# CAN interface

## Industrial engines
## DC09, DC13, DC16, OC16

## Marine engines
## DI09, DI13, DI16



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# Changes from the previous issue

The changes made in this document compared with the previous issue are marked with a black line in the left-hand margin. The changes are also described below.

- The messages CM1, DPFC1 (Diesel Particulate Filter Control) and AT1S1 has been added for Stage V engines.
- DPF Regeneration State for Stage V engines has been added in DLN2-Proprietary.
- Support for DPF Regeneration Countdown Timer for Stage V engines has been added in DLN8.

# Introduction

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

The CAN protocol contains all messages sent and received by the engine control unit.

**REQUIREMENT!**

Two messages received by the engine control unit are high-priority and it is obligatory to send them.

- DLN1-Proprietary.
- Cruise Control/Vehicle Speed (does not apply to OCE1).

If these 2 messages are not received fault codes are generated.

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The CAN protocol used is based on SAE J1939 according to ISO 11898.

- The CAN messages available on the external CAN bus are listed under the headings Summary of CAN messages. This also shows the engines for which the different messages apply.
- Detailed information about each individual CAN message is contained under the headings Detailed description of CAN messages.



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## General guidelines

- The communication speed is 250 kbit/s.
- Control units connected to a CAN bus must be able to handle up to 100% CAN bus load with the correct messages with no significant functional limitations or malfunctions.
- As a rule of thumb, CAN bus load should not exceed 80%.

## Abbreviations

| Abbreviation | Key |
|---|---|
| BAM | Broadcast Announce Message. |
| CAN | Controller Area Network. |
| DTC | Diagnostic trouble code. |
| EMS | Engine management system. |
| EMS S6 | Engine management system for PDE engines, apart from marine engines with PDE and SCR systems. |
| EMS S8 | Engine management system for XPI engines and marine engines with PDE and SCR systems. |
| EMS OCE1 | Engine management system for gas engines |
| PGN | Parameter Group Number. |
| PTO | Power take-off. |

## Clarifications

| Values | |
|---|---|
| Tmin | Shortest period between 2 messages. |
| Tmax | Longest period between 2 messages. |
| Byte | The message starts at byte. |
| Bit | The message starts with this bit in the stated Byte. |
| Length | The parameter length in bits. |



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# Summary of CAN messages sent to the engine

The engine control unit receives the CAN messages on the external CAN bus. The messages are used to activate functions in the engine. These messages can be received by engines in engine generation E2011 manufactured from 7 September 2010:

| Message | Identifier (Hex) | Remarks |
|---|---|---|
| DLN1-Proprietary, all-speed engines | 0C FF 80 27 | Accelerator pedal position and switch. Engine start and emergency stop. PTO mode, torque limiter switches. |
| DLN1-Proprietary, single-speed engines | 0C FF 80 27 | Engine speed offset, droop ON/OFF, torque or engine speed control. Engine start and emergency stop. Nominal engine speed, torque limiter switches, etc. |
| Generator Total AC Power | 0C FE 05 27 | Load signal from alternator in order to use the droop function. |
| Tachograph TCO1 | 0C FE 6C EE | Speed. |
| CC/Vehicle Speed - K | 18 FE F1 27 | Cruise control, flash code and engine shut-off switch. |
| DLN6-Proprietary | 0C FF 89 27 | A/C request, quick heating (if there is an exhaust brake), speed limitation. |
| Time/Date | 18 FE E6 17 | Time and date. |
| TSC1-KE | 0C 00 00 27 | Torque or engine speed request from the coordinator. |
| TSC1-TE | 0C 00 00 03 | Torque request from the transmission. |
| TSC1-AE | 0C 00 00 0B | Torque request from brake management system (not normally used). |
| TSC Proprietary | 0C FF F7 27 | Engine speed request from the coordinator (single-speed engines). |
| Cooling Control Proprietary | 18 FF 51 27 | Request for cooling fan rotational speed, etc. |
| CM1-RDE | 18 E0 00 10 | Requested cooling fan rotational speed in percent. |
| CM1 | 18 E0 00 27 | Used to start manual particulate filter regeneration and to cancel the regeneration when it has been started. |
| ETC1 | 0C F0 02 03 | Gear change information. |
| ETC2 | 18 F0 05 03 | Actual gear ratio for the current gear. |
| KWP2000 Physical Addressing | 18 DA 00 XX | KW-2000 commands for diagnostics. |



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| Message | Identifier (Hex) | Remarks |
|---|---|---|
| KWP2000 Functional Addressing | 18 DB ZZ XX | KW-2000 commands for diagnostics. |
| MABC (Marine Aftertreatment Bypass Control) - K | 18 FF 9A 27 | Control of the SCR system. Only applies to marine single-speed engines with SCR system. |
| ADC (Aftertreatment Desorption Control) - K | 18 FF B7 27 | Acknowledgement for safe start of periodic hydrocarbon evaporation and manual particulate filter regeneration. |

# Summary of CAN messages sent from the engine

These messages can be sent by engines of engine generation E2011 manufactured from 7 September 2010:

| Message | Identifier (Hex) | Remarks |
|---|---|---|
| Engine Temperature | 18 FE EE 00 | Engine coolant temperature. |
| Engine Fluid Level/Pressure - E | 18 FE EF 00 | Oil pressure, coolant level. Used for warning lamps. |
| Inlet/Exhaust Conditions | 18 FE F6 00 | Boost pressure. |
| DLN2-Proprietary | 0C FF 81 00 | Low pressure, high temperature and fault. Used for warning lamps. |
| DLN7-Proprietary | 18 FF 87 00 | Reductant level. |
| DLN8 | 18 FF 88 00 | Fault in exhaust gas aftertreatment system. |
| DPFC1 (Diesel Particulate Filter Control) | 18 FD 7C 00 | Information about the amount of soot particles, and about cancelled regeneration and the reason why regeneration was cancelled. |
| EEC1 | 0C F0 04 00 | Percentage of max. torque, engine speed etc. |
| EEC2 | 0C F0 03 00 | Accelerator pedal position, switches, etc. Load at current engine speed. |
| EEC3 | 18 FE DF 00 | Nominal friction, percentage of maximum torque. |
| BAM-E | 18 EC FF 00 | |
| Engine Configuration Messages | 18 EB FF 00 | Torque curve, reference torque, etc. |
| Engine Configuration-Proprietary | 18 FF 86 00 | Number of cylinders, injection system, etc. |
| BAM-REX | 18 EC FF 29 | |



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| Message | Identifier (Hex) | Remarks |
|---|---|---|
| Cruise Control/Vehicle Speed - E | 18 FE F1 00 | Cruise control, flash code and engine shut-off connectors. |
| Fuel Economy | 18 FE F2 00 | Fuel consumption. |
| Fuel Consumption | 18 FE E9 00 | Total fuel consumption. |
| Engine Hours, Revolutions | 18 FE E5 00 | Total operating time. |
| DM1 EMS | 18 FE CA 00 | Engine fault codes. |
| DM1 EEC3 | 18 FE CA 3D | SCR fault codes. |
| General Purpose Message 1 | 18 FF 60 00 | Serial number. |
| KWP2000 Physical Addressing | 18 DA XX 00 | KW-2000 commands for diagnostics. |
| Vehicle Electrical Power | 18 FE F7 00 | Battery voltage. |
| MABS (Marine Aftertreatment Bypass Status) - E | 18 FF 9B 00 | Status of SCR system. Only applies to marine engines with SCR systems. |
| ADS (Aftertreatment Desorption Status) | 18 FF B8 00 | Periodic hydrocarbon evaporation needs to be carried out. |
| AT1S1 | 18 FD 7B 00 | Level of soot and ash in the particulate filter as a percentage. |



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# Detailed description of CAN messages sent to engine

The following tables use the concepts below:

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

- Not defined: Not defined in SAE J1939.
- Not used: Defined in SAE 1939 but not used by Scania.

**IMPORTANT!**

For Not defined and Not used, FF must be sent or received.

---

The CAN specification applies to engine control unit S6, S8 and OCE1. There are 2 or 3 columns in the lists. The columns have headings EMS S6, EMS S8 and sometimes EMS OCE1, if the message also applies to gas engines. The message only applies to the engine management system that is marked with an X. The engine management system which the message does not apply to should be considered Not used.



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# DLN1-Proprietary, all-speed engines

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 0C FF 80 27 | 20 | 20 | 00 PG 80 | 3 | 0 | 0 | 27 | 00 | 80 |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 1 | 1 | 8 | **Version Of DLN1-messages configuration** | A1h | | 0 to 250 | A |
| X | X | 2 | 1 | 8 | **Accelerator Pedal Position** | | 0.4% per bit | 0 to 100% | B |
| | | | | | Error (Signal Range Check Error) | FE | | | |
| | | | | | Not available | FF | | | |
| X | X | 3 | 1 | 2 | **AP Low Idle Switch Released** | | | | C |
| | | | | | Throttle pedal not released | 00 | | | |
| | | | | | Throttle pedal released | 01 | | | |
| | | | | | Error (Plausibility error) | 10 | | | |
| | | | | | Not available | 11 | | | |
| X | X | | 3 | 2 | **AP kickdown switch** | | | | D |
| | | | | | Kick down not active | 00 | | | |
| | | | | | Kick down | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| X | X | | 5 | 2 | **Engine Start** | | | | E |
| | | | | | OFF | 00 | | | |
| | | | | | ON | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| X | X | | 7 | 2 | **Engine Emergency Stop Demand** | | | | F |
| | | | | | Engine Emergency Stop Not demanded | 00 | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Engine Emergency Stop demanded | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available | 11 | | | |
| X | X | 4 | 1 | 2 | **Engine Stop** | | | | G |
| | | | | | Engine Stop Not Demanded | 00 | | | |
| | | | | | Engine Stop Demanded | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| | | | 3..4 | | Not used | | | | |
| X | | | 5 | 2 | **Retarder Speed Control Offswitch** | | | | H |
| | | | | | Button not Pressed | 00 | | | |
| | | | | | Button Pressed | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| | | | 7 | 2 | **Retarder Speed Control Setswitch** | | | | H |
| | | | | | Button not Pressed | 00 | | | |
| | | | | | Button Pressed | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| | | 5 | 1..4 | | Not used | | | | |
| X | X | | 5 | 2 | **Lamp test** | | | | I |
| | | | | | Lamp test not requested | 00 | | | |
| | | | | | Lamp test requested | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | | 7 | 2 | **CC-Off** | | | | J |
| | | | | | CC-off not activated | 00 | | | |
| | | | | | CC-off activated | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| X | X | 6 | 1 | 2 | **Increased Idle Speed switch 1 (ISSW1)** | | | | K |
| | | | | | ISSW1 not demanded | 00 | | | |
| | | | | | ISSW1 demanded | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| X | X | | 3 | 2 | **Increased Idle Speed switch 2 (ISSW2)** | | | | K |
| | | | | | ISSW2 not demanded | 00 | | | |
| | | | | | ISSW2 demanded | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| X | X | | 5 | 2 | **Torque Limit 1** | | | | L |
| | | | | | Torque Limit 1 not demanded | 00 | | | |
| | | | | | Torque Limit 1 demanded | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| X | X | | 7 | 2 | **Torque Limit 2** | | | | L |
| | | | | | Torque Limit 2 not demanded | 00 | | | |
| | | | | | Torque Limit 2 demanded | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 7 | 1 | 2 | **Exhaust brake floor switch** | | | | M |
| | | | | | Switch not activated | 00 | | | |
| | | | | | Switch activated | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| X | X | | 3 | 2 | **Exhaust brake Brake Assist Switch** | | | | M |
| | | | | | Switch not activated | 00 | | | |
| | | | | | Switch activated | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| X | X | | 5 | 2 | **Idle Command** | | | | N |
| | | | | | Idle Command not requested | 00 | | | |
| | | | | | Idle Command requested | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| X | X | | 7 | 2 | **White smoke limit request** | | | | M |
| | | | | | White smoke limit not demanded | 00 | | | |
| | | | | | White smoke limit demanded | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| X | X | 8 | 1 | 8 | **Retarder Selection** | | 0.4% per bit | 0 to 100% | M |
| | | | | | Error | FEh | | | |
| | | | | | Not available | FFh | | | |



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A: Indicates which version the DLN1 message has. If the version is incorrect a fault code is generated and the engine control unit will use the basic value for the content of the message.

B: Values between 0xFB and 0xFD are not permitted.

