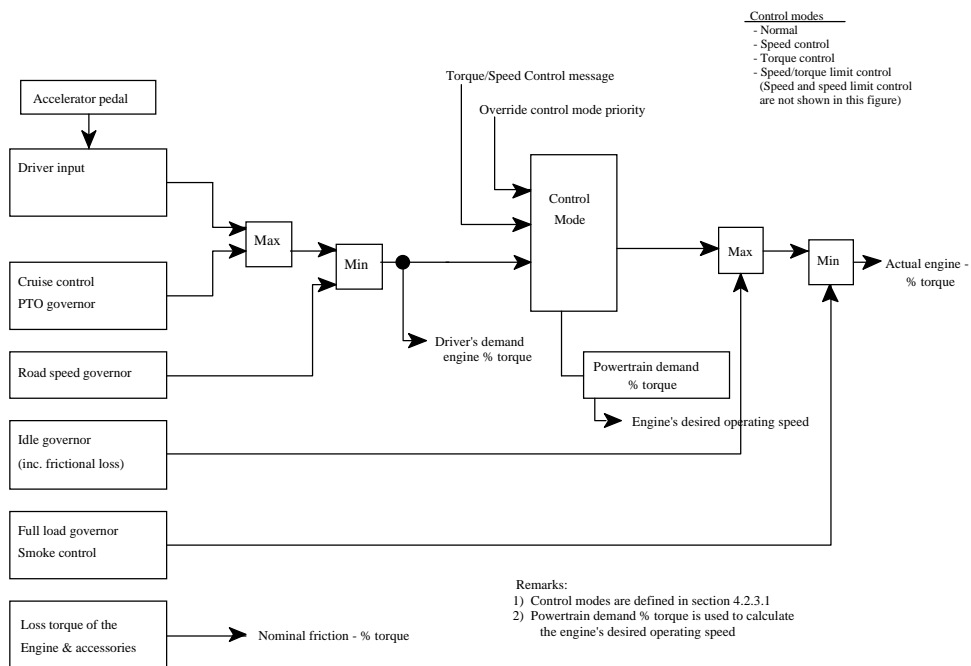

FIGURE 2—TORQUE COMMANDS AND CALCULATIONS WHEN A "MAXIMUM
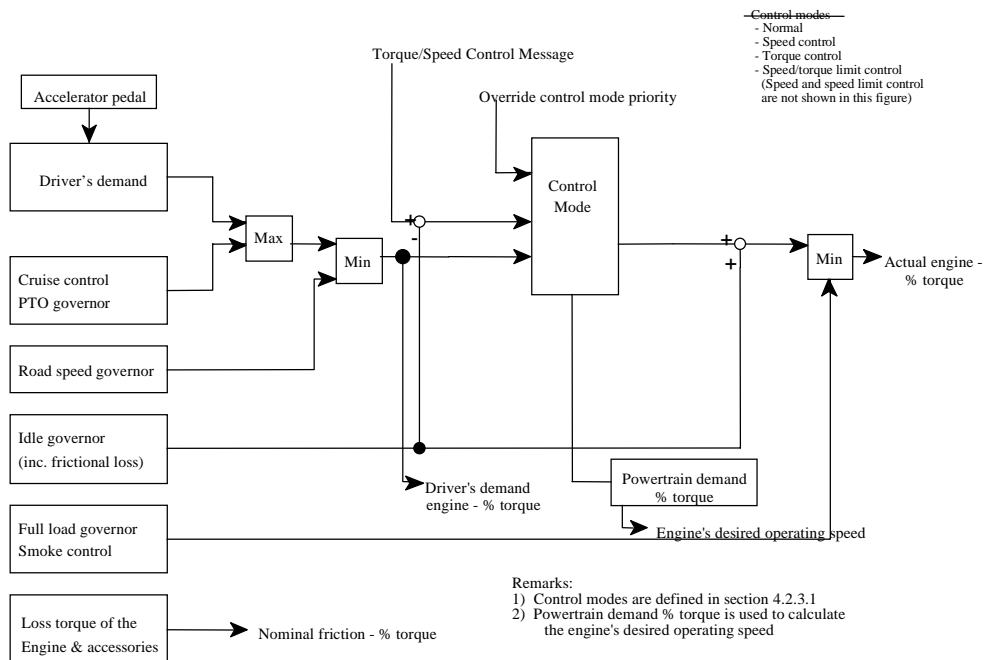SELECTION FOR LOW IDLE" TECHNIQUE IS USED

FIGURE 3—TORQUE COMMANDS AND CALCULATIONS WHEN A "SUMMATION
WITH LOW IDLE" TECHNIQUE IS USED

-71   5.2.1.05   *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, 5.3.17). The engine percent torque value will not be less than zero and it includes the torque developed in the cylinders required to overcome friction as described in 5.2.1.3.

Slot Length: 1 byte

Slot Scaling: 1 %/bit   , -125 %   **Offset**

Slot Range: -125 to 125 %   **Operational Range:** 0 to 125%

SPN Type: Measured

SPN: 513

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61444	Electronic Engine Controller #1 **-** EEC1	-71 5.3.007

-71   5.2.1.06   *Nominal Friction - Percent Torque*

The calculated torque that indicates the amount of torque required by the basic engine itself added by the loss torque of accessories. It contains the frictional and thermodynamic loss of the engine itself, and the losses of fuel, oil and cooling pumps. The data is transmitted in indicated torque as a percent of reference engine torque (see the engine configuration message, 5.3.17).

The realization can be done by a map dependent on engine speed and engine temperature and an offset value for additional loss torques.

Slot Length: 1 byte

Slot Scaling: 1 %/bit   , -125 %   **Offset**

Slot Range: -125 to 125 %   **Operational Range:** 0 to 125%

SPN Type: Status

SPN: 514

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

65247   Electronic Engine Controller #3 - EEC3   -71   5.3.013

-71   **5.2.1.07**   *Percent Load 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.

Slot Length:	1 byte			
Slot Scaling:	1 %/bit	, 0		**Offset**
Slot Range:	0 to 250 %		**Operational Range:**	0 to 125%
SPN Type:	Status			
SPN:	92			

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
61443	Electronic Engine Controller #2 - EEC2	-71 5.3.006

-71   **5.2.1.08**   *Accelerator Pedal Position*

The ratio of actual accelerator pedal position to maximum pedal position. Although it is used as an input to determine powertrain demand, it also provides anticipatory information to transmission and ASR algorithms about driver actions.

Slot Length:	1 byte			
Slot Scaling:	0.4 %/bit	, 0		**Offset**
Slot Range:	0 to 100 %		**Operational Range:**	same as slot range
SPN Type:	Measured			
SPN:	91			

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
61443	Electronic Engine Controller #2 - EEC2	-71 5.3.006

-71   **5.2.1.09**   *Engine Speed*

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

Slot Length:	2 bytes			
Slot Scaling:	0.125 rpm/bit	, 0		**Offset**
Slot Range:	0 to 8,031.875 rpm		**Operational Range:**	same as slot range
SPN Type:	Measured			
SPN:	190			

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
61444	Electronic Engine Controller #1 - EEC1	-71 5.3.007

-71   **5.2.1.10**   *Engine's Desired Operating Speed*

An indication by the engine of the optimal operating speed of the engine for the current existing conditions. These conditions may include the torque generated to accommodate powertrain demands from the operator (via the accelerator pedal), cruise control, road speed limit governors, or ASR. Dynamic commands from functions such as smoke control or shift control are excluded from this calculation.

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:** (upper byte resolution = 32 rpm/bit)
SPN Type: Status
SPN: 515
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65247	Electronic Engine Controller #3 **-** EEC3	-71 5.3.013

-71   **5.2.1.11**   *Ground-Based Vehicle Speed*

Actual ground speed of the vehicle, measured by a device such as RADAR. (1 km/h = 0.621 mph)

Slot Length: 2 bytes
Slot Scaling: 1/256 km/h/bit   ,   0   **Offset**
Slot Range: 0 to 250.996 km/h   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 516
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
	-	

-71   **5.2.1.12**   *Wheel-Based Vehicle Speed*

Speed of the vehicle as calculated from wheel or tailshaft speed.

Slot Length: 2 bytes
Slot Scaling: 1/256 km/h/bit   ,   0   **Offset**
Slot Range: 0 to 250.996 km/h   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 84
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71   **5.2.1.13**   *Navigation-Based Vehicle Speed*

Speed of the vehicle as calculated from a device such as a Global Positioning System (GPS).

Slot Length: 2 bytes
Slot Scaling: 1/256 km/h/bit   ,   0   **Offset**
Slot Range: 0 to 250.996 km/h   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 517
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65256	Vehicle Direction/Speed **-** VDS	-71 5.3.022

-71   **5.2.1.14**   *Output Shaft Speed*

Calculated speed of the transmission output shaft.

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 191
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61442	Electronic Transmission Controller #1 **-** ETC1	-71 5.3.005

-71   5.2.1.15   *Requested Torque*

Parameter provided to the engine or retarder in the torque/speed control message for controlling or limiting the output torque.

Requested torque to the engine is measured in indicated torque as a percentage of reference engine torque (see the engine configuration message, 5.3.17). This is the engine torque at which the engine is expected to operate if the torque control mode is active or the engine torque which the engine is not expected to exceed if the torque limit mode is active.

Zero torque can be requested which implies zero fuel and, according to Figures 2 and 3, the engine will not be allowed to stall. The actual engine percent torque (5.2.1.5) should be zero and the engine should decelerate until the low idle governor kicks in, at which time the actual engine percent torque will be calculated as shown in Figures 2 and 3 and the engine torque mode bits (5.2.2.1) should be equal to 00002 - Low Idle Governor.

Requested torque to the retarder is measured in indicated torque as a percentage of reference retarder torque (see the retarder configuration message, 5.3.15). The logic used in enabling or disabling the retarder is based on the override control mode priority bits (5.2.3.3).

A zero torque request to the retarder is a disable request, and is used by a J1939 node to prevent the retarder from being activated by other combinations of inputs outside of J1939 commands. The Torque Limit Mode is commonly used for this purpose.

Slot Length: 1 byte

Slot Scaling: 1 %/bit   , -125 %   **Offset**

Slot Range: -125 to 125 %   **Operational Range:** 0 to 125% engine torque requests, -125% to
                                                                                                 0% for retarder torque requests

SPN Type: Status

SPN: 518

SPN Supporting Information: spn518obj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
0	Torque/Speed Control #1 **-** TSC1	-71 5.3.001

When preparing to send a request to a retarder, the states of the Retarder Enable - Shift Assist Switch and the Retarder Enable - Brake Assist Switch must be checked by the requesting device to determine whether the request may be sent to the Retarder. Figure 4 shows how those switches and other operator and network inputs are used to create the actual retarder operating point on a system-wide basis. The Retarder may or may not be the device reading the actual switches; even if it is, it will not accept or reject a request based on its knowledge of the switch states. Its function is to send the switch states via J1939 (in its ERC1 message) and it expects other J1939 nodes to honor those switch states by refraining from sending inappropriate commands.

Several elements affect the retarder besides the Requested Torque parameter in the TSC1 message. These elements are not looked at by the retarder itself, but are used by various other devices to determine if they may ask the retarder to be engaged. These are the Retarder Enable Shift Assist Switch, and the Retarder Enable Brake Assist Switch. The relationship between those switches and the retarder (as well as that between the operator and retarder) is described in Figure 4.
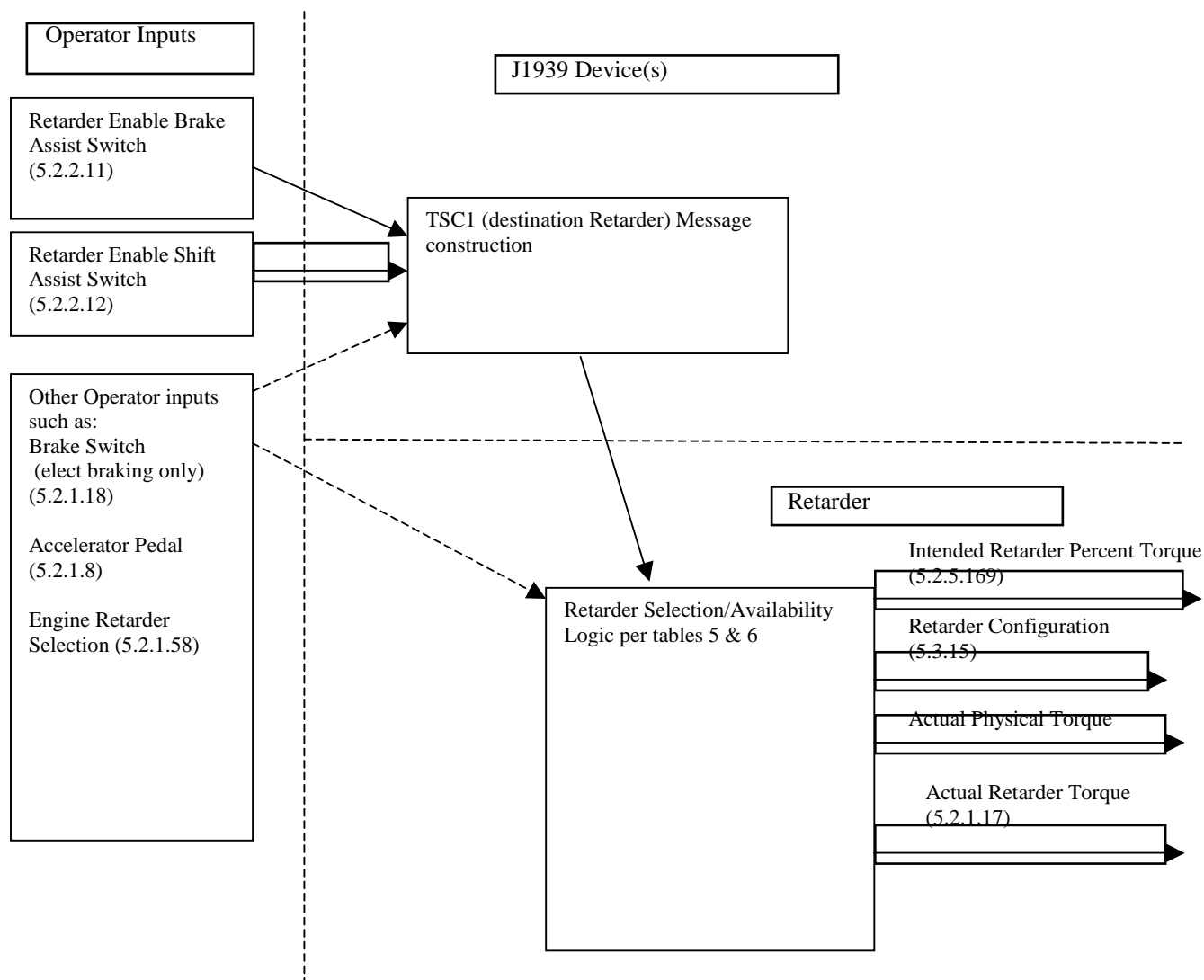
FIGURE 4—RELATIONSHIP BETWEEN OPERATOR/SWITCH INPUTS AND RETARDERS

Tables 5 and 6 identify many use cases. Each row is the summary of one or more uses. One of the primary communications provided by these tables is that the retarder can be activated by the J1939 TSC1 message, although the operator input is "off."

TABLE 5—PRIMARY RETARDER – BEFORE TRANSMISSION (Compression Release Engine Retarder)

Operator Inputs				Outputs	
J1939 Inputs[1] (TSC1)	Cruise Control[2]	Accel Pedal[3]	Torque Request Via "Retarder Selection, Engine"[4]	May Retarder Provide Brake Torque?	Retarder Torque Mode (base 2)

(See 5.2.1.58)

T	Any	Any	Any	No	0000
R	Any	Any	Any	Yes	> 0001
NTR	Any	T	Any	No	0000
NTR	R	ZR	R	Yes	> 0001
NTR	R	ZR	ZR	Yes	0010
NTR	NTR	ZR	R[5]	Yes[5]	0001
NTR	NTR	ZR	ZR	No	0000
ZR	Any	Any	Any	No	0000

Key:

T = request positive Torque

R = request Retarder torque

NTR = No Torque Request

ZR = Zero torque Requested by retarder

Any = This value has no bearing whether or not the Retarder is available. The retarder will NOT be available because some other entity is requesting positive torque.

Footnotes:

1. Note that the TSC1 inputs will override Operator Torque Selection. The J1939 devices that generate the TSC1 messages will assure that the Retarder Enable Brake Assist Switch and Retarder Enable Shift Assist Switch are enabled as appropriate before commanding the Retarder to engage. See sections 5.2.2.11 and 5.2.2.12 for descriptions of these switches. Also, for the purposes of this table, it is assumed that if the TSC1, Destination Retarder message is requesting Retarder Torque, no other TSC1, Destination Engine messages are requesting engine fueling. That arbitration is beyond the scope of this section.

2. This refers to the torque requested by the cruise control, and does not refer to the cruise switches. Cruise control is defined to be on and engaged in this column. The cruise control should not request retarder torque unless the Retarder Enable - Brake Assist Switch is enabled.

3. The Accelerator Pedal is inherently incapable of requesting negative torque. It may have no particular torque demands, or it may request some engine fueling, which prevents the retarder from engaging. Consequently, the chart is complete even though no rows exist for the AP to request retarder torque.

4. The Operator Torque Request is incapable of requesting positive torque. The table is complete without the Operator Torque Request asking for positive Engine Torque

5. This description assumes no other switch (such as brake pedal depressed) is needed in order for the operator torque request to initiate retarder braking. Other implementation specific rules would apply if such a catalyst were needed.

Table 6 shows the relationship between various inputs and an after engine retarder.

The biggest difference between this type of retarder and an engine brake is that the exhaust brake may be engaged while the engine is still being fueled. Also, if cruise control is communicating with the retarder, it would do so using the TSC1 message.

Consequently, columns for accelerator pedal input and cruise control input would only serve to confuse the issue of retarder availability in Table 6.

TABLE 6⎯PRIMARY RETARDER – AFTER ENGINE (EXHAUST BRAKE, HYDRAULIC RETARDER)

Operator Inputs		Outputs	
J1939 Inputs[1] (TSC1)	Torque Request Via operator torque request[2]	May Retarder Provide Brake Torque?	Retarder Torque Mode (base 2)
R	R	Yes	> 0001
R	ZR	Yes	> 0001
NTR	R[3]	Yes[3]	0001
NTR	ZR	No	0000
ZR	Any	No	0000

Key:

R = request Retarder torque - some amount of braking torque is requested of the retarder.

ZR = Zero Retarder request - Zero percent torque is requested of the retarder

NTR = No retarder Torque Request - No request is being made of the retarder one way or another.

Any = This value has no bearing whether or not the retarder is available. In fact, because of what some other entity is requesting, the retarder will NOT be available.

Footnotes:

1. Note that the TSC1 inputs will override Operator Torque Selection. The J1939 devices that generate the TSC1 messages will assure that the Retarder Enable Brake Assist Switch and Retarder Enable Shift Assist Switch are enabled before commanding the Retarder to engage. Also, for the purposes of this table, it is assumed that if the TSC1, Destination Retarder message is requesting Retarder Torque, no other TSC1, Destination Engine messages are requesting engine fueling. That arbitration is beyond the scope of this section.

2. The Operator Torque Request is incapable of requesting positive torque. The table is complete without the Operator Torque Request asking for positive Engine Torque

3. This description assumes no other switch (such as brake pedal depressed) is needed in order for the operator torque request to initiate retarder braking. Other implementation specific rules would apply if such a requirement were needed.

-71   5.2.1.16   *Engine's Desired Operating Speed Asymmetry Adjustment*

This byte is utilized in transmission gear selection routines and indicates the engine's preference of lower versus higher engine speeds should its desired speed not be achievable. This is a scaled ratio such that 125 represents an equal preference for a speed lower or higher that the engine's indicated desired speed. The higher the asymmetry adjustment value is above 125, the more the engine prefers to be operated at or above its indicated desired speed. Conversely, the lower the asymmetry adjustment value is below 125, the more the engine prefers to operate at or below its indicated desired speed. Typically, the engine's asymmetry adjustment will be predicated on fuel consumption considerations, and under these conditions, the method for computing the asymmetry adjustment is indicated in Figure 5. The engine may include other factors into its asymmetry adjustment calculation such as temperatures, pressures, and other operating parameters.

Slot Length: 1 byte

Slot Scaling: 1/bit   , 0   **Offset**

Slot Range: 0 to 250   **Operational Range:** same as slot range

SPN Type: Status

SPN: 519

SPN Supporting Information: Objects\spn519obj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65247	Electronic Engine Controller #3 **-** EEC3	-71 5.3.013
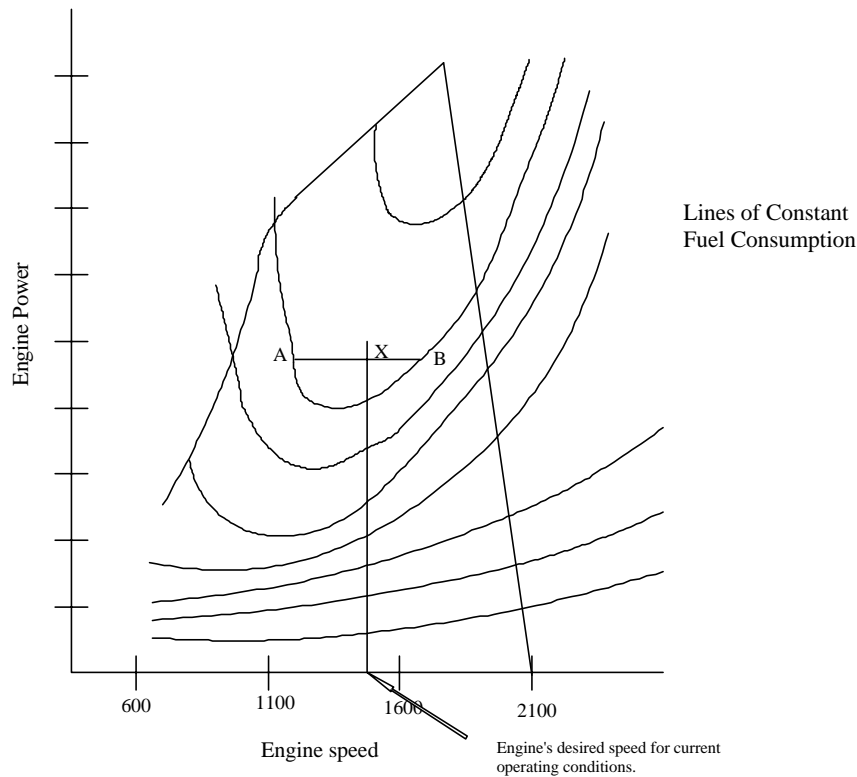
FIGURE 5—DESIRED OPERATING SPEED ASYMMETRY ADJUSTMENT

-71   **5.2.1.17**   *Actual Retarder - Percent Torque*

Actual braking torque of the retarder as a percent of maximum available at that speed.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   ,   -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   -125% to 0 %
SPN Type: Measured
SPN: 520
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61440	Electronic Retarder Controller #1 **-** ERC1	-71 5.3.003

-71   **5.2.1.18**   *Brake Pedal Position*

Ratio of brake pedal position to maximum pedal position. Used for electric brake applications.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   ,   0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 521
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   **5.2.1.19**   *Requested Speed*

Parameter provided to the engine from external sources in the torque/speed control message. This is the engine speed which the engine is expected to operate at if the speed control mode is active or the engine speed which the engine is not expected to exceed if the speed limit mode is active.

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 898
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
0	Torque/Speed Control #1 **-** TSC1	-71 5.3.001

-71   5.2.1.20   *Percent Clutch Slip*

Parameter which represents the ratio of input shaft speed to current engine speed (in percent).

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:**   same as slot range
SPN Type: ????
SPN: 522
SPN Supporting Information: Objects\spn522obj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61442	Electronic Transmission Controller #1 - ETC1	-71 5.3.005

$$\text{Percent Clutch Slip} = \frac{\text{Engine rpm} - \text{Input shaft rpm}}{\text{Engine rpm}} \times 100 \qquad \text{(Eq.1)}$$

-71   5.2.1.21   *Requested Percent Clutch Slip*

Parameter which represents the percent clutch slip requested by a device.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 684
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 - TC1	-71 5.3.002

-71   5.2.1.22   *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.

Slot Length: 1 byte
Slot Scaling: 1 gear value/bit   , -125   **Offset**
Slot Range: -125 to 125   **Operational Range:**   -125 to +125, negative values are reverse
                                                                                      gears, positive values are forward gears,
SPN Type: Measured   zero is neutral. 251 (0xFB) is park.
SPN: 523
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61445	Electronic Transmission Controller #2 - ETC2	-71 5.3.008

-71 **5.2.1.23** *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).

Slot Length: 1 byte

Slot Scaling: 1 gear value/bit , -125 **Offset**

Slot Range: -125 to 125 **Operational Range:** -125 to +125, negative values are reverse
gears, positive values are forward gears,

SPN Type: Status zero is neutral. 251 (0xFB) is park.

SPN: 524

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61445	Electronic Transmission Controller #2 **-** ETC2	-71 5.3.008

-71   5.2.1.24   *Requested Gear*

Gear requested by the operator, ABS, or engine.

negative values are reverse gears, positive values are forward gears, zero is neutral, parameter specific indicators as listed below.

Parameter specific values for this parameter are as follows:
0xFD (253 dec) = Hold current gear
0xFC (252 dec) = Forward Drive Position
0xFB (251 dec) = 'Park' position
0xFA (250 dec) = Forward 'Low' position
0xF9 (249 dec) = Upshift 1 gear from current position
0xF8 (248 dec) = Upshift 2 gears from current position
0xF7 (247 dec) = Downshift 1 gear from current position
0xF6 (246 dec) = Downshift 2 gears from current position
0xF5 (245 dec) = D-1: 1st forward selector position referenced from 'Drive'
0xF4 (244 dec) = D-2: 2nd forward selector position referenced from 'Drive'
0xF3 (243 dec) = D-3: 3rd forward selector position referenced from 'Drive'
0xF2 (242 dec) = D-4: 4th forward selector position referenced from 'Drive'
0xF1 (241 dec) = D-5: 5th forward selector position referenced from 'Drive'
0xF0 (240 dec) = D-6: 6th forward selector position referenced from 'Drive'
0xEF (239 dec) = D-7: 7th forward selector position referenced from 'Drive'
0xEE (238 dec) = Between two shift selector positions (if detail is unknown)
0xED (237 dec) = Between two reverse shift selector positions
0xEC (236 dec) = Between two forward shift selector positions
0xEB (235 dec) = Between D-7 and D-6 shift selector positions
0xEA (234 dec) = Between D-6 and D-5 shift selector positions
0xE9 (233 dec) = Between D-5 and D-4 shift selector positions
0xE8 (232 dec) = Between D-4 and D-3 shift selector positions
0xE7 (231 dec) = Between D-3 and D-2 shift selector positions
0xE6 (230 dec) = Between D-2 and D-1 shift selector positions
0xE5 (229 dec) = Between D-1 and 'Drive' shift selector positions
0xE4 (228 dec) = Between 'Drive' and 'Neutral' shift selector positions
0xE3 (227 dec) = Between 'Neutral' and 'Reverse' shift selector positions
0xE2 (226 dec) = Between 'Reverse' and 'Park' shift selector positions
0xDD - 0x41 (221dec - 65dec) = Reserved
0x3D - 0x00 (61dec - 0dec) = Reserved

Slot Length: 1 byte

Slot Scaling: 1 gear value/bit   ,   -125   **Offset**

Slot Range: -125 to 125   **Operational Range:** -64 to 64

SPN Type: Status

SPN: 525

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 **-** TC1	-71 5.3.002

-71   **5.2.1.25**   *Actual Gear Ratio*

Actual ratio of input shaft speed to output shaft speed.

Slot Length: 2 bytes
Slot Scaling: 0.001/bit   ,   0   **Offset**
Slot Range: 0 to 64.255   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 526
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61445	Electronic Transmission Controller #2 **-** ETC2	-71 5.3.008

-71   **5.2.1.26**   *Engine Speed At Idle, Point 1 (Engine Configuration)*

Stationary low idle speed of engine which includes influences due to engine temperature (after power up) and other
stationary changes (calibration offsets, sensor failures, etc). This parameter is point 1 of the engine configuration map (see

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 188
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   **5.2.1.27**   *Engine Speed At Point 2 (Engine Configuration)*

Engine speed of point 2 of the engine torque map (see 5.2.4.1). In engine configuration mode 1 and 3, point 2 is defined as
the kick-in point from which torque is reduced to zero. In mode 2 (see Table 11), there are no special requirements for the
definition of this point.

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 528
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   **5.2.1.28**   *Engine Speed At Point 3 (Engine Configuration)*

Engine speed of point 3, 4, and 5 of the engine torque map (see 5.2.4.1). It is recommended that one of these points indicate the peak torque point for the current engine torque map. Points 3, 4, and 5 are optional and lie between idle and

Slot Length: 2 bytes

Slot Scaling: 0.125 rpm/bit   ,   0   **Offset**

Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 529

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   **5.2.1.28**   *Engine Speed At Point 4 (Engine Configuration)*

Engine speed of point 3, 4, and 5 of the engine torque map (see 5.2.4.1). It is recommended that one of these points indicate the peak torque point for the current engine torque map. Points 3, 4, and 5 are optional and lie between idle and

Slot Length: 2 bytes

Slot Scaling: 0.125 rpm/bit   ,   0   **Offset**

Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 530

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   **5.2.1.28**   *Engine Speed At Point 5 (Engine Configuration)*

Engine speed of point 3, 4, and 5 of the engine torque map (see 5.2.4.1). It is recommended that one of these points indicate the peak torque point for the current engine torque map. Points 3, 4, and 5 are optional and lie between idle and

Slot Length: 2 bytes

Slot Scaling: 0.125 rpm/bit   ,   0   **Offset**

Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 531

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71　　　　**5.2.1.29**　　　*Engine Speed At High Idle, Point 6 (Engine Configuration)*

Engine speed of high idle (point 6) of the engine torque map (see 5.2.4.1). In engine configuration mode 3 (see Table 11), point 6 is not defined by the engine torque map but by the governor characteristic and the zero torque line.

Slot Length:　2 bytes
Slot Scaling:　0.125 rpm/bit　　　　　　　,　0　　　　　　　**Offset**
Slot Range:　0 to 8,031.875 rpm　　　　　**Operational Range:**　same as slot range
SPN Type:　Measured
SPN:　532
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71　5.3.017

-71　　　　**5.2.1.30**　　　*Maximum Momentary Engine Override Speed, Point 7 (Engine Configuration)*

The maximum engine speed above high idle allowed by the engine control during a momentary high idle override. This duration of the override is limited by the maximum momentary override time limit.

Slot Length:　2 bytes
Slot Scaling:　0.125 rpm/bit　　　　　　　,　0　　　　　　　**Offset**
Slot Range:　0 to 8,031.875 rpm　　　　　**Operational Range:**　same as slot range
SPN Type:　Measured
SPN:　533
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71　5.3.017

-71　　　　**5.2.1.31**　　　*Maximum Momentary Override Time Limit (Engine*

The maximum time limit allowed to override the engine's high idle speed.

Slot Length:　1 byte
Slot Scaling:　0.1 s/bit　　　　　　　,　0　　　　　　　**Offset**
Slot Range:　0 to 25 s　　　　　**Operational Range:**　0 to 25 sec, 0 = no override of high idle allowed, 255 = not applicable (no time restriction)
SPN Type:　Measured
SPN:　534
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71　5.3.017

-71   5.2.1.32   *Requested Speed Control Range Lower Limit (Engine Configuration)*

The minimum engine speed that the engine will allow when operating in a speed control/limit mode.

Slot Length: 1 byte
Slot Scaling: 10 rpm/bit   , 0   **Offset**
Slot Range: 0 to 2,500 rpm   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 535
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   5.2.1.33   *Requested Speed Control Range Upper Limit (Engine Configuration)*

The maximum engine speed that the engine will allow when operating in a speed control/limit mode, excluding any maximum momentary engine override speed, if supported.

Slot Length: 1 byte
Slot Scaling: 10 rpm/bit   , 0   **Offset**
Slot Range: 0 to 2,500 rpm   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 536
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   5.2.1.34   *Requested Torque Control Range Lower Limit (Engine Configuration)*

The minimum engine torque that the engine will allow when operating in a torque control/limit mode.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** 0 to 125%
SPN Type: Measured
SPN: 537
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   5.2.1.35   *Requested Torque Control Range Upper Limit (Engine Configuration)*

The maximum engine torque that the engine will allow when operating in a torque control/limit mode.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** 0 to 125%
SPN Type: Measured
SPN: 538
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   5.2.1.36   *Percent Torque At Idle, Point 1 (Engine Configuration)*

The torque limit that indicates the available engine torque which can be provided by the engine at idle speed. This parameter may be influenced by engine temperature (after power up) and other stationary changes (calibration offsets, sensor failures, etc.) See also 5.2.1.26. The data is transmitted in indicated torque as a percent of the reference engine torque.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** 0 to 125%
SPN Type: Measured
SPN: 539
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   5.2.1.37   *Percent Torque At Point 2 (Engine Configuration)*

The torque limit that indicates the available engine torque which can be provided by the engine at point 2 of the engine map (see 5.2.4.1). In engine configuration mode 1 and 3 (see Table 11), point 2 is defined as the kick-in point from which torque is reduced to zero. In mode 2, there are no special requirements for the definition of this point. The data is transmitted in indicated torque as a percent of the reference engine torque.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** 0 to 125%
SPN Type: Measured
SPN: 540
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   **5.2.1.38**   *Percent Torque At Point 3 (Engine Configuration)*

The torque limit that indicates the available engine torque which can be provided by the engine at point 3, 4, and 5 of the engine map (see 5.2.4.1). It is required that one of these points indicate the peak torque point for the current engine torque map. Points 3, 4, and 5 lie between idle and point 2. The data is transmitted in indicated torque as a percent of the

Slot Length: 1 byte

Slot Scaling: 1 %/bit   , -125 %   **Offset**

Slot Range: -125 to 125 %   **Operational Range:**   0 to 125%

SPN Type: Measured

SPN: 541

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   **5.2.1.38**   *Percent Torque At Point 4 (Engine Configuration)*

The torque limit that indicates the available engine torque which can be provided by the engine at point 3, 4, and 5 of the engine map (see 5.2.4.1). It is required that one of these points indicate the peak torque point for the current engine torque map. Points 3, 4, and 5 lie between idle and point 2. The data is transmitted in indicated torque as a percent of the

Slot Length: 1 byte

Slot Scaling: 1 %/bit   , -125 %   **Offset**

Slot Range: -125 to 125 %   **Operational Range:**   0 to 125%

SPN Type: Measured

SPN: 542

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   **5.2.1.38**   *Percent Torque At Point 5 (Engine Configuration)*

The torque limit that indicates the available engine torque which can be provided by the engine at point 3, 4, and 5 of the engine map (see 5.2.4.1). It is required that one of these points indicate the peak torque point for the current engine torque map. Points 3, 4, and 5 lie between idle and point 2. The data is transmitted in indicated torque as a percent of the

Slot Length: 1 byte

Slot Scaling: 1 %/bit   , -125 %   **Offset**

Slot Range: -125 to 125 %   **Operational Range:**   0 to 125%

SPN Type: Measured

SPN: 543

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   5.2.1.39   *Reference Engine Torque (Engine Configuration)*

This parameter is the 100% reference value for all defined indicated engine torque parameters. It is only defined once and doesn't change if a different engine torque map becomes valid.

Slot Length: 2 bytes
Slot Scaling: 1 Nm/bit   ,   0   **Offset**
Slot Range: 0 to 64,255 Nm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 544
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   5.2.1.40   *Gain (Kp) Of The Endspeed Governor (Engine Configuration)*

The endspeed governor is defined as a linear line with the following equations (Capital letters mean physical values, small letters mean normalized values). Refer to Figures 9 and 10.

The gain KP/kp is defined as a positive value. The factor 4096 is necessary for realizing flat curves with sufficient resolution as well as very steep curves.

KP = delta Torque / delta Speed
kp (normalized) = KP * 250/100% * 8031 rpm/64255 * 4096 = KP * 1280 rpm/%

Slot Length: 2 bytes
Slot Scaling: 1/1280 %/rpm per bit   ,   0   **Offset**
Slot Range: 0 to 50.2 %/rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 545
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   5.2.1.41   *Retarder Speed At Idle, Point 1 (Retarder Configuration)*

See 5.2.4.3.

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 546
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65249	Retarder Configuration **-** RC	-71 5.3.015

-71   **5.2.1.42**   *Retarder Speed At Peak Torque, Point 5 (Retarder Configuration)*

See 5.2.4.3.

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 547
SPN Supporting Information:

Reference:
| **PGN** | **Parameter Group Name and Acronym** | **Doc. and Paragraph** |
| 65249 | Retarder Configuration **-** RC | -71   5.3.015 |

-71   **5.2.1.43**   *Maximum Retarder Speed, Point 2 (Retarder Configuration)*

Maximum speed of retarder (see 5.2.4.3).

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 548
SPN Supporting Information:

Reference:
| **PGN** | **Parameter Group Name and Acronym** | **Doc. and Paragraph** |
| 65249 | Retarder Configuration **-** RC | -71   5.3.015 |

-71   **5.2.1.44**   *Retarder Speed At Point 3 (Retarder Configuration)*

Retarder speed of point 3 of the engine retarder torque map (see 5.2.4.3).

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 549
SPN Supporting Information:

Reference:
| **PGN** | **Parameter Group Name and Acronym** | **Doc. and Paragraph** |
| 65249 | Retarder Configuration **-** RC | -71   5.3.015 |

-71   5.2.1.44   *Retarder Speed At Point 4 (Retarder Configuration)*

Retarder speed of point 4 of the engine retarder torque map (see 5.2.4.3).

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 550
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65249	Retarder Configuration **-** RC	-71 5.3.015

-71   5.2.1.45   *Percent Torque At Idle, Point 1 (Retarder Configuration)*

The torque limit that indicates the available retarder torque which can be provided by the retarder at idle speed. The data is transmitted in indicated torque as a percent of the reference retarder torque.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   ,   -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   -125 to 0%
SPN Type: Measured
SPN: 551
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65249	Retarder Configuration **-** RC	-71 5.3.015

-71   5.2.1.46   *Percent Torque At Maximum Speed, Point 2 (Retarder Configuration)*

The torque limit that indicates the available retarder torque which can be provided by the retarder at its maximum speed (see 5.2.4.3). The data is transmitted in indicated torque as a percent of the reference retarder torque.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   ,   -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   -125 to 0%
SPN Type: Measured
SPN: 552
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65249	Retarder Configuration **-** RC	-71 5.3.015

**-71   5.2.1.47   *Percent Torque At Point 3 (Retarder Configuration)*

The torque limit that indicates the available retarder torque which can be provided by the retarder at points 3 and 4 of the retarder torque map (see 5.2.4.3). The data is transmitted in indicated torque as a percent of the reference retarder torque.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   ,   -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** -125 to 0%
SPN Type: Measured
SPN: 553
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65249	Retarder Configuration **-** RC	-71 5.3.015

**-71   5.2.1.47   *Percent Torque At Point 4 (Retarder Configuration)*

The torque limit that indicates the available retarder torque which can be provided by the retarder at points 3 and 4 of the retarder torque map (see 5.2.4.3). The data is transmitted in indicated torque as a percent of the reference retarder torque.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   ,   -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** -125 to 0%
SPN Type: Measured
SPN: 554
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65249	Retarder Configuration **-** RC	-71 5.3.015

**-71   5.2.1.48   *Percent Torque At Peak Torque, Point 5 (Retarder Configuration)*

The torque limit that indicates the available retarder torque which can be provided by the retarder at point 5 of the retarder torque map (see 5.2.4.3). The data is transmitted in indicated torque as a percent of the reference retarder torque.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   ,   -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** -125 to 0%
SPN Type: Measured
SPN: 555
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65249	Retarder Configuration **-** RC	-71 5.3.015

**-71   5.2.1.49   *Reference Retarder Torque (Retarder Configuration)*

This parameter is the 100% reference value for all defined indicated retarder torque parameters. It is only defined once and doesn't change if a different retarder torque map becomes valid.

Slot Length: 2 bytes
Slot Scaling: 1 Nm/bit   ,   0   **Offset**
Slot Range: 0 to 64,255 Nm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 556
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65249	Retarder Configuration **-** RC	-71 5.3.015

**-71   5.2.1.50   *Retarder Control Method (Retarder Configuration)*

This parameter identifies the number of steps used by the retarder.

Slot Length: 1 byte
Slot Scaling: 1 step/bit   ,   0   **Offset**
Slot Range: 0 to 250 steps   **Operational Range:**   0: continuous control,1 On/Off control, 2 to 250: Number of steps
SPN Type: Measured
SPN: 557
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65249	Retarder Configuration **-** RC	-71 5.3.015

**-71   5.2.1.51   *Front Axle Speed*

The average speed of the two front wheels.

Slot Length: 2 bytes
Slot Scaling: 1/256 km/h/bit   ,   0   **Offset**
Slot Range: 0 to 250.996 km/h   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 904
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65215	Wheel Speed Information **-** EBC2	-71 5.3.056

-71   **5.2.1.52**   *Relative Speed; Front Axle, Left Wheel*

The speed of the front axle, left wheel relative to the front axle (see 5.2.1.51).

Slot Length: 1 byte
Slot Scaling: 1/16 km/h/bit   , -7.8125 km/h   **Offset**
Slot Range: -7.8125 to 7.8125 km/h   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 905
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65215	Wheel Speed Information **-** EBC2	-71 5.3.056

-71   **5.2.1.53**   *Relative Speed; Front Axle, Right Wheel*

The speed of the front axle, right wheel relative to the front axle (see 5.2.1.51).

Slot Length: 1 byte
Slot Scaling: 1/16 km/h/bit   , -7.8125 km/h   **Offset**
Slot Range: -7.8125 to 7.8125 km/h   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 906
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65215	Wheel Speed Information **-** EBC2	-71 5.3.056

-71   **5.2.1.54**   *Relative Speed; Rear Axle #1, Left Wheel*

The speed of the rear axle #1, left wheel relative to the front axle (see 5.2.1.51).

Slot Length: 1 byte
Slot Scaling: 1/16 km/h/bit   , -7.8125 km/h   **Offset**
Slot Range: -7.8125 to 7.8125 km/h   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 907
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65215	Wheel Speed Information **-** EBC2	-71 5.3.056

-71   5.2.1.55   *Relative Speed; Rear Axle #1, Right Wheel*

The speed of the rear axle #1, right wheel relative to the front axle (see 5.2.1.51).

Slot Length: 1 byte
Slot Scaling: 1/16 km/h/bit   , -7.8125 km/h   **Offset**
Slot Range: -7.8125 to 7.8125 km/h   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 908
SPN Supporting Information:

Reference:
         PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
         65215   Wheel Speed Information **-** EBC2   -71   5.3.056

-71   5.2.1.56   *Relative Speed; Rear Axle #2, Left Wheel*

The speed of the rear axle #2, left wheel relative to the front axle (see 5.2.1.51).

Slot Length: 1 byte
Slot Scaling: 1/16 km/h/bit   , -7.8125 km/h   **Offset**
Slot Range: -7.8125 to 7.8125 km/h   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 909
SPN Supporting Information:

Reference:
         PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
         65215   Wheel Speed Information **-** EBC2   -71   5.3.056

-71   5.2.1.57   *Relative Speed; Rear Axle #2, Right Wheel*

The speed of the rear axle #2, right wheel relative to the front axle (see 5.2.1.51).

Slot Length: 1 byte
Slot Scaling: 1/16 km/h/bit   , -7.8125 km/h   **Offset**
Slot Range: -7.8125 to 7.8125 km/h   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 910
SPN Supporting Information:

Reference:
         PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
         65215   Wheel Speed Information **-** EBC2   -71   5.3.056

-71   **5.2.1.58**   *Engine Retarder Selection*

The position of the operator controlled selector, expressed as percent and determined by the ratio of the current position of the selector to its maximum possible position. Zero percent means no braking torque is requested by the operator from the engine while 100% means maximum braking.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 973
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   **5.2.1.59**   *Remote Accelerator*

Ratio of the actual remote accelerator position to the maximum remote accelerator position.

NOTE: The remote accelerator enable switch (see 5.2.6.53) must be active and the accelerator interlock switch (see 5.2.6.56) inactive before the remote accelerator can be enabled.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 974
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61443	Electronic Engine Controller #2 **-** EEC2	-71 5.3.006

-71   **5.2.1.60**   *Estimated Percent Fan Speed*

Estimated fan speed as a ratio of the fan drive (current speed) to the fully engaged fan drive (maximum fan speed). A two state fan (off/on) will use 0% and 100% respectively. A three state fan (off/intermediate/on) will use 0%, 50% and 100% respectively. A variable speed fan will use 0% to 100%. Multiple fan systems will use 0 to 100% to indicate the percent cooling capacity being provided.

Note that the intermediate fan speed of a three state fan will vary with different fan drives, therefore 50% is being used to indicate that the intermediate speed is required from the fan drive.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 975
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65213	Fan Drive **-** FD	-71 5.3.058

-71   5.2.1.61   *Requested Percent Fan Speed*

Fan speed as a ratio of the actual fan drive (current speed) to the fully engaged fan drive (maximum fan speed). A two state fan (off/on) will use 0% and 100% respectively. A three state fan (off/intermediate/on) will use 0%, 50% and 100% respectively. A variable speed fan will use 0% to 100%. Multiple fan systems will use 0 to 100% to indicate the percent cooling capacity being provided. Feedback to this request is provided using the estimated fan speed (see 5.2.1.60).

Note that the intermediate fan speed of a three state fan will vary with different fan drives, therefore 50% is being used to indicate that the intermediate speed is required from the fan drive.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 986
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
57344	Cab Message #1 **-** CM1	-71 5.3.059

-71   5.2.2.01   *Engine Torque Mode*

State signal which indicates which engine 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. For typical priorities refer to Figures 23 and 34 for engine control and Tables 5 to 6 for retarder control. The data type of this parameter is measured. (Reference: 5.3.3, 5.3.7)

Mode 00002 means "No request": engine torque may range from 0 to full load only due to low idle governor output; retarder torque = 0 (no braking).

Modes 00012 to 11102 indicate that there is either a torque request or the identified function is currently controlling the engine/retarder: engine/retarder torque may range from 0 (no fueling/no braking) to the upper limit.

Slot Length: 4 bits
Slot Scaling: 16 states/4 bit   , 0   **Offset**
Slot Range: 0 to 15   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 899
SPN Supporting Information: TorqueModeobj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61444	Electronic Engine Controller #1 **-** EEC1	-71 5.3.007

TABLE 7—ENGINE/RETARDER TORQUE MODES

	Bit States	Engine/Retarder Torque Mode
	0000	Low idle governor/no request (default mode)
	0001	Accelerator pedal/operator selection
	0010	Cruise control
	0011	PTO governor
	0100	Road speed governor
	0101	ASR control
	0110	Transmission control
	0111	ABS control
	1000	Torque limiting
	1001	High speed governor
	1010	Braking system
(R)	1011	Remote accelerator

1100	not defined
1101	not defined
1110	Other
1111	Not available

5.2.2.1.1 Low Idle Governor/No request (Default mode)—This mode is active if the accelerator pedal (not necessarily the torque output of the driver input, see Figure 3 and Figure 4) is zero. This is the default mode. At low speed, the low idle governor may be active while at higher speed, it is zero.

5.2.2.1.2 Accelerator Pedal—This mode is active if the accelerator pedal position is active (being followed). This mode is active for the retarder if it is turned on by the operator. Note that it may be disabled by the accelerator pedal or clutch switches (operator selection).

5.2.2.1.3 Cruise Control—This mode is active if cruise control is active and greater than the accelerator pedal request.

5.2.2.1.4 PTO Governor—This mode is active if the PTO governor is active.

5.2.2.1.5 Road Speed Governing—Indicates that road speed governing is active and limiting torque.

5.2.2.1.6 ASR Control—Indicates that the ASR command is active (Speed, Torque, or Speed/Torque Limit Control).

5.2.2.1.7 Transmission Control—Indicates that the transmission command is active (Speed, Torque, or Speed/Torque Limit Control).

5.2.2.1.8 ABS Control—Indicates that the ABS is controlling torque.

5.2.2.1.9 Torque Limiting—This mode is active if the demanded or commanded engine torque is limited by internal logic due to full load, smoke and/or emissions control, engine protection and/or other factors. A reduced torque limit may be necessary for engine protection if the engine temperature is too high or a sensor fails (speed, timing, or boost pressure), as examples.

5.2.2.1.10 High Speed Governor—This mode is active if the engine is controlled by the high speed governor due to normal operation.

5.2.2.1.11 Brake System (Electronic)—This indicates that the brake pedal is controlling the torque. Note that this may include enabling of the retarder when the brake pedal is depressed (touched).

Note that if there is a request to the retarder but operating conditions do not allow braking, this situation will be reflected by the Percent Retarder Torque = 0 when broadcast.

(R)   5.2.2.1.12 Remote Accelerator—This mode is active if the remote accelerator is controlling engine speed.

5.2.2.1.13 Other—Torque control by a type of device which is different than those defined in 5.2.2.1.1 through 5.2.2.1.11.

-71   5.2.2.01   *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. For typical priorities refer to Figures 23 and 34 for engine control and Tables 5 to 6 for retarder control. The data type of this parameter is measured. (Reference: 5.3.3, 5.3.7)

Mode 00002 means "No request": engine torque may range from 0 to full load only due to low idle governor output; retarder torque = 0 (no braking).

Modes 00012 to 11102 indicate that there is either a torque request or the identified function is currently controlling the engine/retarder: engine/retarder torque may range from 0 (no fueling/no braking) to the upper limit.

Slot Length: 4 bits
Slot Scaling: 16 states/4 bit   , 0   **Offset**
Slot Range: 0 to 15   **Operational Range:** same as slot range
SPN Type: Status
SPN: 900
SPN Supporting Information: TorqueModeobj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61440	Electronic Retarder Controller #1 **-** ERC1	-71 5.3.003

5.2.2.1.1 Low Idle Governor/No request (Default mode)—This mode is active if the accelerator pedal (not necessarily the torque output of the driver input, see Figure 3 and Figure 4) is zero. This is the default mode. At low speed, the low idle governor may be active while at higher speed, it is zero.

5.2.2.1.2 Accelerator Pedal—This mode is active if the accelerator pedal position is active (being followed). This mode is active for the retarder if it is turned on by the operator. Note that it may be disabled by the accelerator pedal or clutch switches (operator selection).

5.2.2.1.3 Cruise Control—This mode is active if cruise control is active and greater than the accelerator pedal request.

5.2.2.1.4 PTO Governor—This mode is active if the PTO governor is active.

5.2.2.1.5 Road Speed Governing—Indicates that road speed governing is active and limiting torque.

5.2.2.1.6 ASR Control—Indicates that the ASR command is active (Speed, Torque, or Speed/Torque Limit Control).

5.2.2.1.7 Transmission Control—Indicates that the transmission command is active (Speed, Torque, or Speed/Torque Limit Control).

5.2.2.1.8 ABS Control—Indicates that the ABS is controlling torque.

5.2.2.1.9 Torque Limiting—This mode is active if the demanded or commanded engine torque is limited by internal logic due to full load, smoke and/or emissions control, engine protection and/or other factors. A reduced torque limit may be necessary for engine protection if the engine temperature is too high or a sensor fails (speed, timing, or boost pressure), as examples.

5.2.2.1.10 High Speed Governor—This mode is active if the engine is controlled by the high speed governor due to normal operation.

5.2.2.1.11 Brake System (Electronic)—This indicates that the brake pedal is controlling the torque. Note that this may include enabling of the retarder when the brake pedal is depressed (touched).

Note that if there is a request to the retarder but operating conditions do not allow braking, this situation will be reflected by the Percent Retarder Torque = 0 when broadcast.

(R)   5.2.2.1.12 Remote Accelerator—This mode is active if the remote accelerator is controlling engine speed.

5.2.2.1.13 Other—Torque control by a type of device which is different than those defined in 5.2.2.1.1 through 5.2.2.1.11.

-71 5.2.2.02 *Retarder Type*

A vehicle retarder is a supplementary device to the wheel brakes for the driver to better control the vehicle. The wheel brakes used in the vehicle are not designed for continuous retarding operation. In a prolonged period of braking, the brakes can be thermally over-stressed, causing the braking effect to be reduced or even lead to complete braking system failure. The vehicle retarder is designed for continuous operation for braking during downhill operation and is also used for braking the vehicle to comply with speed limits and traffic conditions.

This parameter provides some indication of the retarder dynamics. It is used in the retarder configuration message (See 5.3.15). The data type of this parameter is measured.

Slot Length: 4 bits

Slot Scaling: 16 states/4 bit   , 0   **Offset**

Slot Range: 0 to 15   **Operational Range:** same as slot range

SPN Type: Status

SPN: 901

SPN Supporting Information: RetarderTypesObj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65249	Retarder Configuration **-** RC	-71 5.3.015

TABLE 8—RETARDER TYPES

Bit States	Retarder Type
0000	Electric/Magnetic
0001	Hydraulic
0010	Cooled Friction
0011	Compression Release (Engine retarder)
0100	Exhaust
0101-1101	Not defined
1110	Other
1111	Not available

5.2.2.2.1 Electric/Magnetic Retarder—The electric/magnetic retarder functions by creating eddy currents generated in a conductive armature when placed in a variable magnetic field. Currently, electric retarders have a stator on which field coils are mounted. The rotors, mounted on both sides of the drive shaft, are ribbed for heat dissipation. In order to brake the vehicle, voltage is applied to the field coils which generate a magnetic field inducing eddy currents in the rotors as they pass through the field. Magnetic retarders use a permanent magnet to generate the eddy currents. Braking-torque is dependent on stator excitation and on the air gap between the rotor and the stator.

5.2.2.2.2 Hydraulic Retarder—The hydraulic retarder is a hydrodynamic coupling device. Two impellers which face each other, a rotor and a stator, are filled with oil. When the rotor, which is connected to the vehicle drive shaft rotates, it drives the oil in the direction of rotation. The mechanical energy produced by the rotor is converted into kinetic energy in the operating fluid. Hydrodynamic coupling between the rotor and stator converts the kinetic energy into heat and the rotor is retarded. This retardation effect is transmitted to the drive shaft and the vehicle is retarded.

5.2.2.2.3 Cooled Friction Brake—The cooled friction brake uses air or hydraulic fluid to dissipate heat from the friction surface of the service brake. By controlling the friction surface temperature, retarding torque is improved, along with a reduced rate of wear.

5.2.2.2.4 Compression Release Engine Retarder—The compression release engine retarder converts a power-producing diesel engine into a power-absorbing retarding mechanism by opening the exhaust valve near the top dead center in the engine compression cycle. No positive power will be produced, since the compressed air mass is released. The vehicle is retarded as it must provide energy to compress the cylinder air charge and subsequently to return the piston to the bottom position.

5.2.2.2.5 Exhaust Brake—The exhaust brake restricts the escape of the exhaust gas from the exhaust manifold. Each succeeding exhaust stroke builds up a back pressure in the manifold which exerts a retarding effect to

the pistons during the exhaust stroke. The engine turns against this back pressure creating a braking effect to the vehicle.

5.2.2.2.6 Auxiliary Retarder—Fans, air conditioners, or any power-absorbing device in the vehicle can also function as retarders as they impose parasitic loading on the engine or vehicle.

-71   5.2.2.03   *Retarder Location*

This parameter defines whether the "torque/speed curve" defined by the retarder configuration message (see 5.3.15) is dependent on engine rpm, output shaft rpm, or other parameter. The data type of this parameter is measured.

Slot Length: 4 bits

Slot Scaling: 16 states/4 bit   , 0   **Offset**

Slot Range: 0 to 15   **Operational Range:** same as slot range

SPN Type: Status

SPN: 902

SPN Supporting Information: RetardLocObj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65249	Retarder Configuration **-** RC	-71 5.3.015

TABLE 9—RETARDER LOCATION

Bit States		Retarder Location
0000	(Primary)	Engine Compression Release Brake (Engine rpm)
0001	(Primary)	Engine Exhaust Brake (Exhaust pressure)
0010	(Primary)	Transmission Input (Engine rpm)
0011	(Secondary)	Transmission Output (Output Shaft rpm)
0100	(Secondary)	Driveline (Output Shaft rpm)
0101		Trailer (Vehicle speed)
0110-1101		Not defined
1110		Other
1111		Not available

-71   5.2.2.04   *Accelerator Pedal Low Idle Switch*

Switch signal which indicates whether the accelerator pedal low idle switch is opened or closed. The low idle switch is defined in SAE J1843.

00 Accelerator pedal not in low idle condition
01 Accelerator pedal in low idle condition

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 558

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61443	Electronic Engine Controller #2 **-** EEC2	-71 5.3.006

-71   5.2.2.05   *Accelerator Pedal Kickdown Switch*

Switch signal which indicates whether the accelerator pedal kickdown switch is opened or closed. The kickdown switch is defined in SAE J1843.

00 Kickdown passive
01 Kickdown active

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 559

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61443	Electronic Engine Controller #2 **-** EEC2	-71 5.3.006

-71   5.2.2.06   *Driveline Engaged*

Driveline engaged indicates the transmission controlled portion of the driveline is engaged sufficiently to allow a transfer of torque through the transmission. Driveline engaged is ACTIVE whenever the transmission is in gear and the clutch (if controlled by the transmission controller) is less than 100% clutch slip (clutch able to transfer torque). This parameter should be used in conjunction with the parameter "Shift in Process" (5.2.2.14). While a shift is in process, the receiver should not assume that the driveline is either fully engaged or disengaged (i.e., cruise control).

00 Driveline disengaged
01 Driveline engaged

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Measured		
SPN:	560		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61442	Electronic Transmission Controller #1 **-** ETC1	-71 5.3.005

-71   5.2.2.07   *ASR Engine Control Active*

State signal which indicates that ASR engine control has been commanded to be active. Active means that ASR actually tries to control the engine. This state signal is independent of other control commands to the engine (e.g., from the transmission) which may have higher priority.

00 - ASR engine control passive but installed
01 - ASR engine control active

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	561		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   5.2.2.08   *ASR Brake Control Active*

State signal which indicates that ASR brake control is active. Active means that ASR actually controls wheel brake pressure at one or more wheels of the driven axle(s).

00 - ASR brake control passive but installed
01 - ASR brake control active

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	562		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   5.2.2.09   *Anti-Lock Braking (ABS) Active*

State signal which indicates that the ABS is active. The signal is set active when wheel brake pressure actually starts to be modulated by ABS and is reset to passive when all wheels are in a stable condition for a certain time. The signal can also be set active when driven wheels are in high slip (e.g., caused by retarder). Whenever the ABS system is not fully operational (due to a defect or during off-road ABS operation) , this signal is only valid for that part of the system that is still working. When ABS is switched off completely, the flag is set to passive regardless of the current wheel slip conditions.

00 ABS passive but installed

Slot Length:	2 bits			
Slot Scaling:	4 states/2 bit	, 0	**Offset**	
Slot Range:	0 to 3		**Operational Range:**	same as slot range
SPN Type:	Status			
SPN:	563			

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   5.2.2.10   *Differential Lock State - Central*

State used which indicates the condition of the various differential locks. The differential locks are located as defined in Figure 6.7.

00 Differential lock disengaged
01 Differential lock engaged

Slot Length:	2 bits			
Slot Scaling:	4 states/2 bit	, 0	**Offset**	
Slot Range:	0 to 3		**Operational Range:**	same as slot range
SPN Type:	Status			
SPN:	564			

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61446	Electronic Axle Controller #1 **-** EAC1	-71 5.3.009

-71   5.2.2.10   *Differential Lock State - Central Front*

State used which indicates the condition of the various differential locks. The differential locks are located as defined in Figure 6.7.

00 Differential lock disengaged
01 Differential lock engaged

Slot Length:	2 bits			
Slot Scaling:	4 states/2 bit	, 0	**Offset**	
Slot Range:	0 to 3		**Operational Range:**	same as slot range
SPN Type:	Status			
SPN:	565			

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61446	Electronic Axle Controller #1 **-** EAC1	-71 5.3.009

-71   5.2.2.10   *Differential Lock State - Central Rear*

State used which indicates the condition of the various differential locks. The differential locks are located as defined in Figure 6.7.

00 Differential lock disengaged
01 Differential lock engaged

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 566

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61446	Electronic Axle Controller #1 **-** EAC1	-71 5.3.009

-71   **5.2.2.10**   *Differential Lock State - Front Axle 1*

State used which indicates the condition of the various differential locks. The differential locks are located as defined in Figure 6.7.

00 Differential lock disengaged
01 Differential lock engaged

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 567

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61446	Electronic Axle Controller #1 **-** EAC1	-71 5.3.009

-71   **5.2.2.10**   *Differential Lock State - Front Axle 2*

State used which indicates the condition of the various differential locks. The differential locks are located as defined in Figure 6.7.

00 Differential lock disengaged
01 Differential lock engaged

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 568

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61446	Electronic Axle Controller #1 **-** EAC1	-71 5.3.009

-71   **5.2.2.10**   *Differential Lock State - Rear Axle 1*

State used which indicates the condition of the various differential locks. The differential locks are located as defined in Figure 6.7.

00 Differential lock disengaged
01 Differential lock engaged

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 569
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61446	Electronic Axle Controller #1 **-** EAC1	-71 5.3.009

-71   **5.2.2.10**   *Differential Lock State - Rear Axle 2*

State used which indicates the condition of the various differential locks. The differential locks are located as defined in Figure 6.7.

00 Differential lock disengaged
01 Differential lock engaged

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 570
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61446	Electronic Axle Controller #1 **-** EAC1	-71 5.3.009

-71   **5.2.2.11**   *Retarder Enable - Brake Assist Switch*

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: ????
SPN: 571
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61440	Electronic Retarder Controller #1 **-** ERC1	-71 5.3.003

-71   5.2.2.12   *Retarder Enable - Shift Assist Switch*

Switch signal which indicates whether the operator wishes the retarder to be enabled for transmission shift assist. The retarder does not check this switch, nor does the enabling of this switch engage the retarder. When this switch is "enabled," the transmission may activate the retarder (via the TSC1 message) to increase the rate of engine deceleration to assist in shift control. The switch exists to prevent the engine retarder from being asked to be engaged via TSC1 in a noise sensitive area. See also 5.2.2.11.

00 Retarder - shift assist disabled
01 Retarder - shift assist enabled

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 572
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61440	Electronic Retarder Controller #1 **-** ERC1	-71 5.3.003

-71   5.2.2.13   *Torque Converter Lockup Engaged*

State signal which indicates whether the torque converter lockup is engaged.

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 573
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61442	Electronic Transmission Controller #1 **-** ETC1	-71 5.3.005

-71　　　　**5.2.2.14**　　　*Shift In Process*

Indicates that the transmission is in process of shifting from the current gear to the selected gear. This state is generally ACTIVE during the entire time that the transmission controls the vehicle. This includes any transmission clutch control, all engine control sequences, pulling to transmission neutral, and engaging the destination gear (e.g., until it is no longer sending commands and/or limits to the engine). See also 5.2.2.6. (See Figure 7.)

00 - Shift is not in process
01 - Shift in process

Slot Length:　2 bits
Slot Scaling:　4 states/2 bit　　　　　　　, 0　　　　　　　　　**Offset**
Slot Range:　0 to 3　　　　　　　**Operational Range:**　same as slot range
SPN Type:　Measured
SPN:　　574
SPN Supporting Information:　　ShiftInProgressObj.doc

Reference:

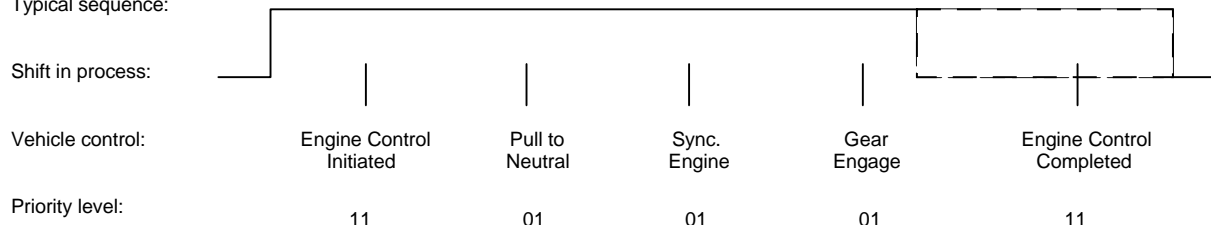| PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61442	Electronic Transmission Controller #1 - ETC1	-71 5.3.005

FIGURE 7—SHIFT IN PROCESS

-71　　　　**5.2.2.15**　　　*ABS Offroad Switch*

Switch signal which indicates the position of the ABS off-road switch.

00 - ABS off-road switch passive
01 - ABS off-road switch active

Slot Length:　2 bits
Slot Scaling:　4 states/2 bit　　　　　　　, 0　　　　　　　　　**Offset**
Slot Range:　0 to 3　　　　　　　**Operational Range:**　same as slot range
SPN Type:　Measured
SPN:　　575
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 - EBC1	-71 5.3.004

-71　　　　**5.2.2.16**　　　*ASR Offroad Switch*

Switch signal which indicates the position of the ASR off-road switch.

00 - ASR off-road switch passive
01 - ASR off-road switch active

Slot Length:　2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 576

SPN Supporting Information:

Reference:

PGN   **Parameter Group Name and Acronym Doc. and Paragraph**

-71   **5.2.2.17**   *ASR "Hill Holder" Switch*

Switch signal which indicates the position of the ASR "hill holder" switch.

00 - ASR "hill holder" switch passive
01 - ASR "hill holder" switch active

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 577
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   **5.2.2.18**   *Cruise Control States*

This parameter is used to indicate the current state, or mode, of operation by the cruise control device. This is a status parameter. (Reference: 5.3.31)

Slot Length: 3 bits
Slot Scaling: 8 states/3 bit   , 0   **Offset**
Slot Range: 0 to 7   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 527
SPN Supporting Information: CruiseStateObj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

TABLE 10—CRUISE CONTROL STATES

Bit States	Cruise Control State
000	Off/Disabled
001	Hold
010	Accelerate
011	Decelerate/Coast
100	Resume
101	Set
110	Accelerator override
111	Not available

5.2.2.18.1 Off/Disabled 000—Used to indicate that the cruise control device is off or on standby. Note that the cruise control system switch does not necessarily have to be off to be in this mode.

5.2.2.18.2 Hold 001—Used to indicate that the cruise control device is active and currently maintaining a captured operating speed.

5.2.2.18.3 Accelerate 010—Used to indicate that the cruise control device is in the process of ramping up the operating speed.

5.2.2.18.4 Decelerate 011—Used to indicate that the cruise control device is in the process of ramping down, or coasting, the operating speed.

5.2.2.18.5 Resume 100—Used to indicate that the cruise control device is in the process of resuming the operating speed to a previously captured value.

5.2.2.18.6 Set 101—Used to indicate that the cruise control device is establishing the current vehicle speed as the operating speed (captured value).

5.2.2.18.7 Accelerator Override 110—Used to indicate that the cruise control device is active but not currently maintaining the captured operating speed.

-71   **5.2.2.19**   *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. The Suspect Parameter Number for this parameter is 976.

Slot Length: 5 bits

Slot Scaling: 32 states/5 bit   , 0   **Offset**

Slot Range: 0 to 31   **Operational Range:** same as slot range

SPN Type: Status

SPN: 976

SPN Supporting Information: PTOStatesObj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

(R) TABLE 11—PTO STATES

Bit States	PTO State
00000	Off/Disabled
00001	Hold
00010	Remote Hold
00011	Standby
00100	Remote Standby
00101	Set
00110	Decelerate/Coast
00111	Resume
01000	Accelerate
01001	Accelerator Override
01010	Preprogrammed set speed 1
01011	Preprogrammed set speed 2
01100	Preprogrammed set speed 3
01101	Preprogrammed set speed 4
01110	Preprogrammed set speed 5
01111	Preprogrammed set speed 6
10000	Preprogrammed set speed 7
10001	Preprogrammed set speed 8
10010-11110	Not defined
11111	Not available

(R)   5.2.2.19.1 Off/Disabled 00000—Used to indicate that the PTO enable switch is in the off position.

(R)   5.3.3.19.2 Hold 00001—Used to indicate that the PTO device is active and currently maintaining a captured operating speed.

(R)   5.2.2.19.3 Remote Hold 00010—Used to indicate that the remote PTO device is active and currently maintaining a captured operating speed.

(R)   5.2.2.19.4 Standby 00011—Used to indicate that the PTO device enable switch is in the ON position and it is

possible to manage the PTO device.

(R)   5.2.2.19.5 Remote Standby 00100—Used to indicate that the remote PTO device enable switch is in the ON position and it is possible to manage the PTO device.

(R)   5.2.2.19.6 Set 00101—Used to indicate that the PTO device is establishing current speed as the operating speed (captured value).

(R)   5.2.2.19.7 Decelerate/Coast 00110—Used to indicate that the PTO device is in the process of ramping down, or coasting, from the current operating speed.

(R)   5.2.2.19.8 Resume 00111—Used to indicate that the PTO device is in the process of resuming the operating speed to a previously captured value.

(R)   5.2.2.19.9 Accelerate 01000—Used to indicate that the PTO device is in the process of ramping up the operating speed.

(R)   5.2.2.19.10 Accelerator Override 01001—Used to indicate that the PTO device is active but for the present time the engine is controlled by a large driver's demand.

(R)   5.2.2.19.11 Preprogrammed Set Speed 1 01010—Used to indicate that the PTO device is establishing a first preprogrammed set speed (user programmable) as the current operating speed.

(R)   5.2.2.19.12 Preprogrammed Set Speed 2 01011—Used to indicate that the PTO device is establishing a second preprogrammed set speed (user programmable) as the current operating speed.

(R)   5.2.2.19.13 Preprogrammed Set Speed 3 01100—Used to indicate that the remote PTO device is establishing a third preprogrammed set speed (user programmable) as the current operating speed.

(R)   5.2.2.19.14 Preprogrammed Set Speed 4 01101—Used to indicate that the remote PTO device is establishing a fourth preprogrammed set speed (user programmable) as the current operating speed.

(R)   5.2.2.19.15 Preprogrammed Set Speed 5 01110—Used to indicate that the remote PTO device is establishing a fifth preprogrammed set speed (user programmable) as the current operating speed.

(R)   5.2.2.19.16 Preprogrammed Set Speed 6 01111—Used to indicate that the remote PTO device is establishing a sixth preprogrammed set speed (user programmable) as the current operating speed.

(R)   5.2.2.19.17 Preprogrammed Set Speed 7 10000—Used to indicate that the remote PTO device is establishing a seventh preprogrammed set speed (user programmable) as the current operating speed.

(R)   5.2.2.19.18 Preprogrammed Set Speed 8 10001—Used to indicate that the remote PTO device is establishing a eighth preprogrammed set speed (user programmable) as the current operating speed.

-71   5.2.2.20   *Fan Drive State*

This parameter is used to indicate the current state or mode of operation by the fan drive.

(R) TABLE 13 FAN DRIVE STATES

Bit States Fan Drive State
0000 Fan off
0001 Engine system–General
0010 Excessive engine air temperature

0011 Excessive engine oil temperature
0100 Excessive engine coolant temperature
0101 Excessive transmission oil temperature
0110 Excessive hydraulic oil temperature
0111 Default Operation
1000 Not defined
1001 Manual control
1010 Transmission retarder
1011 A/C system
1100 Timer
1101 Engine brake
1110 Other
1111 Not available

Fan off 0000—Used to indicate that the fan clutch is disengaged and the fan is inactive

Engine system–General 0001—Used to indicate that the fan is active due to an engine system not otherwise defined.

Excessive engine air temperature 0010—Used to indicate that the fan is active due to high air temperature.

Excessive engine oil temperature 0011—Used to indicate that the fan is active due to high oil temperature.

Excessive engine coolant temperature 0100—Used to indicate that the fan is active due to high coolant temperature.

Manual control 1001—Used to indicate that the fan is active as requested by the operator.

Transmission retarder 1010—Used to indicate that the fan is active as required by the transmission retarder.

A/C system 1011—Used to indicate that the fan is active as required by the air conditioning system.