C: A plausibility check between Low Idle Switch and Accelerator Pedal Position is performed by the engine control unit.

| Low Idle Switch | Accelerator Pedal Position |
|---|---|
| 01 | 0-0.4% |
| don’t care | 0.8-19.6% |
| 00 | 20-100% |

D: A plausibility check between Kickdown Switch and Accelerator Pedal Position is performed by the engine control unit.

| Kickdown Switch | Accelerator Pedal Position |
|---|---|
| 01 | 0-99.6% |
| 00 | 100% |

E: Start request if the starter motor is connected and controlled by the engine control unit. Otherwise the message is not used.

F: Is normally used as an emergency stop for the engine. A fault code is also generated for S6.

G: Normally used as an emergency stop of the engine without a fault code being generated.

H: Used only if the engine is fitted with a Scania hydraulic retarder, otherwise Not available will be sent.

I: Lamp test. Activates AC_ACT in the engine control unit, which is used for the Throttle out of order lamp if it is connected.



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J: CC-off switches off the cruise control or active power take-off.

K: Select from 4 different power take-off settings.

| ISSW1 | ISSW2 | Power take-off setting |
|---|---|---|
| 00 | 00 | Normal hand throttle |
| 01 | 00 | Limited hand throttle |
| 00 | 01 | Temporary change of low idle speed |
| 01 | 01 | Fixed engine speed |

L: Select from 4 different torque limitation settings. The function is not available on all engines.

| TLSW1 | TLSW2 | Torque limitation |
|---|---|---|
| 00 | 00 | High torque limitation curve |
| 01 | 00 | Low torque limitation curve |
| 00 | 01 | Torque limitation curve defined by user |
| 01 | 01 | Torque limitation curve defined by user |

M: Exhaust brake floor switch, Exhaust brake Brake Assist Switch or White smoke limit request. The same values as Retarder Selection can be requested for the exhaust brake (if an exhaust brake is fitted and controlled by the engine control unit).

N: Forces the engine to run on low idle.



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# DLN1-Proprietary, single-speed engines

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 0C FF 80 27 | 20 | 20 | 00 PG 80 | 3 | 0 | 0 | 27 | 00 | 80 |

| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| X | X | X | 1 | 1 | 8 | **Version** | A0h | | 0 to 250 | A |
| X | X | X | 2 | 1 | 8 | **Nominal speed offset/Requested Torque** | | 0.4% per bit | 0 to 100% | B |
| | | | | | | Error (Signal Range Check Error) | FE | | | |
| | | | | | | Not available | FF | | | |
| X | X | X | 3 | 1 | 2 | **Droop enable** | | | | C |
| | | | | | | Droop disabled (zero droop) | 00 | | | |
| | | | | | | Droop enabled | 01 | | | |
| | | | | | | Error (Plausibility error) | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | X | | 3 | 2 | **Torque enable** | | | | D |
| | | X | | | | Engine speed control | 00 | | | |
| | | | | | | Torque control | 01 | | | |
| | | | | | | Error (Plausibility error) | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | X | | 5 | 2 | **Engine Start** | | | | E |
| | | | | | | OFF | 00 | | | |
| | | | | | | ON | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | X | | 7 | 2 | **Engine Stop (with error code)** | | | | F |
| | | | | | | Engine Stop Not demanded | 00 | | | |



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| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Engine Stop demanded | 01 | | | |
| | | | | | | Error indicator | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | X | 4 | 1 | 2 | **Engine Stop (without error code)** | | | | G |
| | | | | | | Engine Stop Not Demanded | 00 | | | |
| | | | | | | Engine Stop Demanded | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| | | | | 3..4 | | Not used | | | | |
| | | | | 5 | 4 | Not available | | | | |
| | | | 5 | | | Not available | | | | |
| X | X | X | 6 | 1 | 2 | **Nominal speed switch 1 (NSSW1)** | | | | H |
| | | | | | | NSSW1 not demanded | 00 | | | |
| | | | | | | NSSW1 demanded | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | X | | | | **Nominal speed switch 2 (NSSW2)** | | | | H |
| | | | | | | NSSW2 not demanded | 00 | | | |
| | | | | | | NSSW2 demanded | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | | | 5 | 2 | **Torque Limit 1** | | | | I |
| | | | | | | Torque Limit 1 not demanded | 00 | | | |
| | | | | | | Torque Limit 1 demanded | 01 | | | |
| | | | | | | Error | 10 | | | |



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| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Not available | 11 | | | |
| X | X | | | 7 | 2 | **Torque Limit 2** | | | | I |
| | | | | | | Torque Limit 2 not demanded | 00 | | | |
| | | | | | | Torque Limit 2 demanded | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | | 7 | 1 | 2 | **Exhaust brake floor switch** | | | | |
| | | | | | | Switch not activated | 00 | | | |
| | | | | | | Switch activated | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | | | 3 | 2 | **Exhaust brake – Brake Assist Switch** | | | | |
| | | | | | | Switch not activated | 00 | | | |
| | | | | | | Switch activated | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | X | | 5 | 2 | **Idle Command** | | | | J |
| | | | | | | Idle Command not requested | 00 | | | |
| | | | | | | Idle Command requested | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | | | 7 | 2 | **White smoke limit request** | | | | |
| | | | | | | White smoke limit not demanded | 00 | | | |
| | | | | | | White smoke limit demanded | 01 | | | |
| | | | | | | Error | 10 | | | |



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| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Not available | 11 | | | |
| X | X | | 8 | 1 | 8 | **Retarder Selection** | | 0.4% per bit | 0 to 100% | |
| | | | | | | Error | FE | | | |
| | | | | | | Not available | FF | | | |

**Note:**

This message can be run at the same time or be deprioritised by TSC Proprietary, single-speed engines.

A: If the version is incorrect a fault code is generated and the engine control unit will use the basic value for the content of the message.

B: If Torque enable is engine speed control, see note D. Increase or decrease the reference speed (with or without droop, see note C) in relation to the nominal engine speed. The setting range can be changed with calibration parameters, normally ±120 rpm.

| **Example:** | |
|---|---|
| Nominal engine speed at full load | 1,500 rpm |
| Droop | 4% |
| Minimum offset | -120 rpm |
| Maximum offset | +120 rpm |
| Nominal speed offset | 0x3A = 58% gives an engine speed offset of +19.2 rpm |
| Reference speed to control unit at full load | 1,500 + 19.2 = 1,519.2 rpm |
| Reference speed to control unit without load | 1,500 + 0.004 x 1,500 + 19.2 = 1,579.2 rpm |

If Torque enable is Torque control, see note D. The torque request according to the maximum available torque at current engine speed.



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C: Activate or deactivate droop function. The droop value can be changed with a calibration parameter or with TSC Proprietary. **Applies to OCE1**: The droop calculation is controlled by the Generator Total AC Power message sent from the coordinator.

D: 00 Means engine speed control using Nominal speed offset, as described in note B. 01 Means torque control using Requested Torque, as described in note B.

E: Start request if the starter motor is connected and controlled by the engine control unit.

F: Is normally used as an emergency stop for the engine. When it is used, a fault code is generated.

G: Is normally used as an emergency stop for the engine. When it is used, no fault code is generated.

H: Select nominal engine speed.

| NSSW1 | NSSW2 | Nominal engine speed |
|---|---|---|
| 00 | 00 | Set with adjustable parameter |
| 01 | 00 | 1,500 rpm |
| 00 | 01 | 1,800 rpm |
| 01 | 01 | Low idling |

Engine Control Allowed in TSC Proprietary, single-speed engines can be used to select the nominal engine speed. In that case NSSW1 and NSSW2 are de-prioritised.

I: Select torque limitation curve.

| TLSW1 | TLSW2 | Torque limitation |
|---|---|---|
| 00 | 00 | High torque limitation curve |
| 01 | 00 | Low torque limitation curve |
| 00 | 01 | Torque limitation curve defined by user |



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| TLSW1 | TLSW2 | Torque limitation |
|---|---|---|
| 01 | 01 | Torque limitation curve defined by user |

J: Forces the engine to run on low idle.

## Generator Total AC Power

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 0C FE 05 27 | 100 | 100 | 00 FE 05 | 3 | 0 | 0 | 27 | | 05 |

| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | | X | 1 | 1 | 32 | **Generator Total Real Power** | | 1 W per bit,<br>-2,000,000,000 W offset | -2,000,000,000 to<br>2,211,081,215 W | A |

A: In synchronised installations, the generated power is 0 W before the generator set synchronises with the electrical power network. This results in maximum engine speed offset due to droop. It is possible to avoid this by activating droop during synchronisation. Droop is activated via DLN1-Proprietary, single-speed engines.



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# Tachograph TCO1

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 0C FE 6C EE | 20 | 20 | 00 FE 6C | 3 | 0 | 0 | EE | | 6C |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | 1..4 | | | Not Used | | | | |
| X | X | 5 | 1 | 16 | **Tachograph Output Shaft Speed** | | 0.125 rpm per bit | 0 to 8,031.75 rpm | |
| | | | | | Error | FExx | | | |
| | | | | | Not available | FFxx | | | |
| X | X | 7 | 1 | 16 | **Tachograph Vehicle Speed** | | 1/256 km/h per bit | 0 to 250.996 km/h | A |
| | | | | | Error | FExx | | | |
| | | | | | Not available | FFxx | | | |

A: This signal is the primary source of vehicle speed.



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# Cruise Control/Vehicle Speed - K

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FE F1 27 | 100 | 100 | 00 FE F1 | 6 | 0 | 0 | 27 | | F1 |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 1 | 2 | Not Used | | | | |
| X | X | | 3 | 2 | **Parking Brake Switch** | | | | |
| | | | | | Parking brake not set | 00 | | | |
| | | | | | Parking brake set | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| | | | 5..8 | | Not Defined | | | | |
| | | 2..3 | | | Not Used | | | | |
| | | 4 | 1 | 2 | Not Used | | | | |
| X | X | | 3 | 2 | **Cruise Control Enable Switch** | | | | |
| | | | | | Cruise control disabled | 00 | | | |
| | | | | | Cruise control enabled | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| X | X | | 5 | 2 | **Brake Switch** | | | | |
| | | | | | Brake pedal released | 00 | | | |
| | | | | | Brake pedal depressed | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| X | X | | 7 | 2 | **Clutch Switch** | | | | |
| | | | | | Clutch pedal released | 00 | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Clutch pedal depressed | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| | | 5 | 1 | 2 | Not used | | | | |
| X | X | | 3 | 2 | **Cruise Control Coast (Decelerate) Switch** | | | | |
| | | | | | Cruise control activator not in the position “coast” | 00 | | | |
| | | | | | Cruise control activator in position “coast” | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| X | X | | 5 | 2 | **Cruise Control Resume Switch** | | | | |
| | | | | | Cruise control activator not in the position “resume” | 00 | | | |
| | | | | | Cruise control activator in position “resume” | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| X | X | | 7 | 2 | **Cruise Control Accelerate Switch** | | | | |
| | | | | | Cruise control activator not in the position “accelerate” | 00 | | | |
| | | | | | Cruise control activator in position “accelerate” | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| | | 6..7 | | | Not Used | | | | |
| | | 8 | 1..4 | | Not Used | | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | | | 5 | 2 | **Engine Test Mode Switch** | | | | A |
| | | | | | Off | 00 | | | |
| | | | | | On | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| X | X | | 7 | 2 | **Engine Shutdown Override Switch** | | | | B |
| | | | | | Off | 00 | | | |
| | | | | | On | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |

A: Request to start sending fault codes and delete saved fault codes.

If the switch is pressed down for more than 0.2 s and then released, the engine control unit starts sending fault codes in DLN2-Proprietary.

If the switch is depressed for between 2.5 and 10 seconds during system start (15 voltage switched on), saved fault codes are deleted. The fault codes which can only be read with SDP3 are not deleted.

B: This switch can be used to stop the engine from switching off due to low oil pressure, low coolant level or high coolant temperature.