Timer 1100—Used to indicate that the fan is active as required by a timing function.

Engine brake 1101—Used to indicate that the fan is active as required to assist engine braking.

Excessive transmission oil temperature - 0101 - Used to indicate fan is active due to excessive transmission oil temperature.

Excessive hydraulic oil temperature - 0110 - Used to indicate fan is active due to excessive hydraulic oil temperature.

Default Operation - 0111 - Used to indicate fan is active due to a error condition resulting in default operation

Slot Length:　　4 bits

Slot Scaling:　16 states/4 bit　　　　　　　, 　0　　　　　　　　　**Offset**

Slot Range:　　0 to 15　　　　　　　　**Operational Range:**　same as slot range

SPN Type:　　Status

SPN:　　977

SPN Supporting Information:　　FanDriveStatesObj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65213	Fan Drive **-** FD	-71 5.3.058

(R) TABLE 12—FAN DRIVE STATES

Bit States	Fan Drive State
0000	Fan off
0001	Engine system–General
0010	Excessive engine air temperature
0011	Excessive engine oil temperature
0100	Excessive engine coolant temperature
0101-1000	Not defined
1001	Manual control
1010	Transmission retarder
1011	A/C system
1100	Timer
1101	Engine brake

1110	Other
1111	Not available

(R)   5.2.2.20.1 Fan Off 0000—Used to indicate that the fan clutch is disengaged and the fan is inactive

(R)   5.2.2.20.2 Engine System–General 0001—Used to indicate that the fan is active due to an engine system not otherwise defined.

(R)   5.2.2.20.3 Excessive Engine Air Temperature 0010—Used to indicate that the fan is active due to high air temperature.

(R)   5.2.2.20.4 Excessive Engine Oil Temperature 0011—Used to indicate that the fan is active due to high oil temperature.

(R)   5.2.2.20.5 Excessive Engine Coolant Temperature 0100—Used to indicate that the fan is active due to high coolant temperature.

(R)   5.2.2.20.6 Manual Control 1001—Used to indicate that the fan is active as requested by the operator.

(R)   5.2.2.20.7 Transmission Retarder 1010—Used to indicate that the fan is active as required by the transmission retarder.

(R)   5.2.2.20.8 A/C System 1011—Used to indicate that the fan is active as required by the air conditioning system.

(R)   5.2.2.20.9 Timer 1100—Used to indicate that the fan is active as required by a timing function.

(R)   5.2.2.20.10 Engine Brake 1101—Used to indicate that the fan is active as required to assist engine braking.

-71   **5.2.2.21**   *Engine Coolant Load Increase*

Status of an event, external to the engine, that may increase the nominal temperature of the engine coolant liquid.

00 No coolant load increase
01 Coolant load increase possible

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 1082
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61440	Electronic Retarder Controller #1 **-** ERC1	-71 5.3.003

-71   **5.2.3.01**   *Override Control Mode*

The override control mode defines which sort of command is used:

00 Override disabled - Disable any existing control commanded by the source of this command.
01 Speed control - Govern speed to the included "desired speed" value.
10 Torque control - Control torque to the included "desired torque" value.
11 Speed/torque limit control - Limit speed and/or torque based on the included limit values. The speed limit governor is a droop governor where the speed limit value defines the speed at the maximum torque available during this operation.

If a device wants to know whether it has access to the engine, there are several possibilities:

a. Comparing its command with the actual engine broadcasts.

b. Looking at command modes from other devices.
c. Looking to the engine and retarder torque mode.

Remarks:

a. The realization of a torque limit (minimum selection) is possible by setting the speed limit to a high value (FAFF16).
b. The realization of a speed limit (minimum selection) is possible by setting the torque limit to a high value (FA16).
c. Limiting the retarder torque means to limit the magnitude of the torque request. As the brake torque is represented by negative torque values, the limitation must be done by a maximum selection of the requested torque and the retarder internal torque signals.
d. For torque increasing functions, time limits for the torque or speed value (command) and the direct modes are desirable.

e. The selection of which device has control of the engine's speed or torque depends on the override mode priority (see 5.2.3.3) with the highest priority device gaining control. In the case of two devices with identical priority, the engine responds to speed/torque control commands over speed/torque limit commands and will act on the speed or torque commands on a first come, first served basis. The torque limit will be a "lowest wins" selection (e.g., if one device commands 60% limit and another 80% limit, then the engine will limit torque to 60%). Figure 89 provides a flowchart of the torque/speed control priority selection logic.

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 695

SPN Supporting Information: TorqControlLogic.doc

Reference:

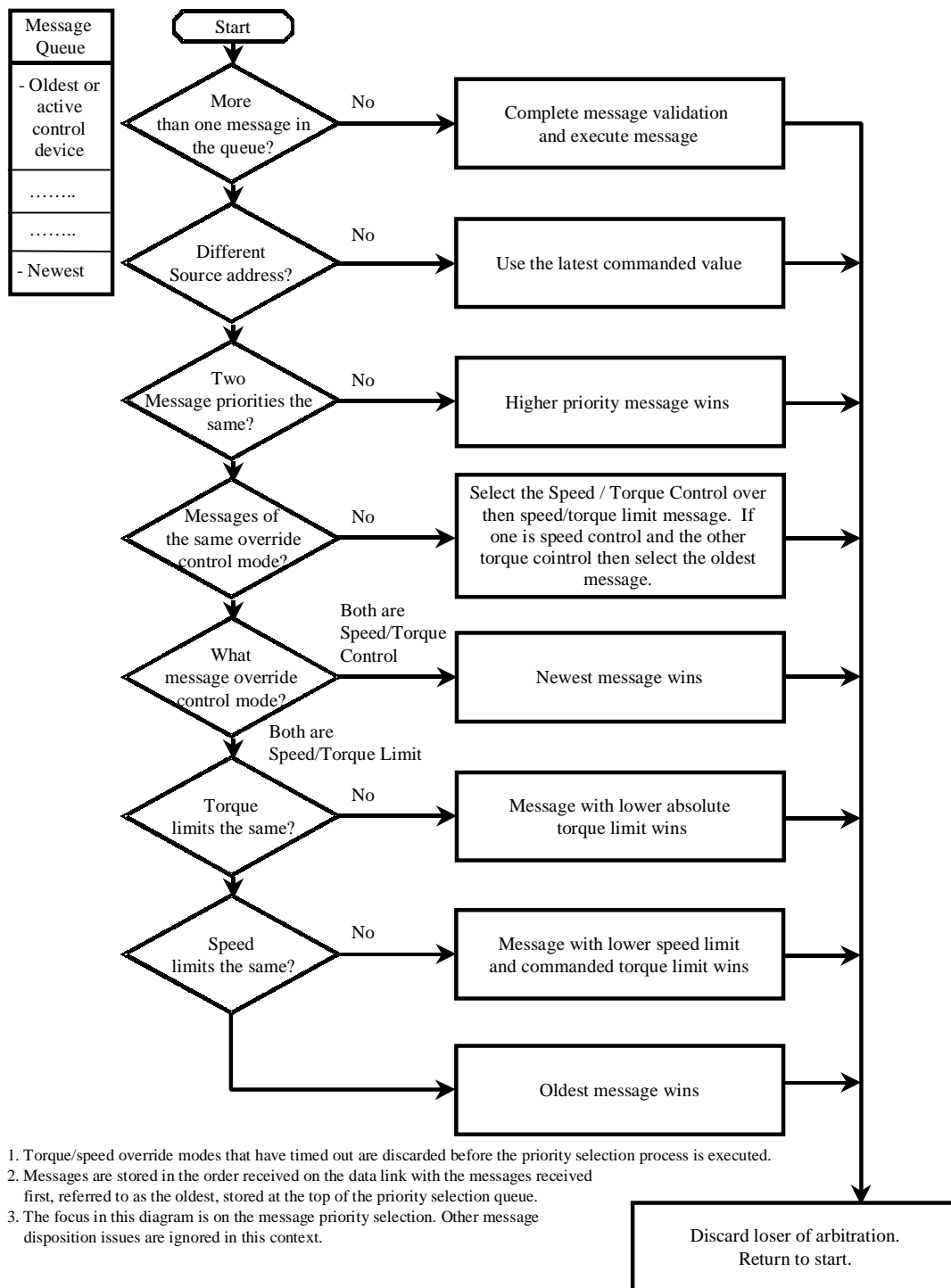| PGN	Parameter Group Name and Acronym	Doc. and Paragraph
0	Torque/Speed Control #1 - TSC1	-71 5.3.001

FIGURE 8—TORQUE/SPEED CONTROL PRIORITY SELECTION LOGIC

-71   5.2.3.02   *Requested Speed Control Conditions*

This mode tells the engine control system the governor characteristics that are desired during speed control. The four characteristics defined are:

00 Transient Optimized for driveline disengaged and non-lockup conditions
01 Stability Optimized for driveline disengaged and non-lockup conditions
10 Stability Optimized for driveline engaged and/or in lockup condition 1 (e.g., vehicle driveline)
11 Stability Optimized for driveline engaged and/or in lockup condition 2 (e.g., PTO driveline)

5.2.3.2.1 Speed Control Characteristic 00 This speed governor gain selection is adjusted to provide rapid transition between speed setpoints. RPM overshoot and undershoot may be greater than what is seen when the "speed control characteristic" is set to be stability optimized.

5.2.3.2.2 Speed Control Characteristic 01 This control condition has been optimized to minimize rpm overshoot and undershoot given an expected plant consisting of the engine and its accessory loads. This gain adjustment is not intended to compensate for driveline characteristics. This characteristic is most appropriate when no driveline is connected.

5.2.3.2.3 Speed Control Characteristic 10 This control condition has been optimized to minimize rpm overshoot and undershoot given a more complex plant. For instance, the more complex plant would contain the engine, its accessory loads and the driveline characteristics. As an example, the driveline characteristics might include the effective spring mass relationship of pumps, tires, clutches, axles, driveshafts, and multiple gear ratios. This characteristic is most appropriate when a driveline is engaged.

5.2.3.2.4 Speed Control Characteristic 11 This speed control characteristic is available for applications requiring compensation for more than one driveline characteristic. It has been optimized to minimize rpm overshoot and undershoot given a more complex plant of the second variety. This more complex plant would again contain the engine, its accessory loads and a second driveline characteristic unique from the one described in speed control characteristic 10.

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	696		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
0	Torque/Speed Control #1 **-** TSC1	-71 5.3.001

-71   5.2.3.03   *Override Control Mode Priority*

This field is used as an input to the engine or retarder to determine the priority of the Override Control Mode received in the Torque/Speed Control message (see 5.3.1). The default is 11 (Low priority). It is not required to use the same priority during the entire override function. For example, the transmission can use priority 01 (High priority) during a shift, but can set the priority to 11 (Low priority) at the end of the shift to allow traction control to also interact with the torque limit of the engine.

The four priority levels defined are:

00 Highest priority
01 High priority
10 Medium priority
11 Low priority

5.2.3.3.1 Highest Priority 00 Used for situations that require immediate action by the receiving device in order to provide safe vehicle operation (i.e., braking systems). This level of priority should only be used in safety critical conditions.

5.2.3.3.2 High Priority 01 Used for control situations that require prompt action in order to provide safe vehicle operation. An example is when the transmission is performing a shift and requires control of the engine in order to control driveline reengagement.

5.2.3.3.3 Medium Priority 10 Used for powertrain control operations which are related to assuring that the vehicle is in a stable operating condition. An example is when the traction control system is commanding the engine in order to achieve traction stability.

5.2.3.3.4 Low Priority 11 Used to indicate that the associated command desires powertrain control but is needed for

function which improves the driver comfort which may be overridden by other devices. An example is cruise control or the non-critical part of a transmission shift to a new gear.

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Status

SPN: 897

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
0	Torque/Speed Control #1 **-** TSC1	-71 5.3.001

-71   5.2.3.04   *Gear Shift Inhibit Request*

Command signal to inhibit gear shifts.

00 Gear shifts are allowed (disable function)
01 Gear shifts are inhibited (enable function)
11 Take no action (leave function as is)

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Status

SPN: 681

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 **-** TC1	-71 5.3.002

-71   5.2.3.05   *Torque Converter Lockup Disable Request*

Command signal to prevent torque converter lockup, which may cause problems in certain circumstances for ASR.

00 Allow torque convertor lockup
01 Disable torque convertor lockup
11 Take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Status

SPN: 682

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 **-** TC1	-71 5.3.002

-71   5.2.3.06   *Disengage Driveline Request*

Command signal used to simply disengage the driveline, e.g., to prevent engine drag torque from causing high wheel slip on slippery surfaces.

00 Allow driveline engagement
01 Disengage driveline
11 Take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 683
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 **-** TC1	-71 5.3.002

-71   5.2.3.07   *Disengage Differential Lock Request - Front Axle 1*

Command signal used to disengage the various differential locks, e.g., to allow an undistributed individual wheel control by ABS. The differential locks are located as defined in Figure 5.

00 Engage differential lock
01 Disengage differential lock
11 Take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 685
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 **-** TC1	-71 5.3.002

-71   5.2.3.07   *Disengage Differential Lock Request - Front Axle 2*

Command signal used to disengage the various differential locks, e.g., to allow an undistributed individual wheel control by ABS. The differential locks are located as defined in Figure 5.

00 Engage differential lock
01 Disengage differential lock
11 Take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 686
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 **-** TC1	-71 5.3.002

-71   5.2.3.07   *Disengage Differential Lock Request - Rear Axle 1*

Command signal used to disengage the various differential locks, e.g., to allow an undistributed individual wheel control by ABS. The differential locks are located as defined in Figure 5.

00 Engage differential lock
01 Disengage differential lock
11 Take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 687
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 **-** TC1	-71 5.3.002

-71   5.2.3.07   *Disengage Differential Lock Request - Rear Axle 2*

Command signal used to disengage the various differential locks, e.g., to allow an undistributed individual wheel control by ABS. The differential locks are located as defined in Figure 5.

00 Engage differential lock
01 Disengage differential lock
11 Take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 688
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 **-** TC1	-71 5.3.002

-71   5.2.3.07   *Disengage Differential Lock Request - Central*

Command signal used to disengage the various differential locks, e.g., to allow an undistributed individual wheel control by ABS. The differential locks are located as defined in Figure 5.

00 Engage differential lock
01 Disengage differential lock
11 Take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 689
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 **-** TC1	-71 5.3.002

-71   **5.2.3.07**   *Disengage Differential Lock Request - Central Front*

Command signal used to disengage the various differential locks, e.g., to allow an undistributed individual wheel control by ABS. The differential locks are located as defined in Figure 5.

00 Engage differential lock
01 Disengage differential lock
11 Take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 690
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 **-** TC1	-71 5.3.002

-71   **5.2.3.07**   *Disengage Differential Lock Request - Central Rear*

Command signal used to disengage the various differential locks, e.g., to allow an undistributed individual wheel control by ABS. The differential locks are located as defined in Figure 5.

00 Engage differential lock
01 Disengage differential lock
11 Take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 691
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 **-** TC1	-71 5.3.002

-71   **5.2.3.08**   *ABS Offroad Switch Request*

Command signal used by the driver via a dashboard switch to choose the ABS offroad function.

00 Switch off ABS offroad function
01 Switch on ABS offroad function
11 Take no action

like SPN 575 delete?

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 692
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
		-

-71   **5.2.3.09**   *ASR Offroad Switch Request*

Command signal used by the driver via a dashboard switch to choose the ASR offroad function.

00 Switch off ASR offroad function
01 Switch on ASR offroad function
11 Take no action

like SPN 576 delete?

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 693
SPN Supporting Information:

Reference:
          PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
                                                          -

-71   **5.2.3.10**   *ASR "Hill Holder" Switch Request*

Command signal used by the driver via a dashboard switch to choose a special ASR function.

00 Switch off ASR special function
01 Switch on ASR special function
11 Take no action

like SPN 577 delete?

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 694
SPN Supporting Information:

Reference:
          PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
                                                          -

-71   **5.2.3.11**   *Progressive Shift Disable*

Command signal used to indicate that progressive shifting by the engine should be disallowed.

00 Progressive shift is not disabled
01 Progressive shift is disabled
11 Take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 607
SPN Supporting Information:

Reference:
          PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
          61442   Electronic Transmission Controller #1 **-** ETC1   -71   5.3.005

-71   5.2.3.12   *Momentary Engine Overspeed Enable*

Command signal used to indicate that the engine speed may be boosted up to the maximum engine overspeed value to accommodate transmission downshifts. The maximum time for overspeed is limited by the time defined in the engine configuration message (see 5.3.17). The transmission module must command a "override disabled" state at least once before the engine will accept a subsequent request for overspeed.

00 Momentary engine overspeed is disabled
01 Momentary engine overspeed is enabled
11 Take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 606

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61442	Electronic Transmission Controller #1 **-** ETC1	-71 5.3.005

-71   5.2.3.13   *Trip Group 1*

Command signal used to reset the PGNs and parameters as defined in Table 13.

00 Take no action
01 Reset
11 Not applicable

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 988

SPN Supporting Information: TripGroup1Obj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
56832	Reset **-** RESET	-71 5.3.074

TABLE 13—TRIP GROUP 1

Parameter	SPN
Trip distance	244
Trip fuel	182
High resolution trip distance	918
Trip compression brake distance	990
Trip service brake applications	993
Trip maximum engine speed	1013
Trip average engine speed	1014
Trip drive average load factor	1015
Trip average fuel rate	1029
Trip average fuel rate (Gaseous)	1031

Parameter Group	SPN
Trip time information #2	65,200
Trip time information #1	65,204
Trip shutdown information	65,205
Trip vehicle speed/cruise distance information	65,206
Trip fuel information (Gaseous)	65,208
Trip fuel information	65,209

-71   5.2.3.14   *Trip Group 2 - Proprietary*

Command signal used to reset proprietary parameters associated with a trip but not defined within this document.

00 Take no action
01 Reset
11 Not applicable

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 989
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
56832	Reset **-** RESET	-71 5.3.074

-71   5.2.4.02   *Transmission Gear Ratio*

The transmission configuration describes the number of forward gears, the number of reverse gears, and the ratio of each gear with the following resolution.

Slot Length: 2 bytes
Slot Scaling: 0.001/bit   , 0   **Offset**
Slot Range: 0 to 64.255   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 581
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65250	Transmission Configuration **-** TCFG	-71 5.3.016

-71   5.2.4.04   *Number of Forward Gear Ratios*

Number of forward gear ratios in the transmission, provided as part of the configuration.

Slot Length: 1 byte
Slot Scaling: 1 gear value/bit   , 0   **Offset**
Slot Range: 0 to 250   **Operational Range:**   0 to 125 gear ratios
SPN Type: Measured
SPN: 957
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65250	Transmission Configuration **-** TCFG	-71 5.3.016

-71   5.2.4.05   *Number of Reverse Gear Ratios*

Number of reverse gear ratios in the transmission, provided as part of the transmission configuration.

Slot Length: 1 byte
Slot Scaling: 1 gear value/bit   ,   0   **Offset**
Slot Range: 0 to 250   **Operational Range:** 0 to 125 gear ratios
SPN Type: Measured
SPN: 958
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65250	Transmission Configuration **-** TCFG	-71 5.3.016

-71　　　　**5.2.5.001**　　*Steering Axle Temperature*

Temperature of lubricant in steering axle.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   ,   -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 75
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65273	Axle Information **-** AI	-71 5.3.039

-71　　　　**5.2.5.002**　　*Drive Axle Temperature*

Temperature of axle lubricant in drive axle.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   ,   -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 578
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65273	Axle Information **-** AI	-71 5.3.039

-71　　　　**5.2.5.003**　　*Power Takeoff Oil Temperature*

Temperature of lubricant in device used to transmit engine power to auxiliary equipment.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   ,   -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 90
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65264	Power Takeoff Information **-** PTO	-71 5.3.030

-71　　　　**5.2.5.004**　　*Intake Manifold 1 Temperature*

Temperature of pre-combustion air found in intake manifold of engine air supply system.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit , -40 deg C **Offset**
Slot Range: -40 to 210 deg C **Operational Range:** same as slot range
SPN Type: Measured
SPN: 105
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65270	Inlet/Exhaust Conditions **-** IC	-71 5.3.036

-71   **5.2.5.004**   *Intake Manifold 2 Temperature*

Temperature of pre-combustion air found in intake manifold of engine air supply system.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit , -40 deg C **Offset**
Slot Range: -40 to 210 deg C **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1131
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65189	Intake Manifold Information #2 **-** IMT2	-71 5.3.084

-71   **5.2.5.004**   *Intake Manifold 3 Temperature*

Temperature of pre-combustion air found in intake manifold of engine air supply system.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit , -40 deg C **Offset**
Slot Range: -40 to 210 deg C **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1132
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65189	Intake Manifold Information #2 **-** IMT2	-71 5.3.084

-71   **5.2.5.004**   *Intake Manifold 4 Temperature*

Temperature of pre-combustion air found in intake manifold of engine air supply system.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit , -40 deg C **Offset**
Slot Range: -40 to 210 deg C **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1133
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65189	Intake Manifold Information #2 **-** IMT2	-71 5.3.084

-71   **5.2.5.005**   *Engine Coolant Temperature*

Temperature of liquid found in engine cooling system.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   ,   -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 110
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65262	Engine Temperature #1 - ET1	-71 5.3.028

-71   **5.2.5.006**   *Engine Intercooler Temperature*

Temperature of liquid found in the intercooler located after the turbocharger.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   ,   -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 52
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65262	Engine Temperature #1 - ET1	-71 5.3.028

-71   **5.2.5.007**   *Hydraulic Retarder Oil Temperature*

Temperature of oil found in a hydraulic retarder.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   ,   -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 120
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65275	Retarder fluids - RF	-71 5.3.041

-71   **5.2.5.008**   *Exhaust Gas Temperature*

Temperature of combustion byproducts leaving the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 173
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65270	Inlet/Exhaust Conditions - IC	-71 5.3.036

-71   **5.2.5.009**   *Road Surface Temperature*

Indicated temperature of road surface over which vehicle is operating.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 79
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65269	Ambient Conditions **-** AMB	-71 5.3.035

-71   **5.2.5.010**   *Cargo Ambient Temperature*

Temperature of air inside vehicle container used to accommodate cargo.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 169
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65276	Dash Display **-** DD	-71 5.3.042

-71   **5.2.5.011**   *Cab Interior Temperature*

Temperature of air inside the part of the vehicle that encloses the driver and vehicle operating controls.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 170
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65269	Ambient Conditions **-** AMB	-71 5.3.035

-71   **5.2.5.012**   *Ambient Air Temperature*

Temperature of air surrounding vehicle.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 171
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65269	Ambient Conditions **-** AMB	-71 5.3.035

-71   **5.2.5.013**   *Air Inlet Temperature*

Temperature of air entering vehicle air induction system.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   ,   -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 172
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65269	Ambient Conditions **-** AMB	-71 5.3.035

-71   **5.2.5.014**   *Fuel Temperature*

Temperature of fuel entering injectors.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 174
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65262	Engine Temperature #1 **-** ET1	-71 5.3.028

-71   **5.2.5.015**   *Engine Oil Temperature 1*

Temperature of the engine lubricant.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 175
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65262	Engine Temperature #1 **-** ET1	-71 5.3.028

-71   **5.2.5.015**   *Engine Oil Temperature 2*

Temperature of the engine lubricant.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1135
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65188	Engine Temperature #2 **-** ET2	-71 5.3.085

-71   **5.2.5.016**   *Turbo Oil Temperature*

Temperature of the turbocharger lubricant.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 176
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65262	Engine Temperature #1 **-** ET1	-71 5.3.028

-71   **5.2.5.017**   *Transmission Oil Temperature*

Temperature of the transmission lubricant.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 177
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65272	Transmission Fluids **-** TF	-71 5.3.038

-71   **5.2.5.018**   *Tire Temperature*

Temperature at the surface of the tire sidewall.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 242
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65268	Tire Condition **-** TIRE	-71 5.3.034

-71   **5.2.5.019**   *Gas Supply Pressure*

Gage pressure of gas supply to fuel metering device.

Slot Length: 2 bytes
Slot Scaling: 0.5 kPa/bit   , 0   **Offset**
Slot Range: 0 to 32,127.5 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 159
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65277	Alternate Fuel #1 **-** AF1	-71 5.3.043

-71   **5.2.5.020**   *Injection Control Pressure*

The gage pressure of the engine oil in the hydraulic accumulator that powers an intensifier used for fuel injection.

Slot Length: 2 bytes
Slot Scaling: 1/256 MPa/bit   , 0   **Offset**
Slot Range: 0 to 251 Mpa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 164
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65243	Engine Fluid Level/Pressure #2 **-** EFL/P2	-71 5.3.046

-71   **5.2.5.021**   *Injector Metering Rail 1 Pressure*

The gage pressure of fuel in the primary, or first, metering rail as delivered from the supply pump to the injector metering inlet. See Figure 15.

Slot Length: 2 bytes
Slot Scaling: 1/256 MPa/bit   , 0   **Offset**
Slot Range: 0 to 251 Mpa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 157
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65243	Engine Fluid Level/Pressure #2 **-** EFL/P2	-71 5.3.046

-71   **5.2.5.022**   *Auxiliary Pump Pressure*

Gage pressure of auxiliary water pump driven as a PTO device.

Slot Length: 1 byte
Slot Scaling: 16 kPa/bit   , 0   **Offset**
Slot Range: 0 to 4000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 73
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65278	Auxiliary Water Pump Pressure **-** AWPP	-71 5.3.044

-71   **5.2.5.023**   *Clutch Pressure*

Gage pressure of oil within a wet clutch.

Slot Length: 1 byte
Slot Scaling: 16 kPa/bit   , 0   **Offset**
Slot Range: 0 to 4000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 123
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65272	Transmission Fluids **-** TF	-71 5.3.038

-71   **5.2.5.024**   *Transmission Oil Pressure*

Gage pressure of lubrication fluid in transmission, measured after pump.

Slot Length: 1 byte
Slot Scaling: 16 kPa/bit   , 0   **Offset**
Slot Range: 0 to 4000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 127
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65272	Transmission Fluids **-** TF	-71 5.3.038

-71   **5.2.5.025**   *Drive Axle Lift Air Pressure*

Gage pressure of air in system that utilizes compressed air to provide force between axle and frame.

Slot Length: 1 byte
Slot Scaling: 4 kPa/bit   , 0   **Offset**
Slot Range: 0 to 1000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 579
SPN Supporting Information:

Reference:
        PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
        65273   Axle Information **-** AI   -71   5.3.039

-71   **5.2.5.026**   *Air Start Pressure*

Gage pressure of air in an engine starting system that utilizes compressed air to provide the force required to rotate the crankshaft.

Slot Length: 1 byte
Slot Scaling: 4 kPa/bit   , 0   **Offset**
Slot Range: 0 to 1000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 82
SPN Supporting Information:

Reference:
        PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
        65246   Air Start Pressure **-** AIR2   -71   5.3.012

-71   **5.2.5.027**   *Fuel Delivery Pressure*

Gage pressure of fuel in system as delivered from supply pump to the injection pump. See Figures 15 & 16.

Slot Length: 1 byte
Slot Scaling: 4 kPa/bit   , 0   **Offset**
Slot Range: 0 to 1000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 94
SPN Supporting Information:

Reference:
        PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
        65263   Engine Fluid Level/Pressure #1 **-** EFL/P1   -71   5.3.029

-71   5.2.5.028   *Engine Oil Pressure*

Gage pressure of oil in engine lubrication system as provided by oil pump.

Slot Length: 1 byte
Slot Scaling: 4 kPa/bit   , 0   **Offset**
Slot Range: 0 to 1000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 100
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65263	Engine Fluid Level/Pressure #1 **-** EFL/P1	-71 5.3.029

-71   5.2.5.029   *Turbocharger Lube Oil Pressure 1*

Gage pressure of oil in turbocharger lubrication system.

Slot Length: 1 byte
Slot Scaling: 4 kPa/bit   , 0   **Offset**
Slot Range: 0 to 1000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 104
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65245	Turbocharger **-** TC	-71 5.3.011

-71   5.2.5.029   *Turbocharger Lube Oil Pressure 2*

Gage pressure of oil in turbocharger lubrication system.

Slot Length: 1 byte
Slot Scaling: 4 kPa/bit   , 0   **Offset**
Slot Range: 0 to 1000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1168
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65179	Turbocharger Information #1 **-** TCI1	-71 5.3.094

-71   5.2.5.030   *Brake Application Pressure*

Gage pressure of compressed air or fluid in vehicle braking system measured at the brake chamber when brake shoe (or pad) is placed against brake drum (or disc).

Slot Length: 1 byte
Slot Scaling: 4 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 1000 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 116
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65274	Brakes **-** B	-71 5.3.040

-71   5.2.5.031   *Brake Primary Pressure*

Gage pressure of air in the primary, or supply side, of the air brake system.

Slot Length: 1 byte
Slot Scaling: 4 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 1000 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 117
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65274	Brakes **-** B	-71 5.3.040

-71   5.2.5.032   *Brake Secondary Pressure*

Gage pressure of air in the secondary, or service side, of the air brake system.

Slot Length: 1 byte
Slot Scaling: 4 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 1000 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 118
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65274	Brakes **-** B	-71 5.3.040

-71   **5.2.5.033**   *Hydraulic Retarder Pressure*

Gage pressure of oil in hydraulic retarder system.

Slot Length: 1 byte
Slot Scaling: 16 kPa/bit   , 0   **Offset**
Slot Range: 0 to 4000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 119
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65275	Retarder fluids **-** RF	-71 5.3.041

-71   **5.2.5.034**   *Tire Pressure*

Pressure at which air is contained in cavity formed by tire and rim.

Slot Length: 1 byte
Slot Scaling: 4 kPa/bit   , 0   **Offset**
Slot Range: 0 to 1000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 241
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65268	Tire Condition **-** TIRE	-71 5.3.034

-71   **5.2.5.035**   *Fuel Filter Differential Pressure*

Change in fuel delivery pressure, measured across the filter, due to accumulation of solid or semisolid matter on the filter element. See Figures 15 &16.

Slot Length: 1 byte
Slot Scaling: 2 kPa/bit   , 0   **Offset**
Slot Range: 0 to 500 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 95
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65276	Dash Display **-** DD	-71 5.3.042

-71   5.2.5.036   *Boost Pressure*

Gage pressure of air measured downstream on the compressor discharge side of the turbocharger. See also 5.2.5.202 for alternate range and resolution. If there is one boost pressure to report and this range and resolution is adequate, this parameter should be used.

Slot Length: 1 byte
Slot Scaling: 2 kPa/bit   , 0   **Offset**
Slot Range: 0 to 500 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 102
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65270	Inlet/Exhaust Conditions **-** IC	-71 5.3.036

-71   5.2.5.037   *Air Inlet Pressure*

Absolute air pressure at inlet to intake manifold or air box.

Slot Length: 1 byte
Slot Scaling: 2 kPa/bit   , 0   **Offset**
Slot Range: 0 to 500 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 106
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65270	Inlet/Exhaust Conditions **-** IC	-71 5.3.036

-71   5.2.5.038   *Coolant Pressure*

Gage pressure of liquid found in engine cooling system.

Slot Length: 1 byte
Slot Scaling: 2 kPa/bit   , 0   **Offset**
Slot Range: 0 to 500 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 109
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65263	Engine Fluid Level/Pressure #1 **-** EFL/P1	-71 5.3.029

-71   5.2.5.039   *Transmission Filter Differential Pressure*

Change in transmission fluid pressure, measured after the filter, due to accumulation of solid or semisolid material on or in the filter.

Slot Length: 1 byte
Slot Scaling: 2 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 500 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 126
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65272	Transmission Fluids **-** TF	-71 5.3.038

-71   5.2.5.040   *Crankcase Pressure*

Gage pressure inside engine crankcase.

Slot Length: 2 bytes
Slot Scaling: 1/128 kPa/bit   ,   -250 kPa   **Offset**
Slot Range: -250 kPa TO 251.99 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 101
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65263	Engine Fluid Level/Pressure #1 **-** EFL/P1	-71 5.3.029

-71   5.2.5.041   *Particulate Trap Inlet Pressure*

Exhaust back pressure as a result of particle accumulation on filter media placed in the exhaust stream.

Slot Length: 1 byte
Slot Scaling: 0.5 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 125 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 81
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65270	Inlet/Exhaust Conditions **-** IC	-71 5.3.036

-71   5.2.5.042   *Engine Oil Filter Differential Pressure*

Change in engine oil pressure, measured across the filter, due to the filter and any accumulation of solid or semisolid material on or in the filter.

Slot Length: 1 byte
Slot Scaling: 0.5 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 125 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 99
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

-71   **5.2.5.043**   *Barometric Pressure*

Absolute air pressure of the atmosphere. See Figures 15 & 16.

Slot Length: 1 byte
Slot Scaling: 0.5 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 125 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 108
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65269	Ambient Conditions - AMB	-71 5.3.035

-71   **5.2.5.044**   *Coolant Filter Differential Pressure*

Change in coolant pressure, measured across the filter, due to the filter and any accumulation of solid or semisolid matter
on or in the filter.

Slot Length: 1 byte
Slot Scaling: 0.5 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 125 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 112
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65270	Inlet/Exhaust Conditions - IC	-71 5.3.036

-71   **5.2.5.045**   *Air Filter Differential Pressure*

Change in engine air system pressure, measured across the filter, due to the filter and any accumulation of solid foreign
matter on or in the filter.

Slot Length: 1 byte
Slot Scaling: 0.05 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 12.5 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 107
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65270	Inlet/Exhaust Conditions - IC	-71 5.3.036

-71   **5.2.5.046**   *Maximum Vehicle Speed Limit*

Maximum vehicle velocity allowed.

Slot Length: 1 byte
Slot Scaling: 1 km/h/bit   ,   0   **Offset**
Slot Range: 0 to 250 km/h   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 74

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65261	Cruise Control/Vehicle Speed Setup - CCSS	-71 5.3.027

-71   5.2.5.047   *Cruise Control Set Speed*

Value of set (chosen) velocity of velocity control system.

Slot Length: 1 byte

Slot Scaling: 1 km/h/bit   , 0   **Offset**

Slot Range: 0 to 250 km/h   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 86

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed - CCVS	-71 5.3.031

-71   5.2.5.048   *Cruise Control High Set Limit Speed*

Maximum vehicle velocity at which cruise can be set.

Slot Length: 1 byte
Slot Scaling: 1 km/h/bit   , 0   **Offset**
Slot Range: 0 to 250 km/h   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 87
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65261	Cruise Control/Vehicle Speed Setup **-** CCSS	-71 5.3.027

-71   5.2.5.049   *Cruise Control Low Set Limit Speed*

Minimum vehicle velocity at which cruise can be set or minimum vehicle velocity for cruise operation before it will exit cruise control operation.

Slot Length: 1 byte
Slot Scaling: 1 km/h/bit   , 0   **Offset**
Slot Range: 0 to 250 km/h   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 88
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65261	Cruise Control/Vehicle Speed Setup **-** CCSS	-71 5.3.027

-71   5.2.5.050   *Trip Distance*

Distance traveled during all or part of a journey.

NOTE See 5.2.5.107 for alternate resolution.

Slot Length: 4 bytes
Slot Scaling: 0.125 km/bit   , 0   **Offset**
Slot Range: 0 to 526,385,151.9 km   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 244
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65248	Vehicle Distance **-** VD	-71 5.3.014

-71   5.2.5.051   *Total Vehicle Distance*

Accumulated distance traveled by vehicle during its operation.

NOTE See 5.2.5.106 for alternate resolution.

Slot Length: 4 bytes
Slot Scaling: 0.125 km/bit   ,   0   **Offset**
Slot Range: 0 to 526,385,151.9 km   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 245
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65248	Vehicle Distance **-** VD	-71 5.3.014

-71   5.2.5.052   *Altitude*

Altitude of the vehicle referenced to sea level at standard atmospheric pressure and temperature.

Slot Length: 2 bytes
Slot Scaling: 0.125 m/bit   ,   -2500 m   **Offset**
Slot Range: -2500 to 5531.875 m   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 580
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65256	Vehicle Direction/Speed **-** VDS	-71 5.3.022

-71   5.2.5.053   *Turbocharger 1 Speed*

Rotational velocity of rotor in the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 4 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 257,020 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 103
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65245	Turbocharger **-** TC	-71 5.3.011

-71   5.2.5.053   *Turbocharger 2 Speed*

Rotational velocity of rotor in the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 4 rpm/bit   , 0   **Offset**
Slot Range: 0 to 257,020 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1169
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65179	Turbocharger Information #1 **-** TCl1	-71 5.3.094

-71   5.2.5.053   *Turbocharger 3 Speed*

Rotational velocity of rotor in the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 4 rpm/bit   , 0   **Offset**
Slot Range: 0 to 257,020 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1170
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65179	Turbocharger Information #1 **-** TCl1	-71 5.3.094

-71   5.2.5.053   *Turbocharger 4 Speed*

Rotational velocity of rotor in the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 4 rpm/bit   , 0   **Offset**
Slot Range: 0 to 257,020 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1171
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65179	Turbocharger Information #1 **-** TCl1	-71 5.3.094

-71   5.2.5.054   *Main Shaft Speed*

Rotational velocity of the first intermediate shaft of the transmission.

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   , 0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 160
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
		-

-71   5.2.5.055   *Input Shaft Speed*

Rotational velocity of the primary shaft transferring power into the transmission. When a torque converter is present, it is the output of the torque converter.

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   , 0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 161
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61442	Electronic Transmission Controller #1 **-** ETC1	-71 5.3.005

-71   5.2.5.056   *Power Takeoff Speed*

Rotational velocity of device used to transmit engine power to auxiliary equipment.

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   , 0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 186
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65264	Power Takeoff Information **-** PTO	-71 5.3.030

-71   5.2.5.057   *Power Takeoff Set Speed*

Rotational velocity selected by operator for device used to transmit engine power to auxiliary equipment.

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   , 0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 187
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65264	Power Takeoff Information **-** PTO	-71 5.3.030

-71   5.2.5.058   *Total Engine Revolutions*

Accumulated number of revolutions of engine crankshaft during its operation.

Slot Length: 4 bytes
Slot Scaling: 1000 r/bit   , 0   **Offset**
Slot Range: 0 to 4,211,081,215,000 r   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 249
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65253	Engine Hours, Revolutions **-** HOURS	-71 5.3.019

-71   **5.2.5.059**   *Total Idle Hours*

Accumulated time of operation of the engine while under idle conditions.

Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   ,   0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 235
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65244	Idle Operation **-** IO	-71 5.3.010

-71   **5.2.5.060**   *Total Vehicle Hours*

Accumulated time of operation of vehicle.

Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   ,   0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 246
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65255	Vehicle Hours **-** VH	-71 5.3.021

-71   **5.2.5.061**   *Total Engine Hours*

Accumulated time of operation of engine.

Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   ,   0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 247
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65253	Engine Hours, Revolutions **-** HOURS	-71 5.3.019

-71   **5.2.5.062**   *Total Power Takeoff Hours*

Accumulated time of operation of power takeoff device.

Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   ,   0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 248
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65255	Vehicle Hours **-** VH	-71 5.3.021

-71   **5.2.5.063**   *Fuel Rate*

Amount of fuel consumed by engine per unit of time.

Slot Length: 2 bytes
Slot Scaling: 0.05 L/h per bit   ,   0   **Offset**
Slot Range: 0 to 3,212.75 L/h   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 183
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65266	Fuel Economy (Liquid) **-** LFE	-71 5.3.032

-71   **5.2.5.064**   *Trip Fuel*

Fuel consumed during all or part of a journey.

Slot Length: 4 bytes
Slot Scaling: 0.5 L/bit   ,   0   **Offset**
Slot Range: 0 to 2,105,540,607.5 L   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 182
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65257	Fuel Consumption (Liquid) **-** LFC	-71 5.3.023

-71   **5.2.5.065**   *Total Idle Fuel Used*

Accumulated amount of fuel used during vehicle operation while under idle conditions.

Slot Length: 4 bytes
Slot Scaling: 0.5 L/bit   ,   0   **Offset**
Slot Range: 0 to 2,105,540,607.5 L   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 236
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65244	Idle Operation **-** IO	-71 5.3.010

-71   **5.2.5.066**   *Total Fuel Used*

Accumulated amount of fuel used during vehicle operation.

Slot Length: 4 bytes
Slot Scaling: 0.5 L/bit   ,   0   **Offset**
Slot Range: 0 to 2,105,540,607.5 L   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 250
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65257	Fuel Consumption (Liquid) **-** LFC	-71 5.3.023

-71   **5.2.5.067**   *Instantaneous Fuel Economy*

Current fuel economy at current vehicle velocity.

Slot Length: 2 bytes
Slot Scaling: 1/512 km/kg   ,   0   **Offset**
Slot Range: 0 to 125.5 km/kg   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 184
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65266	Fuel Economy (Liquid) **-** LFE	-71 5.3.032

-71   **5.2.5.068**   *Average Fuel Economy*

Average of instantaneous fuel economy for that segment of vehicle operation of interest.

Slot Length: 2 bytes
Slot Scaling: 1/512 km/kg   ,   0   **Offset**
Slot Range: 0 to 125.5 km/kg   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 185
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65266	Fuel Economy (Liquid) **-** LFE	-71 5.3.032

-71   **5.2.5.069**   *Blower Bypass Valve Position*

Relative position of the blower bypass valve.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 72
SPN Supporting Information:

Reference:
          PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
          65277   Alternate Fuel #1 **-** AF1   -71 5.3.043

-71   **5.2.5.070**   *Washer Fluid Level*

Ratio of volume of liquid to total container volume of fluid reservoir in windshield wash system.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 80
SPN Supporting Information:

Reference:
          PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
          65276   Dash Display **-** DD   -71 5.3.042

-71   **5.2.5.071**   *Fuel Level*

Ratio of volume of fuel to the total volume of fuel storage container.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 96
SPN Supporting Information:

Reference:
          PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
          65276   Dash Display **-** DD   -71 5.3.042

-71   **5.2.5.072**   *Engine Oil Level*

Ratio of current volume of engine sump oil to maximum required volume.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 98
SPN Supporting Information:

Reference:
          PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
          65263   Engine Fluid Level/Pressure #1 **-** EFL/P1   -71 5.3.029

-71   **5.2.5.073**   *Coolant Level*

Ratio of volume of liquid found in engine cooling system to total cooling system volume. Typical monitoring location is in the coolant expansion tank.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   ,   0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 111
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65263	Engine Fluid Level/Pressure #1 **-** EFL/P1	-71 5.3.029

-71   **5.2.5.074**   *Transmission Oil Level*

Ratio of volume of transmission sump oil to recommended volume.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   ,   0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 124
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65272	Transmission Fluids **-** TF	-71 5.3.038

-71   **5.2.5.075**   *Battery Potential (Voltage), Switched*

Electrical potential measured at the input of the electronic control unit supplied through a switching device.

Slot Length: 2 bytes
Slot Scaling: 0.05 V/bit   , 0   **Offset**
Slot Range: 0 to 3212.75 V   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 158
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65271	Vehicle Electrical Power **-** VEP	-71 5.3.037

-71   **5.2.5.076**   *Alternator Potential (Voltage)*

Electrical potential measured at the alternator output.

Slot Length: 2 bytes
Slot Scaling: 0.05 V/bit   , 0   **Offset**
Slot Range: 0 to 3212.75 V   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 167
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65271	Vehicle Electrical Power **-** VEP	-71 5.3.037

-71   **5.2.5.077**   *Electrical Potential (Voltage)*

Measured electrical potential of the battery.

Slot Length: 2 bytes
Slot Scaling: 0.05 V/bit   , 0   **Offset**
Slot Range: 0 to 3212.75 V   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 168
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65271	Vehicle Electrical Power **-** VEP	-71 5.3.037

-71   **5.2.5.078**   *Net Battery Current*

Net flow of electrical current into/out of the battery or batteries.

Slot Length: 1 byte
Slot Scaling: 1 A/bit   , -125 A   **Offset**
Slot Range: -125 to 125 A   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 114
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65271	Vehicle Electrical Power **-** VEP	-71 5.3.037

-71   5.2.5.079   *Alternator Current*

Measure of electrical current flow from the alternator. Alternator Current (High Range/Resolution) parameter SPN 1795 has a higher range and resolution of the same parameter.

Slot Length: 1 byte
Slot Scaling: 1 A/bit   , 0   **Offset**
Slot Range: 0 to 250 A   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 115
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65271	Vehicle Electrical Power **-** VEP	-71 5.3.037

-71   5.2.5.080   *Axle Weight*

Total mass imposed by the tires on the road surface at the specified axle.

Slot Length: 2 bytes
Slot Scaling: 0.5 kg/bit   , 0   **Offset**
Slot Range: 0 to 32,127.5 kg   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 582
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65258	Vehicle Weight **-** VW	-71 5.3.024

-71   5.2.5.081   *Trailer Weight*

Total mass of freight-carrying vehicle designed to be pulled by truck, including the weight of the contents.

Slot Length: 2 bytes
Slot Scaling: 2 kg/bit   , 0   **Offset**
Slot Range: 0 to 128,510 kg   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 180
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65258	Vehicle Weight **-** VW	-71 5.3.024

-71   5.2.5.082   *Cargo Weight*

The mass of freight carried.

Slot Length: 2 bytes
Slot Scaling: 2 kg/bit   , 0   **Offset**
Slot Range: 0 to 128,510 kg   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 181
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65258	Vehicle Weight **-** VW	-71 5.3.024

-71　　　5.2.5.083　　*Compass Bearing*

Present compass bearing of vehicle.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit　　　　　　　　, 0　　　　　　　**Offset**
Slot Range: 0 to 501.99 deg　　　　　　　**Operational Range:** same as slot range
SPN Type: Measured
SPN: 165
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65256	Vehicle Direction/Speed **-** VDS	-71　5.3.022

-71　　　5.2.5.084　　*Pitch*

Pitch of the vehicle as calculated by the navigation device(s).

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit　　　　　　　, -200 deg　　　　　**Offset**
Slot Range: -200 to 301.99 deg　　　　**Operational Range:** -200 deg (DECENT) to +301.992 deg (ASCENT)
SPN Type: Measured
SPN: 583
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65256	Vehicle Direction/Speed **-** VDS	-71　5.3.022

-71　　　5.2.5.085　　*Latitude*

Latitude position of the vehicle.

Slot Length: 4 bytes
Slot Scaling: 10^-7 deg/bit　　　　　　, -210 deg　　　　　**Offset**
Slot Range: -210 to 211.1008122 deg　　**Operational Range:** -210 deg (SOUTH) to +211.108122 deg (NORTH)
SPN Type: Measured
SPN: 584
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65267	Vehicle Position **-** VP	-71　5.3.033

-71　　　5.2.5.086　　*Longitude*

Longitude position of the vehicle.

Slot Length: 4 bytes
Slot Scaling: 10^-7 deg/bit　　　　　　, -210 deg　　　　　**Offset**
Slot Range: -210 to 211.1008122 deg　　**Operational Range:** -210 deg (WEST) to +211.108121 deg (EAST)
SPN Type: Measured
SPN: 585
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

-71   **5.2.5.087**   *Vehicle Identification Number*

Vehicle Identification Number (VIN) as assigned by the vehicle manufacturer.

NOTE The ASCII character "*" is reserved as a delimiter.

Slot Length: Variable - up to 200 characters ("*" delimited)
Slot Scaling: ASCII   , 0   **Offset**
Slot Range: 0 to 255 per byte   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 237
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65260	Vehicle Identification **-** VI	-71 5.3.026

-71   **5.2.5.088**   *Software Identification*

Software identification of an electronic module. As an example, this parameter may be represented with ASCII characters MMDDYYaa where MM is the month, DD is the day, YY is the year, and aa is the revision number.

NOTE The ASCII character "*" is reserved as a delimiter.

Slot Length: 1 byte
Slot Scaling: ASCII   , 0   **Offset**
Slot Range: 0 to 255 per byte   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 234
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65242	Software Identification **-** SOFT	-71 5.3.047

-71   **5.2.5.089**   *Unit Number (Power Unit)*

Owner assigned unit number for the power unit of the vehicle.

NOTE: The ASCII character "*" is reserved as a delimiter.

Slot Length: Variable - up to 200 characters ("*" delimited)
Slot Scaling: ASCII   , 0   **Offset**
Slot Range: 0 to 255 per byte   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 233
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65259	Component Identification **-** CI	-71 5.3.025

-71   **5.2.5.090**   *Make*

Make of the component corresponding to the codes defined in the American Trucking Association Vehicle Maintenance Reporting Standard (ATA/VMRS). It is suggested that spaces (ASCII 32) are sed to fill the remaining characters if the ATA/VMRS make code is less than five characters in length.

NOTE- The ASCII character "*" is reserved as a delimiter.

Slot Length: 5 bytes
Slot Scaling: ASCII   , 0   **Offset**

Slot Range: 0 to 255 per byte	**Operational Range:** same as slot range

SPN Type: Measured

SPN: 586

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65259	Component Identification **-** CI	-71 5.3.025

-71   **5.2.5.091**   *Model*

Model of the component.

NOTE - The ASCII character "*" is reserved as a delimiter.

Slot Length: Variable - up to 200 characters ("*" delimited)

Slot Scaling: ASCII	, 0	**Offset**	
Slot Range: 0 to 255 per byte	**Operational Range:** same as slot range		

SPN Type: Measured

SPN: 587

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65259	Component Identification **-** CI	-71 5.3.025

-71   **5.2.5.092**   *Serial Number*

Serial number of the component.

NOTE - The ASCII character "*" is reserved as a delimiter.

Slot Length: Variable - up to 200 characters ("*" delimited)

Slot Scaling: ASCII	, 0	**Offset**	
Slot Range: 0 to 255 per byte	**Operational Range:** same as slot range		

SPN Type: Measured

SPN: 588

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65259	Component Identification **-** CI	-71 5.3.025

-71   **5.2.5.093**   *Seconds*

Part of a parameter used to represent time.

Slot Length: 1 byte

Slot Scaling: 0.25 s/bit	, 0	**Offset**	
Slot Range: 0 to 62.5 s	**Operational Range:** 0 to 59.75 sec		

SPN Type: Measured

SPN: 959

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65254	Time/Date **-** TD	-71 5.3.020

-71　　　　5.2.5.094　　*Minutes*

Part of a parameter used to represent time.

Slot Length:　1 byte
Slot Scaling:　0.25 s/bit　　　　　　　　　　, 0　　　　　　　**Offset**
Slot Range:　0 to 62.5 s　　　　　　　**Operational Range:**　0 to 59 min
SPN Type:　Measured
SPN:　960
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65254	Time/Date **-** TD	-71　5.3.020

-71　　　　5.2.5.095　　*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 FF(hex) 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 0016 would be left front tire.

Tire pressure for location 2316 would be right outside rear rear on a 3-axle tractor with dual axle per side (3rd axle, 4th tire).

Slot Length:　8 bits
Slot Scaling:　256 states/8 bit　　　　　　, 0　　　　　　　**Offset**
Slot Range:　0 to 255　　　　　　　**Operational Range:**　same as slot range
SPN Type:　Measured
SPN:　927
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61446	Electronic Axle Controller #1 **-** EAC1	-71　5.3.009

-71　　　　5.2.5.095　　*Axle 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 FF(hex) 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 0016 would be left front tire.

Tire pressure for location 2316 would be right outside rear rear on a 3-axle tractor with dual axle per side (3rd axle, 4th tire).

Slot Length: 8 bits
Slot Scaling: 256 states/8 bit   ,   0   **Offset**
Slot Range: 0 to 255   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 928
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65258	Vehicle Weight **-** VW	-71 5.3.024

-71   5.2.5.095   *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 FF(hex) 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 0016 would be left front tire.

Tire pressure for location 2316 would be right outside rear rear on a 3-axle tractor with dual axle per side (3rd axle, 4th tire).

Slot Length: 8 bits
Slot Scaling: 256 states/8 bit   ,   0   **Offset**
Slot Range: 0 to 255   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 929
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65268	Tire Condition **-** TIRE	-71 5.3.034

-71   5.2.5.095   *Drive Axle 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 FF(hex) 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 0016 would be left front tire.

Tire pressure for location 2316 would be right outside rear rear on a 3-axle tractor with dual axle per side (3rd axle, 4th tire).

Slot Length: 8 bits
Slot Scaling: 256 states/8 bit   ,   0   **Offset**

Slot Range: 0 to 255   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 930

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65273	Axle Information **-** AI	-71 5.3.039

-71   **5.2.5.096**   *Throttle Position*

The position of the valve used to regulate the supply of a fluid, usually air or fuel/air mixture, to an engine. 0% represents no supply and 100% is full supply.

Slot Length: 1 byte

Slot Scaling: 0.4 %/bit   , 0   **Offset**

Slot Range: 0 to 100 %   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 51

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65266	Fuel Economy (Liquid) **-** LFE	-71 5.3.032

-71   **5.2.5.097**   *Alternator Speed*

Actual rotation speed of the alternator.

Slot Length: 2 bytes

Slot Scaling: 0.5 rpm/bit   , 0   **Offset**

Slot Range: 0 to 32,127.5 rpm   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 589

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65237	Alternator Speed **-** AS	-71 5.3.049

-71   **5.2.5.098**   *Shift Finger Rail Position*

The current position of the shift finger in the rail direction.

Slot Length: 1 byte

Slot Scaling: 0.4 %/bit   , 0   **Offset**

Slot Range: 0 to 100 %   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 60

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   5.2.5.099   *Shift Finger Gear Position*

The current position of the shift finger in the gear direction.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 59
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   5.2.5.100   *Transmission Synchronizer Clutch Value*

The current modulated value for the air supply to the synchronizer clutch.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 53
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65221	Electronic Transmission Controller #4 **-** ETC4	-71 5.3.051

-71   5.2.5.101   *Transmission Synchronizer Brake Value*

The current modulated value for the air supply to the synchronizer brake.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 54
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65221	Electronic Transmission Controller #4 **-** ETC4	-71 5.3.051

-71   5.2.5.102   *Service Component Identification*

Identification of component needing service. See Table 15.

Slot Length: 1 byte
Slot Scaling: 1 ID/bit   , 0   **Offset**
Slot Range: 0 to 250 ID   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 911
SPN Supporting Information: ServCompIDobj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

TABLE 15—SERVICE COMPONENT IDENTIFICATION

	Identification	Component
	0	Service check for entire vehicle
	1	Brake lining; left front axle
	2	Brake lining; right front axle
	3	Brake lining; left rear axle
	4	Brake lining; right rear axle
	5	Clutch lining
	6-10	Not defined
	11	Brake lining; left rear axle #2
	12	Brake lining; right rear axle #2
	13	Brake lining; left rear axle #3
	14	Brake lining; right rear axle #3
	15	Brake lining: general
	16	Regulated general check for entire vehicle
	17	Brake system special check
	18	In-between check
	19	Check trip recorder
	20	Check exhaust gas
	21	Check vehicle speed limiter
(R)	22-29	Not defined
(R)	30	Engine coolant change
(R)	31	Engine coolant filter change
	32	Engine oil—engine #1
	33	Engine oil—engine #2
	34	Not defined
	35	Steering oil
	36	Not defined
	37	Transmission oil—transmission #1
	38	Transmission oil—transmission #2
	39	Not defined
	40	Intermediate transmission oil
	41	Not defined
	42	Front axle oil
	43	Rear axle oil
	44-47	Not defined
	48	Tires
	49	Engine air filter
	50	Engine oil filter
(R)	51-60	Not defined
(R)	61	Tachograph
(R)	62	Driver card #1
(R)	63	Driver card #2
(R)	64-239	Not defined
	240-249	Manufacturer specific
(R)	250-251	Reserved
(R)	252	Reset all components
(R)	253	No action to be taken
	254	Error
	255	Component identification not available

-71 5.2.5.102 *Service Component Identification*

Identification of component needing service. See Table 15.

Slot Length: 1 byte

Slot Scaling: 1 ID/bit , 0 **Offset**

Slot Range: 0 to 250 ID **Operational Range:** same as slot range

SPN Type: Measured

SPN: 912

SPN Supporting Information: ServCompIDobj.doc

Reference:

-71   **5.2.5.102**   *Service Component Identification*

Identification of component needing service. See Table 15.

Slot Length: 1 byte
Slot Scaling: 1 ID/bit   , 0   **Offset**
Slot Range: 0 to 250 ID   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 913
SPN Supporting Information: ServCompIDobj.doc

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65216	Service Information **-** SERV	-71 5.3.055

-71   **5.2.5.102**   *Service Component Identification*

Identification of component needing service. See Table 15.

Slot Length: 1 byte
Slot Scaling: 1 ID/bit   , 0   **Offset**
Slot Range: 0 to 250 ID   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1379
SPN Supporting Information: ServCompIDobj.doc

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65166	Service #2 **-** S2	-71 5.3.109

-71   **5.2.5.103**   *Service Distance*

The distance which can be traveled 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 5.2.5.102).

Slot Length: 2 bytes
Slot Scaling: 5 km/bit   , -160,635 km   **Offset**
Slot Range: -160,635 to 160,640 km   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 914
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65216	Service Information **-** SERV	-71 5.3.055

-71   **5.2.5.104**   *Service Delay/Calendar Time Based*

The time in weeks until the next vehicle service inspection is required. A negative value is transmitted if the service

inspection has been passed. The component that requires service is identified by the service component identification (see

Slot Length: 1 byte
Slot Scaling: 1 week/bit   ,   -125 weeks   **Offset**
Slot Range: -125 to 125 weeks   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 915
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65216	Service Information **-** SERV	-71 5.3.055

-71   **5.2.5.105**   *Service Delay/Operational Time Based*

The time in vehicle operational time until the next vehicle service inspection is required. A negative value is transmitted if the service inspection has been passed. The component that requires service is identified by the service component identification (see 5.2.5.102).

Slot Length: 2 bytes
Slot Scaling: 1 hr/bit   ,   -32,127 hr   **Offset**
Slot Range: -32,127 to 32,128 hr   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 916
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65216	Service Information **-** SERV	-71 5.3.055

-71   **5.2.5.106**   *High Resolution Total Vehicle Distance*

Accumulated distance traveled by the vehicle during its operation.

NOTE - See 5.2.5.51 for alternate resolution.

Slot Length: 4 bytes
Slot Scaling: 5 m/bit   ,   0   **Offset**
Slot Range: 0 to 21,055,406 km   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 917
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65217	High Resolution Vehicle Distance **-** VDHR	-71 5.3.054

-71   **5.2.5.107**   *High Resolution Trip Distance*

Distance traveled during all or part of a journey.

NOTE - See 5.2.5.50 for alternate resolution.

Slot Length: 4 bytes
Slot Scaling: 5 m/bit   , 0   **Offset**
Slot Range: 0 to 21,055,406 km   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 918
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65217	High Resolution Vehicle Distance **-** VDHR	-71 5.3.054

-71   **5.2.5.108**   *Transmission Requested Range*

Range selected by the operator. Characters may include P, Rx, Rx-1...R2, R1, R, Nx, Nx-1...N2, N1, N, D, D1, D2..., Dx, L, L1, L2..., Lx-1, 1, 2, 3,... If only one displayed character is required, the second character shall be used and the first character shall be a space (ASCII 32) or a control character (ASCII 0 to 31). If the first character is a control character, refer to the manufacturer's application document for definition.

Slot Length: 2 bytes
Slot Scaling: ASCII   , 0   **Offset**
Slot Range: 0 to 255 per byte   **Operational Range:** same as slot range
SPN Type: Status
SPN: 162
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61445	Electronic Transmission Controller #2 **-** ETC2	-71 5.3.008

-71   **5.2.5.109**   *Transmission Current Range*

Range currently being commanded by the transmission control system. Characters may include P, Rx, Rx-1...R2, R1, R, Nx, Nx-1...N2, N1, N, D, D1, D2..., Dx, L, L1, L2..., Lx-1, 1, 2, 3,... If only one displayed character is required, the second character shall be used and the first character shall be a space (ASCII 32) or a control character (ASCII 0 to 31). If the first character is a control character, refer to the manufacturer's application document for definition.

Slot Length: 2 bytes
Slot Scaling: ASCII   , 0   **Offset**
Slot Range: 0 to 255 per byte   **Operational Range:** same as slot range
SPN Type: Status
SPN: 163
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61445	Electronic Transmission Controller #2 **-** ETC2	-71 5.3.008

-71   **5.2.5.110**   *Hours*

Part of a parameter used to represent time.

Slot Length: 1 byte
Slot Scaling: 1 hr/bit   , 0   **Offset**
Slot Range: 0 to 250 hr   **Operational Range:** 0 to 23 hr
SPN Type: Measured
SPN: 961
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65254	Time/Date **-** TD	-71 5.3.020

-71   **5.2.5.111**   *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.

Slot Length: 1 byte
Slot Scaling: 0.25 days/bit   , 0   **Offset**
Slot Range: 0 to 62.5 days   **Operational Range:** 0.25 to 31.75 day
SPN Type: Measured
SPN: 962
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65254	Time/Date **-** TD	-71 5.3.020

-71   **5.2.5.112**   *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.

Slot Length: 1 byte
Slot Scaling: 1 month/bit   , 0   **Offset**
Slot Range: 0 to 250 months   **Operational Range:** 1 to 12 month
SPN Type: Measured
SPN: 963
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65254	Time/Date **-** TD	-71 5.3.020

-71   5.2.5.113   *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.

Slot Length: 1 byte
Slot Scaling: 1 year/bit   , 1985 years   **Offset**
Slot Range: 1985 to 2235 years   **Operational Range:** 1985 to 2235 years
SPN Type: Measured
SPN: 964
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65254	Time/Date **-** TD	-71 5.3.020

-71   5.2.5.114   *Number of Software Identification Fields*

Number of software identification designators represented in the software identification parameter group.

Slot Length: 1 byte
Slot Scaling: 1 step/bit   , 0   **Offset**
Slot Range: 0 to 250 steps   **Operational Range:** 0 to 125
SPN Type: Measured
SPN: 965
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65242	Software Identification **-** SOFT	-71 5.3.047

-71   5.2.5.115   *Rated Engine Power*

Net brake power that the engine will deliver continuously, specified for a given application at a rated speed.

Slot Length: 2 bytes
Slot Scaling: 0.5 kW/bit   , 0   **Offset**
Slot Range: 0 to 32,127.5 kW   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 166
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65214	Electronic Engine Controller #4 **-** EEC4	-71 5.3.057

-71   5.2.5.116   *Rated Engine Speed*

The maximum governed rotational velocity of the engine crankshaft under full load conditions. Note that the engine speed
at point 2 (5.2.1.27) is equal to rated engine speed only in the case when the engine has not been derated. See also 5.2.4.1.

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   , 0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 189
SPN Supporting Information:

-71   5.2.5.117   *Total Compression Brake Distance*

Total distance over which the compression brakes have been active for the life of the engine.

Slot Length: 4 bytes
Slot Scaling: 0.125 km/bit   ,   0   **Offset**
Slot Range: 0 to 526,385,151.9 km   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 990
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65212	Compression/Service Brake Information **-** CBI	-71 5.3.060

-71   5.2.5.118   *Trip Compression Brake Distance*

Total distance over which the compression brakes have been active since the last trip reset.

Slot Length: 4 bytes
Slot Scaling: 0.125 km/bit   ,   0   **Offset**
Slot Range: 0 to 526,385,151.9 km   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 991
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65212	Compression/Service Brake Information **-** CBI	-71 5.3.060

-71   5.2.5.119   *Trip Service Brake Distance*

Total distance over which the service brakes have been active since the last trip reset.

Slot Length: 4 bytes
Slot Scaling: 0.125 km/bit   , 0   **Offset**
Slot Range: 0 to 526,385,151.9 km   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 992
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65212	Compression/Service Brake Information **-** CBI	-71 5.3.060

-71   5.2.5.120   *Trip Service Brake Applications*

Total number of times the service brakes have been activated since the last trip reset. Brake applications of less than 0.5 s are not counted and lengthy brake applications (longer than 0.5 s) are counted as a single event.

NOTE - Definition and resolution shall stay the same if brakes are applied by only the tractor, only the trailer or both.

Slot Length: 4 bytes
Slot Scaling: 1 brake appl/bit   , 0   **Offset**
Slot Range: 0 to 4,227,858,431 appl   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 993
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65212	Compression/Service Brake Information **-** CBI	-71 5.3.060

-71   5.2.5.121   *Trip Fan On Time*

Total time the fan has been on (due to an automatic trigger or manual trigger) since the last trip reset. The fan could be requested to be on by the engine system, a manual switch, and/or the A/C system. Whichever system requests the fan activation first shall have the time accumulated against it. The sum total of these three values shall equal the trip fan on time.

NOTE—If the fan has been requested to be on by a component that is not one of the defined categories, this time shall be

Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   , 0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 994
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65211	Trip Fan Information **-** TFI	-71 5.3.061

-71   5.2.5.122   *Trip Fan On Time Due to the Engine System*

Total time the fan has been on due to engine triggers (i.e., excluding time on due to an operator manual switch or A/C system) since the last trip reset. For the time to be accumulated against the engine system, it is necessary that it be the first to request the fan activation or it be the only system requesting fan activation.

Slot Length: 4 bytes

Slot Scaling:	0.05 hr/bit	,	0	**Offset**
Slot Range:	0 to 210,554,060.75 hr		**Operational Range:**	same as slot range
SPN Type:	Measured
SPN:	995

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65211	Trip Fan Information **-** TFI	-71 5.3.061

-71   **5.2.5.123**   *Trip Fan On Time Due to a Manual Switch*

Total time the fan has been on due to manual activation by the operator (i.e., excluding time on due to automatic triggers) since the last trip reset. For the time to be accumulated against the manual switch, it is necessary that it be the first to request the fan activation or it be the only system requesting fan activation.

Slot Length:	4 bytes
Slot Scaling:	0.05 hr/bit	,	0	**Offset**
Slot Range:	0 to 210,554,060.75 hr		**Operational Range:**	same as slot range
SPN Type:	Measured
SPN:	996

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65211	Trip Fan Information **-** TFI	-71 5.3.061

-71   **5.2.5.124**   *Trip Fan On Time Due to the A/C System*

Total time the fan has been on due to the A/C system since the last trip reset. For the time to be accumulated against the A/C system, it is necessary that it be the first to request the fan activation or it be the only system requesting fan

Slot Length:	4 bytes
Slot Scaling:	0.05 hr/bit	,	0	**Offset**
Slot Range:	0 to 210,554,060.75 hr		**Operational Range:**	same as slot range
SPN Type:	Measured
SPN:	997

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65211	Trip Fan Information **-** TFI	-71 5.3.061

-71   **5.2.5.125**   *Trip Distance on Road Speed Governing*

Total distance accumulated while the engine torque mode is road speed governing since the last trip reset.

Slot Length:	4 bytes
Slot Scaling:	0.125 km/bit	,	0	**Offset**
Slot Range:	0 to 526,385,151.9 km		**Operational Range:**	same as slot range
SPN Type:	Measured
SPN:	998

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65210	Trip Distance Information **-** TDI	-71 5.3.062

-71   **5.2.5.126**   *Trip Gear Down Distance*

Total distance accumulated while the vehicle has operated in the gear which is one gear down from top gear and exceeds a calibrated minimum time (typically the time to shift the transmission) since the last trip reset.

Slot Length: 4 bytes
Slot Scaling: 0.125 km/bit   ,   0   **Offset**
Slot Range: 0 to 526,385,151.9 km   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 999
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65210	Trip Distance Information **-** TDI	-71 5.3.062

-71   **5.2.5.127**   *Trip Distance in Top Gear*

Total distance accumulated while the vehicle has operated in top gear for a calibrated minimum time since the last trip reset.

Slot Length: 4 bytes
Slot Scaling: 0.125 km/bit   ,   0   **Offset**
Slot Range: 0 to 526,385,151.9 km   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1000
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65210	Trip Distance Information **-** TDI	-71 5.3.062

-71   **5.2.5.128**   *Trip Drive Fuel Used*

Total fuel consumed while the engine speed is greater than zero, vehicle speed is greater than or equal to 2 km/h, and neither the PTO or the remote PTO is controlling the engine power output, since the last trip reset.

NOTE—This parameter is intended for liquid fueled engines. See 5.2.5.134 for alternate resolution.

Slot Length: 4 bytes
Slot Scaling: 0.5 L/bit   ,   0   **Offset**
Slot Range: 0 to 2,105,540,607.5 L   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1001
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65209	Trip Fuel Information (Liquid) **-** LTFI	-71 5.3.063

-71   **5.2.5.129**   *Trip PTO Moving Fuel Used*

Total fuel consumed while the PTO or remote PTO is in the hold state, the engine speed is greater than zero, and vehicle speed is greater than or equal to 2 km/h, since the last trip reset.

NOTE—This parameter is intended for liquid fueled engines. See 5.2.5.135 for alternate resolution.

Slot Length: 4 bytes
Slot Scaling: 0.5 L/bit   ,   0   **Offset**
Slot Range: 0 to 2,105,540,607.5 L   **Operational Range:**   same as slot range
SPN Type: Measured

SPN: 1002

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65209	Trip Fuel Information (Liquid) **-** LTFI	-71 5.3.063

-71   **5.2.5.130**   *Trip PTO Non-moving Fuel Used*

Total fuel consumed while the PTO or remote PTO is in the hold state, the engine speed is greater than zero, and vehicle speed is less than 2 km/h, since the last trip reset.

NOTE—This parameter is intended for liquid fueled engines. See 5.2.5.136 for alternate resolution.

Slot Length: 4 bytes
Slot Scaling: 0.5 L/bit   ,   0   **Offset**
Slot Range: 0 to 2,105,540,607.5 L   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1003
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65209	Trip Fuel Information (Liquid) **-** LTFI	-71 5.3.063

-71   **5.2.5.131**   *Trip Vehicle Idle Fuel Used*

Total fuel consumed while neither the PTO or remote PTO is in the hold state, the engine speed is greater than zero, and vehicle speed is less than 2 km/h, since the last trip reset.

In marine applications, this parameter is defined as the total fuel consumed while the engine speed is greater than zero, and less than or equal to 50 RPM greater than low idle, since the last trip reset.

NOTE—This parameter is intended for liquid fueled engines. See 5.2.5.137 for alternate resolution.

Slot Length: 4 bytes
Slot Scaling: 0.5 L/bit   ,   0   **Offset**
Slot Range: 0 to 2,105,540,607.5 L   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1004
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65209	Trip Fuel Information (Liquid) **-** LTFI	-71 5.3.063

-71   **5.2.5.132**   *Trip Cruise Fuel Used*

Total fuel consumed while the engine is in the cruise hold state since the last trip reset. If both cruise control and VSL (vehicle speed limiter) are commanding the same amount of fuel, the cruise control is deemed the active torque mode and fuel will be accumulated in "trip cruise fuel used" parameter. If fuel commanded due to the accelerator pedal position is larger than fuel commanded by cruise control (e.g., accelerator override torque mode), the cruise control is not deemed the active torque mode and fuel will not be accumulated in the "trip cruise fuel used" parameter.

NOTE—This parameter is intended for liquid fueled engines. See 5.2.5.138 for alternate resolution.

Slot Length: 4 bytes
Slot Scaling: 0.5 L/bit   ,   0   **Offset**
Slot Range: 0 to 2,105,540,607.5 L   **Operational Range:**   same as slot range
SPN Type: Measured

SPN: 1005

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65209	Trip Fuel Information (Liquid) **-** LTFI	-71 5.3.063

-71   5.2.5.133   *Trip Drive Fuel Economy*

Trip drive fuel economy is equal to the distance traveled by vehicle in the drive state (engine speed greater than zero, vehicle speed greater than or equal to 2 km/h, and neither the PTO or remote PTO is controlling engine power output) divided by trip drive fuel used (5.2.5.128), since the last trip reset.

NOTE—This parameter is intended for liquid fueled engines. See 5.2.5.139 for alternate resolution.

Slot Length: 2 bytes
Slot Scaling: 1/512 km/L   ,   0   **Offset**
Slot Range: 0 to 125.5 km/L   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1006

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65209	Trip Fuel Information (Liquid) **-** LTFI	-71 5.3.063

-71   5.2.5.134   *Trip Drive Fuel Used (Gaseous)*

Total fuel consumed while the engine speed is greater than zero, vehicle speed is greater than or equal to 2 km/h, and neither the PTO or the remote PTO is controlling the engine power output, since the last trip reset.

NOTE—This parameter is intended for gaseous fueled engines. See 5.2.5.128 for alternate resolution.

Slot Length: 4 bytes
Slot Scaling: 0.5 kg/bit   ,   0   **Offset**
Slot Range: 0 to 2,105,540,607.5 kg   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1007

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65208	Trip Fuel Information (Gaseous) **-** GTFI	-71 5.3.064

-71   5.2.5.135   *Trip PTO Moving Fuel Used (Gaseous)*

Total fuel consumed while the PTO or remote PTO is in the hold state, the engine speed is greater than zero, and vehicle speed is greater than or equal to 2 km/h, since the last trip reset.

NOTE—This parameter is intended for gaseous fueled engines. See 5.2.5.129 for alternate resolution.

Slot Length: 4 bytes
Slot Scaling: 0.5 kg/bit   ,   0   **Offset**
Slot Range: 0 to 2,105,540,607.5 kg   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1008

SPN Supporting Information:

Reference:

-71   5.2.5.136   *Trip PTO Non-moving Fuel Used (Gaseous)*

Total fuel consumed while the PTO or remote PTO is in the hold state, the engine speed is greater than zero, and vehicle speed is less than to 2 km/h, since the last trip reset.

NOTE—This parameter is intended for gaseous fueled engines. See 5.2.5.130 for alternate resolution.

Slot Length: 4 bytes

Slot Scaling: 0.5 kg/bit   , 0   **Offset**

Slot Range: 0 to 2,105,540,607.5 kg   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1009

SPN Supporting Information:

Reference:

-71   5.2.5.137   *Trip Vehicle Idle Fuel Used (Gaseous)*

Total fuel consumed while neither the PTO or remote PTO is active, the engine speed is greater than zero, and vehicle speed is less than to 2 km/h, since the last trip reset.

NOTE—This parameter is intended for gaseous fueled engines. See 5.2.5.131 for alternate resolution. Trip vehicle idle fuel while in fast idle (vehicle speed less than 2 km/h with engine speed greater than 700 rpm) shall be accumulated in the trip vehicle idle fuel category. All other fuel usage scenarios that do not fall directly in the categories defined shall be accumulated in trip drive fuel used.

Slot Length: 4 bytes

Slot Scaling: 0.5 kg/bit   , 0   **Offset**

Slot Range: 0 to 2,105,540,607.5 kg   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1010

SPN Supporting Information:

Reference:

-71   5.2.5.138   *Trip Cruise Fuel Used (Gaseous)*

Total fuel consumed while the engine is in the cruise hold state since the last trip reset. If both cruise control and VSL (vehicle speed limiter) are commanding the same amount of fuel, the cruise control is deemed the active torque mode and fuel will be accumulated in "trip cruise fuel used" parameter. If fuel commanded due to the accelerator pedal position is larger than fuel commanded by cruise control (e.g., accelerator override torque mode), the cruise control is not deemed the active torque mode and fuel will not be accumulated in the "trip cruise fuel used" parameter.

NOTE—This parameter is intended for gaseous fueled engines. See 5.2.5.132 for alternate resolution.

Slot Length: 4 bytes

Slot Scaling: 0.5 kg/bit   , 0   **Offset**

Slot Range: 0 to 2,105,540,607.5 kg   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1011

SPN Supporting Information:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65208	Trip Fuel Information (Gaseous) **-** GTFI	-71 5.3.064

-71   5.2.5.139   *Trip Drive Fuel Economy (Gaseous)*

Trip drive fuel economy is equal to the distance traveled by vehicle in the drive state (engine speed greater than zero, vehicle speed greater than or equal to 2 km/h, and neither the PTO or remote PTO is controlling engine power output) divided by trip drive fuel used (5.2.5.134), since the last trip reset.

NOTE—This parameter is intended for gaseous fueled engines. See 5.2.5.133 for alternate resolution.

Slot Length:	2 bytes		
Slot Scaling:	1/512 km/kg	, 0	**Offset**
Slot Range:	0 to 125.5 km/kg	**Operational Range:**	same as slot range
SPN Type:	Measured		
SPN:	1012		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65208	Trip Fuel Information (Gaseous) **-** GTFI	-71 5.3.064

-71   5.2.5.140   *Trip Maximum Engine Speed*

Maximum engine speed achieved since the last trip reset.

Slot Length:	2 bytes		
Slot Scaling:	0.125 rpm/bit	, 0	**Offset**
Slot Range:	0 to 8,031.875 rpm	**Operational Range:**	same as slot range
SPN Type:	Measured		
SPN:	1013		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65207	Engine Speed/Load Factor Information **-** LF	-71 5.3.065

-71   5.2.5.141   *Trip Average Engine Speed*

Average speed of the engine since the last trip reset.

NOTE—Excludes ignition-on time without the engine speed above zero. Includes idle, PTO (moving and non-moving), and drive operation.

Slot Length:	2 bytes		
Slot Scaling:	0.125 rpm/bit	, 0	**Offset**
Slot Range:	0 to 8,031.875 rpm	**Operational Range:**	same as slot range
SPN Type:	Measured		
SPN:	1014		

SPN Supporting Information: TripAveSpeedObj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65207	Engine Speed/Load Factor Information **-** LF	-71 5.3.065

The equation is as follows:

$$\text{Trip average engine speed} = \frac{\sum\limits_{i=0}^{N}\text{RPM(i)}}{N} \qquad \text{(Eq.2)}$$

where:

RPM is the engine speed at sample i, N is the number of samples of engine speed and is proportional to the current trip elapsed time

-71   5.2.5.142   *Trip Drive Average Load Factor*

Average engine load factor while engine speed is greater than zero, vehicle speed is greater than or equal to 2 km/h, and both the PTO (moving/non-moving) and remote PTO are not in the hold state, since the last trip reset. Engine operation during cruise control operation is included.

In marine applications, this parameter is defined as the average engine load factor while engine speed is greater than zero, since last trip reset.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   ,   0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1015
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65207	Engine Speed/Load Factor Information **-** LF	-71 5.3.065

-71   5.2.5.143   *Total Drive Average Load Factor*

Average engine load factor while engine speed is greater than zero, vehicle speed is greater than or equal to 2 km/h, and both the PTO (moving/non-moving) and remote PTO are not in the hold state, over the life of the engine. Engine operation during cruise control operation is included.

In marine applications, this parameter is defined as the average engine load factor while engine speed is greater than zero.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   ,   0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1016
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65207	Engine Speed/Load Factor Information **-** LF	-71 5.3.065

-71   5.2.5.144   *Total Engine Cruise Time*

Total time that the engine has operated in the cruise hold state, excluding time in accelerator override, over the life of the engine.

Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   ,   0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:**   same as slot range
SPN Type: Measured

SPN: 1017

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65207	Engine Speed/Load Factor Information **-** LF	-71 5.3.065

-71 5.2.5.145 *Trip Maximum Vehicle Speed*

Maximum vehicle speed achieved while the engine speed is greater than zero and the accelerator pedal position (APS) is at a value greater than 0%, since the last trip reset.

Slot Length: 2 bytes

Slot Scaling: 1/256 km/h/bit , 0 **Offset**

Slot Range: 0 to 250.996 km/h **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1018

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65206	Trip Vehicle Speed/Cruise Distance Information **-** TVI	-71 5.3.066

-71 5.2.5.146 *Trip Cruise Distance*

Total distance that the engine has operated in the cruise hold state, excluding time in accelerator override, since the last trip reset.

Slot Length: 4 bytes

Slot Scaling: 0.125 km/bit , 0 **Offset**

Slot Range: 0 to 526,385,151.9 km **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1019

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65206	Trip Vehicle Speed/Cruise Distance Information **-** TVI	-71 5.3.066

-71 5.2.5.147 *Trip Number of Hot Shutdowns*

Total number of hot shutdowns since the last trip reset. A hot shutdown is based on operation at high load or high engine speed or for long operating periods without allowing the engine to cool sufficiently.

Slot Length: 2 bytes

Slot Scaling: 1 Count/bit , 0 **Offset**

Slot Range: 0 to 64,255 counts **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1020

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65205	Trip Shutdown Information **-** TSI	-71 5.3.067

-71 5.2.5.148 *Trip Number of Idle Shutdowns*

Total number of times the engine has been shutdown due to idling too long (at normal idle or fast idle) since the last trip

reset.

Slot Length:	2 bytes
Slot Scaling:	1 Count/bit , 0 **Offset**
Slot Range:	0 to 64,255 counts **Operational Range:** same as slot range
SPN Type:	Measured
SPN:	1021

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65205	Trip Shutdown Information **-** TSI	-71 5.3.067

-71   **5.2.5.149**   *Trip Number of Idle Shutdown Overrides*

Total number of times an operator disables idle shutdown to prevent an engine shutdown, since the last trip reset.

Slot Length:	2 bytes
Slot Scaling:	1 Count/bit , 0 **Offset**
Slot Range:	0 to 64,255 counts **Operational Range:** same as slot range
SPN Type:	Measured
SPN:	1022

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65205	Trip Shutdown Information **-** TSI	-71 5.3.067

-71   **5.2.5.150**   *Trip Sudden Decelerations*

Total number of decelerations whenever the vehicle deceleration is more than XYZ km/h/sec (where XYZ is a calibratible threshold), since the last trip reset. A lengthy deceleration shall be counted as one sudden deceleration.

Slot Length:	2 bytes
Slot Scaling:	1 Count/bit , 0 **Offset**
Slot Range:	0 to 64,255 counts **Operational Range:** same as slot range
SPN Type:	Measured
SPN:	1023

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65205	Trip Shutdown Information **-** TSI	-71 5.3.067

-71   **5.2.5.151**   *Trip Time in VSL*

Total time accumulated when the engine has operated on the vehicle speed limiter (VSL) while not in the cruise hold state, since the last trip reset. The engine torque mode is equal to road speed governor during this operation.

Slot Length:	4 bytes
Slot Scaling:	0.05 hr/bit , 0 **Offset**
Slot Range:	0 to 210,554,060.75 hr **Operational Range:** same as slot range
SPN Type:	Measured
SPN:	1024

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65204	Trip Time Information #1 **-** TTI1	-71 5.3.068

-71   **5.2.5.152**   *Trip Time in Top Gear*

Total time accumulated when the vehicle has operated in top gear for a calibrated minimum time, since the last trip reset.

Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   , 0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1025
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65204	Trip Time Information #1 **-** TTI1	-71 5.3.068

-71   **5.2.5.153**   *Trip Time in Gear Down*

Total time accumulated when the vehicle has operated in one gear down from the top gear for a calibrated minimum time, since the last trip reset.

Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   , 0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1026
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65204	Trip Time Information #1 **-** TTI1	-71 5.3.068

-71   **5.2.5.154**   *Trip Time in Derate by Engine*

Total time accumulated when the engine final fueling has been derated due to an engine protection algorithm, since the last reset.

Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   , 0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1027
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65204	Trip Time Information #1 **-** TTI1	-71 5.3.068

-71   **5.2.5.155**   *Total Engine PTO Fuel Used*

Total fuel used while the PTO or remote PTO is in the hold state and engine speed is above zero, over the life of the engine.

Slot Length: 4 bytes
Slot Scaling: 0.5 L/bit   , 0   **Offset**
Slot Range: 0 to 2,105,540,607.5 L   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1028
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65203	Fuel Information (Liquid) **-** LFI	-71 5.3.069

-71   **5.2.5.156**   *Trip Average Fuel Rate*

Average fuel rate, equal to trip fuel divided by trip time while the engine speed is above zero, since the last trip reset. This includes idle, PTO (both moving and non-moving) and drive operation but excludes ignition-on time while the engine speed is at zero rpm.

NOTE—This parameter is intended for liquid fueled engines. See 5.2.5.158 for alternate resolution.

Slot Length:	2 bytes		
Slot Scaling:	0.05 L/h per bit	, 0	**Offset**
Slot Range:	0 to 3,212.75 L/h	**Operational Range:**	same as slot range
SPN Type:	Measured		
SPN:	1029		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65203	Fuel Information (Liquid) **-** LFI	-71 5.3.069

-71   **5.2.5.157**   *Total Engine PTO Fuel Used (Gaseous)*

Total fuel used while the PTO or remote PTO is in the hold state and engine speed is above zero, over the life of the engine.

Slot Length:	4 bytes		
Slot Scaling:	0.5 kg/bit	, 0	**Offset**
Slot Range:	0 to 2,105,540,607.5 kg	**Operational Range:**	same as slot range
SPN Type:	Measured		
SPN:	1030		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65202	Fuel Information #1 (Gaseous) **-** GFI1	-71 5.3.070

-71   **5.2.5.158**   *Trip Average Fuel Rate (Gaseous)*

Average fuel rate, equal to trip fuel divided by trip time while the engine speed is above zero, since the last trip reset. This includes idle, PTO (both moving and non-moving) and drive operation but excludes ignition-on time while the engine speed is at zero rpm.

NOTE—This parameter is intended for gaseous fueled engines. See 5.2.5.156 for alternate resolution.

Slot Length:	2 bytes		
Slot Scaling:	0.05 kg/h per bit	, 0	**Offset**
Slot Range:	0 to 3212.75 kg/h	**Operational Range:**	same as slot range
SPN Type:	Measured		
SPN:	1031		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65202	Fuel Information #1 (Gaseous) **-** GFI1	-71 5.3.070

-71   **5.2.5.159**   *Total ECU Distance*

Total distance accumulated over the life of the ECU. When the ECU is replaced this value shall be reset.

Slot Length: 4 bytes
Slot Scaling: 0.125 km/bit   , 0   **Offset**
Slot Range: 0 to 526,385,151.9 km   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1032
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65201	ECU History **-** EH	-71 5.3.071

-71   **5.2.5.160**   *Total ECU Run Time*

Total time accumulated over the life of the ECU, from ignition switch ON to ignition switch OFF. When the ECU is replaced
 this value shall be reset.

Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   , 0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1033
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65201	ECU History **-** EH	-71 5.3.071

-71   **5.2.5.161**   *Trip Cruise Time*

Total time accumulated while the engine is in the cruise hold state, excluding time in accelerator override, since the last trip
reset.
Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   , 0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1034
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65200	Trip Time Information #2 **-** TTI2	-71 5.3.072

-71   **5.2.5.162**   *Trip PTO Time*

Total time accumulated while the engine is in the PTO or remote PTO hold state since the last trip reset.

Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   , 0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1035
SPN Supporting Information:

Reference:

-71   5.2.5.163   *Trip Engine Running Time*

Total time accumulated while the engine speed is greater than zero since the last trip reset. Note that time with the ignition switch on but engine speed at zero is not included.

Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   ,   0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1036
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65200	Trip Time Information #2 - TTI2	-71 5.3.072

-71   5.2.5.164   *Trip Idle Time*

Total time accumulated while the engine speed is greater than zero, both the PTO and remote PTO is inactive, and the vehicle speed is less than 2 km/h, since the last trip reset.

In marine applications, this parameter is defined as the total time accumulated while the engine speed is greater than zero, and less than or equal to 50 RPM greater than low idle, since the last trip reset.

Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   ,   0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1037
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65200	Trip Time Information #2 - TTI2	-71 5.3.072

-71   5.2.5.165   *Trip Air Compressor On Time*

Total time that the air compressor is on and compressing air since the last trip reset.

Slot Length: 4 bytes
Slot Scaling: 0.05 hr/bit   ,   0   **Offset**
Slot Range: 0 to 210,554,060.75 hr   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1038
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65200	Trip Time Information #2 - TTI2	-71 5.3.072

-71   5.2.5.166   *Trip Fuel (Gaseous)*

Total fuel consumed (trip drive fuel + trip PTO moving fuel + trip PTO non-moving fuel + trip idle fuel) since the last trip reset.

Slot Length: 4 bytes

Slot Scaling: 0.5 kg/bit   , 0   **Offset**

Slot Range: 0 to 2,105,540,607.5 kg   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1039

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65199	Fuel Consumption (Gaseous) **-** GFC	-71 5.3.073

-71   **5.2.5.167**   *Total Fuel Used (Gaseous)*

Total fuel consumed (trip drive fuel + trip PTO moving fuel + trip PTO non-moving fuel + trip idle fuel) over the life of the engine.

Slot Length: 4 bytes

Slot Scaling: 0.5 kg/bit   , 0   **Offset**

Slot Range: 0 to 2,105,540,607.5 kg   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1040

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65199	Fuel Consumption (Gaseous) **-** GFC	-71 5.3.073

-71   **5.2.5.168**   *Auxiliary I/O Channel #1*

Auxiliary channel of data (16 bit) read by the ECU. This data is in A/D counts and is manufacturer specific. It may be configured uniquely per application.

Slot Length: 2 bytes

Slot Scaling: 1 Count/bit   , 0   **Offset**

Slot Range: 0 to 64,255 counts   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1083

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   **5.2.5.168**   *Auxiliary I/O Channel #2*

Auxiliary channel of data (16 bit) read by the ECU. This data is in A/D counts and is manufacturer specific. It may be configured uniquely per application.

Slot Length: 2 bytes

Slot Scaling: 1 Count/bit   , 0   **Offset**

Slot Range: 0 to 64,255 counts   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1084

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   **5.2.5.169**   *Intended Retarder Percent Torque*

Braking torque of retarder that the retarder is currently trying to achieve. This value takes into account all static limitations, but not the limitations due to the dynamic behavior of the retarder. This value, if unchanged over a certain time, can and will be reached by the actual retarder - percent torque (See 5.2.1.17).

Slot Length: 1 byte
Slot Scaling: 1 %/bit   ,   -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   -125 to 0%
SPN Type: Status
SPN: 1085
SPN Supporting Information: IntendRetPerTorqueObj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61440	Electronic Retarder Controller #1 **-** ERC1	-71 5.3.003
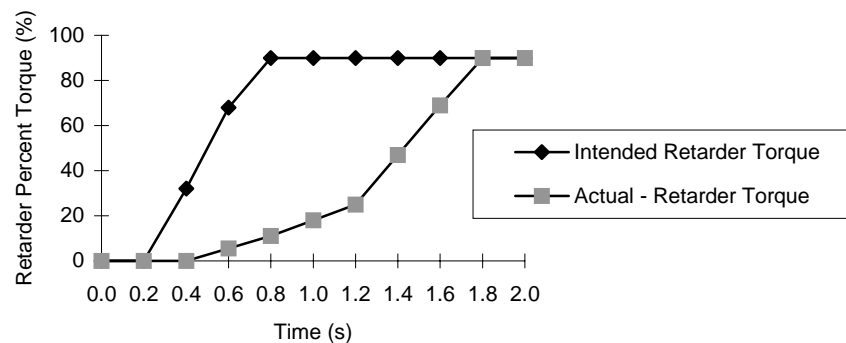
FIGURE 14—INTENDED RETARDER PERCENT TORQUE

-71   **5.2.5.170**   *Pneumatic Supply Pressure*

The pneumatic pressure in the main reservoir, sometimes referred to as the wet tank.

Slot Length: 1 byte
Slot Scaling: 8 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 2,000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 46
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65198	Air Supply Pressure **-** AIR1	-71 5.3.075

-71   **5.2.5.171**   *Parking and/or Trailer Air Pressure*

The pneumatic pressure in the circuit or reservoir for the parking brake and/or the trailer supply.

Slot Length: 1 byte
Slot Scaling: 8 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 2,000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1086

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65198	Air Supply Pressure **-** AIR1	-71 5.3.075

-71   5.2.5.172   *Service Brake Air Pressure Circuit #1*

The pneumatic pressure in the service brake circuit or reservoir #1.

Slot Length: 1 byte
Slot Scaling: 8 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 2,000 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1087
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65198	Air Supply Pressure **-** AIR1	-71 5.3.075

-71   5.2.5.173   *Service Brake Air Pressure Circuit #2*

The pneumatic pressure in the service brake circuit or reservoir #2.

Slot Length: 1 byte
Slot Scaling: 8 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 2,000 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1088
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65198	Air Supply Pressure **-** AIR1	-71 5.3.075

-71   5.2.5.174   *Auxiliary Equipment Supply Pressure*

The pneumatic pressure in the auxiliary circuit.

Slot Length: 1 byte
Slot Scaling: 8 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 2,000 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1089
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65198	Air Supply Pressure **-** AIR1	-71 5.3.075

-71   5.2.5.175   *Air Suspension Supply Pressure*

The pneumatic pressure in the circuit for the electronically controlled air suspension system.

Slot Length: 1 byte
Slot Scaling: 8 kPa/bit   ,   0   **Offset**

Slot Range:	0 to 2,000 kPa

Operational Range: same as slot range

SPN Type: Measured

SPN: 1090

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65198	Air Supply Pressure **-** AIR1	-71 5.3.075

-71   5.2.5.176   *Brake Application Pressure High Range, Front Axle, Left Wheel*

The brake application pressure for the left wheel on the front axle.

Slot Length: 1 byte

Slot Scaling: 5 kPa/bit   , 0   **Offset**

Slot Range: 0 to 1,250 kPa   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1091

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65197	Wheel Application Pressure High Range Information **-** EBC3	-71 5.3.076

-71   5.2.5.177   *Brake Application Pressure High Range, Front Axle, Right Wheel*

The brake application pressure for the right wheel on the front axle.

Slot Length: 1 byte

Slot Scaling: 5 kPa/bit   , 0   **Offset**

Slot Range: 0 to 1,250 kPa   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1092

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65197	Wheel Application Pressure High Range Information **-** EBC3	-71 5.3.076

-71   5.2.5.178   *Brake Application Pressure High Range, Rear Axle #1, Left Wheel*

The brake application pressure for the left wheel on the rear axle #1.

Slot Length: 1 byte

Slot Scaling: 5 kPa/bit   , 0   **Offset**

Slot Range: 0 to 1,250 kPa   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1093

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65197	Wheel Application Pressure High Range Information **-** EBC3	-71 5.3.076

-71   5.2.5.179   *Brake Application Pressure High Range, Rear Axle #1, Right*

The brake application pressure for the right wheel on the rear axle #1.

Slot Length: 1 byte
Slot Scaling: 5 kPa/bit , 0 **Offset**
Slot Range: 0 to 1,250 kPa **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1094
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65197	Wheel Application Pressure High Range Information **-** EBC3	-71 5.3.076

-71   5.2.5.180   *Brake Application Pressure High Range, Rear Axle #2, Left Wheel*

The brake application pressure for the left wheel on the rear axle #2.

Slot Length: 1 byte
Slot Scaling: 5 kPa/bit , 0 **Offset**
Slot Range: 0 to 1,250 kPa **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1095
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65197	Wheel Application Pressure High Range Information **-** EBC3	-71 5.3.076

-71   5.2.5.181   *Brake Application Pressure High Range, Rear Axle #2, Right*

The brake application pressure for the right wheel on the rear axle #2.

Slot Length: 1 byte
Slot Scaling: 5 kPa/bit , 0 **Offset**
Slot Range: 0 to 1,250 kPa **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1096
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65197	Wheel Application Pressure High Range Information **-** EBC3	-71 5.3.076

-71   5.2.5.182   *Brake Application Pressure High Range, Rear Axle #3, Left Wheel*

The brake application pressure for the left wheel on the rear axle #3.

Slot Length: 1 byte
Slot Scaling: 5 kPa/bit , 0 **Offset**
Slot Range: 0 to 1,250 kPa **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1097
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65197	Wheel Application Pressure High Range Information **-** EBC3	-71 5.3.076

-71 **5.2.5.183** *Brake Application Pressure High Range, Rear Axle #3, Right*

The brake application pressure for the right wheel on the rear axle #3.

Slot Length: 1 byte
Slot Scaling: 5 kPa/bit , 0 **Offset**
Slot Range: 0 to 1,250 kPa **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1098
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65197	Wheel Application Pressure High Range Information **-** EBC3	-71 5.3.076

-71 **5.2.5.184** *Brake Lining Remaining, Front Axle, Left Wheel*

The percentage of brake lining which can still be measured for the left wheel on the front axle. 100% represents new brake linings, 0% represents totally worn brake linings.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit , 0 **Offset**
Slot Range: 0 to 100 % **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1099
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65196	Wheel Brake Lining Remaining Information **-** EBC4	-71 5.3.077

-71 **5.2.5.185** *Brake Lining Remaining, Front Axle, Right Wheel*

The percentage of brake lining which can still be measured for the right wheel on the front axle. 100% represents new brake linings, 0% represents totally worn brake linings.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit , 0 **Offset**
Slot Range: 0 to 100 % **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1100
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65196	Wheel Brake Lining Remaining Information **-** EBC4	-71 5.3.077

-71 **5.2.5.186** *Brake Lining Remaining, Rear Axle #1, Left Wheel*

The percentage of brake lining which can still be measured for the left wheel on the rear axle #1. 100% represents new brake linings, 0% represents totally worn brake linings.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit , 0 **Offset**
Slot Range: 0 to 100 % **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1101
SPN Supporting Information:

Reference:

-71   5.2.5.187   *Brake Lining Remaining, Rear Axle #1, Right Wheel*

The percentage of brake lining which can still be measured for the right wheel on the rear axle #1. 100% represents new brake linings, 0% represents totally worn brake linings.

Slot Length: 1 byte

Slot Scaling: 0.4 %/bit   ,   0   **Offset**

Slot Range: 0 to 100 %   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1102

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65196	Wheel Brake Lining Remaining Information **-** EBC4	-71 5.3.077

-71   5.2.5.188   *Brake Lining Remaining, Rear Axle #2, Left Wheel*

The percentage of brake lining which can still be measured for the left wheel on the rear axle #2. 100% represents new brake linings, 0% represents totally worn brake linings.

Slot Length: 1 byte

Slot Scaling: 0.4 %/bit   ,   0   **Offset**

Slot Range: 0 to 100 %   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1103

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65196	Wheel Brake Lining Remaining Information **-** EBC4	-71 5.3.077

-71   5.2.5.189   *Brake Lining Remaining, Rear Axle #2, Right Wheel*

The percentage of brake lining which can still be measured for the right wheel on the rear axle #2. 100% represents new brake linings, 0% represents totally worn brake linings.

Slot Length: 1 byte

Slot Scaling: 0.4 %/bit   ,   0   **Offset**

Slot Range: 0 to 100 %   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1104

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65196	Wheel Brake Lining Remaining Information **-** EBC4	-71 5.3.077

-71   5.2.5.190   *Brake Lining Remaining, Rear Axle #3, Left Wheel*

The percentage of brake lining which can still be measured for the left wheel on the rear axle #3. 100% represents new brake linings, 0% represents totally worn brake linings.

Slot Length: 1 byte

Slot Scaling: 0.4 %/bit   ,   0   **Offset**

Slot Range: 0 to 100 %   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1105

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65196	Wheel Brake Lining Remaining Information **-** EBC4	-71 5.3.077

-71   **5.2.5.191**   *Brake Lining Remaining, Rear Axle #3, Right Wheel*

The percentage of brake lining which can still be measured for the right wheel on the rear axle #3. 100% represents new brake linings, 0% represents totally worn brake linings.

Slot Length: 1 byte

Slot Scaling: 0.4 %/bit   , 0   **Offset**

Slot Range: 0 to 100 %   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1106

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65196	Wheel Brake Lining Remaining Information **-** EBC4	-71 5.3.077

-71   **5.2.5.192**   *Recommended Gear*

The transmission calculates this gear continuously. In dangerous situations this gear may be selected to gain back vehicle control.

Slot Length: 1 byte

Slot Scaling: 1 gear value/bit   , -125   **Offset**

Slot Range: -125 to 125   **Operational Range:** -125 to +125, negative values are reverse gears, positive values are forward gears, zero is neutral. 251 (0xFB) is park.

SPN Type: Status

SPN: 1113

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65195	Electronic Transmission Controller #6 **-** ETC6	-71 5.3.078

-71   **5.2.5.193**   *Lowest Possible Gear*

The transmission calculates this gear continuously. Together with the highest possible gear (see 5.2.5.194), it enables a management computer to know the exact range of available gears.

Slot Length: 1 byte

Slot Scaling: 1 gear value/bit   , -125   **Offset**

Slot Range: -125 to 125   **Operational Range:** -125 to +125, negative values are reverse gears, positive values are forward gears, zero is neutral. 251 (0xFB) is park.

SPN Type: Status

SPN: 1114

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65195	Electronic Transmission Controller #6 **-** ETC6	-71 5.3.078

-71   **5.2.5.194**   *Highest Possible Gear*

The transmission calculates this gear continuously. Together with the lowest possible gear (see 5.2.5.193), it enables a management computer to know the exact range of available gears.

Slot Length: 1 byte

Slot Scaling: 1 gear value/bit   , -125   **Offset**

Slot Range: -125 to 125   **Operational Range:** -125 to +125, negative values are reverse
                                                                          gears, positive values are forward gears,
SPN Type: Status   zero is neutral. 251 (0xFB) is park.

SPN: 1115

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65195	Electronic Transmission Controller #6 - ETC6	-71 5.3.078

-71   **5.2.5.195**   *Gaseous Fuel Correction Factor*

A correction to a predefined gaseous fuel energy (expressed in energy per unit volume) represented as a percentage. The actual fuel energy used to control the engine is the product of the gaseous fuel correction factor and the energy of the gas.

Slot Length: 1 byte

Slot Scaling: 1 %/bit   , 0   **Offset**

Slot Range: 0 to 250 %   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1116

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65194	Alternate Fuel #2 - AF2	-71 5.3.079

-71   **5.2.5.196**   *Desired Rated Exhaust Oxygen*

The desired amount of oxygen in the exhaust at rated conditions represented as a percentage by volume with respect to the total volume of exhaust gases leaving the engine.

Slot Length: 2 bytes

Slot Scaling: 0.0025 %/bit   , 0   **Offset**

Slot Range: 0 to 160.6375 %   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1117

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65193	Exhaust Oxygen #1 - EO1	-71 5.3.080

-71   **5.2.5.197**   *Desired Exhaust Oxygen*

The desired amount of oxygen in the exhaust represented as a percentage by volume with respect to the total volume of exhaust gases leaving the engine.

Slot Length: 2 bytes

Slot Scaling: 0.0025 %/bit   , 0   **Offset**

Slot Range: 0 to 160.6375 %   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1118

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65193	Exhaust Oxygen #1 **-** EO1	-71 5.3.080

-71   5.2.5.198   *Actual Exhaust Oxygen*

The actual amount of oxygen in the exhaust represented as a percentage by volume with respect to the total volume of exhaust gases leaving the engine.

Slot Length: 2 bytes

Slot Scaling: 0.0025 %/bit   , 0   **Offset**

Slot Range: 0 to 160.6375 %   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1119

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65193	Exhaust Oxygen #1 **-** EO1	-71 5.3.080

-71   5.2.5.199   *Articulation Angle*

Angle of deflection of an articulated transit vehicle. A right turn is indicated with a positive angle and a left turn is indicated with a negative angle.

Slot Length: 1 byte

Slot Scaling: 1 deg/bit   , -125 deg   **Offset**

Slot Range: -125 to 125 deg   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1120

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65192	Articulation Control **-** AC	-71 5.3.081

-71   5.2.5.200   *Alternator Bearing 1 Temperature*

Temperature of the bearing inside the alternator. Bearing 1 is the left or rear bearing.

Slot Length: 1 byte

Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**

Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range

SPN Type: ????

SPN: 1122

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65191	Alternator Temperature **-** AT	-71 5.3.082

-71   5.2.5.200   *Alternator Bearing 2 Temperature*

Temperature of the bearing inside the alternator. Bearing 2 is the right or front bearing.

Slot Length: 1 byte

Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**

Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1123
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65191	Alternator Temperature **-** AT	-71 5.3.082

-71　　　　**5.2.5.201**　　*Alternator Winding 1 Temperature*

Temperature of the windings inside the alternator.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1124
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65191	Alternator Temperature **-** AT	-71 5.3.082

-71　　　　**5.2.5.201**　　*Alternator Winding 2 Temperature*

Temperature of the windings inside the alternator.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1125
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65191	Alternator Temperature **-** AT	-71 5.3.082

-71　　　　**5.2.5.201**　　*Alternator Winding 3 Temperature*

Temperature of the windings inside the alternator.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1126
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65191	Alternator Temperature **-** AT	-71 5.3.082

-71　　　　**5.2.5.202**　　*Turbocharger 1 Boost Pressure*

Gage pressure of air measured downstream of the compressor discharge side of the turbocharger. See also 5.2.5.36 for alternate range and resolution. If there is anly one boost pressure to report and the range and resolution in 5.2.5.36 is adequate, that it should be used.

Slot Length: 2 bytes

Slot Scaling: 0.125 kPa/bit   ,   0   **Offset**

Slot Range: 0 to +8031.875 kPa (0 to 1164.62 psi)   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1127

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65190	Intake Manifold Information #1 **-** IMT1	-71 5.3.083

-71   5.2.5.202   *Turbocharger 2 Boost Pressure*

Gage pressure of air measured downstream of the compressor discharge side of the turbocharger. See also 5.2.5.36 for alternate range and resolution. If there is anly one boost pressure to report and the range and resolution in 5.2.5.36 is adequate, that it should be used.

Slot Length: 2 bytes

Slot Scaling: 0.125 kPa/bit   ,   0   **Offset**

Slot Range: 0 to +8031.875 kPa (0 to 1164.62 psi)   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1128

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65190	Intake Manifold Information #1 **-** IMT1	-71 5.3.083

-71   5.2.5.202   *Turbocharger 3 Boost Pressure*

Gage pressure of air measured downstream of the compressor discharge side of the turbocharger. See also 5.2.5.36 for alternate range and resolution. If there is anly one boost pressure to report and the range and resolution in 5.2.5.36 is adequate, that it should be used.

Slot Length: 2 bytes

Slot Scaling: 0.125 kPa/bit   ,   0   **Offset**

Slot Range: 0 to +8031.875 kPa (0 to 1164.62 psi)   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1129

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65190	Intake Manifold Information #1 **-** IMT1	-71 5.3.083

-71   5.2.5.202   *Turbocharger 4 Boost Pressure*

Gage pressure of air measured downstream of the compressor discharge side of the turbocharger. See also 5.2.5.36 for alternate range and resolution. If there is anly one boost pressure to report and the range and resolution in 5.2.5.36 is adequate, that it should be used.

Slot Length: 2 bytes

Slot Scaling: 0.125 kPa/bit   ,   0   **Offset**

Slot Range: 0 to +8031.875 kPa (0 to 1164.62 psi)   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1130

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65190	Intake Manifold Information #1 **-** IMT1	-71 5.3.083

-71   **5.2.5.203**   *Exhaust Gas Port 1 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1137

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65187	Exhaust Port Temperature #1 **-** EPT1	-71 5.3.086

-71   **5.2.5.203**   *Exhaust Gas Port 2 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1138

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65187	Exhaust Port Temperature #1 **-** EPT1	-71 5.3.086

-71   **5.2.5.203**   *Exhaust Gas Port 3 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1139

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65187	Exhaust Port Temperature #1 **-** EPT1	-71 5.3.086

-71   **5.2.5.203**   *Exhaust Gas Port 4 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes

Slot Scaling: 0.03125 deg C/bit , -273 deg C **Offset**
Slot Range: -273 to 1735 deg C **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1140
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65187	Exhaust Port Temperature #1 **-** EPT1	-71 5.3.086

-71 5.2.5.203 *Exhaust Gas Port 5 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit , -273 deg C **Offset**
Slot Range: -273 to 1735 deg C **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1141
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65186	Exhaust Port Temperature #2 **-** EPT2	-71 5.3.087

-71 5.2.5.203 *Exhaust Gas Port 6 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit , -273 deg C **Offset**
Slot Range: -273 to 1735 deg C **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1142
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65186	Exhaust Port Temperature #2 **-** EPT2	-71 5.3.087

-71 5.2.5.203 *Exhaust Gas Port 7 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit , -273 deg C **Offset**
Slot Range: -273 to 1735 deg C **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1143
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65186	Exhaust Port Temperature #2 **-** EPT2	-71 5.3.087

-71   5.2.5.203   *Exhaust Gas Port 8 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1144
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65186	Exhaust Port Temperature #2 **-** EPT2	-71 5.3.087

-71   5.2.5.203   *Exhaust Gas Port 9 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1145
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65185	Exhaust Port Temperature #3 **-** EPT3	-71 5.3.088

-71   5.2.5.203   *Exhaust Gas Port 10 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1146
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65185	Exhaust Port Temperature #3 **-** EPT3	-71 5.3.088

-71   5.2.5.203   *Exhaust Gas Port 11 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1147
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

65185	Exhaust Port Temperature #3 **-** EPT3	-71 5.3.088

-71   **5.2.5.203**   *Exhaust Gas Port 12 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1148
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65185	Exhaust Port Temperature #3 **-** EPT3	-71 5.3.088

-71   **5.2.5.203**   *Exhaust Gas Port 13 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1149
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65184	Exhaust Port Temperature #4 **-** EPT4	-71 5.3.089

-71   **5.2.5.203**   *Exhaust Gas Port 14 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1150
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65184	Exhaust Port Temperature #4 **-** EPT4	-71 5.3.089

-71   **5.2.5.203**   *Exhaust Gas Port 15 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1151

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65184	Exhaust Port Temperature #4 **-** EPT4	-71 5.3.089

-71   5.2.5.203   *Exhaust Gas Port 16 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1152
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65184	Exhaust Port Temperature #4 **-** EPT4	-71 5.3.089

-71   5.2.5.203   *Exhaust Gas Port 17 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1153
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65183	Exhaust Port Temperature #5 **-** EPT5	-71 5.3.090

-71   5.2.5.203   *Exhaust Gas Port 18 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1154
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65183	Exhaust Port Temperature #5 **-** EPT5	-71 5.3.090

-71   5.2.5.203   *Exhaust Gas Port 19 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**

Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1155
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65183	Exhaust Port Temperature #5 **-** EPT5	-71 5.3.090

-71   5.2.5.203   *Exhaust Gas Port 20 Temperature*

Temperature at the cylinder exhaust port of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1156
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65183	Exhaust Port Temperature #5 **-** EPT5	-71 5.3.090

-71   5.2.5.204   *Main Bearing 1 Temperature*

Temperature of the main bearing which supports the crankshaft of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1157
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65182	Main Bearing Temperature #1 **-** MBT1	-71 5.3.091

-71   5.2.5.204   *Main Bearing 2 Temperature*

Temperature of the main bearing which supports the crankshaft of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1158
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65182	Main Bearing Temperature #1 **-** MBT1	-71 5.3.091

-71   5.2.5.204   *Main Bearing 3 Temperature*

Temperature of the main bearing which supports the crankshaft of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit , -273 deg C **Offset**
Slot Range: -273 to 1735 deg C **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1159
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65182	Main Bearing Temperature #1 **-** MBT1	-71 5.3.091

-71   **5.2.5.204**   *Main Bearing 4 Temperature*

Temperature of the main bearing which supports the crankshaft of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit , -273 deg C **Offset**
Slot Range: -273 to 1735 deg C **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1160
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65182	Main Bearing Temperature #1 **-** MBT1	-71 5.3.091

-71   **5.2.5.204**   *Main Bearing 5 Temperature*

Temperature of the main bearing which supports the crankshaft of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit , -273 deg C **Offset**
Slot Range: -273 to 1735 deg C **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1161
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65181	Main Bearing Temperature #2 **-** MBT2	-71 5.3.092

-71   **5.2.5.204**   *Main Bearing 6 Temperature*

Temperature of the main bearing which supports the crankshaft of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit , -273 deg C **Offset**
Slot Range: -273 to 1735 deg C **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1162
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65181	Main Bearing Temperature #2 **-** MBT2	-71 5.3.092

-71   5.2.5.204   *Main Bearing 7 Temperature*

Temperature of the main bearing which supports the crankshaft of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1163
SPN Supporting Information:

Reference:
PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65181	Main Bearing Temperature #2 **-** MBT2	-71 5.3.092

-71   5.2.5.204   *Main Bearing 8 Temperature*

Temperature of the main bearing which supports the crankshaft of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1164
SPN Supporting Information:

Reference:
PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65181	Main Bearing Temperature #2 **-** MBT2	-71 5.3.092

-71   5.2.5.204   *Main Bearing 9 Temperature*

Temperature of the main bearing which supports the crankshaft of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1165
SPN Supporting Information:

Reference:
PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65180	Main Bearing Temperature #3 **-** MBT3	-71 5.3.093

-71   5.2.5.204   *Main Bearing 10 Temperature*

Temperature of the main bearing which supports the crankshaft of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1166
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65180	Main Bearing Temperature #3 **-** MBT3	-71 5.3.093

-71   **5.2.5.204**   *Main Bearing 11 Temperature*

Temperature of the main bearing which supports the crankshaft of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1167
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65180	Main Bearing Temperature #3 **-** MBT3	-71 5.3.093

-71   **5.2.5.205**   *Turbocharger 1 Compressor Inlet Temperature*

Temperature of the air entering the compressor side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1172
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65178	Turbocharger Information #2 **-** TCI2	-71 5.3.095

-71   **5.2.5.205**   *Turbocharger 2 Compressor Inlet Temperature*

Temperature of the air entering the compressor side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1173
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65178	Turbocharger Information #2 **-** TCI2	-71 5.3.095

-71   **5.2.5.205**   *Turbocharger 3 Compressor Inlet Temperature*

Temperature of the air entering the compressor side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range

SPN Type: Measured
SPN: 1174
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65178	Turbocharger Information #2 **-** TCI2	-71 5.3.095

-71   **5.2.5.205**   *Turbocharger 4 Compressor Inlet Temperature*
Temperature of the air entering the compressor side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1175
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65178	Turbocharger Information #2 **-** TCI2	-71 5.3.095

-71   **5.2.5.206**   *Turbocharger 1 Compressor Inlet Pressure*
Gage pressure of the air entering the compressor side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 1/128 kPa/bit   , -250 kPa   **Offset**
Slot Range: -250 kPa TO 251.99 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1176
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65177	Turbocharger Information #3 **-** TCI3	-71 5.3.096

-71   **5.2.5.206**   *Turbocharger 2 Compressor Inlet Pressure*
Gage pressure of the air entering the compressor side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 1/128 kPa/bit   , -250 kPa   **Offset**
Slot Range: -250 kPa TO 251.99 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1177
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65177	Turbocharger Information #3 **-** TCI3	-71 5.3.096

-71   **5.2.5.206**   *Turbocharger 3 Compressor Inlet Pressure*
Gage pressure of the air entering the compressor side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 1/128 kPa/bit   ,   -250 kPa   **Offset**
Slot Range: -250 kPa TO 251.99 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1178
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65177	Turbocharger Information #3 **-** TCI3	-71 5.3.096

-71   5.2.5.206   *Turbocharger 4 Compressor Inlet Pressure*

Gage pressure of the air entering the compressor side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 1/128 kPa/bit   ,   -250 kPa   **Offset**
Slot Range: -250 kPa TO 251.99 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1179
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65177	Turbocharger Information #3 **-** TCI3	-71 5.3.096

-71   5.2.5.207   *Turbocharger 1 Turbine Inlet Temperature*

Temperature of the combustion by-products entering the turbine side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1180
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65176	Turbocharger Information #4 **-** TCI4	-71 5.3.097

-71   5.2.5.207   *Turbocharger 2 Turbine Inlet Temperature*

Temperature of the combustion by-products entering the turbine side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1181
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65176	Turbocharger Information #4 **-** TCI4	-71 5.3.097

-71   5.2.5.207   *Turbocharger 3 Turbine Inlet Temperature*

Temperature of the combustion by-products entering the turbine side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1182
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65176	Turbocharger Information #4 **-** TCI4	-71 5.3.097

-71   5.2.5.207   *Turbocharger 4 Turbine Inlet Temperature*

Temperature of the combustion by-products entering the turbine side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1183
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65176	Turbocharger Information #4 **-** TCI4	-71 5.3.097

-71   5.2.5.208   *Turbocharger 1 Turbine Outlet Temperature*

Temperature of the combustion by-products exiting the turbine side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1184
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65175	Turbocharger Information #5 **-** TCI5	-71 5.3.098

-71   5.2.5.208   *Turbocharger 2 Turbine Outlet Temperature*

Temperature of the combustion by-products exiting the turbine side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1185
SPN Supporting Information:

Reference:

-71   5.2.5.208   *Turbocharger 3 Turbine Outlet Temperature*

Temperature of the combustion by-products exiting the turbine side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1186
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65175	Turbocharger Information #5 **-** TCI5	-71 5.3.098

-71   5.2.5.208   *Turbocharger 4 Turbine Outlet Temperature*

Temperature of the combustion by-products exiting the turbine side of the turbocharger.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1187
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65175	Turbocharger Information #5 **-** TCI5	-71 5.3.098

-71   5.2.5.209   *Turbocharger 1 Wastegate Drive - duplicate (see SPN 646)*

Position of the wastegate drive. A value of 0% represents fully closed and a value of 100% represents fully open.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1188
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65174	Turbocharger Wastegate **-** TCW	-71 5.3.099

-71   5.2.5.209   *Turbocharger 2 Wastegate Drive*

Position of the wastegate drive. A value of 0% represents fully closed and a value of 100% represents fully open.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Measured

SPN: 1189

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65174	Turbocharger Wastegate **-** TCW	-71 5.3.099

-71   **5.2.5.209** *Turbocharger 3 Wastegate Drive*

Position of the wastegate drive. A value of 0% represents fully closed and a value of 100% represents fully open.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1190

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65174	Turbocharger Wastegate **-** TCW	-71 5.3.099

-71   **5.2.5.209** *Turbocharger 4 Wastegate Drive*

Position of the wastegate drive. A value of 0% represents fully closed and a value of 100% represents fully open.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1191

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65174	Turbocharger Wastegate **-** TCW	-71 5.3.099

-71   **5.2.5.210** *Turbocharger Wastegate Actuator Control Air Pressure*

Gage pressure of the air used to control the actuator which opens and closes the wastegate valve.

Slot Length: 1 byte
Slot Scaling: 4 kPa/bit   , 0   **Offset**
Slot Range: 0 to 1000 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1192

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65174	Turbocharger Wastegate **-** TCW	-71 5.3.099

-71   **5.2.5.211** *Engine Operation Time Since Rebuild*

The time in engine operation since the last engine rebuild.

Slot Length: 4 bytes

Slot Scaling: 1 s/bit , 0 **Offset**
Slot Range: 0 to 4,211,081,215 s **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1193
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65173	Rebuild Information **-** RBI	-71 5.3.100

-71   **5.2.5.212**   *Anti-theft Random Number*

A seven byte7-byte random numeric code provided by the component in response to an anti-theft request. This parameter is sent as a numeric value utilizing the full range of 0 to FFFFFFFFFFFFFFhex. The most significant byte is sent first, not following the rules of Table 1.

Slot Length: 7 bytes
Slot Scaling: ASCII , 0 **Offset**
Slot Range: 0 to 255 per byte **Operational Range:** same as slot range
SPN Type: Status
SPN: 1198
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
56320	Anti-theft Status **-** ATS	-71 5.3.102

-71   **5.2.5.213**   *Anti-theft Password Representation*

This parameter is the seven byte7-byte numeric code (i.e., 'encrypted password' or 'key') that is generated based on the encryption algorithm, the password supplied by the end user, and the random number seed given by the component. This parameter is sent as a numeric value utilizing the full range of 0 to FFFFFFFFFFFFFFhex. The most significant byte is sent first, not following the rules of Table 1.

Slot Length: 7 bytes
Slot Scaling: ASCII , 0 **Offset**
Slot Range: 0 to 255 per byte **Operational Range:** same as slot range
SPN Type: Status
SPN: 1202
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
56576	Anti-theft Request **-** ATR	-71 5.3.101

-71   **5.2.5.214**   *Engine Auxiliary Coolant Pressure*

Gage pressure of coolant found in the intercooler which is located after the turbocharger.

Slot Length: 1 byte
Slot Scaling: 4 kPa/bit , 0 **Offset**
Slot Range: 0 to 1000 kPa **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1203
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

65172	Engine Auxiliary Coolant **-** EAC	-71	5.3.103

-71   **5.2.5.215**   *Electrical Load*

Electrical power delivered by the engine to the electrical system connected to the generator.

Slot Length: 2 bytes
Slot Scaling: 0.5 kW/bit   , 0   **Offset**
Slot Range: 0 to 32,127.5 kW   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1204
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**	
65171	Engine Electrical System/Module Information **-** EES	-71	5.3.104

-71   **5.2.5.216**   *Engine ECU Temperature (use SPN 1136)*

Temperature of the engine electronic control unit.

(21, 1207 are not to be used - obsolete)
Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 21
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**	
65188	Engine Temperature #2 **-** ET2	-71	5.3.085

-71   **5.2.5.216**   *Engine ECU Temperature (see also SPN 21)*

Temperature of the engine electronic control unit.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1136
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**	
65188	Engine Temperature #2 **-** ET2	-71	5.3.085

-71   **5.2.5.216**   *Engine ECU Temperature (OBSOLETE use SPN 1136)*

Temperature of the engine electronic control unit.

(21, 1207 are not to be used - obsolete)
Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**

Slot Range:	-273 to 1735 deg C	**Operational Range:** same as slot range
SPN Type:	Measured	
SPN:	1207	

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65188	Engine Temperature #2 **-** ET2	-71 5.3.085

-71   **5.2.5.217**   *Pre-filter Oil Pressure*

Gage pressure of the engine oil before the oil reaches the oil filter.

Slot Length:	1 byte		
Slot Scaling:	4 kPa/bit	, 0	**Offset**
Slot Range:	0 to 1000 kPa	**Operational Range:** same as slot range
SPN Type:	Measured	
SPN:	1208	

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65170	Engine Information **-** EI	-71 5.3.105

-71   **5.2.5.218**   *Exhaust Gas Pressure*

Gage pressure of the exhaust gasses as measured at the turbine inlet of the turbocharger.

Slot Length:	2 bytes		
Slot Scaling:	1/128 kPa/bit	, -250 kPa	**Offset**
Slot Range:	-250 kPa TO 251.99 kPa	**Operational Range:** same as slot range
SPN Type:	Measured	
SPN:	1209	

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65170	Engine Information **-** EI	-71 5.3.105

-71   **5.2.5.219**   *Rack Position*

Measured position of the engine rack. A value of 0% rack represents no fueling and a value of 100% rack represents maximum fueling.

Slot Length:	1 byte		
Slot Scaling:	0.4 %/bit	, 0	**Offset**
Slot Range:	0 to 100 %	**Operational Range:** same as slot range
SPN Type:	Measured	
SPN:	1210	

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65170	Engine Information **-** EI	-71 5.3.105

-71   **5.2.5.220**   *Engine Auxiliary Coolant Temperature*

Temperature of coolant found in the intercooler which is located after the turbocharger.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1212
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65172	Engine Auxiliary Coolant **-** EAC	-71 5.3.103

-71   5.2.5.221   *Mass Flow (Gaseous)*

Mass flow of natural gas to the engine.

Slot Length: 2 bytes
Slot Scaling: 0.05 kg/h per bit   , 0   **Offset**
Slot Range: 0 to 3212.75 kg/h   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1241
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65170	Engine Information **-** EI	-71 5.3.105

-71   5.2.5.222   *Instantaneous Estimated Brake Power*

Estimate of the power developed by the engine.

Slot Length: 2 bytes
Slot Scaling: 0.5 kW/bit   , 0   **Offset**
Slot Range: 0 to 32,127.5 kW   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1242
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65170	Engine Information **-** EI	-71 5.3.105

-71   5.2.5.223   *Number of Torque History Records*

Number of torque history records contained in the engine torque history PGN. A value of 0 is broadcast if no torque history records are stored in the ECU.

Slot Length: 1 byte
Slot Scaling: 1 record/bit   , 0   **Offset**
Slot Range: 0 to 250 records   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1246
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   5.2.5.224   *Engine Power*

Advertised engine power capability. Advertised power is what a customer will find on a sales sheet for an engine with a certain calibration.

Slot Length: 2 bytes
Slot Scaling: 0.5 kW/bit   ,   0   **Offset**
Slot Range: 0 to 32,127.5 kW   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1247
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   5.2.5.225   *Peak Engine Torque 1*

Maximum torque output of the current ECU calibration when the engine operates on torque curve 1. For calibrations that support two torque curves, this parameter shall be assigned the value of the lower curve. For calibrations that support only one curve, this parameter should be used.

Slot Length: 2 bytes
Slot Scaling: 1 Nm/bit   ,   0   **Offset**
Slot Range: 0 to 64,255 Nm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1248
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   5.2.5.226   *Peak Engine Torque 2*

Maximum torque output of the current ECU calibration when the engine operates on torque curve 2. For calibrations that support two torque curves, this parameter shall be assigned the value of the higher curve. For calibrations that support only one curve, this parameter should to set to "not available".

Slot Length: 2 bytes
Slot Scaling: 1 Nm/bit   ,   0   **Offset**
Slot Range: 0 to 64,255 Nm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1249
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   5.2.5.227   *Calibration Record Start Month*

Calendar month timestamp when an ECU record was established.

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

Slot Length: 1 byte
Slot Scaling: 1 month/bit   ,   0   **Offset**
Slot Range: 0 to 250 months   **Operational Range:**   1 to 12 month
SPN Type: Measured

SPN: 1250

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   **5.2.5.228**   *Calibration Record Start Day*

Calendar day timestamp when an ECU record was established.

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.

Slot Length: 1 byte

Slot Scaling: 0.25 days/bit   ,   0   **Offset**

Slot Range: 0 to 62.5 days   **Operational Range:** 0.25 to 31.75 day

SPN Type: Measured

SPN: 1251

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   **5.2.5.229**   *Calibration Record Start Year*

Calendar year timestamp when an ECU record was established.

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

Slot Length: 1 byte

Slot Scaling: 1 year/bit   ,   1985 years   **Offset**

Slot Range: 1985 to 2235 years   **Operational Range:** 1985 to 2235 year

SPN Type: Measured

SPN: 1252

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   **5.2.5.230**   *Calibration Record Duration Time*

Duration in hours for which the engine operated in the conditions captured in the current record.

Slot Length: 4 bytes

Slot Scaling: 0.05 hr/bit   ,   0   **Offset**

Slot Range: 0 to 210,554,060.75 hr   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1253

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   5.2.5.231   *Engine Oil Specific Resistance*

Engine oil specific resistance used to describe the engine oil quality.

Slot Length: 1 byte
Slot Scaling: 0.1Mohm*m/bit   ,   0   **Offset**
Slot Range: 0 to 25 Mohm*m   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1476
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
	-	

-71   5.2.5.232   *Transmission Gear Ratio 1*

Gear ratio value stored in the ECU that is used to define a range of transmission gears for which a limit is applied to the engine output torque. Transmission gear ratio 1 should be the numerically highest transmission gear ratio breakpoint that defines ratio ranges for torque limits.

Slot Length: 2 bytes
Slot Scaling: 0.01/bit   ,   0   **Offset**
Slot Range: 0 to 642.55   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1255
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History - ETH	-71 5.3.107

-71   5.2.5.233   *Engine Torque Limit 1, Transmission*

Limit applied to the engine output torque during vehicle operation in transmission gear ratios numerically greater than transmission gear ratio 1 (see 5.2.5.232).

Slot Length: 2 bytes
Slot Scaling: 1 Nm/bit   ,   0   **Offset**
Slot Range: 0 to 64,255 Nm   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1256
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History - ETH	-71 5.3.107

-71   5.2.5.234   *Transmission Gear Ratio 2*

Gear ratio value stored in the ECU that is used to define a range of transmission gears for which a limit is applied to the engine output torque. Transmission gear ratio 2 should be the numerically highest transmission gear ratio breakpoint less than transmission gear ratio 1 (see 5.2.5.232) that defines ratio ranges for torque limits.

Slot Length: 2 bytes
Slot Scaling: 0.01/bit   ,   0   **Offset**
Slot Range: 0 to 642.55   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1257

-71   5.2.5.235   *Engine Torque Limit 2, Transmission*

Limit applied to the engine output torque during vehicle operation in transmission gear ratios numerically less than or equal to transmission gear ratio 1 (see 5.2.5.232) and numerically greater than transmission gear ratio 2 (see.3.2.5.234).(see.5.2.5.234). For example, with transmission gear ratio 1 equal to 12.0:1 and transmission gear ratio 2 equal to 5.0:1, vehicle operation in a transmission gear with a ratio of 6.0:1 will result in the application of engine torque limit

Slot Length:	2 bytes			
Slot Scaling:	1 Nm/bit	,	0	**Offset**
Slot Range:	0 to 64,255 Nm		**Operational Range:**	same as slot range
SPN Type:	Measured			
SPN:	1258			

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   5.2.5.236   *Transmission Gear Ratio 3*

Gear ratio value stored in the ECU that is used to define a range of transmission gears for which a limit is applied to the engine output torque. Transmission gear ratio 3 should be the numerically highest transmission gear ratio breakpoint less than transmission gear ratio 2 (see 5.2.5.234) that defines ratio ranges for torque limits.

Slot Length:	2 bytes			
Slot Scaling:	0.01/bit	,	0	**Offset**
Slot Range:	0 to 642.55		**Operational Range:**	same as slot range
SPN Type:	Measured			
SPN:	1259			

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   5.2.5.237   *Engine Torque Limit 3, Transmission*

Limit applied to the engine output torque during vehicle operation in transmission gear ratios numerically less than or equal to transmission gear ratio 2 (see 5.2.5.234) and numerically greater than transmission gear ratio 3 (see.3.2.5.236). For example, with transmission gear ratio 2 equal to 5.0:1 and transmission gear ratio 3 equal to 2.0:1, vehicle operation in a transmission gear with a ratio of 3.0:1 will result in the application of engine torque limit 3, transmission.

Slot Length:	2 bytes			
Slot Scaling:	1 Nm/bit	,	0	**Offset**
Slot Range:	0 to 64,255 Nm		**Operational Range:**	same as slot range
SPN Type:	Measured			
SPN:	1260			

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   5.2.5.238   *Engine Torque Limit 4, Transmission*

Limit applied to the engine output torque during vehicle operation in transmission gear ratios numerically less than or equal to transmission gear ratio 3 (see 5.2.5.236).

Slot Length: 2 bytes
Slot Scaling: 1 Nm/bit   , 0   **Offset**
Slot Range: 0 to 64,255 Nm   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1261
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   5.2.5.239   *Engine Torque Limit 5, Switch*

Limit applied to the engine output torque based on activation of an ECU switch input.

Slot Length: 2 bytes
Slot Scaling: 1 Nm/bit   , 0   **Offset**
Slot Range: 0 to 64,255 Nm   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1262
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   5.2.5.240   *Engine Torque Limit 6, Axle Input*

Limit applied to the engine output torque based on the maximum allowable axle input torque. Axle input torque is calculated as the current engine torque output multiplied by the transmission gear ratio.

Slot Length: 2 bytes
Slot Scaling: 2 Nm/bit   , 0   **Offset**
Slot Range: 0 to 128,510 Nm   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1263
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   5.2.5.241   *Extended Crankcase Blow-by Pressure (use SPN 1264)*

Differential crankcase blow-by pressure as measured through a tube with a venturi.

(1264 not to be used – obsolete)

Slot Length: 1 byte
Slot Scaling: 0.05 kPa/bit   , 0   **Offset**
Slot Range: 0 to 12.5 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 22
SPN Supporting Information:

-71   5.2.5.241   *Extended Crankcase Blow-by Pressure - duplicate (see SPN 22)*

Differential crankcase blow-by pressure as measured through a tube with a venturi.

(1264 not to be used – obsolete)

Slot Length: 1 byte
Slot Scaling: 0.05 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 12.5 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1264
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65263	Engine Fluid Level/Pressure #1 **-** EFL/P1	-71 5.3.029

-71   5.2.5.242   *Engine Intercooler Thermostat Opening*

The current position of the thermostat used to regulate the temperature of the engine intercooler. A value of 0% represents the thermostat being completely closed and 100% represents the thermostat being completely open.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   ,   0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1134
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65262	Engine Temperature #1 **-** ET1	-71 5.3.028

-71   5.2.5.243   *Injector Timing Rail 1 Pressure*

The gage pressure of fuel in the timing rail delivered from the supply pump to the injector timing inlet. See Figure 15.

Slot Length: 2 bytes
Slot Scaling: 1/256 MPa/bit   ,   0   **Offset**
Slot Range: 0 to 251 Mpa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 156
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65243	Engine Fluid Level/Pressure #2 **-** EFL/P2	-71 5.3.046

-71   5.2.5.244   *Injector Metering Rail 2 Pressure (duplicate, use 1349)*

The gage pressure of fuel in the metering rail #2 as delivered from the supply pump to the injector metering inlet. See Figure 15 for fuel system related parameters. Although the figure does not show rail #2 it does show the relationship of rail pressure to other signals.

(Obsolete - use SPN 1349)

Slot Length:	2 bytes
Slot Scaling:	1/256 MPa/bit , 0 **Offset**
Slot Range:	0 to 251 Mpa **Operational Range:** same as slot range
SPN Type:	Measured
SPN:	129

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65243	Engine Fluid Level/Pressure #2 **-** EFL/P2	-71 5.3.046

-71   5.2.5.244   *Injector Metering Rail 2 Pressure (see also SPN 129)*

The gage pressure of fuel in the metering rail #2 as delivered from the supply pump to the injector metering inlet. See Figure 15 for fuel system related parameters. Although the figure does not show rail #2 it does show the relationship of rail pressure to other signals.

Slot Length:	2 bytes
Slot Scaling:	1/256 MPa/bit , 0 **Offset**
Slot Range:	0 to 251 Mpa **Operational Range:** same as slot range
SPN Type:	Measured
SPN:	1349

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65243	Engine Fluid Level/Pressure #2 **-** EFL/P2	-71 5.3.046

-71   5.2.5.245   *Fuel Specific Gravity*

This parameter conveys the specific gravity of the gaseous fuel being used by the engine. The specific gravity of the fuel can then be used to compute the density of the fuel.

Slot Length:	2 bytes
Slot Scaling:	0.0001/bit , 0 **Offset**
Slot Range:	0 to 6.4255 **Operational Range:** 0 to 2.0000
SPN Type:	Status
SPN:	1389

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65202	Fuel Information #1 (Gaseous) **-** GFI1	-71 5.3.070

-71   5.2.5.246   *Time Since Last Service*

The vehicle operation time since the last service was performed. The type of service information is identified by the service component identification number.

Slot Length:	2 bytes
Slot Scaling:	1 hr/bit , -32,127 hr **Offset**
Slot Range:	-32,127 to 32,128 hr **Operational Range:** same as slot range
SPN Type:	Measured
SPN:	1350

SPN Supporting Information:

-71   5.2.5.247   *Externally Supplied Air Pressure*

Pressure of the air used to shut off the fuel supply to the engine.

Slot Length: 2 bytes
Slot Scaling: 0.5 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 32,127.5 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1320
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65167	Supply Pressure #2 **-** SP2	-71 5.3.108

-71   5.2.5.248   *Auxiliary Pressure #1*

Pressure measured by auxiliary pressure sensor #1 or #2. Not to be used in place of existing SPNs.

Slot Length: 1 byte
Slot Scaling: 16 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 4000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1387
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65164	Auxiliary Analog Information **-** AAI	-71 5.3.111

-71   5.2.5.248   *Auxiliary Pressure #2*

Pressure measured by auxiliary pressure sensor #1 or #2. Not to be used in place of existing SPNs.

Slot Length: 1 byte
Slot Scaling: 16 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 4000 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1388
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65164	Auxiliary Analog Information **-** AAI	-71 5.3.111

-71   5.2.5.249   *Auxiliary Temperature 1*

Temperature measured by auxiliary temperature sensor #1. Not to be used in place of existing SPNs.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   ,   -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:**   same as slot range

SPN Type: Measured
SPN: 441
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65164	Auxiliary Analog Information **-** AAI	-71 5.3.111

-71   5.2.5.249   *Auxiliary Temperature 2*
Temperature measured by auxiliary temperature sensor #2. Not to be used in place of existing SPNs.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 442
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65164	Auxiliary Analog Information **-** AAI	-71 5.3.111

-71   5.2.5.249   *Auxiliary Temperature #1 (duplicate see also SPN 441)*
Temperature measured by auxiliary temperature sensor #1 or #2. Not to be used in place of existing SPNs.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1385
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65164	Auxiliary Analog Information **-** AAI	-71 5.3.111

-71   5.2.5.249   *Auxiliary Temperature #2 (duplicate see also SPN 442)*
Temperature measured by auxiliary temperature sensor #1 or #2. Not to be used in place of existing SPNs.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1386
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65164	Auxiliary Analog Information **-** AAI	-71 5.3.111

-71   5.2.5.250   *Absolute Fuel Valve Inlet Pressure*
The absolute pressure at the inlet of the gaseous fuel valve.

Slot Length: 2 bytes
Slot Scaling: 0.1 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 6,425.5 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1390
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65163	Gaseous Fuel Pressure **-** GFP	-71 5.3.113

-71   **5.2.5.251**   *Outlet to Inlet Fuel Valve Differential Pressure*

The differential pressure between the inlet and the outlet of a gaseous fuel valve.

Slot Length: 2 bytes
Slot Scaling: 0.1 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 6,425.5 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1391
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65163	Gaseous Fuel Pressure **-** GFP	-71 5.3.113

-71   **5.2.5.252**   *Air to Fuel Differential Pressure*

The differential pressure between the gaseous fuel and the air intake manifold.

Slot Length: 2 bytes
Slot Scaling: 0.1 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 6,425.5 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1392
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65163	Gaseous Fuel Pressure **-** GFP	-71 5.3.113

-71   **5.2.5.253**   *Cylinder 1 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   ,   -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1393
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65160	Ignition Transformer Secondary Output #1 **-** ISO1	-71 5.3.114

-71   5.2.5.253   *Cylinder 2 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1394
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65160	Ignition Transformer Secondary Output #1 **-** ISO1	-71 5.3.114

-71   5.2.5.253   *Cylinder 3 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1395
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65160	Ignition Transformer Secondary Output #1 **-** ISO1	-71 5.3.114

-71   5.2.5.253   *Cylinder 4 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1396
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65160	Ignition Transformer Secondary Output #1 **-** ISO1	-71 5.3.114

-71   5.2.5.253   *Cylinder 5 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1397
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

-71   **5.2.5.253**   *Cylinder 6 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1398
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65160	Ignition Transformer Secondary Output #1 **-** ISO1	-71 5.3.114

-71   **5.2.5.253**   *Cylinder 7 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1399
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65160	Ignition Transformer Secondary Output #1 **-** ISO1	-71 5.3.114

-71   **5.2.5.253**   *Cylinder 8 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1400
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65160	Ignition Transformer Secondary Output #1 **-** ISO1	-71 5.3.114

-71   **5.2.5.253**   *Cylinder 9 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1401

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65161	Ignition Transformer Secondary Output #2 **-** ISO2	-71 5.3.115

-71   5.2.5.253   *Cylinder 10 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1402
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65161	Ignition Transformer Secondary Output #2 **-** ISO2	-71 5.3.115

-71   5.2.5.253   *Cylinder 11 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1403
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65161	Ignition Transformer Secondary Output #2 **-** ISO2	-71 5.3.115

-71   5.2.5.253   *Cylinder 12 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1404
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65161	Ignition Transformer Secondary Output #2 **-** ISO2	-71 5.3.115

-71   5.2.5.253   *Cylinder 13 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**

Slot Range: -125 to 125 % **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1405
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65161	Ignition Transformer Secondary Output #2 **-** ISO2	-71 5.3.115

-71 **5.2.5.253** *Cylinder 14 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit , -125 % **Offset**
Slot Range: -125 to 125 % **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1406
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65161	Ignition Transformer Secondary Output #2 **-** ISO2	-71 5.3.115

-71 **5.2.5.253** *Cylinder 15 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit , -125 % **Offset**
Slot Range: -125 to 125 % **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1407
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65161	Ignition Transformer Secondary Output #2 **-** ISO2	-71 5.3.115

-71 **5.2.5.253** *Cylinder 16 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit , -125 % **Offset**
Slot Range: -125 to 125 % **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1408
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65161	Ignition Transformer Secondary Output #2 **-** ISO2	-71 5.3.115

-71 **5.2.5.253** *Cylinder 17 Ignition Transformer Secondary Output*

This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit , -125 % **Offset**
Slot Range: -125 to 125 % **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1409
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65162	Ignition Transformer Secondary Output #3 **-** ISO3	-71 5.3.116

-71   5.2.5.253   *Cylinder 18 Ignition Transformer Secondary Output*
This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit , -125 % **Offset**
Slot Range: -125 to 125 % **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1410
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65162	Ignition Transformer Secondary Output #3 **-** ISO3	-71 5.3.116

-71   5.2.5.253   *Cylinder 19 Ignition Transformer Secondary Output*
This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit , -125 % **Offset**
Slot Range: -125 to 125 % **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1411
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65162	Ignition Transformer Secondary Output #3 **-** ISO3	-71 5.3.116

-71   5.2.5.253   *Cylinder 20 Ignition Transformer Secondary Output*
This parameter indicates the relative intensity of the secondary output voltage of the ignition transformer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit , -125 % **Offset**
Slot Range: -125 to 125 % **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1412
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65162	Ignition Transformer Secondary Output #3 **-** ISO3	-71 5.3.116

-71   5.2.5.254   *Battery 2 Potential*

The voltage for isolated battery #2.

Slot Length: 2 bytes
Slot Scaling: 0.05 V/bit   , 0   **Offset**
Slot Range: 0 to 3212.75 V   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 444
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65165	Vehicle Electrical Power #2 **-** VP2	-71 5.3.110

-71   5.2.5.254   *Battery 2 Potential (Voltage)   (duplicate - see also SPN 444)*

The voltage for isolated battery #2.

Slot Length: 2 bytes
Slot Scaling: 0.05 V/bit   , 0   **Offset**
Slot Range: 0 to 3212.75 V   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1376
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65165	Vehicle Electrical Power #2 **-** VP2	-71 5.3.110

-71   5.2.5.255   *Actual Ignition Timing*

The actual ignition timing at the current engine conditions. This parameter may or may not be equal to one of the desired timing parameters (see 5.2.5.256), depending on the status of the engine.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   , -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1436
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65159	Ignition Timing #6 **-** IT6	-71 5.3.122

-71   5.2.5.256   *Desired Ignition Timing #1*

A programmable timing value specific to the engine's application. Factors affecting this value include both fuel type and the nature of the load being driven.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   , -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1433

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65159	Ignition Timing #6 **-** IT6	-71 5.3.122

-71   5.2.5.256   *Desired Ignition Timing #2*

A programmable timing value specific to the engine's application. Factors affecting this value include both fuel type and the nature of the load being driven.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   ,   -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1434
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65159	Ignition Timing #6 **-** IT6	-71 5.3.122

-71   5.2.5.256   *Desired Ignition Timing #3*

A programmable timing value specific to the engine's application. Factors affecting this value include both fuel type and the nature of the load being driven.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   ,   -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1435
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65159	Ignition Timing #6 **-** IT6	-71 5.3.122

-71   5.2.5.257   *Cylinder 1 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   ,   -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1413
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65154	Ignition Timing #1 **-** IT1	-71 5.3.117

-71   5.2.5.257   *Cylinder 2 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes

Slot Scaling: 1/128 deg/bit , -200 deg **Offset**
Slot Range: -200 to 301.99 deg **Operational Range:** same as slot range
SPN Type: Status
SPN: 1414
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65154	Ignition Timing #1 **-** IT1	-71 5.3.117

-71   5.2.5.257   *Cylinder 3 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit , -200 deg **Offset**
Slot Range: -200 to 301.99 deg **Operational Range:** same as slot range
SPN Type: Status
SPN: 1415
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65154	Ignition Timing #1 **-** IT1	-71 5.3.117

-71   5.2.5.257   *Cylinder 4 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit , -200 deg **Offset**
Slot Range: -200 to 301.99 deg **Operational Range:** same as slot range
SPN Type: Status
SPN: 1416
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65154	Ignition Timing #1 **-** IT1	-71 5.3.117

-71   5.2.5.257   *Cylinder 5 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit , -200 deg **Offset**
Slot Range: -200 to 301.99 deg **Operational Range:** same as slot range
SPN Type: Status
SPN: 1417
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65155	Ignition Timing #2 **-** IT2	-71 5.3.118

-71   5.2.5.257   *Cylinder 6 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   , -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1418
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65155	Ignition Timing #2 **-** IT2	-71 5.3.118

-71   5.2.5.257   *Cylinder 7 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   , -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1419
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65155	Ignition Timing #2 **-** IT2	-71 5.3.118

-71   5.2.5.257   *Cylinder 8 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   , -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1420
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65155	Ignition Timing #2 **-** IT2	-71 5.3.118

-71   5.2.5.257   *Cylinder 9 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   , -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1421
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

-71   **5.2.5.257**   *Cylinder 10 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   ,   -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1422
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65156	Ignition Timing #3 **-** IT3	-71 5.3.119

-71   **5.2.5.257**   *Cylinder 11 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   ,   -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1423
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65156	Ignition Timing #3 **-** IT3	-71 5.3.119

-71   **5.2.5.257**   *Cylinder 12 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   ,   -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1424
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65156	Ignition Timing #3 **-** IT3	-71 5.3.119

-71   **5.2.5.257**   *Cylinder 13 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   ,   -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1425

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65157	Ignition Timing #4 **-** IT4	-71 5.3.120

-71   **5.2.5.257**   *Cylinder 14 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   ,   -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1426
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65157	Ignition Timing #4 **-** IT4	-71 5.3.120

-71   **5.2.5.257**   *Cylinder 15 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   ,   -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1427
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65157	Ignition Timing #4 **-** IT4	-71 5.3.120

-71   **5.2.5.257**   *Cylinder 16 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   ,   -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1428
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65157	Ignition Timing #4 **-** IT4	-71 5.3.120

-71   **5.2.5.257**   *Cylinder 17 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   ,   -200 deg   **Offset**

Slot Range: -200 to 301.99 deg   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1429
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65158	Ignition Timing #5 **-** IT5	-71 5.3.121

-71   5.2.5.257   *Cylinder 18 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   , -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1430
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65158	Ignition Timing #5 **-** IT5	-71 5.3.121

-71   5.2.5.257   *Cylinder 19 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   , -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1431
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65158	Ignition Timing #5 **-** IT5	-71 5.3.121

-71   5.2.5.257   *Cylinder 20 Ignition Timing*

The ignition timing of the cylinder.