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## DLN6-Proprietary

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 0C FF 89 27 | 1,000 | 1,000 | 00 FF 89 | 3 | 0 | 0 | 27 | | 89 |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | 1..3 | | | Not Used | | | | |
| X | X | 4 | 1 | 2 | **Road Speed Governor (Speed Limiter)** | | | | |
| | | | | | Speed Limit 1 demanded | 00 | | | |
| | | | | | Speed Limit 2 demanded | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available | 11 | | | |
| | | | 3 | 4 | **DPF Manual Activation** | | | | |
| | | | | | No Req | 0000 | | | |
| | | | | | Unvalidated Man Regen Req | 0001 | | | |
| | | | | | Manual Regeneration Request | 0010 | | | |
| | | | | | Reserved | 0011..1101 | | | |
| | | | | | Error | 1110 | | | |
| | | | | | Don't Care | 1111 | | | |
| | | | 7 | 2 | **DPF Manual Inhibit** | | | | |
| | | | | | No Request | 00 | | | |
| | | | | | Inhibit Regeneration Request | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| | | 5 | 1 | 16 | **High Resolution Barometric Pressure** | | 0.05 kPa per bit | 0 to 3,212.75 kPa | |
| | | | | | Error indicator | FExxh | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Not available | FFxxh | | | |
| | | 7 | | | Not Used | | | | |
| | X | 8 | 1 | 2 | **Battery Management Idle Speed Increase Request** | | | | |
| | | | | | Idle speed increase not requested | 00 | | | |
| | | | | | Idle speed increase requested | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |
| | X | 8 | 3 | 6 | **Requested Generator PWM** | | | | |
| | | | | | Error | 111110 | | | |
| | | | | | Not available | 111111 | | | |



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## Time/Date

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FE E6 17 | 1,000 | 1,000 | 00 FE E6 | 6 | 0 | 0 | 17 | | E6 |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 1 | 1 | 8 | **Seconds** | | 0.25 s per bit | 0 to 59.75 s | |
| | | | | | Error | FEh | | | |
| | | | | | Not available | FFh | | | |
| X | X | 2 | 1 | 8 | **Minutes** | | 1 min per bit | 0 to 59 min | |
| | | | | | Error | FEh | | | |
| | | | | | Not available | FFh | 1 h per bit | 0 to 23 h | |
| X | X | 3 | 1 | 8 | **Hours** | | | | |
| | | | | | Error | FEh | | | |
| | | | | | Not available | FFh | | | |
| X | X | 4 | 1 | 8 | **Month** | | 1 month per bit | 1 to 12 months | |
| | | | | | Error | FEh | | | |
| | | | | | Not available | FFh | | | |
| X | X | 5 | 1 | 8 | **Day** | | 0.25 days per bit | 0.25 to 31.75 days | |
| | | | | | Error | FEh | | | |
| | | | | | Not available | FFh | | | |
| X | X | 6 | 1 | 8 | **Year** | | 1 year per bit | 1985 to 2235 | |
| | | | | | Error | FEh | | | |
| | | | | | Not available | FFh | | | |
| | | 7..8 | | | Not Used | | | | |



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# TSC1-KE

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 0C 00 00 27 | 10 | - | 00 00 00 | 3 | 0 | 0 | 27 | | |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 1 | 2 | **Engine Override Control Mode** | | | | |
| X | X | | | | Override Disabled | 00 | | | |
| X | X | | | | Speed Control | 01 | | | |
| | | | | | Torque Control | 10 | | | |
| X | X | | | | Speed/Torque Limit Control | 11 | | | |
| X | X | | 3 | 2 | **Engine Requested Speed Control Conditions** | | | | A |
| | | | | | Transient Optimized for driveline disengaged and non-lockup condition | 00 | | | |
| | | | | | Stability Optimized for driveline disengaged and non-lockup condition 1 | 01 | | | |
| | | | | | Stability Optimized for driveline engaged and/or in lockup condition 2 | 10 | | | |
| | | | | | Stability Optimized for driveline engaged and/or in lockup condition | 11 | | | |
| X | X | | 5 | 2 | **Override Control Mode Priority** | | | | B |
| | | | | | Highest Priority | 00 | | | |
| | | | | | High Priority | 01 | | | |
| | | | | | Medium Priority | 10 | | | |
| | | | | | Low Priority | 11 | | | |
| | | | 7..8 | | Not Defined | | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 2 | 1 | 16 | **Requested Speed/Speed Limit** | | 0.125 rpm | 0 to 8,031.875 rpm | |
| | | | | | Error indicator | FExx | | | |
| | | | | | Not available | FFxx | | | |
| | | 4 | 1 | 8 | **Engine Requested Torque/Torque Limit** | | 1% | -125 to +125% | |
| | | | | | Error indicator | FE | | | |
| | | | | | Not available | FF | | | |
| | | 5..8 | | | Not Defined | | | | |

**Note:**

The TSC1 message with the lowest source address has the highest priority.

---

A: If status 10 is received, a more powerful regulator is used; otherwise a normal regulator is used.

B: If medium or low priority is received, the request from TSC1 can be deprioritised by Accelerator Pedal in DLN1-Proprietary, all-speed engines. If highest or high priority is received, the normal accelerator pedal has no effect.



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# TSC1-TE

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 0C 00 00 03 | 10 | - | 00 00 00 | 3 | 0 | 0 | 03 | 00 | |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 1 | 1 | 2 | **Engine Override Control Mode** | | | | |
| | | | | | Override Disabled | 00 | | | |
| | | | | | Speed Control | 01 | | | |
| | | | | | Torque Control | 10 | | | |
| | | | | | Speed/Torque Limit Control | 11 | | | |
| X | | | 3 | 2 | **Engine Requested Speed Control Conditions** | | | | A |
| | | | | | Transient Optimized for driveline disengaged and non-lockup condition | 00 | | | |
| | | | | | Stability Optimized for driveline disengaged and non-lockup condition 1 | 01 | | | |
| | | | | | Stability Optimized for driveline engaged and/or in lockup condition 2 | 10 | | | |
| | | | | | Stability Optimized for driveline engaged and/or in lockup condition | 11 | | | |
| X | X | | 5 | 2 | **Override Control Mode Priority** | | | | B |
| | | | | | Highest Priority | 00 | | | |
| | | | | | High Priority | 01 | | | |
| | | | | | Medium Priority | 10 | | | |
| | | | | | Low Priority | 11 | | | |
| | | | 7..8 | | Not Defined | | | | |
| X | X | 2 | 1 | 16 | **Requested Speed/Speed Limit** | | 0.125 rpm | 0 to 8,031.875 rpm | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Error indicator | FExx | | | |
| | | | | | Not available | FFxx | | | |
| X | X | 4 | 1 | 8 | **Engine Requested Torque/Torque Limit** | | 1% | -125 to +125% | |
| | | | | | Error indicator | FE | | | |
| | | | | | Not available | FF | | | |
| | | 5..8 | | | Not Defined | | | | |

**Note:**

TSC1message with the lowest source address has the highest priority.

---

A: If status 10 is received, a more powerful regulator is used; otherwise a normal regulator is used.

B: If medium or low priority is received, the request from TSC1 can be deprioritised by Accelerator Pedal in DLN1-Proprietary, all-speed engines. If highest or high priority is received, the normal accelerator pedal has no effect.



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# TSC1-AE

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 0C 00 00 0B | 10 | - | 00 00 00 | 3 | 0 | 0 | 0B | 00 | |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 1 | 1 | 2 | **Engine Override Control Mode** | | | | |
| | | | | | Override Disabled | 00 | | | |
| | | | | | Speed Control | 01 | | | |
| | | | | | Torque Control | 10 | | | |
| | | | | | Speed/Torque Limit Control | 11 | | | |
| X | | | 3 | 2 | **Engine Requested Speed Control Conditions** | | | | A |
| | | | | | Transient Optimized for driveline disengaged and non-lockup condition | 00 | | | |
| | | | | | Stability Optimized for driveline disengaged and non-lockup condition 1 | 01 | | | |
| | | | | | Stability Optimized for driveline engaged and/or in lockup condition 2 | 10 | | | |
| | | | | | Stability Optimized for driveline engaged and/or in lockup condition | 11 | | | |
| X | X | | 5 | 2 | **Override Control Mode Priority** | | | | B |
| | | | | | Highest Priority | 00 | | | |
| | | | | | High Priority | 01 | | | |
| | | | | | Medium Priority | 10 | | | |
| | | | | | Low Priority | 11 | | | |
| | | | 7..8 | | Not Defined | | | | |
| X | X | 2 | 1 | 16 | **Requested Speed/Speed Limit** | | 0.125 rpm | 0 to 8,031.875 rpm | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Error indicator | FExx | | | |
| | | | | | Not available | FFxx | | | |
| X | X | 4 | 1 | 8 | **Engine Requested Torque/Torque Limit** | | 1% | -125 to +125% | |
| | | | | | Error indicator | FE | | | |
| | | | | | Not available | FF | | | |
| | | 5..8 | | | Not defined | | | | |

**Note:**

TSC1message with the lowest source address has the highest priority.

---

A: If status 10 is received, a more powerful regulator is used; otherwise a normal regulator is used.

B: If medium or low priority is received, the request from TSC1 can be deprioritised by Accelerator Pedal in DLN1-Proprietary, all-speed engines. If highest or high priority is received, the normal accelerator pedal has no effect.



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# TSC Proprietary, single-speed engines

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 0C FF F7 27 | 50 | - | 00 FF F7 | 3 | 0 | 0 | 27 | | F7 |

| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| X | X | X | 1 | 1 | 2 | **Engine Override Control Mode** | | | | A |
| | | | | | | Override Disabled | 00 | | | |
| | | | | | | Speed Control | 01 | | | B |
| | | | | | | Torque Control | 10 | | | C |
| | | | | | | Speed/Torque Limit Control | 11 | | | |
| X | X | X | | 3 | 2 | **Requested Governor** | | | | D |
| | | | | | | Normal Governor | 00 | | | |
| | | | | | | Soft Governor | 01 | | | |
| | | | | | | Stiff Governor | 10 | | | |
| | | | | | | Not Defined | 11 | | | |
| X | X | X | | 5 | 2 | **Override Control Mode Priority** | | | | E |
| | | | | | | Highest Priority | 00 | | | |
| | | | | | | High Priority | 01 | | | |
| | | | | | | Medium Priority | 10 | | | |
| | | | | | | Low Priority | 11 | | | |
| | | | | 7..8 | | Not Defined | | | | |
| X | X | X | 2 | 1 | 16 | **Requested Speed** | | 0.125 rpm per bit | 0 to 8,031.875 rpm | B |
| | | | | | | Error Indicator | FExx | | | |
| | | | | | | Not Available | FFxx | | | |
| X | X | | 4 | 1 | 8 | **Engine Requested Torque/Torque Limit** | | 1% | -125 to +125% | C |
| | | | | | | Error indicator | FE | | | |



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| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Not available | FF | | | |
| X | X | X | 5 | 1 | 2 | **Droop Adjust Enable** | | | | F, H |
| | | | | | | Droop adjust disabled | 00 | | | |
| | | | | | | Droop adjust enabled | 01 | | | |
| | | | | | | Error Indicator | 10 | | | |
| | | | | | | Not Available or Not Installed | 11 | | | |
| X | X | X | | 3 | 2 | **Droop Adjust Increase** | | | | F, H |
| | | | | | | Adjust switch NOT in position increase | 00 | | | |
| | | | | | | Adjust switch in position increase | 01 | | | |
| | | | | | | Error Indicator | 10 | | | |
| | | | | | | Not Available or Not Installed | 11 | | | |
| X | X | X | | 5 | 2 | **Droop Adjust Decrease** | | | | F, H |
| | | | | | | Adjust switch NOT in position Decrease | 00 | | | |
| | | | | | | Adjust switch in position Decrease | 01 | | | |
| | | | | | | Error Indicator | 10 | | | |
| | | | | | | Not Available or Not Installed | 11 | | | |
| | | | | 7..8 | | Not Defined | | | | |
| X | X | X | 6 | 1 | 8 | **Requested Droop** | | 0.1% per bit | 0 to 25% | G, H |
| | | | | | | Error indicator | FE | | | |
| | | | | | | Not available | FF | | | |
| | | | 7..8 | | | Not Defined | | | | |



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**Note:**

TSC Proprietary is also supported by Stage IV/Tier 4f all-speed engines

TSC Proprietary can be run at the same time as DLN1-Proprietary, single-speed engines. TSC Proprietary has higher priority than DLN1. If the message is not received by the engine control unit or if the values are Not available, Error or Out of range, congruent values in DLN1 will be used. Alternatively, EMS parameters are used.

A: For OCE1, Override Disabled must be sent when the starter motor is running. Speed Control must not be activated until the engine has reached the operating speed.