Slot Length: 2 bytes
Slot Scaling: 1/128 deg/bit   , -200 deg   **Offset**
Slot Range: -200 to 301.99 deg   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1432
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65158	Ignition Timing #5 **-** IT5	-71 5.3.121

-71   5.2.5.258   *Desired Combustion Time*

The desired combustion time based upon engine load and speed lookup maps.

Slot Length: 2 bytes
Slot Scaling: 0.01ms/bit   , 0   **Offset**
Slot Range: 0 to 642.55 ms   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1464
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65152	Combustion Time #6 **-** CT6	-71 5.3.129

-71   **5.2.5.259**   *Average Engine Combustion Time*

The average combustion time of all cylinders of an engine.

Slot Length: 2 bytes
Slot Scaling: 0.01ms/bit   , 0   **Offset**
Slot Range: 0 to 642.55 ms   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1465
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65152	Combustion Time #6 **-** CT6	-71 5.3.129

-71   **5.2.5.260**   *Cylinder 1 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes
Slot Scaling: 0.01ms/bit   , 0   **Offset**
Slot Range: 0 to 642.55 ms   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1444
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65147	Combustion Time #1 **-** CT1	-71 5.3.124

-71   **5.2.5.260**   *Cylinder 2 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes
Slot Scaling: 0.01ms/bit   , 0   **Offset**
Slot Range: 0 to 642.55 ms   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1445
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

-71   5.2.5.260   *Cylinder 3 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes

Slot Scaling: 0.01ms/bit   ,   0   **Offset**

Slot Range: 0 to 642.55 ms   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1446

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**	
65147	Combustion Time #1 - CT1	-71	5.3.124

-71   5.2.5.260   *Cylinder 4 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes

Slot Scaling: 0.01ms/bit   ,   0   **Offset**

Slot Range: 0 to 642.55 ms   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1447

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**	
65147	Combustion Time #1 - CT1	-71	5.3.124

-71   5.2.5.260   *Cylinder 5 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes

Slot Scaling: 0.01ms/bit   ,   0   **Offset**

Slot Range: 0 to 642.55 ms   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1448

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**	
65148	Combustion Time #2 - CT2	-71	5.3.125

-71   5.2.5.260   *Cylinder 6 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes

Slot Scaling: 0.01ms/bit   ,   0   **Offset**

Slot Range: 0 to 642.55 ms   **Operational Range:**   same as slot range

SPN Type: Measured
SPN: 1449
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65148	Combustion Time #2 **-** CT2	-71 5.3.125

-71   5.2.5.260   *Cylinder 7 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes
Slot Scaling: 0.01ms/bit   , 0   **Offset**
Slot Range: 0 to 642.55 ms   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1450
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65148	Combustion Time #2 **-** CT2	-71 5.3.125

-71   5.2.5.260   *Cylinder 8 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes
Slot Scaling: 0.01ms/bit   , 0   **Offset**
Slot Range: 0 to 642.55 ms   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1451
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65148	Combustion Time #2 **-** CT2	-71 5.3.125

-71   5.2.5.260   *Cylinder 9 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes
Slot Scaling: 0.01ms/bit   , 0   **Offset**
Slot Range: 0 to 642.55 ms   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1452
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65149	Combustion Time #3 **-** CT3	-71 5.3.126

-71   5.2.5.260   *Cylinder 10 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes

Slot Scaling: 0.01ms/bit   , 0   **Offset**

Slot Range: 0 to 642.55 ms   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1453

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65149	Combustion Time #3 **-** CT3	-71 5.3.126

-71   5.2.5.260   *Cylinder 11 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes

Slot Scaling: 0.01ms/bit   , 0   **Offset**

Slot Range: 0 to 642.55 ms   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1454

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65149	Combustion Time #3 **-** CT3	-71 5.3.126

-71   5.2.5.260   *Cylinder 12 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes

Slot Scaling: 0.01ms/bit   , 0   **Offset**

Slot Range: 0 to 642.55 ms   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1455

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65149	Combustion Time #3 **-** CT3	-71 5.3.126

-71   5.2.5.260   *Cylinder 13 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes

Slot Scaling: 0.01ms/bit   , 0   **Offset**

Slot Range: 0 to 642.55 ms   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1456

SPN Supporting Information:

Reference:

-71   **5.2.5.260**   *Cylinder 14 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes

Slot Scaling: 0.01ms/bit   ,   0   **Offset**

Slot Range: 0 to 642.55 ms   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1457

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65150	Combustion Time #4 **-** CT4	-71 5.3.127

-71   **5.2.5.260**   *Cylinder 15 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes

Slot Scaling: 0.01ms/bit   ,   0   **Offset**

Slot Range: 0 to 642.55 ms   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1458

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65150	Combustion Time #4 **-** CT4	-71 5.3.127

-71   **5.2.5.260**   *Cylinder 16 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes

Slot Scaling: 0.01ms/bit   ,   0   **Offset**

Slot Range: 0 to 642.55 ms   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1459

**SPN Supporting Information:**

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65150	Combustion Time #4 **-** CT4	-71 5.3.127

-71   **5.2.5.260**   *Cylinder 17 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length: 2 bytes

Slot Scaling: 0.01ms/bit   ,   0   **Offset**

Slot Range:	0 to 642.55 ms	**Operational Range:** same as slot range
SPN Type:	Measured
SPN:	1460

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65151	Combustion Time #5 **-** CT5	-71 5.3.128

-71   5.2.5.260   *Cylinder 18 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length:	2 bytes
Slot Scaling:	0.01ms/bit	, 0	**Offset**
Slot Range:	0 to 642.55 ms		**Operational Range:** same as slot range
SPN Type:	Measured
SPN:	1461

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65151	Combustion Time #5 **-** CT5	-71 5.3.128

-71   5.2.5.260   *Cylinder 19 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length:	2 bytes
Slot Scaling:	0.01ms/bit	, 0	**Offset**
Slot Range:	0 to 642.55 ms		**Operational Range:** same as slot range
SPN Type:	Measured
SPN:	1462

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65151	Combustion Time #5 **-** CT5	-71 5.3.128

-71   5.2.5.260   *Cylinder 20 Combustion Time*

The amount of time from when the ignition of the fuel is initiated to when the fuel is completely ignited (i.e., the flame front has propagated across the cylinder).

Slot Length:	2 bytes
Slot Scaling:	0.01ms/bit	, 0	**Offset**
Slot Range:	0 to 642.55 ms		**Operational Range:** same as slot range
SPN Type:	Measured
SPN:	1463

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65151	Combustion Time #5 **-** CT5	-71 5.3.128

-71   5.2.5.261   *Fuel Valve 1 Position*

The position of a gaseous fuel valve that is metering the fuel flow to the engine. 0% indicates no fuel flow through valve and 100% means maximum fuel flow through valve.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   ,   0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1442
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65153	Fuel Information #2 (Gaseous) **-** GFI2	-71 5.3.123

-71   5.2.5.261   *Fuel Valve 2 Position*

The position of a gaseous fuel valve that is metering the fuel flow to the engine. 0% indicates no fuel flow through valve and 100% means maximum fuel flow through valve.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   ,   0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1443
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65153	Fuel Information #2 (Gaseous) **-** GFI2	-71 5.3.123

-71   5.2.5.262   *Fuel Flow Rate 1*

The rate at which the fuel is flowing through a fuel valve.

Slot Length: 2 bytes
Slot Scaling: 0.1 m^3/h per bit   ,   0   **Offset**
Slot Range: 0 to 6425.5 m^3/h   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1440
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65153	Fuel Information #2 (Gaseous) **-** GFI2	-71 5.3.123

-71   5.2.5.262   *Fuel Flow Rate 2*

The rate at which the fuel is flowing through a fuel valve.

Slot Length: 2 bytes
Slot Scaling: 0.1 m^3/h per bit   ,   0   **Offset**
Slot Range: 0 to 6425.5 m^3/h   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1441
SPN Supporting Information:

Reference:

-71   **5.2.5.263**   *Trailer, Tag Or Push Channel Tire Pressure*

The latest gage pressure reading of the trailer, tag, or push group of tires, as opposed to the pressure in each tire.

Slot Length: 2 bytes
Slot Scaling: 0.5 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 32,127.5 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 144
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65146	Tire Pressure Control Unit Current Pressures **-** TP3	-71 5.3.130

-71   **5.2.5.264**   *Drive Channel Tire Pressure*

The latest gage pressure reading of the drive group of tires, as opposed to the pressure in each tire.

Slot Length: 2 bytes
Slot Scaling: 0.5 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 32,127.5 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 145
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65146	Tire Pressure Control Unit Current Pressures **-** TP3	-71 5.3.130

-71   **5.2.5.265**   *Steel Channel Tire Pressure*

The latest gage pressure reading of the steer group of tires, as opposed to the pressure in each tire.

Slot Length: 2 bytes
Slot Scaling: 0.5 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 32,127.5 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 146
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65146	Tire Pressure Control Unit Current Pressures **-** TP3	-71 5.3.130

-71   **5.2.5.266**   *Trailer, Tag Or Push Channel Tire Pressure Target*

The tire pressure control system's target gage pressure for the trailer, tag, or push group of tires.

Slot Length: 2 bytes
Slot Scaling: 0.5 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 32,127.5 kPa   **Operational Range:**   same as slot range
SPN Type: Measured

SPN: 141

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65145	Tire Pressure Control Unit Target Pressures **-** TP2	-71 5.3.131

-71   **5.2.5.267**   *Drive Channel Tire Pressure Target*

The tire pressure control system's target gage pressure for the drive group of tires.

Slot Length: 2 bytes
Slot Scaling: 0.5 kPa/bit   , 0   **Offset**
Slot Range: 0 to 32,127.5 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 142

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65145	Tire Pressure Control Unit Target Pressures **-** TP2	-71 5.3.131

-71   **5.2.5.268**   *Steer Channel Tire Pressure Target*

The tire pressure control system's target gage pressure for the steer group of tires.

Slot Length: 2 bytes
Slot Scaling: 0.5 kPa/bit   , 0   **Offset**
Slot Range: 0 to 32,127.5 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 143

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65145	Tire Pressure Control Unit Target Pressures **-** TP2	-71 5.3.131

-71   **5.2.5.269**   *Tire Pressure Check Interval*

The interval at which the system will check the tire pressures (e.g., 5, 10, 15 min.).

NOTE - A value of 0 indicates continuous (real time) pressure readings.

Slot Length: 1 byte
Slot Scaling: 1 min/bit   , 0   **Offset**
Slot Range: 0 to 250 mins   **Operational Range:**   0: indicates continuous (real time) pressure
                                                                                                        readings
SPN Type: Status
SPN: 39

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65144	Tire Pressure Control Unit Mode and Status **-** TP1	-71 5.3.132

-71   **5.2.5.270**   *Auxiliary Vacuum Pressure Reading*

Identifies the current vacuum pressure (relative to atmosphere) that is configured uniquely per application. Not to be used in place of defined parameters.

Slot Length: 2 bytes
Slot Scaling: 0.5 kPa/bit   , 0   **Offset**
Slot Range: 0 to 32,127.5 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 136
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65143	Auxiliary Pressures **-** AP	-71 5.3.133

-71   5.2.5.271   *Auxiliary Gauge Pressure Reading 1*

Identifies the current gage pressure (relative to atmosphere) that is configured uniquely per application. Not to be used in place of defined parameters.

Slot Length: 2 bytes
Slot Scaling: 0.5 kPa/bit   , 0   **Offset**
Slot Range: 0 to 32,127.5 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 137
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65143	Auxiliary Pressures **-** AP	-71 5.3.133

-71   5.2.5.272   *Auxiliary Absolute Pressure Reading*

Identifies the current absolute pressure (relative to 0 pressure) that is configured uniquely per application. Not to be used in place of defined parameters.

Slot Length: 2 bytes
Slot Scaling: 0.5 kPa/bit   , 0   **Offset**
Slot Range: 0 to 32,127.5 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 138
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65143	Auxiliary Pressures **-** AP	-71 5.3.133

-71   5.2.5.273   *Powered Vehicle Weight*

Total mass imposed by the tires of the powered vehicle on the road surface. Does not include the trailer.

Slot Length: 2 bytes
Slot Scaling: 10 kg/bit   , 0   **Offset**
Slot Range: 0 to 642,550 kg   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1585
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

| 65136 | Combination Vehicle Weight **-** CVW | -71   5.3.140 |

-71   5.2.5.274   *Speed of forward vehicle*

Absolute velocity of the preceding vehicle situated within 250 m in the same lane and moving in the same direction.

Slot Length: 1 byte
Slot Scaling: 1 km/h/bit   , 0   **Offset**
Slot Range: 0 to 250 km/h   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1586
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65135	Adaptive Cruise Control **-** ACC1	-71 5.3.141

-71   5.2.5.275   *Distance to forward vehicle*

Distance to the preceding vehicle situated within 250 m in the same lane and moving in the same direction.

Slot Length: 1 byte
Slot Scaling: 1m/bit   , 0   **Offset**
Slot Range: 0 to 250 m   **Operational Range:** Ffhex means no vehicle detected
SPN Type: Measured
SPN: 1587
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65135	Adaptive Cruise Control **-** ACC1	-71 5.3.141

-71   5.2.5.276   *Adaptive Cruise Control Set Speed*

Value of the desired (chosen) velocity of the adaptive cruise control system.

Slot Length: 1 byte
Slot Scaling: 1 km/h/bit   , 0   **Offset**
Slot Range: 0 to 250 km/h   **Operational Range:** 0 to 120 km/h
SPN Type: Status
SPN: 1588
SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65135	Adaptive Cruise Control **-** ACC1	-71 5.3.141

-71   5.2.5.277   *Road curvature*

Estimated value of the current road curvature for use by the adaptive cruise control system. Positive values are used for left curves. Curvature is the inverse of the radius and is zero for straight roads.

Slot Length: 2 bytes
Slot Scaling: 1/128 1/km/bit   , -250 1/km   **Offset**
Slot Range: -250 to 250 1/km   **Operational Range:** same as slot range
SPN Type: Status

SPN: 1591

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65135	Adaptive Cruise Control **-** ACC1	-71 5.3.141

-71   **5.2.5.278**   *Front Axle, Left Wheel Speed*

High resolution measurement of the speed of the left wheel on the front axle.

Slot Length: 2 bytes
Slot Scaling: 1/256 km/h/bit   ,   0   **Offset**
Slot Range: 0 to 250.996 km/h   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1592
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65134	High Resolution Wheel Speed **-** HRW	-71 5.3.142

-71   **5.2.5.279**   *Front axle, right wheel speed*

High resolution measurement of the speed of the right wheel on the front axle.

Slot Length: 2 bytes
Slot Scaling: 1/256 km/h/bit   ,   0   **Offset**
Slot Range: 0 to 250.996 km/h   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1593
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65134	High Resolution Wheel Speed **-** HRW	-71 5.3.142

-71   **5.2.5.280**   *Rear axle, left wheel speed*

High resolution measurement of the speed of the left wheel on the rear axle.

Slot Length: 2 bytes
Slot Scaling: 1/256 km/h/bit   ,   0   **Offset**
Slot Range: 0 to 250.996 km/h   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1594
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65134	High Resolution Wheel Speed **-** HRW	-71 5.3.142

-71   **5.2.5.281**   *Rear axle, right wheel speed*

High resolution measurement of the speed of the right wheel on the rear axle.

Slot Length: 2 bytes

Slot Scaling: 1/256 km/h/bit , 0 **Offset**
Slot Range: 0 to 250.996 km/h **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1595
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65134	High Resolution Wheel Speed **-** HRW	-71 5.3.142

-71   5.2.5.282   *Tachograph output shaft speed*

Calculated speed of the transmission output shaft.

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit , 0 **Offset**
Slot Range: 0 to 8,031.875 rpm **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1623
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65132	Tachograph **-** TC01	-71 5.3.143

-71   5.2.5.283   *Tachograph vehicle speed*

Speed of the vehicle registered by the tachograph.

Slot Length: 2 bytes
Slot Scaling: 1/256 km/h/bit , 0 **Offset**
Slot Range: 0 to 250.996 km/h **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1624
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65132	Tachograph **-** TC01	-71 5.3.143

-71   5.2.5.284   *Engine Oil Level Remote Reservoir*

Ratio of current volume of engine oil in a remote reservoir to the maximum required volume. If a single switch (on/off) is used, 20% and 100% respectively will be used where 100% means no oil needs to be added and 20% means oil needs to be added. If two switches are used, 20%, 50%, and 100% will be used where 20% indicates the oil is critically low, 50% indicates the oil level is low, and 100% means no oil needs to be added. For continuous sensors, the actual measured

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit , 0 **Offset**
Slot Range: 0 to 100 % **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1380
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65130	Engine Fuel/lube systems **-** EFS	-71 5.3.112

-71   **5.2.5.285**   *Fuel Supply Pump Inlet Pressure*

Absolute pressure of fuel at the fuel supply pump inlet. See Figures 15 &and 16.

Slot Length: 1 byte

Slot Scaling: 2 kPa/bit   ,   0   **Offset**

Slot Range: 0 to 500 kPa   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1381

SPN Supporting Information: fuelsystemobj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65130	Engine Fuel/lube systems **-** EFS	-71 5.3.112
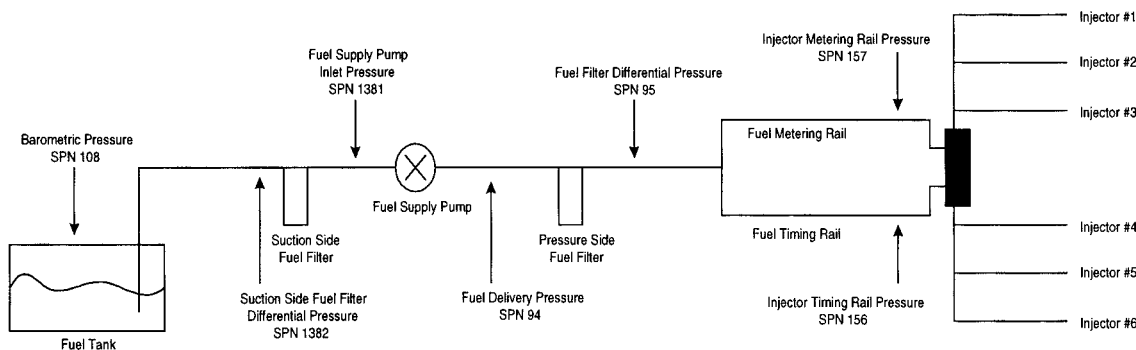
FIGURE 15—FUEL SYSTEM WITH RAILS
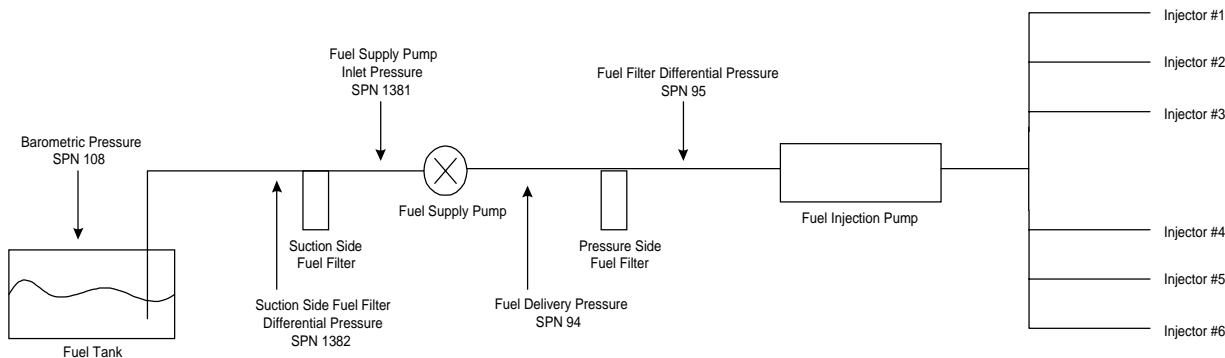
FIGURE 16—FUEL SYSTEM WITH PUMP

-71   **5.2.5.286**   *Fuel Filter (Suction Side) Differential Pressure (see also SPN 1382)*

Differential pressure measured across the fuel filter located between the fuel tank and the supply pump. See Figures 15 & 16.

Slot Length: 1 byte

Slot Scaling: 2 kPa/bit   ,   0   **Offset**

Slot Range: 0 to 500 kPa   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 16

SPN Supporting Information: fuelsystemobj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

-71   **5.2.5.286**   *Fuel Filter (suction side) Differential Pressure*

Differential pressure measured across the fuel filter located between the fuel tank and the supply pump. See Figures 15 and 16.

Slot Length: 1 byte

Slot Scaling: 2 kPa/bit   , 0   **Offset**

Slot Range: 0 to 500 kPa   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1382

SPN Supporting Information: fuelsystemobj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65130	Engine Fuel/lube systems **-** EFS	-71 5.3.112

-71   **5.2.5.287**   *Driver 1 identification*

Used to obtain the driver identity.

Slot Length: Variable Delimiter (ASCII "*")

Slot Scaling: ASCII   , 0   **Offset**

Slot Range: 0 to 255 per byte   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1625

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65131	Driver's Identification **-** DI	-71 5.3.145

-71   **5.2.5.287**   *Driver 2 identification*

Used to obtain the driver identity.

Slot Length: Variable Delimiter (ASCII "*")
Slot Scaling: ASCII   , 0   **Offset**
Slot Range: 0 to 255 per byte   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1626
SPN Supporting Information:

Reference:
PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65131	Driver's Identification **-** DI	-71 5.3.145

-71   **5.2.5.288**   *Adjust seconds*

Part of the parameter used to set the time.

Slot Length: 1 byte
Slot Scaling: 0.25 s/bit   , 0   **Offset**
Slot Range: 0 to 62.5 s   **Operational Range:**   0 to 59.75 s
SPN Type: Measured
SPN: 1603
SPN Supporting Information:

Reference:
PGN	Parameter Group Name and Acronym	Doc. and Paragraph
54528	Time/Date Adjust **-** TDA	-71 5.3.144

-71   **5.2.5.289**   *Adjust minutes*

Part of the parameter used to set the time.

Slot Length: 1 byte
Slot Scaling: 1 min/bit   , 0   **Offset**
Slot Range: 0 to 250 mins   **Operational Range:**   0 to 59 min
SPN Type: Measured
SPN: 1604
SPN Supporting Information:

Reference:
PGN	Parameter Group Name and Acronym	Doc. and Paragraph
54528	Time/Date Adjust **-** TDA	-71 5.3.144

-71   **5.2.5.290**   *Adjust hours*

Part of the parameter used to set the time.

Slot Length: 1 byte
Slot Scaling: 1 hr/bit   , 0   **Offset**
Slot Range: 0 to 250 hr   **Operational Range:**   0 to 23 h
SPN Type: Measured
SPN: 1605
SPN Supporting Information:

Reference:
PGN	Parameter Group Name and Acronym	Doc. and Paragraph

-71   **5.2.5.291**   *Adjust month*

Part of a parameter used to set a calendar date.

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

Slot Length: 1 byte

Slot Scaling: 1 month/bit   ,   0   **Offset**

Slot Range: 0 to 250 months   **Operational Range:** 1 to 12 month

SPN Type: Measured

SPN: 1606

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
54528	Time/Date Adjust **-** TDA	-71 5.3.144

-71   **5.2.5.292**   *Adjust day*

Part of a parameter used to set 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.

Slot Length: 1 byte

Slot Scaling: 0.25 days/bit   ,   0   **Offset**

Slot Range: 0 to 62.5 days   **Operational Range:** 0.25 to 31.75 day

SPN Type: Measured

SPN: 1607

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
54528	Time/Date Adjust **-** TDA	-71 5.3.144

-71   **5.2.5.293**   *Adjust year*

Part of a parameter used to set a calendar date.

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

Slot Length: 1 byte

Slot Scaling: 1 year/bit   ,   1985 years   **Offset**

Slot Range: 1985 to 2235 years   **Operational Range:** 1985 to 2235 year

SPN Type: Measured

SPN: 1608

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
54528	Time/Date Adjust **-** TDA	-71 5.3.144

-71   **5.2.5.294**   *Adjust local minute offset*

Used to set the local offset in minutes from a reference time.

Slot Length: 1 byte
Slot Scaling: 1 min/bit , -125 mins **Offset**
Slot Range: -125 to 125 mins **Operational Range:** -59 to +59 min
SPN Type: Measured
SPN: 1609
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
54528	Time/Date Adjust **-** TDA	-71 5.3.144

-71   5.2.5.295   *Adjust local hour offset*

Used to set the local offset in hours from a reference time

Slot Length: 1 byte
Slot Scaling: 1 hr/bit , -125 hr **Offset**
Slot Range: -125 to 125 hr **Operational Range:** -24 to +23 h
SPN Type: Measured
SPN: 1610
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
54528	Time/Date Adjust **-** TDA	-71 5.3.144

-71   5.2.5.296   *Local minute offset*

Local offset in minutes from a reference time.

Slot Length: 1 byte
Slot Scaling: 1 min/bit , -125 mins **Offset**
Slot Range: -125 to 125 mins **Operational Range:** -59 to +59 min
SPN Type: Measured
SPN: 1601
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65254	Time/Date **-** TD	-71 5.3.020

-71   5.2.5.297   *Local hour offset*

Local offset in hours from a reference time

Slot Length: 1 byte
Slot Scaling: 1 hr/bit , -125 hr **Offset**
Slot Range: -125 to 125 hr **Operational Range:** -24 to +23 h
SPN Type: Measured
SPN: 1602
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65254	Time/Date **-** TD	-71 5.3.020

-71   **5.2.5.298**   *Source Address of Controlling Device for Engine Control*

The source address of the SAE J1939 device currently controlling the engine. It is used to expand the torque mode parameter (see 5.2.2.1) in cases where control is in response to an ECU that is not listed in Table 7. Its value may be the source address of the ECU transmitting the message (which means that no external SAE J1939 message is providing the active command) or the source address of the SAE J1939 ECU that is currently providing the active command in a TSC1 (see 5.3.1) or similar message. Note that if this parameter value is the same as the source address of the device transmitting it, the control may be due to a message on a non-J1939 data link such as SAE J1922 or a proprietary link.

Slot Length: 1 byte

Slot Scaling: 1 source address/bit   , 0   **Offset**

Slot Range: 0 to 255   **Operational Range:**   0 to 253

SPN Type: Status

SPN: 1483

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61444	Electronic Engine Controller #1 **-** EEC1	-71 5.3.007

-71   **5.2.5.299**   *Source Address of Controlling Device for Brake Control*

The source address of the SAE J1939 device currently controlling the brake system. Its value may be the source address of the ECU transmitting the message (which means that no external SAE J1939 message is providing the active command) or the source address of the SAE J1939 ECU that is currently providing the active command in a TSC1 (see 5.3.1) or similar message. Note that if this parameter value is the same as the source address of the device transmitting it, the control may be due to a message on a non-SAE J1939 data link such as SAE J1922 or a proprietary link.

Slot Length: 1 byte

Slot Scaling: 1 source address/bit   , 0   **Offset**

Slot Range: 0 to 255   **Operational Range:**   0 to 253

SPN Type: Status

SPN: 1481

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   **5.2.5.300**   *Source Address of Controlling Device for Retarder Control*

The source address of the SAE J1939 device currently controlling the retarder. It is used to expand the torque mode parameter (see 5.2.2.1) in cases where control is in response to an ECU that is not listed in Table 7. Its value may be the source address of the ECU transmitting the message (which means that no external SAE J1939 message is providing the active command) or the source address of the SAE J1939 ECU that is currently providing the active command in a TSC1 (see 5.3.1) or similar message. Note that if this parameter value is the same as the source address of the device transmitting it, the control may be due to a message on a non-SAE J1939 data link such as SAE J1922 or a proprietary link.

Slot Length: 1 byte

Slot Scaling: 1 source address/bit   , 0   **Offset**

Slot Range: 0 to 255   **Operational Range:**   0 to 253

SPN Type: Status

SPN: 1480

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61440	Electronic Retarder Controller #1 **-** ERC1	-71 5.3.003

-71   **5.2.5.301**   *Source Address of Controlling Device for Transmission Control*

The source address of the SAE J1939 device currently controlling the transmission. Its value may be the source address of the ECU transmitting the message (which means that no external SAE J1939 message is providing the active command) or the source address of the SAE J1939 ECU that is currently providing the active command in a TSC1 (see 5.3.1) or similar message. Note that if this parameter value is the same as the source address of the device transmitting it, the control may be due to a message on a non-SAE J1939 data link such as SAE J1922 or a proprietary link.

Slot Length: 1 byte

Slot Scaling: 1 source address/bit , 0 **Offset**

Slot Range: 0 to 255 **Operational Range:** 0 to 253

SPN Type: Status

SPN: 1482

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61442	Electronic Transmission Controller #1 **-** ETC1	-71 5.3.005

-71   5.2.5.302   *Engine Oil Kinematic Viscosity*

Engine oil kinematic viscosity used to describe the engine oil quality.

Slot Length: 1 byte

Slot Scaling: 1 mm^2/s per bit , 0 **Offset**

Slot Range: 0 to 250 mm^2/s **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1477

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
	-	

-71   5.2.5.303   *Engine Oil Relative Dielectricity*

Engine oil relative dielectricity used to describe the engine oil quality.

Slot Length: 1 byte

Slot Scaling: 0.1/bit , 0 **Offset**

Slot Range: 0 to 25.0 **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1478

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
	-	

-71   5.2.5.305   *Laser Strike Vertical Deviation*

The calculated distance from the laser strike position to the current land leveling system reference point.

Slot Length: 2 bytes

Slot Scaling: 0.1 mm/bit , -3,200 mm **Offset**

Slot Range: -3,200 to 3,225.5 mm **Operational Range:** -3200 to +3200 mm, negative values are below grade, positive values are above grade, zero is on grade, 0xFE03 indicates that the sensor can not sense the laser

SPN Type: Measured

SPN: 1574

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65141	Laser Leveling System Vertical Deviation **-** LVD	-71 5.3.135

-71   5.2.5.306   *Modify Set Point*

Used to control and coordinate the set point for the leveling system.

Operating Range: -3200–3200 to +3200 mm, negative values are below current position, positive values are above current position, zero is no change.
Parameter specific parameter:
0xFE0116 indicates Stop modifying the set point
0xFE0316 indicates Raise the current set point by 5 mm
0xFE1116 indicates Lower the current set point by 5 mm
0xFE1316 indicates Search for laser or target
0xFE1516 indicates go to the Park position
0xFE1716 indicates go to the Bench position

Slot Length: 2 bytes
Slot Scaling: 0.1 mm/bit   ,   -3,200 mm   **Offset**
Slot Range: -3,200 to 3,225.5 mm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1575
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65140	Modify Leveling System Control Set Point **-** LSP	-71 5.3.136

-71   5.2.5.307   *Mast Position*

Used to monitor the position of the sensor attached to the land leveling mast.

Slot Length: 2 bytes
Slot Scaling: 0.1 mm/bit   ,   -3,200 mm   **Offset**
Slot Range: -3,200 to 3,225.5 mm   **Operational Range:**   -3200 to +3200 mm, negatvie values are below current position, positive values are above current position, zero is no change.
SPN Type: Measured
SPN: 1576
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65139	Laser Receiver Mast Position **-** LMP	-71 5.3.137

-71   5.2.5.308   *Blade Duration and Direction*

Used to indicate the duration and direction that the land leveling system blade moves.

Slot Length: 2 bytes
Slot Scaling: .1 sec/bit   ,   -3,276.8 sec   **Offset**
Slot Range: -3276.8 to 3148.7 sec   **Operational Range:**   -3276.8 to 3276.8 sec, negative values idicate move the blade up, positive values idicate move the blade down, zero indicates no change
SPN Type: Status
SPN: 1577
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65138	Laser Leveling System Blade Control **-** LBC	-71 5.3.138

-71   **5.2.5.310**   *Laser Tracer Target Deviation*

The calculated distance for the laser target to the current laser tracer reference point.

–3200 to +3200 mm, negative values are below setpoint, positive values are above setpoint, zero is on grade.
Parameter specific parameter:
0xFE0316 indicates that the sensor can not sense the laser

Slot Length: 2 bytes
Slot Scaling: 0.1 mm/bit   , -3,200 mm   **Offset**
Slot Range: -3,200 to 3,225.5 mm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1579
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65137	Laser Tracer Position **-** LTP	-71 5.3.139

-71   **5.2.5.311**   *Laser Tracer Vertical Distance*

The elevation of the laser tracer sensor in a laser leveling system.

Slot Length: 2 bytes
Slot Scaling: 0.1 mm/bit   , -3,200 mm   **Offset**
Slot Range: -3,200 to 3,225.5 mm   **Operational Range:**   0 to 6400 mm
SPN Type: Measured
SPN: 1580
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65137	Laser Tracer Position **-** LTP	-71 5.3.139

-71   **5.2.5.312**   *Laser Tracer Horizontal Deviation*

The calculated percent deviation between the target distance and the center of the laser tracer.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , 0   **Offset**
Slot Range: 0 to 250 %   **Operational Range:**   0 to 200%, 0 to 99% indicates target is left of center, 101 to 200% indicates target is right of center, 100% indicates target is centered, 0xFF indicates previous pass mode and thus no horizontal deviation
SPN Type: Measured
SPN: 1581
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65137	Laser Tracer Position **-** LTP	-71 5.3.139

-71   **5.2.6.001**   *Two Speed Axle Switch*

Switch signal which indicates the current axle range.

00 - Low speed range
01 - High speed range

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Measured

SPN: 69

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71 5.2.6.002 *Idle Shutdown Timer State*

Status signal which indicates the current mode of operation of the idle shutdown timer system. See Figure 18.

00 - Inactive
01 - Active

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Status

SPN: 590

SPN Supporting Information: IdleShutdownObj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65252	Shutdown **-** SHUTDOW	-71 5.3.018
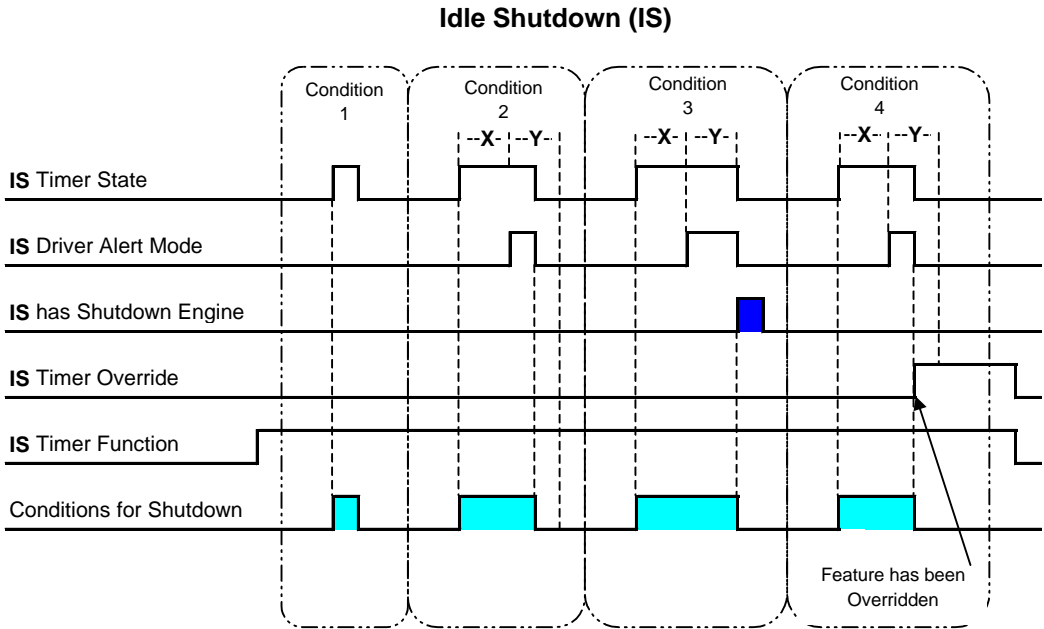
Idle Shutdown (IS)

FIGURE 17—IDLE SHUTDOWN (IS)

Condition 1 - When the IS Timer Override is inactive, the IS Timer State will become inactive if the conditions for shutdown no longer exist before the "X" time interval has expired or IS Driver Alert Mode is activated.

Condition 2 - When the IS Timer Override is inactive, the IS Timer State will become inactive if the conditions for shutdown no longer exist before the IS Driver Alert Mode "Y" time interval has expired.

Condition 3 - When the IS Timer Override is inactive, then the IS has Shutdown Engine will be active after the "Y" time interval has expired.

Condition 4 - When the IS Timer Override is active during the "Y" time interval, then the IS feature shall be overridden and will no longer be available until the system has been re-initated.

NOTE — 0 State – Inactive, disabled in calibration, or conditions for idle shutdown do not exist.
                                              1 State – Active, enabled in calibration, or conditions for idle shutdown do exist.

-71   **5.2.6.003**   *Idle Shutdown Timer Function*

Parameter which indicates the configuration of the idle shutdown timer system.

00 - Disabled in calibration
01 - Enabled in calibration

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 591
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65252	Shutdown - SHUTDOW	-71 5.3.018

-71   **5.2.6.004**   *Idle Shutdown Timer Override*

Status signal which indicates the status of the override feature of the idle shutdown timer system. See Figure 18.

00 - Inactive
01 - Active

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 592
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65252	Shutdown - SHUTDOW	-71 5.3.018

-71   **5.2.6.005**   *Idle Shutdown has Shutdown Engine*

Status signal which identifies whether or not the engine has been shutdown by the idle shutdown timer system. See Figure 18.

00 - No

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 593

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65252	Shutdown **-** SHUTDOW	-71 5.3.018

-71   5.2.6.006   *Idle Shutdown Driver Alert Mode*

Status signal which indicates the status of the driver alert mode of the idle shutdown timer system. While the driver alert mode is active, the idle shutdown timer may be overridden. See Figure 18.

00 - Inactive
01 - Active

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 594

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65252	Shutdown **-** SHUTDOW	-71 5.3.018

-71   5.2.6.007   *Water In Fuel Indicator*

Signal which indicates the presence of water in the fuel.

00 - No
01 - Yes

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 97

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65279	Water in Fuel Indicator **-** WFI	-71 5.3.045

-71   5.2.6.008   *Parking Brake Switch*

Switch signal which indicates when the parking brake is set. (See also 5.2.6.13.)

00 - Parking brake not set
01 - Parking brake set

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Measured		
SPN:	70		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71   5.2.6.009   *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.

00 - Cruise control switched off
01 - Cruise control switched on

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Measured		
SPN:	595		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71   5.2.6.010   *Cruise Control Enable Switch*

Switch signal which indicates that it is possible to manage the cruise control function.

00 - Cruise control disabled
01 - Cruise control enabled

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Measured		
SPN:	596		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71   5.2.6.011   *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 behavior 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).

00 - Brake pedal released
01 - Brake pedal depressed
10 - Error
11 - Not Available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 597

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71   **5.2.6.012**   *Clutch Switch*

Switch signal which indicates that the clutch pedal is being pressed. It is necessary for a safe drivetrain behavior that the clutch switch is set before the clutch is opened (cruise control function).

00 - Clutch pedal released
01 - Clutch pedal depressed

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 598

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71   **5.2.6.013**   *Parking Brake Actuator*

Signal which indicates the current state of the actuator(s) that control the parking brake (see also 5.2.6.8).

00 - Parking brake actuator inactive
01 - Parking brake actuator active

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 619

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65274	Brakes **-** B	-71 5.3.040

-71   **5.2.6.014**   *Cruise Control Set Switch*

Switch signal of the cruise control activator which indicates that the activator is in the position "set."

00 - Cruise control activator not in the position "set"
01 - Cruise control activator in position "set"

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 599

-71   5.2.6.015   *Cruise Control Coast (Decelerate) Switch*

Switch signal of the cruise control activator which indicates that the activator is in the position "coast (decelerate)."

00 - Cruise control activator not in the position "coast"
01 - Cruise control activator in position "coast"

Slot Length:	2 bits
Slot Scaling:	4 states/2 bit , 0 **Offset**
Slot Range:	0 to 3 **Operational Range:** same as slot range
SPN Type:	Measured
SPN:	600

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71   5.2.6.016   *Cruise Control Resume Switch*

Switch signal of the cruise control activator which indicates that the activator is in the position "resume."

00 - Cruise control activator not in the position "resume"
01 - Cruise control activator in position "resume"

Slot Length:	2 bits
Slot Scaling:	4 states/2 bit , 0 **Offset**
Slot Range:	0 to 3 **Operational Range:** same as slot range
SPN Type:	Measured
SPN:	601

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71   5.2.6.017   *Cruise Control Accelerate Switch*

Switch signal of the cruise control activator which indicates that the activator is in the position "accelerate."

00 - Cruise control activator not in the position "accelerate"
01 - Cruise control activator in position "accelerate"

Slot Length:	2 bits
Slot Scaling:	4 states/2 bit , 0 **Offset**
Slot Range:	0 to 3 **Operational Range:** same as slot range
SPN Type:	Measured
SPN:	602

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71   5.2.6.018   *Auxiliary I/O #01*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Dependent upon Application
SPN: 701
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status - AUXIO	-71 5.3.048

-71   5.2.6.018   *Auxiliary I/O #02*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Dependent upon Application
SPN: 702
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status - AUXIO	-71 5.3.048

-71   5.2.6.018   *Auxiliary I/O #03*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Dependent upon Application
SPN: 703
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status - AUXIO	-71 5.3.048

-71   5.2.6.018   *Auxiliary I/O #04*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3		**Operational Range:** same as slot range
SPN Type:	Dependent upon Application		
SPN:	704		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   **5.2.6.018**   *Auxiliary I/O #05*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3		**Operational Range:** same as slot range
SPN Type:	Dependent upon Application		
SPN:	705		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   **5.2.6.018**   *Auxiliary I/O #06*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3		**Operational Range:** same as slot range
SPN Type:	Dependent upon Application		
SPN:	706		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   **5.2.6.018**   *Auxiliary I/O #07*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3		**Operational Range:** same as slot range
SPN Type:	Dependent upon Application		
SPN:	707		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   5.2.6.018   *Auxiliary I/O #08*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Dependent upon Application
SPN: 708

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   5.2.6.018   *Auxiliary I/O #09*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Dependent upon Application
SPN: 709

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   5.2.6.018   *Auxiliary I/O #10*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Dependent upon Application
SPN: 710

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   **5.2.6.018**   *Auxiliary I/O #11*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Dependent upon Application
SPN: 711
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   **5.2.6.018**   *Auxiliary I/O #12*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Dependent upon Application
SPN: 712
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   **5.2.6.018**   *Auxiliary I/O #13*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Dependent upon Application
SPN: 713
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   **5.2.6.018**   *Auxiliary I/O #14*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Dependent upon Application
SPN: 714
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   **5.2.6.018**   *Auxiliary I/O #15*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Dependent upon Application
SPN: 715
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   **5.2.6.018**   *Auxiliary I/O #16*

Identifies the current status of auxiliary input/output functions that are configured uniquely per application.

00 - Auxiliary channel off
01 - Auxiliary channel on

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Dependent upon Application
SPN: 716
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65241	Auxiliary Input/Output Status **-** AUXIO	-71 5.3.048

-71   **5.2.6.019**   *Shift Finger Neutral Indicator*

Indicates the status of the shift finger in the neutral position.

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 780

-71   5.2.6.020   *Shift Finger Engagement Indicator*

Identifies the status of the shift finger in the engagement position.

00 - Off
01 - On

Slot Length:	2 bits			
Slot Scaling:	4 states/2 bit	, 0	**Offset**	
Slot Range:	0 to 3	**Operational Range:**	same as slot range	
SPN Type:	Status			
SPN:	781			

SPN Supporting Information:

Reference:
PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   5.2.6.021   *Shift Finger Center Rail Indicator*

Identifies the status of the shift finger in the center rail position.

00 - Off
01 - On

Slot Length:	2 bits			
Slot Scaling:	4 states/2 bit	, 0	**Offset**	
Slot Range:	0 to 3	**Operational Range:**	same as slot range	
SPN Type:	Status			
SPN:	782			

SPN Supporting Information:

Reference:
PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   5.2.6.022   *Shift Finger Gear Actuator 1*

Identifies the status of the actuator that moves the shift finger identified as gear actuator #1.

00 - Off
01 - On

Slot Length:	2 bits			
Slot Scaling:	4 states/2 bit	, 0	**Offset**	
Slot Range:	0 to 3	**Operational Range:**	same as slot range	
SPN Type:	Status			
SPN:	773			

SPN Supporting Information:

Reference:
PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   5.2.6.023   *Shift Finger Gear Actuator 2*

Identifies the status of the actuator that moves the shift finger identified as gear actuator #2.

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 784
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   5.2.6.024   *Shift Finger Rail Actuator 1*

Identifies the status of the actuator that moves the shift finger identified as rail actuator #1.

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 772
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   5.2.6.025   *Shift Finger Rail Actuator 2*

Identifies the status of the actuator that moves the shift finger identified as rail actuator #2.

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 783
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   5.2.6.026   *Splitter Indirect Actuator*

Identifies the status of the splitter indirect actuator in the auxiliary unit.

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 771
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   **5.2.6.027**   *Splitter Direct Actuator*

Identifies the status of the splitter direct actuator in the auxiliary unit.

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 770
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   **5.2.6.028**   *Range Low Actuator*

Identifies the status of the range low actuator in the auxiliary unit.

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 769
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   **5.2.6.029**   *Range High Actuator*

Identifies the status of the range high actuator in the auxiliary unit.

00 -Off
01 -On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 768

-71   **5.2.6.030**   *Inertia Brake Actuator*

Identifies the status of the actuator that controls the inertia brake.

00 - Off
01 - On

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:** same as slot range	
SPN Type:	Status		
SPN:	787		

SPN Supporting Information:

Reference:

	PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
	65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   **5.2.6.031**   *Defuel Actuator*

Identifies the status of the actuator that controls the engine defuel mechanism.

00 - Off
01 - On

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:** same as slot range	
SPN Type:	Status		
SPN:	786		

SPN Supporting Information:

Reference:

	PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
	65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   **5.2.6.032**   *Lockup Clutch Actuator*

Identifies the status of the actuator that controls the lockup clutch.

00 - Off
01 - On

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:** same as slot range	
SPN Type:	Status		
SPN:	740		

SPN Supporting Information:

Reference:

	PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
	65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   **5.2.6.033**   *Clutch Actuator*

Identifies the status of the actuator that controls the clutch.

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 788
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65223	Electronic Transmission Controller #3 **-** ETC3	-71 5.3.050

-71   **5.2.6.034**   *Transmission Low Range Sense Switch*

Identifies the status of the switch that represents low range.

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 779
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65219	Electronic Transmission Controller #5 **-** ETC5	-71 5.3.052

-71   **5.2.6.035**   *Transmission High Range Sense Switch*

Identifies the status of the switch that represents high range.

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 778
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65219	Electronic Transmission Controller #5 **-** ETC5	-71 5.3.052

-71   5.2.6.036   *Transmission Forward Direction Switch*￼

Identifies the status of the switch that indicates forward direction.

00 - Off
01 - On

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	903		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65219	Electronic Transmission Controller #5 **-** ETC5	-71 5.3.052

-71   5.2.6.037   *Transmission Neutral Switch*

Identifies the status of the switch that indicates neutral.

00 - Off
01 - On

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	604		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65219	Electronic Transmission Controller #5 **-** ETC5	-71 5.3.052

-71   5.2.6.038   *Transmission Reverse Direction Switch*

Identifies the status of the switch that indicates reverse direction.

00 - Off
01 - On

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	767		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65219	Electronic Transmission Controller #5 **-** ETC5	-71 5.3.052

-71   5.2.6.039   *Transmission Output Retarder*

Identifies the status of the transmission output retarder.

00 - Off
01 - On

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 748

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65218	Electronic Retarder Controller #2 **-** ERC2	-71 5.3.053

-71   **5.2.6.040**   *Engine Test Mode Switch*

Switch signal which indicates the position of the engine test mode switch.

00 - Off
01 - On

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 966

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71   **5.2.6.041**   *Idle Decrement Switch*

Switch signal which indicates the position of the idle decrement switch.

00 - Off
01 - On

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 967

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71   **5.2.6.042**   *Idle Increment Switch*

Switch signal which indicates the position of the idle increment switch.

00 - Off
01 - On

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 968

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71   5.2.6.043   *Remote PTO Variable Speed Control Switch*

Switch signal which indicates that the remote PTO toggle switch is in the enabled (ON) position. If the toggle switch is enabled and other conditions are satisfied then the remote PTO control feature is activated and the PTO will control at a variable speed.

00 - Off

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:** same as slot range	
SPN Type:	Measured		
SPN:	978		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65264	Power Takeoff Information **-** PTO	-71 5.3.030

-71   5.2.6.044   *Remote PTO Preprogrammed Speed Control Switch*

Switch signal which indicates that the remote PTO toggle switch is in the enabled (ON) position. If the toggle switch is enabled and other conditions are satisfied then the remote PTO control feature is activated and the PTO will control at the preprogrammed speed.

00 - Off
01 - On

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:** same as slot range	
SPN Type:	Measured		
SPN:	979		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65264	Power Takeoff Information **-** PTO	-71 5.3.030

-71   5.2.6.045   *PTO Enable Switch*

Switch signal which indicates that the PTO toggle switch is in the enabled (ON) position and therefore it is possible to manage the PTO control function.

00 - Off
01 - On

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:** same as slot range	
SPN Type:	Measured		
SPN:	980		

SPN Supporting Information:

-71   **5.2.6.046**   *PTO Accelerate Switch*

Switch signal of the PTO control activator which indicates that the activator is in the position "accelerate".

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 981
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65264	Power Takeoff Information **-** PTO	-71 5.3.030

-71   **5.2.6.047**   *PTO Resume Switch*

Switch signal of the PTO control activator which indicates that the activator is in the position "resume".

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 982
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65264	Power Takeoff Information **-** PTO	-71 5.3.030

-71   **5.2.6.048**   *PTO Coast/Decelerate Switch*

Switch signal of the PTO control activator which indicates that the activator is in the position "coast/decelerate".

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 983
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65264	Power Takeoff Information **-** PTO	-71 5.3.030

-71 **5.2.6.049** *PTO Set Switch*

Switch signal of the PTO control activator which indicates that the activator is in the position "set".

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Measured
SPN: 984
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65264	Power Takeoff Information **-** PTO	-71 5.3.030

-71 **5.2.6.050** *Refrigerant High Pressure Switch*

Switch signal which indicates the position of the high pressure switch in the coolant circuit of an air conditioning system.
When the switch is enabled, the pressure inside the circuit is too high and the compressor clutch may be disengaged.

00 - Pressure normal
01 - Pressure too high, compressor clutch may be disengaged

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Measured
SPN: 605
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65252	Shutdown **-** SHUTDOW	-71 5.3.018

-71 **5.2.6.051** *Refrigerant Low Pressure Switch*

Switch signal which indicates the position of the low pressure switch in the coolant circuit of an air conditioning system.
When the switch is enabled, the pressure inside the circuit is too low and the compressor clutch may be disengaged.

00 - Pressure normal
01 - Pressure too low, compressor clutch may be disengaged

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Measured
SPN: 875
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65252	Shutdown **-** SHUTDOW	-71 5.3.018

-71 **5.2.6.052** *A/C High Pressure Fan Switch*

Switch signal which indicates that the pressure in the coolant circuit of an air conditioning system is high and the fan may be
engaged.

00 - Pressure normal
01 - Pressure high, fan may be engaged

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 985
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65252	Shutdown **-** SHUTDOW	-71 5.3.018

-71   **5.2.6.053**   *Remote Accelerator Enable Switch*

Switch signal which indicates that the remote accelerator has been enabled and controls the engine.

00 - Off
01 - On

NOTE—The accelerator interlock switch (see 5.2.6.56) must be disabled in order for the remote accelerator to perform engine control.

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 969
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   **5.2.6.054**   *Auxiliary Engine Shutdown Switch*

Switch signal which requests that all engine fueling stop.

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 970
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   **5.2.6.055**   *Engine Derate Switch*

Switch signal used to activate the torque limiting feature of the engine. The specific nature of torque limiting should be verified with the manufacturer.

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 971
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   **5.2.6.056**   *Accelerator Interlock Switch*

Switch signal used to disable the accelerator and remote accelerator inputs, causing the engine to return to idle.

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 972
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   **5.2.6.057**   *Wait to Start Lamp*

Lamp signal which indicates that the engine is too cold to start and the operator should wait until the signal becomes inactive
(turns off).

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1081
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65252	Shutdown **-** SHUTDOW	-71 5.3.018

-71   **5.2.6.058**   *Engine Protection System Timer State*

Status signal which indicates the current mode of the engine protection system timer system. See Figure 19.

00 - Inactive
01 - Active
Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1107

SPN Supporting Information: EPSObj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65252	Shutdown **-** SHUTDOW	-71 5.3.018

Engine Protection System (EPS)
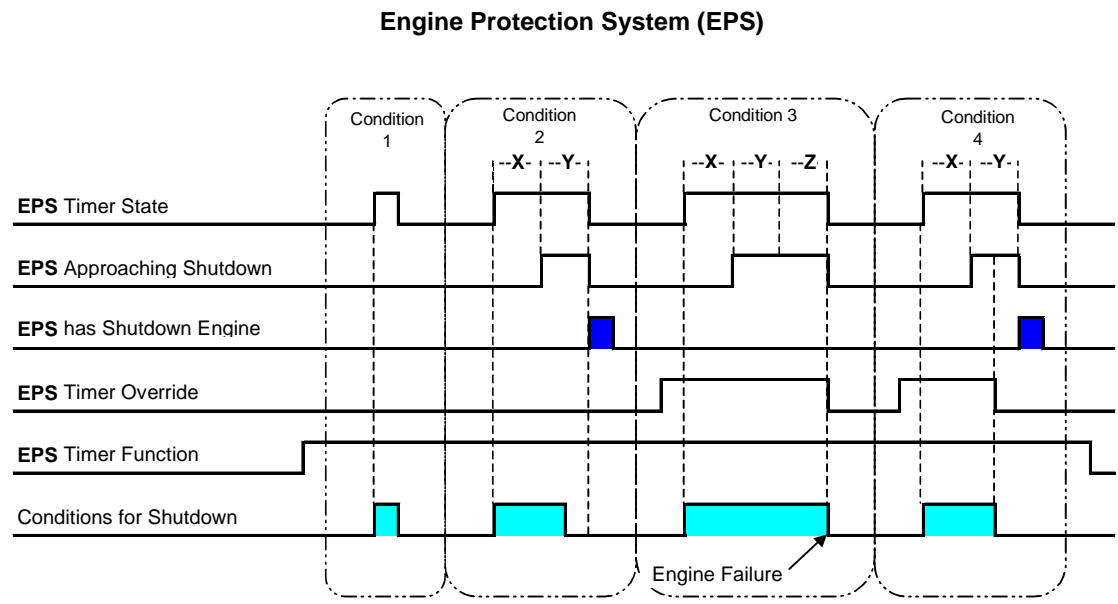
FIGURE 19—ENGINE PROTECTION SYSTEM (EPS)

Condition 1 – When the EPS Timer Override is inactive, the EPS Timer State will become inactive if the conditions for shutdown no longer exist before the "X" time interval has expired or EPS Approaching Shutdown is activated.

Condition 2 – When the EPS Timer Override is inactive and conditions for shutdown exist during the "Y" time interval, then the Engine will shutdown, even though shutdown conditions subside before the "Y" time interval has expired.

Condition 3 – When the EPS Timer Override is active, then the EPS feature shall be overridden allowing for an engine failure when the "Z" time interval has expired.

Condition 4 – When the EPS Timer Override is active and then allowed to go inactive during the "Y" time interval, the response by the EPS shall be the same as condition 2. The time intervals for "X" and "Y" shall always start when conditions for shutdown first commence regardless whether the EPS Timer Override is enabled or not.

NOTE —   0 State – Inactive, disabled in calibration, or conditions for Engine Protection do not exist.
1 State – Active, enabled in calibration, or conditions for Engine Protection do exist.

-71   **5.2.6.059**   *Engine Protection System Timer Override*

Status signal which indicates the status of the override feature of the engine protection system timer. See Figure 19.

00 - Inactive
01 - Active

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1108
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65252	Shutdown **-** SHUTDOW	-71 5.3.018

-71   **5.2.6.060**   *Engine Protection System Approaching Shutdown*

Status signal which indicates that engine shutdown is imminent. This engine protection signal can be a result of different systems failing, i.e., engine overheating. See Figure 19.

00 - Not approaching
01 - Approaching

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1109
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65252	Shutdown **-** SHUTDOW	-71 5.3.018

-71   **5.2.6.061**   *Engine Protection System has Shutdown Engine*

Status signal which indicates whether or not the engine protection system has shutdown the engine. See Figure 19.

00 - No
01 - Yes

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1110
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65252	Shutdown **-** SHUTDOW	-71 5.3.018

-71   **5.2.6.062**   *Engine Protection System Configuration*

Parameter which indicates the configuration of the engine shutdown system.

00 - Disabled in calibration

01 - Enabled in calibration

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1111
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65252	Shutdown **-** SHUTDOW	-71 5.3.018

-71   5.2.6.063   *Anti-theft Encryption Seed Present Indicator*

Indicates the presence of the encryption seed random number.

00 - Random number is not present
01 - Random number is present

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1194
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
56320	Anti-theft Status **-** ATS	-71 5.3.102

-71   5.2.6.064   *Anti-theft Password Valid Indicator*

Indicates the presence of a validated password.

00 - Password is not a validated password
01 - Password is a validated password

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1195
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
56320	Anti-theft Status **-** ATS	-71 5.3.102

-71   5.2.6.065   *Anti-theft Component Status States*

Indicates whether or not the component can be started.

00 Unlocked
01 Locked
10 Blocked
11 Not defined

5.2.6.65.1 Unlocked—This state indicates that the component can be started without the end user being required to enter a

password.

5.2.6.65.2 Locked—This state indicates that the component can NOT be started (i.e., Unlocked) without the end user being required to enter a password.

5.2.6.65.3 Blocked—This state indicates that a Lock or Unlock command cannot be executed because some other algorithm or command of higher priority is commanding differently.

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Status

SPN: 1196

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
56320	Anti-theft Status **-** ATS	-71 5.3.102

-71 5.2.6.066 *Anti-theft Modify Password States*

This parameter is used to indicate whether a password request was successfully performed, or if the request could not be perform due to system constraints or if the request was not a valid request.

00 Ok
01 Full_of_Passwords
10 Empty_of_Passwords
11 Not_valid

5.2.6.66.1 Ok—This state indicates that the request was successfully performed.

5.2.6.66.2 Full_Of_Passwords—This state indicates that the component can NOT store any additional passwords in its memory.

5.2.6.66.3 Empty_Of_Passwords—This state indicates that the component would be empty of passwords (an unacceptable condition) if the password under which the end user is logged in, is deleted. Thus the delete password command is not successfully executed.

Note that if the Delete_Password command is sent to a component that does not currently have a password the Empty_Of_Passwords state indicator shall be used.

5.2.6.66.4 Not_Valid—This state indicates that the request is not a valid one.

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Status

SPN: 1197

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
56320	Anti-theft Status **-** ATS	-71 5.3.102

-71 5.2.6.067 *Anti-theft Encryption Indicator States*

This parameter is used to indicate if a random number seed is being requested, or if an encrypted password is being provided to the component.

00 Encryption_Seed_Request
01 Encrypted_Code_Present
10 Not defined

11 Not_Available

5.2.6.67.1 Encryption_Seed_Request—This state represents a request to the component to provide a random number seed.

5.2.6.67.2 Encrypted_Code_Present—This state is used to indicate that an encrypted password is being provided to the component.

5.2.6.67.3 Not_Available—This state is used to indicate that a random number is NOT being requested nor is an encrypted password being provided to the component.

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1199

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
56576	Anti-theft Request **-** ATR	-71 5.3.101

-71   5.2.6.068   *Anti-theft Desired Exit Mode States*

This parameter is used to specify the desired triggers that are to be used by the component in deciding when to transition to the Locked state.

00 Lock_Upon_Operator_Request
01 Lock_When_Key_Off
10 Not defined
11 Not_Available

5.2.6.68.1 Lock_Upon_Operator_Request—This state is used to indicate that the end user would have to manually enter a password to Lock the engine.

5.2.6.68.2 Lock_When_Keyoff—This state is used to indicate that the component would automatically transition to the Locked state when the end user turns off the engine (i.e. without the end user being required to manually enter the password).

5.2.6.68.3 Not_Available—This state is indicates that the option is not selectable or changeable by the operator via using current tool.

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1200

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
56576	Anti-theft Request **-** ATR	-71 5.3.101

-71   5.2.6.069   *Anti-theft Command States*

This parameter is used to identify the specific requests being sent to the component.

000 Add_Password
001 Delete_Password
010 Change_Password
011 Lock_or_Unlock
100 Check_Status

101 Login
110-111 Not defined

5.2.6.69.1 Add_Password—This state represents a request to the component to add a password to the list of passwords that the component has stored as valid codes. This command will not be performed if the component has already stored, the maximum number of passwords that it is capable of storing. The Login command must precede this command.

5.2.6.69.2 Delete_Password—This state represents a request to the component to delete the password (the same one used when the end-user logged in). See 5.2.6.66.3 for limitations.

5.2.6.69.3 Change_Password—This state represents a request to the component to change the password (the same one that the end-user logged in with) to a different password, which is to be specified by the end user. The Login command must precede this command.

5.2.6.69.4 Lock_Or_Unlock—This state represents a request to the component to change from the Locked state to the Unlocked state or from the Unlocked state to the Locked state.

5.2.6.69.5 Check_Status—This state represents a request to check to see if the component is in the Locked or Unlocked state.

5.2.6.69.6 Login—This state represents a request to validate the end user, before performing commands such as Add_Password and Change_Password.

Slot Length: 3 bits

Slot Scaling: 8 states/3 bit , 0 **Offset**

Slot Range: 0 to 7 **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1201

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
56576	Anti-theft Request **-** ATR	-71 5.3.101

-71   **5.2.6.070**   *Engine Build Hours Reset*

Command signal used to reset the engine rebuild hours.

00 Do not reset
01 Reset
11 Take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1211

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
56832	Reset **-** RESET	-71 5.3.074

-71   **5.2.6.071**   *EBS Brake Switch*

Switch signal which indicates that the brake pedal is being pressed. The EBS brake switch is independent of the brake light switch and has no provisions for external connections.

00 Brake pedal is not being pressed
01 Brake pedal is being pressed

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1121

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 - EBC1	-71 5.3.004

-71   **5.2.6.072**   *Traction Control Override Switch*

Switch signal which indicates the position of the traction control override switch. The traction control override signal disables the automatic traction control function allowing the wheels to spin.

00- off
01- on
10 - Error
11 - Not available or not installed

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1238

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 - EBC1	-71 5.3.004

-71   **5.2.6.073**   *ABS/EBS Amber Warning Lamp State (Powered Vehicle)*

The ABS/EBS amber warning state is set as non-critical faults are
detected in the ABS/EBS system. The vehicle can be driven to the next service station.

00 Off
01 On
10 Reserved
11 Take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1438

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 - EBC1	-71 5.3.004

-71   **5.2.6.074**   *EBS Red Warning Lamp State*

The EBS red warning lamp state is set if critical EBS faults are detected and the vehicle has to stop.

00 Off
01 On
10 Reserved

11 Take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1439

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   **5.2.6.075** *ABS Fully Operational*

Signal which indicates whether an ABS system is fully operational or whether its functionality is reduced by a defect or by an intended action (e.g., by activation of an ABS-off-road switch or during special diagnostic procedures). There are cases where the signal is necessary to fulfill legal regulations for special applications (e.g. (e.g., switching off integrated retarders).

00 - Not Fully Operational

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1243

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   **5.2.6.076** *Road Speed Limit Status*

Status (active or not active) of the system used to limit maximum vehicle velocity.

00 - Active
01 - Not Active

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1437

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61443	Electronic Engine Controller #2 **-** EEC2	-71 5.3.006

-71   **5.2.6.077** *Driver 1 working state*

State of work of the driver.

000 Rest - sleeping
001 Driver available – short break
010 Work – loading, unloading, working in an office
011 Drive – behind wheel

100-101 Reserved
110 Error
111 Not available

Slot Length: 3 bits
Slot Scaling: 8 states/3 bit   , 0   **Offset**
Slot Range: 0 to 7   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1612
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65132	Tachograph **-** TC01	-71 5.3.143

-71   **5.2.6.077**   *Driver 2 working state*
State of work of the driver.

000 Rest - sleeping
001 Driver available – short break
010 Work – loading, unloading, working in an office
011 Drive – behind wheel
100-101 Reserved
110 Error
111 Not available

Slot Length: 3 bits
Slot Scaling: 8 states/3 bit   , 0   **Offset**
Slot Range: 0 to 7   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1613
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65132	Tachograph **-** TC01	-71 5.3.143

-71   **5.2.6.078**   *Drive recognize*
Indicates whether motion of the vehicle is detected or not.

00 Vehicle motion not detected
01 Vehicle motion detected

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1611
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65132	Tachograph **-** TC01	-71 5.3.143

-71   **5.2.6.079**   *Driver 1 time related state*
Indicates if the driver approaches or exceeds working time limits (or other limits).

0000 Normal/No limits reached
0001 Limit #1 – 15 min before 4 ½ h
0001 Limit #1 – 15 min before 4-1/2 h
0010 Limit #2 – 4 ½ h reached
0010 Limit #2 – 4–1/2 h reached
0011 Limit #3 – 15 min before 9 h
0100 Limit #4 – 9 h reached
0101 Limit #5 – 15 min before 16 h (not having 8h rest during the last 24h)
0110 Limit #6 – 16 h reached
0111-1100 Reserved
1101 Other
1110 Error
1111 Not available

Slot Length: 4 bits
Slot Scaling: 16 states/4 bit   , 0   **Offset**
Slot Range: 0 to 15   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1617
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65132	Tachograph **-** TC01	-71 5.3.143

-71   5.2.6.079   *Driver 2 time related state*

Indicates if the driver approaches or exceeds working time limits (or other limits).

0000 Normal/No limits reached
0001 Limit #1 – 15 min before 4 ½ h
0001 Limit #1 – 15 min before 4-1/2 h
0010 Limit #2 – 4 ½ h reached
0010 Limit #2 – 4–1/2 h reached
0011 Limit #3 – 15 min before 9 h
0100 Limit #4 – 9 h reached
0101 Limit #5 – 15 min before 16 h (not having 8h rest during the last 24h)
0110 Limit #6 – 16 h reached
0111-1100 Reserved
1101 Other
1110 Error
1111 Not available

Slot Length: 4 bits
Slot Scaling: 16 states/4 bit   , 0   **Offset**
Slot Range: 0 to 15   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1618
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65132	Tachograph **-** TC01	-71 5.3.143

-71   5.2.6.080   *Driver card, driver 1*

Indicates the presence of a driver card

00 - Driver card not present
01 - Driver card present

Slot Length: 2 bits

Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3		**Operational Range:** same as slot range
SPN Type:	Measured		
SPN:	1615		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65132	Tachograph **-** TC01	-71 5.3.143

-71   5.2.6.080   *Driver card, driver 2*

Indicates the presence of a driver card

00 - Driver card not present
01 - Driver card present

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3		**Operational Range:** same as slot range
SPN Type:	Measured		
SPN:	1616		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65132	Tachograph **-** TC01	-71 5.3.143

-71   5.2.6.081   *Overspeed*

Indicates whether the vehicle is exceeding the legal speed limit set in the tachograph.

00 No overspeed
01 Over speed

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3		**Operational Range:** same as slot range
SPN Type:	Measured		
SPN:	1614		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65132	Tachograph **-** TC01	-71 5.3.143

-71   5.2.6.082   *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.

00 - No tachograph event
01 - Tachograph event

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3		**Operational Range:** same as slot range
SPN Type:	Status		

SPN: 1622

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65132	Tachograph **-** TC01	-71 5.3.143

-71   **5.2.6.083**   *Handling information*

Indicates that handling information is present. Information could include "no printer paper", "no driver card", etc.

00 - No handling information
01 - Handling information

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1621
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65132	Tachograph **-** TC01	-71 5.3.143

-71   **5.2.6.084**   *Tachograph performance*

Indicates the tachograph performance; including electronic or mechanical analysis, instrument analysis, speed sensor analysis, mass storage analysis, and printer analysis.

00 - Normal performance
01 - Performance analysis

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1620
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65132	Tachograph **-** TC01	-71 5.3.143

-71   **5.2.6.085**   *Direction indicator*

Indicates the direction of the vehicle.

00 - Forward
01 - Reverse

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1619
SPN Supporting Information:

Reference:

-71   5.2.6.086   *Adaptive cruise control set distance mode*

Selected distance mode for adaptive cruise control.

000 ACC Distance mode #1 (largest distance)
001 ACC Distance mode #2
010 ACC Distance mode #3
011 ACC Distance mode #4
100 ACC Distance mode #5 (shortest distance)
101 Conventional cruise control mode
110 Error condition
111 Not available/not valid

Slot Length: 3 bits

Slot Scaling: 8 states/3 bit   , 0   **Offset**

Slot Range: 0 to 7   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1589

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65135	Adaptive Cruise Control **-** ACC1	-71 5.3.141

-71   5.2.6.087   *Adaptive Cruise Control Mode*

This parameter is used to indicate the current state, or mode, of operation by the Adaptive Cruise Control (ACC) device.
The states characterize independent system states (e.g., it is not possible to express distance control active and overtake
mode simultaneously). See Table 24. ACC must not switch itself off while active because the driver expects it to work. So
if an error occurs, the ACC
must signal that to the driver so that the driver knows that he has to switch off the ACC.

000 Off (Standby, enabled, ready for activation)
001 Speed control active
010 Distance control active
011 Overtake mode
100 HOLD
101 Finish mode
110 Disabled or error condition
111 Not available/not valid

5.2.6.87.1 Off 000—Used to indicate the ACC is enabled in calibration or configuration and there are no faults that would
prevent the system from operating.
5.2.6.87.2 Speed Control Active 001—Used to indicate that ACC is on but not currently sending control messages. In other
words, there is no target ahead and regular vehicle cruise control is controlling the vehicle speed to the driver's set speed.
 5.2.6.87.3 Distance Control Active 010—Used to indicate that ACC is on and actively sending control messages to
maintain the appropriate following interval.
5.2.6.87.4 Overtake Mode 011—Used to indicate that ACC is on but temporarily disabled because the driver is manually
overriding cruise control by using either the accelerator pedal or the cruise control "accel" switch.
5.2.6.87.5 Hold Mode 100 - Used to indicate that the ACC has lost the previous target vehicle and is in HOLD mode. In this
mode, the ACC shall limit the speed to the speed held when the target was lost. For example, if the driver activates the
typical cruise buttons (Resume/Inc/Dec) the HOLD mode shall be exited and normal cruise functionality resumed. If a new
target is detected, the Distance Control Active mode (010) is again entered, unless existing conditions prohibit this.
5.2.6.87.6 Finish Mode 101—Used to indicate that ACC is on with no target ahead, and ACC is currently sending control
messages to return to the driver's set speed. This occurs when the target the ACC system was tracking moves out of the
way so ACC returns the vehicle to the driver's set speed.
5.2.6.87.7 Disabled or Error Condition 110—Used to indicate that ACC is in an error state and can not operate.

Slot Length: 3 bits

Slot Scaling: 8 states/3 bit   , 0   **Offset**

Slot Range:	0 to 7	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1590		
SPN Supporting Information:			

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65135	Adaptive Cruise Control **-** ACC1	-71 5.3.141

-71   **5.2.6.088**   *Steer Channel Mode*

Indicates the functional mode of steer channel of the tire pressure control system.

0000 Maintain
0001 Inflate
0010 Deflate
0011 Confirm
0100 Inflate Wait – System will inflate when conditions allow
0101 Deflate Wait – System will deflate when conditions allow
0110 Pressure Check
0111-1101 Reserved
1110 Error Condition
1111 Not available

Slot Length:	4 bits		
Slot Scaling:	16 states/4 bit	, 0	**Offset**
Slot Range:	0 to 15	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1466		
SPN Supporting Information:			

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65144	Tire Pressure Control Unit Mode and Status **-** TP1	-71 5.3.132

-71   **5.2.6.089**   *Trailer/tag Channel Mode*

Indicates the functional mode of trailer/tag channel of the tire pressure control system.

0000 Maintain
0001 Inflate
0010 Deflate
0011 Confirm
0100 Inflate Wait – System will inflate when conditions allow
0101 Deflate Wait – System will deflate when conditions allow
0110 Pressure Check
0111-1101 Reserved
1110 Error Condition
1111 Not available

Slot Length:	4 bits		
Slot Scaling:	16 states/4 bit	, 0	**Offset**
Slot Range:	0 to 15	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1467		
SPN Supporting Information:			

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65144	Tire Pressure Control Unit Mode and Status **-** TP1	-71 5.3.132

-71   5.2.6.090   *Drive Channel Mode*

Indicates the functional mode of trailer/tag channel of the tire pressure control system.

0000 Maintain
0001 Inflate
0010 Deflate
0011 Confirm
0100 Inflate Wait – System will inflate when conditions allow
0101 Deflate Wait – System will deflate when conditions allow
0110 Pressure Check
0111-1101 Reserved
1110 Error Condition
1111 Not available

Slot Length: 4 bits
Slot Scaling: 16 states/4 bit   , 0   **Offset**
Slot Range: 0 to 15   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1468
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65144	Tire Pressure Control Unit Mode and Status **-** TP1	-71 5.3.132

-71   5.2.6.091   *PCU Drive Solenoid Status*

Current state of the drive solenoid used to implement a tire pressure control system in its pneumatic control unit (PCU).

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1469
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65144	Tire Pressure Control Unit Mode and Status **-** TP1	-71 5.3.132

-71   5.2.6.092   *PCU Steer Solenoid Status*

Current state of the steer solenoid used to implement a tire pressure control system in its pneumatic control unit (PCU).

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1470
SPN Supporting Information:

Reference:

PGN   Parameter Group Name and Acronym Doc. and Paragraph

-71   5.2.6.093   *Tire Pressure Supply Switch Status*

Current state of an open/closed type switch used to determine if adequate pressure exists for system implementation.

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1471
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65144	Tire Pressure Control Unit Mode and Status - TP1	-71 5.3.132

-71   5.2.6.094   *PCU Deflate Solenoid Status*

Current state of the deflate solenoid used to implement a tire pressure control system in its pneumatic control unit (PCU).

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1472
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65144	Tire Pressure Control Unit Mode and Status - TP1	-71 5.3.132

-71   5.2.6.095   *PCU Control Solenoid Status*

Current state of the control solenoid used to implement a tire pressure control system in its pneumatic control unit (PCU).

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1473
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65144	Tire Pressure Control Unit Mode and Status - TP1	-71 5.3.132

-71   5.2.6.096   *PCU Supply Solenoid Status*

Current state of the supply solenoid used to implement a tire pressure control system in its pneumatic control unit (PCU).

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 1474
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65144	Tire Pressure Control Unit Mode and Status **-** TP1	-71 5.3.132

-71 5.2.6.097 *PCU Trailer, Tag or Push Solenoid Status*

Current state of the trailer, tag, or push solenoid used to implement a tire pressure control system in its pneumatic control unit (PCU).

00 - Off
01 - On

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 1475
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65144	Tire Pressure Control Unit Mode and Status **-** TP1	-71 5.3.132

-71 5.2.6.098 *Fuel Leakage 1*

Status signal which indicates fuel leakage in the fuel rail of the engine. The location can be either before or after the fuel pump.

00 - no leakage detected

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 1239
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65169	Fuel Leakage **-** FL	-71 5.3.106

-71 5.2.6.098 *Fuel Leakage 2*

Status signal which indicates fuel leakage in the fuel rail of the engine. The location can be either before or after the fuel pump.

00 - no leakage detected

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1240		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65169	Fuel Leakage **-** FL	-71 5.3.106

-71   **5.2.6.099**   *Safety Wire Status*

Status signal which indicates that the safety wire has been activated. When the safety wire is activated, the engine will not operate. This is used for maintenance purposes.

00 - Safety wire has not been activated
01 - Safety wire has been activated

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1205		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65171	Engine Electrical System/Module Information **-** EES	-71 5.3.104

-71   **5.2.6.100**   *Turning Gear Engaged*

Status signal which indicates that the turning gear is engaged. The turning gear is used to turn the flywheel/crankshaft, for maintenance purposes, while the engine is not running.

00 - Turning gear is not engaged
01 - Turning gear is engaged

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1206		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65171	Engine Electrical System/Module Information **-** EES	-71 5.3.104

-71   **5.2.6.102**   *Engine Shutdown Override Switch*

Switch signal which indicates the position of the engine shutdown override switch. This switch function allows the operator to
 override an impending engine shutdown.

00 - Off
01 - On

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**

| Slot Range: | 0 to 3 | | Operational Range: | same as slot range |

Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1237
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71   **5.2.6.103**   *Torque Limiting Feature Status*

Status of an ECU feature which limits the torque output of the engine.

00 - Disabled
01 - Enabled

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1254
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   **5.2.6.104**   *Torque Limit Feature*

Torque limit rating described in the current record.

000 Reserved
001 Highest torque rating
010 First torque rating
011 Previous torque rating (rating prior to the current rating)
100 Current torque rating
101-110 Reserved
111 Not available

Slot Length: 3 bits
Slot Scaling: 8 states/3 bit   , 0   **Offset**
Slot Range: 0 to 7   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1632
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65168	Engine Torque History **-** ETH	-71 5.3.107

-71   **5.2.6.105**   *LED Display Data #1*

Informs display devices how to display the current vertical position.

00000010 High Coarse LED on
00000100 High Fine LED on
00001000 On-grade LED on
00010000 Low Fine LED on
00100000 Low Coarse LED on
All other values Reserved

Slot Length: 8 bits

Slot Scaling: 256 states/8 bit   , 0   **Offset**

Slot Range: 0 to 255   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1573

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65142	Laser Leveling System Vertical Position Display Data **-** LVDD	-71 5.3.134

-71   5.2.6.106   *LED Display Data #2*

Informs display devices how to display the current position of the laser tracer.

00000001 On-grade "A" LED on
00000010 On-grade "B" LED on
00000100 On-grade "C" LED on
00001000 Up LED on
00010000 Down LED on
00100000 Left LED on
01000000 Right LED on
All other values Reserved

Slot Length: 8 bits

Slot Scaling: 256 states/8 bit   , 0   **Offset**

Slot Range: 0 to 255   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1582

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65137	Laser Tracer Position **-** LTP	-71 5.3.139

-71   5.2.6.107   *Blade Control Mode*

Allows the user to select the type of blade control for the land leveling system.

00000000 Manual mode
00000001 Automatic mode
00000010 Inactive automatic mode
All other values Reserved

Slot Length: 8 bits

Slot Scaling: 256 states/8 bit   , 0   **Offset**

Slot Range: 0 to 255   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1578

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65138	Laser Leveling System Blade Control **-** LBC	-71 5.3.138

-71   5.2.6.108   *Laser Tracer Information*

Provides the status of the laser tracer to the operator.

00000001 Laser power is on
00000010 Laser is ready
00000100 Valid target (1 = yes)
00001000 Previous pass (1 = yes)
00010000 Stringline (1 = yes)
00100000 Curb (1 = yes)
All other values Reserved

Slot Length: 8 bits

Slot Scaling: 256 states/8 bit , 0 **Offset**

Slot Range: 0 to 255 **Operational Range:** same as slot range

SPN Type: Status

SPN: 1583

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65137	Laser Tracer Position **-** LTP	-71 5.3.139

-71   **5.2.7.???**   *Recirculated Engine Exhaust Gas Differential Pressure*

Differential pressure across the Exhaust Gas Recirculation (EGR) system

Slot Length: 2 bytes

Slot Scaling: 1/128 kPa/bit , -250 kPa **Offset**

Slot Range: -250 kPa TO 251.99 kPa **Operational Range:** same as slot range

SPN Type: Measured

SPN: 411

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65188	Engine Temperature #2 **-** ET2	-71 5.3.085

-71   **5.2.7.???**   *Recirculated Engine Exhaust Gas Temperature*

Temperature of Recirculated Exhaust Gas

Slot Length: 2 bytes

Slot Scaling: 0.03125 deg C/bit , -273 deg C **Offset**

Slot Range: -273 to 1735 deg C **Operational Range:** same as slot range

SPN Type: Measured

SPN: 412

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65188	Engine Temperature #2 **-** ET2	-71 5.3.085

-71   **5.2.7.???**   *Illumination Brightness Percent*

Commanded backlight brightness level for all cab displays

Slot Length: 1 byte

Slot Scaling: 0.4 %/bit , 0 **Offset**

Slot Range: 0 to 100 % **Operational Range:** same as slot range

SPN Type: Status

SPN: 1487

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53248	Cab Illumination Message **-** CL	-71 5.3.2??

-71 5.2.7.??? *Operator Seat Switch*

This switch senses the presence of the operator in the seat.

Slot Length:	2 bits			
Slot Scaling:	4 states/2 bit	, 0	**Offset**	
Slot Range:	0 to 3	**Operational Range:** same as slot range		
SPN Type:	????			
SPN:	1504			

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
		-

-71 5.2.7.??? *Cruise Control Pause Switch*

Switch signal which indicates the position of the Cruise Control Pause Switch used on Remote Cruise Control applications.
The Cruise Control Pause Switch signal temporarily disables the Cruise Control function.

00 - Off
01 - On
10 - Error Indicator
11 -Take No Action

Slot Length:	2 bits			
Slot Scaling:	4 states/2 bit	, 0	**Offset**	
Slot Range:	0 to 3	**Operational Range:** same as slot range		
SPN Type:	Measured			
SPN:	1633			

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65265	Cruise Control/Vehicle Speed **-** CCVS	-71 5.3.031

-71 5.2.7.??? *Intake Manifold 1 Air Temperature (High Resolution)*

Temperature of pre-combustion air found in intake manifold of engine air supply system. The higher resolution is required for
control purposes.

Slot Length:	2 bytes			
Slot Scaling:	0.03125 deg C/bit	, -273 deg C	**Offset**	
Slot Range:	-273 to 1735 deg C	**Operational Range:** same as slot range		
SPN Type:	Measured			
SPN:	1636			

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65129	Engine Temperature #3 **-** ET3	-71 5.3.2??

-71 5.2.7.??? *Engine Coolant Temperature (High Resolution)*

Temperature of liquid found in engine cooling system. The higher resolution is required for control purposes.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1637
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65129	Engine Temperature #3 **-** ET3	-71 5.3.2??

-71 5.2.7.??? *Hydraulic Temperature*

Temperature of hydraulic fluid.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1638
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65128	Vehicle Fluids **-** VF	-71 5.3.2??

-71 5.2.7.??? *Fan Speed*

The speed of the fan associated with engine coolant system.

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   , 0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1639
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65213	Fan Drive **-** FD	-71 5.3.058

-71 5.2.7.??? *Vehicle Limiting Speed Governor Enable Switch*

Switch signal which enables the Vehicle Limiting Speed Governor (VLSG) such that the vehicle speed may be either increased or decreased when the engine is off idle.

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1653
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

-71   5.2.7.???   *Vehicle Limiting Speed Governor Increment Switch*
Switch signal which increases the Vehicle Limiting Speed Governor (VLSG).

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1654
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
57344	Cab Message #1 **-** CM1	-71 5.3.059

-71   5.2.7.???   *Vehicle Limiting Speed Governor Decrement Switch*
Switch signal which decreases the Vehicle Limiting Speed Governor (VLSG).

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1655
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
57344	Cab Message #1 **-** CM1	-71 5.3.059

-71   5.2.7.???   *Engine Automatic Start Enable Switch*
Switch signal which enables the idle management system to be enabled. When this system is enabled with the engine in an idle mode and safe operating conditions existing, then the engine may be started or stopped automatically.

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1656
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
57344	Cab Message #1 **-** CM1	-71 5.3.059

-71   5.2.7.???   *Turbo Oil Level Switch*
Switch signal which indicates the presence of oil at the turbocharger

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured

SPN: 1665

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65245	Turbocharger **-** TC	-71 5.3.011

-71   5.2.7.???   *Automatic Gear Shifting Enable Switch*

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: ????
SPN: 1666
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
57344	Cab Message #1 **-** CM1	-71 5.3.059

-71   5.2.7.???   *Retarder Requesting Brake Light*

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: ????
SPN: 1667
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61440	Electronic Retarder Controller #1 **-** ERC1	-71 5.3.003

-71   5.2.7.???   *Engine Starter Mode*

there are several phases in a starting action and different reasons why a start cannot take place.

0000 start not requested
0001 starter active, gear not engaged
0010 starter active, gear engaged
0011 start finished; starter not active after having been actively engaged ? (after 50ms mode goes to 0000)?
0100 starter inhibited due to engine already running
0101 starter inhibited due to engine not ready for start (preheating)
0110 starter inhibited due to driveline engaged
0111 starter inhibited due to active immobilizer
1000 starter inhibited due to starter over-temp
1001-1011 Reserved
1100 starter inhibited - reason unknown
1101 error
1111 not available

Slot Length: 4 bits
Slot Scaling: 16 states/4 bit   , 0   **Offset**
Slot Range: 0 to 15   **Operational Range:** same as slot range

SPN Type: Status
SPN: 1675
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61444	Electronic Engine Controller #1 **-** EEC1	-71 5.3.007

-71   **5.2.7.???**   *Auxilary Heater Water Pump Status*

Parameter indicating whether the auxilary heater water pump is running

00 Water Pump is not running
01 Water Pump is running
10 Reserved
11 Not available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1676
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65133	Heater Information **-** HTR	-71 5.3.2??

-71   **5.2.7.???**   *Auxiliary Heater Mode*

State of the auxiliary heater

0000 Heater not active
0001 Off due to ADR per European Regulations for Transport of hazardous materials
0010 Economy mode
0011 Normal mode
0100-1101 Not defined
1110 Error
1111 Not available

Slot Length: 4 bits
Slot Scaling: 16 states/4 bit   , 0   **Offset**
Slot Range: 0 to 15   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1677
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65133	Heater Information **-** HTR	-71 5.3.2??

-71   **5.2.7.???**   *Cab Ventilation*

Indicates whether the cab is being ventilated or not.

00 Cab not ventilated
01 Cab is ventilated
10 Reserved
11 Not available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Status

SPN: 1678

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65133	Heater Information **-** HTR	-71 5.3.2??

-71   5.2.7.???   *Engine Heating Zone*

Parameter indicating whether the engine zone is being heated.

00 Engine heating zone off
01 Engine heating zone on
10 Reserved
11 Not available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Status

SPN: 1679

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65133	Heater Information **-** HTR	-71 5.3.2??

-71   5.2.7.???   *Cab Heating Zone*

Parameter indicating whether the cab zone is being heated.

00 Cab heating zone off
01 Cab heating zone off
10 Reserved
11 Not available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Status

SPN: 1680

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65133	Heater Information **-** HTR	-71 5.3.2??

-71   5.2.7.???   *Battery Main Switch Hold State*

Parameter indicating whether the battery main switch is held due to an external request or not. The state battery main switch
 held indicates that the battery main switch is about to switch off.

00 Battery main switch not held
01 Battery main switch held
10 Reserved

11 Don't care/take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1681

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65126	Battery Main Switch Information **-** BM	-71 5.3.2??

-71   5.2.7.???   *Battery Main Switch Hold Request*

Request to hold the battery main switch.

00 Release Battery Main Switch
01 Hold Battery Main Switch
10 undefined
11 Don't care/take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1682

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
57344	Cab Message #1 **-** CM1	-71 5.3.059

-71   5.2.7.???   *Auxiliary Heater Mode Request*

Request to activate the auxiliary heater.

0000 De-activate auxiliary heater
0001 Off due to ADR per European Regulations for Transport of hazardous materials
0010 Economy mode
0011 Normal mode
0100-1101 Not defined
1110 Reserved
1111 Don't care/take no action

Slot Length: 4 bits

Slot Scaling: 16 states/4 bit   , 0   **Offset**

Slot Range: 0 to 15   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1683

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
57344	Cab Message #1 **-** CM1	-71 5.3.059

-71   5.2.7.???   *Auxiliary Heater Coolant Pump Request*

Indicates whether to activate the auxiliary heater coolant water pump.

00 Deactivate water pump
01 Activate water pump
10 Reserved
11 Don't care/take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1684
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
57344	Cab Message #1 **-** CM1	-71 5.3.059

-71   5.2.7.???   *Request Engine Zone Heating*

Request to activate engine zone heating.

00 Do not heat engine zone
01 Heat engine zone
10 Reserved
11 Don't care/take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1685
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
57344	Cab Message #1 **-** CM1	-71 5.3.059

-71   5.2.7.???   *Request Cab Zone Heating*

Request to activate cab zone heating.

00 Do not cab engine zone
01 Heat cab zone
10 Reserved
11 Don't care/take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1686
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
57344	Cab Message #1 **-** CM1	-71 5.3.059

-71   5.2.7.???   *Auxiliary Heater Output Coolant Temperature*

Temperature of the auxiliary heater output coolant (I.e. water in a water heater system.)

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit , -40 deg C **Offset**
Slot Range: -40 to 210 deg C **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1687
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65133	Heater Information **-** HTR	-71 5.3.2??

-71   **5.2.7.???**   *Auxiliary Heater Input Air Temperature*

Temperature of the input air in an auxiliary heater system.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit , -40 deg C **Offset**
Slot Range: -40 to 210 deg C **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1688
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65133	Heater Information **-** HTR	-71 5.3.2??

-71   **5.2.7.???**   *Auxiliary Heater Output Power Percent*

Current auxiliary heater output power, relative to the auxiliary heater maximum output power.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit , 0 **Offset**
Slot Range: 0 to 100 % **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1689
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65133	Heater Information **-** HTR	-71 5.3.2??

-71   **5.2.7.???**   *Auxiliary Heater Maximum Output Power*

The maximum output power of the auxiliary heater.

Slot Length: 2 bytes
Slot Scaling: 2 W/bit , 0 **Offset**
Slot Range: 0 to 128,510 W **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1690
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65127	Climate Control Configuration **-** CCC	-71 5.3.2??

-71   5.2.7.???   *Cab Interior Temperature Request*

Parameter used to request a certain cab interior temperature.

Slot Length: 2 bytes
Slot Scaling: 0.03125 deg C/bit   ,   -273 deg C   **Offset**
Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1691
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
57344	Cab Message #1 **-** CM1	-71 5.3.059

-71   5.2.7.???   *Desired Absolute Intake Manifold Pressure (Turbo Boost Limit)*

The desired absolute intake manifold pressure of the engine.

Slot Length: 2 bytes
Slot Scaling: 0.1 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 6,425.5 kPa   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1692
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65194	Alternate Fuel #2 **-** AF2	-71 5.3.079

-71   5.2.7.???   *Wastegate Valve Position*

The position of the turbocharger wastegate valve (not the electronic wastegate control valve).

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   ,   0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1693
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65194	Alternate Fuel #2 **-** AF2	-71 5.3.079

-71   5.2.7.???   *Gas Mass Flow Sensor Fueling Correction*

The amount of fuel the Gas Mass Flow Sensor is sensing should be added or subtracted compared to the maximum amount of fuel the control system allows the sensor to add or subtract.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   ,   -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1694

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65194	Alternate Fuel #2 **-** AF2	-71 5.3.079

-71   5.2.7.???   *Exhaust Gas Oxygen Sensor Fueling Correction*

The amount of fueling change required by the system based on the measured Exhaust Oxygen value compared to the maximum fueling change permitted by the system, expressed as percentages.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1695
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65193	Exhaust Oxygen #1 **-** EO1	-71 5.3.080

-71   5.2.7.???   *Exhaust Gas Oxygen Sensor Closed Loop Operation*

Indicates whether the engine is using the Exhaust Gas Oxygen sensor to control the air/fuel ratio.

00 Command to disable function
01 Command to enable function
10 Reserved
11 Don't Care/take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1696
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65193	Exhaust Oxygen #1 **-** EO1	-71 5.3.080

-71   5.2.7.???   *CTI Wheel End Electrical Fault*

Indicates the status of electrical fault on CTI wheel interface.

00 Ok (No Fault)
01 Not Defined
10 Error
11 Not Supported

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1697
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

-71   5.2.7.???   *CTI Tire Status*

Indicates the status of the tire.

00 Ok (no fault)
01 Tire leak detected
10 Error
11 Not Supported

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1698
SPN Supporting Information:

Reference:
                    PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
                    65268   Tire Condition **-** TIRE   -71   5.3.034

-71   5.2.7.???   *CTI Wheel Sensor Status*

Indicates whether the wheel is being monitored by the CTI controller.

00 Off / isolated from CTI Pressure Controller
01 On (tire is polled)
10 Not Defined
11 Not Supported

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1699
SPN Supporting Information:

Reference:
                    PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
                    65268   Tire Condition **-** TIRE   -71   5.3.034

-71   5.2.7.???   *Lane Departure Imminent, Left Side*

Indicates departure imminent on left side of lane.

00 Not imminent
01 Imminent
10 Reserved
11 Not used

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1700
SPN Supporting Information:

Reference:

-71   5.2.7.???   *Lane Departure Imminent, Right Side*

Indicates departure imminent on right side of lane.

00 Not imminent
01 Imminent
10 Reserved
11 Not Used

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1701
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61447	Forward Lane Image urgent msg **-** FLI1	-71 5.3.2??

-71   5.2.7.???   *Lane Departure Indication Enable Status*

Indicates whether lane departure indication is active.

00 Lane Departure indication disabled
01 Lane Departure Indication enabled
10 Reserved
11 Not Used

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1702
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65115	Forward Lane Image **-** FLI2	-71 5.3.2??

-71   5.2.7.???   *Lane Tracking Status Left Side*

Indicates whether the left side is tracking lane.

00 Not Tracking Left side
01 Tracking Left side
10 Reserved
11 Don't care/Take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1710
SPN Supporting Information:

-71   **5.2.7.???**   *Lane Tracking Status Right Side*

Indicates whether right side is tracking lane.

00 Not Tracking Right side
01 Tracking Right side
10 Reserved
11 Don't Care/take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1711
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65115	Forward Lane Image **-** FLI2	-71 5.3.2??

-71   **5.2.7.???**   *Extended Range Requested Speed Control Range Upper Limit*

The maximum Engine Speed that the engine will allow when operating in a speed control/limit mode, excluding any maximum momentary engine override speed, if supported.

When the limit is higher that 2500 RPM the 'Requested Speed Control Range Upper Limit (Engine Configuration)' parameter (see SPN 536) will be transmitted with a value of 2500 RPM.

Slot Length: 2 bytes
Slot Scaling: 0.125 rpm/bit   , 0   **Offset**
Slot Range: 0 to 8,031.875 rpm   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1712
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   **5.2.7.???**   *Hydraulic Oil Filter Restriction Switch*

This switch indicates whether hydraulic oil filter is clogged.

00 No restriction
01 Restriction exists on oil fitler
10 Error
11 Not Available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1713
SPN Supporting Information:

-71   5.2.7.???   *Operator Seat Direction Switch*

Senses whether the operator seat is in the forward driving position

00 Operator seat not facing forward
01 Operator seat is facing forward
10 Error
11 Not Available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1714

SPN Supporting Information:

Reference:

	PGN	Parameter Group Name and Acronym	Doc. and Paragraph
	57344	Cab Message #1 **-** CM1	-71 5.3.059

-71   5.2.7.???   *Drivers Demand Retarder - Percent Torque*

The Drivers demand retarder – percent torque is the maximum torque selected by the driver when more than one mode can be selected by the driver, such as hand lever, switch, constant torque, constant velocity, etc.

Slot Length: 1 byte

Slot Scaling: 1 %/bit   ,   -125 %   **Offset**

Slot Range: -125 to 125 %   **Operational Range:**   -125% to 0%

SPN Type: Status

SPN: 1715

SPN Supporting Information:

Reference:

	PGN	Parameter Group Name and Acronym	Doc. and Paragraph
	61440	Electronic Retarder Controller #1 **-** ERC1	-71 5.3.003

-71   5.2.7.???   *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.

Slot Length: 1 byte

Slot Scaling: 0.4 %/bit   ,   0   **Offset**

Slot Range: 0 to 100 %   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1716

SPN Supporting Information:

Reference:

	PGN	Parameter Group Name and Acronym	Doc. and Paragraph
	61440	Electronic Retarder Controller #1 **-** ERC1	-71 5.3.003

-71   5.2.7.???   *Actual Maximum Available Retarder - Percent Torque*

This is the maximum amount of torque that the retarder can immediately deliver.   It is the same as the maximum torque shown in the Retarder's Configuration message, but allows for a much faster rate of change than could be communicated by reissuing the configuration message.

Application Note: The purpose for this parameter is to allow a "Master" retarder controller to more accurately allocate the vehicle's retarder requirements among multiple retarders. Its value should be the same as the value in the Configuration message at the time that message is assembled for broadcast, but may vary between those broadcasts.

Slot Length: 1 byte

Slot Scaling: 1 %/bit   ,   -125 %   **Offset**

Slot Range: -125 to 125 %   **Operational Range:**   0 to -125 %

SPN Type: Measured

SPN: 1717

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61440	Electronic Retarder Controller #1 **-** ERC1	-71 5.3.003

-71   5.2.7.???   *Damper Stiffness Request Front Axle*

Demand value for the shock absorber control at the front axle.

Slot Length: 1 byte

Slot Scaling: 0.4 %/bit   ,   0   **Offset**

Slot Range: 0 to 100 %   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1718

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53760	Air Suspension Control #2 **-** ASC2	-71 5.3.2??

-71   5.2.7.???   *Damper Stiffness Request Rear Axle*

Demand value for the shock absorber control at the rear axle.

Slot Length: 1 byte

Slot Scaling: 0.4 %/bit   ,   0   **Offset**

Slot Range: 0 to 100 %   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1719

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53760	Air Suspension Control #2 **-** ASC2	-71 5.3.2??

-71   5.2.7.???   *Damper Stiffness Request Lift / Tag Axle*

Demand value for the shock absorber control at the lift or tag axle

Slot Length: 1 byte

Slot Scaling: 0.4 %/bit   ,   0   **Offset**

Slot Range: 0 to 100 %   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1720

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53760	Air Suspension Control #2 **-** ASC2	-71 5.3.2??

-71   5.2.7.???   *Relative Level Front Axle Left*

Information of the height at the left side of the front axle referred to normal level 1. For explanations of normal level 1 see parameter "nominal level front axle".

Slot Length: 2 bytes

Slot Scaling: 0.1 mm/bit   ,   -3,200 mm   **Offset**

Slot Range: -3,200 to 3,225.5 mm   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1721

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65113	Air Suspension Control #3 **-** ASC3	-71 5.3.2??

-71   5.2.7.???   *Relative Level Front Axle Right*

Information of the height at the right side of the front axle referred to normal level 1. For explanations of normal level 1 see parameter "nominal level front axle".

Slot Length: 2 bytes

Slot Scaling: 0.1 mm/bit   ,   -3,200 mm   **Offset**

Slot Range: -3,200 to 3,225.5 mm   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1722

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65113	Air Suspension Control #3 **-** ASC3	-71 5.3.2??

-71   5.2.7.???   *Relative Level Rear Axle Right*

Information of the height at the left side of the rear axle referred to normal level 1. For explanations of normal level 1 see parameter "nominal level front axle".

Slot Length: 2 bytes

Slot Scaling: 0.1 mm/bit   ,   -3,200 mm   **Offset**

Slot Range: -3,200 to 3,225.5 mm   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1723

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65113	Air Suspension Control #3 **-** ASC3	-71 5.3.2??

-71   5.2.7.???   *Relative Level Rear Axle Left*

Information of the height at the left side of the rear axle referred to normal level 1. For explanations of normal level 1 see parameter "nominal level front axle".

Slot Length: 2 bytes
Slot Scaling: 0.1 mm/bit   ,   -3,200 mm   **Offset**
Slot Range: -3,200 to 3,225.5 mm   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1724
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65113	Air Suspension Control #3 **-** ASC3	-71 5.3.2??

-71   **5.2.7.???**   *Bellow Pressure Front Axle Left*

Information of the pressure of the air suspension bellow at the left side of the front axle

Slot Length: 2 bytes
Slot Scaling: 0.1 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 6,425.5 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1725
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65112	Air Suspension Control #4 **-** ASC4	-71 5.3.2??

-71   **5.2.7.???**   *Bellow Pressure Front Axle Right*

Information of the pressure of the air suspension bellow at the right side of the front axle

Slot Length: 2 bytes
Slot Scaling: 0.1 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 6,425.5 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1726
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65112	Air Suspension Control #4 **-** ASC4	-71 5.3.2??

-71   **5.2.7.???**   *Bellow Pressure Rear Axle Left*

Information of the pressure of the air suspension bellow at the left side of the rear axle

Slot Length: 2 bytes
Slot Scaling: 0.1 kPa/bit   ,   0   **Offset**
Slot Range: 0 to 6,425.5 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1727
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65112	Air Suspension Control #4 **-** ASC4	-71 5.3.2??

-71   5.2.7.???   *Bellow Pressure Rear Axle Right*

Information of the pressure of the air suspension bellow at the right side of the rear axle

Slot Length: 2 bytes
Slot Scaling: 0.1 kPa/bit   , 0   **Offset**
Slot Range: 0 to 6,425.5 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1728
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65112	Air Suspension Control #4 **-** ASC4	-71 5.3.2??

-71   5.2.7.???   *Damper Stiffness Front Axle*

Damper stiffness information of the shock absorber control at the front axle

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1729
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65111	Air Suspension Control #5 **-** ASC5	-71 5.3.2??

-71   5.2.7.???   *Damper Stiffness Rear Axle*

Damper stiffness information of the shock absorber control at the rear axle

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1730
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65111	Air Suspension Control #5 **-** ASC5	-71 5.3.2??

-71   5.2.7.???   *Damper Stiffness Lift / Tag Axle*

Damper stiffness information of the shock absorber control at the lift of tag axle

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1731
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

-71   5.2.7.???   *Level Preset Front Axle Left*

Set value for nominal level 'preset level' at the left side of the front axle. This value is referred to 'Normal level 1'. For explanations of normal level 1 see parameter "nominal level front axle".

Slot Length: 2 bytes

Slot Scaling: 0.1 mm/bit   ,   -3,200 mm   **Offset**

Slot Range: -3,200 to 3,225.5 mm   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1732

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53504	Air Suspension Control #6 **-** ASC6	-71 5.3.2??

-71   5.2.7.???   *Nominal Level Rear Axle*

Signal which indicates the nominal (desired) height of the rear axle to be controlled by the suspension system.

For further explanations see parameter "nominal level front axle".

0000 Level not specified,(i.e. the nominal level is none of the specified levels, no error condition)
0001 "Normal Level 1,(i.e. the level prescribed for normal driving, given by design)
0010 "Normal Level 2,(i.e. a level permitted for driving, for example to lower the vehicle in case of high speed)
0011 "Normal Level 3,(i.e. a level permitted for driving, for example to lift the vehicle in case of offroad)
0100 "Preset Level,(i.e. a level to be defined externally via CAN)
0101 "Customer Level,(i.e. a level to be defined by customer via parameter setting)
0110 "Upper Level,(i.e. the highest level to be controlled)
0111 "Lower Level,(i.e. the lowest level to be controlled)
1000-1101 Not defined
1110 Error
1111 Not available

Slot Length: 4 bits

Slot Scaling: 16 states/4 bit   ,   0   **Offset**

Slot Range: 0 to 15   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1733

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   5.2.7.???   *Nominal Level Front Axle*

Signal which indicates the nominal (desired) height of the front axle to be controlled by the suspension system.

These heights are discrete levels. They are the upper level, lower level, normal level 1, normal level 2, normal level 3, customer level, and preset level. Refer to Figure ?????.

· Upper Level is the highest mechanically available height of the vehicle.
· Lower Level is the lowest mechanically available height of the vehicle.

Normal Levels 1, 2 and 3 are heights normally used during driving.
· Normal Level 1 is most often used and is given by design.

· Normal Level 2 may be chosen, for example, to be lower than Normal Level 1 for the purpose of reducing fuel consumption while driving on highways.
· Normal Level 3 may be chosen above Normal Level 1 for driving off road.

The preset level has to be set by means of ASC 6 (PGN: 53504).

0000 Level not specified,(i.e. the nominal level is none of the specified levels, no error condition)
0001 "Normal Level 1,(i.e. the level prescribed for normal driving, given by design)
0010 "Normal Level 2,(i.e. a level permitted for driving, for example to lower the vehicle in case of high speed)
0011 "Normal Level 3,(i.e. a level permitted for driving, for example to lift the vehicle in case of offroad)
0100 "Preset Level,(i.e. a level to be defined externally via CAN)
0101 "Customer Level,(i.e. a level to be defined by customer via parameter setting)
0110 "Upper Level,(i.e. the highest level to be controlled)
0111 "Lower Level,(i.e. the lowest level to be controlled)
1000-1101 Not defined
1110 Error
1111 Not available

Slot Length: 4 bits
Slot Scaling: 16 states/4 bit   , 0   **Offset**
Slot Range: 0 to 15   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1734
SPN Supporting Information: spn1734obj.doc

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??
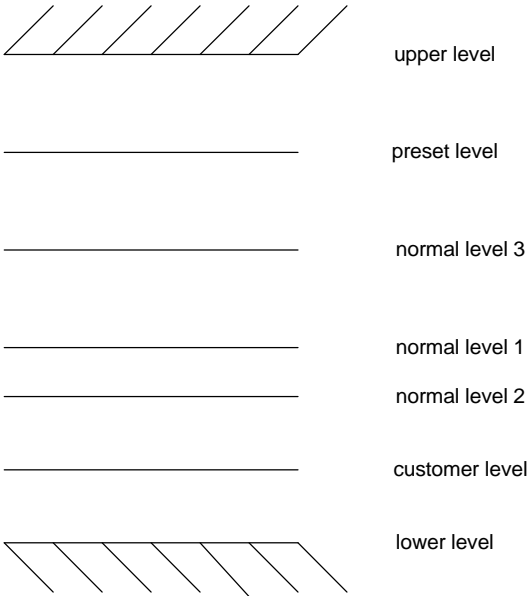
Figure : Example for nominal levels

If the vehicle height, to be controlled by the ASC, is not within the tolerances of the defined nominal levels, the nominal level is set to not specified.

The defined vehicle heights can be activated via the ASC 2 (PGN: 53760) message or via a remote control (see figure below). The remote control is an external unit to operate the suspension system.
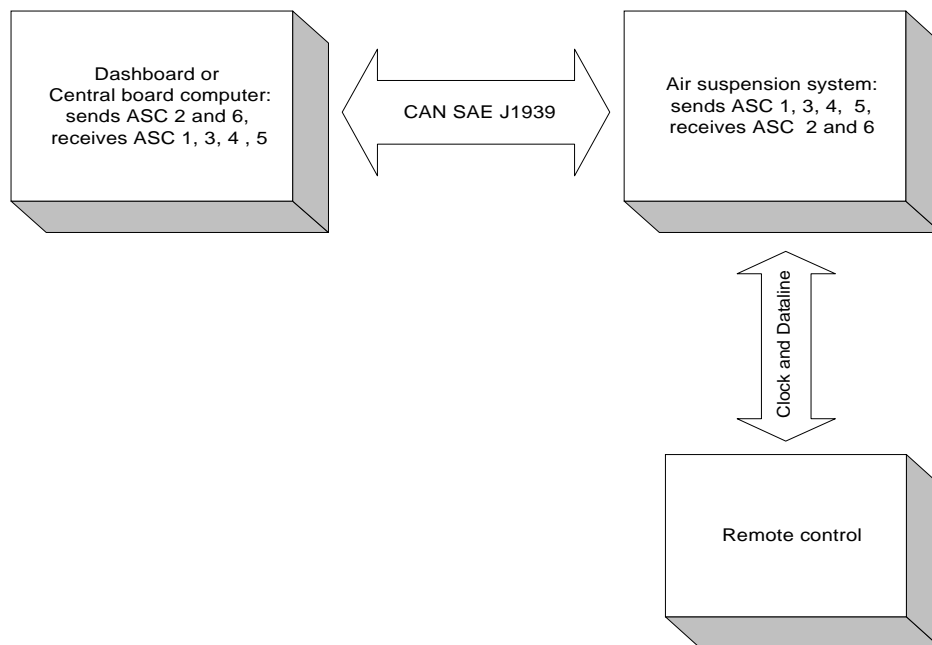
Figure: Possible integration of ASC system into vehicle network

An example: The nominal level is the normal level 1. Via remote control a new nominal level (for instance upper level) is requested. The nominal level is then set to upper level and during the height modification the ASC is indicating that the actual level is below nominal level until the upper level is reached.

-71   5.2.7.???   *Level Preset Rear Axle Right*

Set value for nominal level 'preset level' at the right side of the rear axle. This value is referred to 'Normal level 1'. For explanations of normal level 1 see parameter "nominal level front axle".

Slot Length: 2 bytes

Slot Scaling: 0.1 mm/bit   ,   -3,200 mm   **Offset**

Slot Range: -3,200 to 3,225.5 mm   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1735

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53504	Air Suspension Control #6 **-** ASC6	-71 5.3.2??

-71   5.2.7.???   *Above Nominal Level Rear Axle*

Signal which indicates whether the actual height of the rear axle is above the nominal (desired) level of the rear axle. For explanations of nominal level see parameter "nominal level front axle".

00 Not above
01 Above

10 Error
11 Not available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1736
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   **5.2.7.???**   *Above Nominal Level Front Axle*

Signal which indicates whether the actual height of the front axle is above the nominal (desired) level of the front axle. For explanations of nominal level see parameter "nominal level front axle".

00 Not above
01 Above
10 Error
11 Not available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1737
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   **5.2.7.???**   *Below Nominal Level Front Axle*

Signal which indicates whether the actual height of the front axle is below the nominal (desired) level for the front axle. For explanations of nominal level see parameter "nominal level front axle".

00 Not below
01 Below
10 Error
11 Not available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1738
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   **5.2.7.???**   *Lifting Control Mode Front Axle*

Signal which indicates the actual lifting level change at the front axle

00 Lifting not active
01 Lifting active
10 Error
11 Not available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1739

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   5.2.7.???   *Lowering Control Mode Front Axle*

Signal which indicates the actual lowering level change at the front axle

00 Lowering not active
01 Lowering active
10 Error
11 Not available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1740

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   5.2.7.???   *Level Control Mode*

Signal which indicates the actual control mode of the air suspension system

0000 Normal operation,(i.e. the system performs a ""pure"" control of the vehicle height)
0001Traction help (load transfer),(i.e. the driven axle is loaded to a maximum value given by legislation or design)
0010 Load fixing,(i.e. the driven axlen is loaded to a value defined by the driver)
0011 Pressure ratio 1,(i.e. the ratio between the pressures at the driven axle and at the third axle is controlled, so that the ratio equals a fixed value 1)
0100 Pressure ratio 2,(i.e. the ratio between the pressures at the driven axle and at the third axle is controlled, so that the ratio equals a fixed value 2)
0101 Optimum traction 1,(i.e. the pressure at the driven axle is controlled at a fixed value 1)
0110 Optimum traction 2,(i.e. the pressure at the driven axle is controlled at a fixed value 2)
0111-1101 Not defined
1110 Error
1111 Not available

Slot Length: 4 bits

Slot Scaling: 16 states/4 bit   , 0   **Offset**

Slot Range: 0 to 15   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1741

SPN Supporting Information:

-71   **5.2.7.???**   *Kneeling Information*

Signal which indicates the actual level change in case of kneeling function

0000 Not active,(i.e. the kneeling function is not active")
0001Lowering active,(i.e. the vehicle is lowered due to a kneeling request)
0010 Kneeling level reached,(i.e. the vehicle is at the fixed kneeling level)
0011 Lifting active,(i.e. the vehicle is lifted due to a recover request)
0100 Kneeling aborted,(i.e. in case of manual actuation the request was dropped before the kneeling level was reached)
0101-1101 Not defined
1110 Error
1111 Not available

Slot Length: 4 bits
Slot Scaling: 16 states/4 bit   , 0   **Offset**
Slot Range: 0 to 15   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1742
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   **5.2.7.???**   *Lift Axle 1 Position*

Signal which indicates the position / load condition of lift axle / tag axle #1.   Numbering of lift/tag axles starts at front axle.

00 Lift axle position down / tag axle laden
01 Lift axle position up / tag axle unladen
10 Error

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1743
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   **5.2.7.???**   *Door Release*

Signal which indicates that the doors may be opened. [Please note: doors instead of door!]
In case a kneeling request is active the ASC indicates during lowering the vehicle „doors shall not be opened" as a security information until the kneeling level is reached. Then "doors may be opened" is sent.

00 Doors may not be opened
01 Doors may be opened
10 Error
11 Not available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Status

SPN: 1744

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   5.2.7.???   *Vehicle Motion Inhibit*

Signal which indicates whether vehicle motion is inhibited.

00 Vehicle may be moved
01 Vehicle motion is inhibited
10 Error
11 Not available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Status

SPN: 1745

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   5.2.7.???   *Security Device*

The signal which indicates the status of the security device. An example of a security device is a curbstone feeler installed
 beneath the doors of a bus. If the security device becomes active during kneeling the kneeling process (lowering) is
stopped and the vehicle lifts back to the starting level.

00 Not active
01 Active
10 Error
11 Not available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Status

SPN: 1746

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   5.2.7.???   *Kneeling Control Mode Request*

Command signal to select the kneeling functionality

00 Automatically actuated
01 Manually actuated
10 Reserved

11 Don't care/take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1747

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53760	Air Suspension Control #2 **-** ASC2	-71 5.3.2??

-71   5.2.7.???   *Kneeling Request Right Side*

Command signal to activate the kneeling functionality on the right side of the vehicle

00 No kneeling request
01 Kneeling request
10 Reserved
11 Don't care/take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1748

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53760	Air Suspension Control #2 **-** ASC2	-71 5.3.2??

-71   5.2.7.???   *Kneeling Request Left Side*

Command signal to activate the kneeling functionality on the left side of the vehicle

00 No kneeling request
01 Kneeling request
10 Reserved
11 Don't care/take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1749

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53760	Air Suspension Control #2 **-** ASC2	-71 5.3.2??

-71   5.2.7.???   *Nominal Level Request Rear Axle*

Command signal to activate a level of the rear axle programmed and/or memorised in the ECU. For explanations of nominal level see parameter "nominal level front axle".

0000 No level request

0001 Normal Level 1,(i.e. the level prescribed for normal driving, given by design)
0010 Normal Level 2,(i.e. a level permitted for driving, for example to lower the vehicle in case of high speed)
0011 Normal Level 3,(i.e. a level permitted for driving, for example to lift the vehicle in case of offroad)
0100 Preset Level,(i.e. a level to be defined externally via CAN)
0101 Customer Level,(i.e. a level to be defined by customer via parameter setting)
0110 Upper Level,(i.e. the highest level to be controlled)
0111 Lower Level,(i.e. the lowest level to be controlled)
1000 Stop level change,(i.e. the level change in process shall be stopped immediately)
1001-1101 Not defined
1110 Reserved
1111 Don't care/take no action

Slot Length: 4 bits

Slot Scaling: 16 states/4 bit   , 0   **Offset**

Slot Range: 0 to 15   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1750

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53760	Air Suspension Control #2 **-** ASC2	-71 5.3.2??

-71   5.2.7.???   *Nominal Level Request Front Axle*

Command signal to activate a level of the front axle programmed and/or memorised in the ECU   For explanations of nominal level see parameter "nominal level front axle".

0000 No level request
0001 Normal Level 1,(i.e. the level prescribed for normal driving, given by design)
0010 Normal Level 2,(i.e. a level permitted for driving, for example to lower the vehicle in case of high speed)
0011 Normal Level 3,(i.e. a level permitted for driving, for example to lift the vehicle in case of offroad)
0100 Preset Level,(i.e. a level to be defined externally via CAN)
0101 Customer Level,(i.e. a level to be defined by customer via parameter setting)
0110 Upper Level,(i.e. the highest level to be controlled)
0111 Lower Level,(i.e. the lowest level to be controlled)
1000 Stop level change,(i.e. the level change in process shall be stopped immediately)
1001-1101 Not defined
1110 Reserved
1111 Don't care/take no action

Slot Length: 4 bits

Slot Scaling: 16 states/4 bit   , 0   **Offset**

Slot Range: 0 to 15   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1751

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53760	Air Suspension Control #2 **-** ASC2	-71 5.3.2??

-71   5.2.7.???   *Lift Axle 1 Position Request*

Command signal to control the position / load condition of lift / tag axle #1. Numbering of lift/tag axles starts at front axle.

00 Lift axle position down / tag axle laden
01 Lift axle position up / tag axle unladen
10 Reserved
11 Don't care/take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 1752
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53760	Air Suspension Control #2 **-** ASC2	-71 5.3.2??

-71   5.2.7.???   *Level Control Mode Request*

Command signal to activate a level control mode

0000 Normal operation,(i.e. the system performs a ""pure"" control of the vehicle height)
0001 Traction help (load transfer),(i.e. the driven axle is loaded to a maximum value given by legislation or design)
0010 Load fixing,(i.e. the driven axlen is loaded to a value defined by the driver)
0011 Pressure ratio 1,(i.e. the ratio between the pressures at the driven axle and at the third axle is controlled, so that the ratio equals a fixed value 1)
0100 Pressure ratio 2,(i.e. the ratio between the pressures at the driven axle and at the third axle is controlled, so that the ratio equals a fixed value 2)
0101 Optimum traction 1,(i.e. the pressure at the driven axle is controlled at a fixed value 1)
0110 Optimum traction 2,(i.e. the pressure at the driven axle is controlled at a fixed value 2)
0111-1101 Not defined
1110 Reserved
1111 Don't care/take no action

Slot Length: 4 bits
Slot Scaling: 16 states/4 bit , 0 **Offset**
Slot Range: 0 to 15 **Operational Range:** same as slot range
SPN Type: Status
SPN: 1753
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53760	Air Suspension Control #2 **-** ASC2	-71 5.3.2??

-71   5.2.7.???   *Below Nominal Level Rear Axle*

Signal which indicates whether the actual height of the rear axle is below the nominal (desired) level for the rear axle. For explanations of nominal level see parameter "nominal level front axle".

00 Not below
01 Below
10 Error
11 Not available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 1754
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   **5.2.7.???**   *Lowering Control Mode Rear Axle*

Signal which indicates the actual lowering level change at the rear axle

00 Lowering not active
01 Lowering active
10 Error
11 Not available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1755
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   **5.2.7.???**   *Lifting Control Mode Rear Axle*

Signal which indicates the actual lifting level change at the rear axle

00 Lifting not active
01 Lifting active
10 Error
11 Not available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1756
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   **5.2.7.???**   *Level Preset Front Axle Right*

Set value for nominal level 'preset level' at the right side of the front axle. This value is referred to 'Normal level 1'. For explanations of normal level 1 see parameter "nominal level front axle".

Slot Length: 2 bytes
Slot Scaling: 0.1 mm/bit   , -3,200 mm   **Offset**
Slot Range: -3,200 to 3,225.5 mm   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1757
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53504	Air Suspension Control #6 **-** ASC6	-71 5.3.2??

-71   **5.2.7.???**   *Level Preset Rear Axle Left*

Set value for nominal level 'preset level' at the left side of the rear axle. This value is referred to 'Normal level 1'. For explanations of normal level 1 see parameter "nominal level front axle".

Slot Length: 2 bytes

Slot Scaling: 0.1 mm/bit   , -3,200 mm   **Offset**

Slot Range: -3,200 to 3,225.5 mm   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1758

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53504	Air Suspension Control #6 **-** ASC6	-71 5.3.2??

-71   **5.2.7.???**   *Blade Height Set Point - High Resolution*

High resolution for the laser blade set point. The high resolution required for more accurate control and 'accurate' unit conversions.

Slot Length: 4 bytes

Slot Scaling: 100 nm/bit   , -209.7152 m   **Offset**

Slot Range: -209.7152 m to 211.3929215 m   **Operational Range:** The operational range is -209.7152m to 209.7152m, negative values are below grade, positive values are above grade, zero is on grade.

SPN Type: Measured

SPN: 1759

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65140	Modify Leveling System Control Set Point **-** LSP	-71 5.3.136

-71   **5.2.7.???**   *Gross Combination Vehicle Weight*

The total weight of the truck and all attached trailers.

Slot Length: 2 bytes

Slot Scaling: 10 kg/bit   , 0   **Offset**

Slot Range: 0 to 642,550 kg   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1760

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65136	Combination Vehicle Weight **-** CVW	-71 5.3.140

-71   **5.2.7.???**   *Catalyst Tank Level*

A special catalyst uses chemical substance to reach legal requirement for NOX emissions. This parameter indicates the level within that catalyst tank.

0 % = Empty
100% = Full

Slot Length: 1 byte

Slot Scaling: 0.4 %/bit   , 0   **Offset**

Slot Range: 0 to 100 %   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1761

SPN Supporting Information:

-71   5.2.7.???   *Hydraulic Pressure*

Hydraulic pressure measured at the output of the hydraulic pump.

Slot Length: 2 bytes
Slot Scaling: 2 kPa/bit   , 0   **Offset**
Slot Range: 0 to 128,510 kPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1762
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61448	Hydraulic Pressure Governor Info **-** HPG	-71 5.3.2??

-71   5.2.7.???   *Hydraulic Pressure Mode Indicator*

Mode for governor operation is hydraulic pressure control.

00 Disabled
01 Enabled
10 Error Indicator
11 Not Available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1763
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61448	Hydraulic Pressure Governor Info **-** HPG	-71 5.3.2??

-71   5.2.7.???   *Hydraulic Pressure Governor Switch*

switch that sets the mode of hydraulic governor

00 Pressure Mode Inactive
01 Pressure Mode Active
10 Error Indicator
11 Not Available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1764
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61448	Hydraulic Pressure Governor Info **-** HPG	-71 5.3.2??

-71   5.2.7.???   *Requested Fuel Valve 1 Position*

The requested position of a gaseous fuel valve 1 that is metering the fuel flow to the engine.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1765
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65153	Fuel Information #2 (Gaseous) **-** GFI2	-71 5.3.123

-71   5.2.7.???   *Requested Fuel Valve 2 Position*

The requested position of a gaseous fuel valve 2 that is metering the fuel flow to the engine, as requested by the Engine Control Unit.

Slot Length: 1 byte
Slot Scaling: 0.4 %/bit   , 0   **Offset**
Slot Range: 0 to 100 %   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1766
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65153	Fuel Information #2 (Gaseous) **-** GFI2	-71 5.3.123

-71   5.2.7.???   *Specific Heat Ratio*

The specific heat ratio of the fuel.

Slot Length: 2 bytes
Slot Scaling: 0.001/bit   , 0   **Offset**
Slot Range: 0 to 64.255   **Operational Range:** 0 to 2.0000
SPN Type: Status
SPN: 1767
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65109	Gaseous Fuel Properties **-** GFD	-71 5.3.2??

-71   5.2.7.???   *Low Limit Threshhold for Maximum RPM from Engine*

Minimum allowable value for maximum continuous RPM from engine

Slot Length: 1 byte
Slot Scaling: 32 rpm/bit   , 0   **Offset**
Slot Range: 0 to 8,000 rpm   **Operational Range:** same as slot range
SPN Type: Status

SPN: 1768

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65108	Engine Continuous Torque & Speed Limit **-** ECT1	-71 5.3.2??

-71   **5.2.7.???**   *High Limit Threshhold for Minimum Continuous Engine RPM*

Maximum allowable value for minimum continuous RPM from engine

Slot Length: 1 byte
Slot Scaling: 32 rpm/bit   , 0   **Offset**
Slot Range: 0 to 8,000 rpm   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1769

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65108	Engine Continuous Torque & Speed Limit **-** ECT1	-71 5.3.2??

-71   **5.2.7.???**   *Low Limit Threshold for Maximum Torque from Engine*

Minimum allowable value for maximum continuous torque. From engine

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1770

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65108	Engine Continuous Torque & Speed Limit **-** ECT1	-71 5.3.2??

-71   **5.2.7.???**   *High Limit Threshhold for Minimum Continuous Torque from Engine*

Maximum allowable value for minimum continuous torque. From engine

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1771

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65108	Engine Continuous Torque & Speed Limit **-** ECT1	-71 5.3.2??

-71   **5.2.7.???**   *Maximum Continuous Engine RPM*

Applied limit for maximum continuous engine RPM

Slot Length: 1 byte
Slot Scaling: 32 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 8,000 rpm   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1772
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65108	Engine Continuous Torque & Speed Limit **-** ECT1	-71 5.3.2??

-71   **5.2.7.???**   *Minimum Continuous Engine RPM*

Applied limit for minimum continuous engine RPM

Slot Length: 1 byte
Slot Scaling: 32 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 8,000 rpm   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1773
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65108	Engine Continuous Torque & Speed Limit **-** ECT1	-71 5.3.2??

-71   **5.2.7.???**   *Maximum Continuous Engine Torque*

Applied limit for maximum continuous engine torque.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   ,   -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1774
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65108	Engine Continuous Torque & Speed Limit **-** ECT1	-71 5.3.2??

-71   **5.2.7.???**   *Minimum Continuous Engine Torque*

Applied limit for minimum continuous engine torque

Slot Length: 1 byte
Slot Scaling: 1 %/bit   ,   -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1775
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65108	Engine Continuous Torque & Speed Limit **-** ECT1	-71 5.3.2??

-71   **5.2.7.???**   *Low Limit Threshhold for Maximum RPM from Retarder*

Minimum allowable value for maximum continuous retarder speed

Slot Length: 1 byte
Slot Scaling: 32 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 8,000 rpm   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1776
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65107	Retarder Continuous Torque & Speed Limit **-** RTC1	-71 5.3.2??

-71   **5.2.7.???**   *High Limit Threshhold for Minimum Continuous RPM from Retarder*

Maximum allowable value for minimum continuous retarder speed

Slot Length: 1 byte
Slot Scaling: 32 rpm/bit   ,   0   **Offset**
Slot Range: 0 to 8,000 rpm   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1777
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65107	Retarder Continuous Torque & Speed Limit **-** RTC1	-71 5.3.2??

-71   **5.2.7.???**   *Low Limit Threshhold for Maximum Torque from Retarder*

Minimum allowable value for maximum continuous retarder torque.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   ,   -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1778
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65107	Retarder Continuous Torque & Speed Limit **-** RTC1	-71 5.3.2??

-71   **5.2.7.???**   *High Limit Threshhold for Minimum Continuous Torque from Retarder*

Maximum allowable value for minimum continuous retarder torque.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   ,   -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1779
SPN Supporting Information:

-71   5.2.7.???   *Maximum Continuous Retarder Speed*

Applied limit for maximum continuous retarder RPM

Slot Length: 1 byte
Slot Scaling: 32 rpm/bit   , 0   **Offset**
Slot Range: 0 to 8,000 rpm   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1780
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65107	Retarder Continuous Torque & Speed Limit **-** RTC1	-71 5.3.2??

-71   5.2.7.???   *Minimum Continuous Retarder Speed*

Applied limit for minimum continuous retarder RPM

Slot Length: 1 byte
Slot Scaling: 32 rpm/bit   , 0   **Offset**
Slot Range: 0 to 8,000 rpm   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1781
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65107	Retarder Continuous Torque & Speed Limit **-** RTC1	-71 5.3.2??

-71   5.2.7.???   *Maximum Continuous Retarder Torque*

Applied limit for maximum continuous retarder torque.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1782
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65107	Retarder Continuous Torque & Speed Limit **-** RTC1	-71 5.3.2??

-71   5.2.7.???   *Minimum Continuous Retarder Torque*

Applied limit for minimum continuous retarder torque

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** same as slot range

SPN Type: Status
SPN: 1783
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65107	Retarder Continuous Torque & Speed Limit **-** RTC1	-71 5.3.2??

-71 5.2.7.??? *Minimum Continuous Engine Speed Limit Request*

Requested minimum continuous engine speed

Slot Length: 1 byte
Slot Scaling: 32 rpm/bit   , 0   **Offset**
Slot Range: 0 to 8,000 rpm   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1784
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
52992	Continuous Torque & Speed Limit Request **-** CTL	-71 5.3.2??

-71 5.2.7.??? *Maximum Continuous Engine Speed Limit Request*

Requested maximum continuous engine speed

Slot Length: 1 byte
Slot Scaling: 32 rpm/bit   , 0   **Offset**
Slot Range: 0 to 8,000 rpm   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1785
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
52992	Continuous Torque & Speed Limit Request **-** CTL	-71 5.3.2??

-71 5.2.7.??? *Minimum Continuous Engine Torque Limit Request*

Requested minimum continuous engine torque (operating range: 0 to 125%)

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:** 0 to 125%
SPN Type: Status
SPN: 1786
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
52992	Continuous Torque & Speed Limit Request **-** CTL	-71 5.3.2??

-71 5.2.7.??? *Maximum Continuous Engine Torque Limit Request*

Requested maximum continuous engine torque (operating range: 0 to 125%)

Slot Length:	1 byte			
Slot Scaling:	1 %/bit	, -125 %	**Offset**	
Slot Range:	-125 to 125 %	**Operational Range:**	0 to 125%	
SPN Type:	Status			
SPN:	1787			

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
52992	Continuous Torque & Speed Limit Request **-** CTL	-71 5.3.2??

-71   **5.2.7.???**   *Minimum Continuous Retarder Speed Limit Request*

Requested minimum continuous retarder speed

Slot Length:	1 byte		
Slot Scaling:	32 rpm/bit	, 0	**Offset**
Slot Range:	0 to 8,000 rpm	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1788		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
52992	Continuous Torque & Speed Limit Request **-** CTL	-71 5.3.2??

-71   **5.2.7.???**   *Maximum Continuous Retarder Speed Limit Request*

Requested maximum continuous retarder speed

Slot Length:	1 byte		
Slot Scaling:	32 rpm/bit	, 0	**Offset**
Slot Range:	0 to 8,000 rpm	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1789		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
52992	Continuous Torque & Speed Limit Request **-** CTL	-71 5.3.2??

-71   **5.2.7.???**   *Minimum Continuous Retarder Torque Limit Request*

Requested minimum continuous retarder torque (operating range: -125 to 0%)

Slot Length:	1 byte		
Slot Scaling:	1 %/bit	, -125 %	**Offset**
Slot Range:	-125 to 125 %	**Operational Range:**	-125 to 0%
SPN Type:	Status		
SPN:	1790		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
52992	Continuous Torque & Speed Limit Request **-** CTL	-71 5.3.2??

-71   **5.2.7.???**   *Maximum Continuous Retarder Torque Limit Request*

Requested maximum continuous retarder torque (operating range: -125 to 0%)

Slot Length: 1 byte

Slot Scaling: 1 %/bit   ,   -125 %   **Offset**

Slot Range: -125 to 125 %   **Operational Range:**   -125 to 0%

SPN Type: Status

SPN: 1791

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
52992	Continuous Torque & Speed Limit Request **-** CTL	-71 5.3.2??

-71   **5.2.7.???**   *ABS Trailer Warning Lamp State*

This parameter controls the tractor-mounted trailer ABS warning lamp, via J1939. (i.e. malfunction, bulb-check, etc.)

00 Off
01 On
10 Reserved
11 Take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1792

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   **5.2.7.???**   *ATC/ASR Lamp State (Powered Vehicle)*

This is broadcast when the ABS ECU controls the ASR dash status lamp, via J1939. (i.e. malfunction, active, etc.)

00 Off
01 On
10 Reserved
11 Take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 1793

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   **5.2.7.???**   *Engine Moment of Inertia*

Moment of inertia for the engine, including items driven full-time by the engine such as fuel, oil and cooling pumps. The inertia from the following items are not included: flywheel, alternator, compressor and other engine-driven accessories.

Slot Length: 2 bytes

Slot Scaling: 0.004 kg-m^2   , 0   **Offset**

Slot Range: 0 to 257.02 kg-m^2   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1794

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   **5.2.7.???**   *Alternator Current (High Range/Resolution)*

This parameter which indicates the amount of electrical current output from the alternator of the main vehicle. Alternator Current (SPN 115) has a lower range and resolution.

Slot Length: 2 bytes

Slot Scaling: 0.05 A/bit   , -1600 A   **Offset**

Slot Range: -1600 to 1612.75 A   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1795

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65106	Vehicle Electrical Power #3 **-** VP3	-71 5.3.2??

-71   **5.2.7.???**   *ACC Distance Alert Signal*

Signal to indicate to the operator that the ACC system is not able to maintain the distance to the target. Example: Target stopping rapidly. This signal may be used to activate warning sounds or indicators.

00 ACC DAS Not Active
01 ACC DAS Active
10 Reserved
11 Take no action

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1796

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65135	Adaptive Cruise Control **-** ACC1	-71 5.3.141

-71   **5.2.7.???**   *ACC System Shutoff Warning*

Signal to warn the driver of system deactivation due to non-driver actions. Example: Attempting to control vehicle speed below or above limits of ACC. This signal may be used to activate warning sounds or indicators.

00 ACC SSOW Not Active
01 ACC SSOW Active
10 Reserved
11 Take no action

Slot Length: 2 bits

Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1797		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65135	Adaptive Cruise Control **-** ACC1	-71 5.3.141

-71   **5.2.7.???**   *ACC Target Detected*

Signal to indicate to the driver that the ACC system has detected a target.

00 No targets detected
01 Target detected
10 Reserved
11 Take no action

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1798		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65135	Adaptive Cruise Control **-** ACC1	-71 5.3.141

-71   **5.2.7.???**   *Requested ACC Distance Mode*

The Requested Distance Control Mode to the ACC system from the operators interface.

The ACC Set Distance Mode (SPN 1589) indicates the selected Distance Control Mode for the ACC system. This parameter
 is the driver requested setting for this.

000 Requested ACC Distance Mode #1 (largest distance)
001 Requested ACC Distance Mode #2
010 Requested ACC Distance Mode #3
011 Requested ACC Distance Mode #4
100 Requested ACC Distance Mode #5 (shortest distance)
101 not defined
110 error condition
111 not available

Slot Length:	3 bits		
Slot Scaling:	8 states/3 bit	, 0	**Offset**
Slot Range:	0 to 7	**Operational Range:**	same as slot range
SPN Type:	Measured		
SPN:	1799		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65105	Adaptive Cruise Control, Operator Input **-** ACC2	-71 5.3.2??

-71   **5.2.7.???**   *Battery 1 Temperature*

Temperature of the battery 1. The relation to physical location is determined by the vehicle manufacturer.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1800
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65104	Battery Temperature **-** BT1	-71 5.3.2??

-71   5.2.7.???   *Battery 2 Temperature*

Temperature of the battery 2. The relation to physical location is determined by the vehicle manufacturer.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1801
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65104	Battery Temperature **-** BT1	-71 5.3.2??

-71   5.2.7.???   *Intake Manifold 5 Temperature*

Temperature of pre-combustion air found in intake manifold of engine or supply system.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1802
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65189	Intake Manifold Information #2 **-** IMT2	-71 5.3.084

-71   5.2.7.???   *Intake Manifold 6 Temperature*

Temperature of pre-combustion air found in intake manifold of engine or supply system.

Slot Length: 1 byte
Slot Scaling: 1 deg C/bit   , -40 deg C   **Offset**
Slot Range: -40 to 210 deg C   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1803
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65189	Intake Manifold Information #2 **-** IMT2	-71 5.3.084

-71   **5.2.7.???**   *LED Display Mode Control*

This parameter informs the system what the selected Display mode will be.

0 0 0 0 Center On-Grade Display Mode 1 (5 CHANNEL)
0 0 0 1 Offset On-Grade Display Mode
0 0 1 0 Center On-Grade Display Mode 2 (7 CHANNEL)
0 0 1 1 - 1 1 1 1 Reserved

Slot Length: 4 bits
Slot Scaling: 16 states/4 bit   , 0   **Offset**
Slot Range: 0 to 15   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1805
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65142	Laser Leveling System Vertical Position Display Data **-** LVDD	-71 5.3.134

-71   **5.2.7.???**   *LED Display Deadband Control*

This parameter informs the system what the selected Display deadband will be.

0 0 0 0 +/- 4.5 mm,   0.015 feet,   0.18 inches
0 0 0 1 +/- 12 mm,   0.040 feet,   0.45 inches
0 0 1 0 +/- 24 mm,   0.080 feet, 0.96 inches
0 0 1 1 - 1 1 1 1 Reserved

Slot Length: 4 bits
Slot Scaling: 16 states/4 bit   , 0   **Offset**
Slot Range: 0 to 15   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1806
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65142	Laser Leveling System Vertical Position Display Data **-** LVDD	-71 5.3.134

-71   **5.2.7.???**   *Steering wheel angle*

The main operator`s steering wheel angle (on the steering column, not the actual wheel angle). The vehicle being steered to the left results in a positive steering wheel angle.

Slot Length: 2 bytes
Slot Scaling: 1/1024 rad   , -31.374 rad   **Offset**
Slot Range: -31.374 to +31.374 rad   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1807
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61449	Vehicle Dynamic Stability Control #2 **-** VDC2	-71 5.3.2??

-71   **5.2.7.???**   *Yaw rate*

Indicates the rotation about the vertical axis. A positive yaw rate signal results when the vehicle turns anti-clockwise.

Slot Length: 2 bytes

Slot Scaling: 1/8192 rad/s , -3.92 rad/s **Offset**
Slot Range: -3.92 to +3.92 rad/s **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1808
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61449	Vehicle Dynamic Stability Control #2 **-** VDC2	-71 5.3.2??

-71   5.2.7.???   *Lateral Acceleration*

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

Slot Length: 2 bytes
Slot Scaling: 1/2048 m/s² , -15.687 m/s² **Offset**
Slot Range: -15.687 to +15.687 m/s² **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1809
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61449	Vehicle Dynamic Stability Control #2 **-** VDC2	-71 5.3.2??

-71   5.2.7.???   *Longitudinal Acceleration*

Indicates the longitudinal acceleration of the vehicle.

Slot Length: 1 byte
Slot Scaling: 0.1 m/s² , -12.5 m/s² **Offset**
Slot Range: -12.5 to +12.5 m/s² **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1810
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61449	Vehicle Dynamic Stability Control #2 **-** VDC2	-71 5.3.2??

-71   5.2.7.???   *Steering Wheel Turn Counter*

Indicates number of steering wheel turns, absolute position or relative position at ignition on. Positive values indicate left turns.

Slot Length: 6 bits
Slot Scaling: 1 turn/bit , -32 turns **Offset**
Slot Range: -32 to 31 turns **Operational Range:** -10 to +10 Turns
SPN Type: Measured
SPN: 1811
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61449	Vehicle Dynamic Stability Control #2 **-** VDC2	-71 5.3.2??

-71 5.2.7.??? *Steering Wheel Angle Sensor Type*

Indicates whether the steering wheel angle sensor is capable of absolute measuring of the number of steering wheel turns or not (relative measuring to position at ignition on).

00 Relative measuring principle
01 Absolute measuring principle
10 Reserved
11 Not Available

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1812		

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
61449	Vehicle Dynamic Stability Control #2 **-** VDC2	-71 5.3.2??

-71 5.2.7.??? *VDC lamp state*

This is broadcast when the VDC ECU controls the VDC dash status lamp, via J1939. (e.g. malfunction, active, etc.)

00 Off
01 On
10 Reserved
11 Don't care/Take no action

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1813		

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65103	Vehicle Dynamic Stability Control #1 **-** VDC1	-71 5.3.2??

-71 5.2.7.??? *VDC fully operational*

Signal that indicates whether VDC is fully operational or whether its functionality is reduced by a permanent or temporary (e.g. low voltage) defect, by intended action (e.g. disabled by a switch or during special diagnostic procedures), not configured or not yet fully initialized (e.g. missing initialization or configuration message). VDC contains ROP and YC.

00 Not fully operational
01 Fully operational
10 Reserved
11 Don't care/Take no action

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1814		

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65103	Vehicle Dynamic Stability Control #1 **-** VDC1	-71 5.3.2??

-71   5.2.7.???   *VDC brake light request*

Indicates whether VDC requests to turn the vehicle brake lights on

00 Turn brake light not on
01 Turn brake light on
10 Reserved
11 Don't care/Take no action

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1815		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65103	Vehicle Dynamic Stability Control #1 - VDC1	-71 5.3.2??

-71   5.2.7.???   *ROP Engine Control active*

State Signal which indicates that the Roll Over Prevention (ROP) has commanded engine control to be active. Within the physical limits, ROP attempts to prevent rolling over of the vehicle. Active means that ROP actually tries to control the engine. This state signal is independent of other control commands to the engine which may have higher priority.

00 ROP engine control passive but installed
01 ROP engine control active
10 Reserved
11 Don't care/Take no action

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1816		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65103	Vehicle Dynamic Stability Control #1 - VDC1	-71 5.3.2??

-71   5.2.7.???   *YC Engine Control active*

State Signal which indicates that the Yaw Control (YC) has commanded engine control to be active. Within the physical limits, YC attempts to prevent yawing of the vehicle. Active means that YC actually tries to control the engine. This state signal is independent of other control commands to the engine which may have higher priority.

00 YC engine control passive but installed
01 YC engine control active
10 Rreserved
11 Don't care/Take no action

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1817		

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

-71   **5.2.7.???**   *ROP Brake Control active*

State signal which indicates that Roll over Prevention (ROP) has activated brake control. Active means that ROP actually controls wheel brake pressure at one or more wheels of the vehicle or vehicle combination. Within the physical limits, ROP attempts to prevent rolling over of the vehicle.

00 ROP brake control passive but installed
01 ROP brake control active
10 Reserved
11 Don't care/Take no action

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1818		

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65103	Vehicle Dynamic Stability Control #1 **-** VDC1	-71 5.3.2??

-71   **5.2.7.???**   *YC Brake Control active*

State signal which indicates that Yaw Control (YC) has activated brake control. Active means that YC actually controls wheel brake pressure at one or more wheels of the vehicle or vehicle combination. Within the physical limits, YC attempts to prevent yawing of the vehicle.

00 YC brake control passive but installed
01 YC brake control active
10 Reserved
11 Don't care/Take no action

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	1819		

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65103	Vehicle Dynamic Stability Control #1 **-** VDC1	-71 5.3.2??

-71   **5.2.7.???**   *Ramp / Wheel Chair Lift Status*

Signal which indicates the actual status of the ramp / wheel chair lift.

00 Inside bus
01 Outside bus
10 Error
11 Not available

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Measured		

SPN: 1820

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65102	Door Control **-** DC	-71 5.3.2??

-71   **5.2.7.???**   *Status of doors*

Signal which indicates the actual status of the doors.

0000 At least 1 door is open
0001 Closing last door
0010 All doors closed
0011-1101 Not defined
1110 Error
1111 Not available

Slot Length: 4 bits

Slot Scaling: 16 states/4 bit   , 0   **Offset**

Slot Range: 0 to 15   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1821

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65102	Door Control **-** DC	-71 5.3.2??