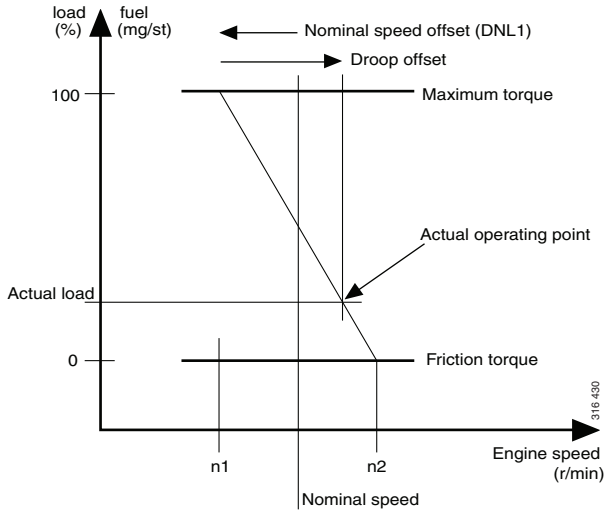
B: The nominal engine speed is the engine speed at a defined load (stored in the engine control unit, normally 100% and only valid when the droop level is >0%). The requested engine speed depends on the current load, speed offset and droop.

C: It is possible to control torque instead of engine speed. The torque level is related to the maximum available torque. The values between -125% and 0% are seen as 0%, and the values between 100% and 125% are seen as 100%.

D: It is possible to select hardness on the engine speed regulator.

E: It is possible to select whether the normal offset signal, i.e. Nominal speed offset in DLN1, is to be used or not.

- If Override Control Mode Priority is equal to Highest Priority or High Priority, Nominal speed offset is ignored in DLN1.
- If Override Control Mode Priority is equal to Medium Priority or Low Priority, Nominal speed offset is used in DLN1.




*Note B: The droop value is defined as (n2 - n1)/Nominal rpm * 100 (%).*



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F: It is possible to adjust the droop value which has been stored in the engine control unit. The current droop value is sent with Single-Speed Droop Value in the DLN2-Proprietary.

G: It is possible to request the desired droop value directly.

H: For OCE1, the droop calculation is controlled by the Generator Total AC Power message sent from the coordinator.

## Cooling Control Proprietary

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FF 51 27 | 1,000 | 1,000 | 00 FF 51 | 6 | 0 | 0 | 27 | 00 | 51 |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | | | Not Used | | | | |
| | X | 2 | 1 | 8 | **Request Cooling Fan Speed** | | 16 | 0 to 4,000 rpm | |
| | | | | | Error | FE | | | |
| | | | | | Not available | FF | | | |
| | | 3..8 | | | Not Used | | | | |



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## CM1-RDE

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 E0 00 10 | 1,000 | 1,000 | 00 E0 00 | 6 | 0 | 0 | 10 | 00 | |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | | 1 | 1 | 8 | **Requested Percent Fan Speed** | | 0.4% per bit | 0 to 100% | |
| | | | | | Error | FEh | | | |
| | | | | | Not Available/Take No Action | FFh | | | |
| | | 2..8 | | | Not used | | | | |



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## CM1

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 E0 00 27 | 100 | 100 | 00 E0 00 | 6 | | 0 | 27 | 00 | |

| EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|
| | 1..5 | | | **Not used** | | | | |
| X | 6 | 1 | 2 | **Diesel Particulate Filter Regeneration Inhibit Switch** | | | | |
| | | | | Not Active | 00 | | | |
| | | | | Active | 01 | | | |
| | | | | Error | 10 | | | |
| | | | | Not Available | 11 | | | |
| X | 6 | 3 | 2 | **Diesel Particulate Filter Regeneration Force Switch** | | | | |
| | | | | Not Active | 00 | | | |
| | | | | Active | 01 | | | |
| | | | | Error | 10 | | | |
| | | | | Not Available | 11 | | | |
| | | 5..8 | | Not used | | | | |
| | 7..8 | | | **Not used** | | | | |



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# ETC1

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 0C F0 02 03 | 10 | 10 | 00 F0 02 | 3 | 0 | 0 | 03 | | 02 |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 1 | 1 | 2 | **Driveline Engaged** | | | | |
| | | | | | Driveline disengaged | 00 | | | |
| | | | | | Driveline engaged | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| X | X | | 3 | 2 | **Torque Converter Lockup Engaged** | | | | |
| | | | | | Torque converter lockup disengaged | 00 | | | |
| | | | | | Torque converter lockup engaged | 01 | | | |
| | | | | | Reserved | 10 | | | |
| | | | | | Don’t care/take no action | 11 | | | |
| X | X | | 5 | 2 | **Shift in progress** | | | | |
| | | | | | Shift is not in process | 00 | | | |
| | | | | | Shift in process | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| | | | 7..8 | | Not Defined | | | | |
| X | X | 2 | 1 | 16 | **Output Shaft Speed** | | 0.125 rpm | 0 to 8,031.875 rpm | |
| | | | | | Error Indicator | FExx | | | |
| | | | | | Not Available | FFxx | | | |
| | | 4 | | | Not Used | | | | |
| X | X | 5 | 1 | 2 | **Momentary Engine Overspeed Enable** | | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Momentary engine overspeed is disabled | 00 | | | |
| | | | | | Momentary engine overspeed is enabled | 01 | | | |
| | | | | | Reserved | 10 | | | |
| | | | | | Take no action | 11 | | | |
| | | | 3 | | Not Used | | | | |
| | | | 4..8 | | Not Defined | | | | |
| | X | 6 | 1 | 16 | **Input Shaft Speed** | | 0.125 | 0 to 8,031.875 rpm | |
| | | | | | Error | FExx | | | |
| | | | | | Not Available | FFxx | | | |
| | | 8 | | | Not Used | | | | |

## ETC2

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 F0 05 03 | 100 | 100 | 00 F0 05 | 6 | 0 | 0 | 03 | | 05 |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | | | Not Used | | | | |
| X | X | 2 | 1 | 16 | **Actual Gear Ratio** | | 0.001 | 0 to 64.255 | |
| | | | | | Error Indicator | FExx | | | |
| | | | | | Not available | FFxx | | | |
| X | X | 4 | 1 | 8 | **Current Gear, - rev, + forw, 0 neut, 126 park** | | 1 gear | -125 to +125 | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not available | FF | | | |
| | | 5..8 | | | Not Used | | | | |



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## KWP2000 Physical Addressing

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 DA 00 xx | | | 00 DA 00 | 6 | 0 | 0 | xx | 00 | |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 1..8 | | | **See ISO 15765** | | | | |

## KWP2000 Functional Addressing

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 DB zz xx | | | 00 DB 00 | 6 | 0 | 0 | xx | zz | |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 1..8 | | | **See ISO 15765** | | | | |



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# MABC (Marine Aftertreatment Bypass Control) - K

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FF 9A 27 | 100 | 100 | 00 FF 9A | 6 | 0 | 0 | 27 | 00 | 9A |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | X | 1 | 1 | 4 | **Requested ECA Mode (Requested Emission Controlled Area Mode)** | | | | A |
| | X | | | | ECA IMO2 | 0000 | | | |
| | X | | | | ECA IMO3 | 0001 | | | |
| | | | | | ECA TIER4M | 0010 | | | |
| | | | | | Reserved | 1110 | | | |
| | X | | | | TakeNoAction | 1111 | | | |

A: Option to switch between IMO Tier III and IMO Tier II mode (SCR circuit and bypass circuit). Only applies to marine single-speed engines with SCR system.



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# ADC (Aftertreatment Desorption Control) - K

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FF B7 27 | 100 | 100 | 00 FF B7 | 6 | 0 | 0 | 27 | | B7 |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | X | 1 | 1 | 2 | **Desorption Granted Status** | | | | |
| | | | | | No action required | 00 | | | |
| | | | | | Increased idle with heavy exhaust braking | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not Available | 11 | | | |



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# Detailed description of CAN messages sent from the engine

## Engine Temperature

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FE EE 00 | 1,000 | 1,000 | 00 FE EE | 6 | 0 | 0 | 00 | | EE |

| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| X | X | X | 1 | 1 | 8 | **Engine Coolant Temperature** | | 1°C | -40 to +210°C | |
| | | | | | | Error Indicator | FE | | | |
| | | | | | | Not Available | FF | | | |
| | | | 2 | | | Not Used | | | | |
| X | | X | 3 | 1 | 16 | **Engine Oil Temperature** | | 0.03125°C | -273°C to +1,735.0°C | A |
| | | | | | | Error Indicator | FExx | | | |
| | | | | | | Not Available | FFxx | | | |
| | | | 5..8 | | | Not Used | | | | |

A: If the engine is equipped with temperature sensors and the function has been selected, the oil temperature value is sent in this message.



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# Engine Fluid Level/Pressure - E

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FE EF 00 | 500 | 500 | 00 FE EF | 6 | 0 | 0 | 00 | | EF |

| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1..2 | | | Not Used | | | | |
| | X | | 3 | 1 | 8 | **Engine Oil Level** | | 0.4% | 0 to 100% | |
| | | | | | | Error | FE | | | |
| | | | | | | Not Available | FF | | | |
| X | X | X | 4 | 1 | 8 | **Engine Oil Pressure** | | 4 kPa | 0 to 1,000 kPa | |
| | | | | | | Error Indicator | FE | | | |
| | | | | | | Not Available | FF | | | |
| | | | 5..7 | | | Not Used | | | | |
| X | X | X | 8 | 1 | 8 | **Coolant Level** | | 0.4% | 0 to 100% | A |
| | | | | | | Error Indicator | FE | | | |
| | | | | | | Not Available | FF | | | |

A: Only the values 0% (low coolant level) and 100% (normal coolant level) are sent.

Error indicator sent in the event of a sensor error.

Not available is sent if no connected sensor has been selected using SDP3.



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## Inlet/Exhaust Conditions

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FE F6 00 | 500 | 500 | 00 FE F6 | 6 | 0 | 0 | 00 | | F6 |

| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | | | Not Used | | | | |
| X | X | X | 2 | 1 | 8 | **Boost Pressure** | | 2 kPa | 0 to +500 kPa | A |
| | | | | | | Error Indicator | FE | | | |
| | | | | | | Not Available | FF | | | |
| X | X | X | 3 | 1 | 8 | **Intake Manifold Temperature** | | 1°C | -40 to +210°C | |
| | | | | | | Error Indicator | FE | | | |
| | | | | | | Not Available | FF | | | |
| | | | 4..8 | | | Not Used | | | | |

A: Indicates indicator pressure (relative pressure).



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## DLN2-Proprietary

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 0C FF 81 00 | 100 | 100 | 00 FF 81 | 3 | 0 | 0 | 00 | | 81 |

| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| X | X | X | 1 | 1 | 8 | **Version of DLN-messages Configuration** | A1h | | 0 to 250 | |
| | | | 2 | 1..2 | | Not used | | | | |
| | X | | 2 | 3 | 4 | **DPF Regeneration State** | | | | |
| | | | | | | Activation Not Needed Alert | 0000 | | | |
| | | | | | | Manual Activation Inhibited | 0001 | | | |
| | | | | | | Manual Regeneration Initialization | 0010 | | | |
| | | | | | | Manual Regeneration Active | 0011 | | | |
| | | | | | | Manual Regeneration Completed | 0100 | | | |
| | | | | | | Manual Regeneration Aborted | 0101 | | | |
| | | | | | | Automatic Regeneration Inhibited | 0110 | | | |
| | | | | | | Automatic Regeneration Initialization | 0111 | | | |
| | | | | | | Automatic Regeneration Active | 1000 | | | |
| | | | | | | Automatic Regeneration Completed | 1001 | | | |
| | | | | | | Automatic Regeneration Aborted | 1010 | | | |
| | | | | | | Don't Care | 1111 | | | |
| | | | | 7..8 | | Not used | | | | |
| | | X | 3 | 1 | 2 | **Low Engine Oil Level** | | | | |
| | | | | | | Not Low Engine Oil Level | 00 | | | |
| | | | | | | Low Engine Oil Level | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |



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| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | X | X | | 3 | 2 | **High Engine Oil Level** | | | | |
| | | | | | | Not High Engine Oil Level | 00 | | | |
| | | | | | | High Engine Oil Level | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | X | | 5 | 2 | **Low Engine Oil Pressure** | | | | |
| | | | | | | Not Low Engine Oil Pressure | 00 | | | |
| | | | | | | Low Engine Oil Pressure | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| | | | | 7..8 | | Not defined | | | | |
| X | X | X | 4 | 1 | 2 | **High Engine Coolant Temp** | | | | A |
| | | | | | | Not High Engine Coolant Temp | 00 | | | |
| | | | | | | High Engine Coolant Temp | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | | | 3 | 2 | **Power Lost Due to High Temp** | | | | B |
| | | | | | | No Power Lost Due to High Temp | 00 | | | |
| | | | | | | Power Lost Due to High Temp | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | X | | 5 | 2 | **Engine stop limit exceed** | | | | C |
| | | | | | | Limit not exceeded | 00 | | | |
| | | | | | | Limit is exceeded | 01 | | | |
| | | | | | | Error | 10 | | | |



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| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Not available | 11 | | | |
| | X | | | 7 | 2 | **Low Urea Level** | | | | D |
| | | | | | | No Low Urea Level | 00 | | | |
| | | | | | | Low Urea Level | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | X | 5 | 1 | 2 | **Charge 61** | | | | E |
| | | | | | | Generator not charging | 00 | | | |
| | | | | | | Generator Charging | 01 | | | |
| | | | | | | Reserved | 10 | | | |
| | | | | | | Don’t care/Take no action | 11 | | | |
| | | | | 3..8 | | Not defined | | | | |
| X | X | | 6 | 1 | 2 | **Test Engine Lamp** | | | | F |
| | | | | | | Not activated | 00 | | | |
| | | | | | | Activated | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| X | X | | | 3 | 2 | **Diagnostic Status** | | | | G |
| | | | | | | Twinkling not active | 00 | | | |
| | | | | | | Twinkling of twinkle code active | 01 | | | |
| | | | | | | Diagnostic button pressed | 10 | | | |
| | | | | | | Not Available | 11 | | | |
| X | X | | | 5 | 2 | **New DTC** | | | | H |
| | | | | | | Not activated | 00 | | | |
| | | | | | | Activated | 01 | | | |



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| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Error | 10 | | | |
| | | | | | | Not available | 11 | | | |
| | | | | 7..8 | | Not defined | | | | |
| X | X | | 7 | 1 | 8 | **Single-Speed Droop Value** | | 0.1% | 0 to 25% | I |
| | | | | | | Error | FE | | | |
| | | | | | | Not available | FF | | | |
| | | | 8 | | | Not defined | | | | |

A: Normally controls the high coolant temperature warning lamp. The message is sent if the coolant temperature exceeds the limit (normally 95°C).

B: The message is sent if the function for reducing engine power due to high engine temperature has been selected and the engine temperature exceeds the upper limit (normally 95°C).

C: The message is sent if the coolant temperature exceeds the shut-off limit which is normally 103°C.

D: For low reductant level, use DLN8 instead.

E: For engines with 2 generators, Generator not charging is sent when one of the generators is not charging.

F:

- The following applies to Stage IIIB/Tier 4i and less restrictive emissions legislation: As soon as at least one DTC is activated the lamp is Activated. If all DTCs are inactive the lamp is Not activated.
- The following applies to Stage IV/Tier 4f: The lamp is Activated during Lamp On for either Red Stop Lamp Status or Amber Warning Lamp Status in message DM1.



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- The engine control unit is started with the signal U15 - ON. During the first few seconds that U15 is activated, the lamp isActivated.
- When the engine control unit is shut off with the signal U15 - OFF, the lamp is Activated until the engine speed is 0 rpm and all engine data is stored in the memory. After that the system is shut down and no more messages are sent. All fault codes are saved in 2 memories – the flash code memory and the DTC memory in the engine control unit.
- The DTCs can be read with the KW2000 command , and the flash codes can be sent in this message together with a request in Engine Test Mode Switch in Cruise Control/Vehicle Speed - K.

G: When the diagnostic switch in Engine Test Mode Switch in Cruise Control/Vehicle Speed - K is activated, status 10 is transmitted. While the flash codes are being sent, status 01 is sent.

H: When a new DTC has been saved in the engine control unit status 01 is sent for 1 second. **Note:** Not supported for Stage IV/Tier 4f.

I: For single-speed engines, the current droop value is sent. For all-speed engines the value FF - Not available. is sent.



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## DLN7-Proprietary

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FF 87 00 | 1,000 | 1,000 | 00 FF 87 | 6 | 0 | 0 | 00 | | 87 |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | X | 1 | 1 | 8 | **Urea Level** | | 0.4% | 0 to 100% | |
| | | | | | Error | FE | | | |
| | | | | | Not available | FF | | | |
| | X | 2 | 1 | 3 | **Malfunction Indicator** | | | | |
| | | | | | NoMI | 00 | | | |
| | | | | | MI Due To System Malfunction | 01 | | | |
| | | | | | MI Due To No Reagent | 10 | | | |
| | | | | | Flashing MI Due To System Malfunction | 11 | | | |
| | | | | | Flashing MI Due To No Reagent | 100 | | | |
| | | | | | Reserved | 110 | | | |
| | | | | | Take No Action | 111 | | | |
| | X | 2 | 4 | 2 | **Incorrect Driver Initiated Engine Shutdown** | | | | |
| | | | | | No Incorrect Shut Down | 00 | | | |
| | | | | | Incorrect Shut Down | 01 | | | |
| | | | | | Reserved | 10 | | | |
| | | | | | Take No Action | 11 | | | |
| | X | 2 | 6 | 3 | **Engine Oil Level Measuring Status** | | | | |
| | | | | | Measurement Ok | 00 | | | |
| | | | | | Measurement Result Pending | 01 | | | |
| | | | | | Conditions Not Fulfilled | 100 | | | |
| | | | | | Sensor Error | 101 | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Reserved | 110 | | | |
| | | | | | Take No Action | 111 | | | |
| | X | 3 | 1 | 4 | **Engine Oil Level Countdown Timer** | | | | |
| | | | | | Less Then One Minute | 0000 | | | |
| | | | | | 1 Minute | 0001 | | | |
| | | | | | 2 Minutes | 0010 | | | |
| | | | | | 3 Minutes | 0011 | | | |
| | | | | | 4 Minutes | 0100 | | | |
| | | | | | 5 Minutes | 0101 | | | |
| | | | | | 6 Minutes | 0110 | | | |
| | | | | | 7 Minutes | 0111 | | | |
| | | | | | 8 Minutes | 1000 | | | |
| | | | | | 9 Minutes | 1001 | | | |
| | | | | | 10 Minutes | 1010 | | | |
| | | | | | 11 Minutes | 1011 | | | |
| | | | | | 12 Minutes | 1100 | | | |
| | | | | | More Than 12 Minutes | 1101 | | | |
| | | | | | Error | 1110 | | | |
| | | | | | Not available | 1111 | | | |
| | | 3 | 5 | 2 | **Gas Leakage** | | | | |
| | | | | | No Leakage | 00 | | | |
| | | | | | Leakage | 01 | | | |
| | | | | | Reserved | 10 | | | |
| | | | | | Take No Action | 11 | | | |
| | X | 3 | 7 | 2 | **Engine Air Filter Clogged** | | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Air Filter Not Clogged | 00 | | | |
| | | | | | Air Filter Clogged | 01 | | | |
| | | | | | Reserved | 10 | | | |
| | | | | | Don'tCare/TakeNoAction | 11 | | | |
| | X | 4 | 1 | 8 | **Max Vehicle Speed Limit 0** | | | | |
| | | | | | Error | FE | | | |
| | | | | | Not available | FF | | | |
| | | 5 | 1 | 8 | **Fuel Level** | | | | |
| | | | | | Error | FE | | | |
| | | | | | Not available | FF | | | |
| | X | 6 | 1 | 8 | **Time to Torque Limiting** | | | | B |
| | | | | | No Pending Torque Limit (Parameter Specific Indicator) | FB | | | |
| | | | | | Error | FE | | | |
| | | | | | Not available | FF | | | |
| | X | 7 | 1 | 3 | **Torque Limit** | | | | C |
| | | | | | No Torque Limit | 000 | | | |
| | | | | | Active Torque Limit Due To Emission | 001 | | | |
| | | | | | Pending Torque Limit Due To Emission | 010 | | | |
| | | | | | Active Torque Limit Due To High Gbx Temp | 011 | | | |
| | | | | | Active Torque Limit Due To High Exhaust Temp | 100 | | | |
| | | | | | Active Torque Limit General | 101 | | | |
| | | | | | Reserved | 110 | | | |
| | | | | | Don'tCare/TakeNoAction | 111 | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | 4..8 | | Not used | | | | |
| | | 8 | 1 | 4 | **OBD Activation Mode and State** | | | | |
| | | | | | Off | 0000 | | | |
| | | | | | Ready | 0001 | | | |
| | | | | | Not Ready | 0010 | | | |
| | | | | | Mode 1 | 0011 | | | |
| | | | | | Mode 2 | 0100 | | | |
| | | | | | Mode 3 | 0101 | | | |
| | | | | | Mode 4 | 0110 | | | |
| | | | | | Reserved | 0111.. 1101 | | | |
| | | | | | Error | 1110 | | | |
| | | | | | Not available | 1111 | | | |
| | X | 8 | 5 | 2 | **Afterrun Status** | | | | |
| | | | | | Afterrun incative | 00 | | | |
| | | | | | Afterrun active | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | X | 8 | 7 | 2 | **Coordinator Stay Alive Request** | | | | |
| | | | | | Coordinator Not Requested To Stay Alive | 00 | | | |
| | | | | | Coordinator Requested To Stay Alive | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not Available | 11 | | | |

A: The cause of the countdown is sent to *Torque Limit* in *DLN1*.

B: Intended for driver information. Remaining time to torque limitation is sent in *Time To Torque Limiting* in DLN7-Proprietary.



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# DLN8

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FF 88 00 | 1,000 | 1,000 | 00 FF 88 | 6 | 0 | 0 | 00 | | 88 |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 1 | 8 | **Coolant Water Flow** | | 10 | 0 to 2,500 l/min | |
| | | | | | Error | FE | | | |
| | | | | | Not available | FF | | | |
| | X | 2 | 1 | 8 | **Cooling Fan Speed** | | 16 | 0 to 4,000 rpm | |
| | | | | | Error | FE | | | |
| | | | | | Not available | FF | | | |
| | | 3 | 1 | 16 | **Applied Vehicle Speed Limit Proprietary** | | 0.00390625 km/h | 0 to 250.99609375 km/h | |
| | | | | | Error | FExx | | | |
| | | | | | Not available | FFxx | | | |
| | X | 5 | 1 | 6 | **DPF Regeneration Countdown Timer** | | 1 | 0 to 60 min | |
| | | | | | More Than 60 Minutes | 111101 | | | |
| | | | | | Error | 111110 | | | |
| | | | | | Not available | 111111 | | | |
| | | 5 | 7 | 2 | **Emission-OBD reactivation mode** | | | | |
| | | | | | Not Active | 00 | | | |
| | | | | | Active | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available | 11 | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | 6 | 1 | 3 | **Starter Motor Temp Status** | | | | |
| | | | | | Starter Motor Normal Temp | 000 | | | |
| | | | | | Starter Motor High Temp | 001 | | | |
| | | | | | Starter Motor Inhibited Due To High Temp | 010 | | | |
| | | | | | Reserved | 110 | | | |
| | | | | | Take No Action | 111 | | | |
| | X | 6 | 4 | 4 | **Emission-OBD inducement state** | | | | A |
| | | | | | No Inducement | 0000 | | | |
| | | | | | Active Torque Limit Due To Urea Level | 0001 | | | |
| | | | | | Active Speed Limit Due To Urea Level | 0010 | | | |
| | | | | | Active Torque Limit Due To SCR Failure | 0011 | | | |
| | | | | | Active Speed Limit Due To SCR Failure | 0100 | | | |
| | | | | | Error | 1110 | | | |
| | | | | | Not available | 1111 | | | |
| | X | 7 | 1 | 8 | **Time to speed limiting** | | | 0 to 255 h | |
| | | | | | No Pending Speed Limit (Parameter Specific Indicator) | FB | | | |
| | | | | | Error | FE | | | |
| | | | | | Not available | FF | | | |
| | X | 8 | 1 | 3 | **Urea level inducement state** | | | | B |
| | | | | | Urea Level Ok | 000 | | | |
| | | | | | Low Urea Level | 001 | | | |
| | | | | | Fill Up Urea | 010 | | | |
| | | | | | Urea Tank Empty | 011 | | | |
| | | | | | Error | FE | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Not available | FF | | | |
| | X | 8 | 4 | 4 | **Emission-OBD inducement failure reason** | | | | C |
| | | | | | No Failure | 0000 | | | |
| | | | | | Dosing Error | 0001 | | | |
| | | | | | Urea Quality | 0010 | | | |
| | | | | | Monitor Failure | 0011 | | | |
| | | | | | NOx Failure | 0100 | | | |
| | | | | | Error | 1110 | | | |
| | | | | | Not available | 1111 | | | |

A: When Active Torque Limit Due To SCR Failure is sent, the warning lamp for faults in the exhaust gas aftertreatment system should flash slowly (½ Hz).
When Active Speed Limit Due To SCR Failure is sent, the warning lamp for faults in the exhaust gas aftertreatment system should flash rapidly (2 Hz).