-71   **5.2.7.???**   *Lift Axle 2 Position*

Signal which indicates the position / load condition of lift axle / tag axle #2.   Numbering of lift/tag axles starts at front axle.

00 Lift axle position down / tag axle laden
01 Lift axle position up / tag axle unladen
10 Error

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1822

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   **5.2.7.???**   *Actual Level Rear Axle in Bumper Range*

Signal which indicates that the vehicle chassis lies on the lower bump stops at the rear axle, i.e. that the bellow pressure may not correctly reflect the vehicle weight.

00 Actual level above bumper range
01 Actual level within bumper range
10 Error
11 Not available

Slot Length: 2 bits

Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:** same as slot range
SPN Type:	Measured
SPN:	1823
SPN Supporting Information:	

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   5.2.7.???   *Actual Level Front Axle in Bumper Range*

Signal which indicates that the vehicle chassis lies on the lower bump stops at the front axle, i.e. that the bellow pressure may not correctly reflect the vehicle weight.

00 Actual level above bumper range
01 Actual level within bumper range
10 Error
11 Not available

Slot Length:	2 bits	
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:** same as slot range
SPN Type:	Measured
SPN:	1824
SPN Supporting Information:	

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   5.2.7.???   *Suspension Remote control 2*

Signal which indicates that the suspension system is controlled by remote control #2. Remote control is an external unit to operate the suspension system.

00 Not active
01 Active
10 Error
11 Not available

Slot Length:	2 bits	
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:** same as slot range
SPN Type:	Measured
SPN:	1825
SPN Supporting Information:	

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   5.2.7.???   *Suspension Remote control 1*

Signal which indicates that the suspension system is controlled by remote control #1. Remote control is an external unit to operate the suspension system.

00 Not active
01 Active

10 Error
11 Not available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1826
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   **5.2.7.???**   *Control refusal information*

Signal which indicates that the air suspension control cannot perform a request due to the operating conditions. It also provides a reason for the refusal.

0000 Actual request not refused
0001 Axle load limit reached (load transfer)
0010 Would exceed axle load limit (tag axle)
0011 Bogie differential not locked
0100 Above speed limit
0101 Below speed limit
0110 - 1101 Not defined
1110 Error
1111 Not available

Slot Length: 4 bits
Slot Scaling: 16 states/4 bit   , 0   **Offset**
Slot Range: 0 to 15   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1827
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65114	Air Suspension Control #1 **-** ASC1	-71 5.3.2??

-71   **5.2.7.???**   *Lift Axle 2 Position Request*

Command signal to control the position / load condition of lift / tag axle #2 Numbering of lift/tag axles starts at front axle.

00 Lift axle position down / tag axle laden
01 Lift axle position up / tag axle unladen
10 Reserved
11 Don't care/take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1828
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53760	Air Suspension Control #2 **-** ASC2	-71 5.3.2??

-71   5.2.7.???   *Kneeling Request Rear Axle*

Command signal to activate the kneeling functionality at the rear axle of the vehicle.

00 No kneeling request
01 Kneeling request
10 Reserved
11 Don't care/take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1829
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53760	Air Suspension Control #2 **-** ASC2	-71 5.3.2??

-71   5.2.7.???   *Kneeling Request Front Axle*

Command signal to activate the kneeling functionality at the front axle of the vehicle

00 No kneeling request
01 Kneeling request
10 Reserved
11 Don't care/take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1830
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
53760	Air Suspension Control #2 **-** ASC2	-71 5.3.2??

-71   5.2.7.???   *Electronic Shock Absorber Control Status Lift/Tag Axle*

Signal which indicates the current mode of operation of the electronic shock absorber control at the lift/tag axle.

00 Normal operation dampers passive
01 Normal operation dampers active
10 Error
11 Not available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 1831
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65111	Air Suspension Control #5 **-** ASC5	-71 5.3.2??

-71   5.2.7.???   *Electronic Shock Absorber Control Status Rear Axle*

Signal which indicates the current mode of operation of the electronic shock absorber control at the rear axle.

00 Normal operation dampers passive
01 Normal operation dampers active
10 Error
11 Not available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1832

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65111	Air Suspension Control #5 **-** ASC5	-71 5.3.2??

-71   5.2.7.???   *Electronic Shock Absorber Control Status Front Axle*

Signal which indicates the current mode of operation of the electronic shock absorber control at the front axle.

00 Normal operation dampers passive
01 Normal operation dampers active
10 Error
11 Not available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1833

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65111	Air Suspension Control #5 **-** ASC5	-71 5.3.2??

-71   5.2.7.???   *Total Average Fuel Rate*

Average fuel rate, equal to total fuel used divided by total engine hours, over the life of the engine

Slot Length: 2 bytes
Slot Scaling: 0.05 L/h per bit   , 0   **Offset**
Slot Range: 0 to 3,212.75 L/h   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1834

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65101	Total Averaged Information **-** TAVG	-71 5.3.2??

-71   5.2.7.???   *Total Average Fuel Economy*

Average fuel economy, equal to total vehicle distance divided by total fuel used, over the life of the engine

Slot Length: 2 bytes

Slot Scaling: 1/512 km/L   , 0   **Offset**

Slot Range: 0 to 125.5 km/L   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 1835

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65101	Total Averaged Information **-** TAVG	-71 5.3.2??

-71   5.2.7.???   *Trailer ABS Status*

State signal which indicates that ABS in the trailer is actively controlling the brakes. A message is send to the tractor from the trailer (f.e. by PLC). The receiving device in the tractor transfers this information to the J1939. At the beginning of power on the message is send by the trailer to indicate if this status information is supported. Timeout of the trailer ABS active can be done by monitoring of the Trailer warning light information.

00 Trailer ABS Status Information Available But Not Active
01 Trailer ABS Active
10 Reserved
11 Trailer ABS Status Information Not Available or Parameter Not Supported

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1836

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61441	Electronic Brake Controller #1 **-** EBC1	-71 5.3.004

-71   5.2.7.???   *Convoy Driving Lamp Select*

Black Out Convoy Driving Lamp Selection

00 Off
01 On
10 Not Defined
11 Not Supported

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 1837

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65100	Military Lighting Request **-** ML	-71 5.3.2??

-71   5.2.7.???   *Convoy Lamp Select*

Black Out Convoy Lamp Selection

00 Off
01 On
10 Not Defined

11 Not Supported

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1838
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65100	Military Lighting Request **-** ML	-71 5.3.2??

-71   5.2.7.???   *Front Black Out Marker Lamp Select*

Front Black Out Marker Lamp Selection

00 Off
01 On
10 Not Defined
11 Not Supported

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1839
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65100	Military Lighting Request **-** ML	-71 5.3.2??

-71   5.2.7.???   *Rear Black Out Marker Select*

Rear Black Out Marker Selection

00 Off
01 On
10 Not Defined
11 Not Supported

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 1840
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65100	Military Lighting Request **-** ML	-71 5.3.2??

-71   5.2.7.???   *Black Out Brake/Stop Lamp Select*

Black Out Brake/Stop Lamp Selection

00 Off
01 On

10 Not Defined
11 Not Supported

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 1841
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65100	Military Lighting Request **-** ML	-71 5.3.2??

-71 5.2.7.??? *Black Out Work Lamp Select*
Black Out Work Lamp Selection

00 Off
01 On
10 Not Defined
11 Not Supported

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 1842
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65100	Military Lighting Request **-** ML	-71 5.3.2??

-71 5.2.7.??? *Night Vision Illuminator Select*
Night Vision Illuminator Selection

00 Off
01 On
10 Not Defined
11 Not Supported

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 1843
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65100	Military Lighting Request **-** ML	-71 5.3.2??

-71 5.2.7.??? *Operators Black Out Intensity Selection*
Operators Selection of lamp intensity in black out mode. This parameter provides the operators selected illumination
intensity as a percentage of available full scale. This parameter would be typically used as a dash or instrument cluster

Slot Length: 1 byte

Slot Scaling: 0.4 %/bit , 0 **Offset**
Slot Range: 0 to 100 % **Operational Range:** same as slot range
SPN Type: Status
SPN: 1844
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65100	Military Lighting Request **-** ML	-71 5.3.2??

-71   5.2.7.???   *Transmission torque limit*

Parameter provided to the engine from the transmission as a torque limit to be invoked by the engine in the event that J1939 communication with the transmission is lost.

The intention is to protect transmissions that use a continuous torque limit during torque converter mode or operation in specific lower gears, where stall or drivetrain torque may reach levels higher than the gearbox capacity. If communication is lost during torque limited operation, unrestricted engine torque output could harm the transmission.

It is recommended that engines use reception of the ETC#1 message as a transmission "heartbeat". In the event that the ETC#1 message is not received in a time period of 5 times its' broadcast rate (5 x 10 ms = 50 ms), the engine should invoke a torque limit holding the engine to less than or equal to the value of the Transmission Torque Limit parameter. The engine may release the limit when engine-to-transmission communication is re-established.

A value of FF00 to FFFF indicates that no transmission torque limit is desired.

It is expected that the engine will record this torque value in non-volatile memory and will include this in the engine configuration PGN as parameter Default Engine Torque Limit.

If the engine observes change in this parameter value on power-up, the engine should record the new value.

Slot Length: 2 bytes
Slot Scaling: 1 Nm/bit , 0 **Offset**
Slot Range: 0 to 64,255 Nm **Operational Range:** same as slot range
SPN Type: Measured
SPN: 1845
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65099	Transmission Configuration 2 **-** TCFG2	-71 5.3.2??

-71   5.2.7.???   *Default Engine Torque Limit*

Companion parameter to Transmission Torque Limit (SPN 1845). This "echo" parameter provides confirmation to the transmission that the engine has received and will invoke the requested Transmission Torque Limit in the event that J1939 communication is lost between the two devices.

If the engine supports this protection logic, the Default Engine Torque Limit parameter should be set equal to the Transmission Torque Limit parameter as received in the Transmission Configuration message (PGN 65250). Otherwise, a Default Engine Torque Limit value of FF00 to FFFF indicates that no default engine torque limit has been received or set.

The intention is to protect transmissions that use a continuous torque limit during torque converter mode or operation in specific lower gears, where stall or drivetrain torque may reach levels higher than the gearbox capacity. If communication is lost during torque limited operation, unrestricted engine torque output could harm the transmission.

It is recommended that engines use reception of the ETC#1 message as a transmission "heartbeat". In the event that the ETC#1 message is not received in a time period of 5 times its' broadcast rate (5 x 10 ms = 50 ms), the engine should invoke a torque limit holding the engine to less than or equal to the value of the Transmission Torque Limit parameter. The engine may release the limit when engine-to-transmission communication is re-established.

Slot Length: 2 bytes

Slot Scaling:	1 Nm/bit	, 0		**Offset**
Slot Range:	0 to 64,255 Nm		**Operational Range:**	same as slot range
SPN Type:	Measured			
SPN:	1846			

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65251	Engine Configuration **-** EC	-71 5.3.017

-71   5.2.7.???   *Transmission Requested Range Display Flash State*

State signal indicating a transmission request for the display of the Transmission Requested Range parameter (SPN 162) to flash or not to flash. The 'Transmission Requested Range Display Flash State' indicator can be utilized by (but not limited to) the shift console, instrument cluster, or cab display. Definition of the cause of this state is at the discretion of the transmission manufacturer. The flash period shall be 700 ms @ 50% duty cycle.

Transmission manufacturers may want to flash the Transmission Requested Range display depending on certain events. It could be because a gear could not be attained, or because fluid is low, etc. Indicator should be on for 350 ms and off for 350 ms.

00 Inactive; Transmission Requested Range display should not be flashing
01 Active; Transmission Requested Range display should be flashing
10 Reserved
11 Take no action

Slot Length:	2 bits			
Slot Scaling:	4 states/2 bit	, 0		**Offset**
Slot Range:	0 to 3		**Operational Range:**	same as slot range
SPN Type:	Status			
SPN:	1849			

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65098	Electronic Transmission Controller #7 **-** ETC7	-71 5.3.2??

-71   5.2.7.???   *Transmission Requested Range Display Blank State*

State signal indicating a transmission request for the display of the Transmission Requested Range parameter (SPN162) to be blanked or not blanked. The 'Transmission Requested Range Display Blank State' indicator can be utilized by (but not limited to) the shift console, instrument cluster, or cab display. Definition of the cause of this state is at the discretion of the transmission manufacturer

Transmission manufacturers may want to blank the Transmission Requested Range display depending on certain events. Typically it is an indication of a shift selector problem.

00 Inactive; Transmission Requested Range display should not be blanked
01 Active; Transmission Requested Range display should be blanked
10 Reserved
11 Take no action

Slot Length:	2 bits			
Slot Scaling:	4 states/2 bit	, 0		**Offset**
Slot Range:	0 to 3		**Operational Range:**	same as slot range
SPN Type:	Status			
SPN:	1850			

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65098	Electronic Transmission Controller #7 **-** ETC7	-71 5.3.2??

-71   5.2.7.???   *Shift Inhibit Indicator*

State signal indicating a transmission request for the Shift Inhibit Indicator to be active or inactive. The shift inhibit indicator can be of lamp or text form, located on (but not limited to) the shift console, instrument cluster, or cab display. Definition of the cause of the 'range inhibit' state is at the discretion of the transmission manufacturer.

Transmission manufacturers may want to indicate that they currently cannot make a requested shift. This could be due to inappropriate vehicle speed or other restrictions.

00 Inactive; shift is not inhibited
01 Active; shift is inhibited
10 Reserved
11 Take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1851
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65098	Electronic Transmission Controller #7 **-** ETC7	-71 5.3.2??

-71   5.2.7.???   *Transmission Mode #1*

Indicates whether transmission mode #1 is enabled. Modes are manufacturer specific and are not necessarily mutually exclusive.

00 Disable
01 Enable
10 Reserved
11 Take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1852
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 **-** TC1	-71 5.3.002

-71   5.2.7.???   *Transmission Mode #2*

Indicates whether transmission mode #2 is enabled. Modes are manufacturer specific and are not necessarily mutually exclusive.

00 Disable
01 Enable
10 Reserved
11 Take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1853
SPN Supporting Information:

-71   **5.2.7.???**   *Transmission Mode #3*

Indicates whether transmission mode #3 is enabled. Modes are manufacturer specific and are not necessarily mutually exclusive.

00 Disable
01 Enable
10 Reserved
11 Take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1854
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 **-** TC1	-71 5.3.002

-71   **5.2.7.???**   *Transmission Mode #4*

Indicates whether transmission mode #4 is enabled. Modes are manufacturer specific and are not necessarily mutually exclusive.

00 Disable
01 Enable
10 Reserved
11 Take no action

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 1855
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
256	Transmission Control #1 **-** TC1	-71 5.3.002

-71   **5.2.7.???**   *Seat Belt Switch*

State of switch used to determine if Seat Belt is buckled

00 NOT Buckled
01 OK - Seat Belt is buckled
10 Error - Switch state cannot be determined
11 Not Available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured

SPN: 1856

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
57344	Cab Message #1 **-** CM1	-71 5.3.059

-71   **5.2.7.???**   *Winch Oil Pressure Switch*

State of switch used to determine if Winch Oil Pressure is above desired minimum

00 NOT OK- Oil pressure is too low
01 OK - Oil pressure is above minimum
10 Error - Switch state cannot be determined
11 Not Available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 1857

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65128	Vehicle Fluids **-** VF	-71 5.3.2??

-71   **5.2.7.???**   *High Beam Head Light Command*

Command to activate or de-activate the tractor high beam head light lamps.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 2347

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   **5.2.7.???**   *High Beam Head Light Data*

This parameter provides measured data from the tractor high beam head light lamps.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Measured
SPN: 2348
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   **5.2.7.???**   *Low Beam Head Light Command*

Command to activate or de-activate the tractor low beam head light lamps.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2349
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   **5.2.7.???**   *Low Beam Head Light Data*

This parameter provides measured data from the tractor low beam head light lamps.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2350
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   **5.2.7.???**   *Alternate Beam Head Light Command*

Command to activate or de-activate the tractor alternate head lights (only low beam is available on alternate head lights).
The alternate position lights are intended for use with loader and snow plows that tend to block the primary head lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 2351

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   **5.2.7.???**   ***Alternate Beam Head Light Data***

This parameter provides measured data from the tractor alternate beam head light lamps.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 2352

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   **5.2.7.???**   ***Tractor Front Low Mounted Work Lights Command***

Command to activate or de-activate the tractor front low mounted work lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 2353

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   **5.2.7.???**   ***Tractor Front Low Mounted Work Lights***

This parameter provides measured data from the tractor front low mounted work lights.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2354
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71 **5.2.7.???** *Tractor Front High Mounted Work Lights Command*

Command to activate or de-activate the tractor front high mounted work lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Status
SPN: 2355
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71 **5.2.7.???** *Tractor Front High Mounted Work Lights*

This parameter provides measured data from the tractor front high mounted work lights.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit , 0 **Offset**
Slot Range: 0 to 3 **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2356
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71 **5.2.7.???** *Tractor Underside Mounted Work Lights Command*

Command to activate or de-activate the tractor underside mounted work lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 2357

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   **5.2.7.???**   *Tractor Underside Mounted Work Lights*

This parameter provides measured data from the tractor underside mounted work lights.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 2358

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   **5.2.7.???**   *Tractor Rear Low Mounted Work Lights Command*

Command to activate or de-activate the tractor rear low mounted work lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 2359

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   5.2.7.???   *Tractor Rear Low Mounted Work Lights*

This parameter provides measured data from the tractor rear low mounted work lights.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2360
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   5.2.7.???   *Tractor Rear High Mounted Work Lights Command*

Command to activate or de-activate the tractor rear high mounted work lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2361
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   5.2.7.???   *Tractor Rear High Mounted Work Lights*

This parameter provides measured data from the tractor rear high mounted work lights.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2362
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

-71   5.2.7.???   *Tractor Side Low Mounted Work Lights Command*
Command to activate or de-activate the tractor side low mounted work lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 2363
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command - LC	-71 5.3.2??

-71   5.2.7.???   *Tractor Side Low Mounted Work Lights*
This parameter provides measured data from the tractor side low mounted work lights.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 2364
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data - LD	-71 5.3.2??

-71   5.2.7.???   *Tractor Side High Mounted Work Lights Command*
Command to activate or de-activate the tractor side high mounted work lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 2365
SPN Supporting Information:

-71   5.2.7.???   *Tractor Side High Mounted Work Lights*

This parameter provides measured data from the tractor side high mounted work lights.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 2366
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   5.2.7.???   *Left Turn Signal Lights Command*

Command to activate or de-activate left turn signal lights on the tractor and all connected implements

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 2367
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   5.2.7.???   *Left Turn Signal Lights*

This parameter provides measured data from the tractor and attached implement left turn signal lights.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2368
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   **5.2.7.???**   *Right Turn Signal Lights Command*

Command to activate or de-activate right turn signal lights on the tractor and all connected implements

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2369
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   **5.2.7.???**   *Right Turn Signal Lights*

This parameter provides measured data from the tractor and attached implement right turn signal lights.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2370
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   **5.2.7.???**   *Left Stop Light Command*

Command to activate or de-activate the tractor and implement left stop lights

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 2371

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   5.2.7.???   *Left Stop Light*

This parameter provides measured data from the tractor and attached implement left stop lights.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 2372

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   5.2.7.???   *Right Stop Light Command*

Command to activate or de-activate the tractor and implement right stop light

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 2373

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   5.2.7.???   *Right Stop Light*

This parameter provides measured data from the tractor and attached implement right stop lights.

00 De-activated

01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2374
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   **5.2.7.???**   *Centre Stop Light Command*

Command to activate or de-activate the tractor and implement centre stop light

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2375
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   **5.2.7.???**   *Centre Stop Light*

This parameter provides measured data from the tractor and attached implement centre stop lights.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2376
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   5.2.7.???   *Tractor Marker Light Command*

Command to activate or de-activate tractor and implement front position lights, rear red tail lights, side amber running lights, license plate lights and instrument and switch back lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2377
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   5.2.7.???   *Tractor Marker Light*

This parameter provides measured data from the tractor and attached implement marker lights, including front position lights, rear tail lights, side running lights, license plate lights and instruments and switch back lights.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2378
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   5.2.7.???   *Implement Marker Light Command*

Command to activate or de-activate implement front position lights, rear red tail lights, side amber running lights, license plate lights and instrument and switch back lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2379
SPN Supporting Information:

Reference:

-71   5.2.7.???   *Implement Marker Light*

This parameter provides measured data from an attached implement marker lights, including front position lights, rear tail lights, side running lights, license plate lights and instruments and switch back lights.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 2380
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   5.2.7.???   *Tractor Clearance Light Command*

Command to activate or de-activate the tractor high mounted clearance and centre ID lights

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 2381
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   5.2.7.???   *Tractor Clearance Light*

This parameter provides measured data from the tractor high mounted clearance and centre ID lights.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range:	0 to 3		**Operational Range:**	same as slot range
SPN Type:	Measured
SPN:	2382

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65088	Lighting Data **-** LD	-71 5.3.2??

-71   5.2.7.???   *Implement Clearance Light Command*

Command to activate or de-activate the implement high mounted clearance and lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length:	2 bits
Slot Scaling:	4 states/2 bit		, 0	**Offset**
Slot Range:	0 to 3		**Operational Range:**	same as slot range
SPN Type:	Status
SPN:	2383

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65089	Lighting Command **-** LC	-71 5.3.2??

-71   5.2.7.???   *Implement Clearance Light*

This parameter provides measured data from an attached implement high mounted clearance lights.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length:	2 bits
Slot Scaling:	4 states/2 bit		, 0	**Offset**
Slot Range:	0 to 3		**Operational Range:**	same as slot range
SPN Type:	Measured
SPN:	2384

SPN Supporting Information:

Reference:

PGN	**Parameter Group Name and Acronym**	**Doc. and Paragraph**
65088	Lighting Data **-** LD	-71 5.3.2??

-71   5.2.7.???   *Rotating Beacon Light Command*

Command to activate or de-activate slow moving vehicle indicator lights on tractor and/or implements. Activation of the
slow moving vehicle lights implies that the controller should manipulate the lighting as appropriate to provide the slow moving
vehicle lighting function.

00 De-activate
01 Activate

10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2385
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   5.2.7.???   *Rotating Beacon Light*

This parameter provides measured data from the beacon light on tractor or attached implements.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2386
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   5.2.7.???   *Tractor Front Fog Lights Command*

Command to activate or de-activate tractor front fog lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2387
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   5.2.7.???   *Tractor Front Fog Lights*

This parameter provides measured data from the tractor front fog lights.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Measured

SPN: 2388

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71 5.2.7.??? *Rear Fog Light Command*

Command to activate or de-activate tractor or implement rear fog lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Status

SPN: 2389

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71 5.2.7.??? *Rear Fog Lights*

This parameter provides measured data from the tractor and/or implement rear fog lights.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit , 0 **Offset**

Slot Range: 0 to 3 **Operational Range:** same as slot range

SPN Type: Measured

SPN: 2390

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   **5.2.7.???**   *Back Up Light and Alarm Horn Command*

Command to activate or de-activate the back up lights and/ or associated alarm if required

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2391
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   **5.2.7.???**   *Back Up Light and Alarm Horn*

This parameter provides measured data from the back up lights and/ or associated alarm.

00 De-activated
01 Activated
10 Fault Detected
11 Not Available

??? Data or not ???

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2392
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   **5.2.7.???**   *Lighting Data Request Command*

Command to provide a response of the light state

00 De-activate
01 Activate
10 Reserved
11 Don't Care

???? Clarification is required on this parameter ?????

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2393
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

-71   5.2.7.???   *Implement Rear Work Light*

This parameter provides measured data from the implement rear work lamps.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 2394

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   5.2.7.???   *Implement OEM Option 1 Light Command*

Command to activate or de-activate an implement OEM option 1 light. This is provided to meet special needs on implements, such as tank inspection or filling lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 2395

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   5.2.7.???   *Implement OEM Option 1 Light*

This parameter provides measured data from the implement OEM option 1 light.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 2396

SPN Supporting Information:

-71   **5.2.7.???**   *Implement OEM Option 2 Light Command*

Command to activate or de-activate an implement OEM option 2 light. This is provided to meet special needs on implements, such as tank inspection or filling lights.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2397
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   **5.2.7.???**   *Implement OEM Option 2 Light*

This parameter provides measured data from the implement OEM option 2 light.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2398
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   **5.2.7.???**   *Implement Left Forward Work Light Command*

Command to activate or de-activate the forward facing work lights toward the left end of the implement.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2399

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   **5.2.7.???**   *Implement Left Forward Work Light*

This parameter provides measured data from the forward facing work lights toward the left end of the implement.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 2400
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   **5.2.7.???**   *Implement Right Forward Work Light Command*

Command to activate or de-activate the forward facing work lights toward the right end of the implement.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 2401
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   **5.2.7.???**   *Implement Right Forward Work Light*

This parameter provides measured data from the forward facing work lights toward the right end of the implement.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   ,   0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured

SPN: 2402

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   5.2.7.???   *Running Light Command*

Command to activate or de-activate the tractor or powered vehicle running lights. Usually only used for on road vehicles.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 2403

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   5.2.7.???   *Running Light*

This parameter provides measured data from the vehicle's running lights.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 2404

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   5.2.7.???   *Implement Rear Work Light Command*

Command to activate or de-activate implement rear work lights. (This is also the same as Reversing Lights for truck applications.)

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Status
SPN: 2405
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command - LC	-71 5.3.2??

-71   **5.2.7.???**   *Implement Right Facing Work Light Command*

Command to activate or de-activate work lights mounted on an implement to illuminate beyond right end of the implement.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Status
SPN: 2406
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command - LC	-71 5.3.2??

-71   **5.2.7.???**   *Implement Right Facing Work Light*

This parameter provides measured data from the work lights mounted on an implement to illuminate beyond right end of the implement.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 2407
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data - LD	-71 5.3.2??

-71   **5.2.7.???**   *Engine Demand – Percent Torque*

The requested torque output of the engine by all dynamic internal inputs, including smoke control, noise control and low and high speed governing.

Slot Length: 1 byte
Slot Scaling: 1 %/bit   , -125 %   **Offset**
Slot Range: -125 to 125 %   **Operational Range:**   -125% to +125%
SPN Type: Measured
SPN: 2432

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
61444	Electronic Engine Controller #1 **-** EEC1	-71 5.3.007

5.2.x.x Engine Demand – Percent Torque – The requested torque output of the engine by all dynamic internal inputs, including smoke control, noise control and low and high speed governing.

Data Length:	1 byte
Resolution:	1%/bit gain, -125% offset
Data Range:	-125 to 125%
Operating Range:	0 to 125%
Type:	Measured
Suspect Parameter Number:	513
Reference:	5.3.7

Background:

During periods of TSC#1 engine control, other devices on the J1939 network may wish to know where the engine wants to go once it is released from TSC#1 control. In order for option transitions of driveline torque between different devices, it becomes necessary to understand the *engine's* desired torque for all phases of a TSC#1 control sequence.

Driver's Demand Engine – Percent Torque (reference 5.2.1.4) provides a partial prediction of the torque the engine wishes to produce after a TSC#1 command is removed. Included in Driver's Demand Torque are external requestors to the powertrain such as accelerator pedal, cruise control, and road speed limit governors. However, *excluded* from DDT are (1) dynamic commands within the powertrain such as smoke control, noise control, and low and high speed engine governing, and (2) external TSC#1 commands to the engine such as those generated by traction control.

For a controller to properly determine the engine's desired output torque during a TSC#1 sequence, it needs knowledge of the torque being scheduled by all active controls within the engine. Since DDT excludes many of these active controllers from its calculation, it cannot be used to accurately predict the desired output torque. The effects of the external TSC#1 commands can be approximated by other devices by means of monitoring TSC#1 messages to the engine; however the effects of the engine's internal dynamic commands are completely unknown and cannot be estimated.

Actual Engine – Percent Torque (reference 5.2.1.5) provides a window to the engine's desired torque output when no TSC#1 commands are actively controlling the engine. However, when the engine is responding to TSC#1 commands, the Actual Engine – Percent Torque parameter is no longer indicative of the torque that the engine will produce once those TSC#1 commands are removed.

In simplest terms, Engine Demand – Percent Torque (or "EDT") contains the engine's internal dynamic commands that are excluded from the Driver's Demand Engine – Percent Torque definition, including smoke control, noise control, and low and high speed governing. With this additional piece of information, devices on the network that are controlling the engine via TSC#1 messages can determine the torque direction of the engine once the current TSC#1 command is relinquished.

It is important to note that the proposed EDT parameter is used as information. The addition of the EDT parameter should in no way cause a change to the engine's actual torque command architecture.

EDT Calculation:

When no devices are controlling the engine via TSC#1 messages, the value of EDT is equal to the Actual Engine – Percent Torque parameter.   When the engine is being controlled via a TSC#1 message, it is necessary

for the engine controller to calculate what its' target torque *would be* if there were no external commands being received. This "runner up" in engine control will come from internal dynamic engine commands.

In the calculation of Actual Engine – Percent Torque, the output of the engine's idle governor must be considered, along with the impact of the engine's full load governor, smoke controls and other internal limiting logic. In the determination of the Engine Demand Torque parameter, these same engine logic components are needed, as indicated in Figure **EDT1**. However, there is a significant difference: These components only affect the Actual Engine – Percent Torque parameter determination if they are the component *actively* controlling the engine. In EDT, any of these components will be used to calculate EDT if they are the *"runner up"* for engine
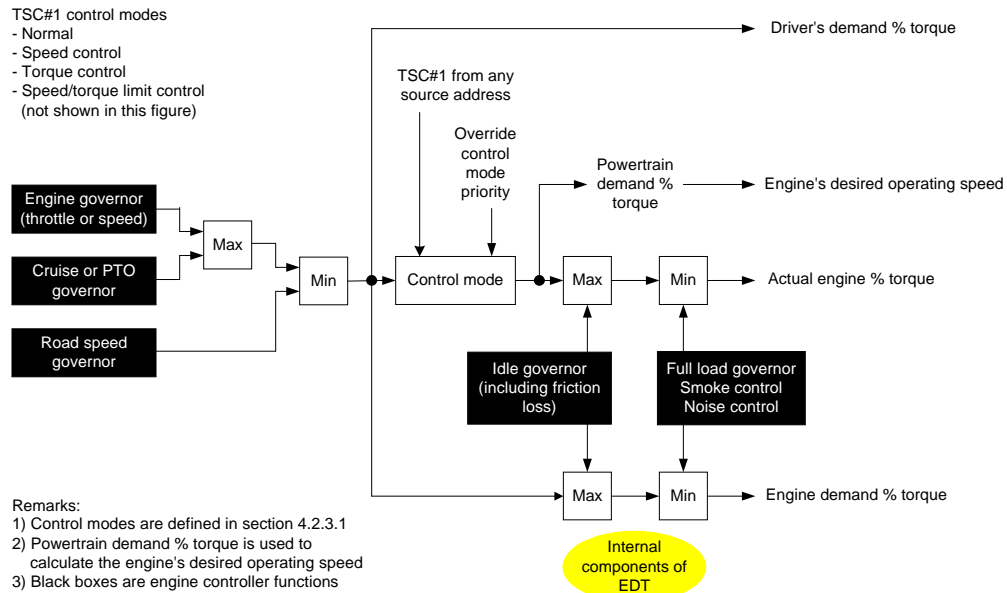
FIGURE **EDT1 -** TORQUE COMMANDS AND CALCULATIONS WHEN A "MAXIMUM LOW IDLE" TECHNIQUE IS USED

If speed governors are involved in determining these components of the EDT calculation, any of the following 3 special cases may need to be addressed:

Special Case #1: Speed Governors

If the engine governor referenced in Figure **EDT1** is a speed-based governor instead of a throttle table arrangement, a new challenge is presented in determining EDT. Since the speed governor output is directly influenced by the TSC#1 command in control (for example, integrator anti-windup logic), the speed governor's output during TSC#1 commands cannot be used to calculate EDT.

Instead, an *approximation* of the speed governor output without the effects of any TSC#1 commands is required for use in the EDT calculation. "Approximation" refers to removing the effects of integrator terms and any other dynamic components that result from the controlling TSC#1 commands. All elements affecting the speed governor reference should be included before the reference is translated into terms of torque.

All control algorithms with dynamic elements (e.g., speed governors) that execute during TSC#1 commands need to have their outputs replaced by "steady-state" approximations for use in the EDT calculation. Again note that these approximations are for use only in the EDT calculation; the actual engine control logic remains unchanged.

Figure **EDT4** illustrates EDT and speed governor output during a typical control sequence. The output of the speed governor may tend to lag the engine's torque trace during and after the TSC#1 command sequence. Note however that the TSC#1's influence is not factored into EDT; only when the command sequence ends or is no

longer winning in terms of engine control arbitration do the dynamic effects of the speed governor(s) appear in the EDT signal.
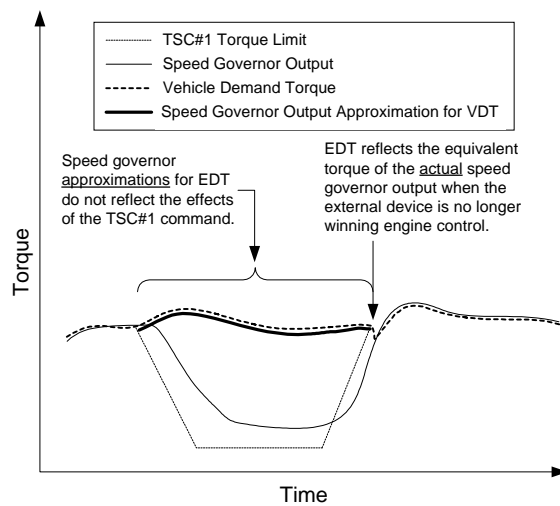
FIGURE **EDT4** – EDT AND SPEED GOVERNOR OUTPUT RELATIONSHIP DURING A CONTROL SEQUENCE
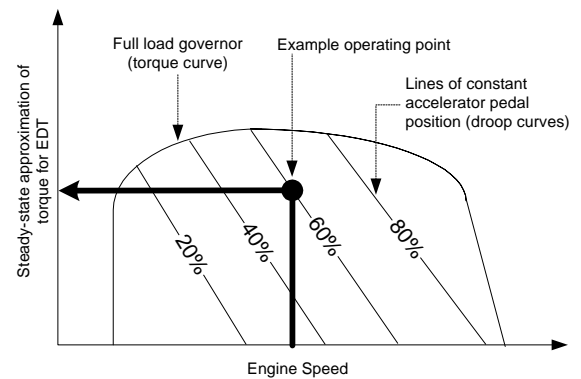
FIGURE **EDT5** - FINDING EDT TORQUE APPROXIMATION FOR A SPEED GOVERNOR

One method of converting the speed governor reference to torque is shown in Figure **EDT5** above. The inputs of current engine speed, accelerator pedal position and the shape of the governor droop curves can be used to find the equivalent torque output of the governor. A lookup table or calculation could be used.

Special Case #2: "Steep" or zero droop speed governors

Using a steady-state approximation with a "steep" or zero droop speed governor can cause large EDT changes over small speed changes. For example, if a cruise control governor has a zero droop and the vehicle speed is just below the cruise set speed, the steady-state torque approximation using the method described previously is very large. If vehicle speed increases a small amount to above the cruise set speed, the steady-state torque approximation becomes very small or zero.

As a result, a more accurate steady-state torque approximation is needed when steep droop governors are involved. A steep droop speed governor is defined as having a droop slope greater than 0.2% actual torque per rpm as seen below in Figure **EDT6**.

The following method can be used to determine a steady-state torque approximation for steep or zero droop governors with fast responding integrator anti-windup / integrator resetting:

1. Upon a TSC#1 message actively controlling engine torque, save the last value of torque commanded by the speed governor (τ_{SGo}) and the last value of speed governor error ($\mathcal{E}_{SGo}$).

2. During this control sequence, calculate speed governor error ($\mathcal{E}_{SGi}$)

3. Calculate an estimated torque for EDT determination use: $\tau_{SGestimated} = \tau_{SGo} + Kp_{SG} * (\mathcal{E}_{SGo} - \mathcal{E}_{SGi})$
     where Kp_{SG} is the speed governor proportional gain

Special Case #3: "Slow Response" Speed Governors

If the speed governor dynamic elements are slow to respond to a 1 second torque derate, then the speed governor can simply be executed during the TSC#1 event and the output used directly in determining EDT. This is an alternative for a speed governor which does not contain an integrator, or if the integrator anti-windup logic is slow to respond. A guideline for "slow response" is that the governor output after 1 second of torque limiting has only moved 1/3 of the way to the limit, as shown for example in Figure **EDT7**.
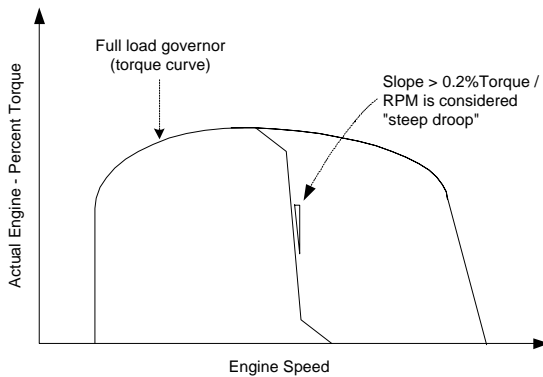
FIGURE **EDT6** – EXAMPLE OF "STEEP DROOP" SPEED GOVERNOR
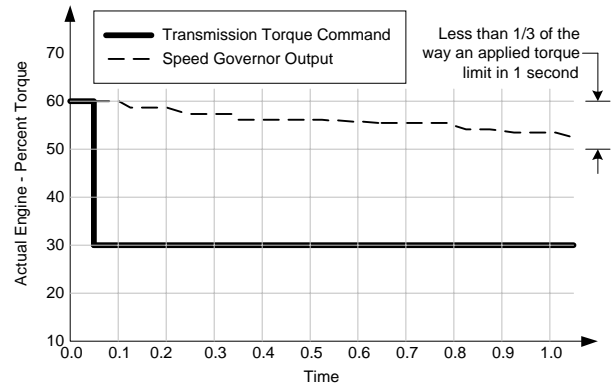
FIGURE **EDT7** – EXAMPLE OF "SLOW TO RESPOND" SPEED GOVERNOR

-71   5.2.7.???   *Right Manifold Exhaust Gas Temperature*

Temperature of combustion byproducts within the right engine exhaust manifold. One single manifold engines use Exhaust temperature (SPN 173).

Slot Length: 2 bytes

Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**

Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 2433

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65031	Exhaust Temperature **-** ET	-71 5.3.2??

-71   5.2.7.???   *Left Manifold Exhaust Gas Temperature*

Temperature of combustion byproducts within the left engine exhaust manifold. One single manifold engines use Exhaust temperature (SPN 173).

Slot Length: 2 bytes

Slot Scaling: 0.03125 deg C/bit   , -273 deg C   **Offset**

Slot Range: -273 to 1735 deg C   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 2434

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph

| 65031 | Exhaust Temperature **-** ET | -71 5.3.2?? |

-71   5.2.7.???   *Sea Water Pump Outlet Pressure*

Gauge pressure of liquid found at outlet of sea water pump in sea water cooling system.

Slot Length: 1 byte
Slot Scaling: 2 kPa/bit   , 0   **Offset**
Slot Range: 0 to 500 kPa   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2435
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65152	Combustion Time #6 **-** CT6	-71 5.3.129
65172	Engine Auxiliary Coolant **-** EAC	-71 5.3.103
2000061303	ENGINE FLUID LEVEL/PRESSURE #3 **-** EFL3	-71 5.3.???

-71   5.2.7.???   *Shift Mode #1*

State signal indicating a transmission request that the Shift mode #1 indicator be set active or inactive. The indicator may be located on, but not limited to, the shift console, instrument cluster or dash display. The definition of the shift mode is left to the discretion of the transmission manufacturer. This state signal is the transmission's indication that it is operating under shift mode #1 as commanded by the shifter via the TC#1 message (PGN 256).

00 Shift Mode #1 not active
01 Shift Mode #1 Active
10 Error
11 Not available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2536
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65098	Electronic Transmission Controller #7 **-** ETC7	-71 5.3.2??

-71   5.2.7.???   *Shift Mode #2*

State signal indicating a transmission request that the Shift mode #2 indicator be set active or inactive. The indicator may be located on, but not limited to, the shift console, instrument cluster or dash display. The definition of the shift mode is left to the discretion of the transmission manufacturer. This state signal is the transmission's indication that it is operating under shift mode #2 as commanded by the shifter via the TC#1 message (PGN 256).

00 Shift Mode #2 not active
01 Shift Mode #2 Active
10 Error
11 Not available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	2537		

SPN Supporting Information:

Reference:

-71   5.2.7.???   *Shift Mode #3*

State signal indicating a transmission request that the Shift mode #3 indicator be set active or inactive. The indicator may be located on, but not limited to, the shift console, instrument cluster or dash display. The definition of the shift mode is left to the discretion of the transmission manufacturer. This state signal is the transmission's indication that it is operating under shift mode #3 as commanded by the shifter via the TC#1 message (PGN 256).

00 Shift Mode #3 not active
01 Shift Mode #3 Active
10 Error
11 Not available

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	2538		

SPN Supporting Information:

Reference:

-71   5.2.7.???   *Shift Mode #4*

State signal indicating a transmission request that the Shift mode #4 indicator be set active or inactive. The indicator may be located on, but not limited to, the shift console, instrument cluster or dash display. The definition of the shift mode is left to the discretion of the transmission manufacturer. This state signal is the transmission's indication that it is operating under shift mode #4 as commanded by the shifter via the TC#1 message (PGN 256).

00 Shift Mode #4 not active
01 Shift Mode #4 Active
10 Error
11 Not available

Slot Length:	2 bits		
Slot Scaling:	4 states/2 bit	, 0	**Offset**
Slot Range:	0 to 3	**Operational Range:**	same as slot range
SPN Type:	Status		
SPN:	2539		

SPN Supporting Information:

Reference:

-71   5.2.7.???   *Laser Receiver Type*

Identifies which type of Laser Receiver transmitted the message.

0 = Reserved
1 = Linear Laser Receiver
2 = 1 Meter Survey Receiver
3 = 2 Meter Survey Receiver
4 = 2.5 Meter Survey Receiver
5-250 = Reserved

Slot Length: 1 byte

Slot Scaling: 1 count   ,   0   **Offset**

Slot Range: 0 to 250   **Operational Range:**   1-4

SPN Type: Status

SPN: 2576

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65141	Laser Leveling System Vertical Deviation - LVD	-71 5.3.135

-71   **5.2.7.???**   *Display Deadbands*

Sets Display Deadbands mode.

0000 - Narrow = +/- 4.5mm
0001 - Standard = +/- 12mm
0010 - Wide + +/- 24mm
0011 - 1110 Reserved
1111 Not Available

Slot Length: 4 bits

Slot Scaling: 16 states/4 bit   ,   0   **Offset**

Slot Range: 0 to 15   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 2577

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65142	Laser Leveling System Vertical Position Display Data - LVDD	-71 5.3.134

-71   **5.2.7.???**   *LED Pattern Control*

Sets LED Pattern control mode.

0000 - 5 Channel
0001 - Offset
0010 - 7 Channel
0011 - 1110 Reserved
1111 Not Available

Slot Length: 4 bits

Slot Scaling: 16 states/4 bit   ,   0   **Offset**

Slot Range: 0 to 15   **Operational Range:**   same as slot range

SPN Type: Status

SPN: 2578

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65142	Laser Leveling System Vertical Position Display Data - LVDD	-71 5.3.134

-71   **5.2.7.???**   *Net Battery Current (High Range/Resolution)*

Net flow of electrical current into/out-of the battery or batteries. This parameter is the high range and resolution of SPN 114
 - Net Battery Current.

Slot Length: 2 bytes
Slot Scaling: 0.05 A/bit   , -1600 A   **Offset**
Slot Range: -1600 to 1612.75 A   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 2579
SPN Supporting Information:

Reference:
                    PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
                    65106   Vehicle Electrical Power #3 **-** VP3   -71   5.3.2??

-71   **5.2.7.???**   *Hydraulic Brake Pressure Circuit 1*

Gage hydraulic pressure in circuit 1 of the hydraulic brake system

Slot Length: 1 byte
Slot Scaling: 100 kPa/bit   , 0   **Offset**
Slot Range: 0 to 25 MPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 2580
SPN Supporting Information:

Reference:
                    PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
                    64998   Hydraulic Braking System **-** HBS   -71   5.3.2??

-71   **5.2.7.???**   *Hydraulic Brake Pressure Circuit 2*

Gage hydraulic pressure in circuit 2 of the hydraulic brake system

Slot Length: 1 byte
Slot Scaling: 100 kPa/bit   , 0   **Offset**
Slot Range: 0 to 25 MPa   **Operational Range:**   same as slot range
SPN Type: Measured
SPN: 2581
SPN Supporting Information:

Reference:
                    PGN   **Parameter Group Name and Acronym Doc. and Paragraph**
                    64998   Hydraulic Braking System **-** HBS   -71   5.3.2??

-71   **5.2.7.???**   *Hydraulic Brake Pressure Supply State Circuit 1*

Signal which indicates whether the hydraulic brake pressure supply of circuit 1 is reliable; that is, able to support continued
braking.

00 Supply is not reliable
01 Supply is reliable
10 Error indicator
11 Not available

Slot Length: 2 bits
Slot Scaling: 4 states/2 bit   , 0   **Offset**
Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 2582

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
64998	Hydraulic Braking System **-** HBS	-71 5.3.2??

-71   **5.2.7.???**   *Hydraulic Brake Pressure Supply State Circuit 2*

Signal which indicates whether the hydraulic brake pressure supply of circuit 2 is reliable; that is, able to support continued braking.

00 Supply is not reliable
01 Supply is reliable
10 Error indicator
11 Not available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 2583

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
64998	Hydraulic Braking System **-** HBS	-71 5.3.2??

-71   **5.2.7.???**   *Hydraulic Brake Pressure Warning State Circuit 1*

Signal which indicates whether the hydraulic brake pressure of circuit 1 is below the warning level

00 Pressure level sufficient
01 Pressure level below warning level
10 Error indicator
11 Not available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:**   same as slot range

SPN Type: Measured

SPN: 2584

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
64998	Hydraulic Braking System **-** HBS	-71 5.3.2??

-71   **5.2.7.???**   *Hydraulic Brake Pressure Warning State Circuit 2*

Signal which indicates whether the hydraulic brake pressure of circuit 2 is below the warning level

00 Pressure level sufficient
01 Pressure level below warning level
10 Error indicator
11 Not available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   , 0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2585
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
64998	Hydraulic Braking System **-** HBS	-71 5.3.2??

-71   5.2.7.???   *Tire Air Leakage Rate*

The pressure loss rate of a tire.

Slot Length: 2 bytes
Slot Scaling: 0.1 Pa/s/bit   , 0   **Offset**
Slot Range: 0 Pa/s to 6425.5 Pa/s   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2586
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65268	Tire Condition **-** TIRE	-71 5.3.034

-71   5.2.7.???   *Tire Pressure Threshold Detection*

Signal indicating the pressure level of the tire. The levels defined represent different pressure conditions of the tire:
000 Extreme over pressure - The tire pressure is at a level where the safety of the vehicle may be jeopardised.
001 Over pressure - The tire pressure is higher than the pressure defined by the vehicle or tire manufacturer.
010 No warning pressure - The tire pressure is within the thresholds defined by the vehicle or tire manufacturer.
011 Under pressure - The tire pressure is lower than the pressure defined by the vehicle or tire manufacturer.
100 Extreme under pressure - The tire pressure is at a level where the safety of the vehicle may be jeopardised.
101 Not defined
110 Error indicator
111 Not available

Slot Length: 3 bits
Slot Scaling: 8 states/3 bit   , 0   **Offset**
Slot Range: 0 to 7   **Operational Range:** same as slot range
SPN Type: Measured
SPN: 2587
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65268	Tire Condition **-** TIRE	-71 5.3.034

-71   5.2.7.???   *Maximum Vehicle Speed Limit #1*

The lowest Maximum Vehicle Speed Limit. This value is the similar to SPN 74. However, SPN 74 was not specifically defined to convey the applied vehicle speed limit or what was possible to be applied. This new SPN is the lowest vehicle speed limit that is possible. Additionally, the lowest vehicle speed limit shall be applied when the J1939 network is no longer providing input regarding the Selected Maximum Vehicle Speed Limit. Exceptions to this exist when the device performing the maximum vehicle speed limiting function has methods of selecting the thresholds separately from the Selected Maximum Vehicle Speed Limit parameter.

Slot Length: 1 byte
Slot Scaling: 1 km/h/bit   , 0   **Offset**
Slot Range: 0 to 250 km/h   **Operational Range:** same as slot range

SPN Type: Status
SPN: 2588
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
64997	Maximum Vehicle Speed Limit Status **-** MVS	-71 5.3.2??

-71   5.2.7.???   *Maximum Vehicle Speed Limit #2*

The highest of the two lowest vehicle speed limits

Slot Length: 1 byte
Slot Scaling: 1 km/h/bit   ,   0   **Offset**
Slot Range: 0 to 250 km/h   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2589
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
64997	Maximum Vehicle Speed Limit Status **-** MVS	-71 5.3.2??

-71   5.2.7.???   *Maximum Vehicle Speed Limit #3*

The highest of the three lowest vehicle speed limits

Slot Length: 1 byte
Slot Scaling: 1 km/h/bit   ,   0   **Offset**
Slot Range: 0 to 250 km/h   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2590
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
64997	Maximum Vehicle Speed Limit Status **-** MVS	-71 5.3.2??

-71   5.2.7.???   *Maximum Vehicle Speed Limit #4*

The highest of the four lowest vehicle speed limits

Slot Length: 1 byte
Slot Scaling: 1 km/h/bit   ,   0   **Offset**
Slot Range: 0 to 250 km/h   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2591
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
64997	Maximum Vehicle Speed Limit Status **-** MVS	-71 5.3.2??

-71   5.2.7.???   *Maximum Vehicle Speed Limit #5*

The highest of the five lowest vehicle speed limits

Slot Length: 1 byte
Slot Scaling: 1 km/h/bit   , 0   **Offset**
Slot Range: 0 to 250 km/h   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2592
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
64997	Maximum Vehicle Speed Limit Status **-** MVS	-71 5.3.2??

-71   5.2.7.???   *Maximum Vehicle Speed Limit #6*

The highest of the six lowest vehicle speed limits

Slot Length: 1 byte
Slot Scaling: 1 km/h/bit   , 0   **Offset**
Slot Range: 0 to 250 km/h   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2593
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
64997	Maximum Vehicle Speed Limit Status **-** MVS	-71 5.3.2??

-71   5.2.7.???   *Maximum Vehicle Speed Limit #7*

The highest of the seven lowest vehicle speed limits

Slot Length: 1 byte
Slot Scaling: 1 km/h/bit   , 0   **Offset**
Slot Range: 0 to 250 km/h   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2594
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
64997	Maximum Vehicle Speed Limit Status **-** MVS	-71 5.3.2??

-71   5.2.7.???   *Applied Maximum Vehicle Speed Limit*

Which Maximum Vehicle Speed Limit is in effect.

Slot Length: 1 byte
Slot Scaling: 1 km/h/bit   , 0   **Offset**
Slot Range: 0 to 250 km/h   **Operational Range:** same as slot range
SPN Type: Status
SPN: 2595
SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
64997	Maximum Vehicle Speed Limit Status **-** MVS	-71 5.3.2??

-71   **5.2.7.???**   *Selected Maximum Vehicle Speed Limit*

User selected Maximum Road Speed, must equal one of the Maximum Road Speed #1-#7 from the Max Vehicle Speed Options PGN.   If different Maximum Road Speed Requests are present from different devices, the lowest requested value should be used.

Slot Length: 1 byte

Slot Scaling: 1 count   ,   0   **Offset**

Slot Range: 0 to 250   **Operational Range:** 1 through 7 are allowed. 8 through 250 are
                                                                                              not allowed.

SPN Type: Status

SPN: 2596

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
57344	Cab Message #1 **-** CM1	-71 5.3.059

-71   **5.2.7.???**   *Implement Left Facing Work Light Command*

Command to activate or de-activate work lights mounted on an implement to illuminate beyond left end of the implement.

00 De-activate
01 Activate
10 Reserved
11 Don't Care

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Status

SPN: 2597

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65089	Lighting Command **-** LC	-71 5.3.2??

-71   **5.2.7.???**   *Implement Left Facing Work Light*

This parameter provides measured data from the work lights mounted on an implement to illuminate beyond left end of the implement.

00 De-activate
01 Activate
10 Fault Detected
11 Not Available

Slot Length: 2 bits

Slot Scaling: 4 states/2 bit   ,   0   **Offset**

Slot Range: 0 to 3   **Operational Range:** same as slot range

SPN Type: Measured

SPN: 2598

SPN Supporting Information:

Reference:

PGN	Parameter Group Name and Acronym	Doc. and Paragraph
65088	Lighting Data **-** LD	-71 5.3.2??

-71   5.3.001   *Torque/Speed Control #1*   - TSC1

NOTE - Retarder may be disabled by commanding a torque limit of 0%. Use of the limit mode allows the use
 of the retarder only up to the limit specified in the request. This can be used to permit retarding of up to
50%, for example, if that limit is required by some device such as an EBS, or it can disable the use of the
retarder by others, as when an ABS controller detects wheel slip.

Transmission Rate: when active; 10 ms to engine - 50 ms to retarder
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 0
PDU Specific: Destination Address
Default Priority: 3
Parameter Group   0   (0   )

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1.1	2 bits	Override Control Mode	695	-71	5.2.3.01	10/1/1998
1.3	2 bits	Requested Speed Control Conditions	696	-71	5.2.3.02	10/1/1998
1.5	2 bits	Override Control Mode Priority	897	-71	5.2.3.03	10/1/1998
2,3	2 bytes	Requested Speed	898	-71	5.2.1.19	10/1/1998
4	1 byte	Requested Torque	518	-71	5.2.1.15	10/1/1998

-71   5.3.002   *Transmission Control #1*   - TC1

Transmission Rate: when active; 50 ms to transmission and axles
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 1
PDU Specific: Destination Address
Default Priority: 3
Parameter Group   256   (100   )

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1.1	2 bits	Gear Shift Inhibit Request	681	-71	5.2.3.04	10/1/1998
1.3	2 bits	Torque Converter Lockup Disable Request	682	-71	5.2.3.05	10/1/1998
1.5	2 bits	Disengage Driveline Request	683	-71	5.2.3.06	10/1/1998
2	1 byte	Requested Percent Clutch Slip	684	-71	5.2.1.21	10/1/1998
3	1 byte	Requested Gear	525	-71	5.2.1.24	11/9/2000
4.1	2 bits	Disengage Differential Lock Request - Front Axle 1	685	-71	5.2.3.07	10/1/1998

4.3	2 bits	Disengage Differential Lock Request - Front Axle 2	686	-71	5.2.3.07	10/1/1998
4.5	2 bits	Disengage Differential Lock Request - Rear Axle 1	687	-71	5.2.3.07	10/1/1998
4.7	2 bits	Disengage Differential Lock Request - Rear Axle 2	688	-71	5.2.3.07	10/1/1998
5.1	2 bits	Disengage Differential Lock Request - Central	689	-71	5.2.3.07	10/1/1998
5.3	2 bits	Disengage Differential Lock Request - Central Front	690	-71	5.2.3.07	10/1/1998
5.5	2 bits	Disengage Differential Lock Request - Central Rear	691	-71	5.2.3.07	10/1/1998
6.1	2 bits	Transmission Mode #1	1852	-71	5.2.7.???	8/10/2000
6.3	2 bits	Transmission Mode #2	1853	-71	5.2.7.???	8/10/2000
6.5	2 bits	Transmission Mode #3	1854	-71	5.2.7.???	8/10/2000
6.7	2 bits	Transmission Mode #4	1855	-71	5.2.7.???	8/10/2000

-71   5.3.003   *Electronic Retarder Controller #1*   -   ERC1

NOTE- This message will be transmitted by several types of retarding devices such as engine compression release brakes, exhaust system restriction brakes, and driveline retarders using hydraulic, electric, or mechanical friction to slow the vehicle. The source address of the message will indicate which one, and the type and location of the retarder are available in the Retarder Configuration Message (see 5.3.15) if that detail is important to the receiver.

Users should also be aware that the Shift Assist and Brake Assist switch status in the first byte of this message are to be used by other ECUs that might request retarding force from the retarder to know when such assistance is available. The state of the "switches" will NOT prevent the retarder from activating if requested, but should be honored by the requester (by not sending a request when the appropriate "switch" is not enabled) to prevent unwarranted noise.

Transmission Rate: 100 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 240
PDU Specific: 0
Default Priority: 6
Parameter Group   61440   (F000)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1.1	4 bits	Retarder Torque Mode	900	-71	5.2.2.01	10/1/1998
1.5	2 bits	Retarder Enable - Brake Assist Switch	571	-71	5.2.2.11	10/1/1998
1.7	2 bits	Retarder Enable - Shift Assist Switch	572	-71	5.2.2.12	10/1/1998
2	1 byte	Actual Retarder - Percent Torque	520	-71	5.2.1.17	10/1/1998
3	1 byte	Intended Retarder Percent Torque	1085	-71	5.2.5.169	10/1/1998
4.1	2 bits	Engine Coolant Load Increase	1082	-71	5.2.2.21	10/1/1998
4.3	2 bits	Retarder Requesting Brake Light	1667	-71	5.2.7.???	5/19/1999
5	1 byte	Source Address of Controlling Device for Retarder	1480	-71	5.2.5.300	10/1/1998
6	1 byte	Drivers Demand Retarder - Percent Torque	1715	-71	5.2.7.???	7/28/2000
7	1 byte	Retarder Selection, non-engine	1716	-71	5.2.7.???	7/28/2000
8	1 byte	Actual Maximum Available Retarder - Percent Torque	1717	-71	5.2.7.???	7/28/2000

-71   **5.3.004**   *Electronic Brake Controller #1*   **-   EBC1**

Used for brake control information

Transmission Rate:	100 ms			
Data Length:	8			
Data Page:	0	**PGN Supporting Information:**		
PDU Format:	240			
PDU Specific:	1			
Default Priority:	6			
Parameter Group		61441 (F001)		

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	2 bits	ASR Engine Control Active	561 -71	5.2.2.07	10/1/1998
1.3	2 bits	ASR Brake Control Active	562 -71	5.2.2.08	10/1/1998
1.5	2 bits	Anti-Lock Braking (ABS) Active	563 -71	5.2.2.09	10/1/1998
1.7	2 bits	EBS Brake Switch	1121 -71	5.2.6.071	10/1/1998
2	1 byte	Brake Pedal Position	521 -71	5.2.1.18	10/1/1998
3.1	2 bits	ABS Offroad Switch	575 -71	5.2.2.15	10/1/1998
3.3	2 bits	ASR Offroad Switch	576 -71	5.2.2.16	10/1/1998
3.5	2 bits	ASR "Hill Holder" Switch	577 -71	5.2.2.17	10/1/1998
3.7	2 bits	Traction Control Override Switch	1238 -71	5.2.6.072	10/1/1998
4.1	2 bits	Accelerator Interlock Switch	972 -71	5.2.6.056	10/1/1998
4.3	2 bits	Engine Derate Switch	971 -71	5.2.6.055	10/1/1998
4.5	2 bits	Auxiliary Engine Shutdown Switch	970 -71	5.2.6.054	10/1/1998
4.7	2 bits	Remote Accelerator Enable Switch	969 -71	5.2.6.053	10/1/1998
5	1 byte	Engine Retarder Selection	973 -71	5.2.1.58	10/1/1998
6.1	2 bits	ABS Fully Operational	1243 -71	5.2.6.075	8/10/1999
6.3	2 bits	EBS Red Warning Lamp State	1439 -71	5.2.6.074	8/10/1999
6.5	2 bits	ABS/EBS Amber Warning Lamp State (Powered Vehicle)	1438 -71	5.2.6.073	8/10/1999
6.7	2 bits	ATC/ASR Lamp State (Powered Vehicle)	1793 -71	5.2.7.???	2/10/2000
7	1 byte	Source Address of Controlling Device for Brake Control	1481 -71	5.2.5.299	10/1/1998
8.5	2 bits	Trailer ABS Status	1836 -71	5.2.7.???	5/11/2000
8.7	2 bits	ABS Trailer Warning Lamp State	1792 -71	5.2.7.???	2/10/2000

-71　　　　5.3.005　　　　*Electronic Transmission Controller #1*　　　　-　ETC1

Transmission Rate:	10 ms
Data Length:	8
Data Page:	0　　　　　　　　**PGN Supporting Information:**
PDU Format:	240
PDU Specific:	2
Default Priority:	3
Parameter Group	61442　（　F002　）

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	2 bits	Driveline Engaged	560 -71	5.2.2.06	10/1/1998
1.3	2 bits	Torque Converter Lockup Engaged	573 -71	5.2.2.13	10/1/1998
1.5	2 bits	Shift In Process	574 -71	5.2.2.14	10/1/1998
2,3	2 bytes	Output Shaft Speed	191 -71	5.2.1.14	10/1/1998
4	1 byte	Percent Clutch Slip	522 -71	5.2.1.20	10/1/1998
5.1	2 bits	Momentary Engine Overspeed Enable	606 -71	5.2.3.12	10/1/1998
5.3	2 bits	Progressive Shift Disable	607 -71	5.2.3.11	10/1/1998
6,7	2 bytes	Input Shaft Speed	161 -71	5.2.5.055	10/1/1998
8	1 byte	Source Address of Controlling Device for Transmission Control	1482 -71	5.2.5.301	10/1/1998

-71　　　　5.3.006　　　　*Electronic Engine Controller #2*　　　　-　EEC2

Transmission Rate:	50 ms
Data Length:	8
Data Page:	0　　　　　　　　**PGN Supporting Information:**
PDU Format:	240
PDU Specific:	3
Default Priority:	3
Parameter Group	61443　（　F003　）

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	2 bits	Accelerator Pedal Low Idle Switch	558 -71	5.2.2.04	10/1/1998
1.3	2 bits	Accelerator Pedal Kickdown Switch	559 -71	5.2.2.05	10/1/1998
1.5	2 bits	Road Speed Limit Status	1437 -71	5.2.6.076	10/1/1998
2	1 byte	Accelerator Pedal Position	91 -71	5.2.1.08	10/1/1998

				SPN	SPN Doc and paragraph	Date Approved
3	1 byte	Percent Load At Current Speed		92 -71	5.2.1.07	10/1/1998
4	1 byte	Remote Accelerator		974 -71	5.2.1.59	10/1/1998

-71   5.3.007   *Electronic Engine Controller #1*   -   EEC1

Transmission Rate:	engine speed dependent (see 5.1.7.2)	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	240	
PDU Specific:	4	
Default Priority:	3	
Parameter Group	61444 (F004)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	4 bits	Engine Torque Mode	899 -71	5.2.2.01	10/1/1998
2	1 byte	Driver's Demand Engine - Percent Torque	512 -71	5.2.1.04	10/1/1998
3	1 byte	Actual Engine - Percent Torque	513 -71	5.2.1.05	10/1/1998
4,5	2 bytes	Engine Speed	190 -71	5.2.1.09	10/1/1998
6	1 byte	Source Address of Controlling Device for Engine	1483 -71	5.2.5.298	10/1/1998
7.1	4 bits	Engine Starter Mode	1675 -71	5.2.7.???	11/11/1999
8	1 byte	Engine Demand – Percent Torque	2432 -71	5.2.7.???	11/9/2000

-71   5.3.008   *Electronic Transmission Controller #2*   -   ETC2

Transmission Rate:	100 ms	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	240	
PDU Specific:	5	
Default Priority:	6	
Parameter Group	61445 (F005)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Selected Gear	524 -71	5.2.1.23	10/1/1998
2,3	2 bytes	Actual Gear Ratio	526 -71	5.2.1.25	10/1/1998
4	1 byte	Current Gear	523 -71	5.2.1.22	10/1/1998
5,6	2 bytes	Transmission Requested Range	162 -71	5.2.5.108	10/1/1998
7,8	2 bytes	Transmission Current Range	163 -71	5.2.5.109	10/1/1998

-71   **5.3.009**   *Electronic Axle Controller #1*   **-**   **EAC1**

NOTE - Request has to be responded to with as many messages as necessary to transmit all available information.

Transmission Rate:	500 ms	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	240	
PDU Specific:	6	
Default Priority:	6	
Parameter Group	61446 (F006)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	8 bits	Location	927 -71	5.2.5.095	10/1/1998
2.1	2 bits	Differential Lock State - Front Axle 1	567 -71	5.2.2.10	10/1/1998
2.3	2 bits	Differential Lock State - Front Axle 2	568 -71	5.2.2.10	10/1/1998
2.5	2 bits	Differential Lock State - Rear Axle 1	569 -71	5.2.2.10	10/1/1998
2.7	2 bits	Differential Lock State - Rear Axle 2	570 -71	5.2.2.10	10/1/1998
3.1	2 bits	Differential Lock State - Central	564 -71	5.2.2.10	10/1/1998
3.3	2 bits	Differential Lock State - Central Front	565 -71	5.2.2.10	10/1/1998
3.5	2 bits	Differential Lock State - Central Rear	566 -71	5.2.2.10	10/1/1998

-71   **5.3.010**   *Idle Operation*   **-**   **IO**

Transmission Rate:	On request	
Data Length:	Variable	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	220	
Default Priority:	6	
Parameter Group	65244 (FEDC)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1-4	4 bytes	Total Idle Fuel Used	236 -71	5.2.5.065	10/1/1998
5-8	4 bytes	Total Idle Hours	235 -71	5.2.5.059	10/1/1998

-71   **5.3.011**   *Turbocharger*   **- TC**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 221
Default Priority: 6
Parameter Group   65245   (FEDD)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Turbocharger Lube Oil Pressure 1	104	-71 5.2.5.029	10/1/1998
2,3	2 bytes	Turbocharger 1 Speed	103	-71 5.2.5.053	10/1/1998
4.7	2 bits	Turbo Oil Level Switch	1665	-71 5.2.7.???	5/18/1999

-71   **5.3.012**   *Air Start Pressure*   **- AIR2**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 222
Default Priority: 6
Parameter Group   65246   (FEDE)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Air Start Pressure	82	-71 5.2.5.026	10/1/1998

-71   5.3.013   *Electronic Engine Controller #3*   -   EEC3

Transmission Rate:	250 msecs		
Data Length:	8		
Data Page:	0	**PGN Supporting Information:**	
PDU Format:	254		
PDU Specific:	223		
Default Priority:	6		
Parameter Group		65247 (FEDF)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Nominal Friction - Percent Torque	514 -71	5.2.1.06	
2,3	2 bytes	Engine's Desired Operating Speed	515 -71	5.2.1.10	10/1/1998
4	1 byte	Engine's Desired Operating Speed Asymmetry	519 -71	5.2.1.16	10/1/1998

-71   5.3.014   *Vehicle Distance*   -   VD

Transmission Rate:	100 ms		
Data Length:	8		
Data Page:	0	**PGN Supporting Information:**	
PDU Format:	254		
PDU Specific:	224		
Default Priority:	6		
Parameter Group		65248 (FEE0)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1-4	4 bytes	Trip Distance	244 -71	5.2.5.050	10/1/1998
5-8	4 bytes	Total Vehicle Distance	245 -71	5.2.5.051	10/1/1998

-71   **5.3.015**   *Retarder Configuration*   **-   RC**

Transmission Rate: On change of torque/speed points of more than 10% since last transmission, or every 5 s.
Data Length: 19
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 225
Default Priority: 6
Parameter Group   65249   (FEE1   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
01.1	4 bits	Retarder Type	901 -71	5.2.2.02	10/1/1998
01.5	4 bits	Retarder Location	902 -71	5.2.2.03	10/1/1998
02	1 byte	Retarder Control Method (Retarder Configuration)	557 -71	5.2.1.50	10/1/1998
03,04	2 bytes	Retarder Speed At Idle, Point 1 (Retarder Configuration)	546 -71	5.2.1.41	10/1/1998
05	1 byte	Percent Torque At Idle, Point 1 (Retarder Configuration)	551 -71	5.2.1.45	10/1/1998
06,07	2 bytes	Maximum Retarder Speed, Point 2 (Retarder Configuration)	548 -71	5.2.1.43	10/1/1998
08	1 byte	Percent Torque At Maximum Speed, Point 2 (Retarder Configuration)	552 -71	5.2.1.46	10/1/1998
09,10	2 bytes	Retarder Speed At Point 3 (Retarder Configuration)	549 -71	5.2.1.44	10/1/1998
11	1 byte	Percent Torque At Point 3 (Retarder Configuration)	553 -71	5.2.1.47	10/1/1998
12,13	2 bytes	Retarder Speed At Point 4 (Retarder Configuration)	550 -71	5.2.1.44	10/1/1998
14	1 byte	Percent Torque At Point 4 (Retarder Configuration)	554 -71	5.2.1.47	10/1/1998
15,16	2 bytes	Retarder Speed At Peak Torque, Point 5 (Retarder Configuration)	547 -71	5.2.1.42	10/1/1998
17,18	2 bytes	Reference Retarder Torque (Retarder Configuration)	556 -71	5.2.1.49	10/1/1998
19	1 byte	Percent Torque At Peak Torque, Point 5 (Retarder Configuration)	555 -71	5.2.1.48	10/1/1998

-71   5.3.016   *Transmission Configuration*   -   TCFG

Total message length depends on total number of forward and reverse gear ratios.

Transmission Rate: On request
Data Length: Variable
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 226
Default Priority: 6
Parameter Group   65250   (FEE2)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1	1 byte	Number of Reverse Gear Ratios	958	-71	5.2.4.05	10/1/1998
2	1 byte	Number of Forward Gear Ratios	957	-71	5.2.4.04	10/1/1998
3,4	2 bytes	Transmission Gear Ratio	581	-71	5.2.4.02	10/1/1998

-71   5.3.017   *Engine Configuration*   -   EC

(reference 5.2.4.1)

Transmission Rate: On change of torque/speed points of more than 10% since last transmission, or every 5 s.
Data Length: 34
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 227
Default Priority: 6
Parameter Group   65251   (FEE3)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
01,02	2 bytes	Engine Speed At Idle, Point 1 (Engine Configuration)	188	-71	5.2.1.26	10/1/1998
03	1 byte	Percent Torque At Idle, Point 1 (Engine Configuration)	539	-71	5.2.1.36	10/1/1998
04,05	2 bytes	Engine Speed At Point 2 (Engine Configuration)	528	-71	5.2.1.27	10/1/1998
06	1 byte	Percent Torque At Point 2 (Engine Configuration)	540	-71	5.2.1.37	10/1/1998
07,08	2 bytes	Engine Speed At Point 3 (Engine Configuration)	529	-71	5.2.1.28	10/1/1998
09	1 byte	Percent Torque At Point 3 (Engine Configuration)	541	-71	5.2.1.38	10/1/1998
10,11	2 bytes	Engine Speed At Point 4 (Engine Configuration)	530	-71	5.2.1.28	10/1/1998
12	1 byte	Percent Torque At Point 4 (Engine Configuration)	542	-71	5.2.1.38	10/1/1998
13,14	2 bytes	Engine Speed At Point 5 (Engine Configuration)	531	-71	5.2.1.28	10/1/1998
15	1 byte	Percent Torque At Point 5 (Engine Configuration)	543	-71	5.2.1.38	10/1/1998

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
16,17	2 bytes	Engine Speed At High Idle, Point 6 (Engine	532	-71	5.2.1.29	10/1/1998
18,19	2 bytes	Gain (Kp) Of The Endspeed Governor (Engine Configuration)	545	-71	5.2.1.40	10/1/1998
20,21	2 bytes	Reference Engine Torque (Engine Configuration)	544	-71	5.2.1.39	10/1/1998
22,23	2 bytes	Maximum Momentary Engine Override Speed, Point 7 (Engine Configuration)	533	-71	5.2.1.30	10/1/1998
24	1 byte	Maximum Momentary Override Time Limit (Engine Configuration)	534	-71	5.2.1.31	10/1/1998
25	1 byte	Requested Speed Control Range Lower Limit (Engine Configuration)	535	-71	5.2.1.32	10/1/1998
26	1 byte	Requested Speed Control Range Upper Limit (Engine Configuration)	536	-71	5.2.1.33	10/1/1998
27	1 byte	Requested Torque Control Range Lower Limit (Engine Configuration)	537	-71	5.2.1.34	10/1/1998
28	1 byte	Requested Torque Control Range Upper Limit (Engine Configuration)	538	-71	5.2.1.35	10/1/1998
29,30	2 bytes	Extended Range Requested Speed Control Range Upper Limit	1712	-71	5.2.7.???	11/11/1999
31,32	2 bytes	Engine Moment of Inertia	1794	-71	5.2.7.???	2/10/2000
33,34	2 bytes	Default Engine Torque Limit	1846	-71	5.2.7.???	8/10/2000

-71   **5.3.018**   *Shutdown*   **- SHUTDO**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 228
Default Priority: 6
Parameter Group   65252   (FEE4)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1.1	2 bits	Idle Shutdown has Shutdown Engine	593	-71	5.2.6.005	10/1/1998
1.3	2 bits	Idle Shutdown Driver Alert Mode	594	-71	5.2.6.006	10/1/1998
1.5	2 bits	Idle Shutdown Timer Override	592	-71	5.2.6.004	10/1/1998
1.7	2 bits	Idle Shutdown Timer State	590	-71	5.2.6.002	10/1/1998
2.7	2 bits	Idle Shutdown Timer Function	591	-71	5.2.6.003	10/1/1998
3.1	2 bits	A/C High Pressure Fan Switch	985	-71	5.2.6.052	10/1/1998
3.3	2 bits	Refrigerant Low Pressure Switch	875	-71	5.2.6.051	10/1/1998
3.5	2 bits	Refrigerant High Pressure Switch	605	-71	5.2.6.050	10/1/1998
4.1	2 bits	Wait to Start Lamp	1081	-71	5.2.6.057	10/1/1998
5.1	2 bits	Engine Protection System has Shutdown Engine	1110	-71	5.2.6.061	10/1/1998
5.3	2 bits	Engine Protection System Approaching Shutdown	1109	-71	5.2.6.060	10/1/1998
5.5	2 bits	Engine Protection System Timer Override	1108	-71	5.2.6.059	10/1/1998
5.7	2 bits	Engine Protection System Timer State	1107	-71	5.2.6.058	10/1/1998
6.7	2 bits	Engine Protection System Configuration	1111	-71	5.2.6.062	10/1/1998

-71   **5.3.019**   *Engine Hours, Revolutions*   **- HOURS**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 229
Default Priority: 6
Parameter Group   65253   (FEE5)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1-4	4 bytes	Total Engine Hours	247	-71 5.2.5.061	10/1/1998
5-8	4 bytes	Total Engine Revolutions	249	-71 5.2.5.058	10/1/1998

-71   **5.3.020**   *Time/Date*   **- TD**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 230
Default Priority: 6
Parameter Group   65254   (FEE6)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Seconds	959	-71 5.2.5.093	10/1/1998
2	1 byte	Minutes	960	-71 5.2.5.094	10/1/1998
3	1 byte	Hours	961	-71 5.2.5.110	10/1/1998
4	1 byte	Month	963	-71 5.2.5.112	10/1/1998
5	1 byte	Day	962	-71 5.2.5.111	10/1/1998
6	1 byte	Year	964	-71 5.2.5.113	10/1/1998
7	1 byte	Local minute offset	1601	-71 5.2.5.296	10/1/1998
8	1 byte	Local hour offset	1602	-71 5.2.5.297	10/1/1998

-71   **5.3.021**   *Vehicle Hours*   **- VH**

Transmission Rate:	On request	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	231	
Default Priority:	6	
Parameter Group	65255 (FEE7)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1-4	4 bytes	Total Vehicle Hours	246 -71	5.2.5.060	10/1/1998
5-8	4 bytes	Total Power Takeoff Hours	248 -71	5.2.5.062	10/1/1998

-71   **5.3.022**   *Vehicle Direction/Speed*   **- VDS**

Transmission Rate:	On request	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	232	
Default Priority:	6	
Parameter Group	65256 (FEE8)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Compass Bearing	165 -71	5.2.5.083	10/1/1998
3,4	2 bytes	Navigation-Based Vehicle Speed	517 -71	5.2.1.13	10/1/1998
5,6	2 bytes	Pitch	583 -71	5.2.5.084	10/1/1998
7,8	2 bytes	Altitude	580 -71	5.2.5.052	10/1/1998

-71   **5.3.023**   *Fuel Consumption (Liquid)*   **-   LFC**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 233
Default Priority: 6
Parameter Group   65257   (FEE9)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1-4	4 bytes	Trip Fuel	182 -71	5.2.5.064	10/1/1998
5-8	4 bytes	Total Fuel Used	250 -71	5.2.5.066	10/1/1998

-71   **5.3.024**   *Vehicle Weight*   **-   VW**

NOTE–Request has to be responded to with as many messages as necessary to transmit all available information.

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 234
Default Priority: 6
Parameter Group   65258   (FEEA)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	8 bits	Axle Location	928 -71	5.2.5.095	10/1/1998
2,3	2 bytes	Axle Weight	582 -71	5.2.5.080	10/1/1998
4,5	2 bytes	Trailer Weight	180 -71	5.2.5.081	10/1/1998
6,7	2 bytes	Cargo Weight	181 -71	5.2.5.082	10/1/1998

-71   5.3.025   *Component Identification*   -   CI

NOTE - The make, model, serial number and unit number fields in this message are optional and separated by an ASCII "*". It is not necessary to include all fields; however, the delimiter ("*") is always required.

Field:
a Make
Delimiter (ASCII "*")
b Model
Delimiter (ASCII "*")
c Serial number
Delimiter (ASCII "*")
d Unit number (Power unit)
Delimiter (ASCII "*")

Transmission Rate:	On request	
Data Length:	Variable	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	235	
Default Priority:	6	
Parameter Group	65259 (FEEB)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
a	5 bytes	Make	586 -71	5.2.5.090	10/1/1998
b	Variable - up to 200 characters ("*" delimited)	Model	587 -71	5.2.5.091	10/1/1998
c	Variable - up to 200 characters ("*" delimited)	Serial Number	588 -71	5.2.5.092	10/1/1998
d	Variable - up to 200 characters ("*" delimited)	Unit Number (Power Unit)	233 -71	5.2.5.089	10/1/1998

-71   **5.3.026**   *Vehicle Identification*   **- VI**

Byte: 1-n Vehicle Identification Number
Delimiter (ASCII "*")

Transmission Rate:	On request	
Data Length:	Variable	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	236	
Default Priority:	6	
Parameter Group	65260 (FEEC)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	Variable - up to 200 characters ("*" delimited)	Vehicle Identification Number	237 -71	5.2.5.087	10/1/1998

-71   **5.3.027**   *Cruise Control/Vehicle Speed Setup*   **- CCSS**

Transmission Rate:	On request	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	237	
Default Priority:	6	
Parameter Group	65261 (FEED)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Maximum Vehicle Speed Limit	74 -71	5.2.5.046	10/1/1998
2	1 byte	Cruise Control High Set Limit Speed	87 -71	5.2.5.048	10/1/1998
3	1 byte	Cruise Control Low Set Limit Speed	88 -71	5.2.5.049	10/1/1998

-71　　　　**5.3.028**　　　　　*Engine Temperature #1*　　　　　　　　　　　**-　ET1**

Transmission Rate:　　　　1 s
Data Length:　　　　　　8
Data Page:　　　　　　　0　　　　　　　**PGN Supporting Information:**
PDU Format:　　　　　　254
PDU Specific:　　　　　　238
Default Priority:　　　　　6
Parameter Group　　　　　　　　65262　　(FEEE)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Engine Coolant Temperature	110	-71　5.2.5.005	10/1/1998
2	1 byte	Fuel Temperature	174	-71　5.2.5.014	10/1/1998
3,4	2 bytes	Engine Oil Temperature 1	175	-71　5.2.5.015	10/1/1998
5,6	2 bytes	Turbo Oil Temperature	176	-71　5.2.5.016	10/1/1998
7	1 byte	Engine Intercooler Temperature	52	-71　5.2.5.006	10/1/1998
8	1 byte	Engine Intercooler Thermostat Opening	1134	-71　5.2.5.242	10/1/1998

-71　　　　**5.3.029**　　　　　*Engine Fluid Level/Pressure #1*　　　　　**-　EFL/P1**

Transmission Rate:　　　　0.5 s
Data Length:　　　　　　8
Data Page:　　　　　　　0　　　　　　　**PGN Supporting Information:**
PDU Format:　　　　　　254
PDU Specific:　　　　　　239
Default Priority:　　　　　6
Parameter Group　　　　　　　　65263　　(FEEF)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Fuel Delivery Pressure	94	-71　5.2.5.027	10/1/1998
2	1 byte	Extended Crankcase Blow-by Pressure (use SPN 1264)	22	-71　5.2.5.241	10/1/1998
2	1 byte	Extended Crankcase Blow-by Pressure - duplicate (see SPN 22)	1264	-71　5.2.5.241	10/1/1998
3	1 byte	Engine Oil Level	98	-71　5.2.5.072	10/1/1998
4	1 byte	Engine Oil Pressure	100	-71　5.2.5.028	10/1/1998
5,6	2 bytes	Crankcase Pressure	101	-71　5.2.5.040	10/1/1998
7	1 byte	Coolant Pressure	109	-71　5.2.5.038	10/1/1998

| 8 | 1 byte | Coolant Level | | 111 | -71 | 5.2.5.073 | 11/9/2000 |

-71   5.3.030   *Power Takeoff Information*   - PTO

Transmission Rate: 100 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 240
Default Priority: 6
Parameter Group   65264   (FEF0)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1	1 byte	Power Takeoff Oil Temperature	90	-71	5.2.5.003	10/1/1998
2,3	2 bytes	Power Takeoff Speed	186	-71	5.2.5.056	10/1/1998
4,5	2 bytes	Power Takeoff Set Speed	187	-71	5.2.5.057	10/1/1998
6.1	2 bits	PTO Enable Switch	980	-71	5.2.6.045	10/1/1998
6.3	2 bits	Remote PTO Preprogrammed Speed Control Switch	979	-71	5.2.6.044	10/1/1998
6.5	2 bits	Remote PTO Variable Speed Control Switch	978	-71	5.2.6.043	10/1/1998
7.1	2 bits	PTO Set Switch	984	-71	5.2.6.049	10/1/1998
7.3	2 bits	PTO Coast/Decelerate Switch	983	-71	5.2.6.048	10/1/1998
7.5	2 bits	PTO Resume Switch	982	-71	5.2.6.047	10/1/1998
7.7	2 bits	PTO Accelerate Switch	981	-71	5.2.6.046	10/1/1998

-71   5.3.031   *Cruise Control/Vehicle Speed*   - CCVS

Transmission Rate: 100 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 241
Default Priority: 6
Parameter Group   65265   (FEF1)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1.1	2 bits	Two Speed Axle Switch	69	-71	5.2.6.001	10/1/1998
1.3	2 bits	Parking Brake Switch	70	-71	5.2.6.008	10/1/1998
1.5	2 bits	Cruise Control Pause Switch	1633	-71	5.2.7.???	2/10/1999

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
2,3	2 bytes	Wheel-Based Vehicle Speed	84	-71	5.2.1.12	10/1/1998
4.1	2 bits	Cruise Control Active	595	-71	5.2.6.009	10/1/1998
4.3	2 bits	Cruise Control Enable Switch	596	-71	5.2.6.010	10/1/1998
4.5	2 bits	Brake Switch	597	-71	5.2.6.011	10/1/1998
4.7	2 bits	Clutch Switch	598	-71	5.2.6.012	10/1/1998
5.1	2 bits	Cruise Control Set Switch	599	-71	5.2.6.014	10/1/1998
5.3	2 bits	Cruise Control Coast (Decelerate) Switch	600	-71	5.2.6.015	10/1/1998
5.5	2 bits	Cruise Control Resume Switch	601	-71	5.2.6.016	10/1/1998
5.7	2 bits	Cruise Control Accelerate Switch	602	-71	5.2.6.017	10/1/1998
6	1 byte	Cruise Control Set Speed	86	-71	5.2.5.047	10/1/1998
7.1	5 bits	PTO State	976	-71	5.2.2.19	10/1/1998
7.6	3 bits	Cruise Control States	527	-71	5.2.2.18	10/1/1998
8.1	2 bits	Idle Increment Switch	968	-71	5.2.6.042	10/1/1998
8.3	2 bits	Idle Decrement Switch	967	-71	5.2.6.041	10/1/1998
8.5	2 bits	Engine Test Mode Switch	966	-71	5.2.6.040	10/1/1998
8.7	2 bits	Engine Shutdown Override Switch	1237	-71	5.2.6.102	10/1/1998

-71   **5.3.032**   *Fuel Economy (Liquid)*   **- LFE**

Transmission Rate: 100 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 242
Default Priority: 6
Parameter Group   65266   (FEF2   )

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1,2	2 bytes	Fuel Rate	183	-71	5.2.5.063	10/1/1998
3,4	2 bytes	Instantaneous Fuel Economy	184	-71	5.2.5.067	10/1/1998
5,6	2 bytes	Average Fuel Economy	185	-71	5.2.5.068	10/1/1998
7	1 byte	Throttle Position	51	-71	5.2.5.096	10/1/1998

-71   **5.3.033**   *Vehicle Position*   **- VP**

Transmission Rate: 5 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 243
Default Priority: 6
Parameter Group   65267   (FEF3)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1-4	4 bytes	Latitude	584 -71	5.2.5.085	10/1/1998
5-8	4 bytes	Longitude	585 -71	5.2.5.086	10/1/1998

-71   **5.3.034**   *Tire Condition*   **- TIRE**

NOTE–Request has to be responded to with as many messages as necessary to transmit all available information.

Transmission Rate: 10 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 244
Default Priority: 6
Parameter Group   65268   (FEF4)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	8 bits	Tire Location	929 -71	5.2.5.095	10/1/1998
2	1 byte	Tire Pressure	241 -71	5.2.5.034	10/1/1998
3,4	2 bytes	Tire Temperature	242 -71	5.2.5.018	10/1/1998
5.1	2 bits	CTI Wheel Sensor Status	1699 -71	5.2.7.???	5/1/1999
5.3	2 bits	CTI Tire Status	1698 -71	5.2.7.???	5/1/1999
5.5	2 bits	CTI Wheel End Electrical Fault	1697 -71	5.2.7.???	5/1/1999
6,7	2 bytes	Tire Air Leakage Rate	2586 -71	5.2.7.???	2/15/2001
8.6	3 bits	Tire Pressure Threshold Detection	2587 -71	5.2.7.???	2/15/2001

-71   5.3.035   *Ambient Conditions*   -   AMB

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 245
Default Priority: 6
Parameter Group   65269   (FEF5   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Barometric Pressure	108 -71	5.2.5.043	10/1/1998
2,3	2 bytes	Cab Interior Temperature	170 -71	5.2.5.011	10/1/1998
4,5	2 bytes	Ambient Air Temperature	171 -71	5.2.5.012	10/1/1998
6	1 byte	Air Inlet Temperature	172 -71	5.2.5.013	10/1/1998
7,8	2 bytes	Road Surface Temperature	79 -71	5.2.5.009	10/1/1998

-71   5.3.036   *Inlet/Exhaust Conditions*   -   IC

Transmission Rate: 0.5 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 246
Default Priority: 6
Parameter Group   65270   (FEF6   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Particulate Trap Inlet Pressure	81 -71	5.2.5.041	10/1/1998
2	1 byte	Boost Pressure	102 -71	5.2.5.036	10/1/1998
3	1 byte	Intake Manifold 1 Temperature	105 -71	5.2.5.004	10/1/1998
4	1 byte	Air Inlet Pressure	106 -71	5.2.5.037	10/1/1998
5	1 byte	Air Filter Differential Pressure	107 -71	5.2.5.045	10/1/1998
6,7	2 bytes	Exhaust Gas Temperature	173 -71	5.2.5.008	10/1/1998
8	1 byte	Coolant Filter Differential Pressure	112 -71	5.2.5.044	10/1/1998

-71   **5.3.037**   *Vehicle Electrical Power*   **-   VEP**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 247
Default Priority: 6
Parameter Group   65271   (FEF7   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Net Battery Current	114 -71	5.2.5.078	10/1/1998
2	1 byte	Alternator Current	115 -71	5.2.5.079	10/1/1998
3,4	2 bytes	Alternator Potential (Voltage)	167 -71	5.2.5.076	10/1/1998
5,6	2 bytes	Electrical Potential (Voltage)	168 -71	5.2.5.077	10/1/1998
7,8	2 bytes	Battery Potential (Voltage), Switched	158 -71	5.2.5.075	10/1/1998

-71   **5.3.038**   *Transmission Fluids*   **-   TF**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 248
Default Priority: 6
Parameter Group   65272   (FEF8   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Clutch Pressure	123 -71	5.2.5.023	10/1/1998
2	1 byte	Transmission Oil Level	124 -71	5.2.5.074	10/1/1998
3	1 byte	Transmission Filter Differential Pressure	126 -71	5.2.5.039	10/1/1998
4	1 byte	Transmission Oil Pressure	127 -71	5.2.5.024	10/1/1998
5,6	2 bytes	Transmission Oil Temperature	177 -71	5.2.5.017	10/1/1998

-71   **5.3.039**   *Axle Information*   **-   AI**

NOTE–Request has to be responded to with as many messages as necessary to transmit all available information.

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 249
Default Priority: 6
Parameter Group   65273   (FEF9)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Steering Axle Temperature	75 -71	5.2.5.001	10/1/1998
2	8 bits	Drive Axle Location	930 -71	5.2.5.095	10/1/1998
3	1 byte	Drive Axle Lift Air Pressure	579 -71	5.2.5.025	10/1/1998
4	1 byte	Drive Axle Temperature	578 -71	5.2.5.002	10/1/1998

-71   **5.3.040**   *Brakes*   **-   B**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 250
Default Priority: 6
Parameter Group   65274   (FEFA)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Brake Application Pressure	116 -71	5.2.5.030	10/1/1998
2	1 byte	Brake Primary Pressure	117 -71	5.2.5.031	10/1/1998
3	1 byte	Brake Secondary Pressure	118 -71	5.2.5.032	10/1/1998
4.1	2 bits	Parking Brake Actuator	619 -71	5.2.6.013	10/1/1998

-71　　　　**5.3.041**　　　　*Retarder fluids*　　　　　　　　　　　　　　**-　RF**

Transmission Rate:　　　1 s
Data Length:　　　　　　8
Data Page:　　　　　　　0　　　　　　　**PGN Supporting Information:**
PDU Format:　　　　　　254
PDU Specific:　　　　　251
Default Priority:　　　　6
Parameter Group　　　　　　　　65275　　(　FEFB　)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Hydraulic Retarder Pressure	119 -71	5.2.5.033	10/1/1998
2	1 byte	Hydraulic Retarder Oil Temperature	120 -71	5.2.5.007	10/1/1998

-71　　　　**5.3.042**　　　　*Dash Display*　　　　　　　　　　　　　　**-　DD**

Transmission Rate:　　　1s
Data Length:　　　　　　8
Data Page:　　　　　　　0　　　　　　　**PGN Supporting Information:**
PDU Format:　　　　　　254
PDU Specific:　　　　　252
Default Priority:　　　　6
Parameter Group　　　　　　　　65276　　(　FEFC　)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Washer Fluid Level	80 -71	5.2.5.070	10/1/1998
2	1 byte	Fuel Level	96 -71	5.2.5.071	10/1/1998
3	1 byte	Fuel Filter Differential Pressure	95 -71	5.2.5.035	10/1/1998
4	1 byte	Engine Oil Filter Differential Pressure	99 -71	5.2.5.042	10/1/1998
5,6	2 bytes	Cargo Ambient Temperature	169 -71	5.2.5.010	10/1/1998

-71 **5.3.043** *Alternate Fuel #1* **- AF1**

Transmission Rate: 500 ms
Data Length: 8
Data Page: 0 **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 253
Default Priority: 6
Parameter Group 65277 (FEFD)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Blower Bypass Valve Position	72 -71	5.2.5.069	10/1/1998
2,3	2 bytes	Gas Supply Pressure	159 -71	5.2.5.019	10/1/1998

-71 **5.3.044** *Auxiliary Water Pump Pressure* **- AWPP**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0 **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 254
Default Priority: 6
Parameter Group 65278 (FEFE)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Auxiliary Pump Pressure	73 -71	5.2.5.022	10/1/1998

-71   **5.3.045**   *Water in Fuel Indicator*   **- WFI**

Transmission Rate: 10 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 255
Default Priority: 6
Parameter Group   65279   (FEFF)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	2 bits	Water In Fuel Indicator	97 -71	5.2.6.007	10/1/1998

-71   **5.3.046**   *Engine Fluid Level/Pressure #2*   **- EFL/P2**

Transmission Rate: 0.5 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 219
Default Priority: 6
Parameter Group   65243   (FEDB)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Injection Control Pressure	164 -71	5.2.5.020	10/1/1998
3,4	2 bytes	Injector Metering Rail 1 Pressure	157 -71	5.2.5.021	10/1/1998
5,6	2 bytes	Injector Timing Rail 1 Pressure	156 -71	5.2.5.243	10/1/1998
7,8	2 bytes	Injector Metering Rail 2 Pressure (see also SPN 129)	1349 -71	5.2.5.244	10/1/1998
7,8	2 bytes	Injector Metering Rail 2 Pressure (duplicate, use 1349)	129 -71	5.2.5.244	10/1/1998

-71 5.3.047 *Software Identification* - SOFT

Byte: 1 Number of software identification fields
2-n Software identification(s)
Delimiter (ASCII "*")

NOTE- The software identification field is variable in length and may contain up to 125 software identification designators. An ASCII "*" is used as a delimiter to separate multiple software identifications. Additional software identification fields may be added at the end, each separated by an ASCII "*" as a delimiter. An ASCII "*" is required at the end of the last software identification field, even if there is only one software identification designator.

Transmission Rate:	On request		
Data Length:	Variable		
Data Page:	0	**PGN Supporting Information:**	
PDU Format:	254		
PDU Specific:	218		
Default Priority:	6		
Parameter Group		65242 (FEDA)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Number of Software Identification Fields	965 -71	5.2.5.114	10/1/1998
2-N	1 byte	Software Identification	234 -71	5.2.5.088	10/1/1998

-71 5.3.048 *Auxiliary Input/Output Status* - AUXIO

NOTE - SPN 701 is used for I/O channel #1. The remaining I/O channels are numbered sequentially ending with SPN 716 for I/O channel #16.

Transmission Rate:	manufacturer defined, not faster than 100 ms		
Data Length:	8		
Data Page:	0	**PGN Supporting Information:**	
PDU Format:	254		
PDU Specific:	217		
Default Priority:	6		
Parameter Group		65241 (FED9)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	2 bits	Auxiliary I/O #04	704 -71	5.2.6.018	10/1/1998
1.3	2 bits	Auxiliary I/O #03	703 -71	5.2.6.018	10/1/1998
1.5	2 bits	Auxiliary I/O #02	702 -71	5.2.6.018	10/1/1998
1.7	2 bits	Auxiliary I/O #01	701 -71	5.2.6.018	10/1/1998

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
2.1	2 bits	Auxiliary I/O #08	708	-71	5.2.6.018	10/1/1998
2.3	2 bits	Auxiliary I/O #07	707	-71	5.2.6.018	10/1/1998
2.5	2 bits	Auxiliary I/O #06	706	-71	5.2.6.018	10/1/1998
2.7	2 bits	Auxiliary I/O #05	705	-71	5.2.6.018	10/1/1998
3.1	2 bits	Auxiliary I/O #12	712	-71	5.2.6.018	10/1/1998
3.3	2 bits	Auxiliary I/O #11	711	-71	5.2.6.018	10/1/1998
3.5	2 bits	Auxiliary I/O #10	710	-71	5.2.6.018	10/1/1998
3.7	2 bits	Auxiliary I/O #09	709	-71	5.2.6.018	10/1/1998
4.1	2 bits	Auxiliary I/O #16	716	-71	5.2.6.018	10/1/1998
4.3	2 bits	Auxiliary I/O #15	715	-71	5.2.6.018	10/1/1998
4.5	2 bits	Auxiliary I/O #14	714	-71	5.2.6.018	10/1/1998
4.7	2 bits	Auxiliary I/O #13	713	-71	5.2.6.018	10/1/1998
5,6	2 bytes	Auxiliary I/O Channel #1	1083	-71	5.2.5.168	10/1/1998
7,8	2 bytes	Auxiliary I/O Channel #2	1084	-71	5.2.5.168	10/1/1998

-71   **5.3.049**   *Alternator Speed*   **- AS**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 213
Default Priority: 6
Parameter Group   65237   (FED5)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1,2	2 bytes	Alternator Speed	589	-71	5.2.5.097	10/1/1998

-71   5.3.050   *Electronic Transmission Controller #3*   -   ETC3

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 199
Default Priority: 7
Parameter Group   65223   (FEC7)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Shift Finger Gear Position	59	-71 5.2.5.099	10/1/1998
2	1 byte	Shift Finger Rail Position	60	-71 5.2.5.098	10/1/1998
3.1	2 bits	Shift Finger Neutral Indicator	780	-71 5.2.6.019	10/1/1998
3.3	2 bits	Shift Finger Engagement Indicator	781	-71 5.2.6.020	10/1/1998
3.5	2 bits	Shift Finger Center Rail Indicator	782	-71 5.2.6.021	10/1/1998
4.1	2 bits	Shift Finger Rail Actuator 1	772	-71 5.2.6.024	10/1/1998
4.3	2 bits	Shift Finger Gear Actuator 1	773	-71 5.2.6.022	10/1/1998
4.5	2 bits	Shift Finger Rail Actuator 2	783	-71 5.2.6.025	10/1/1998
4.7	2 bits	Shift Finger Gear Actuator 2	784	-71 5.2.6.023	10/1/1998
5.1	2 bits	Range High Actuator	768	-71 5.2.6.029	10/1/1998
5.3	2 bits	Range Low Actuator	769	-71 5.2.6.028	10/1/1998
5.5	2 bits	Splitter Direct Actuator	770	-71 5.2.6.027	10/1/1998
5.7	2 bits	Splitter Indirect Actuator	771	-71 5.2.6.026	10/1/1998
6.1	2 bits	Clutch Actuator	788	-71 5.2.6.033	10/1/1998
6.3	2 bits	Lockup Clutch Actuator	740	-71 5.2.6.032	10/1/1998
6.5	2 bits	Defuel Actuator	786	-71 5.2.6.031	10/1/1998
6.7	2 bits	Inertia Brake Actuator	787	-71 5.2.6.030	10/1/1998

-71   5.3.051   *Electronic Transmission Controller #4*   -   ETC4

Transmission Rate:	On request
Data Length:	8
Data Page:	0 **PGN Supporting Information:**
PDU Format:	254
PDU Specific:	197
Default Priority:	7
Parameter Group	65221 (FEC5)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Transmission Synchronizer Clutch Value	53 -71	5.2.5.100	10/1/1998
2	1 byte	Transmission Synchronizer Brake Value	54 -71	5.2.5.101	10/1/1998

-71   5.3.052   *Electronic Transmission Controller #5*   -   ETC5

Transmission Rate:	On request
Data Length:	8
Data Page:	0 **PGN Supporting Information:**
PDU Format:	254
PDU Specific:	195
Default Priority:	7
Parameter Group	65219 (FEC3)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	2 bits	Transmission High Range Sense Switch	778 -71	5.2.6.035	10/1/1998
1.3	2 bits	Transmission Low Range Sense Switch	779 -71	5.2.6.034	10/1/1998
2.1	2 bits	Transmission Reverse Direction Switch	767 -71	5.2.6.038	10/1/1998
2.3	2 bits	Transmission Neutral Switch	604 -71	5.2.6.037	10/1/1998
2.5	2 bits	Transmission Forward Direction Switch	903 -71	5.2.6.036	10/1/1998

-71   **5.3.053**   *Electronic Retarder Controller #2*   **- ERC2**

Transmission Rate: 1 s when active; or on change of state
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 194
Default Priority: 7
Parameter Group   65218   (FEC2)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	2 bits	Transmission Output Retarder	748 -71	5.2.6.039	10/1/1998

-71   **5.3.054**   *High Resolution Vehicle Distance*   **- VDHR**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 193
Default Priority: 6
Parameter Group   65217   (FEC1)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1-4	4 bytes	High Resolution Total Vehicle Distance	917 -71	5.2.5.106	10/1/1998
5-8	4 bytes	High Resolution Trip Distance	918 -71	5.2.5.107	10/1/1998

-71   5.3.055   *Service Information*   -   SERV

Transmitted with the service component identification that has the shortest distance or nearest time until the next service inspection.

NOTE - There are two acceptable formats for the Service PGN. Format 1 has only 8 bytes of data and reports the component most in need of service for each of the three categories. Format 2, however, uses the transport layer as necessary in order to repeat these 8 bytes of service component information until all supported service components in each category have been transmitted.

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 192
Default Priority: 6
Parameter Group   65216   (FEC0)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Service Component Identification	911 -71	5.2.5.102	10/1/1998
2,3	2 bytes	Service Distance	914 -71	5.2.5.103	10/1/1998
4	1 byte	Service Component Identification	912 -71	5.2.5.102	10/1/1998
5	1 byte	Service Delay/Calendar Time Based	915 -71	5.2.5.104	10/1/1998
6	1 byte	Service Component Identification	913 -71	5.2.5.102	10/1/1998
7,8	2 bytes	Service Delay/Operational Time Based	916 -71	5.2.5.105	10/1/1998

-71   5.3.056   *Wheel Speed Information*   -   EBC2

Transmission Rate: 100 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 191
Default Priority: 6
Parameter Group   65215   (FEBF)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Front Axle Speed	904 -71	5.2.1.51	10/1/1998
3	1 byte	Relative Speed; Front Axle, Left Wheel	905 -71	5.2.1.52	10/1/1998
4	1 byte	Relative Speed; Front Axle, Right Wheel	906 -71	5.2.1.53	10/1/1998

					SPN Doc	Date
5	1 byte	Relative Speed; Rear Axle #1, Left Wheel		907 -71	5.2.1.54	10/1/1998
6	1 byte	Relative Speed; Rear Axle #1, Right Wheel		908 -71	5.2.1.55	10/1/1998
7	1 byte	Relative Speed; Rear Axle #2, Left Wheel		909 -71	5.2.1.56	10/1/1998
8	1 byte	Relative Speed; Rear Axle #2, Right Wheel		910 -71	5.2.1.57	10/1/1998

-71   5.3.057   *Electronic Engine Controller #4*   - EEC4

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 190
Default Priority: 7
Parameter Group   65214   (FEBE)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Rated Engine Power	166 -71	5.2.5.115	10/1/1998
3,4	2 bytes	Rated Engine Speed	189 -71	5.2.5.116	10/1/1998

-71   5.3.058   *Fan Drive*   - FD

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 189
Default Priority: 6
Parameter Group   65213   (FEBD)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Estimated Percent Fan Speed	975 -71	5.2.1.60	10/1/1998
2.1	4 bits	Fan Drive State	977 -71	5.2.2.20	10/1/1998
3,4	2 bytes	Fan Speed	1639 -71	5.2.7.???	2/10/1999

-71   **5.3.059**   *Cab Message #1*   **- CM1**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 224
PDU Specific: Destination Address
Default Priority: 6
Parameter Group   57344   (E000   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Requested Percent Fan Speed	986 -71	5.2.1.61	7/29/1999
2,3	2 bytes	Cab Interior Temperature Request	1691 -71	5.2.7.???	3/2/2000
4.1	2 bits	Auxiliary Heater Coolant Pump Request	1684 -71	5.2.7.???	5/19/1999
4.3	2 bits	Battery Main Switch Hold Request	1682 -71	5.2.7.???	5/19/1999
4.5	2 bits	Operator Seat Direction Switch	1714 -71	5.2.7.???	11/11/1999
4.7	2 bits	Seat Belt Switch	1856 -71	5.2.7.???	8/10/2000
5.3	2 bits	Vehicle Limiting Speed Governor Decrement Switch	1655 -71	5.2.7.???	11/11/1999
5.5	2 bits	Vehicle Limiting Speed Governor Increment Switch	1654 -71	5.2.7.???	11/11/1999
5.7	2 bits	Vehicle Limiting Speed Governor Enable Switch	1653 -71	5.2.7.???	11/11/1999
6.5	2 bits	Automatic Gear Shifting Enable Switch	1666 -71	5.2.7.???	11/11/1999
6.7	2 bits	Engine Automatic Start Enable Switch	1656 -71	5.2.7.???	11/11/1999
7.1	4 bits	Auxiliary Heater Mode Request	1683 -71	5.2.7.???	3/2/2000
7.5	2 bits	Request Engine Zone Heating	1685 -71	5.2.7.???	3/2/2000
7.7	2 bits	Request Cab Zone Heating	1686 -71	5.2.7.???	3/2/2000
8	1 byte	Selected Maximum Vehicle Speed Limit	2596 -71	5.2.7.???	11/9/2000

-71   **5.3.060**   *Compression/Service Brake Information*   **- CBI**

Transmission Rate: On request
Data Length: 16
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 188
Default Priority: 7
Parameter Group   65212   (FEBC)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
01-04	4 bytes	Total Compression Brake Distance	990 -71	5.2.5.117	10/1/1998
05-08	4 bytes	Trip Compression Brake Distance	991 -71	5.2.5.118	10/1/1998
09-12	4 bytes	Trip Service Brake Distance	992 -71	5.2.5.119	10/1/1998
13-16	4 bytes	Trip Service Brake Applications	993 -71	5.2.5.120	10/1/1998

-71   **5.3.061**   *Trip Fan Information*   **- TFI**

Transmission Rate: On request
Data Length: 16
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 187
Default Priority: 7
Parameter Group   65211   (FEBB)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
01-04	4 bytes	Trip Fan On Time	994 -71	5.2.5.121	10/1/1998
05-08	4 bytes	Trip Fan On Time Due to the Engine System	995 -71	5.2.5.122	10/1/1998
09-12	4 bytes	Trip Fan On Time Due to a Manual Switch	996 -71	5.2.5.123	10/1/1998
13-16	4 bytes	Trip Fan On Time Due to the A/C System	997 -71	5.2.5.124	10/1/1998

-71   **5.3.062**   *Trip Distance Information*   **- TDI**

Transmission Rate: On request
Data Length: 12
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 186
Default Priority: 7
Parameter Group   65210   (FEBA)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1-4	4 bytes	Trip Distance on Road Speed Governing	998	-71 5.2.5.125	10/1/1998
5-8	4 bytes	Trip Gear Down Distance	999	-71 5.2.5.126	10/1/1998
9-12	4 bytes	Trip Distance in Top Gear	1000	-71 5.2.5.127	10/1/1998

-71   **5.3.063**   *Trip Fuel Information (Liquid)*   **- LTFI**

Transmission Rate: On request
Data Length: 22
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 185
Default Priority: 7
Parameter Group   65209   (FEB9)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
01-04	4 bytes	Trip Drive Fuel Used	1001	-71 5.2.5.128	10/1/1998
05-08	4 bytes	Trip PTO Moving Fuel Used	1002	-71 5.2.5.129	10/1/1998
09-12	4 bytes	Trip PTO Non-moving Fuel Used	1003	-71 5.2.5.130	10/1/1998
13-16	4 bytes	Trip Vehicle Idle Fuel Used	1004	-71 5.2.5.131	11/9/2000
17-20	4 bytes	Trip Cruise Fuel Used	1005	-71 5.2.5.132	10/1/1998
21-22	2 bytes	Trip Drive Fuel Economy	1006	-71 5.2.5.133	10/1/1998

-71   **5.3.064**   *Trip Fuel Information (Gaseous)*   **- GTFI**

Transmission Rate: On request
Data Length: 22
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 184
Default Priority: 7
Parameter Group   65208   (FEB8   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
01-04	4 bytes	Trip Drive Fuel Used (Gaseous)	1007 -71	5.2.5.134	10/1/1998
05-08	4 bytes	Trip PTO Moving Fuel Used (Gaseous)	1008 -71	5.2.5.135	10/1/1998
09-12	4 bytes	Trip PTO Non-moving Fuel Used (Gaseous)	1009 -71	5.2.5.136	10/1/1998
13-16	4 bytes	Trip Vehicle Idle Fuel Used (Gaseous)	1010 -71	5.2.5.137	10/1/1998
17-20	4 bytes	Trip Cruise Fuel Used (Gaseous)	1011 -71	5.2.5.138	10/1/1998
21-22	2 bytes	Trip Drive Fuel Economy (Gaseous)	1012 -71	5.2.5.139	10/1/1998

-71   **5.3.065**   *Engine Speed/Load Factor Information*   **- LF**

Transmission Rate: On request
Data Length: 10
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 183
Default Priority: 7
Parameter Group   65207   (FEB7   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Trip Maximum Engine Speed	1013 -71	5.2.5.140	10/1/1998
3,4	2 bytes	Trip Average Engine Speed	1014 -71	5.2.5.141	10/1/1998
5	1 byte	Trip Drive Average Load Factor	1015 -71	5.2.5.142	11/9/2000
6	1 byte	Total Drive Average Load Factor	1016 -71	5.2.5.143	11/9/2000
7-10	4 bytes	Total Engine Cruise Time	1017 -71	5.2.5.144	10/1/1998

-71   5.3.066   *Trip Vehicle Speed/Cruise Distance*   -   TVI

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 182
Default Priority: 7
Parameter Group   65206   (FEB6)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Trip Maximum Vehicle Speed	1018 -71	5.2.5.145	10/1/1998
3-6	4 bytes	Trip Cruise Distance	1019 -71	5.2.5.146	10/1/1998

-71   5.3.067   *Trip Shutdown Information*   -   TSI

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 181
Default Priority: 7
Parameter Group   65205   (FEB5)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Trip Number of Hot Shutdowns	1020 -71	5.2.5.147	10/1/1998
3,4	2 bytes	Trip Number of Idle Shutdowns	1021 -71	5.2.5.148	10/1/1998
5,6	2 bytes	Trip Number of Idle Shutdown Overrides	1022 -71	5.2.5.149	10/1/1998
7,8	2 bytes	Trip Sudden Decelerations	1023 -71	5.2.5.150	10/1/1998

-71   **5.3.068**   *Trip Time Information #1*   **-** **TTI1**

Transmission Rate: On request
Data Length: 16
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 180
Default Priority: 7
Parameter Group   65204   (FEB4)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
01-04	4 bytes	Trip Time in VSL	1024 -71	5.2.5.151	10/1/1998
05-08	4 bytes	Trip Time in Top Gear	1025 -71	5.2.5.152	10/1/1998
09-12	4 bytes	Trip Time in Gear Down	1026 -71	5.2.5.153	10/1/1998
13-16	4 bytes	Trip Time in Derate by Engine	1027 -71	5.2.5.154	10/1/1998

-71   **5.3.069**   *Fuel Information (Liquid)*   **-** **LFI**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 179
Default Priority: 7
Parameter Group   65203   (FEB3)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1-4	4 bytes	Total Engine PTO Fuel Used	1028 -71	5.2.5.155	10/1/1998
5,6	2 bytes	Trip Average Fuel Rate	1029 -71	5.2.5.156	10/1/1998

-71 **5.3.070** *Fuel Information #1 (Gaseous)* **- GFI1**

Transmission Rate:	On request		
Data Length:	8		
Data Page:	0	**PGN Supporting Information:**	
PDU Format:	254		
PDU Specific:	178		
Default Priority:	7		
Parameter Group		65202 (FEB2)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1-4	4 bytes	Total Engine PTO Fuel Used (Gaseous)	1030 -71	5.2.5.157	10/1/1998
5,6	2 bytes	Trip Average Fuel Rate (Gaseous)	1031 -71	5.2.5.158	10/1/1998
7,8	2 bytes	Fuel Specific Gravity	1389 -71	5.2.5.245	10/1/1998

-71 **5.3.071** *ECU History* **- EH**

Transmission Rate:	On request		
Data Length:	8		
Data Page:	0	**PGN Supporting Information:**	
PDU Format:	254		
PDU Specific:	177		
Default Priority:	7		
Parameter Group		65201 (FEB1)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1-4	4 bytes	Total ECU Distance	1032 -71	5.2.5.159	10/1/1998
5-8	4 bytes	Total ECU Run Time	1033 -71	5.2.5.160	10/1/1998

-71   **5.3.072**   *Trip Time Information #2*   **- TTI2**

Transmission Rate: On request
Data Length: 20
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 176
Default Priority: 7
Parameter Group   65200   (FEB0)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
01-04	4 bytes	Trip Cruise Time	1034	-71 5.2.5.161	10/1/1998
05-08	4 bytes	Trip PTO Time	1035	-71 5.2.5.162	10/1/1998
09-12	4 bytes	Trip Engine Running Time	1036	-71 5.2.5.163	10/1/1998
13-16	4 bytes	Trip Idle Time	1037	-71 5.2.5.164	11/9/2000
17-20	4 bytes	Trip Air Compressor On Time	1038	-71 5.2.5.165	10/1/1998

-71   **5.3.073**   *Fuel Consumption (Gaseous)*   **- GFC**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 175
Default Priority: 7
Parameter Group   65199   (FEAF)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1-4	4 bytes	Trip Fuel (Gaseous)	1039	-71 5.2.5.166	10/1/1998
5-8	4 bytes	Total Fuel Used (Gaseous)	1040	-71 5.2.5.167	10/1/1998

-71   5.3.074   *Reset*   - RESET

NOTE—This message requires an Acknowledgement response (See J1939/21, 5.4.4) from the receiving node. The use of individual proprietary protocols can still be used instead of the "trip reset" PGN to maintain security.

Transmission Rate:	When needed	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	222	
PDU Specific:	Destination Address	
Default Priority:	7	
Parameter Group	56832 (DE00)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	2 bits	Trip Group 1	988 -71	5.2.3.13	10/1/1998
1.3	2 bits	Trip Group 2 - Proprietary	989 -71	5.2.3.14	10/1/1998
2	1 byte	Service Component Identification	1584 -71	5.2.5.102	10/1/1998
3.1	2 bits	Engine Build Hours Reset	1211 -71	5.2.6.070	10/1/1998

-71   5.3.075   *Air Supply Pressure*   - AIR1

Transmission Rate:	1 s	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	174	
Default Priority:	6	
Parameter Group	65198 (FEAE)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Pneumatic Supply Pressure	46 -71	5.2.5.170	10/1/1998
2	1 byte	Parking and/or Trailer Air Pressure	1086 -71	5.2.5.171	10/1/1998
3	1 byte	Service Brake Air Pressure Circuit #1	1087 -71	5.2.5.172	10/1/1998
4	1 byte	Service Brake Air Pressure Circuit #2	1088 -71	5.2.5.173	10/1/1998
5	1 byte	Auxiliary Equipment Supply Pressure	1089 -71	5.2.5.174	10/1/1998
6	1 byte	Air Suspension Supply Pressure	1090 -71	5.2.5.175	10/1/1998

-71   5.3.076   *Wheel Application Pressure High Range*   -   EBC3

Transmission Rate: 100 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 173
Default Priority: 6
Parameter Group   65197   (FEAD)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Brake Application Pressure High Range, Front Axle, Left Wheel	1091 -71	5.2.5.176	10/1/1998
2	1 byte	Brake Application Pressure High Range, Front Axle, Right Wheel	1092 -71	5.2.5.177	10/1/1998
3	1 byte	Brake Application Pressure High Range, Rear Axle #1, Left Wheel	1093 -71	5.2.5.178	10/1/1998
4	1 byte	Brake Application Pressure High Range, Rear Axle #1, Right Wheel	1094 -71	5.2.5.179	10/1/1998
5	1 byte	Brake Application Pressure High Range, Rear Axle #2, Left Wheel	1095 -71	5.2.5.180	10/1/1998
6	1 byte	Brake Application Pressure High Range, Rear Axle #2, Right Wheel	1096 -71	5.2.5.181	10/1/1998
7	1 byte	Brake Application Pressure High Range, Rear Axle #3, Left Wheel	1097 -71	5.2.5.182	10/1/1998
8	1 byte	Brake Application Pressure High Range, Rear Axle #3, Right Wheel	1098 -71	5.2.5.183	10/1/1998

-71   5.3.077   *Wheel Brake Lining Remaining Information*   -   EBC4

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 172
Default Priority: 7
Parameter Group   65196   (FEAC)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Brake Lining Remaining, Front Axle, Left Wheel	1099 -71	5.2.5.184	10/1/1998

2	1 byte	Brake Lining Remaining, Front Axle, Right Wheel		1100	-71	5.2.5.185	10/1/1998
3	1 byte	Brake Lining Remaining, Rear Axle #1, Left Wheel		1101	-71	5.2.5.186	10/1/1998
4	1 byte	Brake Lining Remaining, Rear Axle #1, Right Wheel		1102	-71	5.2.5.187	10/1/1998
5	1 byte	Brake Lining Remaining, Rear Axle #2, Left Wheel		1103	-71	5.2.5.188	10/1/1998
6	1 byte	Brake Lining Remaining, Rear Axle #2, Right Wheel		1104	-71	5.2.5.189	10/1/1998
7	1 byte	Brake Lining Remaining, Rear Axle #3, Left Wheel		1105	-71	5.2.5.190	10/1/1998
8	1 byte	Brake Lining Remaining, Rear Axle #3, Right Wheel		1106	-71	5.2.5.191	10/1/1998

-71   5.3.078   *Electronic Transmission Controller #6*   - ETC6

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 171
Default Priority: 7
Parameter Group   65195   (FEAB)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1	1 byte	Recommended Gear	1113	-71	5.2.5.192	10/1/1998
2	1 byte	Highest Possible Gear	1115	-71	5.2.5.194	10/1/1998
3	1 byte	Lowest Possible Gear	1114	-71	5.2.5.193	10/1/1998

-71   5.3.079   *Alternate Fuel #2*   - AF2

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 170
Default Priority: 7
Parameter Group   65194   (FEAA)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1	1 byte	Gaseous Fuel Correction Factor	1116	-71	5.2.5.195	10/1/1998
2,3	2 bytes	Desired Absolute Intake Manifold Pressure (Turbo Boost Limit)	1692	-71	5.2.7.???	5/20/1999
4	1 byte	Wastegate Valve Position	1693	-71	5.2.7.???	5/20/1999

5	1 byte	Gas Mass Flow Sensor Fueling Correction			1694	-71	5.2.7.???	5/20/1999

-71   **5.3.080**   *Exhaust Oxygen #1*   **- EO1**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 169
Default Priority: 7
Parameter Group   65193   (FEA9)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Desired Rated Exhaust Oxygen	1117 -71	5.2.5.196	10/1/1998
3,4	2 bytes	Desired Exhaust Oxygen	1118 -71	5.2.5.197	10/1/1998
5,6	2 bytes	Actual Exhaust Oxygen	1119 -71	5.2.5.198	10/1/1998
7	1 byte	Exhaust Gas Oxygen Sensor Fueling Correction	1695 -71	5.2.7.???	5/20/1999
8.7	2 bits	Exhaust Gas Oxygen Sensor Closed Loop Operation	1696 -71	5.2.7.???	5/20/1999

-71   **5.3.081**   *Articulation Control*   **- AC**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 168
Default Priority: 7
Parameter Group   65192   (FEA8)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Articulation Angle	1120 -71	5.2.5.199	10/1/1998

-71   **5.3.082**   *Alternator Temperature*   **- AT**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 167
Default Priority: 7
Parameter Group   65191   (FEA7)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1	1 byte	Alternator Bearing 1 Temperature	1122	-71	5.2.5.200	10/1/1998
2	1 byte	Alternator Bearing 2 Temperature	1123	-71	5.2.5.200	10/1/1998
3	1 byte	Alternator Winding 1 Temperature	1124	-71	5.2.5.201	10/1/1998
4	1 byte	Alternator Winding 2 Temperature	1125	-71	5.2.5.201	10/1/1998
5	1 byte	Alternator Winding 3 Temperature	1126	-71	5.2.5.201	10/1/1998

-71   **5.3.083**   *Intake Manifold Information #1*   **- IMT1**

Transmission Rate: 0.5 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 166
Default Priority: 6
Parameter Group   65190   (FEA6)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1,2	2 bytes	Turbocharger 1 Boost Pressure	1127	-71	5.2.5.202	10/1/1998
3,4	2 bytes	Turbocharger 2 Boost Pressure	1128	-71	5.2.5.202	10/1/1998
5,6	2 bytes	Turbocharger 3 Boost Pressure	1129	-71	5.2.5.202	10/1/1998
7,8	2 bytes	Turbocharger 4 Boost Pressure	1130	-71	5.2.5.202	10/1/1998

-71   **5.3.084**   *Intake Manifold Information #2*   **- IMT2**

Transmission Rate:	1 s	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	165	
Default Priority:	7	
Parameter Group		65189 (FEA5)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Intake Manifold 2 Temperature	1131 -71	5.2.5.004	10/1/1998
2	1 byte	Intake Manifold 3 Temperature	1132 -71	5.2.5.004	10/1/1998
3	1 byte	Intake Manifold 4 Temperature	1133 -71	5.2.5.004	10/1/1998
4	1 byte	Intake Manifold 5 Temperature	1802 -71	5.2.7.???	5/11/2000
5	1 byte	Intake Manifold 6 Temperature	1803 -71	5.2.7.???	5/11/2000

-71   **5.3.085**   *Engine Temperature #2*   **- ET2**

Transmission Rate:	1s	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	164	
Default Priority:	6	
Parameter Group		65188 (FEA4)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Engine Oil Temperature 2	1135 -71	5.2.5.015	10/1/1998
3,4	2 bytes	Engine ECU Temperature (OBSOLETE use SPN 1136)	1207 -71	5.2.5.216	10/1/1998
3,4	2 bytes	Engine ECU Temperature (see also SPN 21)	1136 -71	5.2.5.216	10/1/1998
3,4	2 bytes	Engine ECU Temperature (use SPN 1136)	21 -71	5.2.5.216	10/1/1998
5,6	2 bytes	Recirculated Engine Exhaust Gas Differential Pressure	411 -71	5.2.7.???	5/11/2000
7,8	2 bytes	Recirculated Engine Exhaust Gas Temperature	412 -71	5.2.7.???	5/11/2000

-71   **5.3.086**   *Exhaust Port Temperature #1*   **- EPT1**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 163
Default Priority: 7
Parameter Group   65187   (FEA3)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Exhaust Gas Port 1 Temperature	1137 -71	5.2.5.203	10/1/1998
3,4	2 bytes	Exhaust Gas Port 2 Temperature	1138 -71	5.2.5.203	10/1/1998
5,6	2 bytes	Exhaust Gas Port 3 Temperature	1139 -71	5.2.5.203	10/1/1998
7,8	2 bytes	Exhaust Gas Port 4 Temperature	1140 -71	5.2.5.203	10/1/1998

-71   **5.3.087**   *Exhaust Port Temperature #2*   **- EPT2**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 162
Default Priority: 7
Parameter Group   65186   (FEA2)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Exhaust Gas Port 5 Temperature	1141 -71	5.2.5.203	10/1/1998
3,4	2 bytes	Exhaust Gas Port 6 Temperature	1142 -71	5.2.5.203	10/1/1998
5,6	2 bytes	Exhaust Gas Port 7 Temperature	1143 -71	5.2.5.203	10/1/1998
7,8	2 bytes	Exhaust Gas Port 8 Temperature	1144 -71	5.2.5.203	10/1/1998

-71   **5.3.088**   *Exhaust Port Temperature #3*   **- EPT3**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 161
Default Priority: 7
Parameter Group   65185   (FEA1)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Exhaust Gas Port 9 Temperature	1145	-71 5.2.5.203	10/1/1998
3,4	2 bytes	Exhaust Gas Port 10 Temperature	1146	-71 5.2.5.203	10/1/1998
5,6	2 bytes	Exhaust Gas Port 11 Temperature	1147	-71 5.2.5.203	10/1/1998
7,8	2 bytes	Exhaust Gas Port 12 Temperature	1148	-71 5.2.5.203	10/1/1998

-71   **5.3.089**   *Exhaust Port Temperature #4*   **- EPT4**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 160
Default Priority: 6
Parameter Group   65184   (FEA0)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Exhaust Gas Port 13 Temperature	1149	-71 5.2.5.203	10/1/1998
3,4	2 bytes	Exhaust Gas Port 14 Temperature	1150	-71 5.2.5.203	10/1/1998
5,6	2 bytes	Exhaust Gas Port 15 Temperature	1151	-71 5.2.5.203	10/1/1998
7,8	2 bytes	Exhaust Gas Port 16 Temperature	1152	-71 5.2.5.203	10/1/1998

-71   **5.3.090**   *Exhaust Port Temperature #5*   **-**   **EPT5**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 159
Default Priority: 7
Parameter Group   65183   (FE9F   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Exhaust Gas Port 17 Temperature	1153 -71	5.2.5.203	10/1/1998
3,4	2 bytes	Exhaust Gas Port 18 Temperature	1154 -71	5.2.5.203	10/1/1998
5,6	2 bytes	Exhaust Gas Port 19 Temperature	1155 -71	5.2.5.203	10/1/1998
7,8	2 bytes	Exhaust Gas Port 20 Temperature	1156 -71	5.2.5.203	10/1/1998

-71   **5.3.091**   *Main Bearing Temperature #1*   **-**   **MBT1**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 158
Default Priority: 6
Parameter Group   65182   (FE9E   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Main Bearing 1 Temperature	1157 -71	5.2.5.204	10/1/1998
3,4	2 bytes	Main Bearing 2 Temperature	1158 -71	5.2.5.204	10/1/1998
5,6	2 bytes	Main Bearing 3 Temperature	1159 -71	5.2.5.204	10/1/1998
7,8	2 bytes	Main Bearing 4 Temperature	1160 -71	5.2.5.204	10/1/1998

-71   **5.3.092**   *Main Bearing Temperature #2*   **- MBT2**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 157
Default Priority: 6
Parameter Group   65181   (FE9D   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Main Bearing 5 Temperature	1161 -71	5.2.5.204	10/1/1998
3,4	2 bytes	Main Bearing 6 Temperature	1162 -71	5.2.5.204	10/1/1998
5,6	2 bytes	Main Bearing 7 Temperature	1163 -71	5.2.5.204	10/1/1998
7,8	2 bytes	Main Bearing 8 Temperature	1164 -71	5.2.5.204	10/1/1998

-71   **5.3.093**   *Main Bearing Temperature #3*   **- MBT3**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 156
Default Priority: 6
Parameter Group   65180   (FE9C   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Main Bearing 9 Temperature	1165 -71	5.2.5.204	10/1/1998
3,4	2 bytes	Main Bearing 10 Temperature	1166 -71	5.2.5.204	10/1/1998
5,6	2 bytes	Main Bearing 11 Temperature	1167 -71	5.2.5.204	10/1/1998

-71 **5.3.094** *Turbocharger Information #1* **- TCI1**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0 **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 155
Default Priority: 7
Parameter Group 65179 (FE9B)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Turbocharger Lube Oil Pressure 2	1168 -71	5.2.5.029	10/1/1998
2,3	2 bytes	Turbocharger 2 Speed	1169 -71	5.2.5.053	10/1/1998
4,5	2 bytes	Turbocharger 3 Speed	1170 -71	5.2.5.053	10/1/1998
6,7	2 bytes	Turbocharger 4 Speed	1171 -71	5.2.5.053	10/1/1998

-71 **5.3.095** *Turbocharger Information #2* **- TCI2**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0 **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 154
Default Priority: 6
Parameter Group 65178 (FE9A)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	2 bytes	Turbocharger 1 Compressor Inlet Temperature	1172 -71	5.2.5.205	10/1/1998
2	2 bytes	Turbocharger 2 Compressor Inlet Temperature	1173 -71	5.2.5.205	10/1/1998
3	2 bytes	Turbocharger 3 Compressor Inlet Temperature	1174 -71	5.2.5.205	10/1/1998
4	2 bytes	Turbocharger 4 Compressor Inlet Temperature	1175 -71	5.2.5.205	10/1/1998

-71   **5.3.096**   *Turbocharger Information #3*   **- TCI3**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 153
Default Priority: 6
Parameter Group   65177   (FE99   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Turbocharger 1 Compressor Inlet Pressure	1176 -71	5.2.5.206	10/1/1998
3,4	2 bytes	Turbocharger 2 Compressor Inlet Pressure	1177 -71	5.2.5.206	10/1/1998
5,6	2 bytes	Turbocharger 3 Compressor Inlet Pressure	1178 -71	5.2.5.206	10/1/1998
7,8	2 bytes	Turbocharger 4 Compressor Inlet Pressure	1179 -71	5.2.5.206	10/1/1998

-71   **5.3.097**   *Turbocharger Information #4*   **- TCI4**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 152
Default Priority: 6
Parameter Group   65176   (FE98   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Turbocharger 1 Turbine Inlet Temperature	1180 -71	5.2.5.207	10/1/1998
3,4	2 bytes	Turbocharger 2 Turbine Inlet Temperature	1181 -71	5.2.5.207	10/1/1998
5,6	2 bytes	Turbocharger 3 Turbine Inlet Temperature	1182 -71	5.2.5.207	10/1/1998
7,8	2 bytes	Turbocharger 4 Turbine Inlet Temperature	1183 -71	5.2.5.207	10/1/1998

-71   **5.3.098**   *Turbocharger Information #5*   **- TCI5**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 151
Default Priority: 6
Parameter Group   65175   (FE97)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Turbocharger 1 Turbine Outlet Temperature	1184 -71	5.2.5.208	10/1/1998
3,4	2 bytes	Turbocharger 2 Turbine Outlet Temperature	1185 -71	5.2.5.208	10/1/1998
5,6	2 bytes	Turbocharger 3 Turbine Outlet Temperature	1186 -71	5.2.5.208	10/1/1998
7,8	2 bytes	Turbocharger 4 Turbine Outlet Temperature	1187 -71	5.2.5.208	10/1/1998

-71   **5.3.099**   *Turbocharger Wastegate*   **- TCW**

Transmission Rate: 100 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 150
Default Priority: 6
Parameter Group   65174   (FE96)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Turbocharger 1 Wastegate Drive - duplicate (see SPN	1188 -71	5.2.5.209	10/1/1998
2	1 byte	Turbocharger 2 Wastegate Drive	1189 -71	5.2.5.209	10/1/1998
3	1 byte	Turbocharger 3 Wastegate Drive	1190 -71	5.2.5.209	10/1/1998
4	1 byte	Turbocharger 4 Wastegate Drive	1191 -71	5.2.5.209	10/1/1998
5	1 byte	Turbocharger Wastegate Actuator Control Air Pressure	1192 -71	5.2.5.210	10/1/1998

-71   **5.3.100**   *Rebuild Information*   **- RBI**

Transmission Rate:	On request
Data Length:	8
Data Page:	0
PDU Format:	254
PDU Specific:	149
Default Priority:	7

PGN Supporting Information:

Parameter Group   65173   (FE95)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1-4	4 bytes	Engine Operation Time Since Rebuild	1193 -71	5.2.5.211	10/1/1998

-71   **5.3.101**   *Anti-theft Request*   **- ATR**

NOTE–See Figures 20 to 25 for examples of Anti-theft message transfers. Bit 1 is the right most bit in each byte.

Transmission Rate:	Transmission of this message is interrupt driven. This message is also transmitted upon power-up of the interfacing device sending this message.
Data Length:	8
Data Page:	0
PDU Format:	221
PDU Specific:	Destination Address
Default Priority:	7

PGN Supporting Information:

Parameter Group   56576   (DD00)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.2	2 bits	Anti-theft Encryption Indicator States	1199 -71	5.2.6.067	10/1/1998
1.4	2 bits	Anti-theft Desired Exit Mode States	1200 -71	5.2.6.068	10/1/1998
1.6	3 bits	Anti-theft Command States	1201 -71	5.2.6.069	10/1/1998
2	7 bytes	Anti-theft Password Representation	1202 -71	5.2.5.213	10/1/1998

-71   **5.3.102**   *Anti-theft Status*   **- ATS**

NOTE–See Figures 20 to 25 for examples of Anti-theft message transfers. Bit 1 is the right most bit in each byte.

Transmission Rate:	This message is transmitted in response to an Anti-Theft Request message. This message is also sent when the componentn has an abnormal power interuption. In this situation the Anti-Theft Status Report is sent without the Anti-Theft Request.
Data Length:	8
Data Page:	0 **PGN Supporting Information:**
PDU Format:	220 Anti-thift.doc
PDU Specific:	Destination Address
Default Priority:	7
Parameter Group	56320 (DC00)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1.1	2 bits	Anti-theft Encryption Seed Present Indicator	1194	-71	5.2.6.063	10/1/1998
1.3	2 bits	Anti-theft Password Valid Indicator	1195	-71	5.2.6.064	10/1/1998
1.5	2 bits	Anti-theft Component Status States	1196	-71	5.2.6.065	10/1/1998
1.7	2 bits	Anti-theft Modify Password States	1197	-71	5.2.6.066	10/1/1998
2-8	7 bytes	Anti-theft Random Number	1198	-71	5.2.5.212	10/1/1998

Interfacing Device   Component

PGN 56576: This is a request for an encryption seed

Byte 1: | 1 | 0 | 1 | * | * | 0 | 0 | * |

Bytes 2-8: Blank zeros

PGN 56320: The component provides the encryption seed

Byte 1: | * | * | * | * | * | * | 0 | 1 |

Bytes 2-8: Encryption seed

PGN 56576: The password entered by the end user is
encrypted and sent back to the component

Byte 1: | 1 | 0 | 1 | * | * | 0 | 1 | * |

Bytes 2-8: Encrypted login validation password

PGN 56320: Gives appropriate feedback as to the validity of the login
validation password (proceeds only if login validation password check is
passed - - i.e. if the interface device returns a 0 1 and NOT a 0 0)

Byte 1: | * | * | * | * | 0 | 1 | * | * |

Bytes 2-8: Blank zeros

PGN 56576: This is a request to add the password that was
entered by the operator, and represented here in bytes 2-8

Byte 1: | 0 | 0 | 0 | * | * | 0 | 1 | * |

Bytes 2-8: Encrypted password

PGN 56320: Provides feedback if the password entered by the operator is a
valid password and if the "add" command was successfully executed

Byte 1: | 0 | 0 | * | * | 0 | 1 | * | * |

Bytes 2-8: Blank zeros

FIGURE 19—OPERATOR DESIRES TO ADD A PASSWORD TO THE
COMPONENT'S PASSWORD STRUCTURE

Interfacing Device

Component

PGN 56576: This is a request for an encryption seed

Byte 1:

| 0 | 1 | 1 | * | * | 0 | 0 | * |

Bytes 2-8: Blank zeros

PGN 56320: Component provides the encryption seed

Byte 1:

| * | * | * | * | * | * | 0 | 1 |

Bytes 2-8: Encryption seed

PGN 56576: This is the password that the user indicates is to be
deleted from the component's password structure

Byte 1:

| 0 | 0 | 1 | * | * | 0 | 1 | * |

Bytes 2-8: Encrypted password that is to be deleted

PGN 56320: Component provides feedback if the password entered by
the operator is a valid password and if (if the password is valid) if the
"delete" command was successfully executed

Byte 1:

| 0 | 0 | * | * | 0 | 1 | * | * |

Bytes 2-8: Blank zeros

FIGURE 20—OPERATOR DESIRES TO DELETE A PASSWORD FROM THE
COMPONENT'S PASSWORD STRUCTURE

Interfacing Device   Component

PGN 56576: This is a request for an encryption seed

Byte 1: | 1 | 0 | 1 | * | * | 0 | 0 | * |

Bytes 2-8: Blank zeros

PGN 56320: The component provides the encryption seed

Byte 1: | * | * | * | * | * | * | 0 | 1 |

Bytes 2-8: Encryption seed

PGN 56576: The password entered by the end user is
encrypted and sent back to the component

Byte 1: | 1 | 0 | 1 | * | * | 0 | 1 | * |

Bytes 2-8: Encrypted login validation password

PGN 56320: Gives appropriate feedback as to the validity of the login
validation password (proceeds only if login validation password check is
passed - - i.e. if the interface device returns a 0 1 and NOT a 0 0)

Byte 1: | * | * | * | * | 0 | 1 | * | * |

Bytes 2-8: Blank zeros

PGN 56576: This is a request to change the password under which
the operator logged on, to the password provided by the operator,
represented here in bytes 2-8

Byte 1: | 0 | 1 | 0 | * | * | 0 | 1 | * |

Bytes 2-8: Encrypted password

PGN 56320: Provides feedback if the password entered by the operator is a
valid password and if the "change" command was successfully executed

Byte 1: | 0 | 0 | * | * | 0 | 1 | * | * |

Bytes 2-8: Blank zeros

FIGURE 21—OPERATOR DESIRES TO CHANGE A PASSWORD WITHIN THE
COMPONENT'S PASSWORD STRUCTURE

Interfacing Device   Component

PGN 56576: This is a request for an encryption seed

Byte 1: | 0 | 1 | 1 | * | * | 0 | 0 | * |

Bytes 2-8: Blank zeros

PGN 56320: Component provides the encryption seed

Byte 1: | * | * | * | * | * | * | 0 | 1 |

Bytes 2-8: Encryption seed

PGN 56576: Sends the operator's password (that was entered
with the intention to either Lock or Unlock the component)

Byte 1: | 0 | 1 | 1 | * | * | 0 | 1 | * |

Bytes 2-8: Encrypted password

PGN 56320: Component provides feedback if the password entered by
the operator is a valid password and if the Lock or Unlock command
was successfully executed

Byte 1: | 0 | 0 | * | * | 0 | 1 | * | * |

Bytes 2-8: Blank zeros

FIGURE 22—OPERATOR DESIRES TO LOCK OR UNLOCK THE COMPONENT

Interfacing Device

Component

PGN 56576: This is a request to check the Locked/
Unlocked status of the component

Byte 1:

1	0	0	*	*	1	1	*

Bytes 2-8: Blank zeros

PGN 56320: Gives feedback information if the engine is
Locked or Unlocked

Byte 1:

*	*	0	1	*	*	*	*

Bytes 2-8: Blank zeros

FIGURE 23—CHECKING STATUS OF THE COMPONENT

Interfacing Device   Component

                                               ┌──────────────┐
                                               │ *Component* │
                                               │   *Power*   │
                                               │ *Interrupt* │
                                               │   *Occurs*   │
                                               └──────────────┘

PGN 56320: The component provides an Anti-Theft Status
Report (request Not_valid, appropriate lock status, password
valid=false, seed present=false)

Byte 1: | 1 | 1 | * | * | 0 | 0 | 0 | 0 |

Bytes 2-8: Blank zeros

PGN 56576: Interfacing device requests encryption seed

Byte 1: | 0 | 1 | 1 | * | * | 0 | 0 | * |

Bytes 2-8: Blank zeros

PGN 56320: Component provides the encryption seed

Byte 1: | * | * | * | * | * | * | 0 | 1 |

Bytes 2-8: Encryption seed

PGN 56576: Interfacing Device sends the operator's password (that
was entered with the intention to either Lock or Unlock the component)

Byte 1: | 0 | 0 | 0 | * | * | 0 | 1 | * |

Bytes 2-8: Encrypted password

PGN 56320: Component provides feedback if the password entered by
the operator is a valid password and if the Lock or Unlock command
was successfully executed

Byte 1: | 0 | 0 | * | * | 0 | 1 | * | * |

Bytes 2-8: Blank zeros

FIGURE 24—ABNORMAL COMPONENT POWER INTERRUPTION
(INTERFACING DEVICE POWER IS NOT INTERRUPTED)

-71   **5.3.103**   *Engine Auxiliary Coolant*   **- EAC**

Transmission Rate: 0.5 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 148
Default Priority: 6
Parameter Group   65172   (FE94   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Engine Auxiliary Coolant Pressure	1203 -71	5.2.5.214	10/1/1998
2	1 byte	Engine Auxiliary Coolant Temperature	1212 -71	5.2.5.220	10/1/1998
3	1 byte	Sea Water Pump Outlet Pressure	2435 -71	5.2.7.???	11/9/2000

-71   5.3.104   *Engine Electrical System/Module*   **- EES**

Transmission Rate:	100 ms
Data Length:	8
Data Page:	0 **PGN Supporting Information:**
PDU Format:	254
PDU Specific:	147
Default Priority:	7
Parameter Group	65171 (FE93)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Electrical Load	1204 -71	5.2.5.215	10/1/1998
3.1	2 bits	Safety Wire Status	1205 -71	5.2.6.099	10/1/1998
3.3	2 bits	Turning Gear Engaged	1206 -71	5.2.6.100	10/1/1998

-71   5.3.105   *Engine Information*   **- EI**

Transmission Rate:	100 ms
Data Length:	8
Data Page:	0 **PGN Supporting Information:**
PDU Format:	254
PDU Specific:	146
Default Priority:	7
Parameter Group	65170 (FE92)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Pre-filter Oil Pressure	1208 -71	5.2.5.217	10/1/1998
2,3	2 bytes	Exhaust Gas Pressure	1209 -71	5.2.5.218	10/1/1998
4	1 byte	Rack Position	1210 -71	5.2.5.219	10/1/1998
5,6	2 bytes	Mass Flow (Gaseous)	1241 -71	5.2.5.221	10/1/1998
7,8	2 bytes	Instantaneous Estimated Brake Power	1242 -71	5.2.5.222	10/1/1998

-71   **5.3.106**   *Fuel Leakage*   **- FL**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 145
Default Priority: 7
Parameter Group   65169   (FE91)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1.1	2 bits	Fuel Leakage 1	1239	-71	5.2.6.098	10/1/1998
1.3	2 bits	Fuel Leakage 2	1240	-71	5.2.6.098	10/1/1998

-71   **5.3.107**   *Engine Torque History*   **- ETH**

NOTE - The torque history PGN is variable in length and may contain up to 125 torque history records. Each torque history record is 38 bytes in length.

Transmission Rate: On request
Data Length: Variable
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 144
Default Priority: 6
Parameter Group   65168   (FE90)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
01	1 byte	Number of Torque History Records	1246	-71	5.2.5.223	10/1/1998
02,03	2 bytes	Engine Power	1247	-71	5.2.5.224	10/1/1998
04,05	2 bytes	Peak Engine Torque 1	1248	-71	5.2.5.225	10/1/1998
06,07	2 bytes	Peak Engine Torque 2	1249	-71	5.2.5.226	10/1/1998
08	1 byte	Calibration Record Start Month	1250	-71	5.2.5.227	10/1/1998
09	1 byte	Calibration Record Start Day	1251	-71	5.2.5.228	10/1/1998
10	1 byte	Calibration Record Start Year	1252	-71	5.2.5.229	10/1/1998
11-14	4 bytes	Calibration Record Duration Time	1253	-71	5.2.5.230	10/1/1998
15.1	2 bits	Torque Limiting Feature Status	1254	-71	5.2.6.103	10/1/1998
15.3	3 bits	Torque Limit Feature	1632	-71	5.2.6.104	10/1/1998
16,17	2 bytes	Transmission Gear Ratio 1	1255	-71	5.2.5.232	10/1/1998

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
18,19	2 bytes	Engine Torque Limit 1, Transmission	1256 -71	5.2.5.233	10/1/1998
20,21	2 bytes	Transmission Gear Ratio 2	1257 -71	5.2.5.234	10/1/1998
22,23	2 bytes	Engine Torque Limit 2, Transmission	1258 -71	5.2.5.235	10/1/1998
24,25	2 bytes	Transmission Gear Ratio 3	1259 -71	5.2.5.236	10/1/1998
26,27	2 bytes	Engine Torque Limit 3, Transmission	1260 -71	5.2.5.237	10/1/1998
28,29	2 bytes	Engine Torque Limit 4, Transmission	1261 -71	5.2.5.238	10/1/1998
30,31	2 bytes	Engine Torque Limit 5, Switch	1262 -71	5.2.5.239	10/1/1998
32,33	2 bytes	Engine Torque Limit 6, Axle Input	1263 -71	5.2.5.240	10/1/1998

-71   5.3.108   *Supply Pressure #2*   - SP2

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 143
Default Priority: 6
Parameter Group   65167   (FE8F   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Externally Supplied Air Pressure	1320 -71	5.2.5.247	10/1/1998

-71   5.3.109   *Service #2*   - S2

NOTE - There are two acceptable formats for the Service PGN. Format 1 has only 8 bytes of data and reports the component most in need of service for each of the three categories. Format 2, however, uses the transport layer as necessary in order to repeat these 8 bytes of service component information until all supported service components in each category have been transmitted.