B: When Low Urea Level is sent the warning lamp for low reductant level should light.
When Fill Up Urea is sent the warning lamp for low reductant level should flash slowly (½ Hz).
When Urea Tank Empty is sent the warning lamp for low reductant level should flash rapidly (2 Hz).

C When Dosing Error, Urea Quality, Monitor Failure or NOx Failure is sent, the warning lamp for faults in the exhaust gas aftertreatment system should light.

More information about the warning lamps is available in the installation manual *01:07 Exhaust gas aftertreatment*.



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# DPFC1 (Diesel Particulate Filter Control)

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FD 7C 00 | 100 | 1,000 | 00 FD 7C | 6 | | 0 | 00 | | 7C |

| EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|
| | 1 | | | **Not Used** | | | | |
| | 2 | 1..4 | | Not Used | | | | |
| X | 2 | 5 | 3 | **DPF Status** | | | | |
| | | | | Regeneration not needed | 000 | | | |
| | | | | Regeneration needed - lowest level | 001 | | | |
| | | | | Regeneration needed - moderate level | 010 | | | |
| | | | | Regeneration needed - highest level | 011 | | | |
| | | | | Regeneration not possible - replace DPF | 100 | | | |
| | | | | Not Available | 111 | | | |
| X | 3 | 1 | 2 | **DPF Active Regeneration Inhibited Status** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |
| X | 3 | 3 | 2 | **DPF Active Regeneration Inhibited Due To Inhibit Switch** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |



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| EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|
| | 3 | 5 | 2 | **DPF Activation Regeneration Inhibit Due To Clutch Disengage** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |
| | 3 | 7 | 2 | **DPF Activation Regeneration Inhibited Due To Service Brake Active** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |
| | 4 | 1 | 2 | **DPF Activation Regeneration Inhibit Due To PTO Active** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |
| | 4 | 3 | 2 | **DPF Active Regeneration Inhibited Due To Accelerator Pedal Off Idle** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |
| | 4 | 5 | 2 | **DPF Activation Regeneration Inhibit Due To Out Of Neutral** | | | | |



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| EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |
| | 4 | 7 | 2 | **DPF Activation Regeneration Inhibit Due To Vehicle Speed Above Allowed Speed** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |
| | 5 | 1 | 2 | **DPF Activation Regeneration Inhibit Due To Parking Brake Not Set** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |
| X | 5 | 3 | 2 | **DPF Activation Regeneration Inhibit Due To Low Exhaust Gas temperature** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |
| X | 5 | 5 | 2 | **DPF Activation Regeneration Inhibit Due To System Fault Active** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |



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| EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |
| | 5 | 7 | 2 | **DPF Activation Regeneration Inhibit Due To System Timeout** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |
| X | 6 | 1 | 2 | **DPF Activation Regeneration Inhibit Due To Temporary System Lockout** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |
| X | 6 | 3 | 2 | **DPF Activation Regeneration Inhibit Due To Permanent System Lockout** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |
| X | 6 | 5 | 2 | **DPF Activation Regeneration Inhibit Due To Engine Not Warm** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |



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| EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|
| | 6 | 7 | 2 | **DPF Activation Regeneration Inhibit Due To Vehicle Speed Below Allowed Speed** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved | 10 | | | |
| | | | | Not Available | 11 | | | |
| | 7 | 1..2 | | **Not Used** | | | | |
| X | 7 | 3 | 3 | **Exhaust System High Temperature Lamp Command** | | | | |
| | | | | Off | 000 | | | |
| | | | | On - solid | 001 | | | |
| | | | | Reserved | 010 | | | |
| | | | | Reserved | 011 | | | |
| | | | | Reserved | 100 | | | |
| | | | | Reserved | 101 | | | |
| | | | | Reserved | 110 | | | |
| | | | | Not Available | 111 | | | |
| | 7 | 6..8 | | Not Used | | | | |
| | 8 | 1..2 | | Not Used | | | | |
| | 8 | 3 | 2 | **DPF Active Regeneration Inhibited Due to Low Exhaust Gas Pressure** | | | | |
| | | | | Not inhibited | 00 | | | |
| | | | | Inhibited | 01 | | | |
| | | | | Reserved for SAE assignment | 10 | | | |
| | | | | Not Available | 11 | | | |



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| EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|
| | | 5..8 | | Not used | | | | |

## EEC1

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 0C F0 04 00 | 20 | 20 | 00 F0 04 | 3 | 0 | 0 | 00 | | 04 |

| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| X | X | | 1 | 1 | 8 | **Engine and Retarder Torque Mode** | | | | |
| | | | | | | Low Idle Governor | 0000 | | | |
| | | | | | | Accelerator Pedal | 0001 | | | |
| | | | | | | Cruise Control | 0010 | | | |
| | | | | | | PTO Governor | 0011 | | | |
| | | | | | | Road Speed Governing | 0100 | | | |
| | | | | | | ASR Control | 0101 | | | |
| | | | | | | Transmission Control | 0110 | | | |
| | | | | | | ABS Control | 0111 | | | |
| | | | | | | Torque Limiting | 1000 | | | |
| | | | | | | High Speed Governor | 1001 | | | |
| | | | | | | Brake System | 1010 | | | |
| | | | | | | Remote Accelerator | 1011 | | | |
| | | | | | | Not defined | 1100 | | | |
| | | | | | | White Smoke Limiting | 1101 | | | |
| | | | | | | Other | 1110 | | | |
| | | | | | | Not available | 1111 | | | |



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| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 5..8 | | Not Defined | | | | |
| X | X | | 2 | 1 | 8 | **Drivers Demand Engine - Percent Torque** | | 1% | -125 to +125% | |
| | | | | | | Error Indicator | FE | | | |
| | | | | | | Not available | FF | | | |
| X | X | | 3 | 1 | 8 | **Actual Engine - Percent Torque** | | 1% | -125 to +125% | |
| | | | | | | Error Indicator | FE | | | |
| | | | | | | Not available | FF | | | |
| X | X | X | 4 | 1 | 16 | **Engine Speed** | | 0.125 rpm | 0 to 8,031.875 rpm | |
| | | | | | | Error Indicator | FExx | | | |
| | | | | | | Not available | FFxx | | | |
| | | | 6..7 | | | Not Used | | | | |
| | X | | 8 | 1 | 8 | **Engine Demand - PercentTorque** | | -125% | -125 to +125% | |
| | | | | | | Error | FE | | | |
| | | | | | | Not available | FF | | | |



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# EEC2

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 0C F0 03 00 | 50 | 50 | 00 F0 03 | 3 | 0 | 0 | 00 | | 03 |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 1 | 1 | 2 | **Accelerator Pedal Low Idle Switch** | | | | |
| | | | | | Accelerator pedal not in low idle condition | 00 | | | |
| | | | | | Accelerator pedal in low idle condition | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| X | X | | 3 | 2 | **Accelerator Pedal Kickdown Switch** | | | | |
| | | | | | Kickdown passive | 00 | | | |
| | | | | | Kickdown active | 01 | | | |
| | | | | | Error indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| | | | 5..8 | | Not Used | | | | |
| X | X | 2 | 1 | 8 | **Accelerator Pedal Position** | | 0.4% | 0 to 100% | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not available | FF | | | |
| X | X | 3 | 1 | 8 | **Percent Load at Current Speed** | | 1% | 0 to +125% | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not available | FF | | | |
| | | 4..5 | | | Not Used | | | | |
| | X | 6 | 1 | 2 | **Vehicle Acceleration Rate Limit Status** | | | | |
| | | | | | Limit Not Active | 00 | | | |
| | | | | | Limit Active | 01 | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Reserved | 10 | | | |
| | | | | | Not available | 11 | | | |
| | | 7..8 | | | Not Used | | | | |

## EEC3

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FE DF 00 | 250 | 250 | 00 FE DF | 6 | 0 | 0 | 00 | | DF |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 1 | 1 | 8 | **Nominal friction - Percent Torque** | | 1% | -125 to +125% | |
| | | | | | Error | FE | | | |
| | | | | | Not available or not installed | FF | | | |
| | | 2..4 | | | Not Used | | | | |
| | X | 5 | 1 | 8 | **Estimated Engine Parasitic Losses - Percent Torque** | | 1% | -125 to +125% | A |
| | | | | | Error | FE | | | |
| | | | | | Not available | FF | | | |
| | | 6..8 | | | Not Defined | | | | |

A: When the value in this parameter is equal to 0xFB, all parasitic losses calculated by the engine are included in the nominal friction percentage torque of the engine (SPN 514).



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# BAM-E

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 EC FF 00 | 1,000 | 5,000 | 00 EC 00 | 6 | 0 | 0 | 00 | FF | |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 1 | 1 | 8 | **Control byte, Broadcast Announce Message** | | | | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not available | FF | | | |
| X | X | 2 | 1 | 16 | **Total message size** | | | | |
| | | | | | Error Indicator | FExx | | | |
| | | | | | Not available | FFxx | | | |
| X | X | 4 | 1 | 8 | **Total number of packets** | | | | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not available | FF | | | |
| | | 5 | | | Not Used | | | | |
| X | X | 6 | 1 | 24 | **Parameter group number of the packeted message** | 0 | | | |



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# Engine Configuration Messages

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 EB FF 00 | 5,000 | 5,000[1] | 00 EB 00 | 6 | 0 | 0 | 00 | FF | |

1. Sent every 100 ms until the whole message is sent in one BAM cycle.

**Note:**

PGN for Engine Configuration J1939 is 00 FE E3.

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 1 | 1 | 16 | **Engine Speed at Idle, Point 1** | | 0.125 rpm | 0 to 8,031.875 rpm | |
| | | | | | Error Indicator | FExx | | | |
| | | | | | Not Available | FFxx | | | |
| X | X | 3 | 1 | 8 | **Percent Torque at Idle, Point 1** | | 1% | -125 to +125% | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not Available | FF | | | |
| X | X | 4 | 1 | 16 | **Engine Speed at Point 2** | | 0.125 rpm | 0 to 8,031.875 rpm | |
| | | | | | Error Indicator | FExx | | | |
| | | | | | Not Available | FFxx | | | |
| X | X | 6 | 1 | 8 | **Percent Torque at Point 2** | | 1% | -125 to +125% | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not Available | FF | | | |
| X | X | 7 | 1 | 16 | **Engine Speed at Point 3** | | 0.125 rpm | 0 to 8,031.875 rpm | |
| | | | | | Error Indicator | FExx | | | |
| | | | | | Not Available | FFxx | | | |
| X | X | 9 | 1 | 8 | **Percent Torque at Point 3** | | 1% | -125 to +125% | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Error Indicator | FE | | | |
| | | | | | Not Available | FF | | | |
| X | X | 10 | 1 | 16 | **Engine Speed at Point 4** | | 0.125 rpm | 0 to 8,031.875 rpm | |
| | | | | | Error Indicator | FExx | | | |
| | | | | | Not Available | FFxx | | | |
| X | X | 12 | 1 | 8 | **Percent Torque at Point 4** | | 1% | -125 to +125% | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not Available | FF | | | |
| X | X | 13 | 1 | 16 | **Engine Speed at Point 5** | | 0.125 rpm | 0 to 8,031.875 rpm | |
| | | | | | Error Indicator | FExx | | | |
| | | | | | Not Available | FFxx | | | |
| X | X | 15 | 1 | 8 | **Percent Torque at Point 5** | | 1% | -125 to +125% | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not Available | FF | | | |
| X | X | 16 | 1 | 16 | **Engine Speed at High Idle, Point 6** | | 0.125 rpm | 0 to 8,031.875 rpm | |
| | | | | | Error Indicator | FExx | | | |
| | | | | | Not Available | FFxx | | | |
| X | X | 18 | 1 | 16 | **Gain (KP) of the Endspeed Governor** | | 0.0007813% per rpm | 0 to 50.2% per rpm | |
| | | | | | Error Indicator | FExx | | | |
| | | | | | Not Available | FFxx | | | |
| X | X | 20 | 1 | 16 | **Reference Engine Torque** | | 1 Nm | 0 to 64,255 Nm | |
| | | | | | Error Indicator | FExx | | | |
| | | | | | Not Available | FFxx | | | |
| X | X | 22 | 1 | 16 | **Maximum Momentary Engine Override Speed, Point 7** | | 0.125 rpm | 0 to 8,031.875 rpm | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Error Indicator | FExx | | | |
| | | | | | Not Available | FFxx | | | |
| X | X | 24 | 1 | 8 | **Maximum Momentary Override Time Limit** | | 0.1 s | 0 to 25 s | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not Available | FF | | | |
| X | X | 25 | 1 | 8 | **Requested Speed Control Range Lower Limit** | | 10 rpm | 0 to 2,500 rpm | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not Available | FF | | | |
| X | X | 26 | 1 | 8 | **Requested Speed Control Range Upper Limit** | | 10 rpm | 0 to 2,500 rpm | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not Available | FF | | | |
| X | X | 27 | 1 | 8 | **Requested Torque Control Range Lower Limit** | | 1% | -125 to +125% | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not Available | FF | | | |
| X | X | 28 | 1 | 8 | **Requested Torque Control Range Upper Limit** | | 1% | -125 to +125% | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not Available | FF | | | |