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 142
Default Priority: 7
Parameter Group   65166   (FE8E   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Service Component Identification	1379 -71	5.2.5.102	10/1/1998
2,3	2 bytes	Time Since Last Service	1350 -71	5.2.5.246	10/1/1998

-71   5.3.110   *Vehicle Electrical Power #2*   - VP2

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 141
Default Priority: 7
Parameter Group   65165   (FE8D)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Battery 2 Potential (Voltage) (duplicate - see also SPN 444)	1376 -71	5.2.5.254	10/1/1998
1,2	2 bytes	Battery 2 Potential	444 -71	5.2.5.254	10/1/1998

-71   5.3.111   *Auxiliary Analog Information*   - AAI

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 140
Default Priority: 7
Parameter Group   65164   (FE8C)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Auxiliary Temperature 1	441 -71	5.2.5.249	10/1/1998
1	1 byte	Auxiliary Temperature #1 (duplicate see also SPN 441)	1385 -71	5.2.5.249	10/1/1998
2	1 byte	Auxiliary Temperature #2 (duplicate see also SPN 442)	1386 -71	5.2.5.249	10/1/1998
2	1 byte	Auxiliary Temperature 2	442 -71	5.2.5.249	10/1/1998
3	1 byte	Auxiliary Pressure #1	1387 -71	5.2.5.248	10/1/1998
4	1 byte	Auxiliary Pressure #2	1388 -71	5.2.5.248	10/1/1998

-71   **5.3.112**   *Engine Fuel/lube systems*   **-   EFS**

Transmission Rate: 0.5 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 106
Default Priority: 6
Parameter Group   65130   (FE6A   )

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1	1 byte	Engine Oil Level Remote Reservoir	1380	-71	5.2.5.284	10/1/1998
2	1 byte	Fuel Supply Pump Inlet Pressure	1381	-71	5.2.5.285	10/1/1998
3	1 byte	Fuel Filter (suction side) Differential Pressure	1382	-71	5.2.5.286	10/1/1998

-71   **5.3.113**   *Gaseous Fuel Pressure*   **-   GFP**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 139
Default Priority: 7
Parameter Group   65163   (FE8B   )

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1,2	2 bytes	Absolute Fuel Valve Inlet Pressure	1390	-71	5.2.5.250	10/1/1998
3,4	2 bytes	Outlet to Inlet Fuel Valve Differential Pressure	1391	-71	5.2.5.251	10/1/1998
5,6	2 bytes	Air to Fuel Differential Pressure	1392	-71	5.2.5.252	10/1/1998

-71   **5.3.114**   *Ignition Transformer Secondary Output #1*   **- ISO1**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 136
Default Priority: 7
Parameter Group   65160   (FE88)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Cylinder 1 Ignition Transformer Secondary Output	1393	-71 5.2.5.253	10/1/1998
2	1 byte	Cylinder 2 Ignition Transformer Secondary Output	1394	-71 5.2.5.253	10/1/1998
3	1 byte	Cylinder 3 Ignition Transformer Secondary Output	1395	-71 5.2.5.253	10/1/1998
4	1 byte	Cylinder 4 Ignition Transformer Secondary Output	1396	-71 5.2.5.253	10/1/1998
5	1 byte	Cylinder 5 Ignition Transformer Secondary Output	1397	-71 5.2.5.253	10/1/1998
6	1 byte	Cylinder 6 Ignition Transformer Secondary Output	1398	-71 5.2.5.253	10/1/1998
7	1 byte	Cylinder 7 Ignition Transformer Secondary Output	1399	-71 5.2.5.253	10/1/1998
8	1 byte	Cylinder 8 Ignition Transformer Secondary Output	1400	-71 5.2.5.253	10/1/1998

-71   **5.3.115**   *Ignition Transformer Secondary Output #2*   **- ISO2**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 137
Default Priority: 7
Parameter Group   65161   (FE89)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Cylinder 9 Ignition Transformer Secondary Output	1401	-71 5.2.5.253	10/1/1998
2	1 byte	Cylinder 10 Ignition Transformer Secondary Output	1402	-71 5.2.5.253	10/1/1998
3	1 byte	Cylinder 11 Ignition Transformer Secondary Output	1403	-71 5.2.5.253	10/1/1998
4	1 byte	Cylinder 12 Ignition Transformer Secondary Output	1404	-71 5.2.5.253	10/1/1998
5	1 byte	Cylinder 13 Ignition Transformer Secondary Output	1405	-71 5.2.5.253	10/1/1998
6	1 byte	Cylinder 14 Ignition Transformer Secondary Output	1406	-71 5.2.5.253	10/1/1998

				SPN Doc	Date
7	1 byte	Cylinder 15 Ignition Transformer Secondary Output	1407 -71	5.2.5.253	10/1/1998
8	1 byte	Cylinder 16 Ignition Transformer Secondary Output	1408 -71	5.2.5.253	10/1/1998

-71   **5.3.116**   *Ignition Transformer Secondary Output #3*   **- ISO3**

Transmission Rate:	On request	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	138	
Default Priority:	7	
Parameter Group	65162 (FE8A)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Cylinder 17 Ignition Transformer Secondary Output	1409 -71	5.2.5.253	10/1/1998
2	1 byte	Cylinder 18 Ignition Transformer Secondary Output	1410 -71	5.2.5.253	10/1/1998
3	1 byte	Cylinder 19 Ignition Transformer Secondary Output	1411 -71	5.2.5.253	10/1/1998
4	1 byte	Cylinder 20 Ignition Transformer Secondary Output	1412 -71	5.2.5.253	10/1/1998

-71   **5.3.117**   *Ignition Timing #1*   **- IT1**

Transmission Rate:	On request	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	130	
Default Priority:	7	
Parameter Group	65154 (FE82)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Cylinder 1 Ignition Timing	1413 -71	5.2.5.257	10/1/1998
3,4	2 bytes	Cylinder 2 Ignition Timing	1414 -71	5.2.5.257	10/1/1998
5,6	2 bytes	Cylinder 3 Ignition Timing	1415 -71	5.2.5.257	10/1/1998
7,8	2 bytes	Cylinder 4 Ignition Timing	1416 -71	5.2.5.257	10/1/1998

-71   **5.3.118**   *Ignition Timing #2*   **-   IT2**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 131
Default Priority: 7
Parameter Group   65155   (FE83   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Cylinder 5 Ignition Timing	1417 -71	5.2.5.257	10/1/1998
3,4	2 bytes	Cylinder 6 Ignition Timing	1418 -71	5.2.5.257	10/1/1998
5,6	2 bytes	Cylinder 7 Ignition Timing	1419 -71	5.2.5.257	10/1/1998
7,8	2 bytes	Cylinder 8 Ignition Timing	1420 -71	5.2.5.257	10/1/1998

-71   **5.3.119**   *Ignition Timing #3*   **-   IT3**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 132
Default Priority: 7
Parameter Group   65156   (FE84   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Cylinder 9 Ignition Timing	1421 -71	5.2.5.257	10/1/1998
3,4	2 bytes	Cylinder 10 Ignition Timing	1422 -71	5.2.5.257	10/1/1998
5,6	2 bytes	Cylinder 11 Ignition Timing	1423 -71	5.2.5.257	10/1/1998
7,8	2 bytes	Cylinder 12 Ignition Timing	1424 -71	5.2.5.257	10/1/1998

-71 **5.3.120** *Ignition Timing #4* **- IT4**

Transmission Rate: On request
Data Length: 8
Data Page: 0 **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 133
Default Priority: 7
Parameter Group 65157 (FE85)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Cylinder 13 Ignition Timing	1425 -71	5.2.5.257	10/1/1998
3,4	2 bytes	Cylinder 14 Ignition Timing	1426 -71	5.2.5.257	10/1/1998
5,6	2 bytes	Cylinder 15 Ignition Timing	1427 -71	5.2.5.257	10/1/1998
7,8	2 bytes	Cylinder 16 Ignition Timing	1428 -71	5.2.5.257	10/1/1998

-71 **5.3.121** *Ignition Timing #5* **- IT5**

Transmission Rate: On request
Data Length: 8
Data Page: 0 **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 134
Default Priority: 7
Parameter Group 65158 (FE86)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Cylinder 17 Ignition Timing	1429 -71	5.2.5.257	10/1/1998
3,4	2 bytes	Cylinder 18 Ignition Timing	1430 -71	5.2.5.257	10/1/1998
5,6	2 bytes	Cylinder 19 Ignition Timing	1431 -71	5.2.5.257	10/1/1998
7,8	2 bytes	Cylinder 20 Ignition Timing	1432 -71	5.2.5.257	10/1/1998

-71   **5.3.122**   *Ignition Timing #6*   **- IT6**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 135
Default Priority: 7
Parameter Group   65159   (FE87   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Desired Ignition Timing #1	1433 -71	5.2.5.256	10/1/1998
3,4	2 bytes	Desired Ignition Timing #2	1434 -71	5.2.5.256	10/1/1998
5,6	2 bytes	Desired Ignition Timing #3	1435 -71	5.2.5.256	10/1/1998
7,8	2 bytes	Actual Ignition Timing	1436 -71	5.2.5.255	10/1/1998

-71   **5.3.123**   *Fuel Information #2 (Gaseous)*   **- GFI2**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 129
Default Priority: 7
Parameter Group   65153   (FE81   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Fuel Flow Rate 1	1440 -71	5.2.5.262	10/1/1998
3,4	2 bytes	Fuel Flow Rate 2	1441 -71	5.2.5.262	10/1/1998
5	1 byte	Fuel Valve 1 Position	1442 -71	5.2.5.261	10/1/1998
6	1 byte	Fuel Valve 2 Position	1443 -71	5.2.5.261	10/1/1998
7	1 byte	Requested Fuel Valve 1 Position	1765 -71	5.2.7.???	11/11/1999
8	1 byte	Requested Fuel Valve 2 Position	1766 -71	5.2.7.???	11/11/1999

-71   **5.3.124**   *Combustion Time #1*   **-   CT1**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 123
Default Priority: 7
Parameter Group   65147   (FE7B   )

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1,2	2 bytes	Cylinder 1 Combustion Time	1444	-71	5.2.5.260	10/1/1998
3,4	2 bytes	Cylinder 2 Combustion Time	1445	-71	5.2.5.260	10/1/1998
5,6	2 bytes	Cylinder 3 Combustion Time	1446	-71	5.2.5.260	10/1/1998
7,8	2 bytes	Cylinder 4 Combustion Time	1447	-71	5.2.5.260	10/1/1998

-71   **5.3.125**   *Combustion Time #2*   **-   CT2**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 124
Default Priority: 7
Parameter Group   65148   (FE7C   )

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1,2	2 bytes	Cylinder 5 Combustion Time	1448	-71	5.2.5.260	10/1/1998
3,4	2 bytes	Cylinder 6 Combustion Time	1449	-71	5.2.5.260	10/1/1998
5,6	2 bytes	Cylinder 7 Combustion Time	1450	-71	5.2.5.260	10/1/1998
7,8	2 bytes	Cylinder 8 Combustion Time	1451	-71	5.2.5.260	10/1/1998

-71   **5.3.126**   *Combustion Time #3*   **- CT3**

Transmission Rate:	On request	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	125	
Default Priority:	7	
Parameter Group	65149 (FE7D)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Cylinder 9 Combustion Time	1452 -71	5.2.5.260	10/1/1998
3,4	2 bytes	Cylinder 10 Combustion Time	1453 -71	5.2.5.260	10/1/1998
5,6	2 bytes	Cylinder 11 Combustion Time	1454 -71	5.2.5.260	10/1/1998
7,8	2 bytes	Cylinder 12 Combustion Time	1455 -71	5.2.5.260	10/1/1998

-71   **5.3.127**   *Combustion Time #4*   **- CT4**

Transmission Rate:	On request	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	126	
Default Priority:	7	
Parameter Group	65150 (FE7E)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Cylinder 13 Combustion Time	1456 -71	5.2.5.260	10/1/1998
3,4	2 bytes	Cylinder 14 Combustion Time	1457 -71	5.2.5.260	10/1/1998
5,6	2 bytes	Cylinder 15 Combustion Time	1458 -71	5.2.5.260	10/1/1998
7,8	2 bytes	Cylinder 16 Combustion Time	1459 -71	5.2.5.260	10/1/1998

-71   **5.3.128**   *Combustion Time #5*   **- CT5**

Transmission Rate:	On request	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	127	
Default Priority:	7	
Parameter Group	65151 (FE7F)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Cylinder 17 Combustion Time	1460 -71	5.2.5.260	10/1/1998
3,4	2 bytes	Cylinder 18 Combustion Time	1461 -71	5.2.5.260	10/1/1998
5,6	2 bytes	Cylinder 19 Combustion Time	1462 -71	5.2.5.260	10/1/1998
7,8	2 bytes	Cylinder 20 Combustion Time	1463 -71	5.2.5.260	10/1/1998

-71   **5.3.129**   *Combustion Time #6*   **- CT6**

Transmission Rate:	On request	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	128	
Default Priority:	7	
Parameter Group	65152 (FE80)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Average Engine Combustion Time	1465 -71	5.2.5.259	10/1/1998
1,2	2 bytes	Desired Combustion Time	1464 -71	5.2.5.258	10/1/1998
3	1 byte	Sea Water Pump Outlet Pressure	2435 -71	5.2.7.???	11/9/2000

-71   5.3.130   *Tire Pressure Control Unit Current Pressures*   -   TP3

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 122
Default Priority: 7
Parameter Group   65146   (FE7A)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Trailer, Tag Or Push Channel Tire Pressure	144 -71	5.2.5.263	10/1/1998
3,4	2 bytes	Drive Channel Tire Pressure	145 -71	5.2.5.264	10/1/1998
5,6	2 bytes	Steel Channel Tire Pressure	146 -71	5.2.5.265	10/1/1998

-71   5.3.131   *Tire Pressure Control Unit Target Pressures*   -   TP2

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 121
Default Priority: 7
Parameter Group   65145   (FE79)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Trailer, Tag Or Push Channel Tire Pressure Target	141 -71	5.2.5.266	10/1/1998
3,4	2 bytes	Drive Channel Tire Pressure Target	142 -71	5.2.5.267	10/1/1998
5,6	2 bytes	Steer Channel Tire Pressure Target	143 -71	5.2.5.268	10/1/1998

-71　　　　**5.3.132**　　　　*Tire Pressure Control Unit Mode and Status*　　　　**-　TP1**

Transmission Rate:	On request	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	120	
Default Priority:	7	
Parameter Group	65144　（　FE78　）	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Tire Pressure Check Interval	39 -71	5.2.5.269	10/1/1998
2.1	4 bits	Steer Channel Mode	1466 -71	5.2.6.088	10/1/1998
3.1	4 bits	Trailer/tag Channel Mode	1467 -71	5.2.6.089	10/1/1998
3.5	4 bits	Drive Channel Mode	1468 -71	5.2.6.090	10/1/1998
4.1	2 bits	PCU Drive Solenoid Status	1469 -71	5.2.6.091	10/1/1998
4.3	2 bits	PCU Steer Solenoid Status	1470 -71	5.2.6.092	10/1/1998
4.5	2 bits	Tire Pressure Supply Switch Status	1471 -71	5.2.6.093	10/1/1998
5.1	2 bits	PCU Deflate Solenoid Status	1472 -71	5.2.6.094	10/1/1998
5.3	2 bits	PCU Control Solenoid Status	1473 -71	5.2.6.095	10/1/1998
5.5	2 bits	PCU Supply Solenoid Status	1474 -71	5.2.6.096	10/1/1998
5.7	2 bits	PCU Trailer, Tag or Push Solenoid Status	1475 -71	5.2.6.097	10/1/1998

-71　　　　**5.3.133**　　　　*Auxiliary Pressures*　　　　**-　AP**

Transmission Rate:	On request	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	119	
Default Priority:	7	
Parameter Group	65143　（　FE77　）	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Auxiliary Vacuum Pressure Reading	136 -71	5.2.5.270	10/1/1998
3,4	2 bytes	Auxiliary Gauge Pressure Reading 1	137 -71	5.2.5.271	10/1/1998
5,6	2 bytes	Auxiliary Absolute Pressure Reading	138 -71	5.2.5.272	10/1/1998

-71   **5.3.134**   *Laser Leveling System Vertical Position*   **- LVDD**

Transmission Rate: 100 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 118
Default Priority: 4
Parameter Group   65142   (FE76)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	8 bits	LED Display Data #1	1573 -71	5.2.6.105	10/1/1998
2.1	4 bits	LED Display Mode Control	1805 -71	5.2.7.???	5/11/2000
2.5	4 bits	LED Display Deadband Control	1806 -71	5.2.7.???	5/11/2000
3.1	4 bits	LED Pattern Control	2578 -71	5.2.7.???	2/15/2001
3.5	4 bits	Display Deadbands	2577 -71	5.2.7.???	2/15/2001

-71   **5.3.135**   *Laser Leveling System Vertical Deviation*   **- LVD**

Transmission Rate: 50 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 117
Default Priority: 3
Parameter Group   65141   (FE75)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Laser Strike Vertical Deviation	1574 -71	5.2.5.305	10/1/1998
3	1 byte	Laser Receiver Type	2576 -71	5.2.7.???	2/15/2001

-71   **5.3.136**   *Modify Leveling System Control Set Point*   **-   LSP**

Transmission Rate: 50 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 116
Default Priority: 3
Parameter Group   65140   (FE74   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Modify Set Point	1575 -71	5.2.5.306	10/1/1998
3-6	4 bytes	Blade Height Set Point - High Resolution	1759 -71	5.2.7.???	8/10/2000

-71   **5.3.137**   *Laser Receiver Mast Position*   **-   LMP**

Transmission Rate: 50 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 115
Default Priority: 3
Parameter Group   65139   (FE73   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Mast Position	1576 -71	5.2.5.307	10/1/1998

-71   **5.3.138**   *Laser Leveling System Blade Control*   **- LBC**

Transmission Rate: 50 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 114
Default Priority: 3
Parameter Group   65138   (FE72)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Blade Duration and Direction	1577 -71	5.2.5.308	10/1/1998
3	8 bits	Blade Control Mode	1578 -71	5.2.6.107	10/1/1998

-71   **5.3.139**   *Laser Tracer Position*   **- LTP**

Transmission Rate: 50 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 113
Default Priority: 3
Parameter Group   65137   (FE71)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Laser Tracer Target Deviation	1579 -71	5.2.5.310	10/1/1998
3,4	2 bytes	Laser Tracer Vertical Distance	1580 -71	5.2.5.311	10/1/1998
5	1 byte	Laser Tracer Horizontal Deviation	1581 -71	5.2.5.312	10/1/1998
6	8 bits	LED Display Data #2	1582 -71	5.2.6.106	10/1/1998
7	8 bits	Laser Tracer Information	1583 -71	5.2.6.108	10/1/1998

-71   **5.3.140**   *Combination Vehicle Weight*   **-   CVW**

Transmission Rate: On request
Data Length: Variable
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 112
Default Priority: 6
Parameter Group   65136   (FE70   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Powered Vehicle Weight	1585 -71	5.2.5.273	10/1/1998
3,4	2 bytes	Gross Combination Vehicle Weight	1760 -71	5.2.7.???	11/11/1999

-71   5.3.141   *Adaptive Cruise Control*   -   ACC1

NOTE—The ACC1 message is required whenever the engine is running and ACC is powered on and not faulted. The timeout for ACC1 message will be between 2.5 times to 5 times the update rate.

The ACC1 message is intended primarily for engines and driver display units. The receiving device should identify the ACC device based on ACC function value of 32 (headway controller) or source address of 42 (headway controller).
In the event that the engine is running, the ACC is installed and the ACC1 message is not present, the engine will disable cruise control and return to non-cruise mode; also, the driver display unit will notify the driver that ACC operation is no longer available. In addition to the ACC1 timeout, engine cruise control will also be disabled if parameter "Adaptive Cruise Control State" in ACC1 is 1102 (ACC disabled or in error). In some cases, it may be possible for the driver to restart cruise control (without ACC capability) during ACC/J1939 fault by performing a reset function. See Figure 25.

It is possible that engines and driver display units may require calibration settings in order to know if the present vehicle configuration includes an ACC system or not. A calibration setting may also be needed for defining the driver reset function.

Transmission Rate:	100 ms		
Data Length:	8		
Data Page:	0	**PGN Supporting Information:**	
PDU Format:	254	ACCobj.doc	
PDU Specific:	111		
Default Priority:	4		
Parameter Group		65135 (FE6F)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Speed of forward vehicle	1586 -71	5.2.5.274	10/1/1998
2	1 byte	Distance to forward vehicle	1587 -71	5.2.5.275	10/1/1998
3	1 byte	Adaptive Cruise Control Set Speed	1588 -71	5.2.5.276	10/1/1998
4.1	3 bits	Adaptive Cruise Control Mode	1590 -71	5.2.6.087	10/1/1998
4.4	3 bits	Adaptive cruise control set distance mode	1589 -71	5.2.6.086	10/1/1998
5,6	2 bytes	Road curvature	1591 -71	5.2.5.277	10/1/1998
7.1	2 bits	ACC Target Detected	1798 -71	5.2.7.???	2/10/2000
7.3	2 bits	ACC System Shutoff Warning	1797 -71	5.2.7.???	2/10/2000
7.5	2 bits	ACC Distance Alert Signal	1796 -71	5.2.7.???	2/10/2000

FIGURE 25 – ADAPTIVE CRUISE CONTROL TIMING DIAGRAM
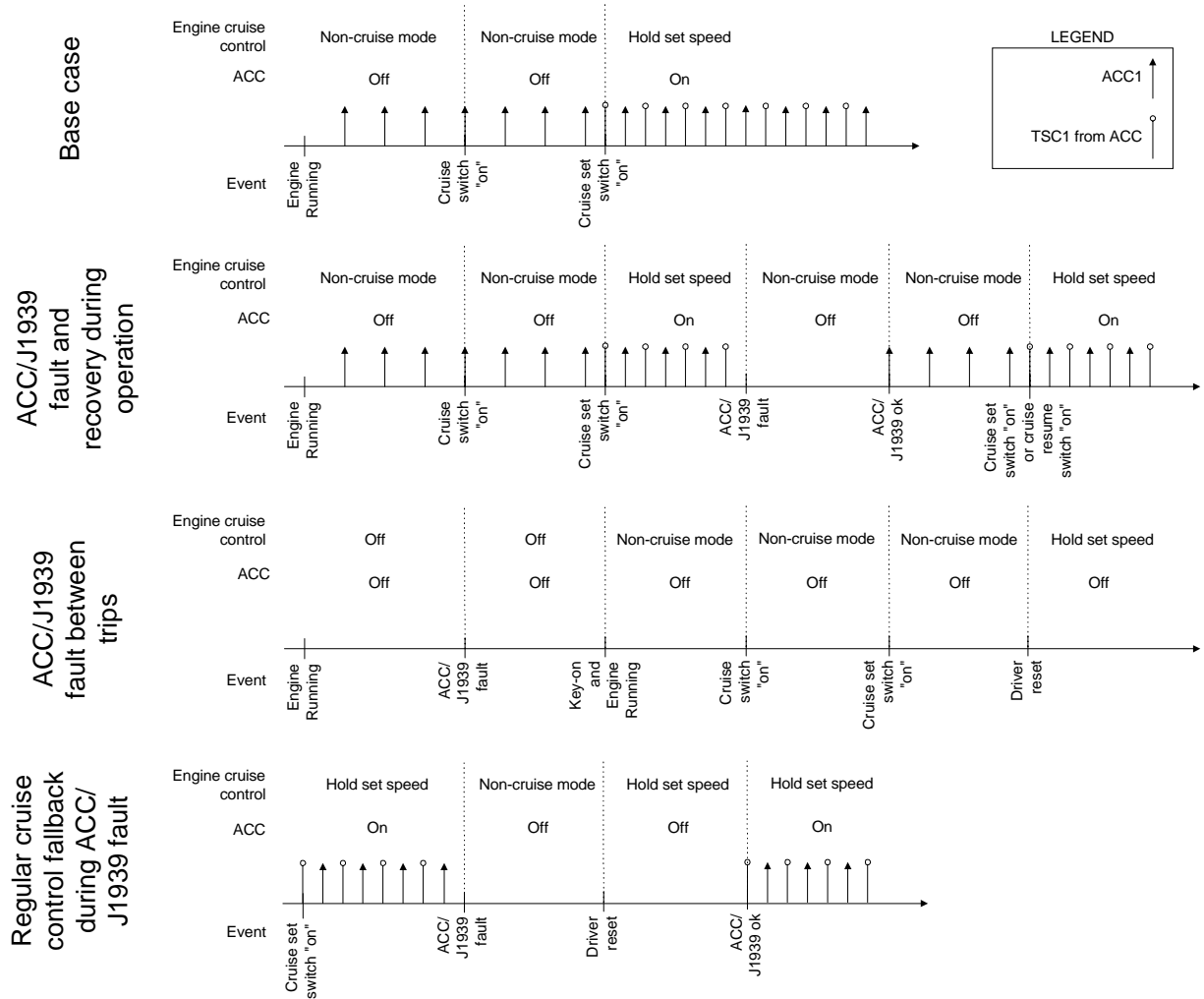
-71 **5.3.142** *High Resolution Wheel Speed* **- HRW**

Transmission Rate:	20 ms	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	110	
Default Priority:	2	
Parameter Group	65134 (FE6E)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Front Axle, Left Wheel Speed	1592 -71	5.2.5.278	10/1/1998
3,4	2 bytes	Front axle, right wheel speed	1593 -71	5.2.5.279	10/1/1998
5,6	2 bytes	Rear axle, left wheel speed	1594 -71	5.2.5.280	10/1/1998
7,8	2 bytes	Rear axle, right wheel speed	1595 -71	5.2.5.281	10/1/1998

-71 **5.3.143** *Tachograph* **- TC01**

Transmission Rate:	50 ms	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	108	
Default Priority:	3	
Parameter Group	65132 (FE6C)	

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	3 bits	Driver 1 working state	1612 -71	5.2.6.077	10/1/1998
1.4	3 bits	Driver 2 working state	1613 -71	5.2.6.077	10/1/1998
1.7	2 bits	Drive recognize	1611 -71	5.2.6.078	10/1/1998
2.1	4 bits	Driver 1 time related state	1617 -71	5.2.6.079	10/1/1998
2.5	2 bits	Driver card, driver 1	1615 -71	5.2.6.080	10/1/1998
2.7	2 bits	Overspeed	1614 -71	5.2.6.081	10/1/1998
3.1	4 bits	Driver 2 time related state	1618 -71	5.2.6.079	10/1/1998
3.5	2 bits	Driver card, driver 2	1616 -71	5.2.6.080	10/1/1998
4.1	2 bits	System event	1622 -71	5.2.6.082	10/1/1998
4.3	2 bits	Handling information	1621 -71	5.2.6.083	10/1/1998

				SPN	SPN Doc and paragraph	Date Approved
4.5	2 bits	Tachograph performance		1620 -71	5.2.6.084	10/1/1998
4.7	2 bits	Direction indicator		1619 -71	5.2.6.085	10/1/1998
5,6	2 bytes	Tachograph output shaft speed		1623 -71	5.2.5.282	10/1/1998
7,8	2 bytes	Tachograph vehicle speed		1624 -71	5.2.5.283	10/1/1998

-71   5.3.144   *Time/Date Adjust*   -   TDA

Transmission Rate: As needed
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 213
PDU Specific: Destination Address
Default Priority: 6
Parameter Group   54528   (D500   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Adjust seconds	1603 -71	5.2.5.288	10/1/1998
2	1 byte	Adjust minutes	1604 -71	5.2.5.289	10/1/1998
3	1 byte	Adjust hours	1605 -71	5.2.5.290	10/1/1998
4	1 byte	Adjust month	1606 -71	5.2.5.291	10/1/1998
5	1 byte	Adjust day	1607 -71	5.2.5.292	10/1/1998
6	1 byte	Adjust year	1608 -71	5.2.5.293	10/1/1998
7	1 byte	Adjust local minute offset	1609 -71	5.2.5.294	10/1/1998
8	1 byte	Adjust local hour offset	1610 -71	5.2.5.295	10/1/1998

-71   5.3.145   *Driver's Identification*   -   DI

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

Transmission Rate:	On request					
Data Length:	Variable					
Data Page:	0		**PGN Supporting Information:**			
PDU Format:	254					
PDU Specific:	107					
Default Priority:	6					
Parameter Group		65131	(FE6B)			

POS	Length	Parameter Name	SPN	SPN Doc and paragraph		Date Approved
1,2	Variable Delimiter (ASCII "*")	Driver 1 identification	1625	-71	5.2.5.287	10/1/1998
3,4	Variable Delimiter (ASCII "*")	Driver 2 identification	1626	-71	5.2.5.287	10/1/1998

-71   5.3.2??   *Continuous Torque & Speed Limit Request*   -   CTL

Transmission Rate: 5 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 207   ContinousTorque.doc
PDU Specific: Destination Address
Default Priority: 6
Parameter Group   52992   (CF00)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Minimum Continuous Engine Speed Limit Request	1784 -71	5.2.7.???	11/13/1999
2	1 byte	Maximum Continuous Engine Speed Limit Request	1785 -71	5.2.7.???	11/13/1999
3	1 byte	Minimum Continuous Engine Torque Limit Request	1786 -71	5.2.7.???	11/13/1999
4	1 byte	Maximum Continuous Engine Torque Limit Request	1787 -71	5.2.7.???	11/13/1999
5	1 byte	Minimum Continuous Retarder Speed Limit Request	1788 -71	5.2.7.???	11/13/1999
6	1 byte	Maximum Continuous Retarder Speed Limit Request	1789 -71	5.2.7.???	11/13/1999
7	1 byte	Minimum Continuous Retarder Torque Limit Request	1790 -71	5.2.7.???	11/13/1999
8	1 byte	Maximum Continuous Retarder Torque Limit Request	1791 -71	5.2.7.???	11/13/1999

The TSC1 message allows J1939 network devices to temporarily control engine and retarder speed and torque. This approach allows engine (and retarder) speed to be controlled by one device for a limited period of time. This may need to happen for brief emergency conditions (as requested by an anti-lock braking system for example) or in order to synchronize engine speed with some other device such as a transmission in order to allow a shift. Conflicting speed and torque requests from different devices are resolved by a predefined arbitration scheme.

Not every torque or speed need is satisfactorily addressed by this plan, however. Occasionally a network device may wish to impose longer lasting limits on speed and torque. For instance, as long as a transmission is in third gear, it may not be able to withstand all the torque the engine (or retarder) can produce. Or, an auxiliary device such as a pump may only operate correctly if engine speed and torque are kept within some fairly limited range *but not necessarily at one precise speed/torque!* In these cases, the network device does not need to command the precise speed or torque, but does have a legitimate desire to keep it within some boundary for an extended period of time. The TSC1 message doesn't provide this ability.

How:

The ECM and retarder controller(s) first must define a "window" within the torque map. The window should be chosen carefully, and shouldn't be any larger than necessary. Any requests for continuous limits that attempt to intrude on this window will succeed only in setting limits at the very threshold of the window. For example, if the ECM declares that minimum continuous torque limits must be less than 900 lb-ft, and some device attempts to set a minimum continuous torque of 1000 lb-ft, the actual applied continuous limit will be 900 lb-ft (thus 900 lb-ft is the *minimum continuous* torque). When this limit is applied, the engine will always produce at least 900 lb-ft of torque. Similarly, if the engine declares that minimum continuous engine speed cannot be more than 1100

RPM, any attempts at setting a minimum continuous engine speed of over 1100 RPM will result in a minimum continuous engine speed of 1100 RPM. That is, the engine has declared beforehand that it will *always* be able to operate at least at 1100 RPM.

Periodically, the ECM and retarder controller(s) will transmit the dimensions of this window, as well as what actual continuous limits have been applied. This allows the engine to adjust the size and shape of the "window" to allow for derates and provides feedback to the various devices requesting continuous torque and/or speed limits.

The following figure shows an example torque curve with a "window" inside.

Torque

RPM
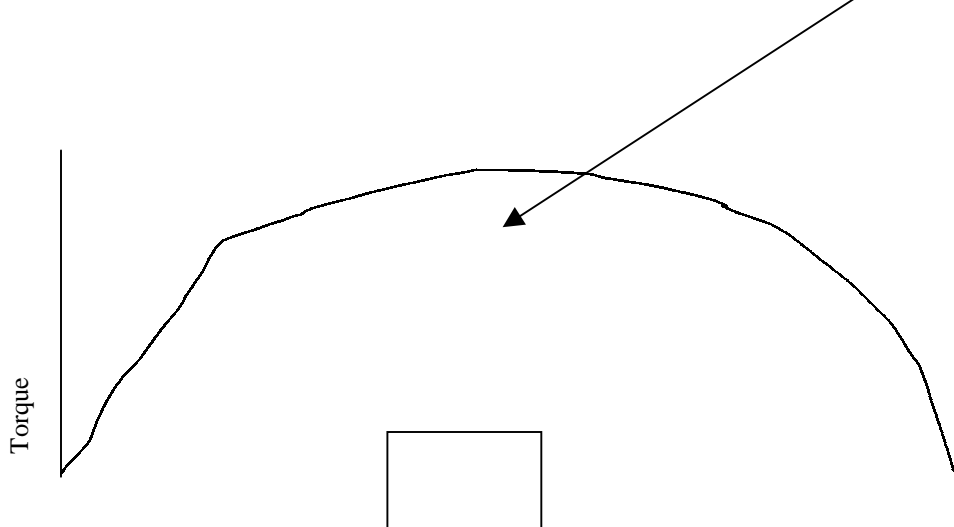
The following figure shows how the ECM will treat requests that are outside of the bounds set by the "window." Note that the ECM has declared a "maximum allowable minimum" and a "minimum allowable maximum" for both speed and torque. These limits form a sort of rectangular "window" within the torque. The engine **must** be free to operate within this window; no continuous limits will be accepted that would intrude on it. In the diagram, some network device has ignored those values and attempted to set a minimum continuous speed higher than allowed. Remember, a minimum continuous speed means that the engine must always maintain an RPM of that value or greater. The ECM cannot accept the requested limit, so it applies a continuous limit as close as possible: right at the boundary set by "maximum value allowed for minimum continuous speed." Requests for Minimum Continuous Speed and Max/Min continuous torque are handled the same way.

Highest value for minimum continuous
RPM as allowed by ECM

Minimum Continuous RPM as requested by
a network device

Torque

RPM
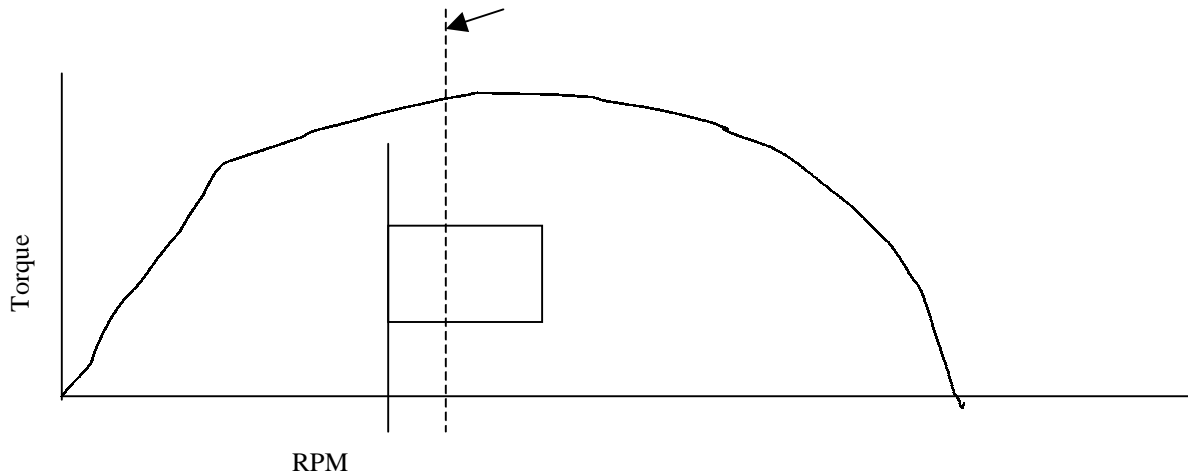
Minimum Continuous Speed
limit that will actually be applied.

Things get a little more complicated when a retarder is included. Fortunately, only the engine compression brake retarder has any real relationship to the engine's torque map. Because other retarders may work against the engine, only the compression brake is generally controlled by the same ECU. For this reason, we must give it more careful attention.

The following figure illustrates one of the problems. Suppose continuous limits have been applied to the engine and retarder as indicated by the rectangular boxes within the torque maps. If the engine is prohibited from allowing torque to decrease below x, how can the retarder be engaged? An engine compression brake retarder needs zero fueling for the engine in order to engage. The simple answer is that if there is a minimum continuous torque limit applied to the engine, the retarder will not be engaged.

How does the reverse case behave? If the retarder is of a type other than engine compression brake, it may work against the engine and continuously produce a negative torque. Engine compression brake retarders must not send out a list of acceptable limits that would allow such conundrums. In practical terms, this means that engine compression brake retarders must set their Maximum Continuous Torque limit (think of it as MINIMUM continuous BRAKING torque limit) to zero in order for the retarder to ever be engaged. Similarly, the continuous limits as actually applied to the engine must allow zero torque if the retarder is to be engaged.
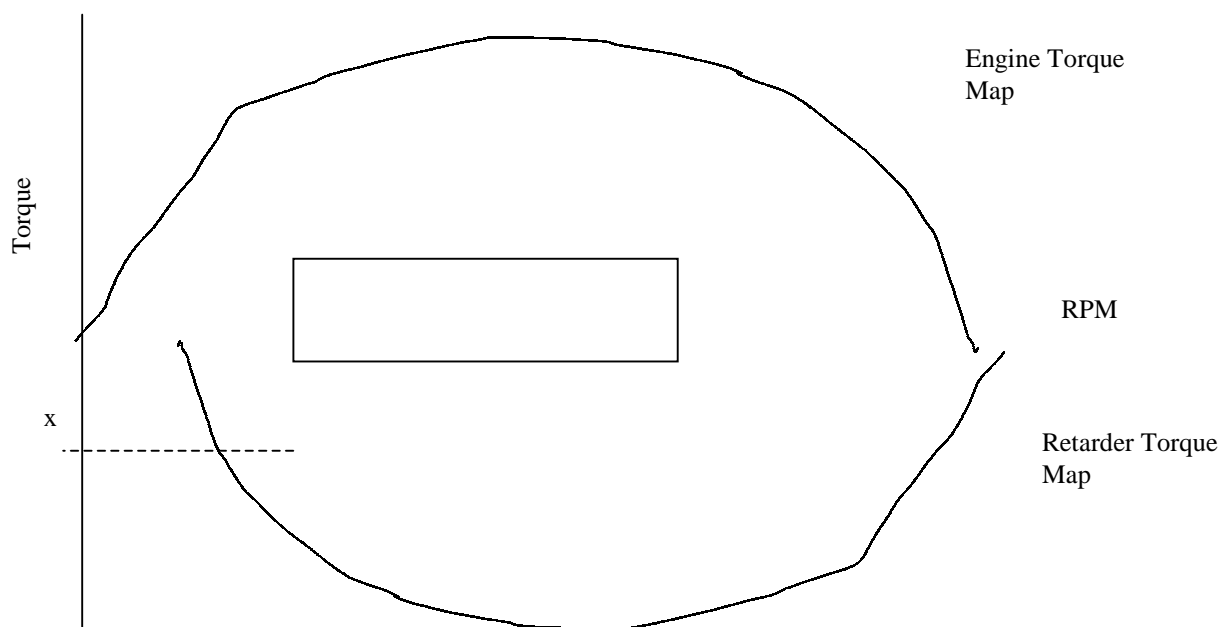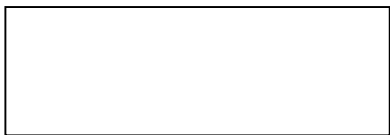
-71   **5.3.2??**   *Cab Illumination Message*   **- CL**

This message contains information that controls illumination devices inside the vehicle's cab.

Transmission Rate:	on change of state, but not faster that 100 ms, and every 5 s
Data Length:	8
Data Page:	0 **PGN Supporting Information:**
PDU Format:	208
PDU Specific:	Destination Address
Default Priority:	6
Parameter Group	53248 (D000)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Illumination Brightness Percent	1487 -71	5.2.7.???	11/11/1999

-71 **5.3.2??** *Air Suspension Control #6* **- ASC6**

Used for suspension control

Transmission Rate:	100 ms when active
Data Length:	8
Data Page:	0 **PGN Supporting Information:**
PDU Format:	209
PDU Specific:	Destination Address
Default Priority:	3
Parameter Group	53504 (D100)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1,2	2 bytes	Level Preset Front Axle Left	1732	-71	5.2.7.???	11/11/1999
3,4	2 bytes	Level Preset Front Axle Right	1757	-71	5.2.7.???	11/11/1999
5,6	2 bytes	Level Preset Rear Axle Left	1758	-71	5.2.7.???	11/11/1999
7,8	2 bytes	Level Preset Rear Axle Right	1735	-71	5.2.7.???	11/11/1999

-71 **5.3.2??** *Air Suspension Control #2* **- ASC2**

Used for suspension control

Transmission Rate:	100 ms
Data Length:	8
Data Page:	0 **PGN Supporting Information:**
PDU Format:	210
PDU Specific:	Destination Address
Default Priority:	3
Parameter Group	53760 (D200)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1.3	2 bits	Kneeling Request Left Side	1749	-71	5.2.7.???	11/11/1999
1.5	2 bits	Kneeling Request Right Side	1748	-71	5.2.7.???	11/11/1999
1.7	2 bits	Kneeling Control Mode Request	1747	-71	5.2.7.???	11/11/1999
2.1	4 bits	Nominal Level Request Front Axle	1751	-71	5.2.7.???	11/11/1999
2.5	4 bits	Nominal Level Request Rear Axle	1750	-71	5.2.7.???	11/11/1999
3.1	4 bits	Level Control Mode Request	1753	-71	5.2.7.???	11/11/1999
3.5	2 bits	Lift Axle 1 Position Request	1752	-71	5.2.7.???	5/11/2000
3.7	2 bits	Lift Axle 2 Position Request	1828	-71	5.2.7.???	5/11/2000
4	1 byte	Damper Stiffness Request Front Axle	1718	-71	5.2.7.???	11/11/1999
5	1 byte	Damper Stiffness Request Rear Axle	1719	-71	5.2.7.???	11/11/1999

6	1 byte	Damper Stiffness Request Lift / Tag Axle		1720	-71	5.2.7.???	11/11/1999
7.1	2 bits	Kneeling Request Front Axle		1830	-71	5.2.7.???	5/11/2000
7.3	2 bits	Kneeling Request Rear Axle		1829	-71	5.2.7.???	5/11/2000

-71   **5.3.2??**   *Forward Lane Image urgent msg*   **- FLI1**

Transmission Rate:	50 ms (only when active)
Data Length:	8
Data Page:	0
PDU Format:	240
PDU Specific:	7
Default Priority:	4
Parameter Group	61447 (F007)

PGN Supporting Information:

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.5	2 bits	Lane Departure Imminent, Right Side	1701 -71	5.2.7.???	11/11/1999
1.7	2 bits	Lane Departure Imminent, Left Side	1700 -71	5.2.7.???	11/11/1999

-71   **5.3.2??**   *Hydraulic Pressure Governor Info*   **- HPG**

Information to be used for a hydraulic pressure governing control system

Transmission Rate:	50 ms
Data Length:	8
Data Page:	0
PDU Format:	240
PDU Specific:	8
Default Priority:	6
Parameter Group	61448 (F008)

PGN Supporting Information:

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Hydraulic Pressure	1762 -71	5.2.7.???	11/11/1999
3.1	2 bits	Hydraulic Pressure Mode Indicator	1763 -71	5.2.7.???	11/11/1999
3.3	2 bits	Hydraulic Pressure Governor Switch	1764 -71	5.2.7.???	11/11/1999

-71   **5.3.2??**   *Vehicle Dynamic Stability Control #2*   **-   VDC2**

Contains information which relates to the vehicle's movement.

Transmission Rate: 10 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 240
PDU Specific: 9
Default Priority: 6
Parameter Group   61449   (F009   )

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1,2	2 bytes	Steering wheel angle	1807	-71	5.2.7.???	5/11/2000
3.1	6 bits	Steering Wheel Turn Counter	1811	-71	5.2.7.???	5/11/2000
3.7	2 bits	Steering Wheel Angle Sensor Type	1812	-71	5.2.7.???	5/11/2000
4,5	2 bytes	Yaw rate	1808	-71	5.2.7.???	5/11/2000
6,7	2 bytes	Lateral Acceleration	1809	-71	5.2.7.???	5/11/2000
8	1 byte	Longitudinal Acceleration	1810	-71	5.2.7.???	5/11/2000

-71   **5.3.2??**   *Maximum Vehicle Speed Limit Status*   **-   MVS**

Reports the possible maximum vehicle speed limits, one through seven, and the applied maximum vehicle speed limit.

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 253
PDU Specific: 229
Default Priority: 6
Parameter Group   64997   (FDE5   )

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1	1 byte	Maximum Vehicle Speed Limit #1	2588	-71	5.2.7.???	11/9/2000
2	1 byte	Maximum Vehicle Speed Limit #2	2589	-71	5.2.7.???	11/9/2000
3	1 byte	Maximum Vehicle Speed Limit #3	2590	-71	5.2.7.???	11/9/2000
4	1 byte	Maximum Vehicle Speed Limit #4	2591	-71	5.2.7.???	11/9/2000
5	1 byte	Maximum Vehicle Speed Limit #5	2592	-71	5.2.7.???	11/9/2000
6	1 byte	Maximum Vehicle Speed Limit #6	2593	-71	5.2.7.???	11/9/2000
7	1 byte	Maximum Vehicle Speed Limit #7	2594	-71	5.2.7.???	11/9/2000

| 8 | 1 byte | Applied Maximum Vehicle Speed Limit | | 2595 | -71 | 5.2.7.??? | 11/9/2000 |

-71 **5.3.2??** *Hydraulic Braking System* **- HBS**

Used for information on a hydraulic brake system

As an example: this PGN may be used for a two circuit hydraulic brake system with separate circuits for front and rear axle. The hydraulic energy is supplied via two independent electrically driven pumps. The energy is stored in gas filled hydraulic accumulators also separated for each circuit.

Transmission Rate:	100 ms	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	253	
PDU Specific:	230	
Default Priority:	3	
Parameter Group	64998 (FDE6)	

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1	1 byte	Hydraulic Brake Pressure Circuit 1	2580	-71	5.2.7.???	2/15/2001
2	1 byte	Hydraulic Brake Pressure Circuit 2	2581	-71	5.2.7.???	2/15/2001
3.1	2 bits	Hydraulic Brake Pressure Warning State Circuit 1	2584	-71	5.2.7.???	2/15/2001
3.3	2 bits	Hydraulic Brake Pressure Warning State Circuit 2	2585	-71	5.2.7.???	2/15/2001
3.5	2 bits	Hydraulic Brake Pressure Supply State Circuit 1	2582	-71	5.2.7.???	2/15/2001
3.7	2 bits	Hydraulic Brake Pressure Supply State Circuit 2	2583	-71	5.2.7.???	2/15/2001

-71 **5.3.2??** *Exhaust Temperature* **- ET**

Transmission Rate:	0.5 s	
Data Length:	8	
Data Page:	0	**PGN Supporting Information:**
PDU Format:	254	
PDU Specific:	7	
Default Priority:	6	
Parameter Group	65031 (FE07)	

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1,2	2 bytes	Right Manifold Exhaust Gas Temperature	2433	-71	5.2.7.???	11/9/2000
3,4	2 bytes	Left Manifold Exhaust Gas Temperature	2434	-71	5.2.7.???	11/9/2000

-71   **5.3.2??**   *Lighting Data*   **- LD**

This lighting message is a response to the request for lighting data in the lighting command message. Each lighting controller on the tractor and attached implements must transmit this message to the Tractor ECU when requested. The tractor will use this information to determine which lighting systems are functioning. Lighting controllers that have lamp sensing capability will also report failed light bulbs. This is a legal requirement in many areas.

Transmission Rate: As requested.
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 64
Default Priority: 6
Parameter Group   65088   (FE40   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	2 bits	Running Light	2404 -71	5.2.7.???	8/10/2000
1.3	2 bits	Alternate Beam Head Light Data	2352 -71	5.2.7.???	8/10/2000
1.5	2 bits	Low Beam Head Light Data	2350 -71	5.2.7.???	8/10/2000
1.7	2 bits	High Beam Head Light Data	2348 -71	5.2.7.???	8/10/2000
2.1	2 bits	Tractor Front Fog Lights	2388 -71	5.2.7.???	8/10/2000
2.3	2 bits	Rotating Beacon Light	2386 -71	5.2.7.???	8/10/2000
2.5	2 bits	Right Turn Signal Lights	2370 -71	5.2.7.???	8/10/2000
2.7	2 bits	Left Turn Signal Lights	2368 -71	5.2.7.???	8/10/2000
3.1	2 bits	Back Up Light and Alarm Horn	2392 -71	5.2.7.???	8/10/2000
3.3	2 bits	Centre Stop Light	2376 -71	5.2.7.???	8/10/2000
3.5	2 bits	Right Stop Light	2374 -71	5.2.7.???	8/10/2000
3.7	2 bits	Left Stop Light	2372 -71	5.2.7.???	8/10/2000
4.1	2 bits	Implement Clearance Light	2384 -71	5.2.7.???	8/10/2000
4.3	2 bits	Tractor Clearance Light	2382 -71	5.2.7.???	8/10/2000
4.5	2 bits	Implement Marker Light	2380 -71	5.2.7.???	8/10/2000
4.7	2 bits	Tractor Marker Light	2378 -71	5.2.7.???	8/10/2000
5.1	2 bits	Rear Fog Lights	2390 -71	5.2.7.???	8/10/2000
5.3	2 bits	Tractor Underside Mounted Work Lights	2358 -71	5.2.7.???	8/10/2000
5.5	2 bits	Tractor Rear Low Mounted Work Lights	2360 -71	5.2.7.???	8/10/2000
5.7	2 bits	Tractor Rear High Mounted Work Lights	2362 -71	5.2.7.???	8/10/2000
6.1	2 bits	Tractor Side Low Mounted Work Lights	2364 -71	5.2.7.???	8/10/2000
6.3	2 bits	Tractor Side High Mounted Work Lights	2366 -71	5.2.7.???	8/10/2000
6.5	2 bits	Tractor Front Low Mounted Work Lights	2354 -71	5.2.7.???	8/10/2000
6.7	2 bits	Tractor Front High Mounted Work Lights	2356 -71	5.2.7.???	8/10/2000
7.1	2 bits	Implement OEM Option 2 Light	2398 -71	5.2.7.???	8/10/2000
7.3	2 bits	Implement OEM Option 1 Light	2396 -71	5.2.7.???	8/10/2000
7.5	2 bits	Implement Right Facing Work Light	2407 -71	5.2.7.???	8/10/2000

7.7	2 bits	Implement Left Facing Work Light		2598	-71	5.2.7.???	8/10/2000
8.3	2 bits	Implement Right Forward Work Light		2402	-71	5.2.7.???	8/10/2000
8.5	2 bits	Implement Left Forward Work Light		2400	-71	5.2.7.???	8/10/2000
8.7	2 bits	Implement Rear Work Light		2394	-71	5.2.7.???	8/10/2000

-71   **5.3.2??**   *Lighting Command*   **-   LC**

The lighting command message has been defined as a global message from the tractor to all lighting controllers on the tractor and attached implements. Separate messages are provided for tractor and implement work and driving lights. Additional commands have been provided for 3 optional lights on implements to meet the needs of speciality equipment. Common marking and signaling messages are provided.

This message is used to control the state of all lighting functions. The lighting command message shall be sent on each change of state of a lamp, or at periodic rate to provide synchronization of turn signal and hazard flashers. The state values indicate the lights is to be turned ON or OFF. Flashing is accomplished by sending the lighting message with the state alternately ON or OFF. A lighting command message must be sent at least once per second. It is the responsibility of the tractor designer to provide the correct combination of lamp commands to meet local legislative directives.

Transmission Rate: On change of lamp on/ off state. Maximum period of 1 second between messages. No greater than 10 messages per second for all lights.
                              ??? What's the fastest Rate > or < 100 ms ??

Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 65
Default Priority: 3
Parameter Group   65089   (FE41   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	2 bits	Running Light Command	2403 -71	5.2.7.???	8/10/2000
1.3	2 bits	Alternate Beam Head Light Command	2351 -71	5.2.7.???	8/10/2000
1.5	2 bits	Low Beam Head Light Command	2349 -71	5.2.7.???	8/10/2000
1.7	2 bits	High Beam Head Light Command	2347 -71	5.2.7.???	8/10/2000
2.1	2 bits	Tractor Front Fog Lights Command	2387 -71	5.2.7.???	8/10/2000
2.3	2 bits	Rotating Beacon Light Command	2385 -71	5.2.7.???	8/10/2000
2.5	2 bits	Right Turn Signal Lights Command	2369 -71	5.2.7.???	8/10/2000
2.7	2 bits	Left Turn Signal Lights Command	2367 -71	5.2.7.???	8/10/2000
3.1	2 bits	Back Up Light and Alarm Horn Command	2391 -71	5.2.7.???	8/10/2000
3.3	2 bits	Centre Stop Light Command	2375 -71	5.2.7.???	8/10/2000
3.5	2 bits	Right Stop Light Command	2373 -71	5.2.7.???	8/10/2000
3.7	2 bits	Left Stop Light Command	2371 -71	5.2.7.???	8/10/2000
4.1	2 bits	Implement Clearance Light Command	2383 -71	5.2.7.???	8/10/2000
4.3	2 bits	Tractor Clearance Light Command	2381 -71	5.2.7.???	8/10/2000
4.5	2 bits	Implement Marker Light Command	2379 -71	5.2.7.???	8/10/2000
4.7	2 bits	Tractor Marker Light Command	2377 -71	5.2.7.???	8/10/2000
5.1	2 bits	Rear Fog Light Command	2389 -71	5.2.7.???	8/10/2000

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
5.3	2 bits	Tractor Underside Mounted Work Lights Command	2357	-71	5.2.7.???	8/10/2000
5.5	2 bits	Tractor Rear Low Mounted Work Lights Command	2359	-71	5.2.7.???	8/10/2000
5.7	2 bits	Tractor Rear High Mounted Work Lights Command	2361	-71	5.2.7.???	8/10/2000
6.1	2 bits	Tractor Side Low Mounted Work Lights Command	2363	-71	5.2.7.???	8/10/2000
6.3	2 bits	Tractor Side High Mounted Work Lights Command	2365	-71	5.2.7.???	8/10/2000
6.5	2 bits	Tractor Front Low Mounted Work Lights Command	2353	-71	5.2.7.???	8/10/2000
6.7	2 bits	Tractor Front High Mounted Work Lights Command	2355	-71	5.2.7.???	8/10/2000
7.1	2 bits	Implement OEM Option 2 Light Command	2397	-71	5.2.7.???	8/10/2000
7.3	2 bits	Implement OEM Option 1 Light Command	2395	-71	5.2.7.???	8/10/2000
7.5	2 bits	Implement Right Facing Work Light Command	2406	-71	5.2.7.???	8/10/2000
7.7	2 bits	Implement Left Facing Work Light Command	2597	-71	5.2.7.???	8/10/2000
8.1	2 bits	Lighting Data Request Command	2393	-71	5.2.7.???	8/10/2000
8.3	2 bits	Implement Right Forward Work Light Command	2401	-71	5.2.7.???	8/10/2000
8.5	2 bits	Implement Left Forward Work Light Command	2399	-71	5.2.7.???	8/10/2000
8.7	2 bits	Implement Rear Work Light Command	2405	-71	5.2.7.???	8/10/2000

-71   **5.3.2??**   *Electronic Transmission Controller #7*   **- ETC7**

Transmission status information from the transmission controller to network.

Transmission Rate: 100 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 74
Default Priority: 6
Parameter Group   65098   (FE4A)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1.5	2 bits	Transmission Requested Range Display Blank State	1850	-71	5.2.7.???	8/10/2000
1.7	2 bits	Transmission Requested Range Display Flash State	1849	-71	5.2.7.???	8/10/2000
2.7	2 bits	Shift Inhibit Indicator	1851	-71	5.2.7.???	8/10/2000
3.1	2 bits	Shift Mode #4	2539	-71	5.2.7.???	11/9/2000
3.3	2 bits	Shift Mode #3	2538	-71	5.2.7.???	11/9/2000
3.5	2 bits	Shift Mode #2	2537	-71	5.2.7.???	11/9/2000
3.7	2 bits	Shift Mode #1	2536	-71	5.2.7.???	11/9/2000

-71   5.3.2??   *Transmission Configuration 2*   - TCFG2

Contains transmission configuration information.

Transmission Rate: On request
Data Length: Variable
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 75
Default Priority: 6
Parameter Group   65099   (FE4B)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Transmission torque limit	1845 -71	5.2.7.???	11/9/2000

-71   5.3.2??   *Military Lighting Request*   - ML

The message contains parameters that control military specific lights.

Transmission Rate: 500ms or upon state change, but not faster than 100 ms.
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 76
Default Priority: 6
Parameter Group   65100   (FE4C)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	2 bits	Rear Black Out Marker Select	1840 -71	5.2.7.???	5/11/2000
1.3	2 bits	Front Black Out Marker Lamp Select	1839 -71	5.2.7.???	5/11/2000
1.5	2 bits	Convoy Lamp Select	1838 -71	5.2.7.???	5/11/2000
1.7	2 bits	Convoy Driving Lamp Select	1837 -71	5.2.7.???	5/11/2000
3.7	2 bits	Black Out Brake/Stop Lamp Select	1841 -71	5.2.7.???	5/11/2000
4.1	2 bits	Night Vision Illuminator Select	1843 -71	5.2.7.???	5/11/2000
4.7	2 bits	Black Out Work Lamp Select	1842 -71	5.2.7.???	5/11/2000
8	1 byte	Operators Black Out Intensity Selection	1844 -71	5.2.7.???	5/11/2000

-71   5.3.2??   *Total Averaged Information*   - TAVG

Averages of information accumulated over the life of the engine

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 77
Default Priority: 7
Parameter Group   65101   (FE4D)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Total Average Fuel Rate	1834 -71	5.2.7.???	5/11/2000
3,4	2 bytes	Total Average Fuel Economy	1835 -71	5.2.7.???	5/11/2000

-71   5.3.2??   *Door Control*   - DC

Used for door information.

Transmission Rate: 100 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 78
Default Priority: 6
Parameter Group   65102   (FE4E)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	4 bits	Status of doors	1821 -71	5.2.7.???	5/11/2000
1.5	2 bits	Ramp / Wheel Chair Lift Status	1820 -71	5.2.7.???	5/11/2000

-71   5.3.2??   *Vehicle Dynamic Stability Control #1*   -   VDC1

Contains information which relates to the VDC system status.

Transmission Rate: 100ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 79
Default Priority: 6
Parameter Group   65103   (FE4F)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	2 bits	VDC lamp state	1813 -71	5.2.7.???	5/11/2000
1.3	2 bits	VDC fully operational	1814 -71	5.2.7.???	5/11/2000
1.5	2 bits	VDC brake light request	1815 -71	5.2.7.???	5/11/2000
2.1	2 bits	ROP Engine Control active	1816 -71	5.2.7.???	5/11/2000
2.3	2 bits	ROP Brake Control active	1818 -71	5.2.7.???	5/11/2000
2.5	2 bits	YC Engine Control active	1817 -71	5.2.7.???	5/11/2000
2.7	2 bits	YC Brake Control active	1819 -71	5.2.7.???	5/11/2000

-71   5.3.2??   *Battery Temperature*   -   BT1

Contains battery temperature information.

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 80
Default Priority: 6
Parameter Group   65104   (FE50)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Battery 1 Temperature	1800 -71	5.2.7.???	5/11/2000
2	1 byte	Battery 2 Temperature	1801 -71	5.2.7.???	5/11/2000

-71   **5.3.2??**   *Adaptive Cruise Control, Operator Input*   **-**   **ACC2**

The operator requested characteristics for the ACC systems operation.

Transmission Rate:	250 ms
Data Length:	8
Data Page:	0 **PGN Supporting Information:**
PDU Format:	254
PDU Specific:	81
Default Priority:	6
Parameter Group	65105 (FE51)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.6	3 bits	Requested ACC Distance Mode	1799 -71	5.2.7.???	2/10/2000

-71   **5.3.2??**   *Vehicle Electrical Power #3*   **-**   **VP3**

This contains high resolution/range parameters reported from the allternator or power generation

Transmission Rate:	1 s
Data Length:	8
Data Page:	0 **PGN Supporting Information:**
PDU Format:	254
PDU Specific:	82
Default Priority:	6
Parameter Group	65106 (FE52)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Alternator Current (High Range/Resolution)	1795 -71	5.2.7.???	2/10/2000
3,4	2 bytes	Net Battery Current (High Range/Resolution)	2579 -71	5.2.7.???	2/15/2001

-71   **5.3.2??**   *Retarder Continuous Torque & Speed Limit*   **- RTC1**

Transmission Rate: 5 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 83
Default Priority: 6
Parameter Group   65107   (FE53   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Low Limit Threshhold for Maximum RPM from Retarder	1776 -71	5.2.7.???	11/13/1999
2	1 byte	High Limit Threshhold for Minimum Continuous RPM from Retarder	1777 -71	5.2.7.???	11/13/1999
3	1 byte	Low Limit Threshhold for Maximum Torque from Retarder	1778 -71	5.2.7.???	11/13/1999
4	1 byte	High Limit Threshhold for Minimum Continuous Torque from Retarder	1779 -71	5.2.7.???	11/13/1999
5	1 byte	Maximum Continuous Retarder Speed	1780 -71	5.2.7.???	11/13/1999
6	1 byte	Minimum Continuous Retarder Speed	1781 -71	5.2.7.???	11/13/1999
7	1 byte	Maximum Continuous Retarder Torque	1782 -71	5.2.7.???	11/13/1999
8	1 byte	Minimum Continuous Retarder Torque	1783 -71	5.2.7.???	11/13/1999

-71   **5.3.2??**   *Engine Continuous Torque & Speed Limit*   **- ECT1**

Transmission Rate: 5 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 84
Default Priority: 6
Parameter Group   65108   (FE54   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Low Limit Threshhold for Maximum RPM from Engine	1768 -71	5.2.7.???	11/13/1999
2	1 byte	High Limit Threshhold for Minimum Continuous Engine RPM	1769 -71	5.2.7.???	11/13/1999
3	1 byte	Low Limit Threshold for Maximum Torque from Engine	1770 -71	5.2.7.???	11/13/1999

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
4	1 byte	High Limit Threshhold for Minimum Continuous Torque from Engine	1771 -71	5.2.7.???	11/13/1999
5	1 byte	Maximum Continuous Engine RPM	1772 -71	5.2.7.???	11/13/1999
6	1 byte	Minimum Continuous Engine RPM	1773 -71	5.2.7.???	11/13/1999
7	1 byte	Maximum Continuous Engine Torque	1774 -71	5.2.7.???	11/13/1999
8	1 byte	Minimum Continuous Engine Torque	1775 -71	5.2.7.???	11/13/1999

-71   5.3.2??   *Gaseous Fuel Properties*   - GFD

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 85
Default Priority: 6
Parameter Group   65109   (FE55)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Specific Heat Ratio	1767 -71	5.2.7.???	11/11/1999

-71   5.3.2??   *TANK Information #1*   - TI1

Contains information on various tank levels

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 86
Default Priority: 6
Parameter Group   65110   (FE56)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Catalyst Tank Level	1761 -71	5.2.7.???	11/11/1999

-71   **5.3.2??**   *Air Suspension Control #5*   **- ASC5**

Used for damper stiffness information

Transmission Rate:	100 ms					
Data Length:	8					
Data Page:	0		**PGN Supporting Information:**			
PDU Format:	254					
PDU Specific:	87					
Default Priority:	3					
Parameter Group		65111 (FE57)				

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1	1 byte	Damper Stiffness Front Axle	1729	-71	5.2.7.???	11/11/1999
2	1 byte	Damper Stiffness Rear Axle	1730	-71	5.2.7.???	11/11/1999
3	1 byte	Damper Stiffness Lift / Tag Axle	1731	-71	5.2.7.???	11/11/1999
4.1	2 bits	Electronic Shock Absorber Control Status Front Axle	1833	-71	5.2.7.???	5/11/2000
4.3	2 bits	Electronic Shock Absorber Control Status Rear Axle	1832	-71	5.2.7.???	5/11/2000
4.5	2 bits	Electronic Shock Absorber Control Status Lift/Tag Axle	1831	-71	5.2.7.???	5/11/2000

-71   **5.3.2??**   *Air Suspension Control #4*   **- ASC4**

Used for bellow pressure information

Transmission Rate:	100 ms					
Data Length:	8					
Data Page:	0		**PGN Supporting Information:**			
PDU Format:	254					
PDU Specific:	88					
Default Priority:	6					
Parameter Group		65112 (FE58)				

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1,2	2 bytes	Bellow Pressure Front Axle Left	1725	-71	5.2.7.???	11/11/1999
3,4	2 bytes	Bellow Pressure Front Axle Right	1726	-71	5.2.7.???	11/11/1999
5,6	2 bytes	Bellow Pressure Rear Axle Left	1727	-71	5.2.7.???	11/11/1999
7,8	2 bytes	Bellow Pressure Rear Axle Right	1728	-71	5.2.7.???	11/11/1999

-71   **5.3.2??**   *Air Suspension Control #3*   **- ASC3**

Used for height information

Transmission Rate:	100 ms			
Data Length:	8			
Data Page:	0	**PGN Supporting Information:**		
PDU Format:	254			
PDU Specific:	89			
Default Priority:	6			
Parameter Group		65113 (FE59)		

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Relative Level Front Axle Left	1721 -71	5.2.7.???	11/11/1999
3,4	2 bytes	Relative Level Front Axle Right	1722 -71	5.2.7.???	11/11/1999
5,6	2 bytes	Relative Level Rear Axle Left	1724 -71	5.2.7.???	11/11/1999
7,8	2 bytes	Relative Level Rear Axle Right	1723 -71	5.2.7.???	11/11/1999

-71   **5.3.2??**   *Air Suspension Control #1*   **- ASC1**

Used for suspension control control information

Transmission Rate:	100 ms			
Data Length:	8			
Data Page:	0	**PGN Supporting Information:**		
PDU Format:	254			
PDU Specific:	90			
Default Priority:	3			
Parameter Group		65114 (FE5A)		

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	4 bits	Nominal Level Front Axle	1734 -71	5.2.7.???	11/11/1999
1.5	4 bits	Nominal Level Rear Axle	1733 -71	5.2.7.???	11/11/1999
2.1	2 bits	Below Nominal Level Front Axle	1738 -71	5.2.7.???	11/11/1999
2.3	2 bits	Below Nominal Level Rear Axle	1754 -71	5.2.7.???	11/11/1999
2.5	2 bits	Above Nominal Level Front Axle	1737 -71	5.2.7.???	11/11/1999
2.7	2 bits	Above Nominal Level Rear Axle	1736 -71	5.2.7.???	11/11/1999
3.1	2 bits	Lowering Control Mode Front Axle	1740 -71	5.2.7.???	11/11/1999
3.3	2 bits	Lowering Control Mode Rear Axle	1755 -71	5.2.7.???	11/11/1999
3.5	2 bits	Lifting Control Mode Front Axle	1739 -71	5.2.7.???	11/11/1999
3.7	2 bits	Lifting Control Mode Rear Axle	1756 -71	5.2.7.???	11/11/1999

4.1	4 bits	Kneeling Information	1742	-71	5.2.7.???	11/11/1999
4.5	4 bits	Level Control Mode	1741	-71	5.2.7.???	11/11/1999
5.1	2 bits	Security Device	1746	-71	5.2.7.???	11/11/1999
5.3	2 bits	Vehicle Motion Inhibit	1745	-71	5.2.7.???	11/11/1999
5.5	2 bits	Door Release	1744	-71	5.2.7.???	11/11/1999
5.7	2 bits	Lift Axle 1 Position	1743	-71	5.2.7.???	5/11/2000
6.1	2 bits	Actual Level Front Axle in Bumper Range	1824	-71	5.2.7.???	5/11/2000
6.3	2 bits	Actual Level Rear Axle in Bumper Range	1823	-71	5.2.7.???	5/11/2000
6.7	2 bits	Lift Axle 2 Position	1822	-71	5.2.7.???	5/11/2000
7.1	2 bits	Suspension Remote control 1	1826	-71	5.2.7.???	5/11/2000
7.3	2 bits	Suspension Remote control 2	1825	-71	5.2.7.???	5/11/2000
8.1	4 bits	Control refusal information	1827	-71	5.2.7.???	5/11/2000

-71   **5.3.2??**   *Forward Lane Image*   **- FLI2**

Transmission Rate: 100 ms
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 91
Default Priority: 6
Parameter Group   65115   (FE5B)

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1.3	2 bits	Lane Tracking Status Right Side	1711	-71	5.2.7.???	11/11/1999
1.5	2 bits	Lane Tracking Status Left Side	1710	-71	5.2.7.???	11/11/1999
1.7	2 bits	Lane Departure Indication Enable Status	1702	-71	5.2.7.???	11/11/1999

-71   **5.3.2??**   *Battery Main Switch Information*   **-   BM**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 102
Default Priority: 6
Parameter Group   65126   (FE66   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1.1	2 bits	Battery Main Switch Hold State	1681	-71 5.2.7.???	5/19/1999

-71   **5.3.2??**   *Climate Control Configuration*   **-   CCC**

Transmission Rate: On request
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 103
Default Priority: 6
Parameter Group   65127   (FE67   )

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1,2	2 bytes	Auxiliary Heater Maximum Output Power	1690	-71 5.2.7.???	5/19/1999

-71   **5.3.2??**   *Vehicle Fluids*   **-   VF**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 104
Default Priority: 6
Parameter Group   65128   (FE68   )

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1	1 byte	Hydraulic Temperature	1638	-71	5.2.7.???	2/10/1999
2.1	2 bits	Hydraulic Oil Filter Restriction Switch	1713	-71	5.2.7.???	11/11/1999
2.3	2 bits	Winch Oil Pressure Switch	1857	-71	5.2.7.???	8/10/2000

-71   **5.3.2??**   *Engine Temperature #3*   **-   ET3**

This parameter group is used to transit high resolution engine temperatures for control purposes.

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 105
Default Priority: 6
Parameter Group   65129   (FE69   )

POS	Length	Parameter Name	SPN		SPN Doc and paragraph	Date Approved
1,2	2 bytes	Intake Manifold 1 Air Temperature (High Resolution)	1636	-71	5.2.7.???	2/10/1999
3,4	2 bytes	Engine Coolant Temperature (High Resolution)	1637	-71	5.2.7.???	2/10/1999

-71   **5.3.2??**   *Heater Information*   **- HTR**

Transmission Rate: 1 s
Data Length: 8
Data Page: 0   **PGN Supporting Information:**
PDU Format: 254
PDU Specific: 109
Default Priority: 6
Parameter Group   65133   (FE6D)

POS	Length	Parameter Name	SPN	SPN Doc and paragraph	Date Approved
1	1 byte	Auxiliary Heater Output Coolant Temperature	1687 -71	5.2.7.???	5/19/1999
2	1 byte	Auxiliary Heater Input Air Temperature	1688 -71	5.2.7.???	5/19/1999
3	1 byte	Auxiliary Heater Output Power Percent	1689 -71	5.2.7.???	5/19/1999
4.1	4 bits	Auxiliary Heater Mode	1677 -71	5.2.7.???	5/19/1999
5.1	2 bits	Auxilary Heater Water Pump Status	1676 -71	5.2.7.???	5/19/1999
5.3	2 bits	Cab Ventilation	1678 -71	5.2.7.???	5/19/1999
5.5	2 bits	Engine Heating Zone	1679 -71	5.2.7.???	5/19/1999
5.7	2 bits	Cab Heating Zone	1680 -71	5.2.7.???	5/19/1999