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# Engine Configuration-Proprietary

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FF 86 00 | 5,000 | 5,000 | 00 FF 86 | 6 | 0 | 0 | 00 | | 86 |

| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| X | X | X | 1 | 1 | 4 | **Number of cylinders** | | | 0 to 14 | |
| | | | | | | Not Available | 1111 | | | |
| X | X | X | | 5 | 4 | **Injection System** | | | | |
| | | | | | | To be defined | 0000 | | | |
| | | | | | | Bosch PDE | 0001 | | | |
| | | | | | | HPI | 0010 | | | |
| | | | | | | Inline pump with MS5 | 011 | | | |
| | | | | | | Bosch Common Rail | 0100 | | | |
| | | | | | | XPI | 0101 | | | |
| | | | | | | To be defined | 0110.. 1111 | | | |
| X | | | 2 | 1 | 8 | **Maximum fuel quantity** | | 1 mg/stroke | 100 to 350 mg/stroke | |
| | | | | | | Error | FEh | | | |
| | | | | | | Not Available | FFh | | | |
| X | | | 3 | 1 | 48 | **Economy engine speed info** | | | | |
| | | | 3 | 1 | 8 | Economy Engine Speed at 30% Load | | 8 rpm | 500 to 2,500 rpm | |
| | | | 4 | 1 | 8 | Economy Engine Speed at 50% Load | | 8 rpm | 500 to 2,500 rpm | |
| | | | 5 | 1 | 8 | Economy Engine Speed at 60% Load | | 8 rpm | 500 to 2,500 rpm | |
| | | | 6 | 1 | 8 | Economy Engine Speed at 70% Load | | 8 rpm | 500 to 2,500 rpm | |
| | | | 7 | 1 | 8 | Economy Engine Speed at 80% Load | | 8 rpm | 500 to 2,500 rpm | |
| | | | 8 | 1 | 8 | Economy Engine Speed at 95% Load | | 8 rpm | 500 to 2,500 rpm | |



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# BAM-REX

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 EC FF 29 | 1,000 | 5,000 | 00 EC 00 | 6 | 0 | 0 | 29 | FF | |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 1 | 1 | 8 | **Control byte, Broadcast Announce Message** | | | | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not Available | FF | | | |
| X | X | 2 | 1 | 16 | **Total message size** | | | | |
| | | | | | Error Indicator | FExx | | | |
| | | | | | Not Available | FFxx | | | |
| X | X | 4 | 1 | 8 | **Total number of packets** | | | | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not Available | FF | | | |
| X | X | 5 | 1 | 8 | **Reserved for assignment by SAE** | | | | |
| | | | | | Error Indicator | FE | | | |
| | | | | | Not Available | FF | | | |
| X | X | 6 | 1 | 24 | **Parameter group number of the packeted message** | | | | |



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# Cruise Control/Vehicle Speed - E

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FE F1 00 | 100 | 100 | 00 FE F1 | 6 | 0 | 0 | 00 | | F1 |

| EMS S6 | EMS S8 | Renew-al | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 1..2 | | Not Used | | | | |
| X | X | | 3 | 2 | **Parking Brake Switch** | | | | |
| | | | | | Parking brake not set | 00 | | | |
| | | | | | Parking brake set | 01 | | | |
| | | | | | Error Indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| | | | 5..8 | | Not Defined | | | | |
| X | X | 2 | 1 | 16 | **Wheel-based Vehicle Speed** | | 1/256 km/h per bit | 0 to 251 km/h | |
| | | | | | Error Indicator | FExx | | | |
| | | | | | Not Available | FFxx | | | |
| X | X | 4 | 1 | 2 | **Cruise Control Active** | | | | |
| | | | | | Cruise control switched off | 00 | | | |
| | | | | | Cruise control switched on | 01 | | | |
| | | | | | Error Indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| X | X | | 3 | 2 | **Cruise Control Enable Switch** | | | | |
| | | | | | Cruise control disabled | 00 | | | |
| | | | | | Cruise control enabled | 01 | | | |
| | | | | | Error Indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| X | X | | 5 | 2 | **Brake Switch** | | | | |



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| EMS S6 | EMS S8 | Renew-al | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Brake pedal released | 00 | | | |
| | | | | | Brake pedal depressed | 01 | | | |
| | | | | | Error Indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| X | X | | 7 | 2 | **Clutch Switch** | | | | |
| | | | | | Clutch pedal released | 00 | | | |
| | | | | | Clutch pedal depressed | 01 | | | |
| | | | | | Error Indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| | | 5 | 1 | 2 | Not Used | | | | |
| X | X | | 3 | 2 | **Cruise Control Coast (Decelerate) Switch** | | | | |
| | | | | | Cruise control activator not in the position “coast” | 00 | | | |
| | | | | | Cruise control activator in position “coast” | 01 | | | |
| | | | | | Error Indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| X | X | | 5 | 2 | **Cruise Control Resume Switch** | | | | |
| | | | | | Cruise control activator not in position “re-sume” | 00 | | | |
| | | | | | Cruise control activator in position “resume” | 01 | | | |
| | | | | | Error Indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| X | X | | 7 | 2 | **Cruise Control Accelerate Switch** | | | | |
| | | | | | Cruise control activator not in position “acceler-ate” | 00 | | | |



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| EMS S6 | EMS S8 | Renew-al | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Cruise control activator in position “accelerate” | 01 | | | |
| | | | | | Error Indicator | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| | X | 6 | 1 | 8 | **Cruise Control Set Speed** | | | 0 to 250 km/h | A |
| | | | | | Error | FE | | | |
| | | | | | Not available | FF | | | |
| | X | 7 | 1 | 5 | **PTO State** | | | | |
| | | | | | Off/Disabled | 00 | | | |
| | | | | | Hold | 01 | | | |
| | | | | | Not Used | 10..10 001 | | | |
| | | | | | Not available | 11111 | | | |
| X | X | | 6 | 3 | **Cruise Control States** | | | | |
| | | | | | Off/Disabled | 000 | | | |
| | | | | | Hold | 001 | | | |
| | | | | | Accelerate | 010 | | | |
| | | | | | Decelerate/Coast | 011 | | | |
| | | | | | Resume | 100 | | | |
| | | | | | Set | 101 | | | |
| | | | | | Accelerator override | 110 | | | |
| | | | | | Not available | 111 | | | |
| | | 8 | 1..4 | | Not Used | | | | |
| X | X | | 5 | 2 | **Engine Test Mode Switch** | | | | |
| | | | | | Off | 00 | | | |
| | | | | | On | 01 | | | |



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| EMS S6 | EMS S8 | Renew-al | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Error | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |
| X | X | | 7 | 2 | **Engine Shutdown Override Switch** | | | | |
| | | | | | Off | 00 | | | |
| | | | | | On | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not available or not installed | 11 | | | |

A: The signal is updated with information from CCVS-K.

## Fuel Economy

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FE F2 00 | 100 | 100 | 00 FE F2 | 6 | 0 | 0 | 00 | | F2 |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 1 | 1 | 16 | **Fuel Rate** | | 0.05 l/h per bit | 0 to 3,212.75 l/h | |
| | | | | | Error | FExxh | | | |
| | | | | | Not available | FFxxh | | | |
| X | X | 3 | 1 | 16 | **Instantaneous Fuel Economy** | | 1/512 km/l per bit | 0 to 125.5 km/l | |
| | | | | | Error | FExxh | | | |
| | | | | | Not available | FFxxh | | | |
| | | 5..8 | | | Not Used | | | | |



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## Fuel Consumption

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FE E9 00 | 1,000 | 1,000 | 00 FE E9 | 6 | 0 | 0 | 00 | | E9 |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | 1..4 | | | Not Used | | | | |
| X | X | 5 | 1 | 32 | **Total fuel used** | | 0.5 l per bit | 0 to 2,105,540,607.5 l | |
| | | | | | Error | FExx xxxxh | | | |
| | | | | | Not Available | FFxx xxxxh | | | |

## Engine Hours, Revolutions

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FE E5 00 | 1,000 | 1,000 | 00 FE E5 | 6 | 0 | 0 | 00 | | E5 |

| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| X | X | X | 1 | 1 | 32 | **Total engine hours** | | 0.05 h per bit | 0 to 210,554,060.75 h | |
| | | | | | | Error | FEh | | | |
| | | | | | | Not Available | FFh | | | |
| | | | 5..8 | | | Not Used | | | | |



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# DM1 EMS

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FE CA 00 | 1,000 | 1,000 | 00 FE CA | 6 | 0 | 0 | 00 | | CA |

| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1 | 1 | 2 | Not Used | | | | |
| X | X | X | | 3 | 2 | **Amber Warning Lamp Status** | | | | A |
| | | | | | | Lamp Off | 00 | | | |
| | | | | | | Lamp On | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Take no action | 11 | | | |
| X | X | X | | 5 | 2 | **Red Stop Lamp Status** | | | | A |
| | | | | | | Lamp Off | 00 | | | |
| | | | | | | Lamp On | 01 | | | |
| | | | | | | Error | 10 | | | |
| | | | | | | Take no action | 11 | | | |
| | | | | 7..8 | | Not Used | | | | |
| X | X | X | 3 | 1 | 8 | **Suspect Parameter Number LSB** | | | 0 to 255 | B |
| X | X | X | 4 | 1 | 8 | **Suspect Parameter Number Mid Byte** | | | 0 to 255 | B |
| X | X | X | 5 | 1 | 5 | **Failure Mode Identifier** | | | | C |
| | | | | | | Above normal (most severe) | 00 | | | |
| | | | | | | Below normal (most severe) | 01 | | | |
| | | | | | | Data erratic | 10 | | | |
| | | | | | | Voltage above normal | 11 | | | |
| | | | | | | Voltage below normal | 100 | | | |
| | | | | | | Current below normal | 101 | | | |



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| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Current above normal | 110 | | | |
| | | | | | | Mechanical system not responding | 111 | | | |
| | | | | | | Abnormal frequency | 1000 | | | |
| | | | | | | Abnormal update rate | 1001 | | | |
| | | | | | | Abnormal rate of change | 1010 | | | |
| | | | | | | Root cause not known | 1011 | | | |
| | | | | | | Bad intelligent device | 1100 | | | |
| | | | | | | Out of calibration | 1101 | | | |
| | | | | | | Special instructions | 1110 | | | |
| | | | | | | Above normal (least severe) | 1111 | | | |
| | | | | | | Above normal (moderately severe) | 10000 | | | |
| | | | | | | Below normal (least severe) | 10001 | | | |
| | | | | | | Below normal (moderately severe) | 10010 | | | |
| | | | | | | Received network data in error | 10011 | | | |
| | | | | | | Data Drifted High | 10100 | | | |
| | | | | | | Data Drifted Low | 10101 | | | |
| | | | | | | Not Available | 11111 | | | |
| X | X | X | 5 | 6 | 3 | **Suspect Parameter Number MS 3-bit** | | | 0 to 7 | B |
| X | X | X | 6 | 1 | 7 | **Occurrence Count** | | | 0 to 126 | |
| | | | | | | Not Available | 11111 11 | | | |
| X | X | X | 6 | 8 | 1 | **SPN Conversion Method** | | | | |
| | | | | | | Convert SPNs per the Version 4 definition in SAE J1939-73 chap 5.7.1.11 | 0 | | | |



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A: Red Stop Lamp Status indicates a serious fault that means that the operator must immediately initiate a controlled engine shut down.

Amber Warning Lamp Status indicates a fault that means that the operator should visit a workshop as soon as possible.

DM1 fault codes that do not activate Red Stop Lamp Status or Amber Warning Lamp Status are less important. Such fault codes should not be displayed on the machine display. The mechanic need only read these out using a diagnostic tool and rectify the faults during the next planned maintenance.

B: See parameter SPN Conversion for the method and how SAE J1939-73 is to be interpreted.

C: Greatest significance at bit 5.



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# DM1 EEC3

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FE CA 3D | 1,000 | 1,000 | 00 FE CA | 6 | 0 | 0 | 3D | | CA |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 1 | 2 | Not Used | | | | |
| X | X | | 3 | 2 | **Amber Warning Lamp Status** | | | | A |
| | | | | | Lamp Off | 00 | | | |
| | | | | | Lamp On | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Take no action | 11 | | | |
| X | X | | 5 | 2 | **Red Stop Lamp Status** | | | | A |
| | | | | | Lamp Off | 00 | | | |
| | | | | | Lamp On | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Take no action | 11 | | | |
| | | | 7..8 | | Not Used | | | | |
| X | X | 3 | 1 | 8 | **Suspect Parameter Number LSB** | | | 0 to 255 | B |
| X | X | 4 | 1 | 8 | **Suspect Parameter Number Mid Byte** | | | 0 to 255 | B |
| X | X | 5 | 1 | 5 | **Failure Mode Identifier** | | | | C |
| | | | | | Above normal (most severe) | 00 | | | |
| | | | | | Below normal (most severe) | 01 | | | |
| | | | | | Data erratic | 10 | | | |
| | | | | | Voltage above normal | 11 | | | |
| | | | | | Voltage below normal | 100 | | | |
| | | | | | Current below normal | 101 | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Current above normal | 110 | | | |
| | | | | | Mechanical system not responding | 111 | | | |
| | | | | | Abnormal frequency | 1000 | | | |
| | | | | | Abnormal update rate | 1001 | | | |
| | | | | | Abnormal rate of change | 1010 | | | |
| | | | | | Root cause not known | 1011 | | | |
| | | | | | Bad intelligent device | 1100 | | | |
| | | | | | Out of calibration | 1101 | | | |
| | | | | | Special intstructions | 1110 | | | |
| | | | | | Above normal (least severe) | 1111 | | | |
| | | | | | Above normal (moderately severe) | 10000 | | | |
| | | | | | Below normal (least severe) | 10001 | | | |
| | | | | | Below normal (moderatels severe) | 10010 | | | |
| | | | | | Received network data in error | 10011 | | | |
| | | | | | Data Drifted High | 10100 | | | |
| | | | | | Data Drifted Low | 10101 | | | |
| | | | | | Not Available | 11111 | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 5 | 6 | 3 | **Suspect Parameter Number MS 3-bit** | | | 0 to 7 | B |
| X | X | 6 | 1 | 7 | **Occurrence Count** | | | 0 to 126 | |
| | | | | | Not Available | 11111 11 | | | |
| X | X | 6 | 8 | 1 | **SPN Conversion Method** | | | | |
| | | | | | Convert SPNs per the Version 4 definition in SAE J1939-73 chap 5.7.1.11 | 0 | | | |

A: Red Stop Lamp Status indicates a serious fault that means that the operator must immediately initiate a controlled engine shut down.

Amber Warning Lamp Status indicates a fault that means that the operator should visit a workshop as soon as possible.

DM1 fault codes that do not activate Red Stop Lamp Status or Amber Warning Lamp Status are less important. Such fault codes should not be displayed on the machine display. The mechanic need only read these out using a diagnostic tool and rectify the faults during the next planned maintenance.

B: See parameter SPN Conversion for the method and how SAE J1939-73 is to be interpreted.

C: Greatest significance at bit 5.



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# General Purpose Message 1

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FF 60 00 | 5,000 | 5,000 | 00 FF 60 | 6 | 0 | 0 | 00 | | 60 |

| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| X | X | X | 1 | 1 | 32 | **Engine No.** | | 1 per bit | 0 h to FFFFFFFF h | A |
| | | | | | | Error | | | | |
| | | | | | | Not available | FExxxxxx | | | B |
| | | | 5..8 | | | Not defined | FFxxxxxx | | | |

A: The engine serial number is sent as a decimal value.

B: No engine serial number has been set in the engine control unit.



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## KWP2000 Physical Addressing

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 DA XX 00 | | | 00 DA 00 | 6 | 0 | 0 | 00 | xx | |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| X | X | 1..8 | | | **See ISO 15765** | | | | |

## Vehicle Electrical Power

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FE F7 00 | 1,000 | 1,000 | 00 FE F7 | 6 | 0 | 0 | 00 | | F7 |

| EMS S6 | EMS S8 | EMS OCE1 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1..6 | | | Not Used | | | | |
| X | X | X | 7 | 1 | 16 | **Keyswitch Battery Potential** | | 0.05 V per bit | 0 to +3,212.75 V | |
| | | | | | | Error | FExxh | | | |
| | | | | | | Not Available | FFxxh | | | |



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# MABS (Marine Aftertreatment Bypass Status) - E

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FF 9B 00 | 100 | 100 | 00 FF 9B | 6 | 0 | 0 | 00 | | 9B |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | X | 1 | 1 | 4 | **Actual ECA Mode (Actual Emission Controlled Area Mode)** | | | | A |
| | X | | | | ECA IMO2 | 0000 | | | |
| | X | | | | ECA IMO3 | 0001 | | | |
| | | | | | ECA TIER4M | 0010 | | | |
| | X | | | | Error | 1110 | | | |
| | X | | | | NotAvailable | 1111 | | | |
| | X | 1 | 5 | 2 | **Aftertreatment Clogged Status** | | | | B |
| | | | | | Not clogged | 00 | | | |
| | | | | | Clogged | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | NotAvailable | 11 | | | |
| | X | 1 | 7 | 2 | **Aftertreatment Manual Bypass Request** | | | | C |
| | | | | | Aftertreatment manual bypass not requested | 00 | | | |
| | | | | | Aftertreatment manual bypass requested | 01 | | | |
| | | | | | Reserved | 10 | | | |
| | | | | | TakeNoAction | 11 | | | |
| | | 2 | 1 | 2 | **Aftertreatment Port Valve Status** | | | | |
| | | | | | Normal operation | 00 | | | |
| | | | | | Valve faulty | 01 | | | |
| | | | | | Error | 10 | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | NotAvailable | 11 | | | |
| | | 2 | 3 | 2 | **Aftertreatment Bypass Valve Status** | | | | |
| | | | | | Normal operation | 00 | | | |
| | | | | | Valve faulty | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | NotAvailable | 11 | | | |
| | X | 2 | 5 | 2 | **Aftertreatment Exotherm Status** | | | | D |
| | | | | | Normal operation | 00 | | | |
| | | | | | Exotherm detected | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | NotAvailable | 11 | | | |
| | X | 2 | 7 | 2 | **Aftertreatment Manual Bypass Status** | | | | E |
| | | | | | Manual bypass disabled | 00 | | | |
| | | | | | Manual bypass enabled | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | NotAvailable | 11 | | | |

**Note:**

The message only applies to marine engines with exhaust gas aftertreatment system.

A: If IMO Tier III is requested via MABC (Marine Aftertreatment Bypass Control) - K but not activated by the engine control unit, this must be shown by a warning lamp for faults in the exhaust gas aftertreatment system.

B: Information to the user that the SCR system is blocked. A pop-up window will be displayed with a text that the SCR system is blocked.



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C: Information to the user that the SCR system must be manually bypassed. A pop-up window will be displayed with a text that the SCR system must be manually bypassed.

D: Information to the user that the SCR system is overheated. A pop-up window will be displayed with a text that the SCR system is overheated.

E: A check to see whether manual bypass of the SCR system is in the correct position or not. If Aftertreatment Manual Bypass Status is 1 (activated) and Aftertreatment Manual Bypass Request in MABC (Marine Aftertreatment Bypass Control) - K is not equal to 1, a pop-up window will be displayed with a text that there is a fault with manual bypass of the SCR system.

## ADS (Aftertreatment Desorption Status) - E

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FF B8 00 | 100 | 100 | 00 FF B8 | 6 | 0 | 0 | 00 | | B8 |

| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | X | 1 | 1 | 3 | **HC Evaporation Status** | | | | |
| | | | | | Evaporation not required | 000 | | | |
| | | | | | Evaporation required - less urgent | 001 | | | |
| | | | | | Evaporation required - urgent | 010 | | | |
| | | | | | Evaporation is in progress | 011 | | | |
| | | | | | Error | 110 | | | |
| | | | | | Not Available | 111 | | | |
| | X | 1 | 4 | 3 | **HC Evaporation Required Action** | | | | |
| | | | | | No action required | 000 | | | |
| | | | | | Run engine warm | 001 | | | |



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| EMS S6 | EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Increased idle and heavy exhaust braking | 010 | | | |
| | | | | | Engine stop | 011 | | | |
| | | | | | Error | 110 | | | |
| | | | | | Not Available | 111 | | | |
| | X | 2 | 1 | 6 | **HC Evaporation Progress Countdown Timer** | | | 0-60 min. | |
| | | | | | More than 60 minutes | 111101 | | | |
| | | | | | Error | 111110 | | | |
| | | | | | Not Available | 111111 | | | |
| | X | 3 | 1 | 6 | **HC Evaporation Action Start Countdown Timer** | | | 0-60 min. | |
| | | | | | More than 60 minutes | 111101 | | | |
| | | | | | Error | 111110 | | | |
| | | | | | Not Available | 111111 | | | |
| | X | 4 | 1 | 3 | **Sulphur Regeneration request** | | | | |
| | | | | | DeSOx inactive | 000 | | | |
| | | | | | DeSOx active | 001 | | | |
| | | | | | Blocked deSOx | 010 | | | |
| | | | | | Error | 011 | | | |
| | | | | | NotAvailable | 110 | | | |
| | X | 4 | 4 | 2 | **deSOx heatup request** | | | | |
| | | | | | No request | 00 | | | |
| | | | | | Run engine hot request | 01 | | | |
| | | | | | Error | 10 | | | |
| | | | | | Not Available | 11 | | | |



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## AT1S1

| Identifier | Tmin | Tmax | PGN | Default Priority | R1 | DP | Source | Destination | Group Extension |
|---|---|---|---|---|---|---|---|---|---|
| 18 FD 7B 00 | On Request | | 00 FD 7B | 6 | 0 | 0 | 00 | | |

| EMS S8 | Byte | Bit | Length | Explanation | State | Resolution | Limits | Note |
|---|---|---|---|---|---|---|---|---|
| X | 1 | 1 | 8 | **Aftertreatment 1 Diesel Particulate Filter Soot Load Percent** | | 1 | 0 to 250% | |
| | | | | Error | FE | | | |
| | | | | Not Available | FF | | | |
| X | 2 | 1 | 8 | **Aftertreatment 1 Diesel Particulate Filter Ash Load Percent** | | 1 | 0 to 250% | |
| | | | | Error | FE | | | |
| | | | | Not Available | FF | | | |
| | 3 | 1 | 32 | **Aftertreatment 1 Diesel Particulate Filter Time Since Last Active Regeneration** | | 1 | 0 to 4,211,081,215 seconds | |
| | | | | Error | FFFFFE00 | | | |
| | | | | Not Available | FFFFFFFF | | | |
| | 7 | 1 | 16 | **Aftertreatment 1 Diesel Particulate Filter Soot Load Regeneration Threshold** | | 0.0025 | 0 to 160.6375% | |
| | | | | Error | FFFE | | | |
| | | | | Not Available | FFFF | | | |



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